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Introducing the Turbonomic REST API

Welcome to the Turbonomic REST API Guide. This guide will help you to use the Turbonomic REST API as you script interactions with the Turbonomic software and develop integrations between Turbonomic and other software applications.

The REST API exposes Turbonomic data and processing to remote access via HTTP GET, POST, PUSH, and DELETE methods.

The Turbonomic user interface is a client to this API, and every feature exposed in the user interface is the product of API calls. To understand the API, you should have a working knowledge of the Turbonomic user interface, the features it exposes, the data it uses, and the use cases that it supports. In most cases, if you want to script some Turbonomic behavior, you should be able to execute most of that behavior via the user interface. Stepping through these use case in that context will help you plan and implement your scripts.

To get the most out of the REST API, you should understand how Turbonomic organizes its underlying data, and how the various REST resources map to that organization. This introductory section includes discussions of the data that underlies:

- Markets and how they represent your environment (see Markets (on page 14))
- Plans and an overview of how to work with them (see Plans (on page 16))
- Workload placement policies and how they are represented (see Workload Placement Policies (on page 19))
- Reservations for deployment, and how to set them up (see Reservations (on page 20))

NOTE:
This guide is not a comprehensive reference to every possible setting and data payload in the REST API. Many endpoint descriptions include samples of API data objects, but they necessarily cannot document every possible compination of inputs. For a complete reference to the API, use this guide in conjunction with the Turbonomic REST SwaggerUI documentation. For more information, see Turbonomic REST API Swagger Documentation (on page 13).

Getting Started with the Turbonomic REST API

The easiest way to see results with the API is to try calls in the Swagger documentation. You can navigate to:
Introducing the Turbonomic REST API

https://<Your_Turbonomic_IP>/api/v3/

NOTE:
For this version of Turbonomic, API v3 is live. API v3 introduces breaking changes to v2, and prior versions will no longer be supported. Please read the API Guide carefully, as field naming conventions and required data may have changed.

With the Swagger-UI for the Turbonomic API, you can navigate to different endpoints and try out their methods. For example, if you navigate to the Users endpoint you can get a listing of all the users that are specified for your Turbonomic installation. For more information, see Turbonomic REST API Swagger Documentation (on page 13).

Ultimately, you will want to implement scripts that use the API to get data, execute actions, or integrate Turbonomic with other processes. As you work with the API, you need to know about:

- Authentication
- URI Structure
- Response Format
- Time in the Turbonomic API

Authentication

To use the API, you must have a valid user account on the Turbonomic instance. Also note that accounts can have different roles. The API will only execute commands that are valid for your user role. For example, to execute Turbonomic recommended actions, your account must have a role of either administrator, deployer, or automator.

You must also create an authentication token and pass it with each subsequent request to the Turbonomic API. One method is to store the cookie locally.


Then, each request must use the -b cookie-filename parameter to use the session cookie delivered by the login request.

URI Structure

To use the Turbonomic REST API, your client will make HTTP requests to specific REST resources. The Turbonomic REST API supports the standard HTTP methods:

- **GET**
  Get lists of entities or data objects, get individual items.

- **POST**
  Create new objects in the Turbonomic environment, or specify filters for certain queries.

- **PUT**
  Incrementally modify existing entities or objects.

- **DELETE**
  Delete entities or objects.

The base URI structure for a Turbonomic REST API resource is:

https://<Your_Turbonomic_IP>/api/v3/<resource_name>
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NOTE:
Earlier versions of the API used the following URI structure:

https://<Your_Turbonomic_IP>/api/v3/<resource_name>

This form is deprecated. The current version still supports this URI structure, but Turbonomic reserves the right to drop support at any time.

Response Format

The Turbonomic REST API returns data as JSON objects. Turbonomic refers to these objects as Data Transfer Objects or DTOs. A DTO is an array of objects that describe the data you have requested, or the data that is the result of executing a POST or PUT. For example, if you GET the users defined for an installation of Turbonomic, the API returns a DTO similar to this:

```json
[
  {
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.174.40/api/v3/users/_4T_7kwY-Ed-WUKbEYSVIDw"
      }
    ],
    "uuid": "/_4T_7kwY-Ed-WUKbEYSVIDw",
    "displayName": "Administrator User",
    "username": "administrator",
    "roleUuid": "/_4UAioQY-Ed-WUKbEYSVIDw",
    "roleName": "administrator",
    "loginProvider": "Local",
    "type": "DedicatedCustomer",
    "showSharedUserSC": false
  }
]
```

In this case, the DTO is an array of one object. In other words, there is only one user account defined for this installation of Turbonomic. The user object begins with a links array that gives the URL to this user account. It then follows with properties to describe the given user account.

Note that in most cases to execute a PUT or POST, you will pass the parameters to create the object via a DTO. These DTOs are similar to the associated response DTOs, but they are not identical. For this example of a user account, the response DTO does not include the user account password, but the DTO to create an account must include the password.

You can try out different REST methods in the Swagger documentation to see typical response DTOs.

Time in the Turbonomic API

The Turbonomic REST API contains requests that require a start time and/or an end time to create or filter information. Time may be entered in three different formats:

- ISO 8601 Date and Time Format
  
  `YYYY-MM-DDTHH:MM:SS`. For example, `2018-10-07T12:38:17`

- Epoch Time
Introducing the Turbonomic REST API

Epoch Time is represented as the number of seconds that have elapsed since midnight UTC, January 1, 1970. For example, 1514764800 corresponds to January 1, 2018 12:00:00 AM UTC.

• Relative time

Relative time is represented as the time relative to when the call is executed. For example, a start time of \(-1w\) and an end time of \(-1d\) indicates that the results should include entries from a week before the call is executed, to the day before the call is executed. Relative units are case-sensitive. Turbonomic supports the following relative units:
- \(m\) — minutes
- \(h\) — hours
- \(d\) — days
- \(w\) — weeks
- \(M\) — months
- \(y\) — years

Pagination in the Turbonomic API

Some API calls return very large datasets. Turbonomic recommends using the pagination features at all times. This is particularly important for larger environments managed by Turbonomic. Via scopes and filters for individual requests, data may be preliminarily filtered. Using the `limit` and `x-next-cursor` parameters, the data can be returned in manageable chunks.

For example:

https://10.10.10.10/api/v3/markets/214075923753936/entities/stats?limit=5&ascending=true

The request above is to obtain statistics for all entities in a specific market. `limit=5` indicates that each page of returned data should have 5 results.

The headers in the returned data will now include `x-next-cursor: 5`. In order to retrieve the next page of results, use the cursor in the next request:

https://10.10.10.10/api/v3/markets/214075923753936/entities/stats?
cursor=5&limit=5&ascending=true

When the final page is reached, the `x-next-cursor` will be empty.

Turbonomic REST API Swagger Documentation

You can try out different REST methods in the Swagger documentation to see typical response DTOs.

To access the Turbonomic Swagger documentation, navigate to:

https://<Your_Turbonomic_IP>/api/v3/

This documentation uses a standard Swagger-UI application that delivers documentation for all the methods on the different endpoints in the API. This documentation includes a description of the call, a list of parameters to pass, and descriptions of the JSON payloads you POST or PUSH, as well as the payloads you get in the response. If you view the MODEL of a JSON payload, you can navigate the JSON structure to see descriptions of the different object fields.

To access the API, the Swagger-UI requires authentication. If you have already logged into Turbonomic, your browser session should have a current authentication cookie. The Swagger-UI uses this same cookie for its API authentication.
For each method, the Swagger doc includes a Try it out feature where you can set up a call through the Swagger-UI, and then execute it. This generates the following information as a response:

- A curl request for your call
  The curl commands generated by Swagger may need some modification for use in your environment (for example, escaping quotes or adding the -k modifier in order to use HTTP URLs).
- A standard HTTP request for your call
- The server response code
- The response body – The JSON data that the API call returns
- Response headers

Turbonomic Markets

Turbonomic uses market-based analysis to perform workload management. To do this, it constructs a model of your environment, representing each entity as a buyer and seller in a market. You can access this model via a named market resource.

At any time, your Turbonomic appliance can have a number of markets in memory. To get a list of the current markets in your appliance, execute the following URL:

GET: /rest/markets

This listing returns the main real-time market, plus any plan markets that are in memory at the time of the call. Note that you can pass group UUIDs to set a scope for the call. In that case, the call returns only markets for plans that include the passed groups in their scope.

The Real-Time Market

The real-time market performs analysis and workload management on your environment. You can use the real-time market to access entities and get current or historical data about them.

The real-time market displayName is Market. This market should always be in the RUNNING state. Under no circumstances should you use the API to stop this market.

Turbonomic performs discovery to populate the topology it manages (the collection of entities in the real-time market). For this reason, you should be careful not to delete entities from or add entities to the real-time market.

For the real-time market, you can safely execute POST, PUT, and DELETE calls to:

- Post a query filter to get filtered lists of actions, notifications, and stats for the real-time market
- Post to create placement policies in the real-time market
- Delete to remove placement policies from the real-time market
- Put to edit placement policies on the real-time market
- Post a scenario to the real-time market to run a plan

When you run a plan scenario against the real-time market, Turbonomic creates a copy of the real-time market, and modifies the copy according to the plan scenario.
NOTE:
It is possible to execute POST or DELETE methods to modify the topology of the real-time market. However, it is highly unlikely that you would have a reason to do so. You should be aware that changes to the real-time market will affect the analysis Turbonomic performs. For example, if you remove a VM from the real-time market, Turbonomic can no longer manage its placement. The VM will still be present in your environment, but it will no longer be managed by Turbonomic. However, you can’t reliably use this technique to make specific entities unavailable to Turbonomic. For the next discovery pass, Turbonomic will rediscover the deleted entity, and it will appear in the real-time market again.

Plan Markets

Turbonomic can have markets other than the real-time market in memory. These other markets represent plans. A plan market begins as a snapshot of the real-time market. You POST a scenario to the real-time market, and Turbonomic does two things:

• It makes a copy of the real-time market, to create a plan market. This plan market is just like the real-time market, except for any changes that were declared in the scenario. For example, if the scenario declares a scope for the plan, then the plan market only contains entities that are within that scope.
• It runs economic cycles (buy/sell cycles) against this plan market until there are no more meaningful improvements to be made. At this point the plan run is completed.

Note that once Turbonomic creates the plan market, that market stays in memory until you delete it. Also note that you can later apply a scenario to the plan market. This is how you run a plan on a plan. The logic flow is the same, and Turbonomic creates yet another plan market to run the analysis.

Internal-Use Plans

Turbonomic regularly runs plans to generate data that it displays in the GUI — The Cluster Capacity and Project Cluster Resources dashboards both display data generated by regularly-run plans.

A plan market that is for internal use includes the substring _BasePlan in the displayName. You should not modify these plan markets for any reason.

User-Created Plans

Users can create plans to run what-if scenarios in the environment. At any time, each user account can have a planner market loaded in the Turbonomic instance. This means that the number of resident user-created plans can potentially be one for each user logged into the appliance. You identify planner markets by their names. A plan name is specified as <PlanType><userName>_<arbitraryID>.

For example, a valid plan name is CLOUD_MIGRATION_cud_1493140514716. To find out which user owns this plan, you can parse out the user’s name and query the API for that user’s account information.

When you get a plan market, the response includes information such as:

• uuid: The market's identifier.
• state: Whether the plan succeeded or not. The state can be one of:
  ◦ CREATED
  ◦ READY_TO_START
  ◦ RUNNING
Introducing the Turbonomic REST API

- COPYING
- SUCCEEDED
- STOPPING
- STOPPED
- USER_STOPPED
- DELETING

As long as a plan market is running, Turbonomic is still calculating the plan results. If the market is stopped, then the plan has been run and you can access data from this market to see the plan results. You can make a PUT call to the market to stop a plan that is running.

For a plan market, you can execute the same POST, PUT, and DELETE methods that you would execute on the real-time market. These include:

- POST a query filter to get filtered lists of actions, notifications, and stats for the plan market
- POST to create placement policies in the plan market
- DELETE to remove placement policies from the plan market
- PUT to edit placement policies on the plan market
- POST a scenario to the plan market to run a plan on plan

You can also safely execute the following methods on a plan market:

- DELETE a plan market
- PUT to save or stop a plan market

**NOTE:**
It’s possible to stop a plan market through the GUI or the API. Also, a plan may have been stopped before it finished its calculations. In this case, the plan results will be incomplete.

### Running Plans

A plan is a simulation or what-if scenario that explores the results of possible changes to your environment. To run a plan, Turbonomic creates a snapshot copy of your real-time market and applies changes to it. It then uses the Economic Scheduling Engine to perform analysis on that plan market.

Before working with plans in the API, you should be familiar with plans via the GUI. You should know what plans can accomplish, and how to specify the plan settings such as:

- Plan scope
- Changes to workload in the environment (adding or removing VMs)
- Changes to supply (adding, removing, or reconfiguring hardware)
- Changes to placement (migrating to the cloud or a different cluster)
- Changes to constraints

To create a plan, you first specify a plan scenario. This is an object that contains all the plan settings. The scenario object contains an array of changes, and each change declares a setting that you want to make.
After you create a scenario, you POST it to a market. In most cases you will post it to the real-time market. When you post the scenario to the market, Turbonomic does two things:

- It makes a copy of the market, to create a plan market. This plan market is just like the original market, except for any changes that were declared in the scenario. For example, if the scenario declares a scope for the plan, then the plan market only contains entities that are within that scope.
- It runs economic cycles (buy/sell cycles) against this plan market until there are no more meaningful improvements to be made. At this point the plan run is completed.

### Saving and Deleting Plan Markets

As you run a plan, Turbonomic performs analysis and shows the results. It also serializes and saves the plan results so users can load the results into the GUI at a later time.

**NOTE:**
Updates to Turbonomic can change the data format for the saved plan results. In that event, then the results will be inconsistent. After each update to Turbonomic, you should regenerate all the plans you want to save, and save them again.

To delete a plan via the API, just execute a DELETE method on the plan market.

### Creating Scenarios

The first step for a plan is to create the scenario. Note that a scenario is entirely separate from the plan. You create a scenario and then POST it to a market to create the plan. But the scenario still exists in memory, and you can apply it to a different market if you wish. For example, you can apply the same scenario to the real-time market at different times.

The API includes the Scenarios resource that you can use to create scenarios. To create a scenario, use the POST: `/rest/scenarios/{name}` method. This method takes three parameters:

- **scope**
  An array of group UUIDs. For a scope of multiple groups, you must specify groups of the same type.
- **projection_days**
  For a projection scenario, the days to mark each projection period
- **input**
  A ScenarioApiInputDTO that can specify all the settings for a scenario.

The input parameter, a ScenarioApiInputDTO, is an object that you can POST to the API to specify scenario settings. The API includes methods to create and delete scenarios. In most cases, you will create a scenario by POSTing or PUTing a ScenarioApiInputDTO with changes to declare the scenario settings you want. Note that the API includes methods you can use to PUT many of these settings into a specific scenario by passing properties directly in the URL. However, you can also make these settings with the ScenarioApiInputDTO. Learning to use this DTO is the most consistent way to create and modify a scenario.

Note that as you create a scenario you can POST all of its settings in the ScenarioApiInputDTO, or you can create an incomplete scenario, and then PUT other changes into the scenario at a different time.

### Creating a Projection Scenario

Projection plans calculate infrastructure requirements into the future, so your environment can accommodate changes to workload requirements over time. In a single plan you can specify the scope of the plan, how far into the future to
project, and by what increments of time. For example, you can project the requirements of a specific datacenter one year into the future, showing how requirements change at one-month intervals.

When you create a projection scenario via the API, you provide the projection periods as an array of the days from today that you want to project. For example, 0 for today, 30 for 30 days from today, 60 for 60 days from today, and so on.

To create a scenario for a projection plan:

- **Scope the scenario**
  
  A projection plan requires a scope to the scenario.

- **Create a change in the plan of type PROJECTION_PERIODS**
  
  This change identifies the plan periods that you want, as an array of days.

```json
{  
  "changes": [  
    {  
      "type": "PROJECTION_PERIODS",  
      "projectionDays": [0, 30, 60, 90]  
    }  
  ]
}
```

- For any plan changes that you want to repeat on specific projection periods, specify a `projectionDays` array for that change. Note that the items in this array must match the `projectionDays` that you specified for the `PROJECTION_PERIODS` change.

For example, assume you specified "projectionDays": [0, 30, 60, 90] for the initial projection:

- Valid: "projectionDays": [0, 30, 60, 90]
- Valid: "projectionDays": [30, 90]
- Not valid: "projectionDays": [0, 35, 70, 90]

This listing shows a plan scenario that scopes the plan market, sets up a projection for four periods, and adds one VM to the inventory for two out of four projection periods:

```json
{  
  "displayName": "My Projection",  
  "changes": [  
    {  
      "type": "SCOPE",  
      "scope": [  
        {  
          "uuid": "5678a46e9716657be88b5e1217df91436e13e4ff",  
          "className": "Group",  
          "entitiesCount": 2,  
          "groupType": "VirtualMachine"  
        }  
      ]  
    },  
    {  
      "type": "PROJECTION_PERIODS",  
      "projectionDays": [  
        0,  
        30,  
        60,  
        18
```
Introducing the Turbonomic REST API

Placement Policies in Plans

You can enable or disable placement policies in a plan. This is useful to see how the environment would change if you had a different set of constraints. It's important to note that a placement policy exists in the context of a market. To get a placement policy, query the market that contains it. To create a placement policy for a plan, you will create the policy and add it to the plan market.

If you want to enable or disable a placement policy in a plan, you specify that as a change in the scenario. Because the placement policy exists in a market, you have to know which market you will run the plan against, and get the policy from that market.

For example, if you will run the plan against the real-time market, you would:

- Query the real-time market for the policy you want
- Give that policy's UUID in the scenario change object
- In the scenario change object — Specify to enable or disable the policy
- When the scenario is complete, POST the scenario to the real-time market

Remember that when you run a plan, Turbonomic creates a new plan market. This plan market will contain a copy of the placement policy, and will enable or disable it, depending on your setting.

Workload Placement Policies

Workload Placement Policies affect how Turbonomic calculates placement for the workloads in your environment. Policies can enforce specific business rules to constrain placement, and they can remove boundaries to enable placement calculations across cluster or datacenter boundaries.

A placement policy exists in the context of a market — Either the real-time market or a plan market. Each market has its own set of placement policies. Even if a plan market is an exact copy of the real-time market, the plan market has its own placement policies, each with its own UUID.

Before you work with placement policies via the API, you should understand how they work in the user interface. You should understand the types of placement policies you can create, and the effect of each on market analysis.
Introducing the Turbonomic REST API

The API supports the following types of policies:

- **AT_MOST_N**: Only the given number of consumers can run on a single member of the providers group. This is set in the capacity property of the policy object.
- **BIND_TO_GROUP**: The consumers can only run on members of the provider group.
- **BIND_TO_COMPLEMENTARY_GROUP**: The consumers cannot run on any members of the provider group.
- **MUST_RUN_TOGETHER**: These consumers must run on the same provider entity.
- **AT_MOST_N_BOUND**: Only the given number of consumers can run on a single member of the providers group, AND The consumers can only run on members of the provider group.
- **MERGE**: Remove cluster boundaries for the specified clusters.
- **BIND_TO_GROUP_AND_LICENSE**: Create a license group.

When you get a policy, the returned object describes the policy type, as well as the consumer and provider groups. When you create a policy, you do not have to provide the full data. You provide:

- **buyerUuid**: The group of consumers for this policy.
- **sellerUuid**: The provider group for this policy.
- **type**: The policy type.
- **policyName**: A display name for this policy.
- **enabled**: Whether to enable the policy in the market. Can be true or false.
- **capacity**: For an AT_MOST_N or AT_MOST_N_BOUND policy, the number of consumers to allow on a provider entity.
- **mergeType**: For a MERGE policy, the type of clusters to merge. Can be one of Cluster, StorageCluster, or DataCenter.
- **mergeUuids**: The groups that you want to merge. The group type must match the `mergeType`.

For example, to create a DON'T PLACE policy, post the following inputDto to the market:

```json
{
    "buyerUuid": "f82dbbc2b3366052f3bc1ac8a68c9c06b0eb182a",
    "enabled": false,
    "policyName": "PolicyFromApi",
    "sellerUuid": "4a2f5f132ae690af147ccfd6ea9839e79da3db79",
    "type": "BIND_TO_COMPLEMENTARY_GROUP"
}
```

To edit a placement policy, **PUT** an inputDto to the given policy. Specify the changes you want in the inputDto.

---

**Calculating Reservations and Workload Placement**

Turbonomic includes the capability to reserve resources for VMs you plan to deploy in the future. This feature includes calculating the placement for these VMs, and then managing reserved copies of them so users can see their placement in the GUI, and plans can include these reserved VMs in their calculations. Users can see that a reservation is in an active or pending state. Users can also direct Turbonomic to deploy the VMs from an active reservation.

Note that the list of reservations is external to the markets that might be current on the appliance. However, when you deploy a reservation, that action deploys the VMs in the physical environment, and so they will get added to the real-time market.
To specify the type of workload you are planning to deploy, the reservation includes a workload template, and a deployment profile. The API includes separate resources for these objects.

A reservation object does not necessarily reserve resources for workloads. You can use the reservation object to:

• Calculate Deployment
  For the given status of the current environment, calculate the optimal placement for workloads. A typical use case is to get placement results and then pass them to an orchestration system that actually executes the deployments.
• Deploy Immediately
  Calculate the optimal placement for the workloads, and then execute the deployment immediately.
• Reserve Resources and Deploy
  Calculate the optimal placement for the workloads, reserve the resources for these workloads, and then deploy them at a later date.

Note that before using the API to work with reservations, you should understand how reservations work from the user interface.

With the API, you can perform the following:

• Get list of reservations
• See the current placement for the reservation workloads
• Create reservations
• Immediately deploy the reserved workloads
• Delete a current reservation

### Getting Reservation Information

To get a list of current reservations, execute `/rest/reservations`. This returns a list of all active reservations. If you know the UUID of the reservation you want, you can pass it to get data for just that reservation.

Each reservation object fully describes it, including:

• Display name
• Status — can be:
  ° DEPLOYING — Turbonomic is deploying the workload
  ° DEPLOY_SUCCEEDED — The workload was successfully deployed
  ° IN_PROGRESS — Placement calculation is in progress
  ° PLACEMENT_SUCCEEDED — For a new reservation, the environment has sufficient resources to place the workload; if you specified a reserve date, this will be an active reservation
  ° PLACEMENT_FAILED — For a newly created reservation, the environment doesn’t have resources to place the workload; if you specified a reserve date, this will be an unfulfilled reservation
  ° RETRYING — Turbonomic is trying to place the workload of an unfulfilled reservation
• Time the reservation was created, time to deploy, and time it will expire
• A description of the reserved workload
• The deployment profile that identifies the physical files that will be copied to deploy the workload, as well as optional placement limitations
• Statistics for the compute and storage resources the reservation sets aside

For example, this listing shows a reservation for one VM:

```json
{
```
Introducing the Turbonomic REST API

```
"uuid": ".\_kWZHIDD\_mEeePge\_Xuo0RRbw\", 
"displayName": "MyReservation", 
"count": 1, 
"status": "PLACEMENT_SUCCEEDED", 
"reserveDateTime": "Thu May 04 16:27:29 UTC 2017", 
"expireDateTime": "Thu Aug 31 16:27:29 UTC 2017", 
"deployDateTime": "Thu Aug 31 16:27:29 UTC 2017", 
"reserveCount": 1, 
"demandEntities": [ 
{
  "uuid": "\_kWgb7TDm\_EeePge\_\_Xuo0RRbw\", 
  "displayName": "MyReservation\_C0", 
  "className": "VirtualMachine", 
  "template": {
    "uuid": "T423f548d-cadc-e525-6df4-1f90724cf696", 
    "displayName": "vsphere\-dc3.dev.mycorp.com::TMP-SUSE64", 
    "className": "VirtualMachineProfile" 
  }, 
  "deploymentProfile": {
    "uuid": "\_gHJ0ICX\_\_EeePge\_\_Xuo0RRbw\", 
    "displayName": "DEP-SUSE64", 
    "className": "ServiceCatalogItem" 
  }, 
  "placements": {
    "computeResources": [
    {
      "stats": [
      {
        "name": "numOfCpu", 
        "value": 1
      }, 
      {
        "name": "cpuSpeed", 
        "value": 2603
      }, 
      {
        "name": "cpuConsumedFactor", 
        "value": 0.5
      }, 
      {
        "name": "memorySize", 
        "value": 2097152
      }, 
      {
        "name": "memoryConsumedFactor", 
        "value": 0.75
      }, 
      {
        "name": "ioThroughput", 
        "value": 0
      }, 
      {
        "name": "networkThroughput", 
        "value": 0
      }]
    }
}
```
Creating a Reservation

To create a reservation, you POST an input DTO that defines the reservation's:

- **action**: The action type — PLACEMENT, RESERVATION, or DEPLOYMENT
- **demandName**: The display name of the reservation — If you do not specify names for the added workloads, this will be the root name for new VMs
- **deploymentParameters**:
  - deploymentProfileID: The UUID of a deployment profile
  - highAvailability
  - priority
- **placementParameters**:
  - constraintIDs: An array of UUIDs for placement policies that will affect the calculated placement
  - count: The number of workloads to place
  - entityNames: An array of names for the placed VMs — The array length should equal count
  - geographicRedundancy: If true place the workloads on unique hosts, otherwise Turbonomic can place multiple workloads on the same host
  - templateID: The UUID of the template that you will use to place this workload — Note that the template must include a reference to the deployment profile that you specify in deploymentParameters
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- **deployDateTime**: When to deploy the workloads — Only provide this for an action of type DEPLOYMENT
- **expireDateTime**: When to cancel a reservation if Turbonomic cannot place all the workloads by that date — for a RESERVATION action, Turbonomic automatically sets the deploy time to equal this time
- **reserveDateTime**: The time to calculate the workload placement and create the reservation — This time cannot be earlier than the time that you POST the reservation to the API

The following listing shows an input DTO that creates a reservation. It will place four workloads, and it gives specific names of each one.

```json
{
  "action": "RESERVATION",
  "demandName": "MyReservation",
  "expireDateTime": "2017-10-10T12:38:17+00:00",
  "parameters": [
    {
      "deploymentParameters": {
        "deploymentProfileID": "_c9CJMDDAEeePgeXuo0RRbw"
      },
      "placementParameters": {
        "geographicRedundancy": false,
        "count": 4,
        "entityNames": ["foo","bar","baz","bonk"],
        "templateID": "_UKsnkJkSEeCHcOxhrzJExA"
      }
    },
    "reserveDateTime": "2017-05-04T18:22:12+00:00"
  ]
}
```

**Async or Blocked Placement Calculation**

When you POST a reservation, Turbonomic runs a plan to calculate the optimal placement of the workloads. Depending on the size of the reservation, this can take a significant amount of time. This POST method includes the apiCallBlock parameter that specifies whether to execute the call asynchronously or in a blocked mode. If you do not set this parameter, then the API assumes asynchronous by default:

- **Blocked**: `/rest/reservations?apiCallBlock=true`
- **Async**: `/rest/reservations?apiCallBlock=false`

When you execute in asynchronous mode, the response to your POST shows that the calculation is in progress:

```json
{
  "uuid": "_0dPrYTDIeePgeXuo0RRbw",
  "displayName": "MyReservation",
  "count": 4,
  "status": "IN_PROGRESS",
  "reserveDateTime": "Thu May 04 18:22:12 UTC 2017",
  "expireDateTime": "Tue Oct 10 12:38:17 UTC 2017"
}
```

To examine the placement results, GET the reservation using the UUID that the API gives in the response.
When you execute the call in blocked mode, the response body contains the full reservation, including the status to show whether placement succeeded or failed.

**Using Deployment Profiles and Templates**

To create a reservation, you must specify a template and a deployment profile. These specify the workload requirements, and identify where to get the physical files to deploy.

VM Templates specify the resources that will be available to the VM, including:

- VCPUs
- Virtual Memory
- Storage
- Network Throughput
- IOPS
- IO Throughput

Note that you must choose a template that is mapped to a Deployment Profile. To determine this, GET the template you’re interested in and look for the `deploymentProfile` property in the template object. For example, assume `myTemplate.deploymentProfile` gives:

```json
"deploymentProfile": {
    "uuid": "_f8mJ9yXxEeePgeXuo0RRbw",
    "displayName": "DEP-5ff7938ad18c33bdad6a8af6b42f347b",
    "className": "ServiceCatalogItem"
},
```

You can use the included UUID as a deployment profile for workloads based on this template.

Note that templates can be created by users, and Turbonomic also discovers templates that are created by the management services in your environment. For example, a hypervisor or a cloud service provider typically manages a number of its own templates — Turbonomic discovers these. You should never edit a discovered template. Also, if that template includes a deployment profile, then you can assume the deployment profile was discovered also.

To see whether a template is discovered, GET the template you’re interested in and look for the discovered property. This will be true or false.
Turbonomic REST API Endpoints

The REST API resources give you full access to the Turbonomic software. This is a complete API that exposes the full set of Turbonomic capabilities. In fact, the product user interface is implemented as a Turbonomic client that uses this API.

While the REST API resources are documented in the SwaggerUI, this section provides extra details for the more expressive resources in the API.

To access the Turbonomic REST SwaggerUI, open a web browser to:
https://<Your_Turbonomic_IP>/vmturbo/apidoc/

Utility Requests

In the Turbonomic API Guide, utility requests are the requests within and endpoint that do not return information about your environment, but provide benefits to other calls you may make. For example, the https://10.10.10.10/api/v3/settings/ returns a list of all possible settings managers. This information can be used to find settings on your instance- but the /settings/ request itself does not provide any instance-specific information.

Actions Endpoint

Instead of responding to thresholds, Turbonomic analyzes the operating conditions and constantly recommends actions to keep the entire environment within the desired state. If you execute these actions (or let Turbonomic execute them for you), the environment will maintain operating conditions that assure performance while also ensuring the lowest possible cost thanks to efficient utilization of your resources.

Using the actions endpoint, you can:
• Get a complete or filtered list of actions in your environment
• Accept or reject actions
• Get statistics related to a specified action
• Get notifications related to a specified action
Actions Utility Requests

Utility requests provide metadata that you can use to make related requests, assemble inputDTOs, or see the potential values of a particular DTO.

Getting the Valid actionMode parameters for a Specified Entity and Action

The actions endpoint contains a utility request that shows the possible values for the actionMode parameter for a specified entity and action type. These can be used to set or understand the possibilities for various action settings.

To specify an entity/action type, this request takes the following parameters:

<table>
<thead>
<tr>
<th>action_type</th>
<th>START:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Start an entity, and add it to the Turbonomic market.</td>
</tr>
<tr>
<td></td>
<td>MOVE:</td>
</tr>
<tr>
<td></td>
<td>Move an entity from one provider to another. For example, moving a VM between hosts, or a datastore between disk arrays.</td>
</tr>
<tr>
<td></td>
<td>SUSPEND:</td>
</tr>
<tr>
<td></td>
<td>Remove capacity from your environment. Suspended entities are not removed from the environment, but will not be used in market decisions. Based on market conditions, suspended entities can be started, re-adding them to the market.</td>
</tr>
<tr>
<td></td>
<td>ADD PROVIDER:</td>
</tr>
<tr>
<td></td>
<td>This is equivalent to the START action, but for storage entities.</td>
</tr>
<tr>
<td></td>
<td>CHANGE:</td>
</tr>
<tr>
<td></td>
<td>Move a virtual machine's storage between datastores.</td>
</tr>
<tr>
<td></td>
<td>PROVISION:</td>
</tr>
<tr>
<td></td>
<td>Add capacity to your environment.</td>
</tr>
<tr>
<td></td>
<td>RECONFIGURE:</td>
</tr>
<tr>
<td></td>
<td>When a VM is not able to correct a misconfiguration via another type of action. For example, if a placement policy requires a VM to move to a host on a particular cluster, but cross-cluster moves are not permitted.</td>
</tr>
<tr>
<td></td>
<td>DELETE:</td>
</tr>
<tr>
<td></td>
<td>This is equivalent to the SUSPEND action, but for storage entities.</td>
</tr>
<tr>
<td></td>
<td>RESERVE_ON_PM:</td>
</tr>
<tr>
<td></td>
<td>When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular host.</td>
</tr>
<tr>
<td></td>
<td>RESERVE_ON_DS:</td>
</tr>
<tr>
<td></td>
<td>When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular datastore.</td>
</tr>
<tr>
<td></td>
<td>RESIZE_FOR_EFFICIENCY:</td>
</tr>
<tr>
<td></td>
<td>A resize that reduces the capacity of a commodity, such as vCPU, or vMEM.</td>
</tr>
<tr>
<td></td>
<td>RESIZE_FOR_PERFORMANCE:</td>
</tr>
</tbody>
</table>
A resize that increases the capacity of a commodity, such as vCPU, or vMEM.

| entity_type       | BUSINESS_UNIT | CLOUD_SERVICE | CONTAINER | DATABASE | DATABASE_SERVER | DATACENTER | DISK_ARRAY | PHYSICAL_MACHINE | STORAGE | VIRTUAL_MACHINE | SWITCH | VIRTUAL_DATACENTER | CHASSIS | STORAGE_CONTROLLER | IO_MODULE | APPLICATION_SERVER | VIRTUAL_APPLICATION | NETWORK | APPLICATION | CONTAINER | CONTAINER_POD | LOGICAL_POOL | DPOD | VPOD | LOAD_BALANCER |
|-------------------|---------------|---------------|-----------|----------|----------------|------------|------------|-------------------|---------|----------------|--------|-------------------|---------|-------------------|-----------|-------------------|-----------|-------------------|-----------|--------|-------------|---------|-------------|-----------|

**Example:** GET https://10.10.10.10/api/v3/actions/availablemodes?action_type=PROVISION&entity_type=PhysicalMachine

**Response:** An array of strings, where each string is a valid actionMode for the combination provided. In this example, a PROVISION action and the PhysicalMachine entity. An empty response body indicates that the requested entity does not have an action of that type, usually for practical reasons. For example, the Network entity cannot have a MOVE action.

```json
[  "RECOMMEND",  "DISABLED",  "MANUAL",  "AUTOMATIC"
]```
Getting a List of Entry Points for Actions

The actions endpoint contains a utility request that shows the entry points for other action-related requests. These can be used to find the UUID and details relating to a specific action.

Example: GET https://10.10.10.10/api/v3/actions

Response: An array of Link objects, where each object contains a URL to get all actions for a specified market, entity, or group.

```json
{
    "links": [
        {
            "rel": "Market actions",
            "href": "https://10.10.10.10/api/v3/markets/{uuid}/actions?ascending=true"
        },
        {
            "rel": "Entity actions",
            "href": "https://10.10.10.10/api/v3/entities/{uuid}/actions?ascending=false"
        },
        {
            "rel": "Group actions",
            "href": "https://10.10.10.10/api/v3/groups/{uuid}/actions?ascending=true"
        }
    ]
}
```

Actions Requests

Action requests handle acceptance, rejection, filtering, and exploration of actions on your Turbonomic appliance.

Getting a Specified Action

Gets the action details, including the creation time and target entity information, for a specified action UUID.

Example: GET https://10.10.10.10/api/v3/actions/_6QsKkaNWEeiYWYj--U8W5g/details

Response: The full ActionApiDTO for the requested action:

```json
{
    "links": [
        {
            "rel": "self",
            "href": "https://10.10.10.10/api/v3/actions/_6QsKkaNWEeiYWYj--U8W5g"
        },
        {
            "rel": "self",
            "href": "https://10.10.10.10/api/v3/actions/2218532354592"
        }
    ],
    "uuid": "_6QsKkaNWEeiYWYj--U8W5g",
    "created": "2023-01-01T12:00:00.000Z",
    "active": true,
    "type": "Capacity Adjustment",
    "target": {"id": "123456", "name": "Entity Name"},
    "status": "Accepted",
    "statusReason": "Approved by User"
}
```
"createTime":"2018-08-19T07:40:57-04:00",
"actionType":"MOVE",
"actionState":"PENDING_ACCEPT",
"actionMode":"MANUAL",
"details":"Move VirtualMachine Jboss-EAP-10.203 from dc17-host-01.mycorp.com to dc17-host-02.mycorp.com",
"importance":7.4150376,
"target":{
  "uuid":"421d8db4-3fc6-440b-0575-11383c020c6c",
  "displayName":"Jboss-EAP-10.203",
  "className":"VirtualMachine",
  "aspects":{
    "virtualMachineAspect":{
      "os":"CentOS 4/5/6/7 (64-bit)",
      "connectedNetworks":[
        {
          "uuid":"34f9f5364cd843a1fe9990621ee3b51a7dc6e5",
          "displayName":"VM Network"
        }
      ],
      "numVCPUs":2,
      "ebsOptimized":false
    }
  },
  "environmentType":"ONPREM"
},
"currentEntity":{
  "uuid":"34313836-3333-5553-4537-33364e385146",
  "displayName":"dc17-host-01.mycorp.com",
  "className":"PhysicalMachine",
  "environmentType":"ONPREM"
},
"newEntity":{
  "uuid":"34313836-3333-5553-4537-33394e43424e",
  "displayName":"dc17-host-02.mycorp.com",
  "className":"PhysicalMachine",
  "environmentType":"ONPREM"
},
"risk":{
  "uuid":"_CizZoKN2EeiYWYj--U8W5g",
  "subCategory":"Efficiency Improvement",
  "description":"dc17-host-01.mycorp.com can be suspended for efficiency",
  "severity":"MINOR",
  "importance":0
},
"actionID":2218532354592}
## Getting a Filtered List of Actions

Gets a list of actions, given a scope UUID and filtered by an ActionApiInputDTO using one or more of the following criteria:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>actionModeList</strong></td>
<td></td>
</tr>
<tr>
<td>• <strong>DISABLED:</strong></td>
<td>Do not recommend or perform the action. When you disable an action, the user interface will no longer display actions of that type.</td>
</tr>
<tr>
<td>• <strong>RECOMMENDED:</strong></td>
<td>Recommend the action so a user can execute it via the given hypervisor or by other external means</td>
</tr>
<tr>
<td>• <strong>MANUAL:</strong></td>
<td>Recommend the action, and provide the option to execute that action through the Turbonomic user interface or an /actions API request.</td>
</tr>
<tr>
<td>• <strong>AUTOMATED:</strong></td>
<td>You have directed Turbonomic to execute the action automatically.</td>
</tr>
<tr>
<td>• <strong>COLLECTION (UNUSED):</strong></td>
<td>Legacy action mode, no longer used.</td>
</tr>
<tr>
<td><strong>actionStateList</strong></td>
<td></td>
</tr>
<tr>
<td>• <strong>DISABLED:</strong></td>
<td>An action whose policy has been disabled.</td>
</tr>
<tr>
<td>• <strong>RECOMMEND:</strong></td>
<td>An action that cannot be automated due to policy settings or must be executed outside the system, such as the purchase of hardware.</td>
</tr>
<tr>
<td>• <strong>PENDING_ACCEPT:</strong></td>
<td>When the action mode is set to manual, a recommended action that has not been accepted or cleared.</td>
</tr>
<tr>
<td>• <strong>ACCEPTED:</strong></td>
<td>An action that has been accepted, but is not yet in progress.</td>
</tr>
<tr>
<td>• <strong>IN_PROGRESS:</strong></td>
<td>An action that is being executed.</td>
</tr>
<tr>
<td>• <strong>SUCCEEDED:</strong></td>
<td>An action that was accepted and completed successfully.</td>
</tr>
<tr>
<td>• <strong>FAILED:</strong></td>
<td>An action that was accepted and did not complete successfully.</td>
</tr>
<tr>
<td>• <strong>REJECTED:</strong></td>
<td>When the action mode is set to manual, an action that has been rejected by the user.</td>
</tr>
<tr>
<td>• <strong>CLEARED:</strong></td>
<td>When the action mode is set to manual, an action that is no longer recommended by the market.</td>
</tr>
<tr>
<td>• <strong>ACCOUNTING:</strong></td>
<td></td>
</tr>
<tr>
<td>Criteria</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>For cloud entities, an action to resize in order to use a different instance template.</td>
</tr>
<tr>
<td></td>
<td>• QUEUED:</td>
</tr>
<tr>
<td></td>
<td>When more than 10 actions are to be executed for a single target, Turbonomic will place the 11th and all subsequent actions into a QUEUED state, and they will execute as the previous actions complete.</td>
</tr>
</tbody>
</table>

| actionTypeList       | • START:                                                                    |
|                     | Start an entity, and add it to the Turbonomic market.                      |
|                     | • MOVE:                                                                    |
|                     | Move an entity from one provider to another. For example, moving a VM between hosts, or a datastore between disk arrays. |
|                     | • SUSPEND:                                                                 |
|                     | Remove capacity from your environment. Suspended entities are not removed from the environment, but will not be used in market decisions. Based on market conditions, suspended entities can be started, re-adding them to the market. |
|                     | • ADD PROVIDER:                                                           |
|                     | This is equivalent to the START action, but for storage entities.          |
|                     | • CHANGE:                                                                  |
|                     | Move a virtual machine's storage between datastores.                       |
|                     | • PROVISION:                                                               |
|                     | Add capacity to your environment.                                          |
|                     | • RECONFIGURE:                                                            |
|                     | When a VM is not able to correct a misconfiguration via another type of action. For example, if a placement policy requires a VM to move to a host on a particular cluster, but cross-cluster moves are not permitted. |
|                     | • DELETE:                                                                 |
|                     | This is equivalent to the SUSPEND action, but for storage entities.        |
|                     | • RESERVE_ON_PM:                                                         |
|                     | When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular host. |
|                     | • RESERVE_ON_DS:                                                         |
|                     | When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular datastore. |
|                     | • RESIZE_FOR_EFFICIENCY:                                                  |
|                     | A resize that reduces the capacity of a commodity, such as vCPU, or vMEM.  |
|                     | • RESIZE_FOR_PERFORMANCE:                                                 |
|                     | A resize that increases the capacity of a commodity, such as vCPU, or vMEM. |

<p>| cleared             | Default: false. When true, actions that were removed from the action list before being executed will be returned. |
| costType            | • Saving                                                                   |</p>
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>An action that will decrease cloud spending.</td>
</tr>
<tr>
<td></td>
<td>• Investment</td>
</tr>
<tr>
<td></td>
<td>An action that will increase cloud spending.</td>
</tr>
<tr>
<td>cumulative</td>
<td>Default: false. When true, shows the savings for each action in a scope as</td>
</tr>
<tr>
<td></td>
<td>a cumulative total, rather than showing the savings for individual actions.</td>
</tr>
<tr>
<td>environmentType</td>
<td>• ONPREM:</td>
</tr>
<tr>
<td></td>
<td>Returns only actions related to entities that are part of your on-premises</td>
</tr>
<tr>
<td></td>
<td>environment.</td>
</tr>
<tr>
<td></td>
<td>• CLOUD:</td>
</tr>
<tr>
<td></td>
<td>Returns only actions related to entities that are part of your cloud</td>
</tr>
<tr>
<td></td>
<td>environment.</td>
</tr>
<tr>
<td>groupBy</td>
<td>You may group the actions returned by the following criteria: [actionModes,</td>
</tr>
<tr>
<td></td>
<td>actionStates, actionTypes, risk, riskSeverity, riskSubCategory]</td>
</tr>
<tr>
<td>hasReservedInstance</td>
<td>Default: false. When true, only actions that are related to reserved</td>
</tr>
<tr>
<td></td>
<td>instances will be returned.</td>
</tr>
<tr>
<td>relatedEntityTypes</td>
<td>Returns only actions related to entities of these types within the scope.</td>
</tr>
<tr>
<td></td>
<td>For example, if your scope is a virtual datacenter and you specify</td>
</tr>
<tr>
<td></td>
<td>VirtualMachine as a related entity type, the request will include only</td>
</tr>
<tr>
<td></td>
<td>those actions related to VMs in the specified virtual datacenter. Choose</td>
</tr>
<tr>
<td></td>
<td>from the following entity types: [ Datacenter, PhysicalMachine, Virtual</td>
</tr>
<tr>
<td></td>
<td>Machine, Storage, Application, Chassis, DiskArray, IOModule, Storage</td>
</tr>
<tr>
<td></td>
<td>Control, Switch, VirtualDataCenter, VPod, DPod, Container, Database,</td>
</tr>
<tr>
<td></td>
<td>DatabaseServerContainer, LogicalPool ]</td>
</tr>
<tr>
<td>riskSeverityList</td>
<td>Returns only actions of the given severities. [ Unknown, Normal, Minor,</td>
</tr>
<tr>
<td></td>
<td>Major, Critical ]</td>
</tr>
<tr>
<td>riskSubCategoryList</td>
<td>returns only actions of the given subcategories. [ Performance Assurancen</td>
</tr>
<tr>
<td></td>
<td>Efficiency Improvement, Prevention, Compliance ]</td>
</tr>
</tbody>
</table>

Example: POST https://10.10.10.10/api/v3/actions

Example input: In this example, a list of actions that meet the following criteria will be returned and grouped by the actionMode of the action:

• Is in state PENDING_ACCEPT
• Is part of an on-premises environment
• Is an action for a virtual machine
• Is an action generated by the Turbonomic real-time market

```json
{
    "actionInput":{
        "actionStateList": ["PENDING_ACCEPT"],
        "environmentType": "ONPREM",
        "groupBy": ["actionModes"
    ]
}
```
Response: A list of ActionApiDTOs that meet the specified criteria.

Accepting or Rejecting a Specified Action

This request accepts or rejects an action with the specified UUID, and takes the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>action_UUID (Required)</td>
<td>The UUID of the action.</td>
</tr>
<tr>
<td>accept (Required)</td>
<td>When true, accepts the action. When false, rejects the action.</td>
</tr>
</tbody>
</table>

Example: POST https://10.10.10.10/api/v3/actions/_QJCzNd3jEeiJ-LI4LMERow?accept=false

Response: true, if the action was accepted.

Actions Cookbook

GroupBy Field Criteria

When using the POST requests to query actions and action statistics, there is a groupBy parameter that is used to group statistics for easy amalgamation. The valid values for this parameter differ by entity type. Here is the complete list of valid options per entity:

NOTE: When sending an inputDTO using this field, only the value is needed.

Example: "groupBy": "vmsByPMName"

```json
{
    "VirtualMachine":{
        "criteria":[
            {
                "filterType":"vmsByName"
            },
            {
                "filterType":"vmsByPMName"
            },
            {
                "filterType":"vmsByStorage"
            },
            {
                "filterType":"vmsByNetwork"
            }
        ]
    }
}```
"filterType": "vmsByApplication",
},
{
 "filterType": "vmsByDatabaseServer"
},
{
 "filterType": "vmsByDatabaseServerVersion"
},
{
 "filterType": "vmsByDC"
},
{
 "filterType": "vmsByVDC"
},
{
 "filterType": "vmsByDCnested"
},
{
 "filterType": "vmsByNumCPUs"
},
{
 "filterType": "vmsByMem"
},
{
 "filterType": "vmsByGuestName"
},
{
 "filterType": "vmsByAltName"
},
{
 "filterType": "vmsByClusterName"
},
{
 "filterType": "vmsByDiskArrayName"
},
{
 "filterType": "vmsByLogicalPoolName"
},
{
 "filterType": "vmsByProfileName"
},
{
 "filterType": "vmsByTag"
},
{
 "filterType": "vmsByState"
},
{
 "filterType": "vmsByBusinessAccountUuid"
},
{
 "filterType": "vmsByResourceGroupUuid"
}]}
"VirtualDataCenter":{
    "criteria":[
        {
            "filterType": "vdcsByName"
        },
        {
            "filterType": "vdcsByVDCName"
        },
        {
            "filterType": "vdcsByTag"
        },
        {
            "filterType": "vdcsByState"
        }
    ]
},
"PhysicalMachine":{
    "criteria":[
        {
            "filterType": "pmsByName"
        },
        {
            "filterType": "pmsByStorage"
        },
        {
            "filterType": "pmsByNetwork"
        },
        {
            "filterType": "pmsBySwitch"
        },
        {
            "filterType": "pmsByNumVms"
        },
        {
            "filterType": "pmsByDC"
        },
        {
            "filterType": "pmsByMem"
        },
        {
            "filterType": "pmsByNumCPUs"
        },
        {
            "filterType": "pmsByVendorName"
        },
        {
            "filterType": "pmsByCPUModel"
        },
        {
            "filterType": "pmsByModel"
        },
        {
            "filterType": "pmsByTimezone"
        }
    ]
"filterType":"pmsByClusterName"
),
{
  "filterType":"pmsByTag"
),
{
  "filterType":"pmsByState"
}
]
},
"Storage":{
  "criteria":[
    {
      "filterType":"storageByName"
    },
    {
      "filterType":"storageByTag"
    },
    {
      "filterType":"storageByVMs"
    },
    {
      "filterType":"storageByDC"
    },
    {
      "filterType":"storageByPMCluster"
    },
    {
      "filterType":"storageByState"
    }
  ]
},
"Application":{
  "criteria":[
    {
      "filterType":"appsByName"
    },
    {
      "filterType":"appsByTag"
    }
  ]
},
"ApplicationServer":{
  "criteria":{
    "filterType":"appSrvsByName"
  }
},
"WebServer":{
  "criteria":{
    "filterType":"wbSrvsByName"
  }
}
Turbonomic REST API Endpoints

"BusinessApplication":{
    "criteria":[
        {
            "filterType":"busAppsByName"
        }
    ],
},
"Database":{
    "criteria":[
        {
            "filterType":"databaseByName"
        },
        {
            "filterType":"databaseByTag"
        },
        {
            "filterType":"databaseByBusinessAccountUuid"
        },
        {
            "filterType":"databaseByResourceGroupUuid"
        }
    ]
},
"DatabaseServer":{
    "criteria":[
        {
            "filterType":"databaseServerByName"
        },
        {
            "filterType":"databaseServerByTag"
        },
        {
            "filterType":"databaseServerByBusinessAccountUuid"
        },
        {
            "filterType":"databaseServerByEngine"
        },
        {
            "filterType":"databaseServerByEdition"
        },
        {
            "filterType":"databaseServerByVersion"
        }
    ]
},
"VirtualApplication":{
    "criteria":[
        {
            "filterType":"vappsByName"
        }
    ]
},
"Cluster":{
    "criteria":[
{  
  "filterType": "clustersByName"
},
{  
  "filterType": "clustersByTag"
}
},
"DataCenter":{  
  "criteria": [
    {  
      "filterType": "datacentersByName"
    },
    {  
      "filterType": "datacentersByTag"
    }
  ]
},
"Group":{  
  "criteria": [
    {  
      "filterType": "groupsByName"
    },
    {  
      "filterType": "groupsByTargetName"
    }
  ]
},
"StorageCluster":{  
  "criteria": [
    {  
      "filterType": "storageClustersByName"
    }
  ]
},
"DiskArray":{  
  "criteria": [
    {  
      "filterType": "diskarrayByName"
    }
  ]
},
"Zone":{  
  "criteria": [
    {  
      "filterType": "zonsByName"
    }
  ]
},
"Region":{  
  "criteria": [
    {  
      "filterType": "regsByName"
    }
  ]
}
},
"Network":{
  "criteria":[
    {
      "filterType":"netsByName"
    }
  ]
},
"LoadBalancer":{
  "criteria":[
    {
      "filterType":"lbsByName"
    }
  ]
},
"Chassis":{
  "criteria":[
    {
      "filterType":"chasByName"
    }
  ]
},
"IOModule":{
  "criteria":[
    {
      "filterType":"ioModuleByName"
    }
  ]
},
"StorageController":{
  "criteria":[
    {
      "filterType":"storagecontrollerByName"
    }
  ]
},
"DPod":{
  "criteria":[
    {
      "filterType":"dpodByName"
    }
  ]
},
"VPod":{
  "criteria":[
    {
      "filterType":"vpodByName"
    }
  ]
},
"LogicalPool":{
  "criteria":[
    {
      "filterType":"logicalPoolByName"
    }
  ]
}
Turbonomic REST API Endpoints

- **Switch**:
  - "criteria":[
    - {"filterType": "switchByName"},
    - {"filterType": "switchByGroupName"}
  ]

- **Container**:
  - "criteria":[
    - {"filterType": "containersByGroupName"},
    - {"filterType": "containersByVMName"}
  ]

- **ContainerPod**:
  - "criteria":[
    - {"filterType": "containerpodsByGroupName"},
    - {"filterType": "containerpodsByVMName"}
  ]

- **ServiceEntity**:
  - "criteria":[
    - {"filterType": "workloadByBusinessAccountUuid"},
    - {"filterType": "workloadByResourceGroupUuid"}
  ]

- **Workload**:
  - "criteria":[
    - {"filterType": "workloadByBusinessAccountUuid"},
    - {"filterType": "workloadByResourceGroupUuid"}
  ]

- **ResourceGroup**:
  - "criteria":[
    - {"filterType": "resourceGroupByGroupName"},
    - {"filterType": "resourceGroupByBusinessAccountUuid"}
  ]
"filterType":"resourceGroupByUuid"
},
{
"filterType":"resourceGroupByBusinessAccountUuid"
},
{
"filterType":"resourceGroupByTag"
}

"BusinessAccount":{
"criteria":[
{
"filterType":"businessAccountByName"
},
{
"filterType":"businessAccountByUuid"
},
{
"filterType":"subBusinessAccountOfUuid"
},
{
"filterType":"businessAccountValidationStatus"
},
{
"filterType":"businessAccountTargetName"
},
{
"filterType":"businessAccountCloudProvider"
}
]

"BillingFamily":{
"criteria":[
{
"filterType":"billingFamilyByName"
}
]

"ViewPod":{
"criteria":[
{
"filterType":"viewPodByName"
}
]

"DesktopPool":{
"criteria":[
{
"filterType":"desktopPoolByName"
},
{
"filterType":"desktopPoolByViewPod"
}
]
Admin Endpoint

The admin endpoint is a collection of requests that enable you to perform various administrative functions. To use the admin endpoint, you must be logged into Turbonomic as an administrator user.

Using the admin endpoint, you can:
- Load existing configuration files for use in your environment
- Export diagnostics locally, and send them to Support
- Get or set proxy settings
- Get or set logging levels for various components of your environment
- Get the current product version information
- Check for and apply updates to your Turbonomic appliance

Admin Requests

**Getting the Current Version**

Gets the version of each Turbonomic package that your instance is running. Set the `check_for_updates` parameter to `true` to additionally check for updates that may be available.

This request takes the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>check_for_updates</code></td>
<td>Check for available updates before returning version information. Default: false.</td>
</tr>
</tbody>
</table>

**Example:** GET https://10.10.10.10/api/v3/admin/versions?check_for_updates=true

**Response:** A ProductVersionDTO describing details about the current version and available updates. If you are running the latest version of Turbonomic, the updates value will read "No Updates Available\n"

```json
{
  "versionInfo": "Turbonomic Operations Manager 6.1.7 (Build 2018081323950000)\nvmt-platform-6.1.7-2018081323950000.i586"
}```
Exporting Diagnostics

If you are experiencing problems with Turbonomic, your support engineer might request that you export diagnostic data. You can export the data and then send it to the support engineer as requested.

**Example:** POST https://10.10.10.10/api/v3/admin/exports

**Response:** true if successful, false if an error occurs while creating the export. The export file will be saved in the /tmp directory on your instance with a file name that begins with bkp-.

Loading External Configuration Files

To help with diagnosis of some issues, a support engineer might want you to load configuration files into your Turbonomic appliance. You should only use this request while working with a support engineer, who will guide you through the process. Using the required parameters, the support engineer will specify what kind of configuration file you are loading, and the contents of that file.

**Example:** POST https://10.10.10.10/api/v3/admin/configfiles?config_type=TOPOLOGY&topology=abc

**Response:** true if successful, false if an error occurs while uploading the configuration.

Getting and Setting a Proxy

Gets the current state of the proxy and proxy details (if enabled).

**Example:** GET https://10.10.10.10/api/v3/admin/httpproxy

**Response:** A HttpProxyDTO describing details of the proxy. If no proxy is configured, this request returns "isProxyEnabled": false.

```
{
    "isProxyEnabled":true,
    "proxyHost":"10.10.111.1",
    "userName":"UserName",
    "password":"PW"
}
```

To set the proxy, pass a HttpProxyDTO, making sure to include "isProxyEnabled": true if you want to activate the proxy immediately.

**Example:** POST https://10.10.10.10/api/v3/admin/httpproxy

**Example** httpProxyDTO:

```
{
    "isProxyEnabled":true,
```
Turbonomic REST API Endpoints

"proxyHost":"10.10.111.1",
"portNumber":"33128",
"userName":"ProxyUser",
"password":"Password"
}

Response: true if successful, false if an error occurs while setting the proxy.

Getting and Setting Logging Levels by Component

You can set the level of logging for different components of the Turbonomic platform. The default logging level for all components is INFO. You should be aware that setting more verbose logging levels may greatly increase the disk space required to store the log files. You normally change these settings only while you're working with a Turbonomic support engineer.

The available logging levels are (in order of least to most verbose): INFO, WARN, DEBUG, and TRACE.

Example: GET https://10.10.10.10/api/v3/admin/logginglevels

Response: A LoggingApiDTO with details about your current logging level settings:

{
   "componentLoggingLevel":{
   "Extension":"INFO",
   "Analysis":"INFO",
   "Discovery":"INFO",
   "API":"INFO",
   "Presentation":"INFO",
   "Abstraction":"INFO",
   "Monitoring":"INFO"
   }
}

To set the logging level for a specific component, pass a partial LoggingApiDTO containing the component and logging level.

Example: POST https://10.10.10.10/api/v3/admin/logginglevels

Example LoggingApiDTO:

{
   "componentLoggingLevel":{
   "Extension":"WARN"
   }
}

Response: A successful response returns your input in the response body.
Businessunits Endpoint

Business units are container objects used for modeling accounts and subscriptions in Public Cloud targets, and for cloud budgets and price adjustments.

Using the businessunits endpoint of the Turbonomic API, you can:

- For a specified business unit, get a list of:
  - All actions relating to the entities in the business unit
  - Cloud services and pricing models
  - All entities belonging to the business unit
  - Price adjustments
  - Any related (parent, sibling, or child) business units
  - Statistics relating to entities in the business unit
  - Templates available
- Get the supply chain for a specified business unit
- Create a business unit
- Edit a business unit
- Edit a price adjustment
- Delete a business unit

Business units may be one of three types, described below:

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUDGET</td>
<td>A business unit that has a budget, and may contain children.</td>
</tr>
<tr>
<td>DISCOUNT</td>
<td>A business unit that has a discount, and may contain children.</td>
</tr>
<tr>
<td>DISCOVERED</td>
<td>A business unit that has been discovered by the Turbonomic instance. These business units should not be edited or deleted, except on the discovered target.</td>
</tr>
</tbody>
</table>

Businessunits Requests

Getting Business Units

Gets a list of all business units created on or discovered by your Turbonomic instance. This request takes the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>The type of business unit to return. [ BUDGET, DISCOUNT, DISCOVERED ]</td>
</tr>
<tr>
<td>cloud_type</td>
<td>The cloud provider whose business units to return. [ AWS, AZURE, GCP ]</td>
</tr>
<tr>
<td>has_parent</td>
<td>Whether to return only business units that have parent business units. Default: False. When true, all relevant business units will be returned irrespective of parent business units.</td>
</tr>
</tbody>
</table>

**Example:** GET https://10.10.173.174/api/v3/businessunits?type=DISCOVERED&cloud_type=AWS

**Response:** A list of BusinessUnitApiDTOs that meet the selected criteria. In this case, discovered business units that are part of an AWS environment.
[{
  "uuid": "323871187550",
  "displayName": "Product Trust",
  "className": "BusinessAccount",
  "environmentType": "CLOUD",
  "master": false,
  "hasRelatedTarget": true,
  "budget": {
    "value": 0
  },
  "businessUnitType": "DISCOVERED",
  "cloudType": "AWS",
  "targets": [
  {
    "uuid": "_6glgQEEhEemQ645gSx8RYw",
    "displayName": "PT-AWS",
    "type": "AWS"
  }
  ],
  "costPrice": 0,
  "severity": "Critical",
  "membersCount": 80,
  "memberType": "Workload",
  "related": {
    "rateCard": null,
    "priceAdjustment": null
  },
  "resourceGroupsCount": 0
},
{
  "uuid": "001844731978",
  "displayName": "Advanced Engineering",
  "className": "BusinessAccount",
  "environmentType": "CLOUD",
  "master": false,
  "hasRelatedTarget": false,
  "budget": {
    "value": 0
  },
  "businessUnitType": "DISCOVERED",
  "cloudType": "AWS",
  "costPrice": 0,
  "severity": "Normal",
  "membersCount": 0,
  "memberType": "Workload",
  "related": {
    "rateCard": null,
    "priceAdjustment": null
  },
  "resourceGroupsCount": 0
},
{
Turbonomic REST API Endpoints

```
"uuid": "192821421245",
"displayName": "Development",
"className": "BusinessAccount",
"environmentType": "CLOUD",
"master": true,
"hasRelatedTarget": true,
"budget": {
  "value": 0
},
"businessUnitType": "DISCOVERED",
"cloudType": "AWS",
"childrenBusinessUnits": [
  "631949720430",
  "001844731978",
  "323871187550"
],
"targets": [
  {
    "uuid": "_cBVj0MvWEeiFJej-UwMSGg",
    "displayName": "engineering.aws.amazon.com",
    "type": "AWS"
  }
],
"costPrice": 0,
"severity": "Critical",
"membersCount": 33,
"memberType": "Workload",
"related": {
  "rateCard": null,
  "priceAdjustment": null
},
"resourceGroupsCount": 0
],
{
  "uuid": "631949720430",
  "displayName": "Turbonomic SaaS",
  "className": "BusinessAccount",
  "environmentType": "CLOUD",
  "master": false,
  "hasRelatedTarget": false,
  "budget": {
    "value": 0
  },
  "businessUnitType": "DISCOVERED",
  "cloudType": "AWS",
  "costPrice": 0,
  "severity": "Normal",
  "membersCount": 0,
  "memberType": "Workload",
  "related": {
    "rateCard": null,
    "priceAdjustment": null
  },
  "resourceGroupsCount": 0
}
```
Deleting a Business Unit

To delete a business unit, pass the UUID of the business unit in the request. Note, you cannot delete DISCOVERED business units.

Example: DELETE https://10.10.10.10/api/v3/businessunits/49d50ac3f8adbfe649d53e72c42dd9428d1d3835

Response: A response of 200 indicates successful deletion

Getting Cloud Service and Pricing Model Pairs for a Specified Business Unit

Gets the cloud service name and pricing model for each cloud service.

Example: GET https://10.10.10.10/api/v3/businessunits/192821421245/cloudservices

Response: A list of CloudServicePricingModelApiDTOs representing each cloud service available to the business unit:

```json
[
  {
    "uuid": "aws::631949720430::CS::AWSCloudTrail",
    "displayName": "AWS CloudTrail",
    "pricingModel": "ON_DEMAND"
  },
  {
    "uuid": "aws::631949720430::CS::AmazonCloudWatch",
    "displayName": "AWS CloudWatch",
    "pricingModel": "ON_DEMAND"
  },
  {
    "uuid": "aws::192821421245::CS::AWSDeveloperSupport",
    "displayName": "AWS Developer Support",
    "pricingModel": "ON_DEMAND"
  },
  {
    "uuid": "aws::001844731978::CS::AmazonDynamoDB",
    "displayName": "AWS DynamoDB",
    "pricingModel": "ON_DEMAND"
  },
  {
    "uuid": "aws::631949720430::CS::AmazonEC2",
    "displayName": "AWS EC2",
    "pricingModel": "ON_DEMAND"
  },
  {
    "uuid": "aws::001844731978::CS::AmazonEKS",
    "displayName": "AWS EKS",
    "pricingModel": "ON_DEMAND"
  }
]...
Getting Price Adjustments Related to a Specified Business Unit

Gets any price adjustments affecting the specified business unit.

Example: GET https://10.10.10.10/api/v3/businessunits/192821421245/priceadjustments

Response: A list of BusinessUnitPriceAdjustmentApiDTOs showing the corrected prices after adjustment:

```json
[
  {
    "servicePriceAdjustments": [
      {
        "uuid": "aws::192821421245::CS::AmazonCloudWatch",
        "displayName": "AWS CloudWatch",
        "pricingModel": "ON_DEMAND"
      },
      {
        "uuid": "aws::192821421245::CS::AWSDeveloperSupport",
        "displayName": "AWS Developer Support",
        "pricingModel": "ON_DEMAND"
      },
      {
        "uuid": "aws::192821421245::CS::AmazonDynamoDB",
        "displayName": "AWS DynamoDB",
        "pricingModel": "ON_DEMAND"
      },
      {
        "uuid": "aws::192821421245::CS::AmazonEC2",
        "displayName": "AWS EC2",
        "pricingModel": "ON_DEMAND",
        "templateDiscounts": [
          {
            "uuid": "aws::VMPROFILE::g3.16xlarge",
            "displayName": "g3.16xlarge",
            "family": "g3",
            "pricesPerDatacenter": [
              {
                "uuid": "aws::ap-southeast-1::DC::ap-southeast-1",
                "displayName": "aws-Asia Pacific (Singapore)",
                "price": 6.68
              },
              {
                "uuid": "aws::us-west-2::DC::us-west-2",
                "displayName": "aws-US West (Oregon)",
                "price": 4.56
              },
              {
                "uuid": "aws::ca-central-1::DC::ca-central-1",
                "displayName": "aws-Canada (Central)",
                "price": 5.664
              }
            ]
          }
        ]
      }
    ]
  }
]```
"uuid": "aws::eu-west-1::DC::eu-west-1",
"displayName": "aws-EU (Ireland)",
"price": 4.84
},
{ "uuid": "aws::eu-west-3::DC::eu-west-3",
"displayName": "aws-EU (Paris)",
"price": 0
},
{ "uuid": "aws::ap-northeast-1::DC::ap-northeast-1",
"displayName": "aws-Asia Pacific (Tokyo)",
"price": 6.32
},
{ "uuid": "aws::eu-central-1::DC::eu-central-1",
"displayName": "aws-EU (Frankfurt)",
"price": 5.7
},
{ "uuid": "aws::ap-south-1::DC::ap-south-1",
"displayName": "aws-Asia Pacific (Mumbai)",
"price": 0
},
{ "uuid": "aws::ap-northeast-2::DC::ap-northeast-2",
"displayName": "aws-Asia Pacific (Seoul)",
"price": 0
},
{ "uuid": "aws::us-east-1::DC::us-east-1",
"displayName": "aws-US East (N. Virginia)",
"price": 4.56
},
{ "uuid": "aws::us-west-1::DC::us-west-1",
"displayName": "aws-US West (N. California)",
"price": 6.136
},
{ "uuid": "aws::sa-east-1::DC::sa-east-1",
"displayName": "aws-South America (Sao Paulo)",
"price": 0
},
{ "uuid": "aws::ap-southeast-2::DC::ap-southeast-2",
"displayName": "aws-Asia Pacific (Sydney)",
"price": 7.016
},
{ "uuid": "aws::us-east-2::DC::us-east-2",
"displayName": "aws-US East (Ohio)",
"price": 4.56
},
{
"uuid": "aws::eu-north-1::DC::eu-north-1",
"displayName": "aws-EU (Stockholm)",
"price": 0
},
{
"uuid": "aws::eu-west-2::DC::eu-west-2",
"displayName": "aws-EU (London)",
"price": 0
}
],
"uuid": "aws::VMPROFILE::p3.8xlarge",
"displayName": "p3.8xlarge",
"family": "p3",
"pricesPerDatacenter": [
{
"uuid": "aws::ap-southeast-1::DC::ap-southeast-1",
"displayName": "aws-Asia Pacific (Singapore)",
"price": 16.936
},
{
"uuid": "aws::us-west-2::DC::us-west-2",
"displayName": "aws-US West (Oregon)",
"price": 12.24
},
{
"uuid": "aws::ca-central-1::DC::ca-central-1",
"displayName": "aws-Canada (Central)",
"price": 13.464
},
{
"uuid": "aws::eu-west-1::DC::eu-west-1",
"displayName": "aws-EU (Ireland)",
"price": 13.22
},
{
"uuid": "aws::eu-west-3::DC::eu-west-3",
"displayName": "aws-EU (Paris)",
"price": 0
},
{
"uuid": "aws::ap-northeast-1::DC::ap-northeast-1",
"displayName": "aws-Asia Pacific (Tokyo)",
"price": 16.776
},
{
"uuid": "aws::eu-central-1::DC::eu-central-1",
"displayName": "aws-EU (Frankfurt)",
"price": 15.292
},
{
"uuid": "aws::ap-south-1::DC::ap-south-1",
"displayName": "aws-Asia Pacific (Mumbai)",
"price": 0
}
Editing Price Adjustments of a Specified Business Unit

To edit a price adjustment for the specified business unit, send a BusinessUnitPriceAdjustmentApiDTO with the corrected information (in this case, changing the percent discount from 25 to 50.

Example: PUT https://10.10.10.10/api/v3/businessunits/c0acb428d7b447a5d51f9888d2b6660b5fa5225f

Example Input:

```json
{
    "name": "Daltest1",
    "priceAdjustment": {
        "type": "DISCOUNT",
        "value": 50
    },
    "childrenBusinessUnits": [
        "192821421245"
    ],
    "businessUnitType": "DISCOUNT",
    "uuid": "c0acb428d7b447a5d51f9888d2b6660b5fa5225f"
}
```

Response: The full BusinessUnitPriceAdjustmentApiDTO with the corrected values:

```json
{
    "uuid": "c0acb428d7b447a5d51f9888d2b6660b5fa5225f",
    "displayName": "Daltest1",
    "className": "BusinessAccount",
    "environmentType": "CLOUD",
    "discount": 50,
    "priceAdjustment": {
        "type": "DISCOUNT",
        "value": 50
    },
    "master": false,
```
"hasRelatedTarget": false,
"budget": {
  "value": 0
},
"businessUnitType": "DISCOUNT",
"cloudType": "AWS",
"childrenBusinessUnits": [192821421245],
"costPrice": 0,
"severity": "Normal",
"membersCount": 0,
"memberType": "Workload",
"related": {
  "rateCard": null,
  "priceAdjustment": {
    "uuid": "c0acb428d7b447a5d51f9888d2b6660b5fa5225f",
    "displayName": "Daltest1",
    "className": "BusinessAccount"
  }
},
"resourceGroupsCount": 0
}

### Getting Templates Available to a Business Unit

**Referenced Endpoint:** [Templates (on page 264)](#)

Gets details about each template available to the specified business unit:

**Example:** GET https://10.10.10.10/api/v3/businessunits/192821421245/templates

**Response:** A list of TemplateApiDTOs representing the available templates for the specified business unit:

```
[
  {
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/templates/B4166E9F-589B-357D-AC74-0A534B53CE85"
      }
    ],
    "uuid": "B4166E9F-589B-357D-AC74-0A534B53CE85",
    "displayName": "db.x1e.32xlarge",
    "className": "DatabaseServerProfile",
    "price": 0,
    "model": "db.x1e.32xlarge",
    "dbEngine": "Oracle",
    "dbEdition": "Enterprise",
    "computeResources": [
      {
        "stats": [
        
        ```
"name": "numOfCpu",
"value": 128
},
{
"name": "cpuSpeed",
"units": "MHz",
"value": 384000
},
{
"name": "ioThroughputSize",
"units": "MB/s",
"value": 546.875
},
{
"name": "memorySize",
"units": "MB",
"value": 3997696
}
]

"storageResources": [
{
"stats": [
{
"name": "diskSize",
"units": "GB",
"value": 3840
},
{
"name": "diskIopsConsumed",
"value": 35000
}
]
}
],
"deploymentProfile": {
"uuid": "5C57DCA5-72AB-34BF-A22D-06719D13182E",
"displayName": "DEP-RDB- 'ap-northeast-1'",
"className": "ServiceCatalogItem",
"deployParameters": [
{
"targetType": "AWS",
"providers": [
{
"provider": {
"discoveredBy": {
"uuid": "_RRn00PMSeisB7K_chUWVw",
"displayName": "vmturbodev.aws.amazon.com",
"type": "AWS"
}
}
]
}
]
"discovered": true,
"
"links": [
{
  "rel": "self",
  "href": "https://10.10.10.10/api/v3/templates/aws::VMPROFILE::g3.16xlarge"
}]
"uuid": "aws::VMPROFILE::g3.16xlarge",
"displayName": "g3.16xlarge",
"className": "VirtualMachineProfile",
"description": "g3.16xlarge",
"computeResources": [
{
  "stats": [
    {
      "name": "ioThroughputSize",
      "units": "MB/s",
      "value": 1750
    },
    {
      "name": "networkThroughputSize",
      "units": "MB/s",
      "value": 2500
    },
    {
      "name": "numOfCpu",
      "value": 64
    },
    {
      "name": "cpuSpeed",
      "units": "MHz",
      "value": 6664.6587
    },
    {
      "name": "cpuConsumedFactor",
      "units": "%",
      "value": 50
    },
    {
      "name": "memorySize",
      "units": "MB",
      "value": 499712
    },
    {
      "name": "memoryConsumedFactor",
      "units": "%",
      "value": 75
    },
    {
      "name": "ioThroughput",
      "units": "MB/s",
      "value": 56
    }
  ]
}
"value": 0,
]
}
}
]
"storageResources": [
{
"stats": [
{
"name": "diskSize",
"units": "GB",
"value": 976562.5
},
{
"name": "diskIops",
"value": 20000
},
{
"name": "diskConsumedFactor",
"units": "%",
"value": 100
}
]
}
"deploymentProfile": {
"uuid": "aws::us-east-1::DP::DEP-fake-us-east-1",
"displayName": "DEP-fake-us-east-1",
"className": "ServiceCatalogItem",
"deployParameters": [
{
"targetType": "AWS",
"providers": [
{
"provider": {
"discoveredBy": {
"uuid": _RRn00PMSEeisB7K_chUWVw",
"displayName": "vmturbodev.aws.amazon.com",
"type": "AWS"
}
}
]
],
"discovered": true,
"family": "g3"
},
...
Entities Endpoint

Entities are the objects in your topology that Turbonomic manages. For example, VMs, hosts, datastores, and applications are all entities. Turbonomic discovers entities via targets, it monitors and analyzes their utilization of resources, and it recommends actions to change the placement, configuration, or state of entities.

Each market manages a set of entities. Using a market’s UUID, you can get a list of entities managed by that market. For each entity you can get a full range of data, including the resources it buys and sells, the providers it buys resources from, actions for the entity, and other associated information.

Remember that more than one market can be resident in memory at a given time — Turbonomic maintains a real-time market, and there can also be plan markets in memory. As you access market entities, you should keep the following in mind:

• Entities in the real-time market reflect the current state in your physical environment
• You should never add or remove entities in the real-time market
• Entities in a plan market reflect a snapshot of the environment from when the market was created
• Plan markets can be scoped to a subset of your physical environment
• You can add or remove entities in a plan market

An interesting point about entities and markets — A plan market can contain entities that are also managed by the real-time market. These entities have the same stats in both markets. Turbonomic independently performs analysis on these entities in both markets.

Using the entities endpoint of the Turbonomic API, you can get a list of entities (from the market or group that contains the entities). For an individual entity you can get:

• Actions and related data for an entity
• Constraints assigned to the entity
• Through the entity constraints, get the available providers and consumers for the entity
• Groups the entity belongs to
• Notifications and notification data
• Workload placement policies that affect this entity
• Automation policies that affect this entity
• Stats for the entity
• The supply chain of entities that stitch directly with this entity
• Any tags that are defined for the entity

This endpoint contains references to start and end times for certain operations. For more information, including valid time formats, see Time in the Turbonomic API (on page 12)
Entities Utility Requests

Utility requests provide metadata that you can use to make related requests, assemble inputDTOs, or see the potential values of a particular DTO.

Getting a List of Entry Points for Entities

The entities endpoint contains a utility request that shows the entry points you can use to get lists of entities. These can be used to find the UUID and details relating to specific entities.

Example: GET https://10.10.10.10/api/v3/entities

Response: An array of Link objects, where each object contains a URL to get all entities for a specified market or group.

```json
{
    "links": [
        {
            "rel": "Market actions",
            "href": "https://10.10.10.10/api/v3/markets/{uuid}/entities"
        },
        {
            "rel": "Group actions",
            "href": "https://10.10.10.10/api/v3/groups/{uuid}/entities"
        }
    ]
}
```

Getting a List of Entry Points for a Single Entity

If you pass an entity UUID to the entities endpoint, then you get a description of the entity, plus a list of entry points for entity data such as stats, constraints, actions, etc.

Example: GET https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073

Response: An array of Link objects, where each object contains a URL to get information about the entity.

```json
{
    "links": [
        {
            "rel": "self",
            "href": "https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073?include_aspects=false"
        },
        {
            "rel": "To Stats",
            "href": "https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/stats"
        },
        {
            "rel": "Entity notifications",
            "href": "https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/notifications"
        }
    ]
}
```
Entities Requests

Getting Entities

Referenced Endpoint: Groups (on page 88)

To get a list of entities, you start with the object that contains those entities. This is usually a market or a group. You work with individual entities via their UUIDs — A list of entities gives you a list of UUIDs that you can work with.

NOTE:
When working with groups, you should remember that a list of entities in the group is not the same as a list of group members. Assume a group of host clusters. In that case, the list of entities would be all the hosts in those clusters, while the group members would be a list of clusters, plus all the hosts in each cluster. For more information, see Groups Endpoint (on page 88).

Example: GET https://10.10.10.10/api/v3/groups/_B2bFsWXUemoItN1K8jw3Q/entities

Response: A list of Entity objects, where each entity is described by an entity DTO.

```json
[
  {"links": [
    ...
  ],"uuid": "azure::VM:::2ff038a-7af3-4d23-86a9-211da2e4d433", "displayName": "e47f9c97-b44d-4461-be02-0304b97e201e",
```
"className": "VirtualMachine",
"priceIndex": 1.0067123,
"state": "ACTIVE",
"severity": "Critical",
"costPrice": 0.64534247,
"discoveredBy": {
  "uuid": "-_S9g YoEmHGIeet0BoNQ",
  "displayName": "758ad253-cbf5-4b18-8863-3eed0825bf07",
  "type": "Azure"
},
"remoteId": "azure::VM::2ff038a-7af3-4323-86a9-211da2e4d433",
"providers": [
  {
    "uuid": "azure::ST::eastus2-managed_premium",
    "displayName": "azure-eastus2-Managed Premium",
    "className": "Storage"
  },
  {
    "uuid": "azure::eastus2::PM::eastus2",
    "displayName": "azure-eastus2",
    "className": "PhysicalMachine"
  }
],
"consumers": [
  {
    "uuid": "azure::APP::2ff038a-7af3-4323-86a9-211da2e4d433",
    "displayName": "GuestLoad [e47f9c97-b44d-4461-be02-0304b97e201e]",
    "className": "Application"
  }
],
"template": {
  "uuid": "azure::VMPROFILE::Standard_DS13_v2",
  "displayName": "Standard_DS13_v2",
  "discovered": false,
  "enableMatch": false
},
"environmentType": "CLOUD",
"tags": {
  "instance_group": ["diego_cell"]
}
]
If you provide the entity UUID but do not provide an action UUID, returns a list of ActionApiDTOs for all the actions that are current for the entity. If you provide both the entity UUID and the action UUID, returns the ActionApiDTO for the specified action.

This request takes the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>entity_Uuid</td>
<td>The UUID of the entity whose actions will be returned.</td>
</tr>
<tr>
<td>action_Uuid</td>
<td>The UUID of the action you want to get – Required to get a single action.</td>
</tr>
<tr>
<td>cursor</td>
<td>When making subsequent calls to retrieve additional results, this is the cursor returned by the last call to this method.</td>
</tr>
<tr>
<td>limit</td>
<td>The maximum number of items to return. Must be a positive integer. If not set, the server will provide a default (20).</td>
</tr>
<tr>
<td>order_by</td>
<td>The field to order the results by. [ creation_date, name, risk_category, savings, severity ].</td>
</tr>
<tr>
<td>ascending</td>
<td>Default: true. When false, results will be in descending order.</td>
</tr>
</tbody>
</table>

Examples:

- Get a list of actions for the passed entity: GET https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/actions?order_by=severity&ascending=true
- Get a single action for the entity: GET https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/actions/9223304219064809841

Response: A list of ActionApiDTOs representing the actions that are current for the given entity, or a single ActionApiDTO for the specified action. The following listing shows the list of ActionApiDTOs wrapped in an array.

```json
[
    {
        "links": [
            {
                "rel": "self",
                "href": "https://10.10.10.10/api/v3/actions/922330421906592017"
            },
            {
                "rel": "self",
                "href": "https://10.10.10.10/api/v3/actions/2560158594896"
            }
        ],
        "uuid": "922330421906592017",
        "createTime": "2019-04-23T10:41:37-04:00",
        "actionType": "RIGHT_SIZE",
        "actionState": "PENDING_ACCEPT",
        "actionMode": "MANUAL",
        "details": "Scale down VMem for VirtualMachine vEOS-4 from 2 GB to 623 MB",
        "importance": 0,
        "target": {
            "uuid": "420b1eeb-6190-a9d2-6436-4327ad3ac073",
            "displayName": "vEOS-4",
            "className": "VirtualMachine",
            "discoveredBy": {} 62}
```
"uuid": "_FJwg0EzHEemaXZFqOlsC0g",
"displayName": "vsphere-dc11.dev.mycorp.com",
"type": "vCenter"
},
"aspects": {
  "virtualMachineAspect": {
    "os": "Other 2.6.x Linux (32-bit)",
    "connectedNetworks": [
      {
        "uuid": "d2da5316adfff0bf779652bbe7eb76c3307c2ab5",
        "displayName": "Infrastructure"
      },
      {
        "uuid": "bbe6f88e6ee0e76ba2c82960012b4ba563b78f6bb",
        "displayName": "vmnet4"
      },
      {
        "uuid": "d59c5e7e738ad9d2e2cb454ac5fe073d36b49fb",
        "displayName": "vmnet6"
      },
      {
        "uuid": "96a42a4d438d1336e8d2c6962c976d889792af8a",
        "displayName": "vmnet8"
      },
      {
        "uuid": "067bc9d882e9681c55d964295e43134711520145",
        "displayName": "vmnet57"
      },
      {
        "uuid": "05b0ce5abc5cecc4104b26514b11618d77818c6d",
        "displayName": "vmnet59"
      }
    ],
    "numVCPUs": 1,
    "type": "VMEntityAspectApiDTO"
  }
},
"environmentType": "ONPREM"
},
"currentEntity": {
  "uuid": "_3vIfwmXVEnqIoN1k8jw3Q",
  "className": "VMem"
},
"newEntity": {
  "uuid": "_5fni82XVEmoIoItN1k8jw3Q",
  "className": "VMem",
  "aspects": {
    "virtualMachineAspect": {
      "os": "Linux (Free)",
      "type": "VMEntityAspectApiDTO"
    }
  }
},
"currentValue": "2097152.0",
"newValue": "637952.0",

Turbonomic REST API Endpoints
"resizeToValue": "637952.0",
"risk": {
  "uuid": "_5fr3YWXVEemoItN1K8jw3Q",
  "subcategory": "Efficiency Improvement",
  "description": "Underutilized VMem in Virtual Machine 'vEOS-4'",
  "severity": "MINOR",
  "importance": 0,
  "reasonCommodity": "VMem"
},
"stats": [ {
  "name": "costPrice",
  "filters": [
    {
      "type": "savingsType",
      "value": "savings"
    }
  ],
  "units": "$",
  "value": 69.58008
  }
],
"currentLocation": {
  "uuid": "98e12595449d993db8861c1f94c8f86ba277f17b",
  "displayName": "Cloud",
  "className": "DataCenter"
},
"newLocation": {
  "uuid": "98e12595449d993db8861c1f94c8f86ba277f17b",
  "displayName": "Cloud",
  "className": "DataCenter"
},
"actionId": 2560158594896
}

Getting a Filtered List of Actions Related to an Entity

Referenced Endpoint: Actions (on page 26)

Gets a list of actions, given a market UUID and filtered by an ActionApiInputDTO using one or more of the following criteria:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
</table>
| actionModeList    | • DISABLED: Do not recommend or perform the action. When you disable an action, the user interface will no longer display actions of that type.  
• RECOMMENDED: Recommend the action so a user can execute it via the given hypervisor or by other external means |
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• MANUAL:</td>
</tr>
<tr>
<td></td>
<td>Recommend the action, and provide the option to execute that action through the Turbonomic user interface or an /actions API request.</td>
</tr>
<tr>
<td></td>
<td>• AUTOMATED:</td>
</tr>
<tr>
<td></td>
<td>You have directed Turbonomic to execute the action automatically.</td>
</tr>
<tr>
<td></td>
<td>• COLLECTION (UNUSED):</td>
</tr>
<tr>
<td></td>
<td>Legacy action mode, no longer used.</td>
</tr>
</tbody>
</table>

| actionStateList          | • DISABLED:                                                                                                                                 |
|                          | An action whose policy has been disabled.                                                                                                   |
|                          | • RECOMMEND:                                                                                                                                |
|                          | An action that cannot be automated due to policy settings or must be executed outside the system, such as the purchase of hardware.            |
|                          | • PENDING_ACCEPT:                                                                                                                            |
|                          | When the action mode is set to manual, a recommended action that has not been accepted or cleared.                                           |
|                          | • ACCEPTED:                                                                                                                                 |
|                          | An action that has been accepted, but is not yet in progress.                                                                               |
|                          | • IN_PROGRESS:                                                                                                                               |
|                          | An action that is being executed.                                                                                                            |
|                          | • SUCCEEDED:                                                                                                                                |
|                          | An action that was accepted and completed successfully.                                                                                      |
|                          | • FAILED:                                                                                                                                   |
|                          | An action that was accepted and did not complete successfully.                                                                               |
|                          | • REJECTED:                                                                                                                                 |
|                          | When the action mode is set to manual, an action that has been rejected by the user.                                                        |
|                          | • CLEARED:                                                                                                                                  |
|                          | When the action mode is set to manual, an action that is no longer recommended by the market.                                                |
|                          | • ACCOUNTING:                                                                                                                               |
|                          | For cloud entities, an action to resize in order to use a different instance template.                                                      |
|                          | • QUEUED:                                                                                                                                   |
|                          | When more than 10 actions are to be executed for a single target, Turbonomic will place the 11th and all subsequent actions into a QUEUED state, and they will execute as the previous actions complete. |

<p>| actionTypeList           | • START:                                                                                                                                    |
|                          | Start an entity, and add it to the Turbonomic market.                                                                                       |
|                          | • MOVE:                                                                                                                                     |</p>
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Move an entity from one provider to another. For example, moving a VM between hosts, or a datastore between disk arrays.</td>
</tr>
<tr>
<td></td>
<td>• SUSPEND:</td>
</tr>
<tr>
<td></td>
<td>Remove capacity from your environment. Suspended entities are not removed from the environment, but will not be used in market decisions. Based on market conditions, suspended entities can be started, re-adding them to the market.</td>
</tr>
<tr>
<td></td>
<td>• ADD PROVIDER:</td>
</tr>
<tr>
<td></td>
<td>This is equivalent to the START action, but for storage entities.</td>
</tr>
<tr>
<td></td>
<td>• CHANGE:</td>
</tr>
<tr>
<td></td>
<td>Move a virtual machine's storage between datastores.</td>
</tr>
<tr>
<td></td>
<td>• PROVISION:</td>
</tr>
<tr>
<td></td>
<td>Add capacity to your environment.</td>
</tr>
<tr>
<td></td>
<td>• RECONFIGURE:</td>
</tr>
<tr>
<td></td>
<td>When a VM is not able to correct a misconfiguration via another type of action. For example, if a placement policy requires a VM to move to a host on a particular cluster, but cross-cluster moves are not permitted.</td>
</tr>
<tr>
<td></td>
<td>• DELETE:</td>
</tr>
<tr>
<td></td>
<td>This is equivalent to the SUSPEND action, but for storage entities.</td>
</tr>
<tr>
<td></td>
<td>• RESERVE_ON_PM:</td>
</tr>
<tr>
<td></td>
<td>When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular host.</td>
</tr>
<tr>
<td></td>
<td>• RESERVE_ON_DS:</td>
</tr>
<tr>
<td></td>
<td>When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular datastore.</td>
</tr>
<tr>
<td></td>
<td>• RESIZE_FOR_EFFICIENCY:</td>
</tr>
<tr>
<td></td>
<td>A resize that reduces the capacity of a commodity, such as vCPU, or vMEM.</td>
</tr>
<tr>
<td></td>
<td>• RESIZE_FOR_PERFORMANCE:</td>
</tr>
<tr>
<td></td>
<td>A resize that increases the capacity of a commodity, such as vCPU, or vMEM.</td>
</tr>
</tbody>
</table>

<p>| cleared     | Default: false. When true, actions that were removed from the action list before being executed will be returned.                           |
| costType    | • Saving                                                                                                                                       |
|             | An action that will decrease cloud spending.                                                                                                     |
|             | • Investment                                                                                                                                   |
|             | An action that will increase cloud spending.                                                                                                     |
| cumulative  | Default: false. When true, shows the savings for each action in a scope as a cumulative total, rather than showing the savings for individual actions. |
| environmentType | • ONPREM:                                                                                                                                      |
|             | Returns only actions related to entities that are part of your on-premises environment.                                                          |</p>
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>• CLOUD:</td>
<td>Returns only actions related to entities that are part of your cloud environment.</td>
</tr>
<tr>
<td>groupBy</td>
<td>You may group the actions returned by the following criteria: [actionModes, actionStates, actionTypes, risk, riskSeverity, riskSubCategory]</td>
</tr>
<tr>
<td>hasReservedInstance</td>
<td>Default: false. When true, only actions that are related to reserved instances will be returned.</td>
</tr>
<tr>
<td>relatedEntityTypes</td>
<td>Returns only actions related to entities of these types within the scope. For example, if your scope is a virtual datacenter and you specify VirtualMachine as a related entity type, the request will include only those actions related to VMs in the specified virtual datacenter. Choose from the following entity types: [Datacenter, PhysicalMachine, VirtualMachine, Storage, Application, Chassis, DiskArray, IOModule, StorageControl, Switch, VirtualDataCenter, VPod, DPod, Container, Database, DatabaseServerContainer, LogicalPool]</td>
</tr>
<tr>
<td>riskSeverityList</td>
<td>Returns only actions of the given severities. [Unknown, Normal, Minor, Major, Critical]</td>
</tr>
<tr>
<td>riskSubCategoryList</td>
<td>returns only actions of the given subcategories. [Performance Assurance, Efficiency Improvement, Prevention, Compliance]</td>
</tr>
</tbody>
</table>

This request takes the following parameters:

<table>
<thead>
<tr>
<th>entity_Uuid</th>
<th>The UUID of the market whose actions will be returned.</th>
</tr>
</thead>
<tbody>
<tr>
<td>cursor</td>
<td>When making subsequent calls to retrieve additional results, this is the cursor returned by the last call to this method.</td>
</tr>
<tr>
<td>limit</td>
<td>The maximum number of items to return. Must be a positive integer. If not set, the server will provide a default (20).</td>
</tr>
<tr>
<td>order_by</td>
<td>The field to order the results by. [creation_date, name, risk_category, savings, severity].</td>
</tr>
<tr>
<td>ascending</td>
<td>Default: true. When false, results will be in descending order.</td>
</tr>
</tbody>
</table>

**Example:** POST https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/actions?order_by=severity&ascending=true

**Example input:** In this example, a list of actions that meet the following criteria will be returned and grouped by the actionMode of the action, in order of severity:

- Is in state PENDING_ACCEPT
- Is part of an on-premises environment
- Is an action for a virtual machine

```json
{
    "actionInput":{
        "actionStateList": ["PENDING_ACCEPT"],
        "environmentType": "ONPREM",
```
```
"groupBy": [
  "actionModes"
],
"relatedType": "VirtualMachine",
"scopes": [
  "Market"
]
}
```

**Response:** A list of ActionApiDTOs that meet the specified criteria.

### Getting Statistics for a Filtered List of Actions Of an Entity

*Referenced Endpoint: [Actions](on page 26)*

*Referenced Endpoint: [Stats](on page 232)*

Code a list of statistics for a filtered list of actions that are current for the passed entity. Statistics returned include the number of actions, total savings/investment, and the number of entities affected by the actions. In addition to the Entity UUID, provide an ActionApiInputDTO using one or more of the following criteria:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
</table>
| actionModeList    | • **DISABLED:** Do not recommend or perform the action. When you disable an action, the user interface will no longer display actions of that type.  
                    • **RECOMMENDED:** Recommend the action so a user can execute it via the given hypervisor or by other external means  
                    • **MANUAL:** Recommend the action, and provide the option to execute that action through the Turbonomic user interface or an /actions API request  
                    • **AUTOMATED:** You have directed Turbonomic to execute the action automatically.  
                    • **COLLECTION (UNUSED):** Legacy action mode, no longer used. |
| actionStateList   | • **DISABLED:** An action whose policy has been disabled.  
                    • **RECOMMEND:** An action that cannot be automated due to policy settings or must be executed outside the system, such as the purchase of hardware.  
                    • **PENDING_ACCEPT:** When the action mode is set to manual, a recommended action that has not been accepted or cleared.  
                    • **ACCEPTED:** An action that has been accepted, but is not yet in progress. |
### Criteria

<table>
<thead>
<tr>
<th>Action Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN_PROGRESS</td>
<td>An action that is being executed.</td>
</tr>
<tr>
<td>SUCCEEDED</td>
<td>An action that was accepted and completed successfully.</td>
</tr>
<tr>
<td>FAILED</td>
<td>An action that was accepted and did not complete successfully.</td>
</tr>
<tr>
<td>REJECTED</td>
<td>When the action mode is set to manual, an action that has been rejected by the user.</td>
</tr>
<tr>
<td>CLEARED</td>
<td>When the action mode is set to manual, an action that is no longer recommended by the market.</td>
</tr>
<tr>
<td>ACCOUNTING</td>
<td>For cloud entities, an action to resize in order to use a different instance template.</td>
</tr>
<tr>
<td>QUEUED</td>
<td>When more than 10 actions are to be executed for a single target, Turbonomic will place the 11th and all subsequent actions into a QUEUED state, and they will execute as the previous actions complete.</td>
</tr>
</tbody>
</table>

### Action Type List

<table>
<thead>
<tr>
<th>Action Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>START</td>
<td>Start an entity, and add it to the Turbonomic market.</td>
</tr>
<tr>
<td>MOVE</td>
<td>Move an entity from one provider to another. For example, moving a VM between hosts, or a datastore between disk arrays.</td>
</tr>
<tr>
<td>SUSPEND</td>
<td>Remove capacity from your environment. Suspended entities are not removed from the environment, but will not be used in market decisions. Based on market conditions, suspended entities can be started, re-adding them to the market.</td>
</tr>
<tr>
<td>ADD PROVIDER</td>
<td>This is equivalent to the START action, but for storage entities.</td>
</tr>
<tr>
<td>CHANGE</td>
<td>Move a virtual machine's storage between datastores.</td>
</tr>
<tr>
<td>PROVISION</td>
<td>Add capacity to your environment.</td>
</tr>
<tr>
<td>RECONFIGURE</td>
<td>When a VM is not able to correct a misconfiguration via another type of action. For example, if a placement policy requires a VM to move to a host on a particular cluster, but cross-cluster moves are not permitted.</td>
</tr>
<tr>
<td>DELETE</td>
<td>This is equivalent to the SUSPEND action, but for storage entities.</td>
</tr>
<tr>
<td>RESERVE_ON_PM</td>
<td></td>
</tr>
</tbody>
</table>
### Turbonomic REST API Endpoints

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cleared</td>
<td>Default: false. When true, actions that were removed from the action list before being executed will be returned.</td>
</tr>
<tr>
<td>costType</td>
<td>- <strong>Saving</strong></td>
</tr>
<tr>
<td></td>
<td>An action that will decrease cloud spending.</td>
</tr>
<tr>
<td></td>
<td>- <strong>Investment</strong></td>
</tr>
<tr>
<td></td>
<td>An action that will increase cloud spending.</td>
</tr>
<tr>
<td>cumulative</td>
<td>Default: false. When true, shows the savings for each action in a scope as a cumulative total, rather than showing the savings for individual actions.</td>
</tr>
<tr>
<td>environmentType</td>
<td>- <strong>ONPREM:</strong></td>
</tr>
<tr>
<td></td>
<td>Returns only actions related to entities that are part of your on-premises environment.</td>
</tr>
<tr>
<td></td>
<td>- <strong>CLOUD:</strong></td>
</tr>
<tr>
<td></td>
<td>Returns only actions related to entities that are part of your cloud environment.</td>
</tr>
<tr>
<td>groupBy</td>
<td>You may group the actions returned by the following criteria: [actionModes, actionStates, actionTypes, risk, riskSeverity, riskSubCategory]</td>
</tr>
<tr>
<td>hasReservedInstance</td>
<td>Default: false. When true, only actions that are related to reserved instances will be returned.</td>
</tr>
<tr>
<td>relatedEntityTypes</td>
<td>Returns only actions related to entities of these types within the scope. For example, if your scope is a virtual datacenter and you specify VirtualMachine as a related entity type, the request will include only those actions related to VMs in the specified virtual datacenter. Choose from the following entity types: [ Datacenter, PhysicalMachine, VirtualMachine, Storage, Application, Chassis, DiskArray, IOModule, StorageControl, Switch, VirtualDataCenter, VPod, DPod, Container, Database, DatabaseServerContainer, LogicalPool ]</td>
</tr>
<tr>
<td>riskSeverityList</td>
<td>Returns only actions of the given severities. [ Unknown, Normal, Minor, Major, Critical ]</td>
</tr>
<tr>
<td>riskSubCategoryList</td>
<td>returns only actions of the given subcategories. [ Performance Assurance, Efficiency Improvement, Prevention, Compliance ]</td>
</tr>
</tbody>
</table>

**Example:** POST `https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/actions/stats`
**Example input:** In this example, a list of stats for actions that meet the following criteria will be returned and grouped by the `actionMode` of the action, in order of severity:

- Is in state `PENDING_ACCEPT`
- Is part of an on-premises environment
- Is an action for a virtual machine
- Is an action generated by the Turbonomic real-time market

```json
{
  "actionInput":{
    "actionStateList": [
      "PENDING_ACCEPT"
    ],
    "environmentType": "ONPREM",
    "groupBy": [
      "actionModes"
    ],
    "relatedType": "VirtualMachine"
  }
}
```

**Response:** A list of StatSnapshotApiDTOs that aggregate statistics about the filtered actions.

```json
[
  {
    "date": "2019-04-24T03:56:34-04:00",
    "statistics": [
      {
        "name": "numActions",
        "values": {
          "max": 1,
          "min": 1,
          "avg": 1,
          "total": 1
        },
        "value": 1
      },
      {
        "name": "costPrice",
        "filters": [
          {
            "type": "property",
            "value": "savings"
          }
        ],
        "units": "\$",
        "values": {
          "max": 69.77539,
          "min": 69.77539,
          "avg": 69.77539,
          "total": 69.77539
        }
      }
    ]
  }
]
Getting the Constraints for placement of an entity

When it calculates where to place an entity, Turbonomic respects whatever placement constraints there might be in your environment. For example, unless you have a Merge Cluster policy in effect, VM placement is constrained to hosts in the same cluster.

This call gets a ConstraintApiDTO object, which describes these constraints for the specified entity. The data in this object is equivalent to the Placement Constraints view that you can see in the user interface. To see this view, you drill down to the policy view for a single entity. In this user interface view you can see the entity's related providers and consumers. You can also open a view for each related entity to show the constraints that limit potential placement for your entity. Also in this view, you can test out different placement options. (For information about testing different placement options, see Inspecting placement options within constraints for an element (on page 58).)

In the same way, the ConstraintApiDTO contains data objects to describe the current placement relationships, as well as potential changes you could make. The DTO delivers an array of objects for each consumer or provider. Within each object:

- **relation** indicates whether the entity is a provider (bought) or consumer (sold)
- **relatedEntities** describes the current consumer or provider
- **placementOptions** show other placement you could exploit for this relationship, if you were to remove the current constraints (via merge policies or other means)

**Example:** GET https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/constraints

**Response:** This listing shows a subset of the related entities and placement options:

```json
{
  "relation": "bought",
  "entityType": "PhysicalMachine",
  "relatedEntities": [
    {
      "links": [
        {
          "rel": "self",
```
"href": "https://10.10.10.10/api/v3/entities/30333436-3638-5355-4532-313159335631?include_aspects=false" 
],
"uuid": "30333436-3638-5355-4532-313159335631",
"displayName": "hp-dl571.dev.mycorp.com",
"className": "PhysicalMachine",
"priceIndex": 6.577457,
"state": "ACTIVE",
"severity": "Normal",
"discoveredBy": {
  "uuid": "_FJwg0EzHEemaXZFqOlsC0g",
  "displayName": "vsphere-dc11.dev.mycorp.com",
  "type": "vCenter"
},
"remoteId": "host-30",
"environmentType": "ONPREM"
],
"numPotentialEntities": 1,
"placementOptions": [
  {
    "constraintType": "ClusterCommodity",
    "scope": {
      "uuid": "17fe23bc346750d62dce8baa4274fa99b4739975f",
      "displayName": "Cloud\Physical"
    },
    "target": {
      "uuid": "_FJwg0EzHEemaXZFqOlsC0g",
      "displayName": "vCenter:vsphere-dc11.dev.mycorp.com",
      "type": "vCenter"
    },
    "numPotentialEntities": 3,
    "key": "Cluster::17fe23bc346750d62dce8baa4274fa99b4739975f"
  },
  {
    "constraintType": "NetworkCommodity",
    "scope": {
      "displayName": "NetworkCommodity/vEOS-4"
    },
    "numPotentialEntities": 2,
    "key": "DistributedVirtualPortgroup::vmnet4"
  },
  {
    "constraintType": "DatastoreCommodity",
    "scope": {
      "uuid": "5a822e24-584bce98-ecb2-441ea15e2534",
      "displayName": "SCIO:ESXDC11DS2"
    },
    "target": {
      "uuid": "_FJwg0EzHEemaXZFqOlsC0g",
      "displayName": "vCenter:vsphere-dc11.dev.mycorp.com",
      "type": "vCenter"
    },
    "numPotentialEntities": 2,
Inspecting Placement Options Within Constraints for an Element

Within the given constraints that limit placement of an entity, there are usually a number of options for placement. The current placement is just one of many.

For information about getting entity constraints, see [Getting the Constraints for Placement of an Entity](on page 58).

When you get the constraints for an entity, the ConstraintApiDTO includes other placement options for that entity on its providers, and options to place other consumers on the entity. The call in this section passes these placement options and returns the respective providers or consumers that satisfy the resulting constraint changes.

Making this call is equivalent to clicking Find More Placement Options in the user interface. To see this in the user interface, set the scope to a single entity, display the POLICIES tab, and scroll down to the Placement Constraints section. Then click Constraints next to the provider you want to explore, and click Find More Placement Options.

**Example:** POST https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/constraints/entities

**Example input:** In this example, we pass two placement options, that we copied from a ConstraintApiDTO for the entity we’re inspecting. Note that each placement option in the ConstraintApiDTO includes a constraintType and a key. To pass a placement option, these are the only fields we need. For this example we pass a ClusterCommodity constraint and a DatastoreCommodity constraint.

```json
{
"relation": "bought",
"placementOptions": [
{
"constraintType": "ClusterCommodity",
"key": "Cluster::17fe23bc34f750d62dce8ba4274fa99b473975f"
}]
}
```
Response: In the data we posted (above), the cluster commodity has three potential entities, and the datastore commodity has two potential entities. The response brings back the intersection of these three potential provider entities – Two hosts.

```json
[
  {
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/entities/30343835-3638-584d-5131-323530394e39?include_aspects=false"
      },
      "uuid": "30343835-3638-584d-5131-323530394e39",
      "displayName": "hp-dl569.dev.mycorp.com",
      "className": "PhysicalMachine",
      "priceIndex": 1.031998,
      "state": "ACTIVE",
      "severity": "Normal",
      "discoveredBy": {
        "uuid": "_FJwg0EzHEemaXZFqO1sC0g",
        "displayName": "vsphere-dc11.dev.mycorp.com",
        "type": "vCenter"
      },
      "remoteId": "host-3323",
      "environmentType": "ONPREM"
    },
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/entities/30333436-3638-5355-4532-313159335631?include_aspects=false"
      },
      "uuid": "30333436-3638-5355-4532-313159335631",
      "displayName": "hp-dl571.dev.mycorp.com",
      "className": "PhysicalMachine",
      "priceIndex": 6.916899,
      "state": "ACTIVE",
      "severity": "Normal",
      "discoveredBy": {
        "uuid": "_FJwg0EzHEemaXZFqO1sC0g",
        "displayName": "vsphere-dc11.dev.mycorp.com",
        "type": "vCenter"
      },
      "remoteId": "host-3323",
      "environmentType": "ONPREM"
    }
]```
Getting Group Membership of an Entity

Referenced Endpoint: Groups (on page 88)

The Groups endpoint tells you which entities are in a given group. The /entities/{entity_Uuid}/groups call tells you which groups a given entity belongs to. You can make this call in two modes:

- Include relationship paths
  In this mode the results include only those groups that are in a buy or sell relationship with the entity. For example, a VM entity might have relationships with a datacenter and a host cluster. The call would return entries for the datacenter, the host cluster, and the VM itself.

- Do not include relationship paths
  In this mode the call returns every group that includes the passed entity as a member entity. This can be a large number of groups, including all the discovered groups as well as any custom groups you created. The results do not show buy/sell relationships.

This request takes the following parameters:

<table>
<thead>
<tr>
<th>entity_Uuid</th>
<th>The UUID of the entity whose actions will be returned.</th>
</tr>
</thead>
<tbody>
<tr>
<td>path</td>
<td>Default: false. When true, results include only related groups, and they show the providers and consumers for each group when applicable.</td>
</tr>
</tbody>
</table>

Examples:

- **All groups** (path = false): GET https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/groups?path=false

- **Buy/Sell related groups, only** (path = true): GET https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/groups?path=true

Response: A list of related groups. For the default (path = false), this returns an array of group objects.

```json
[
    {
        "links": [
            {
                "rel": "self",
                "href": "https://10.10.10.10/api/v3/groups/_lSlr0GddEemDFcIzuV5wcQ?include_aspects=false"
            }
        ],
        "uuid": "_lSlr0GddEemDFcIzuV5wcQ",
        "displayName": "CUD_Vm_Group_vEOS",
        "className": "Group",
        "environmentType": "ONPREM",
        "entitiesCount": 5,
```
Getting Settings Policies Affecting an Entity

*Referenced Endpoint: [Settings Policies](#page 226)*

This call returns an array of SettingsPolicyApiDTOs for all the Automation Policies that are effective for the given entity. Note that one entity can be in multiple groups, and so it can have policies that set different values for the same setting. In that case, the most conservative setting takes effect. The data returned by this call does not reflect which setting takes precedence in this case. The call merely reflects what you would see in the user interface.

**Example:**

GET https://10.10.10.10/api/v3/entities/420bleeb-6190-a9d2-6436-4327ad3ac073/settingspolicies

**Response:** An array of SettingsPolicyApiDTOs that are effective for the entity.

```json
[
{
    "uuid": "_i-QuUGXUEmoItN1K8jw3Q",
    "displayName": "CUD_VM_AUTOMATION_POLICY",
    "entityType": "VirtualMachine",
    "scopes": [
        {
            "uuid": "_BZbFsWXUEmoItN1K8jw3Q",
            "displayName": "CUD_VM_Group",
            "groupType": "VirtualMachine",
            "isStatic": true,
            "logicalOperator": "AND"
        }
    ],
    "settingsManagers": [
        {
            "uuid": "automationmanager",
            "displayName": "Action Mode Settings",
            "category": "Automation",
            "settings": [
                {
                    "uuid": "startVM",
                    "displayName": "Start",
                    "value": "MANUAL",
                    "defaultValue": "RECOMMEND",
                    "valueType": "STRING",
                    "options": [
                        {
                            "label": "Disabled",
                            "value": "DISABLED"
                        }
                    ]
                }
            ]
        }
    ]
}
]```
Getting Statistics of an Entity

Referenced Endpoint: Stats (on page 232)

Gets all statistics for the specified entity. This request takes the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>entity_uuid</td>
<td>The entity whose statistics will be returned.</td>
</tr>
<tr>
<td>q</td>
<td>Used internally by Turbonomic.</td>
</tr>
</tbody>
</table>

Example: GET https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/stats

Response: A list of StatSnapshotApiDTOs representing the current values of the statistics.

```json
[
  {
    "displayName": "AdityaReplica",
    "date": "2019-04-24T20:09:46-04:00",
    "statistics": [
      {
        "name": "priceIndex",
        "relatedEntityType": "VirtualMachine",
        "values": {
          "max": 1.01,
          "min": 1.01,
          "avg": 1.01,
```
"total": 1.01,
"value": 1.01,
{
"displayName": "CPUProvisioned/AdityaReplica",
"name": "CPUProvisioned",
"capacity": {
"max": 3120000,
"min": 3120000,
"avg": 3120000,
"total": 3120000
},
"relatedEntityType": "VirtualMachine",
"filters": [
{
"type": "relation",
"value": "bought"
}
],
"units": "MHz",
"values": {
"max": 5200,
"min": 5200,
"avg": 5200,
"total": 5200
},
"value": 5200,
{
"displayName": "Swapping/AdityaReplica",
"name": "Swapping",
"capacity": {
"max": 40000000,
"min": 40000000,
"avg": 40000000,
"total": 40000000
},
"relatedEntityType": "VirtualMachine",
"filters": [
{
"type": "relation",
"value": "bought"
}
],
"units": "bit/sec",
"values": {
"max": 0,
"min": 0,
"avg": 0,
"total": 0
},
"value": 0
}
Getting a Filtered List of Statistics for an Entity

Referenced Endpoint: Stats (on page 232)

Gets a list of statistics filtered by a user-created StatPeriodApiInputDTO. For more information about the criteria that makes up the input for this request, see the Swagger documentation for this request, located at https://<Your_Turbonomic_IP>/vmturbo/apidoc/.

Example: POST https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/stats

Example Input: This input will return the values for the VMem, VCPU, and VStorage statistics of the specified entity, ordered first by key, then relatedEntity, then virtualDisk.

```json
{
  "statistics": [
    {
      "name": "VMem",
      "groupBy": [
        "key",
        "relatedEntity",
        "virtualDisk"
      ]
    }
  ]
}
```
"name": "VCPU",
"groupBy": [
  "key",
  "relatedEntity",
  "virtualDisk"
],
",
"name": "VStorage",
"groupBy": [
  "key",
  "relatedEntity",
  "virtualDisk"
]
]
}

Response: An array of StatSnapshotApiDTOs representing the filtered statistics for the entity:

```
[
  {
    "displayName": "vEOS-4",
    "date": "2019-04-25T17:57:02-04:00",
    "statistics": [
      {
        "displayName": "vEOS-4",
        "name": "VCPU",
        "capacity": {
          "max": 2663,
          "min": 2663,
          "avg": 2663,
          "total": 2663
        },
        "relatedEntityType": "VirtualMachine",
        "filters": [
          {
            "type": "virtualDisk",
            "value": ""
          },
          {
            "type": "key",
            "value": null
          },
          {
            "type": "relation",
            "value": "sold"
          }
        ],
        "relatedEntity": {
          "uuid": "c0849b50a2ccee61f57ea0e49e2199503e82f3f54",
          "displayName": "GuestLoad[vEOS-4]",
          "className": "Application"
        }
      }
    ]
  }
]```
Getting the Supply Chain of an Entity

Referenced Endpoint: Supply Chains (on page 246)

Turbonomic models your environment as a market of buyers and sellers. It maps the entities it discovers to a supply chain that represents the buy/sell relationships between these entities.

In the user interface, the default view on the Home Page shows the global supply chain. You can change scope to drill down to a supply chain for the relationships to a single entity. This is the same as the result when you get a supply chain for an entity via the API. The returned data is a SupplyChainApiDTO that expresses the scope for the passed entity.

The supply chain shows tiers of entity types, where depth indicates where in the supply chain levels a specific tier is. When you get a supply chain for an entity, the entity is at depth = 0. The depths for tiers above the entity are negative. For example, if a VM is at depth = 0, then the application that consumes from the VM would be at depth = -1. Likewise, providers to the VM would have positive depths. For example, storage that provides resources to the VM would have depth = 1, and a disk array that hosts the storage would have depth = 2.

The supply chain request takes the following parameters:

- **entity_uuid**
  The entity that sets the scope of the supply chain.

- **types**
  An array of strings for the entity types you want to include in the supply chain. If you leave this blank, the call returns the complete supply chain for this entity. If you specify any types, the returned supply chain contains only those types. If you do not include the type of the passed entity, then it will not be included.

- **entity_states**
  An array of strings. Limit the supply chain to include only entities in the given state. Entity states are:
  - ACTIVE: The entity is actively consuming resources
  - EVACUATED: All consumers have been moved off of the entity, and it can be suspended or terminated
  - FAILOVER: The entity is reserved for failover and will not participate in the market
  - IDLE: The entity is powered off and not actively consuming market resources
  - LAUNCH: The entity is starting up
  - MAINTENANCE: The entity is in Maintenance mode
  - NOT_MONITORED: Turbonomic is currently not monitoring the entity
  - QUEUED: More than ten actions are to be executed for a single target, and this entity has pending actions in the queue
  - RESOURCE_ALLOCATION: For internal use
  - RESOURCE_RELEASE: For internal use
  - SUSPEND: The entity has been placed in Suspend mode
  - SUSPEND_PENDING: The entity is making preparations to suspend, or is the next entity of its type to suspend
  - TERMINATE_PENDING: The entity is making preparations to terminate, or is the next entity of its type to terminate
  - UNKNOWN: Turbonomic is unable to obtain the current state of the entity

- **environment_type**
  Limit the supply chain to a specific environment type. If you do not specify environment type, the supply chain includes all environments, which is the same as HYBRID. The environment types are:
  - HYBRID
<table>
<thead>
<tr>
<th><strong>Turbonomic REST API Endpoints</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
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<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
</tbody>
</table>

**Example:**

```bash
GET https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073/supplychains?types=VirtualMachine&types=Storage&types=DiskArray&detail_type=compact&health=true
```

This example gets a supply chain for a VM entity, with the following settings: including the VM, storage, and disk arrays:

- Only include the VM, its storage, and the disk arrays
- Give compact details
- Show the entity health

**Response:** The `SupplyChainApiDTO` for the filtered request:

```json
{
  "seMap": {
    "VirtualMachine": {
      "depth": 0,
      "entitiesCount": 1,
      "healthSummary": {
        "Normal": 1
      },
      "stateSummary": {
        "ACTIVE": 1
      },
      "connectedProviderTypes": [
        "PhysicalMachine",
        "Storage",
        "VirtualDataCenter"
      ],
      "connectedConsumerTypes": [
        "Application"
      ],
      "instances": {
        "420b1eeb-6190-a9d2-6436-4327ad3ac073": {
          "links": [
            {
              "rel": "self",
              "href": "https://10.10.10.10/api/v3/entities/420b1eeb-6190-a9d2-6436-4327ad3ac073?include_aspects=false"
            }
          ],
          "uuid": "420b1eeb-6190-a9d2-6436-4327ad3ac073",
          "displayName": "vEOS-4",
          "className": "VirtualMachine",
          "priceIndex": 1.1463195,
```

"state": "ACTIVE",
"severity": "Normal",
"discoveredBy": {
  "uuid": "_FJwg0EzHEemaXZFq0lsC0g",
  "displayName": "vsphere-dc11.dev.mycorp.com",
  "type": "vCenter"
},
"remoteId": "vm-100",
"environmentType": "ONPREM"
},
"Storage": {
  "depth": 1,
  "entitiesCount": 2,
  "healthSummary": {
    "Normal": 2
  },
  "stateSummary": {
    "ACTIVE": 2
  },
  "connectedProviderTypes": [
    "DiskArray"
  ],
  "connectedConsumerTypes": [
    "PhysicalMachine",
    "VirtualMachine"
  ],
  "instances": {
    "5a822e24-584bce98-ecb2-441ea15e2534": {
      "links": [
        {
          "rel": "self",
          "href": "https://10.10.10.10/api/v3/entities/5a822e24-584bce98-ecb2-441ea15e2534?include_aspects=false"
        }
      ],
      "uuid": "5a822e24-584bce98-ecb2-441ea15e2534",
      "displayName": "SCIO:ESXDC11DS2",
      "className": "Storage",
      "priceIndex": 1.2797012,
      "state": "ACTIVE",
      "severity": "Normal",
      "discoveredBy": {
        "uuid": "_FJwg0EzHEemaXZFq0lsC0g",
        "displayName": "vsphere-dc11.dev.mycorp.com",
        "type": "vCenter"
      },
      "remoteId": "datastore-2357",
      "environmentType": "ONPREM",
      "tags": {
        "Datastore_DC11": ["True"]
      }
    }
  }
}
"9bd4ee88-99c64661": {
  "links": [
    {
      "rel": "self",
      "href": "https://10.10.10.10/api/v3/entities/9bd4ee88-99c64661?include_aspects=false"
    }
  ],
  "uuid": "9bd4ee88-99c64661",
  "displayName": "QS1:NFSShare",
  "className": "Storage",
  "priceIndex": 20000,
  "state": "ACTIVE",
  "severity": "Normal",
  "discoveredBy": {
    "uuid": "_gQOEYsREemB8r4uTzazvA",
    "displayName": "vsphere-dc5.dev.mycorp.com",
    "type": "vCenter"
  },
  "remoteId": "datastore-1411",
  "environmentType": "ONPREM",
  "tags": {
    "DimStor": ["DimStorTag"],
    "Datastore_DC11": ["True"],
    "Test_Tag": ["MyStorageTag"]
  }
},
"DiskArray": {
  "depth": 2,
  "entitiesCount": 2,
  "healthSummary": {
    "Normal": 2
  },
  "stateSummary": {
    "ACTIVE": 2
  },
  "connectedConsumerTypes": ["Storage"],
  "instances": {
    "DiskArray-9bd4ee88-99c64661": {
      "links": [
        {
          "rel": "self",
          "href": "https://10.10.10.10/api/v3/entities/DiskArray-9bd4ee88-99c64661?include_aspects=false"
        }
      ]
    }
  }
}
Getting the Tags on an Entity

Referenced Endpoint: Tags (on page 249)

Turbonomic discovers tags and tag values that are assigned to different entities in your environment. This call returns the tag and value sets for the entity you pass.

Example: GET https://10.10.10.10/api/v3/entities/9bd4ee88-99c64661/tags

Response: A TagApiDTO for the passed entity. This gives an array of key/value pairs, where the value is an array of strings.
Groups Endpoint

A group is a collection of entities that Turbonomic can work with as a unit. The most common use of groups is to set scope for display in charts or for processing in plans, and to retrieve statistics for a subset of your environment.

This endpoint contains references to start and end times for certain operations. For more information, including valid time formats, see Time in the Turbonomic API (on page 12)

Using the groups endpoint of the Turbonomic API, you can:

- Get a list of all groups on your Turbonomic appliance
- Create a group
- Edit a group
- Delete a group
- Get a list of actions for a specified groups
- Get a list of entities in a specified group
- Get parent groups of a specified group
- Get a list of members of a specified group
- Get a list of notifications for a specified group
- Get a list of settings for a specified group
- Get a list of policies for a specified group
- Get statistics for a specified group
- Get the supply chain related to a specified group
- Get the tags belonging to a specified group
## Group Types and Class Names

Turbonomic subdivides the entities on your appliance by the following group class name, to aid in both searching and understanding the purpose of a group:

<table>
<thead>
<tr>
<th>Class Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folder</td>
<td>These appear in the user interface as folders, and are for visual organization. Discovered folders represent the folder structure in the target — for example, the vCenter folder structure. In addition, Turbonomic discovers vCenter Server resource pools, and groups them into folders.</td>
</tr>
<tr>
<td>Group</td>
<td>Turbonomic places discovered entities into standard groups, and users can create groups of their own with static or dynamic membership.</td>
</tr>
<tr>
<td>RefGroup</td>
<td>A RefGroup can be a group of groups- for example, a group of PM cluster groups that make up a hypervisor target- or a group defined by a relationship. For example, the built-in group PMsByDatacenter is a RefGroup reflecting the relationship between the datacenters and hosts.</td>
</tr>
<tr>
<td>Cluster / StorageCluster</td>
<td>Groups that correspond to discovered clusters.</td>
</tr>
<tr>
<td>DiscoveredGroup</td>
<td>Groups that are defined by a target service. For example, Turbonomic can discover DRS domains that were defined in vCenter Server.</td>
</tr>
<tr>
<td>MarketGroup</td>
<td>A group that is based on the infrastructure cost of that entity type. These groups are based on the Infrastructure Cost settings in the Turbonomic policies.</td>
</tr>
<tr>
<td>StaticMetaGroup / RefMetaGroup / MetaGroup</td>
<td>Groups used internally by Turbonomic. These should not be modified in any way.</td>
</tr>
</tbody>
</table>

In addition, each group has a `groupType` that identifies the type of members that group contains. Remember that when you create a group in the user interface or via the API, you cannot add more than one type of member. The different group types include:

<table>
<thead>
<tr>
<th>Group Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster</td>
<td>A group of clusters. For example, you could create a group of all PM clusters that include the name &quot;Development&quot;.</td>
</tr>
<tr>
<td>ServiceEntity</td>
<td>An internal group type reserved for groups that Turbonomic discovers or creates. Note that the group will still contain members of only one type.</td>
</tr>
</tbody>
</table>

### Entity Type

- BUSINESS_UNIT
- CLOUD_SERVICE
- CONTAINER
- DATABASE
- DATABASE_SERVER
- DATACENTER
- DISK_ARRAY
- PHYSICAL_MACHINE
- STORAGE
- VIRTUAL_MACHINE
### Group Type

<table>
<thead>
<tr>
<th>Group Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWITCH</td>
<td></td>
</tr>
<tr>
<td>VIRTUAL_DATACENTER</td>
<td></td>
</tr>
<tr>
<td>CHASSIS</td>
<td></td>
</tr>
<tr>
<td>STORAGE_CONTROLLER</td>
<td></td>
</tr>
<tr>
<td>IO_MODULE</td>
<td></td>
</tr>
<tr>
<td>APPLICATION_SERVER</td>
<td></td>
</tr>
<tr>
<td>VIRTUAL_APPLICATION</td>
<td></td>
</tr>
<tr>
<td>NETWORK</td>
<td></td>
</tr>
<tr>
<td>APPLICATION</td>
<td></td>
</tr>
<tr>
<td>CONTAINER</td>
<td></td>
</tr>
<tr>
<td>CONTAINER_POD</td>
<td></td>
</tr>
<tr>
<td>LOGICAL_POOL</td>
<td></td>
</tr>
<tr>
<td>DPOD</td>
<td></td>
</tr>
<tr>
<td>VPOD</td>
<td></td>
</tr>
<tr>
<td>LOAD_BALANCER</td>
<td></td>
</tr>
</tbody>
</table>

Understanding the different group types helps you find the group you want. If you know the name of a specific group, then you can filter the returned list for a group of that name. Or if you want to step through all the clusters Turbonomic has discovered, you can filter all the entries with a `className` of `Cluster` or `StorageCluster`.

### Group Filter Types

Turbonomic utilizes regex and a `filterType` to build a group. The `filterType` is the criteria to which the regex will be matched. For example, a `filterType` of `pmsByName` will apply the regex to the display names of physical machines.

The available options for this parameter depend on the entity making up your group:

<table>
<thead>
<tr>
<th>Entity</th>
<th>filterType Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>VirtualMachine</td>
<td>vmsByName</td>
</tr>
<tr>
<td></td>
<td>vmsByPMName</td>
</tr>
<tr>
<td></td>
<td>vmsByStorage</td>
</tr>
<tr>
<td></td>
<td>vmsByNetwork</td>
</tr>
<tr>
<td></td>
<td>vmsByApplication</td>
</tr>
<tr>
<td></td>
<td>vmsByDatabaseServer</td>
</tr>
<tr>
<td></td>
<td>vmsByDatabaseServerVersion</td>
</tr>
<tr>
<td></td>
<td>vmsByDC</td>
</tr>
<tr>
<td></td>
<td>vmsByVDC</td>
</tr>
<tr>
<td></td>
<td>vmsByDCnested</td>
</tr>
<tr>
<td></td>
<td>vmsByNumCPUs</td>
</tr>
<tr>
<td></td>
<td>vmsByMem</td>
</tr>
<tr>
<td></td>
<td>vmsByGuestName</td>
</tr>
<tr>
<td></td>
<td>vmsByAltName</td>
</tr>
<tr>
<td></td>
<td>vmsByClusterName</td>
</tr>
<tr>
<td></td>
<td>vmsByDiskArrayName</td>
</tr>
<tr>
<td>Entity</td>
<td>filterType Options</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>vmsByLogicalPoolName</td>
</tr>
<tr>
<td></td>
<td>vmsByTag</td>
</tr>
<tr>
<td></td>
<td>vmsByState</td>
</tr>
<tr>
<td></td>
<td>vmsByBusinessAccountUuid</td>
</tr>
<tr>
<td></td>
<td>vmsByResourceGroupUuid</td>
</tr>
<tr>
<td>VirtualDataCenter</td>
<td>vdcByByName</td>
</tr>
<tr>
<td></td>
<td>vdcByVDCName</td>
</tr>
<tr>
<td></td>
<td>vdcByTag</td>
</tr>
<tr>
<td></td>
<td>vdcByState</td>
</tr>
<tr>
<td>PhysicalMachine</td>
<td>pmsByName</td>
</tr>
<tr>
<td></td>
<td>pmsByStorage</td>
</tr>
<tr>
<td></td>
<td>pmsByNetwork</td>
</tr>
<tr>
<td></td>
<td>pmsBySwitch</td>
</tr>
<tr>
<td></td>
<td>pmsByNumVms</td>
</tr>
<tr>
<td></td>
<td>pmsByDC</td>
</tr>
<tr>
<td></td>
<td>pmsByMem</td>
</tr>
<tr>
<td></td>
<td>pmsByNumCPUs</td>
</tr>
<tr>
<td></td>
<td>pmsByVendorName</td>
</tr>
<tr>
<td></td>
<td>pmsByCPUModel</td>
</tr>
<tr>
<td></td>
<td>pmsByModel</td>
</tr>
<tr>
<td></td>
<td>pmsByTimezone</td>
</tr>
<tr>
<td></td>
<td>pmsByClusterName</td>
</tr>
<tr>
<td></td>
<td>pmsByTag</td>
</tr>
<tr>
<td></td>
<td>pmsByState</td>
</tr>
<tr>
<td>Storage</td>
<td>storageByName</td>
</tr>
<tr>
<td></td>
<td>storageByTag</td>
</tr>
<tr>
<td></td>
<td>storageByVMs</td>
</tr>
<tr>
<td></td>
<td>storageByDC</td>
</tr>
<tr>
<td></td>
<td>storageByPMCluster</td>
</tr>
<tr>
<td></td>
<td>storageByState</td>
</tr>
<tr>
<td>Application</td>
<td>appsByName</td>
</tr>
<tr>
<td>Application Server</td>
<td>appSrvsByName</td>
</tr>
<tr>
<td>WebServer</td>
<td>wbSrvsByName</td>
</tr>
<tr>
<td>BusinessApplication</td>
<td>busAppsByName</td>
</tr>
<tr>
<td>Database</td>
<td>databaseByName</td>
</tr>
<tr>
<td></td>
<td>databaseByTag</td>
</tr>
<tr>
<td></td>
<td>databaseByBusinessAccountUuid</td>
</tr>
<tr>
<td>Entity</td>
<td>filterType Options</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>• databaseByResourceGroupUuid</td>
</tr>
<tr>
<td>DatabaseServer</td>
<td>• databaseServerByName</td>
</tr>
<tr>
<td></td>
<td>• databaseServerByTag</td>
</tr>
<tr>
<td></td>
<td>• databaseServerByBusinessAccountUuid</td>
</tr>
<tr>
<td></td>
<td>• databaseServerByEngine</td>
</tr>
<tr>
<td></td>
<td>• databaseServerByEdition</td>
</tr>
<tr>
<td></td>
<td>• databaseServerByVersion</td>
</tr>
<tr>
<td>VirtualApplication</td>
<td>• vappsByName</td>
</tr>
<tr>
<td>Cluster</td>
<td>• clustersByName</td>
</tr>
<tr>
<td></td>
<td>• clustersByTag</td>
</tr>
<tr>
<td>DataCenter</td>
<td>• datacentersByName</td>
</tr>
<tr>
<td></td>
<td>• datacentersByTag</td>
</tr>
<tr>
<td>Group</td>
<td>• groupsByName</td>
</tr>
<tr>
<td>StorageCluster</td>
<td>• storageClustersByName</td>
</tr>
<tr>
<td>DiskArray</td>
<td>• diskarrayByName</td>
</tr>
<tr>
<td>Zone</td>
<td>• zonsByName</td>
</tr>
<tr>
<td>Region</td>
<td>• regsByName</td>
</tr>
<tr>
<td>Network</td>
<td>• netsByName</td>
</tr>
<tr>
<td>LoadBalancer</td>
<td>• lbsByName</td>
</tr>
<tr>
<td>Chassis</td>
<td>• chasByName</td>
</tr>
<tr>
<td>StorageController</td>
<td>• storagecontrollerByName</td>
</tr>
<tr>
<td>DPod</td>
<td>• dpodByName</td>
</tr>
<tr>
<td>VPod</td>
<td>• vpodByName</td>
</tr>
<tr>
<td>LogicalPool</td>
<td>• logicalPoolByName</td>
</tr>
<tr>
<td>Switch</td>
<td>• switchByName</td>
</tr>
<tr>
<td>Container</td>
<td>• containersByName</td>
</tr>
<tr>
<td></td>
<td>• containersByVMName</td>
</tr>
<tr>
<td>ContainerPod</td>
<td>• containerpodsByName</td>
</tr>
<tr>
<td></td>
<td>• containerpodsByVMName</td>
</tr>
<tr>
<td>ServiceEntity</td>
<td><strong>NOTE:</strong> Groups of type ServiceEntity are the only groups that have multiple entity types, and are used exclusively for cloud targets.</td>
</tr>
<tr>
<td></td>
<td>• workloadByBusinessAccountUuid</td>
</tr>
<tr>
<td></td>
<td>• workloadByResourceGroupUuid</td>
</tr>
<tr>
<td>Workload</td>
<td>• workloadByBusinessAccountUuid</td>
</tr>
<tr>
<td>Entity</td>
<td>filterType Options</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>• workloadByResourceGroupUuid</td>
</tr>
<tr>
<td></td>
<td>• ResourceGroup</td>
</tr>
<tr>
<td></td>
<td>• resourceGroupByName</td>
</tr>
<tr>
<td></td>
<td>• resourceGroupByUuid</td>
</tr>
<tr>
<td></td>
<td>• resourceGroupByBusinessAccountUuid</td>
</tr>
<tr>
<td>BusinessAccount</td>
<td>• businessAccountByName</td>
</tr>
<tr>
<td></td>
<td>• businessAccountByUuid</td>
</tr>
<tr>
<td></td>
<td>• subBusinessAccountOfUuid</td>
</tr>
<tr>
<td></td>
<td>• businessAccountValidationStatus</td>
</tr>
<tr>
<td></td>
<td>• businessAccountTargetName</td>
</tr>
<tr>
<td></td>
<td>• businessAccountCloudProvider</td>
</tr>
<tr>
<td>BillingFamily</td>
<td>• billingFamilyByName</td>
</tr>
<tr>
<td>ViewPod</td>
<td>• viewPodByName</td>
</tr>
<tr>
<td>DesktopPool</td>
<td>• desktopPoolByName</td>
</tr>
<tr>
<td></td>
<td>• desktopPoolByViewPod</td>
</tr>
<tr>
<td>BusinessUser</td>
<td>• businessUserByName</td>
</tr>
</tbody>
</table>

Groups Requests

Getting a List of Groups

Gets a list of all groups on your Turbonomic appliance. This will include Turbonomic internal and default groups, as well as any groups discovered from your targets, in addition to your custom groups.

Example: GET https://10.10.10.10/api/v3/groups

Response: A list of GroupApiDTOs representing the groups on your appliance.

```json
[
  {
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/groups/_S4k98SFQEd-S4dn3K4_SSA?include_aspects=false"
      }
    ],
    "uuid": "_S4k98SFQEd-S4dn3K4_SSA",
    "displayName": "Datacenters",
    "className": "Group",
    "environmentType": "ONPREM",
    "entitiesCount": 12,
    "membersCount": 12,
```
Creating a Group

In order to create a group in Turbonomic, you must provide a GroupApiDTO with a **groupType** and **isStatic**.

If your group is dynamic, you must also include the **criteriaList** information:

<table>
<thead>
<tr>
<th>caseSensitive</th>
<th>If true, the regex will be evaluated as case-sensitive.</th>
</tr>
</thead>
<tbody>
<tr>
<td>expType</td>
<td>For strings, the allowable values are <strong>EQ</strong> and <strong>NEQ</strong> (Equals, Does Not Equal). For integers, you may additionally use <strong>GT</strong>, <strong>LT</strong>, <strong>GTE</strong>, <strong>LTE</strong> (Greater than, less than, greater than or equal to, and less than or equal to, respectively).</td>
</tr>
<tr>
<td>expVal</td>
<td>The value of the regular expression.</td>
</tr>
<tr>
<td>filterType</td>
<td>See Group Filter Types for a full list of available options</td>
</tr>
</tbody>
</table>

If your group is static, you must provide the UUIDs of the entities belonging to the group in the **memberUuidList**, and you must not have any **criteriaList** parameters.

**Example:** POST https://10.10.10.10/api/v3/groups/

Example input, showing the creation of a dynamic group of VMs whose names start with "AJ":

```json
{
    "isStatic": false,
```
"displayName": "Dallas-Dynamic",
"memberUuidList": [],
"criteriaList": [
{
  "expType": "EQ",
  "expVal": "AJ.*",
  "filterType": "vmsByName",
  "caseSensitive": false
}
],
"groupType": "VirtualMachine"
}

Response:

{
  "uuid": "_4L0PcE9SEemD69d9a0uLJQ",
  "displayName": "Dallas-Dynamic",
  "className": "Group",
  "environmentType": "ONPREM",
  "entitiesCount": 1,
  "membersCount": 1,
  "groupType": "VirtualMachine",
  "severity": "Major",
  "isStatic": false,
  "logicalOperator": "AND",
  "criteriaList": [
    {
      "expVal": "AJ.*",
      "expType": "EQ",
      "filterType": "vmsByName",
      "caseSensitive": false
    }
  ],
  "activeEntitiesCount": 1
}

Example input, showing the creation of a static group of Hosts:

{
  "isStatic": true,
  "displayName": "Dallas-Static",
  "memberUuidList": [
    "4C4C4544-0042-5A10-804A-B1C04F384331",
    "4C4C4544-004A-3610-8057-C8C04F464331",
    "Virtual_ESX_42381e13-4256-64bb-f554-d17798dcb2ba"
  ],
  "criteriaList": [],
  "groupType": "PhysicalMachine"
}
Editing a Group

In order to edit a user-created group, send the complete GroupApiDTO with your changes as the input to this request.

**Example:** PUT https://10.10.10.10/api/v3/groups/_Y6BL4FDQEemD69d9a0uLJQ

**Example Input:** A modified GroupApiDTO. In this case, the expVal parameter has been modified.

```json
{
  "isStatic": false,
  "displayName": "Dallas-Host",
  "memberUuidList": [],
  "criteriaList": [
    {
      "expType": "EQ",
      "expVal": "hp*change",
      "filterType": "pmsByName",
      "caseSensitive": false
    }
  ],
  "groupType": "PhysicalMachine",
  "logicalOperator": "AND"
}
```

**Response:** The full GroupApiDTO reflecting your changes:

```json
{
  "links": [
    {
      "rel": "self",
      "href": "https://10.10.10.10/api/v3/groups/_vn_u0FJ0EemD69d9a0uLJQ?include_aspects=false"
    }
  ],
  "uuid": "/vn_u0FJ0EemD69d9a0uLJQ",
  "displayName": "Dallas-Static",
  "className": "Group",
  "environmentType": "ONPREM",
  "entitiesCount": 3,
  "membersCount": 3,
  "groupType": "PhysicalMachine",
  "severity": "Critical",
  "isStatic": true,
  "logicalOperator": "OR",
  "activeEntitiesCount": 3
}
```
"links": [  
  {  
    "rel": "self",  
    "href": "https://10.10.10.10/api/v3/groups/_Y6BL4FDQEemD69d9a0uLJQ?include_aspects=false"  
  },  
  "uuid": "_Y6BL4FDQEemD69d9a0uLJQ",  
  "displayName": "Dallas-Host",  
  "className": "Group",  
  "environmentType": "ONPREM",  
  "entitiesCount": 0,  
  "membersCount": 0,  
  "groupType": "PhysicalMachine",  
  "severity": "Normal",  
  "isStatic": false,  
  "logicalOperator": "AND",  
  "criteriaList": [  
    {  
      "expVal": "hp*change",  
      "expType": "EQ",  
      "filterType": "pmsByName",  
      "caseSensitive": false  
    }  
  ],  
  "activeEntitiesCount": 0  
}

Deleting a Group

To delete a user-created group, pass the UUID of the group in the URL of the request.

Example: DELETE https://10.10.10.10/api/v3/groups/_vn_u0FJ0EemD69d9a0uLJQ

Response: A response of 200 indicates successful deletion.

Getting Actions Related to a Group

Referenced Endpoint: Actions (on page 26)

Gets a list of actions relating to the entities in the specified group. To get a single action, include the UUID of the action in the request. This request takes the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>group_Uuid</td>
<td>The UUID of the group whose actions will be returned.</td>
</tr>
<tr>
<td>cursor</td>
<td>When making subsequent calls to retrieve additional results, this is the cursor returned by the last call to this method.</td>
</tr>
<tr>
<td>limit</td>
<td>The maximum number of items to return. Must be a positive integer. If not set, the server will provide a default (20).</td>
</tr>
<tr>
<td>order_by</td>
<td>The field to order the results by. [ creation_date, name, risk_category, savings, severity ].</td>
</tr>
<tr>
<td>ascending</td>
<td>Default: true. When false, results will be in descending order.</td>
</tr>
</tbody>
</table>
Examples:

All actions: GET https://10.10.10.10/api/v3/groups/421dd4ce-a4c1-231a-71e7-64fbf598bc65/actions?limit=50&order_by=creation_date&ascending=true

Single action: GET https://10.10.10.10/api/v3/groups/421dd4ce-a4c1-231a-71e7-64fbf598bc65/actions/_pJg98EQaEemD69d9a0uLJQ

Response: A list of ActionApiDTOS related to the specified group:

```json
[
  {
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/actions/_pJg98EQaEemD69d9a0uLJQ"
      },
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/actions/2500817580000"
      }
    ],
    "uuid": "_pJg98EQaEemD69d9a0uLJQ",
    "createTime": "2019-03-11T12:28:03-04:00",
    "actionType": "RIGHT_SIZE",
    "actionState": "PENDING_ACCEPT",
    "actionMode": "MANUAL",
    "details": "Scale down Memory reservation for Virtual Machine 'AJ_Test' from 2 GB to 1 GB",
    "importance": 0,
    "target": {
      "uuid": "421dd4ce-a4c1-231a-71e7-64fbf598bc65",
      "displayName": "AJ_Test",
      "className": "VirtualMachine",
      "aspects": {
        "virtualMachineAspect": {
          "os": "CentOS 4/5/6/7 (64-bit)",
          "ip": ["10.10.10.107"
        ],
        "connectedNetworks": [
          {
            "uuid": "34f9f5364cd843a1fe99900621ee3b51a7dc6e5",
            "displayName": "VM Network"
          }
        ],
        "numVCPUs": 1,
        "ebsOptimized": false
      }
    }
  }
]```


```
{
    "newEntity": {
        "uuid": "_pLCA40QaEemD69d9a0uLJQ",
        "className": "Mem",
        "aspects": {
            "virtualMachineAspect": {
                "os": "Linux (Free)",
                "ebsOptimized": false
            }
        }
    },
    "currentValue": "2097152.0",
    "newValue": "1048576.0",
    "resizeToValue": "1048576.0",
    "risk": {
        "uuid": "_pL_qMEQaEemD69d9a0uLJQ",
        "subCategory": "Efficiency Improvement",
        "description": "Underutilized Memory reservation",
        "severity": "MINOR",
        "importance": 0
    },
    "currentLocation": {
        "uuid": "cdcd967d1e08d20936c3aa9a0879c635214c79ee",
        "displayName": "ACM",
        "className": "DataCenter"
    },
    "newLocation": {
        "uuid": "cdcd967d1e08d20936c3aa9a0879c635214c79ee",
        "displayName": "ACM",
        "className": "DataCenter"
    },
    "actionID": 2500817580000
},
{
    "links": [
        {
            "rel": "self",
            "href": "https://10.10.10.10/api/v3/actions/_XdP4EEQ8EemD69d9a0uLJQ"
        },
        {
            "rel": "self",
            "href": "https://10.10.10.10/api/v3/actions/2501049335840"
        }
    ],
    "uuid": "_XdP4EEQ8EemD69d9a0uLJQ",
    "createTime": "2019-03-11T16:29:28-04:00",
    "actionType": "RIGHT_SIZE",
    "actionState": "PENDING_ACCEPT",
    "actionMode": "MANUAL",
    "details": "Remove VMem limit for VirtualMachine AJ_Test to maximize efficiency",
    "importance": 0,
    "target": {
        "uuid": "421dd4ce-a4c1-231a-71e7-64f6f598bc65",
        "displayName": "AJ_Test",
        "className": "VirtualMachine"
    }
}
```
"aspects": {  
  "virtualMachineAspect": {  
    "os": "CentOS 4/5/6/7 (64-bit)",  
    "ip": [  
      "10.10.10.107"  
    ],  
    "connectedNetworks": [  
      {  
        "uuid": "34f95364cd843a1fe99900621ee3b51a7dc6e5",  
        "displayName": "VM Network"  
      }  
    ],  
    "numVCPUs": 1,  
    "ebsOptimized": false  
  },  
  "environmentType": "ONPREM" 
},  
"currentEntity": {  
  "uuid": "_XdP4EkQ8EemD69d9a0uLJQ",  
  "className": "VMem" 
},  
"newEntity": {  
  "uuid": "_Xnq_YUQ8EemD69d9a0uLJQ",  
  "className": "VMem",  
  "aspects": {  
    "virtualMachineAspect": {  
      "os": "Linux (Free)",  
      "ebsOptimized": false  
    }  
  } 
},  
"currentValue": "2097152.0",  
"newValue": "0.0",  
"resizeToValue": "0.0",  
"risk": {  
  "uuid": "_XnuCsUQ8EemD69d9a0uLJQ",  
  "subCategory": "Efficiency Improvement",  
  "description": "VMem congestion in Virtual Machine 'AJ_Test'",  
  "severity": "MAJOR",  
  "reasonCommodity": "VMem",  
  "importance": 0  
},  
"currentLocation": {  
  "uuid": "ccdc9d7d1e08d20936c3aa9a0879c635214c79ee",  
  "className": "DataCenter" 
},  
"newLocation": {  
  "uuid": "ccdc9d7d1e08d20936c3aa9a0879c635214c79ee",  
  "className": "DataCenter" 
},  
"actionID": 2501049335840
Getting the Entities in a Group

Referenced Endpoint: Entities (on page 58)

Gets all entities contained within a group.

NOTE: This request will not return the contents of nested groups. In order to see groups of groups, use the groups/members request.

Example: GET https://10.10.10.10/api/v3/groups/_4L0PcE9SEemD69d9a0uLJQ/entities

Response: A list of EntityApiDTOs representing the entities in the specified group.

```json
[
  {
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/actions/_pJg98EQaEemD69d9a0uLJQ"
      },
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/actions/2500817580000"
      }
    ],
    "uuid": "_pJg98EQaEemD69d9a0uLJQ",
    "createTime": "2019-03-11T12:28:03-04:00",
    "actionType": "RIGHT_SIZE",
    "actionState": "PENDING_ACCEPT",
    "actionMode": "MANUAL",
    "details": "Scale down Memory reservation for Virtual Machine 'AJ_Test' from 2 GB to 1 GB",
    "importance": 0,
    "target": {
      "uuid": "421dd4ce-a4c1-231a-71e7-64fbf598bc65",
      "displayName": "AJ_Test",
      "className": "VirtualMachine",
      "aspects": {
        "virtualMachineAspect": {
          "os": "CentOS 4/5/6/7 (64-bit)",
          "ip": [
            "10.10.10.107"
          ]
        },
        "connectedNetworks": [
          {
            "uuid": "34f9f5364cd843a1fe99900621ee3b51a7dc6e5",
            "displayName": "VM Network"
          }
        ],
        "numVCPUs": 1,
        "ebsOptimized": false
      }
    }
  }
]
Getting the Parent Groups of a Group

For a specified group, gets any group that the specified group belongs to.

**NOTE:** Turbonomic contains a default parent group for user-created groups called "My Groups". This group should not be modified or deleted.

This request takes the following parameters:

| group_Uuid | The UUID of the group whose actions will be returned. |
path | Default: false. When true, this request will return the parent group, along with any groups traversed to obtain the parent group. For groups that are not nested, this will return the group whose ID you entered and the parent group.

Example: GET https://10.10.10.10/api/v3/groups/_4L0PcE9SEemD69d9a0uLJQ/groups?path=true

Response: A list of GroupApiDTOs representing the group and parent group.

```json
[
  {
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/groups/_S4k68yFvEd-S4dn3T4_SSA?include_aspects=false"
      }
    ],
    "uuid": "_S4k68yFvEd-S4dn3T4_SSA",
    "displayName": "My Groups",
    "className": "Group",
    "environmentType": "ONPREM",
    "entitiesCount": 1,
    "membersCount": 3,
    "groupType": "ServiceEntity",
    "severity": "Major",
    "isStatic": false,
    "logicalOperator": "AND",
    "activeEntitiesCount": 1
  },
  {
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/groups/_4L0PcE9SEemD69d9a0uLJQ?include_aspects=false"
      }
    ],
    "uuid": "_4L0PcE9SEemD69d9a0uLJQ",
    "displayName": "Dallas-Dynamic",
    "className": "Group",
    "environmentType": "ONPREM",
    "entitiesCount": 1,
    "membersCount": 1,
    "groupType": "VirtualMachine",
    "severity": "Major",
    "isStatic": false,
    "logicalOperator": "AND",
    "criteriaList": [
      {
        "expVal": "AJ.*",
        "expType": "EQ",
        "filterType": "vmsByName",
        "caseSensitive": false
      }
    ]
  }
]
```
Getting the Members of a Group

Referenced Endpoint: Entities (on page 58)

Gets all members of a group.

**NOTE:** This request will return nested groups and the entities within. In order to see only the entities in the specified group, use the groups/entities request.

**Example:**

GET https://10.10.10.10/api/v3/groups/_4L0PcE9SEemD69d9a0uLJQ/members

**Response:** A list of serviceEntityApiDTOs representing the members of the group:

```
[
  {
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/entities/183b37c68211668aecd36eadcdce9110ebc58f85?include_aspects=false"
      },
      "uuid": "183b37c68211668aecd36eadcdce9110ebc58f85",
      "displayName": "Olga",
      "className": "VirtualDataCenter",
      "priceIndex": 1,
      "state": "ACTIVE",
      "severity": "Normal",
      "discoveredBy": {
        "uuid": "_h3Km4Bs3EemMFrqlXNi1yQ",
        "displayName": "vsphere-dc23.corp.vmturbo.com",
        "type": "vCenter"
      },
      "remoteId": "resgroup-96",
      "environmentType": "ONPREM"
    },
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/entities/2332ba0f9dc14c07f11adb38e12df43c4bc8ca56?include_aspects=false"
      },
      "uuid": "2332ba0f9dc14c07f11adb38e12df43c4bc8ca56",
      "displayName": "olga_do_not_touch_1",
      "className": "VirtualDataCenter",
      "priceIndex": 1,
```
"state": "ACTIVE",
"severity": "Normal",
"discoveredBy": {
  "uuid": "_5kMqwNLnEeiJs9KWCzOdUQ",
  "displayName": "vsphere-dc1.dev.mycorp.com",
  "type": "vCenter"
},
"remoteId": "resgroup-1088",
"environmentType": "ONPREM"
},
{
  "links": [
    {
      "rel": "self",
      "href": "https://10.10.10.10/api/v3/entities/6668eb0940bf970d24eb13279b31a52f3c44a91f?include_aspects=false"
    }
  ],
  "uuid": "6668eb0940bf970d24eb13279b31a52f3c44a91f",
  "displayName": "Gilad",
  "className": "VirtualDataCenter",
  "priceIndex": 1,
  "state": "ACTIVE",
  "severity": "Normal",
  "discoveredBy": {
    "uuid": "_lj_tkH39EeiKy53b3GBqlA",
    "displayName": "vsphere-dc5.dev.mycorp.com",
    "type": "vCenter"
  },
  "remoteId": "resgroup-1953",
  "environmentType": "ONPREM"
},
{
  "links": [
    {
      "rel": "self",
      "href": "https://10.10.10.10/api/v3/entities/20b9e0acf4c6f7d5b00f744dddc954616095f1f2?include_aspects=false"
    }
  ],
  "uuid": "20b9e0acf4c6f7d5b00f744dddc954616095f1f2",
  "displayName": "ACM",
  "className": "VirtualDataCenter",
  "priceIndex": 1,
  "state": "ACTIVE",
  "severity": "Normal",
  "discoveredBy": {
    "uuid": "_lj_tkH39EeiKy53b3GBqlA",
    "displayName": "vsphere-dc5.dev.mycorp.com",
    "type": "vCenter"
  },
  "remoteId": "resgroup-v1946",
  "environmentType": "ONPREM"
}
Getting Settings of a Group

Referenced Endpoint: Settings (on page 222)

Gets both global and user-modified settings for the specified group. To get a single setting, pass the setting UUID as part of the request URL. This request takes the following parameters:

<table>
<thead>
<tr>
<th>group_Uuid</th>
<th>The Uuid of the group whose settings will be returned</th>
</tr>
</thead>
<tbody>
<tr>
<td>include_settingspolices</td>
<td>Default: false. When true, the settings policies affecting the specified group will be returned in addition to the settings.</td>
</tr>
</tbody>
</table>

Example: GET https://10.10.10.10/api/v3/groups/_WvaGkOBjEeierZ9b1bxmgg/settings?include_settingspolicies=false

Response: A list of SettingsManagerApiDTOs representing the settings, or settings and settings policies for the specified group:

```json
[
  {
    "uuid": "appsettingsmanager",
    "displayName": "Application Discovery",
    "category": "AppDiscovery",
    "settings": [
      {
        "uuid": "Username",
        "displayName": "Username",
        "value": "",
        "defaultValue": "",
        "valueType": "STRING",
```

Turbonomic REST API Endpoints
Editing a Specified Setting of a Group

Referenced Endpoint: Settings (on page 222)

Edits a specified setting for the specified group. This request takes the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>group_Uuid</td>
<td>The Uuid of the group whose settings manager will be returned</td>
</tr>
<tr>
<td>settingsManager_Uuid</td>
<td>The Uuid of the settings manager whose setting will be returned</td>
</tr>
<tr>
<td>setting_Uuid</td>
<td>The Uuid of the setting that will be returned</td>
</tr>
</tbody>
</table>

Example: PUT https://10.10.10.10/api/v3/groups/_WvaGkOBJeierZ9b1bxm9g/settings/appsettingsmanager/Retry_Interval

Example Input:

```json
{
  "value": "61"
}
```
Response: A ServiceEntityApiDTO representing the specified setting, with your changed value(s):

```json
{
    "uuid": "Retry_Interval",
    "displayName": "Retry Interval [mins]",
    "value": "61",
    "defaultValue": "60.0",
    "valueType": "NUMERIC",
    "min": 0,
    "max": 50000,
    "entityType": "VirtualMachine",
    "sourceGroupName": "A_Few_ACM_VMs"
}
```

### Getting Settings Policies of a Group

*Referenced Endpoint:* [Settings Policies](#) (on page 226)

Gets the settings policies of the specified group.

**Example:**

**Response:**

### Getting Statistics of a Group

*Referenced Endpoint:* [Stats](#) (on page 232)

Gets all statistics for the specified group:

**Example:** [https://10.10.10.10/api/v3/groups/_WvaGkOBjEeierZ9b1bxmgg/stats](https://10.10.10.10/api/v3/groups/_WvaGkOBjEeierZ9b1bxmgg/stats)

**Response:** A list of StatSnapshotApiDTOs representing the statistics for the specified group:

```json
[
    {
        "displayName": "A_Few_ACM_VMs",
        "date": "2019-03-31T17:11:35-04:00",
        "statistics": [
            {
                "displayName": "(multiple)",
                "name": "priceIndex",
                "values": {
                    "max": 1.44,
                    "min": 1.03,
                    "avg": 1.19,
                    "total": 4.77
                },
                "value": 1.19
            },
            {
                "displayName": "(multiple)",
                "name": "priceIndex",
                "values": {
                    "max": 1.44,
                    "min": 1.03,
                    "avg": 1.19,
                    "total": 4.77
                },
                "value": 1.19
            }
        ]
    }
]```
"name": "Q1VCPU",
"capacity": {
    "max": 20000,
    "min": 20000,
    "avg": 20000,
    "total": 60000
},
"reserved": {
    "max": 10000,
    "min": 10000,
    "avg": 10000,
    "total": 30000
},
"filters": [
    {
        "type": "relation",
        "value": "bought"
    }
]
...

Getting a Filtered List of Statistics of a Group

Referenced Endpoint: Stats (on page 232)

Gets a filtered list of statistics for the specified group. For more information about creating a filtered list of statistics, see Filtered Statistics (on page 232)

Example: POST https://10.10.10.10/api/v3/groups/_WvaGkJbDeierZ9b1bxmgg/stats

Example input:

```json
{
    "endDate": ":-1d",
    "startDate": "-1w",
    "statistics": {
        "filters": [
            {
                "type": "relation",
                "value": "bought"
            }
        ]
    }
}
```

Response: A list of StatSnapshotApiDTOs representing the statistics for the specified group:
[{
    "displayName": "A_Few_ACM_VMs",
    "date": "2019-03-24T00:00:00-04:00",
    "statistics": [
        {
            "name": "Mem",
            "capacity": {
                "max": 134214448,
                "min": 134214448,
                "avg": 134214448,
                "total": 1073715580
            },
            "filters": [
                {
                    "type": "relation",
                    "value": "bought"
                }
            ],
            "units": "KB",
            "values": {
                "max": 2073084,
                "min": 679782.1,
                "avg": 1124840.4,
                "total": 4499361.5
            },
            "value": 1124840.4
        },
        {
            "name": "MemAllocation",
            "capacity": {
                "max": 504346624,
                "min": 504346624,
                "avg": 504346624,
                "total": 4034772990
            },
            "filters": [
                {
                    "type": "relation",
                    "value": "bought"
                }
            ],
            "units": "KB",
            "values": {
                "max": 2073084,
                "min": 679782.1,
                "avg": 1124840.4,
                "total": 4499361.5
            },
            "value": 1124840.4
        },
        {
            "name": "Q1VCPU",
            "capacity": {
                "max": 100,
                "min": 100,
                "avg": 100,
                "total": 100
            },
            "filters": [
                {
                    "type": "relation",
                    "value": "bought"
                }
            ],
            "units": "KB",
            "values": {
                "max": 100,
                "min": 100,
                "avg": 100,
                "total": 100
            },
            "value": 100
        }
    ]
}]

Turbonomic REST API Endpoints
"capacity": {
    "max": 20000,
    "min": 20000,
    "avg": 20000,
    "total": 120000
},
"filters": [
    {
        "type": "relation",
        "value": "bought"
    }
],
"values": {
    "max": 90,
    "min": 14,
    "avg": 41.08,
    "total": 123.23
},
"value": 41.08
}

Getting the Supply Chain of a Group

Referenced Endpoint: Supply Chains (on page 246)

Using one or more of the following parameters, you can filter the supply chain that is returned by this request:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>market_Uuid</td>
<td>The UUID of the market whose supply chain will be returned</td>
</tr>
<tr>
<td>types</td>
<td>The entity types whose supply chain will be returned. Choose from:</td>
</tr>
<tr>
<td></td>
<td>• BUSINESS_UNIT</td>
</tr>
<tr>
<td></td>
<td>• CLOUD_SERVICE</td>
</tr>
<tr>
<td></td>
<td>• CONTAINER</td>
</tr>
<tr>
<td></td>
<td>• DATABASE</td>
</tr>
<tr>
<td></td>
<td>• DATABASE_SERVER</td>
</tr>
<tr>
<td></td>
<td>• DATACENTER</td>
</tr>
<tr>
<td></td>
<td>• DISK_ARRAY</td>
</tr>
<tr>
<td></td>
<td>• PHYSICAL_MACHINE</td>
</tr>
<tr>
<td></td>
<td>• STORAGE</td>
</tr>
<tr>
<td></td>
<td>• VIRTUAL_MACHINE</td>
</tr>
<tr>
<td></td>
<td>• SWITCH</td>
</tr>
<tr>
<td></td>
<td>• VIRTUAL_DATACENTER</td>
</tr>
<tr>
<td></td>
<td>• CHASSIS</td>
</tr>
<tr>
<td></td>
<td>• STORAGE_CONTROLLER</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>entity_states</td>
<td>Only return entities in the specified states. Choose from:</td>
</tr>
<tr>
<td></td>
<td>• ACTIVE:</td>
</tr>
<tr>
<td></td>
<td>Entity is actively consuming resources.</td>
</tr>
<tr>
<td></td>
<td>• EVACUATED:</td>
</tr>
<tr>
<td></td>
<td>Entity is ready to suspend and will not participate in the market, but will not generate a SUSPEND action.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> This state replaces the SUSPEND state, and requires additional configuration to enable. Turbonomic does not recommend enabling this state.</td>
</tr>
<tr>
<td></td>
<td>• FAILOVER:</td>
</tr>
<tr>
<td></td>
<td>This entity is reserved for failover and will not participate in the market.</td>
</tr>
<tr>
<td></td>
<td>• IDLE:</td>
</tr>
<tr>
<td></td>
<td>Entity is powered off and not actively consuming market resources.</td>
</tr>
<tr>
<td></td>
<td>• LAUNCH:</td>
</tr>
<tr>
<td></td>
<td>Entity is starting.</td>
</tr>
<tr>
<td></td>
<td>• MAINTENANCE:</td>
</tr>
<tr>
<td></td>
<td>Entity is in maintenance mode.</td>
</tr>
<tr>
<td></td>
<td>• NOT_MONITORED:</td>
</tr>
<tr>
<td></td>
<td>Entity is not currently monitored by Turbonomic.</td>
</tr>
<tr>
<td></td>
<td>• QUEUED:</td>
</tr>
<tr>
<td></td>
<td>Entity is in the process of changing from one state to another.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> This state is internal to Turbonomic and will not appear in the UI, but may appear in an API response if the call is executed at the precise moment the entity is changing state.</td>
</tr>
<tr>
<td></td>
<td>• RESOURCE_ALLOCATION:</td>
</tr>
<tr>
<td></td>
<td>Cloud entity is being created.</td>
</tr>
<tr>
<td></td>
<td>• RESOURCE_RELEASE:</td>
</tr>
<tr>
<td></td>
<td>Cloud Entity is being deleted.</td>
</tr>
<tr>
<td></td>
<td>• SUSPEND:</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Entity is suspended or the guest OS is in sleep, standby, or suspended state. The entity is not removed from the environment, but will not be used in market decisions. Based on market conditions, suspended entities can be started, re-adding them to the market.</td>
<td></td>
</tr>
<tr>
<td>SUSPEND_PENDING:</td>
<td>Entity is making preparations to suspend, or is the next entity of its type to suspend.</td>
</tr>
<tr>
<td>TERMINATE_PENDING:</td>
<td>Entity is in the process of being deleted.</td>
</tr>
<tr>
<td>UNKNOWN:</td>
<td>Turbonomic is unable to obtain the current state of the entity. This occurs when the entity is reported to the hypervisor as having a state of DISCONNECTED, ORPHANED, or INVALID.</td>
</tr>
<tr>
<td>environment_type</td>
<td>Only return actions that affect entities in the specified environment type. [ CLOUD, HYBRID, ONPREM ].</td>
</tr>
<tr>
<td>detail_type</td>
<td>The level of detail returned for each item in the returned supply chain. [ compact, entity, aspects ].</td>
</tr>
<tr>
<td>health</td>
<td>Return a small summary of the health of the returned supply chain.</td>
</tr>
</tbody>
</table>

**Example:**

`GET https://10.10.10.10/api/v3/groups/_WvaGkBjEeierZ9b1bxmgg/supplychains?types=PhysicalMachine&entity_states=ACTIVE&entity_states=SUSPEND&entity_states=MAINTENANCE&environment_type=ONPREM&detail_type=entity&health=true`

**Response:** A SupplychainApiDTO representing the supply chain of the specified group:

```json
"seMap": {
   "PhysicalMachine": {
      "depth": 1,
      "entitiesCount": 3,
      "healthSummary": {
         "Minor": 1,
         "Normal": 2
      },
      "stateSummary": {"ACTIVE": 3 },
      "connectedProviderTypes": ["DataCenter", "Storage"],
      "instances": {
         "34313836-3333-5553-4537-33364e385146": {
            "links": ["self", "https://10.10.10.10/api/v3/entities/34313836-3333-5553-4537-33364e385146?include_aspects=false"
```
Groups Cookbook

GroupBy Field Criteria

When using the POST requests to query actions and action statistics, there is a `groupBy` parameter that is used to group statistics for easy amalgamation. The valid values for this parameter differ by entity type. Here is the complete list of valid options per entity:

NOTE:
When sending an inputDTO using this field, only the value is needed.

Example: "groupBy": "vmsByPMName"

```json
{
    "VirtualMachine":{
        "criteria":[
            {
                "filterType": "vmsByName"
            },
            {
                "filterType": "vmsByPMName"
            },
            {
                "filterType": "vmsByStorage"
            },
            {
                "filterType": "vmsByNetwork"
            }
        ]
    }
}```
Turbonomic REST API Endpoints

```json
{
  "filterType": "vmsByApplication",
  "filterType": "vmsByDatabaseServer",
  "filterType": "vmsByDatabaseServerVersion",
  "filterType": "vmsByDC",
  "filterType": "vmsByVDC",
  "filterType": "vmsByDCnested",
  "filterType": "vmsByNumCPUs",
  "filterType": "vmsByMem",
  "filterType": "vmsByGuestName",
  "filterType": "vmsByAltName",
  "filterType": "vmsByClusterName",
  "filterType": "vmsByDiskArrayName",
  "filterType": "vmsByLogicalPoolName",
  "filterType": "vmsByProfileName",
  "filterType": "vmsByTag",
  "filterType": "vmsByState",
  "filterType": "vmsByBusinessAccountUuid",
  "filterType": "vmsByResourceGroupUuid"
}
```
},
  "VirtualDataCenter":{
    "criteria":[
      {
        "filterType": "vdcsByName"
      },
      {
        "filterType": "vdcsByVDCName"
      },
      {
        "filterType": "vdcsByTag"
      },
      {
        "filterType": "vdcsByState"
      }
    ]
  },
  "PhysicalMachine":{
    "criteria":[
      {
        "filterType": "pmsByName"
      },
      {
        "filterType": "pmsByStorage"
      },
      {
        "filterType": "pmsByNetwork"
      },
      {
        "filterType": "pmsBySwitch"
      },
      {
        "filterType": "pmsByNumVms"
      },
      {
        "filterType": "pmsByDC"
      },
      {
        "filterType": "pmsByMem"
      },
      {
        "filterType": "pmsByNumCPUs"
      },
      {
        "filterType": "pmsByVendorName"
      },
      {
        "filterType": "pmsByCPUModel"
      },
      {
        "filterType": "pmsByModel"
      },
      {
        "filterType": "pmsByTimezone"
      }
    ]
  }
Turbonomic REST API Endpoints

```
},

  { "filterType":"pmsByClusterName" },

  { "filterType":"pmsByTag" },

  { "filterType":"pmsByState" }

],

"Storage":{
  "criteria":[
    { "filterType":"storageByName" },
    { "filterType":"storageByTag" },
    { "filterType":"storageByVMs" },
    { "filterType":"storageByDC" },
    { "filterType":"storageByPMCluster" },
    { "filterType":"storageByState" }
  ]
},

"Application":{
  "criteria":[
    { "filterType":"appsByName" },
    { "filterType":"appsByTag" }
  ]
},

"ApplicationServer":{
  "criteria":[
    { "filterType":"appSrvsByName" }
  ]
},

"WebServer":{
  "criteria":[
    { "filterType":"wbSrvsByName" }
  ]
}
```
"BusinessApplication": {
  "criteria": [
    { "filterType": "busAppsByName" }]
},
"Database": {
  "criteria": [
    { "filterType": "databaseByName" },
    { "filterType": "databaseByTag" },
    { "filterType": "databaseByBusinessAccountUuid" },
    { "filterType": "databaseByResourceGroupUuid" }]
},
"DatabaseServer": {
  "criteria": [
    { "filterType": "databaseServerByName" },
    { "filterType": "databaseServerByTag" },
    { "filterType": "databaseServerByBusinessAccountUuid" },
    { "filterType": "databaseServerByEngine" },
    { "filterType": "databaseServerByEdition" },
    { "filterType": "databaseServerByVersion" }]
},
"VirtualApplication": {
  "criteria": [
    { "filterType": "vappsByName" }]
}
"Cluster":{
  "criteria":[
    {
      "filterType":"clustersByName"
    },
    {
      "filterType":"clustersByTag"
    }
  ]
},
"DataCenter":{
  "criteria":[
    {
      "filterType":"datacentersByName"
    },
    {
      "filterType":"datacentersByTag"
    }
  ]
},
"Group":{
  "criteria":[
    {
      "filterType":"groupsByName"
    },
    {
      "filterType":"groupsByTargetName"
    }
  ]
},
"StorageCluster":{
  "criteria":[
    {
      "filterType":"storageClustersByName"
    }
  ]
},
"DiskArray":{
  "criteria":[
    {
      "filterType":"diskarrayByName"
    }
  ]
},
"Zone":{
  "criteria":[
    {
      "filterType":"zonsByName"
    }
  ]
},
"Region":{
  "criteria":[
    {
      "filterType":"regsByName"
    }
  ]
}
Turbonomic REST API Endpoints

```json
{
  "Network":{
    "criteria":[
      {
        "filterType":"netsByName"
      }
    ]
  },
  "LoadBalancer":{
    "criteria":[
      {
        "filterType":"lbsByName"
      }
    ]
  },
  "Chassis":{
    "criteria":[
      {
        "filterType":"chasByName"
      }
    ]
  },
  "IOModule":{
    "criteria":[
      {
        "filterType":"ioModuleByName"
      }
    ]
  },
  "StorageController":{
    "criteria":[
      {
        "filterType":"storagecontrollerByName"
      }
    ]
  },
  "DPod":{
    "criteria":[
      {
        "filterType":"dpodByName"
      }
    ]
  },
  "VPod":{
    "criteria":[
      {
        "filterType":"vpodByName"
      }
    ]
  },
  "LogicalPool":{
    "criteria":[
      {
        "filterType":"logicalPoolByName"
      }
    ]
  }
}
```
"filterType":"logicalPoolByName"
}
]
},
"Switch":{
  "criteria":[
    {
      "filterType":"switchByName"
    }
  ]
},
"Container":{
  "criteria":[
    {
      "filterType":"containersByName"
    },
    {
      "filterType":"containersByVMName"
    }
  ]
},
"ContainerPod":{
  "criteria":[
    {
      "filterType":"containerpodsByName"
    },
    {
      "filterType":"containerpodsByVMName"
    }
  ]
},
"ServiceEntity":{
  "criteria":[
    {
      "filterType":"workloadByBusinessAccountUuid"
    },
    {
      "filterType":"workloadByResourceGroupUuid"
    }
  ]
},
"Workload":{
  "criteria":[
    {
      "filterType":"workloadByBusinessAccountUuid"
    },
    {
      "filterType":"workloadByResourceGroupUuid"
    }
  ]
},
"ResourceGroup":{
  "criteria":[
    {
      "filterType":"resourceGroupByName"
    }
  ]
}
"filterType": "resourceGroupByUuid",
},
  { "filterType": "resourceGroupByBusinessAccountUuid",
  },
  { "filterType": "resourceGroupByTag"
  }
]}
},
"BusinessAccount": {
  "criteria": [
    { "filterType": "businessAccountByName" },
    { "filterType": "businessAccountByUuid" },
    { "filterType": "subBusinessAccountOfUuid" },
    { "filterType": "businessAccountValidationStatus" },
    { "filterType": "businessAccountTargetName" },
    { "filterType": "businessAccountCloudProvider"
  ]
},
"BillingFamily": {
  "criteria": [
    { "filterType": "billingFamilyByName" }
  ]
},
"ViewPod": {
  "criteria": [
    { "filterType": "viewPodByName" }
  ]
},
"DesktopPool": {
  "criteria": [
    { "filterType": "desktopPoolByName" },
    { "filterType": "desktopPoolByViewPod" }
Licenses Endpoint

A product license enables specific features as well as a specific number of workloads that you can manage. You can add additional licenses to Turbonomic as a way to increase the number of workloads your installation can manage. Note that as you add more licenses, they must all support the same feature set.

In all circumstances, you should contact your sales representative to make sure that you get the correct license, and that you know how to install it properly.

Using the licenses endpoint, you can:

- Get a license summary
- Get a list of licenses currently added to your Turbonomic appliance
- Add a license
- Delete a license

NOTE:
For legacy compatibility, Turbonomic maintains /license requests. You should not use these requests unless you have been instructed to do so. Use the /licenses requests, instead.

Licenses Requests

Getting Licenses

Gets a list of licenses. For instances with multiple licenses, the licenses/summary request will return a summed total of licensed workload. For example, if you have two licenses for 10,000 workloads each, the /licenses request will return both LicenseApiDTOs in a list. The /licenses/summary call will return a single summed LicenseApiDTO, which will state that you have capacity for 20,000 workloads.

Examples:
- List of Licenses: GET https://10.10.10.10/api/v3/licenses
- License Summary: GET https://10.10.10.10/api/v3/licenses/summary
Adding a License

Adds a license to your Turbonomic installation. You may optionally specify the `dryRun` parameter which, when set to `true`, will validate the license file but not apply it to the appliance.

**NOTE:**
This request requires a multipart file as input. Due to this requirement, this request cannot be executed directly from the Swagger.

**Example:** `POST https://10.10.10.10/api/v3/licenses?file=%5Bobject%20File%5D&dryRun=true`

Deleting a License

Removes the specified license from your Turbonomic installation. Deleting a license may reduce your licensed workload capacity below your current usage. In this case, you will be unable to add more targets until more workload capacity is available.

**Example:** `DELETE https://10.10.10.10/api/v3/licenses/_I_WVcJtWEeiGEs_doVlDOw`

Markets Endpoint

Turbonomic uses market-based analysis to perform workload management. To do this, it constructs a model of your environment, representing each entity as a buyer and seller in a market. You can access this model via a named market resource. There are two types of markets:

- **Real-Time Market**
  
The real-time market performs analysis and workload management on your environment. You can use the real-time market to access entities and get current or historical data about them.

  The `displayName` of the real-time market is `Market`. This market should always be in the `RUNNING` state. You should not attempt to use the API to stop this market.

  Turbonomic performs discovery to populate the topology it manages (the collection of entities in the real-time market). For this reason, you should be careful not to delete entities from or add nonexistent entities to the real-time market.

- **Plan Market**
  
  A plan market begins as a snapshot of the real-time market. You POST a scenario to the real-time market, and Turbonomic makes a copy of the real-time market to create a plan market. This plan market is just like the real-time market, except for any changes that were declared in the scenario. For example, if the scenario declares a scope for the plan, then the plan market only contains entities that are within that scope.

  Then, Turbonomic runs economic cycles (buy/sell cycles) against this plan market until there are no more meaningful improvements to be made. At this point the plan run is completed.

  Note that once Turbonomic creates the plan market, that market stays in memory until you delete it. Also note that you can later apply a scenario to the plan market. This is how you run a plan on a plan. The logic flow is the same, and Turbonomic creates yet another plan market to run the analysis.

This endpoint contains references to start and end times for certain operations. For more information, including valid time formats, see [Time in the Turbonomic API (on page 12)](#)}
Using the markets endpoint of the Turbonomic API, you can:

- Get a list of markets
- Save or Stop a plan market
- Delete a plan market
- See unplaced entities in a plan market
- Get filtered and unfiltered lists of actions, entities, notifications, policies, reservations, and statistics for a particular market
- Get, edit, and delete placement policies in the real-time market

**Determining the Status of the Main Market**

After restarting the Turbonomic instance, the UI and API may be available before the real-time market has finished initializing and loading the topology of your environment. To check market status, execute the `GET /markets/market_uuid` request with a market UUID of Market.

If information about the market is returned, it has initialized. If the real-time market is not initialized, the following response will be returned:

```json
{
  "type":400,
  "exception":"com.vmturbo.api.exceptions.OperationFailedException: Infrastructure is not controlled yet. Could not get market."
}
```

**Markets Requests**

**Getting a List of Markets**

Returns all the Markets currently stored on your Turbonomic appliance. To get the details of a single market, include the UUID of the market in the request.

**NOTE:**
One market will have the `displayName` of Market. This market is the real-time market. You should not add nor delete entities directly to this market using the API, nor should you attempt to execute a STOP action on this market.

**Examples:**

- **All Markets:** `GET https://10.10.10.10/api/v3/markets`
- **Single Market:** `GET https://10.10.10.10/api/v3/markets/_0x3OYglEd-gHc4L513yOA`

**Response:** A list of MarketApiDTOs representing the markets on your appliance.

```json
[
  {
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/markets/_0x3OYglEd-gHc4L513yOA"
      }
    ]
  }
]```
Stopping or Saving Plan Markets

For troubleshooting, you may need to stop or save a plan market that is taking a long time to run, or does not seem to complete. These actions should never be used on the real-time market. Note that a manually-stopped plan market may have incomplete data.

This request takes the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>market_Uuid</td>
<td>The UUID of the market that will be stopped or saved.</td>
</tr>
<tr>
<td>operation</td>
<td>The operation to perform on the market. [ stop, save ]</td>
</tr>
</tbody>
</table>

**Example:** POST https://10.10.10.10/api/v3/markets/_NO8_sCi_EemDHzuQzfdzxw?operation=stop

**Response:** The MarketApiDTO of the specified market, showing its state as STOPPING.
Deleting a Plan Market

Deleting a plan market removes the market entity along with all the topological links, such as actions, notifications, entities, policies and reservations. This operation is permanent. To delete a plan market, pass the UUID of the market in the request.

This request takes the following parameters:

<table>
<thead>
<tr>
<th>parameter</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>market_Uuid</td>
<td>The UUID of the market that will be deleted.</td>
</tr>
</tbody>
</table>

**Example:** DELETE https://10.10.10.10/api/v3/markets/_NO8_sCi_EemDHtuQzfdzxw

**Response:** The MarketApiDTO of the specified market, showing its state as DELETING.

```json
{
    "links": [
        {
            "rel": "self",
            "href": "https://10.10.10.10/api/v3/markets/2452692215536"
        }
    ]
}
```
Getting a Filtered List of Actions for a Market

Referenced Endpoint: **Actions (on page 26)**

Gets a list of actions, given a market UUID and filtered by an ActionApiInputDTO using one or more of the following criteria:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
</table>
| actionModeList    | • **DISABLED:**
|                   |   Do not recommend or perform the action. When you disable an action, the user interface will no longer display actions of that type. |
|                   | • **RECOMMENDED:**
|                   |   Recommend the action so a user can execute it via the given hypervisor or by other external means |
|                   | • **MANUAL:**
|                   |   Recommend the action, and provide the option to execute that action through the Turbonomic user interface or an /actions API request. |
## Criteria | Description
--- | ---
- AUTOMATED:  
  You have directed Turbonomic to execute the action automatically.
- COLLECTION (UNUSED):  
  Legacy action mode, no longer used.

### actionStateList
- DISABLED:  
  An action whose policy has been disabled.
- RECOMMEND:  
  An action that cannot be automated due to policy settings or must be executed outside the system, such as the purchase of hardware.
- PENDING_ACCEPT:  
  When the action mode is set to manual, a recommended action that has not been accepted or cleared.
- ACCEPTED:  
  An action that has been accepted, but is not yet in progress.
- IN_PROGRESS:  
  An action that is being executed.
- SUCCEEDED:  
  An action that was accepted and completed successfully.
- FAILED:  
  An action that was accepted and did not complete successfully.
- REJECTED:  
  When the action mode is set to manual, an action that has been rejected by the user.
- CLEARED:  
  When the action mode is set to manual, an action that is no longer recommended by the market.
- ACCOUNTING:  
  For cloud entities, an action to resize in order to use a different instance template.
- QUEUED:  
  When more than 10 actions are to be executed for a single target, Turbonomic will place the 11th and all subsequent actions into a QUEUED state, and they will execute as the previous actions complete.

### actionTypeList
- START:  
  Start an entity, and add it to the Turbonomic market.
- MOVE:  
  Move an entity from one provider to another. For example, moving a VM between hosts, or a datastore between disk arrays.
- SUSPEND:  
  #
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Remove capacity from your environment. Suspended entities are not removed from the environment, but will not be used in market decisions. Based on market conditions, suspended entities can be started, re-adding them to the market.</td>
</tr>
<tr>
<td></td>
<td>• ADD PROVIDER:</td>
</tr>
<tr>
<td></td>
<td>This is equivalent to the START action, but for storage entities.</td>
</tr>
<tr>
<td></td>
<td>• CHANGE:</td>
</tr>
<tr>
<td></td>
<td>Move a virtual machine's storage between datastores.</td>
</tr>
<tr>
<td></td>
<td>• PROVISION:</td>
</tr>
<tr>
<td></td>
<td>Add capacity to your environment.</td>
</tr>
<tr>
<td></td>
<td>• RECONFIGURE:</td>
</tr>
<tr>
<td></td>
<td>When a VM is not able to correct a misconfiguration via another type of action. For example, if a placement policy requires a VM to move to a host on a particular cluster, but cross-cluster moves are not permitted.</td>
</tr>
<tr>
<td></td>
<td>• DELETE:</td>
</tr>
<tr>
<td></td>
<td>This is equivalent to the SUSPEND action, but for storage entities.</td>
</tr>
<tr>
<td></td>
<td>• RESERVE_ON_PM:</td>
</tr>
<tr>
<td></td>
<td>When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular host.</td>
</tr>
<tr>
<td></td>
<td>• RESERVE_ON_DS:</td>
</tr>
<tr>
<td></td>
<td>When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular datastore.</td>
</tr>
<tr>
<td></td>
<td>• RESIZE_FOR_EFFICIENCY:</td>
</tr>
<tr>
<td></td>
<td>A resize that reduces the capacity of a commodity, such as vCPU, or vMEM.</td>
</tr>
<tr>
<td></td>
<td>• RESIZE_FOR_PERFORMANCE:</td>
</tr>
<tr>
<td></td>
<td>A resize that increases the capacity of a commodity, such as vCPU, or vMEM.</td>
</tr>
<tr>
<td>cleared</td>
<td>Default: false. When true, actions that were removed from the action list before being executed will be returned.</td>
</tr>
<tr>
<td>costType</td>
<td>• Saving</td>
</tr>
<tr>
<td></td>
<td>An action that will decrease cloud spending.</td>
</tr>
<tr>
<td></td>
<td>• Investment</td>
</tr>
<tr>
<td></td>
<td>An action that will increase cloud spending.</td>
</tr>
<tr>
<td>cumulative</td>
<td>Default: false. When true, shows the savings for each action in a scope as a cumulative total, rather than showing the savings for individual actions.</td>
</tr>
<tr>
<td>environmentType</td>
<td>• ONPREM:</td>
</tr>
<tr>
<td></td>
<td>Returns only actions related to entities that are part of your on-premises environment.</td>
</tr>
<tr>
<td></td>
<td>• CLOUD:</td>
</tr>
<tr>
<td></td>
<td>Returns only actions related to entities that are part of your cloud environment.</td>
</tr>
</tbody>
</table>
**Criteria**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>groupBy</td>
<td>You may group the actions returned by the following criteria: [actionModes, actionStates, actionTypes, risk, riskSeverity, riskSubCategory]</td>
</tr>
<tr>
<td>hasReservedInstance</td>
<td>Default: false. When true, only actions that are related to reserved instances will be returned.</td>
</tr>
<tr>
<td>relatedEntityTypes</td>
<td>Returns only actions related to entities of these types within the scope. For example, if your scope is a virtual datacenter and you specify VirtualMachine as a related entity type, the request will include only those actions related to VMs in the specified virtual datacenter. Choose from the following entity types: [Datacenter, PhysicalMachine, VirtualMachine, Storage, Application, Chassis, DiskArray, IOModule, StorageControl, Switch, VirtualDataCenter, VPod, DPod, Container, Database, DatabaseServerContainer, LogicalPool]</td>
</tr>
<tr>
<td>riskSeverityList</td>
<td>Returns only actions of the given severities. [Unknown, Normal, Minor, Major, Critical]</td>
</tr>
<tr>
<td>riskSubCategoryList</td>
<td>Returns only actions of the given subcategories. [Performance Assurance, Efficiency Improvement, Prevention, Compliance]</td>
</tr>
</tbody>
</table>

This request takes the following parameters:

- **market_Uuid**: The UUID of the market whose actions will be returned.
- **cursor**: When making subsequent calls to retrieve additional results, this is the cursor returned by the last call to this method.
- **limit**: The maximum number of items to return. Must be a positive integer. If not set, the server will provide a default (20).
- **order_by**: The field to order the results by. [creation_date, name, risk_category, savings, severity].
- **ascending**: Default: true. When false, results will be in descending order.

**Example**: POST https://10.10.10.10/api/v3/markets/Market/actions?order_by=severity&ascending=true

**Example input**: In this example, a list of actions that meet the following criteria will be returned and grouped by the `actionMode` of the action, in order of severity:

- Is in state PENDING_ACCEPT
- Is part of an on-premises environment
- Is an action for a virtual machine
- Is an action generated by the Turbonomic real-time market

```json
{
    "actionInput":{
        "actionStateList":[
            "PENDING_ACCEPT"
        ],
        "environmentType":"ONPREM",
        "groupBy":[
            "actionModes"
        ]
    }
}```


Response: ActionApiDTOs meeting the specified criteria.

{
  ...
  "uuid": "_qFuM8CiOEemDHtuQzfdzxw",
  "createTime": "2019-02-04T10:07:58-05:00",
  "actionType": "RIGHT_SIZE",
  "actionState": "PENDING_ACCEPT",
  "actionMode": "MANUAL",
  "details": "Scale VirtualMachine 8f0e3136-b259-43e5-41f8-0d2c64c62acc from Standard_B2ms to Standard_E2s_v3",
  "importance": 0,
  ...
}

Getting Statistics for a Filtered List of Actions for a Market

Referenced Endpoint: Actions (on page 26)

Referenced Endpoint: Stats (on page 232)

Gets a list of statistics for a filtered list of actions. Statistics returned include the number of actions, total savings/investment, and the number of entities affected by the actions. In addition to the Market UUID, provide an ActionApiInputDTO using one or more of the following criteria:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>actionModeList</td>
<td>• DISABLED: Do not recommend or perform the action. When you disable an action, the user interface will no longer display actions of that type.</td>
</tr>
<tr>
<td></td>
<td>• RECOMMENDED: Recommend the action so a user can execute it via the given hypervisor or by other external means</td>
</tr>
<tr>
<td></td>
<td>• MANUAL: Recommend the action, and provide the option to execute that action through the Turbonomic user interface or an /actions API request.</td>
</tr>
<tr>
<td></td>
<td>• AUTOMATED: You have directed Turbonomic to execute the action automatically.</td>
</tr>
<tr>
<td></td>
<td>• COLLECTION (UNUSED):</td>
</tr>
<tr>
<td>Criteria</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Legacy action mode, no longer used.</td>
<td></td>
</tr>
</tbody>
</table>

**actionStateList**

- **DISABLED:**
  An action whose policy has been disabled.

- **RECOMMEND:**
  An action that cannot be automated due to policy settings or must be executed outside the system, such as the purchase of hardware.

- **PENDING_ACCEPT:**
  When the action mode is set to manual, a recommended action that has not been accepted or cleared.

- **ACCEPTED:**
  An action that has been accepted, but is not yet in progress.

- **IN_PROGRESS:**
  An action that is being executed.

- **SUCCEEDED:**
  An action that was accepted and completed successfully.

- **FAILED:**
  An action that was accepted and did not complete successfully.

- **REJECTED:**
  When the action mode is set to manual, an action that has been rejected by the user.

- **CLEARED:**
  When the action mode is set to manual, an action that is no longer recommended by the market.

- **ACCOUNTING:**
  For cloud entities, an action to resize in order to use a different instance template.

- **QUEUED:**
  When more than 10 actions are to be executed for a single target, Turbonomic will place the 11th and all subsequent actions into a QUEUED state, and they will execute as the previous actions complete.

**actionTypeList**

- **START:**
  Start an entity, and add it to the Turbonomic market.

- **MOVE:**
  Move an entity from one provider to another. For example, moving a VM between hosts, or a datastore between disk arrays.

- **SUSPEND:**
  Remove capacity from your environment. Suspended entities are not removed from the environment, but will not be used in market decisions. Based on market conditions, suspended entities can be started, re-adding them to the market.

- **ADD PROVIDER:**
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>This is equivalent to the START action, but for storage entities.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>CHANGE:</strong></td>
<td>Move a virtual machine's storage between datastores.</td>
</tr>
<tr>
<td><strong>PROVISION:</strong></td>
<td>Add capacity to your environment.</td>
</tr>
<tr>
<td><strong>RECONFIGURE:</strong></td>
<td>When a VM is not able to correct a misconfiguration via another type of action. For example, if a placement policy requires a VM to move to a host on a particular cluster, but cross-cluster moves are not permitted.</td>
</tr>
<tr>
<td><strong>DELETE:</strong></td>
<td>This is equivalent to the SUSPEND action, but for storage entities.</td>
</tr>
<tr>
<td><strong>RESERVE_ON_PM:</strong></td>
<td>When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular host.</td>
</tr>
<tr>
<td><strong>RESERVE_ON_DS:</strong></td>
<td>When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular datastore.</td>
</tr>
<tr>
<td><strong>RESIZE_FOR_EFFICIENCY:</strong></td>
<td>A resize that reduces the capacity of a commodity, such as vCPU, or vMEM.</td>
</tr>
<tr>
<td><strong>RESIZE_FOR_PERFORMANCE:</strong></td>
<td>A resize that increases the capacity of a commodity, such as vCPU, or vMEM.</td>
</tr>
</tbody>
</table>

<p>| cleared | Default: false. When true, actions that were removed from the action list before being executed will be returned. |
| costType | Default: Saving. An action that will decrease cloud spending. |
| cumulative | Default: false. When true, shows the savings for each action in a scope as a cumulative total, rather than showing the savings for individual actions. |
| environmentType | Default: ONPREM. Returns only actions related to entities that are part of your on-premises environment. |
| groupBy | You may group the actions returned by the following criteria: [actionModes, actionStates, actionTypes, risk, riskSeverity, riskSubCategory] |
| hasReservedInstance | Default: false. When true, only actions that are related to reserved instances will be returned. |</p>
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>relatedEntityTypes</td>
<td>Returns only actions related to entities of these types within the scope. For example, if your scope is a virtual datacenter and you specify VirtualMachine as a related entity type, the request will include only those actions related to VMs in the specified virtual datacenter. Choose from the following entity types: [Datacenter, PhysicalMachine, VirtualMachine, Storage, Application, Chassis, DiskArray, IOModule, StorageControl, Switch, VirtualDataCenter, VPod, DPod, Container, Database, DatabaseServerContainer, LogicalPool]</td>
</tr>
<tr>
<td>riskSeverityList</td>
<td>Returns only actions of the given severities. [Unknown, Normal, Minor, Major, Critical]</td>
</tr>
<tr>
<td>riskSubCategoryList</td>
<td>Returns only actions of the given subcategories. [Performance Assurance, Efficiency Improvement, Prevention, Compliance]</td>
</tr>
</tbody>
</table>

**Example:** POST https://10.10.10.10/api/v3/markets/Market/actions/stats

**Example input:** In this example, a list of actions that meet the following criteria will be returned and grouped by the `actionMode` of the action, in order of severity:

- Is in state **PENDING_ACCEPT**
- Is part of an on-premises environment
- Is an action for a virtual machine
- Is an action generated by the Turbonomic real-time market

```json
{
  "actionInput":{
    "actionStateList":[
      "PENDING_ACCEPT"
    ],
    "environmentType":"ONPREM",
    "groupBy":[
      "actionModes"
    ],
    "relatedType":"VirtualMachine",
    "scopes":[
      "Market"
    ]
  }
}
```

**Response:** A list of StatSnapshotApiDTOs containing statistics about the filtered actions.

```json
[
  {
    "date":"2019-02-05T14:40:08-05:00",
    "statistics":{
      "name":"numActions",
      "values":{
        "max":268,
```
Getting All Entities Within a Market

Referenced Endpoint: [Entities](#)

Gets a list of all entities in the specified market. This request may be used to retrieve a list of entities used in a plan market.

**Example:** GET https://10.10.10.10/api/v3/markets/2452692215536/entities

**Response:** A list of ServiceEntityApiDTOs, representing the entities in the market. In this case, note that there is an attribute entitled realtimeMarketRefrence because these are entities from a plan market.

```json
[
  {
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/entities/_QQVtEyi_EemDHtuQzfdzxw?include_aspects=false"
      }
    ],
    "uuid": "_QQVtEyi_EemDHtuQzfdzxw",
    "displayName": "osp-master-2",
    "className": "VirtualMachine",
    "priceIndex": 3.6063216,
    "state": "ACTIVE",
    "realtimeMarketReference": "PlanMarket1"
  }
]```
Getting Statistics of Entities Within a Market

Referenced Endpoint: Stats (on page 232)

Referenced Endpoint: Entities (on page 58)

Gets statistics related to entities in a specified market. For example, this request may be used to see the final calculated statistics for entities in a plan market. For more information about creating a filtered list of statistics, see Filtered Statistics (on page 232)

Example:

Response:

Getting Statistics of a Specified Group of Entities Within a Market

Referenced Endpoint: Stats (on page 232)

Referenced Endpoint: Groups (on page 88)

Referenced Endpoint: Entities (on page 58)

Gets statistics related to a specific group of entities in a specified market. For example, this request may be used to see the final calculated statistics for a group of hosts in a plan market. For more information about creating a filtered list of statistics, see Filtered Statistics (on page 232)

Example:

Response:

Getting Policies for a Market

Referenced Endpoint: Policies (on page 150)

Returns a list of all current policies affecting a specified market. For a plan market, this is a list of policies that you created, enabled, disabled, or changed in the plan configuration. For the real-time market, this is a list of policies currently available on your appliance. To get a single policy, include the UUID of the policy in the request.

Examples:

- All policies: GET https://10.10.10.10/api/v3/markets/2481646239616/policies
- One policy:
  
  GET https://10.10.10.10/api/v3/markets/2481646239616/policies/_z3LKSTk0EemeycL7hWgJNw

Response: A list of PolicyApiDTOs representing the policies requested.

"severity":"Normal",
"realtimeMarketReference":{
  "uuid":"42000c5d-9ae5-44f0-252c-daabbb423a86"
},
"environmentType":"ONPREM"
...
"links": [
  {
    "rel": "self",
    "href": "https://10.10.10.10/api/v3/policies/_z3LxVzk0EemeycL7hWgJNw"
  }
],
"uuid": "_z3LxVzk0EemeycL7hWgJNw",
"displayName": "DalTestPolMerge",
"type": "MERGE",
"name": "DalTestPolMerge",
"enabled": true,
"commodityType": "ClusterCommodity",
"mergeType": "Cluster",
"mergeGroups": [
  {
    "uuid": "91ff08749fd278925d73b61b0f0f69d79c99fc3a",
    "displayName": "PMs_Beta DC6\Cluster-1",
    "className": "Group",
    "groupType": "PhysicalMachine",
    "isStatic": true,
    "logicalOperator": "AND"
  },
  {
    "uuid": "8c17d8e79c3db85ed5d3868de622cb89187849ce",
    "displayName": "PMs_Beta DC6\Cluster-2",
    "className": "Group",
    "groupType": "PhysicalMachine",
    "isStatic": true,
    "logicalOperator": "AND"
  }
],
"links": [
  {
    "rel": "self",
    "href": "https://10.10.10.10/api/v3/policies/_z3LKSTk0EemeycL7hWgJNw"
  }
],
"uuid": "_z3LKSTk0EemeycL7hWgJNw",
"displayName": "CommSegmentation/SegmentManager__4T_7kwY-Ed-WUKbEYSVI
 Dw_1551123454966",
"type": "MUST_RUN_TOGETHER",
"name": "CommSegmentation/SegmentManager__4T_7kwY-Ed-WUKbEYSVIDw_1551123454966",
"enabled": false,
"capacity": 1000000000,
"commodityType": "DrsSegmentationCommodity",
"consumerGroup": {
  "uuid": "_z2M57Dk0EemeycL7hWgJNw",
  "displayName": "Buyers-Group-GROUP-DRS-KTG-rule/DC13-Cluster/vsphere-dc13.dev.m
ycorp.com",
  "className": "DiscoveredGroup",
  "groupType": "VirtualMachine",
  "isStatic": true,
  "logicalOperator": "AND"}
Deleting a Placement Policy for a Market

Referenced Endpoint: Policies (on page 150)

Deletes the specified policy, given the UUID of the policy and the market. Note that if you delete an imported policy, it will reappear after the next discovery cycle of the target it was imported from. To delete imported policies, delete them on the target directly.

Example: DELETE https://10.10.10.10/api/v3/markets/2481646239616/policies/_z3LxVzk0EemeycL7hWgJNw


Getting Reservations for a Market

Referenced Endpoint: Reservations (on page 152)

Returns a list of all current reservations for a specified market. For the real-time market, this is a list of reservations currently active on your appliance.

Example: GET https://10.10.10.10/api/v3/markets/Market/reservations

Response: A list of DemandReservationApiDTOs representing any current reservations.

[ { "uuid": "_I6z38Tk8EemeycL7hWgJNw", "displayName": "DalRes2", "count": 1, "status": "RESERVED", "reserveDateTime": "Mon Feb 25 15:30:07 EST 2019", "expireDateTime": "Mon Mar 25 08:29:54 EDT 2019", "deployDateTime": "Tue Mar 26 08:29:54 EDT 2019", "reserveCount": 1, "deployCount": 0, "demandEntities": [ { "uuid": "_JEZRwTk8EemeycL7hWgJNw", "displayName": "DalRes2_C0", "className": "VirtualMachine", "template": { "uuid": "T-ef47f3dbddee39f888052332cbe7d0cf2", ...] } ]
"displayName":"AVG:PMs_ACM\ACM Cluster for last 10 days",
"className":"VirtualMachineProfile"
},
"placements":{
  "computeResources":[
    {
      "stats":{
        "name":"numOfCpu",
        "value":2
      },
      "name":"cpuSpeed",
      "units":"MHz",
      "value":5320
    },
    "name":"cpuConsumedFactor",
    "units":"%",
    "value":4.2516437
  },
  "name":"memorySize",
  "units":"MB",
  "value":6631
},
  "name":"memoryConsumedFactor",
  "units":"%",
  "value":46.328953
},
  "name":"ioThroughput",
  "units":"MB/s",
  "value":0.05301181
},
  "name":"networkThroughput",
  "units":"MB/s",
  "value":0.103116125
},
"provider":{
  "uuid":"30333436-3638-5355-4532-313159335631",
  "displayName":"hp-dl571.dev.mycorp.com",
  "className":"PhysicalMachine"
},
"storageResources":[
  {
    "stats":{
      "name":"diskSize",
      "units":"GB",
      "value":140
    }
  }
]
Running a Scenario on a Market

Referenced Endpoint: [Scenarios](on page 161)

When a scenario is run on the real-time market, it creates a plan market showing the results of the scenario. If a second scenario is run on the resultant market, that is called running a "plan over plan", so named because you are running and applying the configuration for a second plan on a market that is already in a divergent state as a result of the first plan.


Response: A MarketApiDTO showing the new state of the market- if successful, COPYING.

```json
{
    "links": [
        {
            "rel": "self",
            "href": "https://10.10.10.10/api/v3/markets/_ps_iUDlBEemeycL7hWgJNw"
        },
        {
            "rel": "Market notifications",
            "href": "https://10.10.10.10/api/v3/markets/_ps_iUDlBEemeycL7hWgJNw/notifications"
        },
        {
            "rel": "Market actions",
            "href": "https://10.10.10.10/api/v3/markets/_ps_iUDlBEemeycL7hWgJNw/actions?ascending=true"
        },
        {
            "rel": "To Entities",
            "href": "https://10.10.10.10/api/v3/markets/_ps_iUDlBEemeycL7hWgJNw/entities"
        }
    ]
}
```
Getting Statistics for a Market

Referenced Endpoint: Stats (on page 232)

Gets statistics about the specified market. This call can be used to see statistics from the real-time market, or to see the resultant statistics in a plan market after the scenario has been applied.

Example: GET https://10.10.10.10/api/v3/markets/Market/stats

Response: A list of StatSnapshotApiDTOs representing the statistics of the real-time market.

[  
  {  
    "displayName": "PMs",  
    "metric": "CPU",  
    "value": 80  
  },  
  {  
    "displayName": "Memory",  
    "metric": "RAM",  
    "value": 50  
  }
]
Getting a Filtered List of Statistics for a Market

Referenced Endpoint: Stats (on page 232)

Gets a list of statistics about the specified market, filtered by the criteria in the StatPeriodApiInputDTO you must pass as an inputDTO to this request.

Example:

Example Input:

Response: An array of StatSnapshotApiDTOs representing the filtered statistics for the market.

Getting the Supply Chain for a Market

Referenced Endpoint: Supply Chains (on page 246)
Using one or more of the following parameters, you can filter the supply chain that is returned by this request:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>market_Uuid</td>
<td>The UUID of the market whose supply chain will be returned</td>
</tr>
<tr>
<td>types</td>
<td>The entity types whose supply chain will be returned. Choose from:</td>
</tr>
<tr>
<td></td>
<td>• BUSINESS_UNIT</td>
</tr>
<tr>
<td></td>
<td>• CLOUD_SERVICE</td>
</tr>
<tr>
<td></td>
<td>• CONTAINER</td>
</tr>
<tr>
<td></td>
<td>• DATABASE</td>
</tr>
<tr>
<td></td>
<td>• DATABASE_SERVER</td>
</tr>
<tr>
<td></td>
<td>• DATACENTER</td>
</tr>
<tr>
<td></td>
<td>• DISK_ARRAY</td>
</tr>
<tr>
<td></td>
<td>• PHYSICAL_MACHINE</td>
</tr>
<tr>
<td></td>
<td>• STORAGE</td>
</tr>
<tr>
<td></td>
<td>• VIRTUAL_MACHINE</td>
</tr>
<tr>
<td></td>
<td>• SWITCH</td>
</tr>
<tr>
<td></td>
<td>• VIRTUAL_DATACENTER</td>
</tr>
<tr>
<td></td>
<td>• CHASSIS</td>
</tr>
<tr>
<td></td>
<td>• STORAGE_CONTROLLER</td>
</tr>
<tr>
<td></td>
<td>• IO_MODULE</td>
</tr>
<tr>
<td></td>
<td>• APPLICATION_SERVER</td>
</tr>
<tr>
<td></td>
<td>• VIRTUAL_APPLICATION</td>
</tr>
<tr>
<td></td>
<td>• NETWORK</td>
</tr>
<tr>
<td></td>
<td>• APPLICATION</td>
</tr>
<tr>
<td></td>
<td>• CONTAINER</td>
</tr>
<tr>
<td></td>
<td>• CONTAINER_POD</td>
</tr>
<tr>
<td></td>
<td>• LOGICAL_POOL</td>
</tr>
<tr>
<td></td>
<td>• DPOD</td>
</tr>
<tr>
<td></td>
<td>• VPOD</td>
</tr>
<tr>
<td></td>
<td>• LOAD_BALANCER</td>
</tr>
<tr>
<td>entity_states</td>
<td>Only return entities in the specified states. Choose from:</td>
</tr>
<tr>
<td></td>
<td>• ACTIVE:</td>
</tr>
<tr>
<td></td>
<td>Entity is actively consuming resources.</td>
</tr>
<tr>
<td></td>
<td>• EVACUATED:</td>
</tr>
<tr>
<td></td>
<td>Entity is ready to suspend and will not participate in the market, but will not generate a SUSPEND action.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> This state replaces the SUSPEND state, and requires additional configuration to enable. Turbonomic does not recommend enabling this state.</td>
</tr>
<tr>
<td></td>
<td>• FAILOVER:</td>
</tr>
<tr>
<td></td>
<td>This entity is reserved for failover and will not participate in the market.</td>
</tr>
<tr>
<td></td>
<td>• IDLE:</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>entity_states</td>
<td>• LAUNCH: Entity is powered off and not actively consuming market resources.</td>
</tr>
<tr>
<td></td>
<td>• MAINTENANCE: Entity is in maintenance mode.</td>
</tr>
<tr>
<td></td>
<td>• NOT_MONITORED: Entity is not currently monitored by Turbonomic.</td>
</tr>
<tr>
<td></td>
<td>• QUEUED: Entity is in the process of changing from one state to another.</td>
</tr>
<tr>
<td>NOTE:</td>
<td>This state is internal to Turbonomic and will not appear in the UI, but may appear in an API response if the call is executed at the precise moment the entity is changing state.</td>
</tr>
<tr>
<td></td>
<td>• RESOURCE_ALLOCATION: Cloud entity is being created.</td>
</tr>
<tr>
<td></td>
<td>• RESOURCE_RELEASE: Cloud Entity is being deleted.</td>
</tr>
<tr>
<td></td>
<td>• SUSPEND: Entity is suspended or the guest OS is in sleep, standby, or suspended state. The entity is not removed from the environment, but will not be used in market decisions. Based on market conditions, suspended entities can be started, re-adding them to the market.</td>
</tr>
<tr>
<td></td>
<td>• SUSPEND_PENDING: Entity is making preparations to suspend, or is the next entity of its type to suspend.</td>
</tr>
<tr>
<td></td>
<td>• TERMINATE_PENDING: Entity is in the process of being deleted.</td>
</tr>
<tr>
<td></td>
<td>• UNKNOWN: Turbonomic is unable to obtain the current state of the entity.</td>
</tr>
<tr>
<td></td>
<td>This occurs when the entity is reported to the hypervisor as having a state of DISCONNECTED, ORPHANED, or INVALID.</td>
</tr>
</tbody>
</table>

**environment_type** Only return actions that affect entities in the specified environment type. [ CLOUD, HYBRID, ONPREM ].

**detail_type** The level of detail returned for each item in the returned supply chain. [ compact, entity, aspects ].

**health** Return a small summary of the health of the returned supply chain.

**Example:** GET https://10.10.10.10/api/v3/markets/Market/supplychains?types=VirtualMachine&entity_states=RESOURCE_ALLOCATION&entity_states=ACTIVE&environment_type=ONPREM&detail_type=aspects&health=true

**Response:** A SupplychainApiDTO representing the entities meeting your criteria. In the above example, a supply chain including Virtual Machines in the ACTIVE or RESOURCE_ALLOCATION states, in an ONPREM environment, and a healthcheck will be included at the end of the request.
Turbonomic REST API Endpoints

```json
{
    "seMap": {
        "VirtualMachine": {
            "depth": -1,
            "entitiesCount": 335,
            "healthSummary": {
                "Major": 6,
                "Minor": 148,
                "Normal": 181
            },
            "stateSummary": {
                "ACTIVE": 335
            },
            "connectedProviderTypes": [
                "PhysicalMachine",
                "Storage",
                "VirtualDataCenter"
            ],
            "connectedConsumerTypes": [
                "Application"
            ],
            "instances": {
                "421edc7a-761d-9a79-9378-7140caecd50f": {
                    "links": [
                        {
                            "rel": "self",
                            "href": "https://10.10.10.10/api/v3/entities/421edc7a-761d-9a79-9378-7140caecd50f?include_aspects=false"
                        }
                    ],
                    "uuid": "421edc7a-761d-9a79-9378-7140caecd50f",
                    "displayName": "vm-max-test-netapp",
                    "className": "VirtualMachine",
                    "priceIndex": 1.0070138,
                    "state": "ACTIVE",
                    "severity": "Normal",
                    "discoveredBy": {
                        "uuid": "_8c98wBwnEem2J-ksdl1CgA",
                        "displayName": "vsphere-dc7.dev.mycorp.com",
                        "type": "vCenter"
                    },
                    "remoteId": "vm-281",
                    "aspects": {
                        "virtualMachineAspect": {
                            "os": "SUSE Linux Enterprise 11 (64-bit)",
                            "connectedNetworks": [
                                {
                                    "uuid": "7d6d67a50cf8e1979797de159220841a37a55a50c",
                                    "displayName": "VM network"
                                }
                            ],
                            "numVCPUs": 1,
                            "ebsOptimized": false
                        }
                    }
                }
            }
        }
    }
}
```
Markets Cookbook

Unplaced Entities

When running a plan in Turbonomic, you can add workload or remove infrastructure- if the remaining resources are insufficient for the workload, entities may "unplaced". Turbonomic provides an array of the unplaced workloads.

| NOTE: An example will be forthcoming.

Finding a Previously Run Plan Market

While the Turbonomic UI makes a plan look like one item, it is not. A plan is composed of two parts- a scenario, which represents the configuration options for the plan, and the plan market that is created when a scenario is run- this contains the actions, notifications, etc., that make up the state of the market after the plan. For more information about plan configuration, see Scenarios (on page 161).

The simplest way to discover a plan market is to execute the GET https://10.10.10.10/api/v3/markets and disregard the running market with a DTO entry similar to the following:

```json
{
    "uuid":"777777",
    "displayName":"Market",
    "className":"Market",
    "state":"RUNNING",
    "stateProgress":100,
    "unplacedEntities":false,
    "environmentType":"HYBRID"
}
```

The remaining markets are plan markets, and the relevant partial DTO is below:

```json
{
    "uuid":"214172431889696",
    "displayName":"Add Workload 2",
    "className":"Market",
    "state":"SUCCEEDED",
    "stateProgress":100,
    "scenario":{
```
"uuid":"214172431885856",
"displayName":"Add Workload 2",
"owners":{
    
    "uuid":"2993567556912",
    "showSharedUserSC":false
}
...}

The outer-most uuid parameter is the UUID of the plan market, and the DisplayName parameter is the name of the scenario. The state field shows the results of the plan run- SUCCEEDED indicating the plan finished successfully, FAILED indicating the plan did not finish running- usually due to being cancelled by the user.

Within the plan itself, the scenario parameter includes information about the scenario used on the market. Note the inner uuid is the UUID of the scenario, which we will use to see all markets created using this scenario.

Finally, iterating over the return of the /markets call above, looking at each market and comparing the UUID of the scenario (in this case, 214172431889696). This will indicate how many times the scenario was run, and also the market containing the results of that run.

Notifications Endpoint

Notifications represent informational system and market messages from your Turbonomic instance.

This endpoint contains references to start and end times for certain operations. For more information, including valid time formats, see Time in the Turbonomic API (on page 12)

Using the notifications endpoint, you can:
- Get all notifications
- Get a filtered list of notifications
- Get related actions for a specified notification

Notification Categories

Each notification from your Turbonomic instance belongs to a particular category of the following:
- Discovery
- Monitoring
- Control
- Mediation
- Healthcheck
- InterAppliance
- MarketAction
- MarketProblem
- Presentation
- Deploy
## Notifications Requests

### Getting Notifications

Gets a list of system and market level notifications. For a list of notifications, the API returns an array of LogEntryApiDTOs. Each LogEntryApiDTO will contain details about the notification, including the time, state, severity, and importance of the notification. To get a single notification, include the UUID of the notification in the request.

This request takes the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>start_time</td>
<td>The start time for a historic range of notifications.</td>
</tr>
<tr>
<td>end_time</td>
<td>The end time for a historic range of notifications.</td>
</tr>
<tr>
<td>category</td>
<td>The category of notifications to return. [Discovery, Monitoring, Control, Mediation, Healthcheck, InterAppliance, MarketAction, MarketProblem, Presentation, Deploy, Security]</td>
</tr>
<tr>
<td>cursor</td>
<td>When making subsequent calls to retrieve additional results, this is the cursor returned by the last call to this method.</td>
</tr>
<tr>
<td>limit</td>
<td>The maximum number of items to return. Must be a positive integer. If not set, the server will provide a default (20).</td>
</tr>
<tr>
<td>order_by</td>
<td>The field to order the results by. This value can be any field found in the response.</td>
</tr>
<tr>
<td>ascending</td>
<td>Default: true. When false, results will be in descending order.</td>
</tr>
</tbody>
</table>

### Examples:

- **All Notifications (no parameters):**
  ```
  GET https://10.10.10.10/api/v3/notifications
  ```

- **All Notifications (parameters):**
  ```
  GET https://10.10.10.10/api/v3/notifications?start_time=1237056032&end_time=1238056032&limit=100&order_by=name&ascending=true
  ```

- **Single Notification:**
  ```
  GET https://10.10.174.149/api/v3/notifications/_5wcf4J5WEinZ-6Uu4soUw
  ```

### Response:

```json
{
   "links": [
      {
         "rel": "self",
         "href": "https://10.10.10.10/api/v3/notifications/_5wcf4J5WEinZ-6Uu4soUw"
      }
   ],
   "uuid": "_5wcf4J5WEinZ-6Uu4soUw",
   "logActionTime": 1534095671518,
   "targetSE": "Hyper-V:hp-cluster.corp.mycorp.com",
   "category": "Discovery",
   "subCategory": "Validation",
   "description": "Validation of target hp-cluster.corp.mycorp.com failed",
}
```
Turbonomic REST API Endpoints

"shortDescription":"Validation Failed",
"state":"NOTIFY",
"severity":"MAJOR",
"importance":0
},

"links": [ 

{ "rel":"self",
"href":"https://10.10.10.10/api/v3/notifications/_sQ7xUJ5XEeinZ-6Uu4soUw"
}
],
"uuid": "_sQ7xUJ5XEeinZ-6Uu4soUw",
"logActionTime": 1534096010470,
"targetSE": "Hyper-V:hp-cluster.corp.mycorp.com",
"category": "Discovery",
"subCategory": "Discovery",
"description": "Could not get domain for the 'hp-cluster.corp.mycorp.com' target",
"shortDescription": "Discovery failed",
"state": "NOTIFY",
"severity": "MAJOR",
"importance": 0
},
...
]

Policies Endpoint

Policies set business rules to control how Turbonomic analyzes resource allocation, how it displays resource status, and how it recommends or executes actions. There are two kinds of policies:

• Placement Policies

To modify workload placement decisions, Turbonomic divides its market into segments that constrain the valid placement of workloads. Turbonomic discovers placement rules that are defined by the targets in your environment, and you can create your own segments.

• Automation Policies

Turbonomic ships with default settings that we believe will give you the best results from our analysis and control. For some scopes of your environment, you might want to change these settings. For example, you might want to change action automation for that scope, or change the utilization constraints.

The hypervisors that you set as targets can include placement policies of their own. Turbonomic imports these placement policies, and you can choose to enable or disable them as you wish. By default, Turbonomic enables imported placement policies.

Using the policies endpoint, you can:

• Get API entry points for policies
• See details about a specific policy
Policies Utility Requests

Utility requests provide metadata that you can use to make related requests, assemble inputDTOs, or see the potential values of a particular DTO.

The policies endpoint contains a utility request that shows the entry points for policy-related requests. These can be used to find the UUID and details relating to a specific policy.

**Example:** GET https://10.10.10.10/api/v3/policies

**Response:** An array of Link objects, where each object contains a URL to get all policies for a specified market, entity, or group.

```
{
  "links": [  
    {  
      "rel": "Market policies",
      "href": "https://10.10.10.10/api/v3/markets/{uuid}/policies"
    },  
    {  
      "rel": "Entity policies",
      "href": "https://10.10.10.10/api/v3/entities/{uuid}/policies"
    },  
    {  
      "rel": "Group policies",
      "href": "https://10.10.10.10/api/v3/groups/{uuid}/policies"
    }
  ],
  "enabled": false
}
```

Policies Requests

**Getting the Details of a Specified Policy**

The single policy request gets the details of a specified policy, given that policy's UUID. You may use this after getting policies that affect a certain scope, to view details of those policies.

**Example:** GET https://10.10.174.149/api/v3/policies/104:domain-c7:10.10.111.111

**Response:** A PolicyApiDTO describing details about the policy, including the group information for the provider of the policy.

```
{
  "links": [  
    {  
      "rel": "self",
      "href": "https://10.10.10.10/api/v3/policies/104:domain-c7:10.10.111.111"
    }
  ]
}
```
Creating a Policy

Policies are created for a specific market- either a plan market, or the real-time market. For more information about policy creation, see the Markets (on page 124) endpoint.

Reservations Endpoint

Turbonomic utilizes reservations to save the resources you will need to deploy workloads at a future date. Turbonomic uses its intelligent workload management to calculate optimal placement for these workloads, and then it reserves whatever resources the different hosts and storage entities will need to support those workloads. For example, you may instruct Turbonomic on 01 January to reserve the resources required for 100 workloads on 07 January.

Using the reservations endpoint of the Turbonomic API, you can:

- Get a list of reservations
- Create a reservation
- Get information about a specific reservation
- Delete a reservation

Reservation States:

- FUTURE
  A reservation for a future date. No provider resources are reserved until the reservation date.
• **IN_PROGRESS**
  Turbonomic is planning the placement of the reservation workloads.

• **PLACEMENT_FAILED**
  Turbonomic cannot place all the reservation VMs. As your environment changes, Turbonomic continues to calculate placement for the VMs. If at any time it finds that it can place all the VMs, it changes the reservation to RESERVED.

• **INVALID**
  An error occurred while planning the placement of the reservation VMs.

### Reservations in the Product

From the Workload Placement Page, you can set up reservations to save the resources you will need to deploy workloads at a future date. Turbonomic uses its intelligent workload management to calculate optimal placement for these workloads, and then it reserves whatever resources the different hosts and storage entities will need to support those workloads.

When creating a reservation in the product, you will select the VM template, any constraints (scope, policy, network), then give your reservation a name, virtual machine count, and start and end dates.

### Reservations Requests

#### Creating a Reservation

To create a reservation, pass a completed DemandReservationApiInputDTO as input to this request. This DTO will contain information such as the reservation type, the template to use, and the UUIDs of any constraints, such as placement or network policies. Only templates that have associated deployment profiles may be used for reservations.

This request takes the following parameters:

<table>
<thead>
<tr>
<th>apiCallBlock</th>
<th>Default: false. When true, this request will be synchronous, and will not complete until a failure or success response is received.</th>
</tr>
</thead>
</table>

**Example:** POST https://10.10.10.10/api/v3/reservations

Example input DTO, to create a reservation for three instances of a template, whose resources will be reserved from 05 November, to 07 December:

```json
{
    "demandName": "DallasOnPremRes2",
    "reserveDateTime": "2018-11-05T01:00:00Z",
    "expireDateTime": "2018-12-07T14:45:44Z",
    "action": "RESERVATION",
    "parameters": {
        "placementParameters": {
            "count": 3,
            "templateID": "T420fc4e6-b7de-1550-38b3-5152bdbfe131"
        },
        "deploymentParameters": {
            "deploymentProfileID": "DEP-420fc4e6-b7de-1550-38b3-5152bdbfe131"
        }
    }
}
```
Response: A DemandReservationApiDTO that includes the status of the reservation. Note that because the request was executed prior to 05 November, the status is FUTURE and the reserveCount is 0. On the date of the reservation, Turbonomic will attempt to reserve the resources. At that time, the status will change to RESERVED or PLACEMENT_FAILED, and the reserveCount will update.

```json
{
    "uuid": "_R3VbkNJFEeiC9K76pbNqVQ",
    "displayName": "DallasOnPremRes2",
    "count": 3,
    "status": "FUTURE",
    "reserveDateTime": "Sun Nov 04 20:00:00 EST 2018",
    "expireDateTime": "Fri Dec 07 09:45:44 EST 2018",
    "reserveCount": 0
}
```

Creating a Placement Reservation

To create a placement reservation, pass a completed DemandReservationApiInputDTO as input to this request. This DTO will contain information such as the reservation type, the template to use, and the UUIDs of any constraints, such as placement or network policies.

This request takes the following parameters:

<table>
<thead>
<tr>
<th>apiCallBlock</th>
<th>Default: false. When true, this request will be synchronous, and will not complete until a failure or success response is received.</th>
</tr>
</thead>
</table>

Example: POST https://10.10.10.10/api/v3/reservations

Example inputDTO, to perform a placement check for one instance of a template:

```json
{
    "demandName": "1539716447241_administrator",
    "action": "PLACEMENT",
    "parameters": [
        {
            "placementParameters": {
                "count": 1,
                "templateID": "azure::VMPROFILE::Standard_D2_v3",
                "constraintIDs": [
                    "_jhIegNFuEeiKWPUvSfc5Cg",
                    "db6eb2048add713eb67fc60a39f21f540eb889"
                ]
            }
        }
    ]
}
```
Response: A DemandReservationApiDTO that will include the status of the placement attempt.

```json
{
  "uuid": "_npW-gdF2EeiC9K76pbNgvQ",
  "displayName": "1539716801613_administrator",
  "count": 1,
  "status": "PLACEMENT_SUCCEEDED",
  "placementExpirationDateTime": "2018-10-16T15:11:54Z",
  "demandEntities": [
    {
      "uuid": "_npbQANF2EeiC9K76pbNgvQ",
      "displayName": "1539716801613_administrator_C0",
      "className": "VirtualMachine",
      "template": {
        "uuid": "azure::VMPROFILE::Standard_D2_v3",
        "displayName": "Standard_D2_v3",
        "className": "VirtualMachineProfile"
      },
      "placements": {
        "computeResources": [
          {
            "stats": [
              {
                "name": "numOfCpu",
                "value": 2.0
              },
              {
                "name": "cpuSpeed",
                "units": "MHz",
                "value": 3360.0
              },
              {
                "name": "cpuConsumedFactor",
                "units": "%",
                "value": 50.0
              },
              {
                "name": "memorySize",
                "units": "MB",
                "value": 8192.0
              },
              {
                "name": "memoryConsumedFactor",
                "units": "%",
                "value": 75.0
              },
              {
                "name": "ioThroughput",
                "units": "MB/s",
                "value": 0.0
              }
            ]
          }
        ]
      }
    }
  ]
}
```
Deleting a Reservation

Deletes the specified reservation and removes all reserved resources associated with that reservation. This will also remove any pending deployment related to the deleted reservation.

**Example:** DELETE https://10.10.10.10/api/v3/reservations/_i-FLwdLiEeiuY7KD1LoLWg

**Response:** A successful deletion request returns a Response Code of 200.
Reservations Cookbook

Creating Reservations

When creating a reservation, you should be familiar with placement policies, templates, scope constraints, and network constraints. For information about placement policies, see Policies (on page 150). For information on templates, see Templates (on page 264). For information on constraints, see the Turbonomic User Guide.

The action will always be "RESERVATION". demandName is the name that is used for UI display. reserveDateTime is the time to reserve the workload in ISO 8601 format. expireDateTime is the time to release the reserved resources in ISO 8601 format. The parameters array contains the placementParameters object. count is the number of workloads to be reserved, templateID is the UUID of the template to be used for the workloads, and the constraintIDs array contains any constraints on the placement. This may be the UUID of a group, placement policy, network, or other entity.

For example, the following POST creates a reservation scoped to a specific virtual data center with a UUID of 73365042986774 and network with a UUID of 73365048169751:

```json
{
  "action":"RESERVATION",
  "demandName":"DalReservation",
  "reserveDateTime":"2020-03-11T15:44:41Z",
  "expireDateTime":"2020-04-11T15:44:41Z",
  "parameters":{
    "placementParameters":{
      "count":"75",
      "templateID":"214103358655713",
      "constraintIDs":[
        "73365042986774",
        "73365048169751"
      ]
    }
  }
}
```

Getting Reservation Information

To get a list of current reservations, execute https://10.10.10.10/api/v3/reservations. This returns a list of all active reservations. If you know the UUID of the reservation you want, you can pass it to get data for just that reservation.

Each reservation object describes:

- Display name
- Status — can be:
  - DEPLOYING — Turbonomic is deploying the workload
  - DEPLOY_SUCCEEDED — The workload was successfully deployed
  - IN_PROGRESS — Placement calculation is in progress
- **PLACEMENT_SUCCEEDED** — For a new reservation, the environment has sufficient resources to place the workload; if you specified a reserve date, this will be an active reservation
- **PLACEMENT_FAILED** — For a newly created reservation, the environment doesn’t have resources to place the workload; if you specified a reserve date, this will be an unfulfilled reservation
- **RETRYING** — Turbonomic is trying to place the workload of an unfulfilled reservation

- Time the reservation was created, time to deploy, and time it will expire
- A description of the reserved workload
- The deployment profile that identifies the physical files that will be copied to deploy the workload, as well as optional placement limitations
- Statistics for the compute and storage resources the reservation sets aside

For example, this listing shows a reservation for one VM:

```json
{
  "uuid": "_kWZHIDDeEePgeXuo0RRbw",
  "displayName": "MyReservation",
  "count": 1,
  "status": "PLACEMENT_SUCCEEDED",
  "reserveDateTime": "Thu May 04 16:27:29 UTC 2017",
  "expireDateTime": "Thu Aug 31 16:27:29 UTC 2017",
  "deployDateTime": "Thu Aug 31 16:27:29 UTC 2017",
  "reserveCount": 1,
  "demandEntities": [
    {
      "uuid": "_kWg7TDeEePgeXuo0RRbw",
      "displayName": "MyReservation_C0",
      "className": "VirtualMachine",
      "template": {
        "uuid": "T423f548d-cadc-e525-6df4-1f90724cf696",
        "displayName": "vsphere-dc3.dev.mycorp.com::TMP-SUSE64",
        "className": "VirtualMachineProfile"
      },
      "deploymentProfile": {
        "uuid": "_gHJ0ICxDeEePgeXuo0RRbw",
        "displayName": "DEP-SUSE64",
        "className": "ServiceCatalogItem"
      },
      "placements": {
        "computeResources": {
          "stats": {
            { "name": "numOfCpu", "value": 1 },
            { "name": "cpuSpeed", "value": 2603 },
            { "name": "cpuConsumedFactor", "value": 0.5
```
Turbonomic REST API Endpoints

```
},
  
  "name": "memorySize",
  "value": 2097152
},

  
  "name": "memoryConsumedFactor",
  "value": 0.75
},

  
  "name": "ioThroughput",
  "value": 0
},

  
  "name": "networkThroughput",
  "value": 0
}

"provider": {
  "uuid": "Virtual_ESX_42381da5-12fa-1e82-2f1c-887419380d43",
  "displayName": "hp-esx21.corp.vmturbo.com",
  "className": "PhysicalMachine"
}

"storageResources": [

  
  "stats": [
    
    "name": "diskSize",
    "value": 18432.363
  ],

  
  "name": "diskIops",
  "value": 0
}

"provider": {
  
  "uuid": "10545c15-7687ef26",
  "displayName": "QS2:ESXDC3DS1",
  "className": "Storage"
}

```

Creating a Reservation

To create a reservation, you POST an input DTO that defines the reservation's:

- action: The action type — PLACEMENT, RESERVATION, or DEPLOYMENT
• demandName: The display name of the reservation — If you do not specify names for the added workloads, this will be the root name for new VMs
• deploymentParameters:
  ◦ deploymentProfileID: The UUID of a deployment profile
  ◦ highAvailability
  ◦ priority
• placementParameters:
  ◦ constraintIDs: An array of UUIDs for placement policies that will affect the calculated placement
  ◦ count: The number of workloads to place
  ◦ entityNames: An array of names for the placed VMs — The array length should equal count
  ◦ geographicRedundancy: If true place the workloads on unique hosts, otherwise Turbonomic can place multiple workloads on the same host
  ◦ templateID: The UUID of the template that you will use to place this workload — Note that the template must include a reference to the deployment profile that you specify in deploymentParameters
• deployDateTime: When to deploy the workloads — Only provide this for an action of type DEPLOYMENT
• expireDateTime: When to cancel a reservation if Turbonomic cannot place all the workloads by that date — for a RESERVATION action, Turbonomic automatically sets the deploy time to equal this time
• reserveDateTime: The time to calculate the workload placement and create the reservation — This time cannot be earlier than the time that you POST the reservation to the API

The following listing shows an input DTO that creates a reservation. It will place four workloads, and it gives specific names ot each one.

```json
{
   "action": "RESERVATION",
   "demandName": "MyReservation",
   "expireDateTime": "2017-10-10T12:38:17+00:00",
   "parameters": [
      {
         "deploymentParameters": {
            "deploymentProfileID": "_c9CJMDDAEeePgeXuo0RRbw"
         },
         "placementParameters": {
            "geographicRedundancy": false,
            "count": 4,
            "entityNames": [
               "foo","bar","baz","bonk"
            ],
            "templateID": "_UKsnkJkSEeCHcOXhIZhJeaxed2A"
         }
      }
   ],
   "reserveDateTime": "2017-05-04T18:22:12+00:00"
}
```

Async or Blocked Placement Calculation

When you POST a reservation, Turbonomic runs a plan to calculate the optimal placement of the workloads. Depending on the size of the reservation, this can take a significant amount of time. This POST method includes the apiCallBlock
parameter that specifies whether to execute the call asynchronously or in a blocked mode. If you do not set this parameter, then the API assumes asynchronous by default:

- **Blocked**: `/rest/reservations?apiCallBlock=true`
- **Async**: `/rest/reservations?apiCallBlock=false`

When you execute in asynchronous mode, the response to your POST shows that the calculation is in progress:

```json
{
    "uuid": "_0dPrYTD1EeePgeXuo0RRbw",
    "displayName": "MyReservation",
    "count": 4,
    "status": "IN_PROGRESS",
    "reserveDateTime": "Thu May 04 18:22:12 UTC 2017",
    "expireDateTime": "Tue Oct 10 12:38:17 UTC 2017"
}
```

To examine the placement results, GET the reservation using the UUID that the API gives in the response.

When you execute the call in blocked mode, the response body contains the full reservation, including the status to show whether placement succeeded or failed.

---

**Reserved Instances Endpoint**

Turbonomic analysis takes advantage of AWS Reserved Instances and Azure Reserved VM Instances to calculate optimal workload placement and to arrive at the best possible costs for your deployments on the cloud.

Using the reserved instances endpoint of the Turbonomic API, you can:

- Get a single reserved instance or list of reserved instances present in your environment
- Get statistics related to the reserved instances

**Reserved Instances Requests**

The reserved instances endpoint is not implemented in XL at this time.

---

**Scenarios Endpoint**

A scenario assembles configuration settings that you can use to set up and run a plan. To run a plan, you will POST the scenario to a market. Turbonomic will then run a plan based on the combination of the scenario and the market.

The settings you make in a scenario correspond to the plan settings you can make in the user interface. These include:

- Plan scope
- Changes to workload (adding, removing, or replacing VMs or containers)
- Changes to supply (adding, removing, replacing PMs or storage)
• Enable/disable placement policies and other constraints
• Changes to action modes
• Enable/disable provisioning of supply
• Enable/disable resizing of workloads

Using the scenarios endpoint of the Turbonomic API, you can:
• Get a list of scenarios on your instance
• Create a scenario
• Get a list of markets that are connected to a particular scenario

Scenarios Requests

Getting Scenarios

When you get a scenario, the API returns an object that includes:
• uuid
  The unique identifier for this scenario.
• displayName
  By default, Turbonomic creates a display name that matches the scenario type. However, you can provide your own name when you create a scenario.
• owners
  An array of user accounts that can use the scenario. Currently, this is always the user that created the scenario.
• type
  The type of scenario. When a user creates a scenario in the GUI, this matches the given type that user chooses from the Plan Wizard.
• scope
  An array of scope objects to specify the scope of the plan.
• projectionDays
  An array of days to specify how far into the future to project the plan.
• topologyChanges
  An array of additions or deletions to the set of entities in the plan scope.
• loadChanges
  An array of changes to the utilization percentage for different groups of entities within the plan scope.
• configChanges
  An array of configuration changes for different groups of entities within the plan scope.
• changes - DEPRECATED
  An array of scenario settings that make changes to the market before running the plan.

Example:

Response:
Creating a Scenario

Example:
Response:

Deleting a Scenario

Example:
Response:

Getting a List of Plan Markets Connected to a Scenario

A scenario can be used many times, producing a plan market each time. To see all the plan markets of a particular scenario

Example:
Response:

Scenario DTO Breakdown

Scenario DTO Overview

A scenario DTO assembles configuration settings that you use to set up and run a plan. To run a plan, you will POST the scenario to a market (unless running a plan-over-plan, this will be the real-time market). Turbonomic will then run a plan based on the combination of the scenario and the market state.

These configuration settings fall into one of several groups:

<table>
<thead>
<tr>
<th>Name (DTO)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration Changes (ConfigChangesApiDTO)</td>
<td>Adding and removing placement policies, removing constraints, and providing automation settings, OS migration settings, reserved instance settings, and associated business units.</td>
</tr>
<tr>
<td>Load Changes (LoadChangesApiDTO)</td>
<td>Modifications to the current and max utilization values, and peak baseline values.</td>
</tr>
<tr>
<td>Time-Based Topology Changes (TimeBasedTopologyChangesApiDTO)</td>
<td>Settings to include reserved VMs and add historical workload to the environment each month of the plan.</td>
</tr>
<tr>
<td>Topology Changes (TopologyChangesApiDTO)</td>
<td>Settings to add, remove, replace, and migrate workload, or to specify the clusters for an Alleviate Pressure plan.</td>
</tr>
</tbody>
</table>

DTO Configuration Changes

The scenario configuration changes, located in the configChanges parameter of the ScenarioApiDTO, enable you to perform the following tasks:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>addPolicyList</td>
<td>Add a placement policy to the market generated for this plan.</td>
</tr>
</tbody>
</table>
### Parameter | Description
--- | ---
automationSettingList | Change one of the available automation plan settings: VM Resize, Host Provision/Suspend, and Storage Provision/Suspend.
osMigrationSettingList | For a Migrate to Cloud plan, this parameter will contain the source and destination OS platforms, and their BYOL (Bring Your Own License) status.
removeConstraintList | Remove a constraint from the market generated for this plan.
removePolicyList | Remove a placement policy from the market generated for this plan.
riSettingList | Add information about your reserved cloud instances.
subscription | Associate a business unit to the plan.

### Adding and Removing Placement Policies

**Referenced Endpoint: Policies (on page 150)**

When running plans, you may want to see what your environment would look like with or without certain policies enabled, or with a new policy present. By passing the UUIDs of current policies, or a PolicyApiDTO for a new policy with a blank UUID, you can see the effects of these changes.

**Example input (Current Policies):**

```
"addPolicyList": [
  {
    "uuid": ".VnNS0CsqEvemvEL9szcXU1Q",
    "uuid": "522a3317-39f5-1a97-3b53-d1725927a6ab",
    "uuid": "52672058-a93b-0a9-bbd9-5acd33f27882"
  }
]
```

**Example input (New Policy):**

```
"addPolicyList": [
  {
    "capacity": null,
    "consumerGroup": {
      "uuid": "8c7d8e79c3db85ed5d3868de622cb89187849ce",
      "displayName": "PMs_Beta DC6\Cluster-2",
      "className": "Group",
      "groupType": "PhysicalMachine",
      "isStatic": true,
      "logicalOperator": "AND"
    },
    "enabled": true,
    "mergeGroups": null,
    "mergeType": null,
    "name": "DalTestPolMerge",
    "displayName": "DalTestPolMerge",
    "providerGroup": {
      "uuid": "91ff08749fd278925d73b61b0f0f79c99ff3a",
```

---

Turbonomic, Inc. www.turbonomic.com
"displayName": "PMs_Beta DC6\Cluster-1",
"className": "Group",
"groupType": "PhysicalMachine",
"isStatic": true,
"logicalOperator": "AND"
},
"type": "MERGE",
"uuid": ""  
]

Setting Plan Automation Settings

By changing the plan automation settings, you can see the effect of your scenario if VM resizes, Host Provisioning / Suspension, and Storage Provisioning / Suspension are enabled or disabled.

Example Input:

"automationSettingList": [  
  {  
    "uuid": "resize",
    "displayName": "Resize for VMS disabled",
    "value": "false",
    "entityType": "VirtualMachine"
  },
  {  
    "uuid": "provisionPM",
    "displayName": "Provision for PHYSICALMACHINES disabled",
    "value": "false",
    "entityType": "PhysicalMachine"
  },
  {  
    "uuid": "suspendPM",
    "displayName": "Suspend for PHYSICALMACHINES disabled",
    "value": "false",
    "entityType": "PhysicalMachine"
  },
  {  
    "uuid": "provisionDS",
    "displayName": "Provision for STS disabled",
    "value": "false",
    "entityType": "Storage"
  },
  {  
    "uuid": "suspendDS",
    "displayName": "Suspend for STS enabled",
    "value": "true",
    "entityType": "Storage"
  }
]

Additionally, the plan automation settings can be used to adjust operational constraints, such as provisioned values for CPU and MEM:
Example Input:

```
"automationSettingList": [
    {
        "uuid": "capacity_MemProvisioned",
        "displayName": "Mem Overprovisioned Percentage",
        "value": "9876.0",
        "defaultValue": "1000.0",
        "categories": [
            "utilizationThresholds"
        ],
        "valueType": "NUMERIC",
        "min": 1,
        "max": 1000000,
        "entityType": "PhysicalMachine",
        "sourceGroupName": "Global"
    }
]
```

Providing Cloud Reserved Instance Information

Turbonomic enables you to upload RI pricing information specific to the scenario.

Example Input:

```
"riSettingList": [
    {
        "uuid": "preferredTerm",
        "displayName": "Term",
        "value": "YEARS_1",
        "entityType": "YEARS_1"
    },
    {
        "uuid": "preferredPaymentOption",
        "displayName": "Payment",
        "value": "PARTIAL_UPFRONT",
        "entityType": "PARTIAL_UPFRONT"
    },
    {
        "uuid": "preferredOfferingClass",
        "displayName": "Type",
        "value": "STANDARD",
        "entityType": "STANDARD"
    },
    {
        "uuid": "preferredCoverage",
        "displayName": "Coverage",
        "value": "80",
        "entityType": "80"
    },
    {
        "uuid": "riCoverageOverride",
        "displayName": "RI Coverage Override",
        "value": "false"
    }
]
```
Removing Constraints

Referenced Endpoint: **Entities (on page 58)**

When running plans, you may want to see what your environment would look like with or without certain constraints. For example, if a group of virtual machines were allowed to move to any cluster of your environment.

In order to remove a constraint, you will need to know its UUID. To obtain this information, execute the `/entities/ENTITY_UUID/constraints` request for the entity whose constraint you wish to remove.

```
"removeConstraintList": [  
  {  
    "constraintType": "ClusterCommodity",  
    "projectionDay": 0,  
    "target": {  
      "uuid": "a6d365f4fbf03fb9a2e8c8b29e38045e31cee41b",  
      "displayName": "Beta DC6_vm",  
      "className": "VirtualMachine"  
    }  
  }  
]
```

Setting OS Migration Settings for a Migrate to Cloud Plan

When performing a Migrate to Cloud plan, you may want to use custom OS migration settings. You can specify both the OS mapping, and the BYOL (bring your own license) status of the mapping.

**Example Input:**

```
"osMigrationSettingList": [  
  {  
    "uuid": "linuxTargetOs",  
    "displayName": "linuxTargetOs",  
    "value": "LINUX"  
  },  
  {  
    "uuid": "linuxByol",  
    "displayName": "linuxByol",  
    "value": "true"  
  },  
  {  
    "uuid": "rhelTargetOs",  
    "displayName": "rhelTargetOs",  
    "value": "RHEL"  
  },  
  {  
    "uuid": "rhelByol",  
    "displayName": "rhelByol",  
    "value": "false"
  }
]
```
Scenario DTO Load Changes

The scenario load changes, located in the `loadChanges` parameter of the ScenarioApiDTO, make workload utilization changes that enable you to perform the following tasks:
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>baselineDate</td>
<td>If your plan should be run using historical data, the date of the data to be used.</td>
</tr>
<tr>
<td>maxUtilizationList</td>
<td>Changes the max utilization values for a group of entities in your plan.</td>
</tr>
<tr>
<td>peakBaselineList</td>
<td>Changes the peak baseline values for a group of entities in your plan.</td>
</tr>
<tr>
<td>utilizationList</td>
<td>Changes the utilization values for a group of entities in your plan.</td>
</tr>
</tbody>
</table>

**Changing the Baseline Date**

Example input:

```json
"baselineDate": 1552622400000
```

**Changing the Utilization For a Group of Entities**

Example input:

```json
"utilizationList": [  
  {  
    "percentage": -12,  
    "projectionDay": 0,  
    "target": {  
      "displayName": "Global Environment",  
      "uuid": "Market"  
    }  
  }  
]
```

**Changing the Maximum Utilization For a Group of Entities**

Example input:

```json
"maxUtilizationList": [  
  {  
    "maxPercentage": 82,  
    "projectionDay": 0,  
    "target": {  
      "displayName": "All On-prem Hosts",  
      "className": "Group",  
      "uuid": "_PE0v-YEUEee_hYfzgV9uYg"
    }  
  },  
  {  
    "maxPercentage": 85,  
    "projectionDay": 0,  
    "target": {  
      "displayName": "ACM_datastore",  
      "className": "Group",  
      "uuid": "c31a6f99f4409700115fc61fca71e5449ad68700"
    }  
  }  
]
```
Scenario DTO Time-Based Topology Changes

The scenario time-based topology changes, located in the `timebasedTopologyChanges` parameter of the `ScenarioApiDTO`, make time-dependent topology changes to your scenario, such as:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>addHistoryVMs</td>
<td>If <code>true</code>, Turbonomic will add additional workload to your scenario each month equal to the workload added to the real-time market in the previous month.</td>
</tr>
<tr>
<td>includeReservation</td>
<td>If <code>true</code>, Turbonomic will take current reservations and reflect that resource utilization when running the scenario.</td>
</tr>
</tbody>
</table>

Adding Historical VM Usage and/or Including VM Reservations

Example input:

```json
"timebasedTopologyChanges": [ 
  { 
    "addHistoryVMs": "true",
    "includeReservation": "true"
  }
]
```

Scenario DTO Topology Changes

The scenario topology changes, located in the `topologyChanges` parameter of the `ScenarioApiDTO`, make topology changes to your scenario, such as:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>addList</td>
<td>A list of entities added to your environment as part of plan configuration.</td>
</tr>
<tr>
<td>migrateList</td>
<td>A list of entities moved from one set of providers to another as part of plan configuration.</td>
</tr>
<tr>
<td>relievePressureList</td>
<td>In a Relieve Pressure plan, the source and target clusters.</td>
</tr>
<tr>
<td>removeList</td>
<td>A list of entities removed from your environment as part of plan configuration.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>replaceList</td>
<td>A list of entities and the templates to replace them in your environment as part of plan configuration.</td>
</tr>
</tbody>
</table>

**Adding Workload**

Adding workload to a scenario simulates the effect of increased VM or container density in your environment. You may add multiple copies of VM groups or individual VMs.

**Example input:**

```json
"addList": [ 
{
   "count": 3,
   "projectionDays": [ 0
   ],
   "target": {
      "uuid": "421dd4ce-a4c1-231a-7e7-64fbf598bc65",
      "displayName": "AJ_Test",
      "className": "VirtualMachine"
   }
},
{
   "count": 10,
   "projectionDays": [ 0
   ],
   "target": {
      "uuid": "421e503d-d0c0-75f9-8cce-79421924a90d",
      "displayName": "olg_test",
      "className": "VirtualMachine"
   }
},
{
   "count": 5,
   "projectionDays": [ 0
   ],
   "target": {
      "uuid": "420f1840-297f-5a39-9543-b72046b9126f",
      "displayName": "opensuse_with_stress_template",
      "className": "VirtualMachine"
   }
},
{
   "count": 1,
   "projectionDays": [ 0
   ],
   "target": {
      "uuid": "53523c9a4c5d67962a96f90f59456b0c3e72aca0",
      "displayName": "Development67_vm",
      "className": "VirtualMachine"
   }
]```
Migrating Workload to the Cloud
Turbonomic includes a special plan to simulate migration of on-premise workload to the cloud, or migration of workloads from one cloud to another. This plan focuses on optimizing your costs on the cloud by choosing the best templates (most adequate compute resources) and regions to host your workloads. If analysis discovers on-premise workloads that are good candidates for Reserved Instances (RIs), then it recommends migrating to those templates, and can even recommend purchasing more RI capacity. For each group of virtual machines to be migrated (source), you must provide a destination.

Example input:

```json
"migrateList": [
  {
    "projectionDay": 0,
    "source": {
      "uuid": "4656c0ba6b976d05d1a9470ee673672022e8e926",
      "displayName": "ACM_vm",
      "className": "VirtualMachine",
      "severity": "Major"
    },
    "destination": {
      "uuid": "GROUP-PMsByTargetType_Azure",
      "displayName": "PMs_Azure",
      "className": "PhysicalMachine"
    }
  },
  {
    "projectionDay": 0,
    "source": {
      "uuid": "fe23c8642efc5ad2ed4fa1cc502d6b179b8dc9d2",
      "displayName": "Development DC1_vm",
      "className": "VirtualMachine",
      "severity": "Major"
    },
    "destination": {
      "uuid": "GROUP-PMsByTargetType_Azure",
      "displayName": "PMs_Azure",
      "className": "PhysicalMachine"
    }
  },
  {
    "projectionDay": 0,
    "source": {
      "uuid": "f0e26cb417d8143173270b7f01c7213e027cd9e5",
      "displayName": "Development DC7_vm",
      "className": "VirtualMachine",
      "severity": "Major"
    },
    "destination": {
      "uuid": "GROUP-PMsByTargetType_Azure",
      "displayName": "PMs_Azure",
      "className": "PhysicalMachine"
    }
  }
]
```
Turbonomic REST API Endpoints

"uuid": "GROUP-PMsByTargetType_Azure",
"displayName": "PMs_Azure",
"className": "PhysicalMachine"
}
]}

Relieve Pressure

Including this parameter implies an Alleviate Pressure plan to find out how to migrate workloads from a stressed or hot cluster over to a cluster with more headroom.

Example input:

"relievePressureList": [
  {
    "projectionDay": 0,
    "sources": [
      {
        "uuid": "11c63ebd77647e7b9c9fb85dd2d4c77464cbeac2",
        "displayName": "DC13\DC13-Cluster",
        "className": "Cluster"
      }
    ],
    "destinations": [
      {
        "uuid": "57a4026a69ba4b46ebe430cb62d5c55e6ea00695",
        "displayName": "DC13\Physical Hosts_Cluster2 - Intel",
        "className": "Cluster"
      }
    ]
  }
]

Removing Workload

Removing workload in a scenario configuration simulates the effect of decreased VM or container density in your environment. You may remove VM groups or individual VMs.

Example input:

"removeList": [
  {
    "projectionDay": 0,
    "target": {
      "uuid": "5E4F6056-8783-45BC-9070-35CF09457E98",
      "displayName": "AH-TestHyperV-VM001",
      "className": "VirtualMachine"
    }
  },
  {
    "projectionDay": 0,
    "target": {

Replacing Workload

Replacing workload is to change the properties of VMs or containers in your plan market. When you replace workload, you select one or more VMs or containers that you want to change (target), and then you select a template to use in their place.

Example input:

```
"replaceList": [
  {
    "projectionDay": 0,
    "target": {
      "uuid": "421ef003-e152-5a25-6e03-19698340cd01",
      "displayName": "centos_imp_7",
      "className": "VirtualMachine",
      "severity": "Minor"
    },
    "template": {
      "uuid": "_wIBz8Jj4EeC6nYMiQT1jqA",
      "displayName": "Microsoft_SQL2008-small",
      "className": "VirtualMachineProfile"
    }
  }
]
```
{
    "projectionDay": 0,
    "target": {
        "uuid": "42001807-bc8f-b144-8ff6-eb0d0d32cc7a",
        "displayName": "cheuk-OpsMgr-172.113",
        "className": "VirtualMachine",
        "severity": "Minor"
    },
    "template": {
        "uuid": "_wIBz8Jj4EeC6nYMiQT1jqA",
        "displayName": "Microsoft_SQL2008-small",
        "className": "VirtualMachineProfile"
    }
},
{
    "projectionDay": 0,
    "target": {
        "uuid": "4211806a-65f2-8be1-1015-a4abe1a2ab6f",
        "displayName": "dim-dc13amd-6.2.7_01",
        "className": "VirtualMachine",
        "severity": "Minor"
    },
    "template": {
        "uuid": "_wIBz8Jj4EeC6nYMiQT1jqA",
        "displayName": "Microsoft_SQL2008-small",
        "className": "VirtualMachineProfile"
    }
},
{
    "projectionDay": 0,
    "target": {
        "uuid": "42008beb-264e-b0f6-2295-f3443e4ce7d6",
        "displayName": "enOpenShiftInfra1",
        "className": "VirtualMachine",
        "severity": "Minor"
    },
    "template": {
        "uuid": "_wIBz8Jj4EeC6nYMiQT1jqA",
        "displayName": "Microsoft_SQL2008-small",
        "className": "VirtualMachineProfile"
    }
},
{
    "projectionDay": 0,
    "target": {
        "uuid": "420036f6-27c3-0252-439d-e23bcff63d02",
        "displayName": "enOpenShiftInfra2",
        "className": "VirtualMachine",
        "severity": "Minor"
    },
    "template": {
        "uuid": "_wIBz8Jj4EeC6nYMiQT1jqA",
        "displayName": "Microsoft_SQL2008-small",
        "className": "VirtualMachineProfile"
    }
}
Scenario Configuration Examples

Basic Scenario POSTs and Responses

Most scenarios will consist of multiple configuration changes. However, the UI provides several starting points for custom configuration, based on plan type. Turbonomic provides the same starting point in the API with the following list of POST calls and server responses:

**NOTE:**
These plans represent the basic required configuration to accomplish their stated goal (only adding workload for an Add Workload plan, for example). There are many other options you might choose in conjunction with those in the following examples.

**Add Workload**

**POST:**

```
{
    "configChanges": {
        "addPolicyList": [],
        "automationSettingList": [],
        "removeConstraintList": [],
        "removePolicyList": [],
        "riSettingList": [],
        "osMigrationSettingList": [],
        "subscription": {}
    },
    "displayName": "Add Workload- Basic",
    "loadChanges": {
        "utilizationList": [],
        "maxUtilizationList": []
    },
    "projectionDays": [176]
}
```
0
], "scope": [
  {
    "uuid": "Market",
    "displayName": "Global Environment",
    "className": "Market"
  }
], "topologyChanges": {
  "addList": [
    {
      "count": 50,
      "projectionDays": [
        0
      ],
      "target": {
        "uuid": "421dd4ce-a4c1-231a-71e7-64fbf598bc65",
        "displayName": "AJ_Test",
        "className": "VirtualMachine"
      }
    }
  ], "migrateList": [],
  "removeList": [],
  "replaceList": [],
  "relievePressureList": []
}, "type": "ADD_WORKLOAD"

Response:

{
  "uuid": "2502057162928",
  "displayName": "Add Workload- Basic",
  "owners": [
    {
      "uuid": "_4T_7kwY-Ed-WUKbEYSVIDw",
      "username": "administrator",
      "showSharedUserSC": false
    }
  ],
  "type": "ADD_WORKLOAD",
  "scope": [
    {
      "uuid": "_0x3OYUglEd-gHc4L513yOA",
      "displayName": "Market",
      "className": "Market"
    }
  ],
  "projectionDays": [
    0
  ]
}
Decommission Hosts

POST:

{
  "configChanges": {
    "addPolicyList": [],
    "automationSettingList": [
      {
        "uuid": "provisionPM",
        "displayName": "PROVISION for PHYSICALMACHINES disabled",
        "value": "false",
        "entityType": "PhysicalMachine"
      }
    ],
    "removeConstraintList": [],
    "removePolicyList": [],
    "riSettingList": [],
    "osMigrationSettingList": [],
    "subscription": {}
  },
  "displayName": "Decommission Hosts- Basic",
  "loadChanges": {
    "utilizationList": [],
    "maxUtilizationList": []
  },
  "projectionDays": 0
},
  "scope": [
    {
      "uuid": "Market",
      "displayName": "Global Environment",
      "className": "Market"
    }
  ],
  "topologyChanges": {
    "addList": [],
    "migrateList": [],
    "removeList": [
      {
        "projectionDay": 0,
        "target": {
          "uuid": "4C4C4544-0042-5A10-804A-B1C04F384331",
          "displayName": "dell-pe1944.corp.vmturbo.com",
          "className": "PhysicalMachine"
        }
      },
      {
        "projectionDay": 0,
        "target": {
          "uuid": "4C4C4544-0042-5A10-804A-B1C04F384331",
          "displayName": "dell-pe1944.corp.vmturbo.com",
          "className": "PhysicalMachine"
        }
      }
    ]
}
"target": {
    "uuid": "4C4C4544-004A-3610-8057-C8C04F464331",
    "displayName": "dell-pe1953.corp.vmturbo.com",
    "className": "PhysicalMachine"
  },
},
{
  "projectionDay": 0,
  "target": {
    "uuid": "4C4C4544-0059-4D10-8030-B3C04F464331",
    "displayName": "dell-pe1954.corp.vmturbo.com",
    "className": "PhysicalMachine"
  }
},
"replaceList": [],
"relievePressureList": []
}
"type": "DECOMMISSION_HOST"

Response:

{
  "uuid": "2502061312640",
  "displayName": "Decommission Hosts- Basic",
  "owners": [
    {
      "uuid": "_4T_7kwY-Ed-WUKbEYSVIDw",
      "username": "administrator",
      "showSharedUserSC": false
    }
  ],
  "type": "DECOMMISSION_HOST",
  "scope": [
    {
      "uuid": "_0x3OYUglEd-gHc4L513yOA",
      "displayName": "Market",
      "className": "Market"
    }
  ],
  "projectionDays": [
    0
  ],
  "topologyChanges": {
    "removeList": [
      {
        "projectionDay": 0,
        "target": {
          "uuid": "4C4C4544-0042-5A10-804A-B1C04F384331",
          "displayName": "dell-pe1944.corp.vmturbo.com",
          "className": "PhysicalMachine"
        }
      }
    ]
  }
}
"scope": [
  {
    "uuid": "_0x30YUg1Ed-gHc4L513yOA",
    "displayName": "Market",
    "className": "Market"
  }
],
{
  "index": 2,
  "type": "PROJECTION_PERIODS",
  "projectionDays": [0]
},
{
  "index": 3,
  "type": "REMOVED",
  "description": "dell-pe1944.corp.vmturbo.com",
  "targets": [
    {
      "uuid": "4C4C4544-0042-5A10-804A-B1C04F384331",
      "displayName": "dell-pe1944.corp.vmturbo.com",
      "className": "PhysicalMachine",
      "severity": "Critical"
    }
  ],
  "value": "1",
  "projectionDays": [0]
},
{
  "index": 4,
  "type": "REMOVED",
  "description": "dell-pe1953.corp.vmturbo.com",
  "targets": [
    {
      "uuid": "4C4C4544-004A-3610-8057-C8C04F464331",
      "displayName": "dell-pe1953.corp.vmturbo.com",
      "className": "PhysicalMachine",
      "severity": "Critical"
    }
  ],
  "value": "1",
  "projectionDays": [0]
},
{
  "index": 5,
  "type": "REMOVED",
  "description": "dell-pe1954.corp.vmturbo.com",
  "targets": [
    {
      "uuid": "4C4C4544-004B-3610-8057-C8C04F464331",
      "displayName": "dell-pe1954.corp.vmturbo.com",
      "className": "PhysicalMachine",
      "severity": "Critical"
    }
  ],
  "value": "1",
  "projectionDays": [0]
}
Migrate to Cloud

POST:

{
    "configChanges": {
        "addPolicyList": [],
        "automationSettingList": [],
        "removeConstraintList": [],
        "removePolicyList": [],
        "riSettingList": [],
        "osMigrationSettingList": [],
        "subscription": {}
    },
    "displayName": "Migrate to Public Cloud- Basic",
    "loadChanges": {
        "utilizationList": [],
        "maxUtilizationList": []
    },
    "projectionDays": [0]
}
"scope": [
{
"uuid": "4656c0ba6b976d05d1a9470ee673672022e8e926",
"displayName": "ACM_vm",
"groupType": "VirtualMachine",
"className": "Group"
},
{
"uuid": "_lRrTYB--EeewItqBJctLGw",
"displayName": "All Cloud Zones",
"groupType": "PhysicalMachine",
"className": "Group"
}
],
"topologyChanges": {
"addList": [],
"migrateList": [
{
"projectionDay": 0,
"source": {
"uuid": "4656c0ba6b976d05d1a9470ee673672022e8e926",
"displayName": "ACM_vm",
"className": "VirtualMachine"
},
"destination": {
"uuid": "_lRrTYB--EeewItqBJctLGw",
"displayName": "All Cloud Zones",
"className": "PhysicalMachine"
}
}
],
"removeList": [
{
"projectionDay": 0,
"target": {
"uuid": "_nuoxwETSEemi-4wSMH0OAW",
"displayName": "All VMs In All Cloud Zones",
"className": "VirtualMachine"
}
}
],
"replaceList": [],
"relievePressureList": []
},
"type": "CLOUD_MIGRATION"

Response:

{
"uuid": "2502081867536",
"displayName": "Migrate to Public Cloud- Basic",
"owners": [
"uuid": "_4T_7kwY-Ed-WUKbEysVIDw",
"username": "administrator",
"showSharedUserSC": false
}
],
"type": "CLOUD_MIGRATION",
"scope": [
{
"uuid": "4656c0ba6b976d05d1a9470ee673672022e8e926",
"displayName": "ACM_vm",
"className": "Group",
"groupType": "VirtualMachine",
"isStatic": true,
"logicalOperator": "AND"
},
{
"uuid": "_lRrTYB--EeewItqBJctLGw",
"displayName": "All Cloud Zones",
"className": "Group",
"groupType": "PhysicalMachine",
"isStatic": true,
"logicalOperator": "AND"
}
],
"projectionDays": [0]
],
"topologyChanges": {
"removeList": [
"projectionDay": 0,
"target": {
"uuid": "_nuoxwETSEemi-4wSMHOOWA",
"displayName": "All VMs In All Cloud Zones",
"className": "Group"
}
],
"migrateList": [
"projectionDay": 0,
"source": {
"uuid": "4656c0ba6b976d05d1a9470ee673672022e8e926",
"displayName": "ACM_vm",
"className": "Group"
},
"destination": {
"uuid": "_lRrTYB--EeewItqBJctLGw",
"displayName": "All Cloud Zones",
"className": "Group"
}
]"}
"loadChanges": {},
"configChanges": {
  "osMigrationSettingList": [
    {
      "uuid": "matchToSource",
      "value": "true"
    }
  ],
  "changes": [
    {
      "index": 1,
      "type": "SCOPE",
      "scope": [
        {
          "uuid": "4656c0ba6b976d05d1a9470ee673672022e8e926",
          "displayName": "ACM_vm",
          "className": "Group",
          "entitiesCount": 83,
          "groupType": "VirtualMachine",
          "severity": "Major",
          "logicalOperator": "AND"
        },
        {
          "uuid": "_lRrTYB--EeewItqBJctLGw",
          "displayName": "All Cloud Zones",
          "className": "Group",
          "entitiesCount": 78,
          "groupType": "PhysicalMachine",
          "severity": "Normal",
          "logicalOperator": "AND"
        }
      ]
    },
    {
      "index": 2,
      "type": "PROJECTION_PERIODS",
      "projectionDays": [0]
    },
    {
      "index": 3,
      "type": "REMOVED",
      "description": "All VMs In All Cloud Zones",
      "targets": [
        {
          "uuid": "_nuoxwETSEemi-4wSMHOOWA",
          "displayName": "All VMs In All Cloud Zones",
          "className": "Group",
          "entitiesCount": 154,
          "groupType": "VirtualMachine",
          "severity": "Major",
          "logicalOperator": "AND"
        }
      ]
    }
  ]
}


```
},
"value": "1",
"projectionDays": [
  0
]
},
{
  "index": 4,
  "type": "MIGRATION",
  "description": "Migrate [ACM_vm] to All Cloud Zones",
  "targets": [
    {
      "uuid": "4656c0ba6b976d05d1a9470ee673672022e8e926",
      "displayName": "ACM_vm",
      "className": "Group",
      "entitiesCount": 83,
      "groupType": "VirtualMachine",
      "severity": "Major",
      "logicalOperator": "AND"
    },
    {
      "uuid": "_lRrTYB--EeewItqBJctLGw",
      "displayName": "All Cloud Zones",
      "className": "Group",
      "entitiesCount": 78,
      "groupType": "PhysicalMachine",
      "severity": "Normal",
      "logicalOperator": "AND"
    }
  ],
  "projectionDays": [
    0
  ]
},
{
  "index": 5,
  "type": "SET_TARGET_OS",
  "targets": [
    {
      "uuid": "4656c0ba6b976d05d1a9470ee673672022e8e926",
      "displayName": "ACM_vm",
      "className": "Group",
      "entitiesCount": 83,
      "groupType": "VirtualMachine",
      "severity": "Major",
      "logicalOperator": "AND"
    }
  ],
  "projectionDays": [
    0
  ]
}
```


Optimize Cloud

POST:

{  
    "configChanges": {  
        "addPolicyList": [],  
        "automationSettingList": [  
            {  
                "uuid": "resize",  
                "displayName": "resize for VMS enabled",  
                "value": "true",  
                "entityType": "VirtualMachine"  
            }  
        ],  
        "removeConstraintList": [],  
        "removePolicyList": [],  
        "riSettingList": [  
            {  
                "uuid": "preferredOfferingClass",  
                "displayName": "Type",  
                "value": "STANDARD",  
                "entityType": "STANDARD"  
            },  
            {  
                "uuid": "preferredTerm",  
                "displayName": "Term",  
                "value": "YEARS_3",  
                "entityType": "YEARS_3"  
            },  
            {  
                "uuid": "preferredPaymentOption",  
                "displayName": "Payment",  
                "value": "ALL_UPFRONT",  
                "entityType": "ALL_UPFRONT"  
            },  
            {  
                "uuid": "preferredCoverage",  
                "displayName": "Coverage",  
                "value": "80",  
                "entityType": "80"  
            },  
            {  
                "uuid": "riCoverageOverride",  
                "displayName": "RI Coverage Override",  
                "value": "false",  
                "entityType": "false"  
            }  
        ],  
        "osMigrationSettingList": [],  
        "subscription": {}  
    }  
},
"displayName": "Optimize Cloud- Basic",
"loadChanges": {
  "utilizationList": [],
  "maxUtilizationList": []
},
"projectionDays": [0],
"scope": [
  {
    "uuid": "GROUP-PMsByTargetType_AWS",
    "displayName": "PMs_AWS",
    "groupType": "PhysicalMachine",
    "className": "Group"
  }
],
"topologyChanges": {
  "addList": [],
  "migrateList": [],
  "removeList": [],
  "replaceList": [],
  "relievePressureList": []
},
"type": "OPTIMIZE_CLOUD"

Response:

{
  "uuid": "2502117573632",
  "displayName": "Optimize Cloud- Basic",
  "owners": [
    {
      "uuid": "_4T_7kwY-Ed-WUKbEYSVIDw",
      "username": "administrator",
      "showSharedUserSC": false
    }
  ],
  "type": "OPTIMIZE_CLOUD",
  "scope": [
    {
      "uuid": "be95c99fc2a2195ac896204766a52d0e141818a6",
      "displayName": "PMs_AWS",
      "className": "Group",
      "groupType": "PhysicalMachine",
      "isStatic": true,
      "logicalOperator": "AND"
    }
  ],
  "projectionDays": [0],
  "topologyChanges": {}
}
"loadChanges": {},
"configChanges": {
    "automationSettingList": [
        {
            "uuid": "resize",
            "displayName": "resize",
            "value": "true"
        }
    ],
    "riSettingList": [
        {
            "uuid": "preferredPaymentOption",
            "displayName": "Payment",
            "value": "ALL_UPFRONT",
            "defaultValue": "ALL_UPFRONT",
            "valueType": "STRING",
            "options": [
                {
                    "label": "ALL_UPFRONT",
                    "value": "ALL_UPFRONT"
                },
                {
                    "label": "PARTIAL_UPFRONT",
                    "value": "PARTIAL_UPFRONT"
                },
                {
                    "label": "NO_UPFRONT",
                    "value": "NO_UPFRONT"
                }
            ],
            "sourceGroupName": "Global"
        },
        {
            "uuid": "preferredTerm",
            "displayName": "Term",
            "value": "YEARS_3",
            "defaultValue": "YEARS_1",
            "valueType": "STRING",
            "options": [
                {
                    "label": "YEARS_1",
                    "value": "YEARS_1"
                },
                {
                    "label": "YEARS_3",
                    "value": "YEARS_3"
                }
            ],
            "sourceGroupName": "Global"
        },
        {
            "uuid": "preferredCoverage",
            "displayName": "Coverage",
            "value": "80",
            "defaultValue": "80",
            "valueType": "STRING",
            "options": [
                {
                    "label": "80",
                    "value": "80"
                }
            ],
            "sourceGroupName": "Global"
        }
    ]
}
"valueType": "NUMERIC",
"min": 0,
"max": 100,
"sourceGroupName": "Global"
},
{
"uuid": "riCoverageOverride",
"displayName": "RI Coverage Override",
"value": "false",
"defaultValue": "false",
"valueType": "BOOLEAN",
"sourceGroupName": "Global"
},
{
"uuid": "preferredOfferingClass",
"displayName": "Type",
"value": "STANDARD",
"defaultValue": "STANDARD",
"valueType": "STRING",
"options": [
{
"label": "STANDARD",
"value": "STANDARD"
},
{
"label": "CONVERTIBLE",
"value": "CONVERTIBLE"
}
],
"sourceGroupName": "Global"
]
},
"changes": [
{
"index": 1,
"type": "SCOPE",
"scope": [
{
"uuid": "be95c99fc2a2195ac896204766a52d0e141818a6",
"displayName": "PMs_AWS",
"className": "Group",
"entitiesCount": 50,
"groupType": "PhysicalMachine",
"severity": "Normal",
"logicalOperator": "AND"
}
]
},
{
"index": 2,
"type": "PROJECTION_PERIODS",
"projectionDays": [0]
}
On-Prem Workload Migration

POST:

{  
  "configChanges": {  
    "addPolicyList": [],  
    "automationSettingList": [],  
    "removeConstraintList": [],  
    "removePolicyList": [],  
    "riSettingList": [],  
    "osMigrationSettingList": [],  
    "subscription": {}  
  },  
  "timebasedTopologyChanges": {}  
}
"displayName": "On-Prem Workload Migration 1",
"loadChanges": {
  "utilizationList": [],
  "maxUtilizationList": []
},
"projectionDays": [0],
"scope": [
  {
    "uuid": "3e47ff3351f3247367c00c08f6c5bb974695c443",
    "displayName": "DC23-Datacenter\DC23-cluster1",
    "groupType": "PhysicalMachine",
    "className": "Cluster"
  }
],
"topologyChanges": {
  "addList": [
    {
      "count": 1,
      "projectionDays": [0],
      "target": {
        "uuid": "67d24a6f265151876e87f39475fb4ee4b4170098",
        "displayName": "AvailabilitySet::ARSEN-AVS-NCUS",
        "className": "VirtualMachine"
      }
    }
  ],
  "migrateList": [],
  "removeList": [],
  "replaceList": [],
  "relievePressureList": []
},
"type": "WORKLOAD_MIGRATION"

Response:

{
  "uuid": "2502063893936",
  "displayName": "On-Prem Workload Migration- Basic",
  "owners": [
    {
      "uuid": ".\_4T_7kwY-Ed-WUKbEYSVIDw",
      "username": "administrator",
      "showSharedUserSC": false
    }
  ],
  "type": "WORKLOAD_MIGRATION",
  "scope": [
  ]
}
"uuid": "_0x30YUglEd-gHc4L513yOA",
"displayName": "Market",
"className": "Market"
},
"projectionDays": [ 0
],
"topologyChanges": {
"addList": [  {
"projectionDays": [ 0  
],
"target": {  "uuid": "a6d365f4fbbf03fb9a2e8c2db29e38045e31ce41b",
"displayName": "Beta DC6_vm",
"className": "Group"
},
"count": 1
}
]
},
"loadChanges": {},
"configChanges": {},
"changes": [  {
"index": 1,
"type": "SCOPE",
"scope": [
  {  "uuid": "_0x30YUglEd-gHc4L513yOA",
"displayName": "Market",
"className": "Market"
  }
]
},
  {
"index": 2,
  "type": "PROJECTION_PERIODS",
  "projectionDays": [ 0
]
},
  {
"index": 3,
  "type": "ADDED",
  "description": "1 Beta DC6_vm",
  "targets": [
  {  "uuid": "a6d365f4fbbf03fb9a2e8c2db29e38045e31ce41b",
"displayName": "Beta DC6_vm",
"className": "Group",
"entitiesCount": 56,
"groupType": "VirtualMachine",
}
"severity": "Major",
"logicalOperator": "AND"
},
"value": "1",
"projectionDays": [
0
]
},
"timebasedTopologyChanges": {}
}

Hardware Refresh

POST:

{
"configChanges": {
"addPolicyList": [],
"automationSettingList": [],
"removeConstraintList": [],
"removePolicyList": [],
"riSettingList": [],
"osMigrationSettingList": [],
"subscription": {}
},
"displayName": "Hardware Refresh- Basic",
"loadChanges": {
"utilizationList": [],
"maxUtilizationList": []
},
"projectionDays": [0],
"scope": [
{
"uuid": "Market",
"displayName": "Global Environment",
"className": "Market"
}
],
"topologyChanges": {
"addList": [],
"migrateList": [],
"removeList": [],
"replaceList": [
{
"projectionDay": 0,
"target": {
"uuid": "4C4C4544-0042-5A10-804A-B1C04F384331",
"displayName": "dell-pe1944.corp.vmturbo.com",
"className": "PhysicalMachine",
}
"severity": "Critical",
"template": {
  "uuid": "_juCtwJkfEeCX4rLBy_KD2g",
  "displayName": "HP_DL580 G7",
  "className": "PhysicalMachineProfile"
}
},
{
  "projectionDay": 0,
  "target": {
    "uuid": "4C4C4544-004A-3610-8057-C8C04F464331",
    "displayName": "dell-pe1953.corp.vmturbo.com",
    "className": "PhysicalMachine",
    "severity": "Critical"
  },
  "template": {
    "uuid": "_juCtwJkfEeCX4rLBy_KD2g",
    "displayName": "HP_DL580 G7",
    "className": "PhysicalMachineProfile"
  }
},
{
  "projectionDay": 0,
  "target": {
    "uuid": "4C4C4544-0059-4D10-8030-B3C04F464331",
    "displayName": "dell-pe1954.corp.vmturbo.com",
    "className": "PhysicalMachine",
    "severity": "Critical"
  },
  "template": {
    "uuid": "_juCtwJkfEeCX4rLBy_KD2g",
    "displayName": "HP_DL580 G7",
    "className": "PhysicalMachineProfile"
  }
},
{
  "projectionDay": 0,
  "target": {
    "uuid": "Virtual_ESX_4238e933-3923-8334-37fe-3ae38fbd046f",
    "displayName": "hp-esx22.dev.mycorp.com",
    "className": "PhysicalMachine",
    "severity": "Critical"
  },
  "template": {
    "uuid": "_juCtwJkfEeCX4rLBy_KD2g",
    "displayName": "HP_DL580 G7",
    "className": "PhysicalMachineProfile"
  }
}
],
"relievePressureList": []
},
"type": "RECONFIGURE_HARDWARE"
Response:

{
    "uuid": "2502070918448",
    "displayName": "Hardware Refresh - Basic",
    "owners": [
        {
            "uuid": "_4T_7kwY-Ed-WUKbEY5VIDw",
            "username": "administrator",
            "showSharedUserSC": false
        }
    ],
    "type": "RECONFIGURE_HARDWARE",
    "scope": [
        {
            "uuid": "_0x3OYUglEd-gHc4L513yOA",
            "displayName": "Market",
            "className": "Market"
        }
    ],
    "projectionDays": [
        0
    ],
    "topologyChanges": {
        "replaceList": [
            {
                "projectionDay": 0,
                "target": {
                    "uuid": "4C4C4544-0042-5A10-804A-B1C04F384331",
                    "displayName": "dell-pe1944.corp.vmturbo.com",
                    "className": "PhysicalMachine"
                },
                "template": {
                    "uuid": "_juCtwJkfEeCX4rLB3h_yOA",
                    "displayName": "HP_DL580 G7",
                    "className": "PhysicalMachineProfile"
                }
            },
            {
                "projectionDay": 0,
                "target": {
                    "uuid": "4C4C4544-004A-3A10-804A-B1C04F384331",
                    "displayName": "dell-pe1953.corp.vmturbo.com",
                    "className": "PhysicalMachine"
                },
                "template": {
                    "uuid": "_juCtwJkfEeCX4rLB3h_yOA",
                    "displayName": "HP_DL580 G7",
                    "className": "PhysicalMachineProfile"
                }
            }
        ]
    }
}
"projectionDay": 0,
"target": {
  "uuid": "4C4C4544-0059-4D10-8030-B3C04F464331",
  "displayName": "dell-pe1954.corp.vmturbo.com",
  "className": "PhysicalMachine"
},
"template": {
  "uuid": "_juCtwJkfEeCX4rLBy_KD2g",
  "displayName": "HP_DL580 G7",
  "className": "PhysicalMachineProfile"
}
},
{
"projectionDay": 0,
"target": {
  "uuid": "Virtual_ESX_4238e933-3923-8334-37fe-3ae8fbd046f",
  "displayName": "hp-esx22.dev.mycorp.com",
  "className": "PhysicalMachine"
},
"template": {
  "uuid": "_juCtwJkfEeCX4rLBy_KD2g",
  "displayName": "HP_DL580 G7",
  "className": "PhysicalMachineProfile"
}
}
]
},
"loadChanges": {},
"configChanges": {},
"changes": [
{ "index": 1,
  "type": "SCOPE",
  "scope": [ { "uuid": "_0x3OYUglEd-gHc4L513yOA",
    "displayName": "Market",
    "className": "Market" }
  ]
},
{ "index": 2,
  "type": "PROJECTION_PERIODS",
  "projectionDays": [ 0 ]
},
{ "index": 3,
  "type": "REPLACED",
  "targets": [ 
     
    ]
}
Alleviate Pressure

POST:

```
{
  "configChanges": {
    "addPolicyList": [],
    "automationSettingList": [],
    "removeConstraintList": [],
    "removePolicyList": [],
    "riSettingList": [],
    "osMigrationSettingList": [],
    "subscription": {}
  },
  "displayName": "Alleviate Pressure- Basic",
  "projectionDays": [0]
}
```

Turbonomic REST API Endpoints
"loadChanges": {
  "utilizationList": [],
  "maxUtilizationList": []
},
"projectionDays": [
  0
],
"scope": [
  {
    "uuid": "11c63ebd77647e7b9c9fb85dd2d4c77464cbeac2",
    "displayName": "DC13\DC13-Cluster",
    "className": "Cluster"
  },
  {
    "uuid": "57a4026a69ba4b46ebc430cb62d5c55e0ee0695",
    "displayName": "DC13\Physical Hosts_Cluster2 - Intel",
    "className": "Cluster"
  }
],
"topologyChanges": {
  "addList": [],
  "migrateList": [],
  "removeList": [],
  "replaceList": [],
  "relievePressureList": [
    {
      "projectionDay": 0,
      "sources": [
        {
          "uuid": "11c63ebd77647e7b9c9fb85dd2d4c77464cbeac2",
          "displayName": "DC13\DC13-Cluster",
          "className": "Cluster"
        }
      ],
      "destinations": [
        {
          "uuid": "57a4026a69ba4b46ebc430cb62d5c55e0ee0695",
          "displayName": "DC13\Physical Hosts_Cluster2 - Intel",
          "className": "Cluster"
        }
      ]
    }
  ],
  "type": "ALLEVIATE_PRESSURE"
}

Response:

{  "uuid": "2531404249984",
  "displayName": "On-Prem Workload Migration 1",
  "owners": [  }
{
    "uuid": "_4T_7kwY-Ed-WUKbEYsvIdW",
    "username": "administrator",
    "showSharedUserSC": false
}
],
"type": "WORKLOAD_MIGRATION",
"scope": [
{
    "uuid": "3e47ff3351f3247367c00c08fdec5bb974695c443",
    "displayName": "DC23-Datacenter\DC23-cluster1",
    "className": "Cluster",
    "groupType": "PhysicalMachine",
    "isStatic": true,
    "logicalOperator": "AND"
}
],
"projectionDays": [0],
"topologyChanges": {
    "addList": [
    {
        "projectionDays": [0],
        "target": {
            "uuid": "67d24a6f265151876e87f39475fb4ee4b4170098",
            "displayName": "AvailabilitySet::ARSEN-AVS-NCUS",
            "className": "DiscoveredGroup"
        },
        "count": 1
    }
    ],
    "loadChanges": {},
    "configChanges": {},
    "changes": [
    {
        "index": 1,
        "type": "SCOPE",
        "scope": {
        "uuid": "3e47ff3351f3247367c00c08fdec5bb974695c443",
        "displayName": "DC23-Datacenter\DC23-cluster1",
        "className": "Cluster",
        "entitiesCount": 3,
        "groupType": "PhysicalMachine",
        "severity": "Critical",
        "logicalOperator": "AND"
        }
    }
    ],
    {
        "index": 2,
        ...
    }
}
"type": "PROJECTION_PERIODS",
"projectionDays": [
  0
],

{"index": 3,
"type": "ADDED",
"description": "1 AvailabilitySet::ARSEN-AVS-NCUS",
"targets": [
  {
    "uuid": "67d24a6f265151876e87f39475fb4ee4b4170098",
    "displayName": "AvailabilitySet::ARSEN-AVS-NCUS",
    "className": "DiscoveredGroup",
    "entitiesCount": 3,
    "groupType": "VirtualMachine",
    "severity": "Critical",
    "logicalOperator": "AND"
  }
],
"value": "1",
"projectionDays": [
  0
],

"timebasedTopologyChanges": {}
}

Optimize Current Environment

NOTE:
The result of a plan run with no custom configuration is an optimization of your current environment, respecting all
current policies and constraints.

POST:

{
  "configChanges": {
    "addPolicyList": [],
    "addPolicyList": [],
    "automationSettingList": [],
    "removeConstraintList": [],
    "removePolicyList": [],
    "riSettingList": [],
    "osMigrationSettingList": [],
    "subscription": {}
  },
  "displayName": "Custom- No Config",
  "loadChanges": {
    "utilizationList": [],
    "maxUtilizationList": []
  },
  "projectionDays": []
}
"scope": [
  {
    "uuid": "Market",
    "displayName": "Global Environment",
    "className": "Market"
  }
],
"topologyChanges": {
  "addList": [],
  "migrateList": [],
  "removeList": [],
  "replaceList": [],
  "relievePressureList": []
},
"type": "CUSTOM"
}

Response:

{
  "uuid": "2502119526800",
  "displayName": "Custom- No Config",
  "owners": [
    {
      "uuid": "_4T_7kwY-Ed-WUKbEYSVIDw",
      "username": "administrator",
      "showSharedUserSC": false
    }
  ],
  "type": "CUSTOM",
  "scope": [
    {
      "uuid": "_0x3OYUglEd-gHc4L513yOA",
      "displayName": "Market",
      "className": "Market"
    }
  ],
  "changes": [
    {
      "index": 1,
      "type": "SCOPE",
      "scope": [
        {
          "uuid": "_0x3OYUglEd-gHc4L513yOA",
          "displayName": "Market",
          "className": "Market"
        }
      ]
    }
  ]
}
Scenario Future Load Configuration Example

Future Load Plans

Future load plans are a type of plan in which commodities from active VMs are taken and applied to passive or low-workload VMs, simulating the effect on the environment if these passive VMs became active. For example, you may want to investigate the effect on your environment if your disaster recovery VMs were forced to run at historical peak values. In this case, the production VMs whose commodities will be used are the active VMs, and the currently idle disaster recovery VMs are the passive VMs.

Currently, there are two future load plan types:

- **PEAKOFPEAKS**
  The peak-of-peaks future load plan replicates in the passive VMs every commodity of the active VMs reaching its historical peak utilization simultaneously, and the plan result will reflect the effect on your environment.

- **CUSTOM**
  The custom future load plan replicates in the passive VMs every commodity of the active VMs reaching its current utilization simultaneously, and the plan result will reflect the effect on your environment.

The setup and configuration for both future load plans differ only in the content of the `type` parameter— all other steps will be identical.

The settings you make in a scenario correspond to the plan settings you can make in the user interface. These include:

- Plan scope
- Changes to workload (adding, removing, or replacing VMs or containers)
- Changes to supply (adding, removing, replacing PMs or storage)
- Enable/disable placement policies and other constraints
- Changes to action modes
- Enable/disable provisioning of supply
- Enable/disable resizing of workloads

Future Load Prerequisites

In order to run a future load plan, you must retrieve statistics for the entities to be included in the plan. Typically, this is done utilizing the `POST /markets/market_uuid/entities/stats` request, with `startDate` and `scopes` parameters.

Example input for statistic retrieval:

```json
{
  "period": {
    "startDate": 1237056032
  },
  "scopes": [
    "4223ae0c-c99b-f6ca-c1ef-3f367bdf5528",
    "4223bb37-0090-f332-0140-cc3c3e7b3735",
    "4223dc55-78f2-2cd7-9abf-b09b1be835b4",
    "42231932-83af-10d9-f0cd-26c8a08a9e18",
    "422374a3-2c64-b613-a9a7-1f900a2314b4"
  ]
}
Once the call is completed, copy the response in its entirety—or if using Swagger, click the Download button next to the response and copy the contents of the file.

**Peak of Peak Scenario DTO Setup**

When constructing the Scenario DTO, ensure that the `type` parameter is **PEAKOFPEAKS** to run a historical peaks plan, or **CUSTOM** to run a plan on current utilization levels.

Within the `loadChanges` parameter, add an `overlayStatsList` parameter, and paste the response you copied above.

**Example ScenarioApiDTO:**

```json
{
    "uuid": "XXXX-CUSTOM",
    "displayName": "XXXX-CUSTOM",
    "owners": [
        {
            "uuid": "_4T_7kwY-Ed-WUKbEYSVIDw",
            "username": "administrator",
            "showSharedUserSC": false
        }
    ],
    "type": "CUSTOM",
    "scope": [
        {
            "uuid": "_0x3OYUglEd-gHc4L513yOA",
            "displayName": "Market",
            "className": "Market"
        }
    ],
    "topologyChanges": {},
    "loadChanges": {
        "maxUtilizationList": [
            {
                "maxPercentage": 70,
                "projectionDay": 0,
                "target": {
                    "displayName": "All On-prem Hosts",
                    "className": "Group",
                    "uuid": "_PE0v-YEUEee_hYfzgV9uYg"
                }
            }
        ],
        "overlayStatsList": [
            {
                "uuid": "4223c3c2-5c99-2ae5-3df0-75475ba30678",

```
"displayName": "TestQual1",
"className": "VirtualMachine",
"environmentType": "ONPREM",
"stats": [
  {
    "displayName": "TestQual1",
    "date": "2019-03-24T00:00:00-04:00",
    "statistics": [
      {
        "name": "numApps",
        "values": {
          "max": 498,
          "min": 498,
          "avg": 498,
          "total": 498
        },
        "value": 498
      },
      {
        "name": "numClusters",
        "values": {
          "max": 10,
          "min": 10,
          "avg": 10,
          "total": 10
        },
        "value": 10
      },
      ...
    }
  }
  ...
  {
    "uuid": "421dfb80-9df3-1056-a1be-db0ee890530a",
    "displayName": "ACM-Appdynamics-Mysql",
    "className": "VirtualMachine",
    "environmentType": "ONPREM",
    "stats": [
      {
        "displayName": "ACM-Appdynamics-Mysql",
        "date": "2019-03-24T00:00:00-04:00",
        "statistics": [
          {
            "name": "numApps",
            "values": {
              "max": 498,
              "min": 498,
              "avg": 498,
              "total": 498
            },
            "value": 498
          },
          ...
        }
      }
      ...
    ]
    "timebasedTopologyChanges": {}
  }
}
Running the Future Load Plan

After creating the ScenarioApiDTO, the response will include the uuid of the created scenario. Use this uuid along with the uuid of the market to run the plan against (typically the real-time market) in the POST /markets/market_uuid/scenarios/scenario_uuid request.

Viewing the Peak of Peak Plan

After running the plan, the response will include the uuid of the created plan market, which you should note. Results can be viewed using the GET /markets/market_uuid request.

Schedules Endpoint

Turbonomic schedules specify a specific time range during which certain events can occur. Turbonomic currently uses schedules in scoped policies to set up windows of time when the policy can execute certain actions, or when the policy changes settings that affect analysis and action generation.

NOTE: When you configure a schedule window for a resize action, to ensure Turbonomic will execute the action during the scheduled time, you must turn off the Enforce Non Disruptive Mode setting for that scheduled policy. Even if you turn the setting off for the global policy, you still must turn the setting off for your scheduled policy. Otherwise Turbonomic will not execute the resize action.

Using the schedules endpoint, you can:

• Get a list of all schedules
• Get a specified schedule
• Create a new schedule
• Edit a schedule
• Delete a license
• View all policies using a specified schedule

Schedules Requests

Getting Schedules

Gets a list of schedules. For a list of schedules, the API returns an array of ScheduleApiDTOs. Each ScheduleApiDTO will contain details about the schedule, including the start and end time and date and recurrence. To get a single schedule, include the UUID of the notification in the request.

Examples:
• All Schedules: GET https://10.10.10.10/api/v3/schedules
• Single Schedule: GET https://10.10.174.149/api/v3/schedules/284466929277824

Response:
Adding a Schedule

In order to create a schedule in Turbonomic, you must provide a valid ScheduleApiDTO.

Example: POST https://10.10.10.10/api/v3/schedules

Example input, showing a schedule to be run weekly on Friday between the hours of 0000 and 0400 that starts on 2019-12-20 and has no end date:

```json
{
  "displayName": "DallasSched",
  "endTime": "2019-12-20T04:00",
  "startTime": "2019-12-20T00:00",
  "timeZone": "America/Denver",
  "recurrence": {
    "type": "WEEKLY",
    "daysOfWeek": ["Fri"]
  }
}```
Getting Policies Using a Schedule

Given a schedule ID, retrieve any policies associated with that schedule.

**Example:**

GET `https://10.10.10.10/api/v3/schedules/284466929277824/settingsPolicy`

**Response:**

An array of `SettingspolicyApiDTOs` that represent the policies using the specified schedule.

```json
[
  {
    "uuid": "284466929430656",
    "displayName": "DalStorage",
    "entityType": "Storage",
    "scopes": [
      {
        "uuid": "284460958528132",
        "displayName": "HawthorneHC_datastore",
        "isStatic": true,
        "logicalOperator": "AND"
      }
    ],
    "settingsManagers": [
      {
        "uuid": "automationmanager",
        "displayName": "Action Mode Settings",
        "category": "Automation",
        "settings": [
          {
            "uuid": "suspend",
            "displayName": "Suspend",
            "value": "MANUAL",
            "defaultValue": "MANUAL",
            "valueType": "STRING",
            "valueObjectType": "String",
            "options": [
              {
                "label": "Disabled",
                "value": "DISABLED"
              },
              {
                "label": "Recommend",
                "value": "RECOMMEND"
              },
              {
                "label": "Manual",
                "value": "MANUAL"
              }
            ]
          }
        ]
      }
    ]
  }
]```
Schedules Cookbook

Advanced Schedule Creation

When creating schedules, you can set multiple timing criteria. Below are schedules with examples of advanced timing. For basic schedules, see the Schedules Endpoint (on page 207).

Bi-Weekly Schedule with Specific Days

This schedule is set to run biweekly, indicated by the "type": "WEEKLY" and "interval": 2 fields. As indicated by the daysOfWeek array, this schedule is active on Monday, Wednesday, and Friday.

InputDTO:

```json
{
    "displayName": "Schedule1",
    "endDate": "2020-07-10",
    "startDate": "2020-02-29",
    "recurrence": {
        "type": "WEEKLY",
        "interval": 2,
        "daysOfWeek": [1, 3, 5]
    },
    "timeZone": "America/Denver",
    "nextOccurrence": "2020-05-05T16:30:00",
    "nextOccurrenceTimestamp": 1588717800000
}
```
Six-Month Schedule with Specific Week of the Month

This schedule is set to run every six months, indicated by the "type" : "MONTHLY" and "interval" : 6 fields. As indicated by the "daysOfWeek" array this schedule is active on Wednesday, and the "weekOfTheMonth" : 2 indicates that this schedule will only run on the second week of the month.

This schedule was created on May 5th, 2020. Converting the timestamp in the API Response to a human-readable date, we see that the next run is on Wednesday, May 13, 2020 3:30:00 PM, the second Wednesday in May.

Input DTO:

```json
{
  "displayName":"DallasTest2",
  "endDate":"2020-10-19",
  "endTime":"2020-05-06T19:15",
  "timezone":"America/Denver",
  "recurrence":{
    "type":"WEEKLY",
    "daysOfWeek": ["Mon",
                   "Wed",
                   "Fri"],
    "interval":2,
    "timezone":"America/Denver",
    "nextOccurrence": "2020-05-06T15:30:00",
    "nextOccurrenceTimestamp":1588800600000
  }
}
```
Turbonomic REST API Endpoints

The API response for this schedule:

```
{
  "uuid":"284559434037456",
  "displayName":"DallasTest2",
  "endDate":"2020-10-19",
  "startTime":"2020-05-06T15:30",
  "endTime":"2020-05-06T19:15",
  "recurrence":{
    "type":"MONTHLY",
    "daysOfWeek": ["Wed"],
    "weekOfTheMonth": [2],
    "interval":6
  },
  "timeZone":"America/Denver",
  "nextOccurrence":"2020-05-13T15:30:00",
  "nextOccurrenceTimestamp":1589405400000
}
```

Getting Policies Attached to a Specific Schedule

In order to see what policies are using a schedule, use the [https://10.10.10.10/api/v3/schedules/\{schedule_UUID\}/settingsPolicy request]

Response: An array of SettingspolicyApiDTOs that represent the policies using the specified schedule, whose details are also included.

```
[
  {
    "uuid": "284466929430656",
    "displayName": "DalStorage",
    "entityType": "Storage",
    "scopes": [
```

---

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Turbonomic REST API Endpoints

{
    "uuid": "284460958528132",
    "displayName": "HawthorneHC_datastore",
    "isStatic": true,
    "logicalOperator": "AND"
},
"settingsManagers": [
{
    "uuid": "automationmanager",
    "displayName": "Action Mode Settings",
    "category": "Automation",
    "settings": [
    {
        "uuid": "suspend",
        "displayName": "Suspend",
        "value": "MANUAL",
        "defaultValue": "MANUAL",
        "valueType": "STRING",
        "valueObjectType": "String",
        "options": [
        {
            "label": "Disabled",
            "value": "DISABLED"
        },
        {
            "label": "Recommend",
            "value": "RECOMMEND"
        },
        {
            "label": "Manual",
            "value": "MANUAL"
        },
        {
            "label": "Automatic",
            "value": "AUTOMATIC"
        }
    ],
    "entityType": "Storage"
    }
    ]
},
"schedule": {
    "uuid": "284466929277824",
    "displayName": "DalSched2",
    "startTime": "2020-02-29T16:30",
    "endTime": "2020-02-29T17:45",
    "recurrence": {
        "type": "MONTHLY",
        "daysOfMonth": [5]
    },
    "interval": 3
}
}
Search Endpoint

A search is a query performed on the entities that participate in the Turbonomic market. The most common use of search is to locate a particular object, service entity, or group of entities that share a characteristic.

Object and Entity refer to different items in your Turbonomic topology. Objects are members of a superset composed of all entities, and any other item with a UUID. For example: markets, groups, scenarios, and policies are all objects, but not entities. VMs, Hosts, and Applications are both entities and objects.

Using the search endpoint of the Turbonomic API, you can:
- Obtain criteria for use in detailed searching or building groups
- Get detailed information about any object in your Turbonomic environment

Search Utility Requests

Utility requests provide metadata that you can use to make related requests, assemble inputDTOs, or see the potential values of a particular DTO.

The search endpoint contains a utility request that shows the various criteria that you may use to search, for each entity type in the Turbonomic supply chain, and a second that shows the options for a specified criterion. You can then use this information to build your search criteria for more detailed groups.

The available filterTypes depend on the entity making up your search:

<table>
<thead>
<tr>
<th>Entity</th>
<th>filterType Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>VirtualMachine</td>
<td>vmsByName</td>
</tr>
<tr>
<td></td>
<td>vmsByPMName</td>
</tr>
<tr>
<td></td>
<td>vmsByStorage</td>
</tr>
<tr>
<td></td>
<td>vmsByStorage</td>
</tr>
<tr>
<td></td>
<td>vmsByNetwork</td>
</tr>
<tr>
<td></td>
<td>vmsByNetwork</td>
</tr>
<tr>
<td></td>
<td>vmsByApplication</td>
</tr>
<tr>
<td></td>
<td>vmsByDatabaseServer</td>
</tr>
<tr>
<td></td>
<td>vmsByDatabaseServer</td>
</tr>
<tr>
<td></td>
<td>vmsByDC</td>
</tr>
<tr>
<td></td>
<td>vmsByVDC</td>
</tr>
<tr>
<td></td>
<td>vmsByDCnested</td>
</tr>
</tbody>
</table>
### Turbonomic REST API Endpoints

<table>
<thead>
<tr>
<th>Entity</th>
<th>filterType Options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• vmsByNumCPUs</td>
</tr>
<tr>
<td></td>
<td>• vmsByMem</td>
</tr>
<tr>
<td></td>
<td>• vmsByGuestName</td>
</tr>
<tr>
<td></td>
<td>• vmsByAltName</td>
</tr>
<tr>
<td></td>
<td>• vmsByClusterName</td>
</tr>
<tr>
<td></td>
<td>• vmsByDiskArrayName</td>
</tr>
<tr>
<td></td>
<td>• vmsByLogicalPoolName</td>
</tr>
<tr>
<td></td>
<td>• vmsByTag</td>
</tr>
<tr>
<td></td>
<td>• vmsByState</td>
</tr>
<tr>
<td></td>
<td>• vmsByBusinessAccountUuid</td>
</tr>
<tr>
<td></td>
<td>• vmsByResourceGroupUuid</td>
</tr>
<tr>
<td>VirtualDataCenter</td>
<td>• vdcsByName</td>
</tr>
<tr>
<td></td>
<td>• vdcsByVDCName</td>
</tr>
<tr>
<td></td>
<td>• vdcsByTag</td>
</tr>
<tr>
<td></td>
<td>• vdcsByState</td>
</tr>
<tr>
<td>PhysicalMachine</td>
<td>• pmsByName</td>
</tr>
<tr>
<td></td>
<td>• pmsByStorage</td>
</tr>
<tr>
<td></td>
<td>• pmsByNetwork</td>
</tr>
<tr>
<td></td>
<td>• pmsBySwitch</td>
</tr>
<tr>
<td></td>
<td>• pmsByNumVms</td>
</tr>
<tr>
<td></td>
<td>• pmsByDC</td>
</tr>
<tr>
<td></td>
<td>• pmsByMem</td>
</tr>
<tr>
<td></td>
<td>• pmsByNumCPUs</td>
</tr>
<tr>
<td></td>
<td>• pmsByVendorName</td>
</tr>
<tr>
<td></td>
<td>• pmsByCPUModel</td>
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<tr>
<td></td>
<td>• pmsByModel</td>
</tr>
<tr>
<td></td>
<td>• pmsByTimezone</td>
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<tr>
<td></td>
<td>• pmsByClusterName</td>
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<tr>
<td></td>
<td>• pmsByTag</td>
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<tr>
<td></td>
<td>• pmsByState</td>
</tr>
<tr>
<td>Storage</td>
<td>• storageByName</td>
</tr>
<tr>
<td></td>
<td>• storageByTag</td>
</tr>
<tr>
<td></td>
<td>• storageByVMs</td>
</tr>
<tr>
<td></td>
<td>• storageByDC</td>
</tr>
<tr>
<td></td>
<td>• storageByPMCluster</td>
</tr>
<tr>
<td>Entity</td>
<td>filterType Options</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>• storageByState</td>
</tr>
<tr>
<td>Application</td>
<td>• appsByName</td>
</tr>
<tr>
<td>Application Server</td>
<td>• appSrvsByName</td>
</tr>
<tr>
<td>WebServer</td>
<td>• wbSrvsByName</td>
</tr>
<tr>
<td>BusinessApplication</td>
<td>• busAppsByName</td>
</tr>
<tr>
<td>Database</td>
<td>• databaseByName</td>
</tr>
<tr>
<td></td>
<td>• databaseByTag</td>
</tr>
<tr>
<td></td>
<td>• databaseByBusinessAccountUuid</td>
</tr>
<tr>
<td></td>
<td>• databaseByResourceGroupUuid</td>
</tr>
<tr>
<td>DatabaseServer</td>
<td>• databaseServerByName</td>
</tr>
<tr>
<td></td>
<td>• databaseServerByTag</td>
</tr>
<tr>
<td></td>
<td>• databaseServerByBusinessAccountUuid</td>
</tr>
<tr>
<td></td>
<td>• databaseServerByEngine</td>
</tr>
<tr>
<td></td>
<td>• databaseServerByEdition</td>
</tr>
<tr>
<td></td>
<td>• databaseServerByVersion</td>
</tr>
<tr>
<td>VirtualApplication</td>
<td>• vappsByName</td>
</tr>
<tr>
<td>Cluster</td>
<td>• clustersByName</td>
</tr>
<tr>
<td></td>
<td>• clustersByTag</td>
</tr>
<tr>
<td>DataCenter</td>
<td>• datacentersByName</td>
</tr>
<tr>
<td>Entity</td>
<td>filterType Options</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Groups of type <code>ServiceEntity</code> are the only groups that have multiple entity types, and are used exclusively for cloud targets.</td>
</tr>
<tr>
<td></td>
<td>• workloadByBusinessAccountUuid</td>
</tr>
<tr>
<td></td>
<td>• workloadByResourceGroupUuid</td>
</tr>
<tr>
<td></td>
<td>• ResourceGroup</td>
</tr>
<tr>
<td></td>
<td>• resourceGroupByName</td>
</tr>
<tr>
<td></td>
<td>• resourceGroupByUuid</td>
</tr>
<tr>
<td></td>
<td>• resourceGroupByBusinessAccountUuid</td>
</tr>
<tr>
<td></td>
<td>• businessAccountByName</td>
</tr>
<tr>
<td></td>
<td>• businessAccountByUuid</td>
</tr>
<tr>
<td></td>
<td>• subBusinessAccountOfUuid</td>
</tr>
<tr>
<td></td>
<td>• businessAccountValidationStatus</td>
</tr>
<tr>
<td></td>
<td>• businessAccountTargetName</td>
</tr>
<tr>
<td></td>
<td>• datacentersByTag</td>
</tr>
<tr>
<td>Group</td>
<td>• groupsByName</td>
</tr>
<tr>
<td>StorageCluster</td>
<td>• storageClustersByName</td>
</tr>
<tr>
<td>DiskArray</td>
<td>• diskarrayByName</td>
</tr>
<tr>
<td>Zone</td>
<td>• zonsByName</td>
</tr>
<tr>
<td>Region</td>
<td>• regsByName</td>
</tr>
<tr>
<td>Network</td>
<td>• netsByName</td>
</tr>
<tr>
<td>LoadBalancer</td>
<td>• lbsByName</td>
</tr>
<tr>
<td>Chassis</td>
<td>• chasByName</td>
</tr>
<tr>
<td>StorageController</td>
<td>• storagecontrollerByName</td>
</tr>
<tr>
<td>DPod</td>
<td>• dpodByName</td>
</tr>
<tr>
<td>VPod</td>
<td>• vpodByName</td>
</tr>
<tr>
<td>LogicalPool</td>
<td>• logicalPoolByName</td>
</tr>
<tr>
<td>Switch</td>
<td>• switchByName</td>
</tr>
<tr>
<td>Container</td>
<td>• containersByName</td>
</tr>
<tr>
<td></td>
<td>• containersByVMName</td>
</tr>
<tr>
<td>ContainerPod</td>
<td>• containerpodsByName</td>
</tr>
<tr>
<td></td>
<td>• containerpodsByVMName</td>
</tr>
<tr>
<td>Workload</td>
<td>• workloadByBusinessAccountUuid</td>
</tr>
<tr>
<td></td>
<td>• workloadByResourceGroupUuid</td>
</tr>
<tr>
<td></td>
<td>• ResourceGroup</td>
</tr>
<tr>
<td></td>
<td>• resourceGroupByName</td>
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<tr>
<td></td>
<td>• resourceGroupByUuid</td>
</tr>
<tr>
<td></td>
<td>• resourceGroupByBusinessAccountUuid</td>
</tr>
<tr>
<td>BusinessAccount</td>
<td>• businessAccountByName</td>
</tr>
<tr>
<td></td>
<td>• businessAccountByUuid</td>
</tr>
<tr>
<td></td>
<td>• subBusinessAccountOfUuid</td>
</tr>
<tr>
<td></td>
<td>• businessAccountValidationStatus</td>
</tr>
<tr>
<td></td>
<td>• businessAccountTargetName</td>
</tr>
</tbody>
</table>
### Turbonomic REST API Endpoints

#### Entity filterType Options

<table>
<thead>
<tr>
<th>Entity</th>
<th>filterType Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>BillingFamily</td>
<td>• billingFamilyByName</td>
</tr>
<tr>
<td>ViewPod</td>
<td>• viewPodByName</td>
</tr>
<tr>
<td>DesktopPool</td>
<td>• desktopPoolByName</td>
</tr>
<tr>
<td></td>
<td>• desktopPoolByViewPod</td>
</tr>
<tr>
<td>BusinessUser</td>
<td>• businessUserByName</td>
</tr>
</tbody>
</table>

**Example:** GET https://10.10.10.10/api/v3/search/criteria

**Response:** An array of filter criteria, separated by entity type. For example, this is the filter criteria for Virtual Machine entities:

```json
"VirtualMachine": {
  "criteria": [
    {
      "inputType": "*",
      "elements": "displayName",
      "filterCategory": "property",
      "filterType": "vmsByName"
    },
    {
      "inputType": "*",
      "elements": "HostedBy:displayName",
      "filterCategory": "entity",
      "filterType": "vmsByPMName"
    },
    {
      "inputType": "*",
      "elements": "LayeredOver:Storage:displayName",
      "filterCategory": "entity",
      "filterType": "vmsByStorage"
    },
    {
      "inputType": "*",
      "elements": "LayeredOver:Network:displayName",
      "filterCategory": "entity",
      "filterType": "vmsByNetwork"
    },
    {
      "inputType": "*",
      "elements": "Hosts:Application:displayName",
      "filterCategory": "entity",
      "filterType": "vmsByApplication"
    },
    {
      "inputType": "*",
      "elements": "HostedBy:PhysicalMachine:HostedBy:DataCenter:displayName",
      "filterCategory": "entity",
      "filterType": "vmsByDC"
  ]
}
```
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```json
{
    "inputType": "*",
    "elements": "LayeredOver:VirtualDataCenter:displayName",
    "filterCategory": "entity",
    "filterType": "vmsByVDC"
},
{
    "inputType": "*",
    "elements": "AllMemberOf:VirtualDataCenter:displayName",
    "filterCategory": "entity",
    "filterType": "vmsByDCnested"
},
{
    "inputType": "#",
    "elements": "ExtendedBy:VMTopoExt:numCpus",
    "filterCategory": "property",
    "filterType": "vmsByNumCPUs"
},
{
    "inputType": "#",
    "elements": "Commodities:VMem:capacity",
    "filterCategory": "property",
    "filterType": "vmsByMem"
},
{
    "inputType": "*",
    "elements": "ExtendedBy:VMTopoExt:guestName",
    "filterCategory": "property",
    "filterType": "vmsByGuestName"
},
{
    "inputType": "*",
    "elements": "ExtendedBy:VMTopoExt:altName",
    "filterCategory": "property",
    "filterType": "vmsByAltName"
},
{
    "inputType": "*",
    "elements": "HostedBy:PhysicalMachine:MemberOf:Cluster:displayName",
    "filterCategory": "entity",
    "filterType": "vmsByClusterName"
},
{
    "inputType": "*",
    "elements": "LayeredOver:Storage:LayeredOver:DiskArray:displayName",
    "filterCategory": "entity",
    "filterType": "vmsByDiskArrayName"
},
{
    "inputType": "*",
    "elements": "LayeredOver:Storage:LayeredOver:LogicalPool:displayName",
    "filterCategory": "entity",
    "filterType": "vmsByLogicalPoolName"
}
}```
Getting the Options for a Criterion

For a specific search criterion and entity type, get the possible values. For example, you may want to retrieve all tags for a particular group of hosts, or see the available state options for a particular group of virtual machines. This request takes the following parameters:

criteria_key | The criterion to retrieve options for. Currently, Turbonomic accepts the following criteria keys: [ state, tags ]. Any other input that returns results should be considered internal or early access, and should not be relied on for scripting purposes.
scopes | The UUID of the scope to retrieve the criterion values for. For example, to retrieve all tags for virtual machines in a particular cluster, put the cluster UUID here.
entity_type | The entity whose state or tag options will be returned. For example, if scopes is passed with the UUID of a cluster, and this parameter is passed with a value of VirtualMachine, the request will return the options for each virtual machine in that cluster.
order_by | The field to order the results by. [ creation_date, name, risk_category, savings, severity ].
ascending | Default: true. When false, results will be in descending order.
environment_type | Returns only objects in the specified environment type. [ Cloud, Hybrid, Onprem ]

Example: GET https://10.10.10.10/api/v3/search/criteria/state/options?scopes=7c8d50fae46c09b68b00916411469770304226b4&entity_type=VirtualMachine
Response: A CriteriaOptionApiDTO with the available options. For example, the response below indicates that all virtual machines on the cluster whose UUID was passed are either in active or idle states.

```json
[
  {
    "value": "ACTIVE"
  },
  {
    "value": "IDLE"
  }
]
```

Search Requests

**Getting Object Information by UUID**

Gets information about any object in your Turbonomic environment.

Object and Entity refer to different items in your Turbonomic topology. Objects are members of a superset composed of all entities, and any other item with a UUID. For example: markets, groups, scenarios, and policies are all objects, but not entities. VMs, Hosts, and Applications are both entities and objects.

Example: https://10.10.10.10/api/v3/search/Market

Response: An appropriate DTO with information about the object queried. In this case, the real-time Market:

```json
{
    "links": [
        {
            "rel": "self",
            "href": "https://10.10.10.10/api/v3/markets/_0x3OYUglEd-gHc4L513yOA"
        }
    ],
    "uuid": "_0x3OYUglEd-gHc4L513yOA",
    "displayName": "Market",
    "className": "Market",
    "state": "RUNNING",
    "unplacedEntities": false,
    "environmentType": "HYBRID"
}
```
Settings Endpoint

The settings endpoint can be used to change settings in a variety of settings managers. For example, using the actionscriptmanager, you can change action script settings, and using the automationmanager, you can change automation settings on your instance.

Using the settings endpoint of the Turbonomic API, you can:

- Get a list of available setting managers and settings
- Edit a setting

List of Settings Managers

The settings managers available to be modified are:

- actionscriptmanager
- appsettingsmanager
- appsvssettingsmanager
- automationmanager
- busappsettingsmanager
- capacityplandatamanager
- controlmanager
- discoverymanager
- emailmanager
- entityprioritiesmanager
- loadbalancersettingsmanager
- marketsettingsmanager
- osmigrationmanager
- persistencemanager
- presentationmanager
- reportingconfigmanager
- reservedinstancemanager
- storagesettingsmanager

For more information about each settingsmanager, execute the GET https://10.10.10.10/api/v3/settings request.

Settings Utility Requests

Utility requests provide metadata that you can use to make related requests, assemble inputDTOs, or see the potential values of a particular DTO.

The settings endpoint contains a utility request that shows each settings manager, and the settings available.

Example: GET https://10.10.10.10/api/v3/settings/

Response: An array of SettingsManagerApiDTOs, where each object is a settings manager and contains the settings for that manager.
Settings Requests

Getting Current Settings for a Specified Settings Manager

Gets the current settings for the specified settings manager. This request is often used to see the settings of a particular settings manager before updating.

Example: GET https://10.10.10.10/api/v3/settings/automationmanager

Response: A list of SettingApiDTOs representing the settings for the specified settings manager:

```javascript
{
  "uuid": "startVM",
  "displayName": "Start",
  "value": "RECOMMEND",
  "defaultValue": "RECOMMEND",
  "valueType": "STRING",
  "options": [
    {
      "label": "Disabled",
      "value": "DISABLED"
    },
    {
      "label": "Recommend",
      "value": "RECOMMEND"
    },
    {
      "label": "Manual",
      "value": "MANUAL"
    },
    {
      "label": "Automated",
      "value": "AUTOMATIC"
    }
  ],
  "entityType": "VirtualMachine",
  "sourceGroupName": "Global"
},
{
  "uuid": "startPM",
  "displayName": "Start",
  "value": "RECOMMEND",
  "defaultValue": "RECOMMEND",
  "valueType": "STRING",
  "options": [
    {
      "label": "Disabled",
      "value": "DISABLED"
    },
    {
      "label": "Recommend",
      "value": "RECOMMEND"
    }
  ],
  "entityType": "ProcessManager"
}
```
Editing Settings

To edit a Setting, pass the corrected SettingApiDTO in the body of this request. This request takes the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>settingsManager_uuid</td>
<td>The UUID of the settingsmanager whose setting will be changed.</td>
</tr>
<tr>
<td>setting_uuid</td>
<td>The setting whose value will be changed.</td>
</tr>
</tbody>
</table>

**Example:** PUT https://10.10.10.10/api/v3/settings/automationmanager/moveVM

**Example Input:** A SettingApiDTO. In this case, the value is being changed from MANUAL to RECOMMEND:
Turbonomic REST API Endpoints

```json
{
    "uuid": "moveVM",
    "displayName": "Move",
    "value": "RECOMMEND",
    "defaultValue": "MANUAL",
    "valueType": "STRING",
    "options": [
        {
            "label": "Disabled",
            "value": "DISABLED"
        },
        {
            "label": "Recommend",
            "value": "RECOMMEND"
        },
        {
            "label": "Manual",
            "value": "MANUAL"
        },
        {
            "label": "Automated",
            "value": "AUTOMATIC"
        }
    ],
    "entityType": "VirtualMachine",
    "sourceGroupName": "Global"
}
```

Response: The SettingApiDTO reflecting your changes:

```json
{
    "uuid": "moveVM",
    "displayName": "Move",
    "value": "RECOMMEND",
    "defaultValue": "MANUAL",
    "valueType": "STRING",
    "options": [
        {
            "label": "Disabled",
            "value": "DISABLED"
        },
        {
            "label": "Recommend",
            "value": "RECOMMEND"
        },
        {
            "label": "Manual",
            "value": "MANUAL"
        },
        {
            "label": "Automated",
            "value": "AUTOMATIC"
        }
    ]
}
```
Settings Policies Endpoint

A Settings Policy is the collection of settings that apply to an entity. In Turbonomic, there is a default policy for each type of entity. These global defaults are the base settings for entities, and any settings policies that you create will specify deltas to the defaults. Note that you can edit the global policies.

When you create a custom settings policy, you assign a scope to it – one or more groups of entities you want to affect with the policy. For these policies, you specify just the settings that will be different from the defaults.

In addition to global default policies and custom policies, Turbonomic also discovers groups that need special settings, and creates policies for those groups. For example, when Turbonomic discovers Azure Availability Sets and AWS Autoscaling Groups, it generates settings policies for those groups that turn on Consistent Resizing for the group.

Using the settings policies endpoint, you can:
- Get a listing of the settings policies in your environment
- Get details for a single settings policy
- Create settings policies
- Edit settings policies
- Delete settings policies

Settings Policies Requests

**Getting Settings Policies**

This call returns an array of SettingsPolicyApiDTOs for all the settings policies in your environment. You can pass entity types to limit the listing to policies for those types, and you can limit the list to only default policies.

This request takes the following parameters:

<table>
<thead>
<tr>
<th>only_defaults</th>
<th>If this is true, the call only gets the default settings policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>entity_type</td>
<td>One or more entity types to limit the list of settings policies</td>
</tr>
</tbody>
</table>

Examples:
- Get all the settings policies: GET https://10.10.10.10/api/v3/settingspolicies
- Get all the default settings policies: GET https://10.10.10.10/api/v3/settingspolicies?only_defaults=true
Get a single settings policy (pass the policy Uuid): GET https://10.10.10.10/api/v3/settingspolicies/_aVDEwGegEemDFcIzuV5wcQ

Response: An array of SettingsPolicyApiDTOs. This listing shows the settings policies for Container entities.

```json
[
  {
    "uuid": "_vyMHEDnSEemHXrxYkw9y2Q",
    "displayName": "Container defaults",
    "entityType": "Container",
    "settingsManagers": [
      {
        "uuid": "marketsettingsmanager",
        "displayName": "Operational Constraints",
        "category": "Analysis",
        "settings": [
          {
            "uuid": "usedIncrement_Container_VMEM",
            "displayName": "Increment constant for Container VMem [MB]",
            "value": "64.0",
            "defaultValue": "64.0",
            "categories": [
              "resizeRecommendationsConstants"
            ],
            "valueType": "NUMERIC",
            "min": 0,
            "max": 10000000,
            "entityType": "Container",
            "sourceGroupName": "Global"
          },
          {
            "uuid": "usedIncrement_Container_VCPU",
            "displayName": "Increment constant for Container VCPU [MHz]",
            "value": "100.0",
            "defaultValue": "100.0",
            "categories": [
              "resizeRecommendationsConstants"
            ],
            "valueType": "NUMERIC",
            "min": 0,
            "max": 1000000,
            "entityType": "Container",
            "sourceGroupName": "Global"
          },
          {
            "uuid": "enforceConsistentResizingContainer",
            "displayName": "Consistent Resizing",
            "value": "false",
            "defaultValue": "false",
            "categories": [
              "resizeRecommendationsConstants"
            ],
            "valueType": "BOOLEAN",
            "entityType": "Container",
```
Creating a Settings Policy

Referenced Endpoint: Groups (on page 88)

To create a settings policy, you must do the following:

• Specify a policy name,
• Specify whether to enable or disable the policy in your market.
• Set the policy scope – Specify one or more groups of a given element type. This determines the entity type for the policy.
• For the of settings you want to make, specify the appropriate settings manager, and then specify an array of setting/value pairs.
• Optionally, specify a schedule window for the policy.

To set the policy scope, you provide an array of objects that contain group Uuids. These objects are effectively abbreviated GroupApiDTOs. Note that the groups must all be for the same type of entity. This specifies the entity type for the settings policy. Use the Groups endpoint to get the Uuid values for the groups you want in the scope. For example, to set the scope to a single group of VMs, use the following scopes object:

```json
"scopes": [  
  
  ]
```

To specify the actual settings, you provide an array of SettingsManagerApiDTOs. Each one contains an array of settings that you want to make. To see all the settings for a given entity type, refer to the user interface, or the User Guide. The setting managers you can choose from are:

• actionscriptmanager
• appsettingsmanager
• appsvsettingsmanager
• automationmanager
• busappsettingsmanager
• capacityplandatamanager
• controlmanager
• discoverymanager
• emailmanager
• entityprioritiesmanager
• loadbalancersettingsmanager
• marketsettingsmanager
• osmigrationmanager
• persistencemanager
• presentationmanager
• reportingconfigmanager
• reservedinstancemanager
• storagesettingsmanager

For example, to set the VM start action to AUTOMATED and to set the VCPU maximum to 16, use the following settingsManagers array:

```
"settingsManagers": [
  {
    "uuid": "automationmanager",
    "settings": [
      {
        "uuid": "startVM",
        "value": "AUTOMATIC"
      }
    ]
  },
  {
    "uuid": "marketsettingsmanager",
    "settings": [
      {
        "uuid": "resizeVcpuMaximum_VM",
        "value": 16
      }
    ]
  }
]
```

You can set up a schedule window that determines when the settings policy takes effect. For that you provide a ScheduleApiDTO for the schedule details. It includes: the start and end dates, start and end times,

• Start and end dates.
• Start and end times.
• An optional RecurrenceApiDTO for schedule recurrence. If you don’t provide this you will specify a one-time schedule window.
For example, use this to specify a "perpetual" schedule window (does not expire until 2099) that starts at 12:30 am and ends at 7:30 am every Saturday and Sunday.

```
"schedule": {
    "startDate": "2019-04-28T00:30:00-04:00",
    "endDate": "2099-12-31T07:30:00-05:00",
    "startTime": "2019-04-28T00:30:00-04:00",
    "endTime": "2019-04-28T07:30:00-04:00",
    "recurrence": {
        "type": "WEEKLY",
        "daysOfWeek": [
            "Sat",
            "Sun"
        ]
    }
}
```

The complete data payload that you would post to create the settings policy uses these objects. Using the above examples, the policy definition would be:

```
{
    "disabled": false,
    "displayName": "CUD_API_VM_Policy",
    "scopes": [
        {
            "uuid": "_lSlr0GddEemDFcIzuV5wcQ"
        }
    ],
    "settingsManagers": [
        {
            "uuid": "automationmanager",
            "settings": [
                {
                    "uuid": "startVM",
                    "value": "AUTOMATIC"
                }
            ]
        },
        {
            "uuid": "marketsettingsmanager",
            "settings": [
                {
                    "uuid": "resizeVcpuMaximum_VM",
                    "value": 16
                }
            ]
        }
    ],
    "schedule": {
        "startDate": "2019-04-28T00:30:00-04:00",
        "endDate": "2099-12-31T07:30:00-05:00",
        "startTime": "2019-04-28T00:30:00-04:00",
        "endTime": "2019-04-28T07:30:00-04:00"
    }
}
```
"recurrence": {
  "type": "WEEKLY",
  "daysOfWeek": [
    "Sat",
    "Sun"
  ]
}
}
}

Example: Using the above payload, POST https://10.10.10.10/api/v3/settingspolicies

Response: The settings policy that you created. Use this response to get the policy Uuid.

Editing a Settings Policy

To edit a settings policy, you push a new set of data to the Settings Policies end point. The best way to do this is to copy the SettingsPolicyApiDTO that you want to edit, make changes to that DTO, and then push the DTO out to the API. To remove the policy from the scope, pass the SettingsPolicyApiDTO, and also pass reset_defaults=true as a parameter.

This request takes the following parameters:

<table>
<thead>
<tr>
<th>settingsPolicy_Uuid</th>
<th>The Uuid of the policy you want to edit</th>
</tr>
</thead>
<tbody>
<tr>
<td>reset_defaults</td>
<td>A boolean you can use to reset the policy to default. When reset_defaults=true, you remove the policy and reset that scope to default. When you use this setting, pass an empty object {} as the data payload.</td>
</tr>
</tbody>
</table>

Examples:

- Assuming you copied a SettingsPolicyApiDTO and then made some changes to it, and pass that at the payload: PUSH https://10.10.10.10/api/v3/settingspolicies/_2-CbQGoNEemyOoIvFZyv1A?reset_defaults=false

- Assuming you want to remove the policy (and so you pass an empty object as the payload): PUSH https://10.10.10.10/api/v3/settingspolicies/_2-CbQGoNEemyOoIvFZyv1A?reset_defaults=true

Response: The modified SettingsPolicyApiDTO.

Deleting a Settings Policy

Deletes the given settings policy.

Example: DELETE https://10.10.10.10/api/v3/settingspolicies/_aV5ucGoTEemyOoIvFZyv1A

Response: 200 for success.
Statistics Endpoint

Statistics Overview

Statistics are pieces of information that Turbonomic discovers while continuously analyzing your environment. The most common use of statistics is to look at a particular statistic over a specific time frame.

Using the stats endpoint of the Turbonomic API, you can:
- Get a list of stats requests in other endpoints
- Get a filtered list of statistics over a specific time frame
- Get a list of statistics for a specified entity
- Get a filtered list of statistics for a specified entity

Statistics Utility Requests

Utility requests provide metadata that you can use to make related requests, assemble inputDTOs, or see the potential values of a particular DTO.

The stats endpoint contains a utility request that shows common entry points for statistic-related requests. These can be used to obtain statistics for particular entities or groups.

Example: GET https://10.10.10.10/api/v3/stats

Response: An array of Link objects, where each object contains a URL to get all statistics for a specified UUID, entity, or group.

Statistics Requests

Getting Statistics for an Entity

Gets all statistics for the specified entity. This request takes the following parameters:

| entity_uuid | The entity whose statistics will be returned. |
| q           | Used internally by Turbonomic.               |

Example: https://10.10.10.10/api/v3/stats/423f26a7-1132-df1c-64e2-8a040480b046

Response: A list of StatSnapshotApiDTOs representing the current values of the statistics.

```json
[
  {
    "displayName": "AdityaReplica",
    "date": "2019-04-24T20:09:46-04:00",
    "statistics": [
      {
        "name": "priceIndex",
        "relatedEntityType": "VirtualMachine",
```
"values": {
  "max": 1.01,
  "min": 1.01,
  "avg": 1.01,
  "total": 1.01
},
"value": 1.01
},
{
  "displayName": "CPUProvisioned/AdityaReplica",
  "name": "CPUProvisioned",
  "capacity": {
    "max": 3120000,
    "min": 3120000,
    "avg": 3120000,
    "total": 3120000
  },
  "relatedEntityType": "VirtualMachine",
  "filters": [
    {
      "type": "relation",
      "value": "bought"
    }
  ],
  "units": "MHz",
  "values": {
    "max": 5200,
    "min": 5200,
    "avg": 5200,
    "total": 5200
  },
  "value": 5200
},
{
  "displayName": "Swapping/AdityaReplica",
  "name": "Swapping",
  "capacity": {
    "max": 40000000,
    "min": 40000000,
    "avg": 40000000,
    "total": 40000000
  },
  "relatedEntityType": "VirtualMachine",
  "filters": [
    {
      "type": "relation",
      "value": "bought"
    }
  ],
  "units": "bit/sec",
  "values": {
    "max": 0,
    "min": 0,
    "avg": 0,
    "total": 0
  }
}
Getting a Filtered List of Statistics

Gets a list of statistics filtered by a user-created StatPeriodApiInputDTO. For more information about the criteria that makes up the input for this request, see the Swagger documentation for this request, located at https://<Your_Turbonomic_IP>/vmturbo/apidoc/.

Example: POST https://10.10.10.10/api/v3/stats/423f26a7-1132-df1c-64e2-8a040480b046

Example Input: This input will return the values for the VMem, VCPU, and VStorage statistics of the specified entity, ordered first by key, then relatedEntity, then virtualDisk.

```json
{
    "statistics": [
        {
            "name": "VMem",
            "groupBy": [
                "key",
                "relatedEntity",
                "virtualDisk"
            ]
        }
    ]
}
```
Response: A list of StatSnapshotApiDTOs representing the filtered statistics for the entity:

```json
[{
  "displayName": "AdityaReplica",
  "date": "2019-04-24T20:28:06-04:00",
  "statistics": [
    {
      "displayName": "AdityaReplica",
      "name": "VMem",
      "capacity": {
        "max": 1048576,
        "min": 1048576,
        "avg": 1048576,
        "total": 1048576
      },
      "relatedEntityType": "VirtualMachine",
      "filters": [
        {
          "type": "virtualDisk",
          "value": ""
        },
        {
          "type": "key",
          "value": null
        },
        {
          "type": "relation",
          "value": "sold"
        }
      ],
      "relatedEntity": {
        "uuid": "5d2f7b69eb3bf506089feba37d31b0c376b02e34",
        "displayName": "GuestLoad[AdityaReplica]"
      }
    }
  ]
}
```
"className": "Application",
"units": "KB",
"values": {
  "max": 0,
  "min": 0,
  "avg": 0,
  "total": 0
},
"value": 0,
},
{
"displayName": "AdityaReplica",
"name": "VCPUs",
"capacity": {
  "max": 5200,
  "min": 5200,
  "avg": 5200,
  "total": 5200
},
"relatedEntityType": "VirtualMachine",
"filters": [
  {
    "type": "virtualDisk",
    "value": ""
  },
  {
    "type": "key",
    "value": null
  },
  {
    "type": "relation",
    "value": "sold"
  }
],
"relatedEntity": {
  "uuid": "5d2f7b69eb3bf506089feba37d31b0c376b02e34",
  "displayName": "GuestLoad[AdityaReplica]",
  "className": "Application"
},
"units": "MHz",
"values": {
  "max": 19,
  "min": 14.93,
  "avg": 14.93,
  "total": 14.93
},
"value": 14.93}
Getting a Filtered List of Statistics for All Objects In a Specified Scope

For the specified scope, gets a filtered list of statistics for each entity. If you do not provide a statistic in the input, basic information about each entity (but not its statistics) will be returned. For more information about the criteria that makes up the input for this request, see the Swagger documentation for this request, located at https://<Your_Turbonomic_IP>/vmturbo/apidoc/.

Example: POST https://10.10.10.10/api/v3/stats?ascending=true

Example Input: This input will return the VMem values for each entity in the real-time market from a period of five days prior to the request, to one day prior to the request.

```json
{
  "scopes": [
    "Market"
  ],
  "period": {
    "startDate": "-5d",
    "endDate": "-1d",
    "statistics": [
      {
        "name": "VMem"
      }
    ],
  },
  "relatedType": "VirtualMachine"
}
```

Response: A list of StatSnapshotApiDTOs representing the filtered statistics for the entities in the specified scope:

```json
[
  {
    "uuid": "4200829c-1272-c0a4-2d17-55f2cc0ef1b4",
    "displayName": "vm-c67a1cdd-609e-4282-809c-e0def5cd0d7a",
    "className": "VirtualMachine",
    "environmentType": "ONPREM",
    "stats": {
      "displayName": "vm-c67a1cdd-609e-4282-809c-e0def5cd0d7a",
      "date": "2019-04-19T00:00:00-04:00",
      "statistics": {
        "name": "VMem",
        "capacity": {
          "max": 16777216,
          "min": 16777216,
          "avg": 16777216,
          "total": 33554432
        },
        "relatedEntityId": "VirtualMachine",
        "filters": {
          "type": "relation",
```
"value": "sold"
},
"units": "KB",
"values": {
  "max": 1509949.5,
  "min": 335544.3,
  "avg": 587202.56,
  "total": 1174405.1
},
"value": 587202.56
}
]
),
{
"displayName": "vm-c67a1cdd-609e-4282-809c-e0def5cd0d7a",
"date": "2019-04-20T00:00:00-04:00",
"statistics": [
{
  "name": "VMem",
  "capacity": {
    "max": 16777216,
    "min": 16777216,
    "avg": 16777216,
    "total": 33554432
  },
  "relatedEntityType": "VirtualMachine",
  "filters": [
    {
      "type": "relation",
      "value": "sold"
    }
  ],
  "units": "KB",
  "values": {
    "max": 1509949.5,
    "min": 369098.75,
    "avg": 587202.56,
    "total": 1174405.1
  },
  "value": 587202.56
}
]
),
{
"displayName": "vm-c67a1cdd-609e-4282-809c-e0def5cd0d7a",
"date": "2019-04-22T00:00:00-04:00",
"statistics": [
{
  "name": "VMem",
  "capacity": {
    "max": 16777216,
    "min": 16777216,
    "avg": 16777216,
    "total": 33554432
  }
}
Turbonomic REST API Endpoints

```
},
{"relatedEntityType": "VirtualMachine",
"filters": [
{
  "type": "relation",
  "value": "sold"
}
],
"units": "KB",
"values": {
  "max": 12582912,
  "min": 0,
  "avg": 452984.84,
  "total": 905969.7
},
"value": 452984.84
}
],
{"displayName": "vm-c67a1cdd-609e-4282-809c-e0def5cd0d7a",
"date": "2019-04-23T00:00:00-04:00",
"statistics": [
{
  "name": "VMem",
  "capacity": {
    "max": 16777216,
    "min": 16777216,
    "avg": 16777216,
    "total": 33554432
  },
  "relatedEntityType": "VirtualMachine",
  "filters": [
    {
      "type": "relation",
      "value": "sold"
    }
  ],
  "units": "KB",
  "values": {
    "max": 838860.8,
    "min": 0,
    "avg": 167772.16,
    "total": 335544.3
  },
  "value": 167772.16
}
]
}
",
{"uuid": "39EBB726-41D9-4BC8-A41D-CA301854309C",
"displayName": "Gilad_OM-38071_SMB_VM2",
"className": "VirtualMachine",
"value": 452984.84
}
]}
```

"environmentType": "ONPREM"
},
{
  "uuid": "97A3F420-B7AD-414D-A543-FD308AC774A6",
  "displayName": "Gilad_VMM_Test_VM_2",
  "className": "VirtualMachine",
  "environmentType": "ONPREM"
},
{
  "uuid": "4211f183-69a8-3676-3e53-0151365500ff",
  "displayName": "james-ubuntu-dc13",
  "className": "VirtualMachine",
  "environmentType": "ONPREM",
  "stats": [
    {
      "displayName": "james-ubuntu-dc13",
      "date": "2019-04-19T00:00:00-04:00",
      "statistics": [
        {
          "name": "VMem",
          "capacity": {
            "max": 1048576,
            "min": 1048576,
            "avg": 1048576,
            "total": 2097152
          },
          "relatedEntityType": "VirtualMachine",
          "filters": [
            {
              "type": "relation",
              "value": "sold"
            }
          ],
          "units": "KB",
          "values": {
            "max": 83886.08,
            "min": 8388.61,
            "avg": 18874.37,
            "total": 37748.73
          },
          "value": 18874.37
        }
      ]
    },
    {
      "displayName": "james-ubuntu-dc13",
      "date": "2019-04-20T00:00:00-04:00",
      "statistics": [
        {
          "name": "VMem",
          "capacity": {
            "max": 1048576,
            "min": 1048576,
            "avg": 1048576,
            "total": 2097152
          }
        }
      ]
    }
  ]
}


```
},
"relatedEntityName": "james-ubuntu-dc13",
"displayName": "james-ubuntu-dc13",
"date": "2019-04-21T00:00:00-04:00",
"statistics": [  
  {  
    "name": "VMem",
    "capacity": {  
      "max": 1048576,
      "min": 1048576,
      "avg": 1048576,
      "total": 2097152
    },
    "relatedEntityName": "james-ubuntu-dc13",
    "filters": [  
      {  
        "type": "relation",
        "value": "sold"
      }
    ],
    "units": "KB",
    "values": {  
      "max": 73400.32,
      "min": 11534.34,
      "avg": 17825.79,
      "total": 35651.59
    },
    "value": 17825.79
  }
}
],
"displayName": "james-ubuntu-dc13",
"date": "2019-04-22T00:00:00-04:00",
"statistics": [  
  {  
    "name": "VMem",
    "capacity": {  
      "max": 62914.56,
      "min": 13631.49,
      "avg": 18874.37,
      "total": 37748.73
    },
    "relatedEntityName": "james-ubuntu-dc13",
    "filters": [  
      {  
        "type": "relation",
        "value": "sold"
      }
    ],
    "units": "KB",
    "values": {  
      "max": 73400.32,
      "min": 11534.34,
      "avg": 17825.79,
      "total": 35651.59
    },
    "value": 17825.79
  }
}
]
}
```

"capacity": {
  "max": 1048576,
  "min": 1048576,
  "avg": 1048576,
  "total": 2097152
},
"relatedEntityType": "VirtualMachine",
"filters": [
  {
    "type": "relation",
    "value": "sold"
  }
],
"units": "KB",
"values": {
  "max": 83886.08,
  "min": 8388.61,
  "avg": 19922.94,
  "total": 39845.89
},
"value": 19922.94
],
"displayName": "james-ubuntu-dc13",
"date": "2019-04-23T00:00:00-04:00",
"statistics": [
  {
    "name": "VMem",
    "capacity": {
      "max": 1048576,
      "min": 1048576,
      "avg": 1048576,
      "total": 2097152
    },
    "relatedEntityType": "VirtualMachine",
    "filters": [
      {
        "type": "relation",
        "value": "sold"
      }
    ],
    "units": "KB",
    "values": {
      "max": 73400.32,
      "min": 3145.73,
      "avg": 18874.37,
      "total": 37748.73
    },
    "value": 18874.37
  }
]


```
},
{
"uuid": "421d2165-36cd-7f6a-3a43-08e09f6f4e0f",
"displayName": "ACM-LexCorp-Control",
"className": "VirtualMachine",
"environmentType": "ONPREM",
"stats": [
{
"displayName": "ACM-LexCorp-Control",
"date": "2019-04-19T00:00:00-04:00",
"statistics": [
{
"name": "VMem",
"capacity": {
"max": 2097152,
"min": 2097152,
"avg": 2097152,
"total": 4194304
},
"relatedEntityType": "VirtualMachine",
"filters": [
{
"type": "relation",
"value": "sold"
}
],
"units": "KB",
"values": {
"max": 167772.16,
"min": 18874.37,
"avg": 37748.73,
"total": 75497.47
},
"value": 37748.73
}
]
},
{
"displayName": "ACM-LexCorp-Control",
"date": "2019-04-20T00:00:00-04:00",
"statistics": [
{
"name": "VMem",
"capacity": {
"max": 2097152,
"min": 2097152,
"avg": 2097152,
"total": 4194304
},
"relatedEntityType": "VirtualMachine",
"filters": [
{
"type": "relation",
"value": "sold"
}
]
}
]
```

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Turbonomic REST API Endpoints

{},
"units": "KB",
"values": {
  "max": 125829.12,
  "min": 18874.37,
  "avg": 37748.73,
  "total": 75497.47
},
"value": 37748.73
},
{
  "displayName": "ACM-LexCorp-Control",
  "date": "2019-04-21T00:00:00-04:00",
  "statistics": [
    {
      "name": "VMem",
      "capacity": {
        "max": 2097152,
        "min": 2097152,
        "avg": 2097152,
        "total": 4194304
      },
      "relatedEntityType": "VirtualMachine",
      "filters": [
        {
          "type": "relation",
          "value": "sold"
        }
      ],
      "units": "KB",
      "values": {
        "max": 104857.6,
        "min": 20971.52,
        "avg": 35651.59,
        "total": 71303.17
      },
      "value": 35651.59
    }
  ]
},
{
  "displayName": "ACM-LexCorp-Control",
  "date": "2019-04-22T00:00:00-04:00",
  "statistics": [
    {
      "name": "VMem",
      "capacity": {
        "max": 2097152,
        "min": 2097152,
        "avg": 2097152,
        "total": 4194304
      },
      "relatedEntityType": "VirtualMachine",
      "filters": []
    }
  ]
}
"filters": [
  {
    "type": "relation",
    "value": "sold"
  }
],
"units": "KB",
"values": {
  "max": 272629.75,
  "min": 20971.52,
  "avg": 73400.32,
  "total": 146800.64
},
"value": 73400.32
],
"displayName": "ACM-LexCorp-Control",
"date": "2019-04-23T00:00:00-04:00",
"statistics": [
  {
    "name": "VMem",
    "capacity": {
      "max": 2097152,
      "min": 2097152,
      "avg": 2097152,
      "total": 4194304
    },
    "relatedEntityId": "VirtualMachine",
    "filters": [
      {
        "type": "relation",
        "value": "sold"
      }
    ],
    "units": "KB",
    "values": {
      "max": 251658.23,
      "min": 23068.67,
      "avg": 79691.77,
      "total": 159383.55
    },
    "value": 79691.77
  }
]
Turbonomic REST API Endpoints

{  
  "displayName": "shai-redhat",
  "date": "2019-04-19T00:00:00-04:00",
  "statistics": [
    
    {  
        "name": "VMem",
        "capacity": {
            "max": 1048576,
            "min": 1048576,
            "avg": 1048576,
            "total": 2097152
        },
        "relatedEntityType": "VirtualMachine",
        "filters": [
            
            {  
                "type": "relation",
                "value": "sold"
            }
        ],
        "units": "KB",
        "values": {
            "max": 20971.52,
            "min": 0,
            "avg": 1048.58,
            "total": 2097.15
        },
        "value": 1048.58
    }
  ],
  ...  
}

Supplychains Endpoint

Turbonomic models your environment as a market of buyers and sellers. It discovers different types of entities in your environment via the targets you have configured for your installation. Discovery maps these entities to the supply chain so Turbonomic can monitor them and manage the workloads they support. For example, for a hypervisor target Turbonomic discovers VMs, the hosts and datastores that provide resources to the VMs, and the applications that use VM resources. The entities in your environment form a chain of supply and demand where some entities provide resources while others consume the supplied resources.

Using the supplychains endpoint, you can:
- Get a full or filtered supply chain related to an entity in your environment
- Get the statistics for the supply chain related to an entity in your environment
Supplychains Requests

**Getting a Supply Chain for the Specified Entity**

Gets the full supply chain for the specified entity. For example, if the UUID of a virtual machine is used, you will see the applications that are hosted by that virtual machine, the hosts and datastores that it consumes from, the cluster or datacenter that the hosts consume from, the disk arrays and storage controllers that the datastores consume from, and so on.

In a supply chain, depth refers to the distance in the supply chain from the entity called. For example, if the UUID of a host is used, virtual machines consuming from that host will have a depth of -1, applications consuming from those virtual machines will have a depth of -2, other hosts that are in the supply chain will have a depth of 0, and the cluster of the host will have a depth of 1.

**Example:** GET https://10.10.10.10/api/v3/supplychains?uuids=Virtual_ESX_4238042f-7465-e92a-5c28-a7a929307247&health=false

**Response:** A SupplychainApiDTO representing the supply chain of the specified entity - in this case, a host. Note that when there is a single instance of an entity, Turbonomic will return the details of that entity. In the response, you can see this with the DPod and Storage Controller entities.

```json
{
    "seMap": {
        "Application": {
            "depth": -2,
            "entitiesCount": 12,
            "stateSummary": {
                "ACTIVE": 5,
                "SUSPEND": 1,
                "IDLE": 6
            }
        },
        "DPod": {
            "depth": -1,
            "entitiesCount": 1,
            "stateSummary": {
                "ACTIVE": 1
            },
            "instances": {
                "c15cef94af07fccc19e303884592a4ef211764f1": {
                    "links": [
                        {
                            "rel": "self",
                            "href": "https://10.10.10.10/api/v3/entities/c15cef94af07fccc19e303884592a4ef211764f1?include_aspects=false"
                        }
                    ],
                    "uuid": "c15cef94af07fccc19e303884592a4ef211764f1",
                    "displayName": "DPOD-data-mycorp",
                    "className": "DPod",
                    "priceIndex": 1e-12,
                    "state": "ACTIVE",
                    "severity": "Normal",
                }
            }
        }
    }
}
```
Getting Statistics for a Supply Chain

Gets a list of statistics filtered by a user-created SupplyChainStatsApiInputDTO. For more information about the criteria that makes up the input for this request, see the Swagger documentation for this request, located at https://<Your_Turbonomic_IP>/vmturbo/apidoc/.

Example: POST https://10.10.168.102/api/v3/supplychains/stats

Example Input: This input will return the number of applications running on the specified UUID (in this case, a Datacenter):

```json
{
    "uuids": [
        "e27e5c2f85d91107ac3f26fd63d4478e808f590b"
    ]
}
```
Response: A list of StatSnapshotApiDTOs representing the filtered statistics for the entity:

```json
[
  {
    "date": "2019-05-01T17:45:42-04:00",
    "statistics": [
      {
        "name": "entities",
        "filters": [],
        "value": 25
      }
    ]
  }
]
```

Tags Endpoint

Tags Overview

Tags are metadata attached to resources that you can use to organize your environment. Tags are most often used to delineate resource groupings for technical, automation, business, or security purposes.

Turbonomic discovers tags for AWS, Azure, and vCenter resources.

Using the tags endpoint, you can:
- Get a list of available tags
- Get the members belonging to a specified tag

Additionally, you can use the tags-related requests in the entities endpoint to:
- Assign a tag to an entity
- Delete all tags or a single tag associated to an entity

Tags Requests

Getting Tags

For a list of tags, the API returns a list of TagApiDTOs. Each TagApiDTO will contain the key/value pair of the tag. The key can be used to see the entities belonging to the tag.
Example: https://10.10.10.10/api/v3/tags

Response:

```
[
  {
    "key": "owner",
    "values": [
      "QA_Azure"
    ]
  },
  {
    "key": "director",
    "values": [
      "p-bosh",
      "bosh-init"
    ]
  },
  ...
]
```

Filtering Tags by Scope, Entity, and Environment

Gets a filtered list of tags for the specified scope, entity type, and/or environment. For example, you can use this to find tags only in a particular cluster, tags that affect at least one VM, and/or limit your result to only cloud entities. This request accepts the following parameters:

<table>
<thead>
<tr>
<th>scopes</th>
<th>A list of UUIDs representing the scope of the request. For example, providing Market as a scope will search the entire real-time market. If you provide the UUID of a host, only entities on that host would be in the response.</th>
</tr>
</thead>
</table>
| entity_type | • BUSINESS_UNIT  
• CLOUD_SERVICE  
• CONTAINER  
• DATABASE  
• DATABASE_SERVER  
• DATACENTER  
• DISK_ARRAY  
• PHYSICAL_MACHINE  
• STORAGE  
• VIRTUAL_MACHINE  
• SWITCH  
• VIRTUAL_DATACENTER  
• CHASSIS  
• STORAGE_CONTROLLER  
• IO_MODULE  
• APPLICATION_SERVER  
• VIRTUAL_APPLICATION |
**Turbonomic REST API Endpoints**

- NETWORK
- APPLICATION
- CONTAINER
- CONTAINER_POD
- LOGICAL_POOL
- DPOD
- VPOD
- LOAD_BALANCER

**environment_type** Returns only tags from entities in the specified environment type. [Cloud, Hybrid, Onprem]

**Example:** GET https://10.10.10.10/api/v3/tags?
scales=Market&entity_type=VirtualMachine&environment_type=ONPREM

**Response:** a list of VMs running on-premises in the real-time market with tags.

### Getting Entities For A Specified Tag

**Referenced Endpoint:** [Entities](on page 58)

Gets a list of entities that have the specified tag. An entity is any device in your environment that Turbonomic manages, such as applications, physical machines, VMs, storage, and datacenters. You can use this information to see where entities with the specified tag are located, what other tags are associated to those entities, and detailed information about each entity.

**Example:** GET https://10.10.10.10/api/v3/tags/owner/entities

**Response:** A list of entities that have the tag owner:

```
[  
   {  
      "links":[  
         {  
            "rel":"self",  
            "href":https://10.10.10.10/api/v3/entities/azure::VM::375ddf
b4-3127-44eb-9088-3c7645212f81?include_aspects=false"  
         }  
      ],  
      "uuid":"azure::VM::375ddf4-3127-44eb-9088-3c7645212f81",  
      "displayName":"oleg-westus2-unmanaged-std",  
      "className":"VirtualMachine",  
      "priceIndex":3.2109845,  
      "state":"ACTIVE",  
      "severity":"Normal",  
      "costPrice":0.024,  
      "discoveredBy":{
         "uuid":_GLpj4JwIeEei_xJ5A16-rnQ",  
         "displayName":"mycorp.management.core.windows.net",  
         "type":"Azure"  
      },  
      "remoteId":"azure::VM::375ddf4-3127-44eb-9088-3c7645212f81",  
      "template":{
         "uuid":"azure::VMPROFILE::Basic_A0",  
```
"displayName":"Basic_A0",
"discovered":false
},
"environmentType":"CLOUD",
"tags":{
  "owner":[
    "PT_Azure"
  ],
  "AutoSuspend":[
    "false"
  ]
}
],
"links":[
  {
    "rel":"self",
    "href":"https://10.10.10.10/api/v3/entities/azure::VM::c94e96bf-975e-47da-8c52-7ac90161cc87?include_aspects=false"
  }
],
"uuid":"azure::VM::c94e96bf-975e-47da-8c52-7ac90161cc87",
"displayName":"oleg-westus2-managed-avail-set-1",
"className":"VirtualMachine",
"priceIndex":2.446491,
"state":"ACTIVE",
"severity":"Normal",
"costPrice":0.018,
"discoveredBy":{
  "uuid":"_GLpj4JwIEei_xJ5Ai6-rnQ",
  "displayName":"mycorp.management.core.windows.net",
  "type":"Azure"
},
"remoteId":"azure::VM::c94e96bf-975e-47da-8c52-7ac90161cc87",
"template":{
  "uuid":"azure::VMPROFILE::Standard_B1s",
  "displayName":"Standard_B1s",
  "discovered":false
},
"environmentType":"CLOUD",
"tags":{
  "owner":[
    "PT_Azure"
  ],
  "AutoSuspend":[
    "false"
  ]
}
Targets Endpoint

A target is a service that performs management functions in your virtual environment. Turbonomic uses targets to monitor workload and to execute actions in your environment.

To discover entities in your environment, you add different targets to your Turbonomic installation. Turbonomic then uses these targets to collect data from your environment.

Turbonomic uses probes to connect to targets and discover their entities. The Turbonomic GUI provides forms for users to specify different target instances. Note that each probe may require different settings, and it's possible that different versions of Turbonomic supports different sets of probes.

For complete target information, review the Turbonomic Target Configuration Guide. You should not modify targets without a full understanding of how they interact with Turbonomic.

Using the targets endpoint of the Turbonomic API, you can:

• Getting a single target or list of targets present in your environment
• Getting a list of probes available in your Turbonomic installation
• Getting the actions or statistics for a target
• Getting the workflows discovered by a target
• Adding or editing a target
• Triggering validation or rediscovery on a target
• Deleting a target

Targets Utility Requests

Utility requests provide metadata that you can use to make related requests, assemble inputDTOs, or see the potential values of a particular DTO.

The targets endpoint contains a utility request called specs that shows the information required for probe registry for each target available to Turbonomic, including required input fields and expected target type and category values.

NOTE:
For a list of probes available to your specific Turbonomic installation, review your organization's licensing agreement.

Example: GET https://10.10.10.10/api/v3/targets/specs

Response: An array of TargetApiDTO objects, where each object contains an array of input fields. This example shows one entry for the JVM probe in the Application Server category.

```json
[
  {
    "category":"Application Server",
    "identifyingFields":{
      "nameOrAddress"
    },
    "inputFields":[
```
Turbonomic REST API Endpoints

{
  "displayName":"Scope/Address",
  "name":"nameOrAddress",
  "isMandatory":true,
  "isSecret":false,
  "valueType":"GROUP_SCOPE",
  "description":"The group of VMs or the address of the JVM server"
},
{
  "displayName":"Port Number",
  "name":"targetPort",
  "defaultValue":"1099",
  "isMandatory":true,
  "isSecret":false,
  "valueType":"NUMERIC",
  "description":"The JMX port that connects with the JVM server"
},
{
  "displayName":"Username",
  "name":"username",
  "isMandatory":true,
  "isSecret":false,
  "valueType":"STRING",
  "description":"The JVM server JMX password, enter a space if the server has no security"
},
{
  "displayName":"Password",
  "name":"password",
  "isMandatory":true,
  "isSecret":true,
  "valueType":"STRING",
  "description":"The JVM server JMX port, enter a space if the server has no security"
}
},
"type":"JVM"
},
...
]

Targets Requests

Target requests handle creation, configuration, validation, rediscovery, and deletion of targets on your Turbonomic appliance.

Getting Targets
For a list of targets, the API returns an array of TargetApiDTO objects. Each TargetApiDTO object will contain the validation status, target type and category, and input field names and values. To get a single target, include the UUID of the target in the request.

This request takes the following parameters:

- **environment_type** Returns only targets in the specified environment type. [ Cloud, Hybrid, Onprem ]

**Examples:**
- **All Targets:** GET https://10.10.10.10/api/v3/targets
- **Single Target:** GET https://10.10.10.10/api/v3/targets/__xwWYAE33eku7PbzHdETIA

**Response:** A single entry in an array of targets. Notice that the password field is secret, so the response does not contain the password value.

```json
[
  {
    "uuid": "__xwWYAE33eku7PbzHdETIA",
    "category": "Hypervisor",
    "type": "vCenter",
    "status": "Validated",
    "lastValidated": "2018-06-26T14:25:08-04:00",
    "inputFields": [
      {
        "displayName": "Address",
        "name": "address",
        "value": "vsphere-demo.mycorp.com",
        "isMandatory": true,
        "isSecret": false,
        "valueType": "STRING",
        "description": "IP or address of vCenter Server",
        "verificationRegex": ".*"
      },
      {
        "displayName": "Username",
        "name": "username",
        "value": "corp\my.user",
        "isMandatory": true,
        "isSecret": false,
        "valueType": "STRING",
        "description": "User name to use to connect to a target",
        "verificationRegex": ".*"
      },
      {
        "displayName": "Password",
        "name": "password",
        "isMandatory": true,
        "isSecret": true,
        "valueType": "STRING",
        "description": "Password to use to connect to a target",
        "verificationRegex": ".*"
      }
    ]
  }
]
Adding a Target

Adds a target to your Turbonomic installation. You must pass a completed TargetApiDTO object as an inputDTO. For more information about the required fields of the TargetApiDTO for the target you want to add, execute the /targets/specs utility request.

Example: POST https://10.10.174.149/api/v3/targets

Example inputDTO:

```json
{
   "category":"Hypervisor",
   "inputFields":[
      {
         "name":"username",
         "value":"corp\my.name"
      },
      {
         "name":"password",
         "value":"Octopath"
      },
      {
         "name":"nameOrAddress",
         "value":"10.10.10.10"
      }
   ],
   "type":"vCenter"
}
```

Rediscover or Validate All Targets

Manually triggers a full rediscovery or validation of all targets in your environment. This is often done to immediately see multiple changes that would normally not be reflected until a daily full discovery is performed, such as displaying updated Orchestrator workflows.

This call takes the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>validate</td>
<td>When true, validates all targets in your environment</td>
</tr>
<tr>
<td>rediscover</td>
<td>When true, performs a full rediscovery on all targets in your environment</td>
</tr>
</tbody>
</table>

Examples:

- Rediscovery:
  POST https://10.10.10.10/api/v3/targets?validate=true

- Validation:
  POST https://10.10.10.10/api/v3/targets?rediscover=true

Rediscover or Validate A Single Target
Manually triggers a full rediscovery or validation of a single target in your environment. This is often done to immediately see a change that would normally not be reflected until a daily full discovery is performed, such as displaying updated Orchestrator workflows.

This call takes the following parameters:

<table>
<thead>
<tr>
<th>validate</th>
<th>When true, validates the specified target</th>
</tr>
</thead>
<tbody>
<tr>
<td>rediscover</td>
<td>When true, performs a full rediscovery on the specified target</td>
</tr>
</tbody>
</table>

Examples:

- **Rediscovery**: https://10.10.10.10/api/v3/targets/__xwWYAE33eku7PbzHdETIA?rediscover=true
- **Validation**: https://10.10.10.10/api/v3/targets/__xwWYAE33eku7PbzHdETIA?validate=true

Response: The TargetApiDTO object of the specified target:

```json
{
  "uuid": "__xwWYAE3EeiNKPbzHdETIA",
  "category": "Hypervisor",
  "inputFields": [
    ...
  ],
  "lastValidated": "2018-06-27T21:45:56-04:00",
  "status": "Validated",
  "type": "vCenter"
}
```

**Editing Target Input Fields**

Edits the input fields of an existing target, and accepts the modified TargetApiDTO as input.

**NOTE:** You can GET the target first using the GET /targets/specs to see the fields required for that target. Note that you must pass all input fields in the modified TargetApiDTO object.

Example: PUT https://10.10.10.10/api/v3/targets/_HgzQ4CdCEeaUWYEyo3vsyw

Example input, editing the username for a single target:

```json
[
  {
    "uuid": "_HgzQ4CdCEeaUWYEyo3vsyw",
    "category": "Hypervisor",
    "type": "vCenter",
    "status": "Validated",
    "lastValidated": 1474575346109,
    "inputFields": [
      {
        "displayName": "Address",
        "name": "address",
        "value": "vsphere.mycorp.com",
        "isMandatory": true,
        "isSecret": false,
```

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Deleting a Target

Deletes the specified target and removes all entities managed by that target. This will also remove any pending actions related to the deleted target.

**Example:** DELETE https://10.10.10.10/api/v3/targets/__xwWYAE3EeiNKPbzHdETIA

**Response:** A successful deletion request returns a Response Code of 200.

Actions For a Specified Target

*Referenced Endpoint: Actions (on page 26)*

These requests get full or filtered lists of actions per target for use in reports, or to find a particular action.

**NOTE:** Once you have the action UUID, you can use requests from the actions endpoint to post changes to that action.

Getting an Unfiltered Array of Actions

Gets a list of current actions in your environment associated to entities discovered by the specified target.

**Example:** GET https://10.10.10.10/api/v3/targets/__xwWYAE3EeiNKPbzHdETIA/actions

Getting a Filtered Array of Actions

Gets a filtered list of actions discovered by a single target. Pass an inputDTO containing one or more of the following criteria:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
</table>
| actionModeList | - **DISABLED:**
|                | Do not recommend or perform the action. When you disable an action, the user interface will no longer display actions of that type. |
## Turbonomic REST API Endpoints

### Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>RECOMMENDED:</strong></td>
<td>Recommend the action so a user can execute it via the given hypervisor or by other external means.</td>
</tr>
<tr>
<td>• <strong>MANUAL:</strong></td>
<td>Recommend the action, and provide the option to execute that action through the Turbonomic user interface or an /actions API request.</td>
</tr>
<tr>
<td>• <strong>AUTOMATED:</strong></td>
<td>You have directed Turbonomic to execute the action automatically.</td>
</tr>
<tr>
<td>• <strong>COLLECTION (UNUSED):</strong></td>
<td>Legacy action mode, no longer used.</td>
</tr>
</tbody>
</table>

### actionStateList

- **DISABLED:**
  - An action whose policy has been disabled.
- **RECOMMEND:**
  - An action that cannot be automated due to policy settings or must be executed outside the system, such as the purchase of hardware.
- **PENDING_ACCEPT:**
  - When the action mode is set to manual, a recommended action that has not been accepted or cleared.
- **ACCEPTED:**
  - An action that has been accepted, but is not yet in progress.
- **IN_PROGRESS:**
  - An action that is being executed.
- **SUCCEEDED:**
  - An action that was accepted and completed successfully.
- **FAILED:**
  - An action that was accepted and did not complete successfully.
- **REJECTED:**
  - When the action mode is set to manual, an action that has been rejected by the user.
- **CLEARED:**
  - When the action mode is set to manual, an action that is no longer recommended by the market.
- **ACCOUNTING:**
  - For cloud entities, an action to resize in order to use a different instance template.
- **QUEUED:**
  - When more than 10 actions are to be executed for a single target, Turbonomic will place the 11th and all subsequent actions into a QUEUED state, and they will execute as the previous actions complete.

### actionTypeList

- **START:**
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start an entity, and add it to the Turbonomic market.</td>
<td></td>
</tr>
<tr>
<td>MOVE:</td>
<td>Move an entity from one provider to another. For example, moving a VM between hosts, or a datastore between disk arrays.</td>
</tr>
<tr>
<td>SUSPEND:</td>
<td>Remove capacity from your environment. Suspended entities are not removed from the environment, but will not be used in market decisions. Based on market conditions, suspended entities can be started, re-adding them to the market.</td>
</tr>
<tr>
<td>ADD PROVIDER:</td>
<td>This is equivalent to the START action, but for storage entities.</td>
</tr>
<tr>
<td>CHANGE:</td>
<td>Move a virtual machine's storage between datastores.</td>
</tr>
<tr>
<td>PROVISION:</td>
<td>Add capacity to your environment.</td>
</tr>
<tr>
<td>RECONFIGURE:</td>
<td>When a VM is not able to correct a misconfiguration via another type of action. For example, if a placement policy requires a VM to move to a host on a particular cluster, but cross-cluster moves are not permitted.</td>
</tr>
<tr>
<td>DELETE:</td>
<td>This is equivalent to the SUSPEND action, but for storage entities.</td>
</tr>
<tr>
<td>RESERVE_ON_PM:</td>
<td>When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular host.</td>
</tr>
<tr>
<td>RESERVE_ON_DS:</td>
<td>When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular datastore.</td>
</tr>
<tr>
<td>RESIZE_FOR_EFFICIENCY:</td>
<td>A resize that reduces the capacity of a commodity, such as vCPU, or vMEM.</td>
</tr>
<tr>
<td>RESIZE_FOR_PERFORMANCE:</td>
<td>A resize that increases the capacity of a commodity, such as vCPU, or vMEM.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>cleared</th>
<th>Default: false. When true, actions that were removed from the action list before being executed will be returned.</th>
</tr>
</thead>
</table>
| costType | • Saving  
An action that will decrease cloud spending.  
• Investment  
An action that will increase cloud spending. |
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cumulative</td>
<td>Default: false. When true, shows the savings for each action in a scope as a cumulative total, rather than showing the savings for individual actions.</td>
</tr>
<tr>
<td>environmentType</td>
<td>• ONPREM:</td>
</tr>
<tr>
<td></td>
<td>Returns only actions related to entities that are part of your on-premises environment.</td>
</tr>
<tr>
<td></td>
<td>• CLOUD:</td>
</tr>
<tr>
<td></td>
<td>Returns only actions related to entities that are part of your cloud environment.</td>
</tr>
<tr>
<td>groupBy</td>
<td>You may group the actions returned by the following criteria: [actionModes, actionStates, actionTypes, risk, riskSeverity, riskSubCategory]</td>
</tr>
<tr>
<td>hasReservedInstance</td>
<td>Default: false. When true, only actions that are related to reserved instances will be returned.</td>
</tr>
<tr>
<td>relatedEntityTypes</td>
<td>Returns only actions related to entities of these types within the scope. For example, if your scope is a virtual datacenter and you specify VirtualMachine as a related entity type, the request will include only those actions related to VMs in the specified virtual datacenter. Choose from the following entity types: [Datacenter, PhysicalMachine, VirtualMachine, Storage, Application, Chassis, DiskArray, IOModule, StorageControl, Switch, VirtualDataCenter, VPod, DPod, Container, Database, DatabaseServerContainer, LogicalPool]</td>
</tr>
<tr>
<td>riskSeverityList</td>
<td>Returns only actions of the given severities. [Unknown, Normal, Minor, Major, Critical]</td>
</tr>
<tr>
<td>riskSubCategoryList</td>
<td>Returns only actions of the given subcategories. [Performance Assurance, Efficiency Improvement, Prevention, Compliance]</td>
</tr>
</tbody>
</table>

**Example:** POST https://10.10.10.10/api/v3/targets/__xwWyAE3EeiNKpzbHdETIA/actions

Example inputDto, filtering for actions that are pending acceptance:

```json
{
  "actionStateList": [
    "PENDING_ACCEPT"
  ]
}
```

**Response:** An array of actions applicable to the specified target that are in the PENDING_ACCEPT state.

```json
[
  {
    "links": [
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/actions/_uictIJuHEeics6ASqJ-kdg"
      },
      {
        "rel": "self",
        "href": "https://10.10.10.10/api/v3/actions/2204259249360"
      }
    ]
  }
]```
Turbonomic REST API Endpoints

],
"uuid":"_uictIJuHEeics6ASgJ-kdg",
"createTime":"2018-08-08T23:53:08-04:00",
"actionType":"RIGHT_SIZE",
"actionState":"PENDING_ACCEPT",
"actionMode":"MANUAL",
"details":"Scale down VMem for VirtualMachine btc-1 from 8 GB to 7 GB",
"importance":0,
"target":{
"uuid":"4223dcd6-0b28-6ae6-1066-689912ced3a1",
"displayName":"btc-1",
"className":"VirtualMachine",
"aspects":{
"virtualMachineAspect":{
"os":"Other Linux (64-bit)",
"connectedNetworks":[
{
"uuid":"74c91ba4fa390030f47f91e6e1ee77ff7b4db353",
"displayName":"VM Network"
}
],
"numVCPUs":1,
"ebsOptimized":false
}
},
"environmentType":"ONPREM"
},
"currentEntity":{
"uuid":"_ui4yAZuHEeics6ASgJ-kdg",
"className":"VMem"
},
"newEntity":{
"uuid":"_ui4yA5uHEeics6ASgJ-kdg",
"className":"VMem"
},
"currentValue":"8388608.0",
"newValue":"7340032.0",
"resizeToValue":"7340032.0",
"risk":{
"uuid":"_ujB78ZuHEeics6ASgJ-kdg",
"subCategory":"Efficiency Improvement",
"description":"Underutilized VMem in Virtual Machine 'btc-1'",
"severity":"MINOR",
"reasonCommodity":"VMem",
"importance":0
},
"stats":[
{
"name":"costPrice",
"filters":[
{
"type":"savingsType",
"value":"savings"
}
],

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Entities For a Specified Target

Referenced Endpoint: Entities (on page 58)

Gets a list of entities discovered by the specified target. This is used most often for reporting, dashboard, or inventory purposes.

Getting An Array of Entities

Gets a list of all entities discovered by the specified target. An entity is any device in your environment that Turbonomic manages, such as applications, physical machines, VMs, storage, and datacenters.

Example: GET https://10.10.10.10/api/v3/targets/__xwWYAE3EeiNKPbzHdETIA/actions

Response: An array of EntityApiDTO objects belonging to a vCenter target:

```json
[  {    "links":[      {        "rel":"self",        "href":"https://10.10.10.10/api/v3/entities/vsphere-mycorp.com-ResourcePool-resgroup-8?include_aspects=false"      }    ],    "uuid":"vsphere-mycorp.com-ResourcePool-resgroup-8",    "displayName":"Resources-Cluster1",    "className":"VirtualDataCenter",    "priceIndex":1e-12,    "state":"ACTIVE",    "severity":"Normal",    "discoveredBy":{      "uuid":"__xwWYAE3EeiNKPbzHdETIA",      "displayName":"vsphere-mycorp.com",      "type":"vCenter"    },    "remoteId":"resgroup-8",    "environmentType":"ONPREM"  },  {    "links":[      {        "rel":"self",      "href":null    }    ]  }]
```
Templates Endpoint

Turbonomic uses templates to reserve resources and deploy workload in your environment, to calculate supply or demand changes in a plan, and to calculate workloads for cloud environments.

Using the templates endpoint, you can:

- Get a list of templates available to your Turbonomic appliance
- Get information needed to create templates, such as supported OSes and CPUs
- Create a template
- Edit and Delete templates

Templates Utility Requests

Utility requests provide metadata that you can use to make related requests, assemble inputDTOs, or see the potential values of a particular DTO.

The templates endpoint contains utility requests that show the possible values for several optional fields used to create detailed templates. These can be used to find the supported cloud OSes and CPU models.

Getting a List of CPU Models

Gets a list of valid CPU Models. If given a CPU Model, Turbonomic can more accurately reflect your CPU capacity in market decisions.

Example: GET https://10.10.10.10/api/v3/templates/physicalmachine/cpumodels
**Result:** A list of CpuModelApiDTOs, describing the cores, speed, and internal scaling factor for each CPU. This information will be used to provide more granular CPU data, if passed as part of a TemplateApiInputDTO:

```
[  
  {  
    "numCores": 4,  
    "speed": 3500,  
    "scalingFactor": 1.116909571123129,  
    "modelName": "AMD A10 PRO-7800B"  
  },  
  {  
    "numCores": 4,  
    "speed": 3700,  
    "scalingFactor": 0.9745581799084503,  
    "modelName": "AMD A10 PRO-7850B"  
  },  
  ...
  {  
    "numCores": 8,  
    "speed": 1415,  
    "scalingFactor": 1.1638948014750774,  
    "modelName": "UltraSPARC T2 Plus"  
  }
]
```

**Templates Requests**

Template requests handle creation, configuration, editing and deletion of templates on your Turbonomic appliance.

**Getting a List of Templates**

Gets a list of templates available to your Turbonomic instance. This list will include both templates discovered from underlying targets and those created through the Turbonomic UI. To get a specific template, pass the template UUID as part of the request.

**Examples:**

- **All Templates:** GET https://10.10.10.10/api/v3/templates
- **Single Target:** GET https://10.10.10.10/api/v3/templates/_v0Q70MpiEd-hypXfJzX8Wg

**Response:** A list of TemplateApiDTOs:

```
[
  {  
    "links": [  
      
      {  
        "rel": "self",  
        "href": "https://10.10.10.10/api/v3/templates/_v0Q70MpiEd-hypXfJzX8Wg"
      }  
    ]  
  },  
  "uuid": "_v0Q70MpiEd-hypXfJzX8Wg",
]```
"displayName": "Small",
"className": "PhysicalMachineProfile",
"price": 5000,
"computeResources": [ 
{
   "stats": [
   {
      "name": "numOfCores",
      "value": 4
   },
   {
      "name": "cpuSpeed",
      "units": "MHz",
      "value": 2992
   },
   {
      "name": "ioThroughputSize",
      "units": "MB/s",
      "value": 890
   },
   {
      "name": "memorySize",
      "units": "MB",
      "value": 32759
   },
   {
      "name": "networkThroughputSize",
      "units": "MB/s",
      "value": 512
   }
   ]
 },

],
"infrastructureResources": [ 
{
   "stats": [
   {
      "name": "powerSize",
      "value": 1
   },
   {
      "name": "spaceSize",
      "value": 1
   },
   {
      "name": "coolingSize",
      "value": 1
   }
   ]
 },
"discovered": false
],
"links": [ 

Turbonomic REST API Endpoints

```
{
    "rel": "self",
    "href": "https://10.10.10.10/api/v3/templates/_v0Q70cpiEd-hypXfJzX8Wg"
}
]
"uuid": "_v0Q70cpiEd-hypXfJzX8Wg",
"displayName": "Medium",
"className": "PhysicalMachineProfile",
"price": 10000,
"computeResources": [

    {
        "stats": [
            {
                "name": "numOfCores",
                "value": 4
            },
            {
                "name": "cpuSpeed",
                "units": "MHz",
                "value": 2992
            },
            {
                "name": "ioThroughputSize",
                "units": "MB/s",
                "value": 1780
            },
            {
                "name": "memorySize",
                "units": "MB",
                "value": 65519
            },
            {
                "name": "networkThroughputSize",
                "units": "MB/s",
                "value": 512
            }
        ]
    }
]

"infrastructureResources": [

    {
        "stats": [
            {
                "name": "powerSize",
                "value": 1
            },
            {
                "name": "spaceSize",
                "value": 1
            },
            {
                "name": "coolingSize",
                "value": 1
            }
        ]
    }

```

Creating a Template

Creates a template for use in your environment. You must pass a completed TemplateApiInputDTO as the inputDTO. You can create templates for virtual machines, physical machines, storage, and containers.

Example: POST https://10.10.10.10/api/v3/templates

Example inputs:

<table>
<thead>
<tr>
<th>Template Type</th>
<th>Example Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container</td>
<td>{</td>
</tr>
<tr>
<td></td>
<td>&quot;computeResources&quot;: [</td>
</tr>
<tr>
<td></td>
<td>{</td>
</tr>
<tr>
<td></td>
<td>&quot;stats&quot;: [</td>
</tr>
<tr>
<td></td>
<td>{</td>
</tr>
<tr>
<td></td>
<td>&quot;name&quot;: &quot;ioThroughput&quot;,</td>
</tr>
<tr>
<td></td>
<td>&quot;value&quot;: 0</td>
</tr>
<tr>
<td></td>
<td>},</td>
</tr>
<tr>
<td></td>
<td>{</td>
</tr>
<tr>
<td></td>
<td>&quot;name&quot;: &quot;networkThroughput&quot;,</td>
</tr>
<tr>
<td></td>
<td>&quot;value&quot;: 0</td>
</tr>
<tr>
<td></td>
<td>},</td>
</tr>
<tr>
<td></td>
<td>{</td>
</tr>
<tr>
<td></td>
<td>&quot;name&quot;: &quot;memorySize&quot;,</td>
</tr>
<tr>
<td></td>
<td>&quot;value&quot;: 8192</td>
</tr>
<tr>
<td></td>
<td>},</td>
</tr>
<tr>
<td></td>
<td>{</td>
</tr>
<tr>
<td></td>
<td>&quot;name&quot;: &quot;cpuSpeed&quot;,</td>
</tr>
<tr>
<td></td>
<td>&quot;value&quot;: 1536</td>
</tr>
<tr>
<td></td>
<td>}</td>
</tr>
<tr>
<td></td>
<td>},</td>
</tr>
<tr>
<td></td>
<td>&quot;storageResources&quot;: [</td>
</tr>
<tr>
<td></td>
<td>{</td>
</tr>
<tr>
<td></td>
<td>&quot;stats&quot;: [</td>
</tr>
<tr>
<td></td>
<td>{</td>
</tr>
<tr>
<td></td>
<td>&quot;name&quot;: &quot;diskSize&quot;,</td>
</tr>
<tr>
<td></td>
<td>&quot;value&quot;: 20</td>
</tr>
<tr>
<td></td>
<td>}</td>
</tr>
<tr>
<td></td>
<td>}</td>
</tr>
<tr>
<td></td>
<td>},</td>
</tr>
</tbody>
</table>
|               |   "className": "ContainerProfile" |}
<table>
<thead>
<tr>
<th>Template Type</th>
<th>Example Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Machine</td>
<td>`{ &quot;cpuModel&quot;: &quot;AMD A10-5700&quot;, &quot;computeResources&quot;: [ { &quot;stats&quot;: [ { &quot;name&quot;: &quot;ioThroughputSize&quot;, &quot;value&quot;: 1000 }, { &quot;name&quot;: &quot;networkThroughputSize&quot;, &quot;value&quot;: 1000 }, { &quot;name&quot;: &quot;memorySize&quot;, &quot;value&quot;: 8192 }, { &quot;name&quot;: &quot;numOfCores&quot;, &quot;value&quot;: 4 }, { &quot;name&quot;: &quot;cpuSpeed&quot;, &quot;value&quot;: &quot;3400&quot; } ] } ], &quot;price&quot;: 0, &quot;className&quot;: &quot;PhysicalMachineProfile&quot;, &quot;displayName&quot;: &quot;HostTemplate1&quot; }</td>
</tr>
<tr>
<td>Storage</td>
<td>`{ &quot;storageResources&quot;: [ { &quot;stats&quot;: [ { &quot;name&quot;: &quot;diskIops&quot;, &quot;value&quot;: 250 }, { &quot;name&quot;: &quot;diskSize&quot;, &quot;value&quot;: 750 } ] } ] }</td>
</tr>
</tbody>
</table>
**Template Type** | **Example Input**
---|---

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

```json

Virtual Machine

{
    "computeResources": [
        {
            "stats": [
                {
                    "name": "ioThroughput",
                    "value": 0
                },
                {
                    "name": "networkThroughput",
                    "value": 500
                },
                {
                    "name": "memorySize",
                    "value": 4096
                },
                {
                    "name": "memoryConsumedFactor",
                    "value": 70
                },
                {
                    "name": "numOfCpu",
                    "value": 2
                },
                {
                    "name": "cpuSpeed",
                    "value": 1024
                },
                {
                    "name": "cpuConsumedFactor",
                    "value": 75
                }
            ]
        },
        {
            "type": "disk",
            "stats": [
                {
                    "name": "diskIops",
                    "value": 270
                },
                {
                    "name": "diskThroughput",
                    "value": 500
                },
                {
                    "name": "diskSize",
                    "value": 4096
                }
            ]
        }
    ],
    "storageResources": [
        {
            "type": "disk",
            "stats": [
                {
                    "name": "diskIops",
                    "value": 270
                },
                {
                    "name": "diskThroughput",
                    "value": 500
                },
                {
                    "name": "diskSize",
                    "value": 4096
                }
            ]
        }
    ]
}
```
Response: The TemplateApiInputDTO for the template created. In this case, a virtual machine template:

```json
{
    "uuid": "_lmaQoLUTeEei5nORDMStFGA",
    "displayName": "VirtualMachineTemplate1",
    "className": "VirtualMachineProfile",
    "computeResources": [
        {
            "stats": [
                {
                    "name": "numOfCpu",
                    "value": 2.0
                },
                {
                    "name": "cpuSpeed",
                    "units": "MHz",
                    "value": 1024.0
                },
                {
                    "name": "cpuConsumedFactor",
                    "units": "%",
                    "value": 75.0
                },
                {
                    "name": "memorySize",
                    "units": "MB",
                    "value": 4096.0
                },
                {
                    "name": "memoryConsumedFactor",
                    "units": "%",
                    "value": 70.0
                }
            ]
        }
    ]
}
```


```
{
    "name": "ioThroughput",
    "units": "MB/s",
    "value": 0.0
},
{
    "name": "networkThroughput",
    "units": "MB/s",
    "value": 500.0
}
],
"storageResources": [
    {
        "stats": [
            {
                "name": "diskIops",
                "value": 50.0
            },
            {
                "name": "diskSize",
                "units": "GB",
                "value": 20.0
            },
            {
                "name": "diskConsumedFactor",
                "units": "%",
                "value": 70.0
            }
        ],
        "type": "disk"
    }
},
"deploymentProfile": {
    "uuid": "_llbZMrUtEei5nORDMStFGA",
    "displayName": "VirtualMachineTemplate1_DeploymentProfile",
    "className": "ServiceCatalogItem",
    "deployParameters": [
        {
            "targetType": "vCenter",
            "providers": [
                {
                    "provider": {
                        "uuid": "dfe657268310d8b128d441b2a34ec0721e72ee7e",
                        "displayName": "Development DC7",
                        "className": "DataCenter",
                        "discoveredBy": {
                            "uuid": "_OjF3UJwFEEi_xJ5Ai6-rnQ",
                            "displayName": "vsphere-dc7.mycorp.com",
                            "type": "vCenter"
                        }
                    }
                }
            ],
            "parameters": [  
```
Editing a Template

Edits a user-created template, given the template UUID and the edited DTO. To edit discovered templates, edit them on the target from which they originate. Note that you must pass a complete TemplateApiDTO with the edited fields.

Example: PUT https://10.10.10.10/api/v3/templates/_lmaQoLUTei5nORDMStFGA

Example input: Note that both the `displayName` and `diskConsumedFactor` values were changed:

```json
{
  "computeResources": [
    {
      "stats": [
        {
          "name": "ioThroughput",
          "value": 0
        },
        {
          "name": "networkThroughput",
          "value": 500
        },
        {
          "name": "memorySize",
          "value": 4096
        },
        {
          "name": "memoryConsumedFactor",
          "value": 70
        },
        {
          "name": "numOfCpu",
          "value": 2
        },
        {
          "name": "cpuSpeed",
```
Response: The modified TemplateApiDTO reflecting the submitted changes.

Deleting a Template

Deletes the specified template. This will not delete associated deployment profiles, and deployments already scheduled to use this template will not succeed.

Example: DELETE https://10.10.10.10/api/v3/templates/_lmaQoLUtEei5nORDMStFGA

Response: A successful deletion will return true.

Workflows Endpoint

When added to your Turbonomic installation, Orchestrator targets assign workflows that execute multiple actions to make changes in your environment. Turbonomic discovers workflows that you have defined on the orchestrator. You can then set up an automation policy that maps workflows to actions. If the action mode is Manual or Automatic, then when Turbonomic recommends the action, it will direct the orchestrator to use the mapped workflow to execute it.
For more information about specific Orchestrator targets, see the Target Configuration Guide. For more information about execution of workflows, see the User Guide.

Using the workflows endpoint, you can:
- Get a list of all workflows
- Get detailed information about a specified workflow

## Workflows Requests

### Getting Workflows

For a list of workflows, the API returns an array of WorkflowApiDTOs. Each WorkflowApiDTO object will contain detailed information about that workflow, including description and parameters. To get a single workflow, include the UUID of the workflow in the request.

This call takes the following parameter:

<table>
<thead>
<tr>
<th>type</th>
<th>Filters the request by type of workflow. [ UCSD, AWS_Service_Catalog ]</th>
</tr>
</thead>
</table>

**Examples:**
- **All Workflows:** GET https://10.10.10.10/api/v3/workflows
- **Single Workflow:** GET https://10.10.10.10/api/v3/workflows/UCSD-WF-ucsd.eng.mycorp.com-103

**Response:**

```
[
  {
    "links": [
      {
        "rel": "self",
      }
    ],
    "uuid": "UCSD-WF-ucsd.eng.mycorp.com-103",
    "displayName": "APIC Container Delete Firewall Rule Action",
    "className": "Workflow",
    "actionType": "NONE",
    "parameters": [
      {
        "name": "APIC_TENANT_L4L7_EPG_ACE_IDENTITY",
        "isMandatory": true,
        "isSecret": false,
        "specificValueType": "ApicTenantL4L7EPGAceIdentity"
      },
      {
        "name": "L4L7Identity",
        "isMandatory": true,
        "isSecret": false,
        "specificValueType": "gen_text_input"
      }
    ]
  }
]
```
Getting Workflows of a Specific Type

By adding the type parameter to the /api/v3/workflows request, you can filter workflows from a specific source. For example, the response to this request will be an array of WorkflowApiDTOs discovered through UCS Director targets:

Appendix I: Internal Turbonomic API Requests

Internal Requests are requests that are used internally by Turbonomic, but are not intended for customer use. The structure data returned by these requests is subject to change without notice.

The following requests have been marked as Internal Only:

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Request</th>
</tr>
</thead>
</table>
| /entities | DELETE /entities/loggingEntities  
PUT /entities/{entity_Uuids}/loggingEntities  
GET /entities/{entity_Uuid}/aspects/{aspect_name}/actions  
POST /entities/{entity_Uuid}/aspects/{aspect_name}/actions  
GET /entities/{entity_Uuid}/aspects/{aspect_name}/stats  
POST /entities/{entity_Uuid}/aspects/{aspect_name}/stats  
POST /entities/{entity_Uuid}/tags  
DELETE /entities/{entity_Uuid}/tags  
DELETE /entities/{entity_Uuid}/tags/{tag_key} |
| /groups | GET /groups/{group_Uuid}/aspects/{aspect_name}/actions  
POST /groups/{group_Uuid}/aspects/{aspect_name}/actions  
GET /groups/{group_Uuid}/aspects/{aspect_name}/stats  
POST /groups/{group_Uuid}/aspects/{aspect_name}/stats  
POST /groups/{group_Uuid}/notifications/stats  
POST /groups/{group_Uuid}/tags  
DELETE /groups/{group_Uuid}/tags  
DELETE /groups/{group_Uuid}/tags/{tag_key} |
| /markets | PUT /markets/{market_Uuid}/policies/{policy_Uuid} |
### Appendix I: Internal Turbonomic API Requests

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Request</th>
</tr>
</thead>
<tbody>
<tr>
<td>/reports</td>
<td>POST /reports/templates</td>
</tr>
<tr>
<td>/scenarios</td>
<td>PUT /scenarios/{scenario_Uuid}</td>
</tr>
<tr>
<td></td>
<td>PUT /scenarios/{scenario_Uuid}/entities/{entity_Uuid}</td>
</tr>
<tr>
<td></td>
<td>DELETE /scenarios/{scenario_Uuid}/entities/{entity_Uuid}</td>
</tr>
<tr>
<td></td>
<td>PUT /scenarios/{scenario_Uuid}/groups/{group_Uuid}</td>
</tr>
<tr>
<td></td>
<td>PUT /scenarios/{scenario_Uuid}/policies</td>
</tr>
<tr>
<td></td>
<td>DELETE /scenarios/{scenario_Uuid}/policies/{policy_Uuid}</td>
</tr>
<tr>
<td></td>
<td>PUT /scenarios/{scenario_Uuid}/templates/{template_name}</td>
</tr>
<tr>
<td>/widgetsets</td>
<td>The entire /widgetsets endpoint is Internal Only.</td>
</tr>
</tbody>
</table>
Appendix II: Scenario Peak-of-Peak Full Scenario Input DTO

For reference purposes, see below for a complete input DTO for a Peak of Peaks plan.

```json
{
  "uuid":"XXXXDemo",
  "displayName":"XXXXDemo",
  "owners":[
    {
      "uuid":"_4T_7kwY-Ed-WUKbEYSVIDw",
      "username":"administrator",
      "showSharedUserSC":false
    }
  ],
  "type":"PEAKOFPEAKS",
  "scope":[
    {
      "uuid":"_PE0v-YEUEee_hYfzgV9uYg",
      "displayName":"All On-prem Hosts",
      "className":"All On-prem Hosts"
    }
  ],
  "topologyChanges":{
  },
  "loadChanges":{
    "maxUtilizationList":[
      {
        "maxPercentage":70,
        "projectionDay":0,
        "target":{
          "displayName":"All On-prem Hosts",
          "className":"Group",
          "uuid":"_PE0v-YEUEee_hYfzgV9uYg"
        }
      }
    ]
  }
}
```

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Appendix II: Scenario Peak-of-Peak Full Scenario Input DTO

```json

"overlayStatsList": [

  {
    "uuid":"4223ae0c-c99b-f6ca-c1ef-3f367bdf5528",
    "displayName":"centos_imp_2",
    "className":"VirtualMachine",
    "environmentType":"ONPREM",
    "stats": [
      {
        "displayName":"centos_imp_2",
        "date":"2019-02-01T00:00:00-05:00",
        "statistics": [
          {
            "displayName":"centos_imp_2",
            "date":"2019-03-14T15:12:36-04:00",
            "statistics": [
              {
                "name": "priceIndex",
                "values": {
                  "max": 20000,
                  "min": 20000,
                  "avg": 20000,
                  "total": 20000
                }
              },
              {
                "name": "CPUProvisioned",
                "capacity": {
                  "max": 104000,
                  "min": 104000,
                  "avg": 104000,
                  "total": 104000
                }
              },
              {
                "name": "relatedEntity",
                "uuid": "Virtual_ESX_4238255f-86cc-4cb9-0f47-11ff689f0b22",
                "displayName": "hp-esx4.dev.mycorp.com",
                "className": "PhysicalMachine"
              }
            ]
          }]
        }
      }
    ]
  }
```

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Appendix II: Scenario Peak-of-Peak Full Scenario Input DTO

```
{
  "name": "Mem",
  "capacity": {
    "max": 16776692,
    "min": 16776692,
    "avg": 16776692,
    "total": 16776692
  },
  "filters": [
    {
      "type": "relation",
      "value": "bought"
    }
  ],
  "relatedEntity": {
    "uuid": "Virtual_ESX_4238255f-86cc-4cb9-0f47-11ff689f0b22",
    "displayName": "hp-esx4.dev.mycorp.com",
    "className": "PhysicalMachine"
  },
  "units": "KB",
  "values": {
    "max": 3555836,
    "min": 3554799.8,
    "avg": 3554799.8,
    "total": 3554799.8
  },
  "value": 3554799.8
},
{
  "name": "MemProvisioned",
  "capacity": {
    "max": 167766912,
    "min": 167766912,
    "avg": 167766912,
    "total": 167766912
  },
  "filters": [
    {
      "type": "relation",
      "value": "bought"
    }
  ],
  "relatedEntity": {
    "uuid": "Virtual_ESX_4238255f-86cc-4cb9-0f47-11ff689f0b22",
    "displayName": "hp-esx4.dev.mycorp.com",
    "className": "PhysicalMachine"
  },
  "units": "KB",
  "values": {
    "max": 4194304,
    "min": 4194304,
    "avg": 4194304,
    "total": 4194304
  }
}
```
Appendix II: Scenario Peak-of-Peak Full Scenario Input DTO

```
},
  "value":4194304
},
  {  
    "name":"StorageAmount",
    "capacity":{
      "max":3301375,
      "min":3301375,
      "avg":3301375,
      "total":3301375
    },
    "filters":[
      {
        "type":"relation",
        "value":"bought"
      }
    ],
    "relatedEntity":{
      "uuid":"6f76b47e-e6f0a3fe",
      "displayName":"QSGRID01:ESXDC1DS1",
      "className":"Storage"
    },
    "units":"MB",
    "values":{
      "max":725.32,
      "min":725.32,
      "avg":725.32,
      "total":725.32
    },
    "value":725.32
  },
  {  
    "name":"NetThroughput",
    "capacity":{
      "max":3072000,
      "min":3072000,
      "avg":3072000,
      "total":3072000
    },
    "filters":[
      {
        "type":"relation",
        "value":"bought"
      }
    ],
    "relatedEntity":{
      "uuid":"Virtual_ESX_4238255f-86cc-4cb9-0f47-11ff689f0b22",
      "displayName":"hp-esx4.dev.mycorp.com",
      "className":"PhysicalMachine"
    },
    "units":"Kbit/sec",
    "values":{
      "max":0,
      "min":0,
      "avg":0,
```
"total":0,
"value":0,
{
  "name":"MemAllocation",
  "capacity":{
    "max":52503552,
    "min":52503552,
    "avg":52503552,
    "total":52503552
  },
  "filters":[
    {
      "type":"key",
      "value":"VirtualDataCenter::2332ba0f9dc14c07f11adb38e12df43c4bc8ca56"
    }
  ],
  "relatedEntity":{
    "uuid":"2332ba0f9dc14c07f11adb38e12df43c4bc8ca56",
    "displayName":"olga_do_not_touch_1",
    "className":"VirtualDataCenter"
  },
  "units":"KB",
  "values":{
    "max":3555836,
    "min":3554799.8,
    "avg":3554799.8,
    "total":3554799.8
  },
  "value":3554799.8
},
{
  "name":"VCPU",
  "capacity":{
    "max":5200,
    "min":5200,
    "avg":5200,
    "total":5200
  },
  "filters":[
    {
      "type":"relation",
      "value":"sold"
    }
  ],
  "units":"MHz",
  "values":{
    "max":5214,
    "min":5201.9,
Appendix II: Scenario Peak-of-Peak Full Scenario Input DTO

```json
{
    "avg": 5201.9,
    "total": 5201.9
},
"value": 5201.9
}

{
    "name": "Ballooning",
    "capacity": {
        "max": 16776692,
        "min": 16776692,
        "avg": 16776692,
        "total": 16776692
    },
    "filters": [
        {
            "type": "relation",
            "value": "bought"
        }
    ],
    "relatedEntity": {
        "uuid": "Virtual_ESX_4238255f-86cc-4cb9-0f47-11ff689f0b22",
        "displayName": "hp-esx4.dev.mycorp.com",
        "className": "PhysicalMachine"
    },
    "units": "KB",
    "values": {
        "max": 0,
        "min": 0,
        "avg": 0,
        "total": 0
    },
    "value": 0
}

{
    "name": "StorageAccess",
    "capacity": {
        "max": 5000,
        "min": 5000,
        "avg": 5000,
        "total": 5000
    },
    "filters": [
        {
            "type": "relation",
            "value": "bought"
        }
    ],
    "relatedEntity": {
        "uuid": "6f76b47e-e6f0a3fe",
        "displayName": "QSGRID01:ESXDC1DS1",
        "className": "Storage"
    },
    "units": "IOPS",
    "values": {
        "max": 0,
```
"min":0,
"avg":0,
"total":0
},
"value":0
},
{
  "name":"CPUAllocation",
  "capacity":{
    "max":31096,
    "min":31096,
    "avg":31096,
    "total":31096
  },
  "filters":[
    {
      "type":"key",
      "value":"VirtualDataCenter::2332ba0f9dc14c07f11adb38e12df43c4bc8ca56"
    },
    {
      "type":"relation",
      "value":"bought"
    }
  ],
  "relatedEntity":{
    "uuid":"2332ba0f9dc14c07f11adb38e12df43c4bc8ca56",
    "displayName":"olga_do_not_touch_1",
    "className":"VirtualDataCenter"
  },
  "units":"MHz",
  "values":{
    "max":5214,
    "min":5201.9,
    "avg":5201.9,
    "total":5201.9
  },
  "value":5201.9
},
{
  "name":"IOTThroughput",
  "capacity":{
    "max":11264000,
    "min":11264000,
    "avg":11264000,
    "total":11264000
  },
  "reserved":{
    "max":9011200,
    "min":9011200,
    "avg":9011200,
    "total":9011200
  },
  "filters":[]
}
Appendix II: Scenario Peak-of-Peak Full Scenario Input DTO

```json
{
  "type": "relation",
  "value": "bought"
}
]
},
"relatedEntity":{
  "uuid": "Virtual_ESX_4238255f-86cc-4cb9-0f47-11ff689f0b22",
  "displayName": "hp-esx4.dev.mycorp.com",
  "className": "PhysicalMachine"
},
"units": "Kbit/sec",
"values":{
  "max": 0,
  "min": 0,
  "avg": 0,
  "total": 0
},
"value": 0
},
{
  "name": "StorageLatency",
  "capacity":{
    "max": 100,
    "min": 100,
    "avg": 100,
    "total": 100
  },
  "filters":[
    {
      "type": "relation",
      "value": "bought"
    }
  ],
  "relatedEntity":{
    "uuid": "6f76b47e-e6f0a3fe",
    "displayName": "QSGRID01:ESXDC1DS1",
    "className": "Storage"
  },
  "units": "msec",
  "values":{
    "max": 0.5,
    "min": 0.5,
    "avg": 0.5,
    "total": 0.5
  },
  "value": 0.5
},
{
  "name": "VMem",
  "capacity":{
    "max": 4194304,
    "min": 4194304,
    "avg": 4194304,
    "total": 4194304
  },
  "filters":[
```
{  
  "type": "relation",
  "value": "sold"
}
],
"units": "KB",
"values":{
  "max": 3397384,
  "min": 3233807,
  "avg": 3233807,
  "total": 3233807
},
"value": 3233807
},
{
  "name": "CPU",
  "capacity":{
    "max": 10400,
    "min": 10400,
    "avg": 10400,
    "total": 10400
  },
  "filters":[
    {
      "type": "relation",
      "value": "bought"
    }
  ],
  "relatedEntity":{
    "uuid": "Virtual_ESX_4238255f-86cc-4cb9-0f47-11ff689f0b22",
    "displayName": "hp-esx4.dev.mycorp.com",
    "className": "PhysicalMachine"
  },
  "units": "MHz",
  "values":{
    "max": 5214,
    "min": 5201.9,
    "avg": 5201.9,
    "total": 5201.9
  },
  "value": 5201.9
},
{
  "name": "VStorage",
  "capacity":{
    "max": 2646,
    "min": 1014,
    "avg": 2238,
    "total": 8952
  },
  "filters":[
    {
      "type": "key",
      "value": "VirtualMachine::08bb59f519b55c22415be8d623b5ccdf578b85cc"
    }
  ]}
Appendix II: Scenario Peak-of-Peak Full Scenario Input DTO

```json
{
   "type": "relation",
   "value": "sold"
}
,"units": "MB",
"values": {
   "max": 1016.14,
   "min": 142.4,
   "avg": 797.71,
   "total": 3190.82
},
"value": 797.71
}
}
{
   "uuid": "4223bb37-0090-f332-0140-cc3cce7b3735",
   "displayName": "centos_imp_3",
   "className": "VirtualMachine",
   "environmentType": "ONPREM",
   "stats": {
      "displayName": "centos_imp_3",
      "date": "2019-02-01T00:00:00-05:00",
      "statistics": {
         "displayName": "centos_imp_3",
         "date": "2019-03-14T15:12:36-04:00",
         "statistics": {
            "name": "priceIndex",
            "values": {
               "max": 20000,
               "min": 20000,
               "avg": 20000,
               "total": 20000
            },
            "value": 20000
         },
         "name": "CPUProvisioned",
         "capacity": {
            "max": 104000,
            "min": 104000,
            "avg": 104000,
            "total": 104000
         },
         "filters": {
            "type": "relation",
            "value": "bought"
         }
      }
   }
}
}
}
```
Appendix II: Scenario Peak-of-Peak Full Scenario Input DTO

```
{
  "relatedEntity": {
    "uuid": "Virtual_ESX_4238a511-8593-4469-2751-46611e09b6a8",
    "displayName": "hp-esx1.dev.mycorp.com",
    "className": "PhysicalMachine"
  },
  "units": "MHz",
  "values": {
    "max": 5200,
    "min": 5200,
    "avg": 5200,
    "total": 5200
  },
  "value": 5200
},
{
  "name": "Swapping",
  "capacity": {
    "max": 40000000,
    "min": 40000000,
    "avg": 40000000,
    "total": 40000000
  },
  "filters": [
    {
      "type": "relation",
      "value": "bought"
    }
  ],
  "relatedEntity": {
    "uuid": "Virtual_ESX_4238a511-8593-4469-2751-46611e09b6a8",
    "displayName": "hp-esx1.dev.mycorp.com",
    "className": "PhysicalMachine"
  },
  "units": "bit/sec",
  "values": {
    "max": 0,
    "min": 0,
    "avg": 0,
    "total": 0
  },
  "value": 0
},
{
  "name": "NumDisk",
  "capacity": {
    "max": 2147483650,
    "min": 2147483650,
    "avg": 2147483650,
    "total": 2147483650
  },
  "filters": [
    {
      "type": "relation",
      "value": "bought"
    }
  ]
}
```


}]
,"relatedEntity":{
    "uuid":"Virtual_ESX_4238a511-8593-4469-2751-46611e09b6a8",
    "displayName":"hp-esx1.dev.mycorp.com",
    "className":"PhysicalMachine"
},
"values":{
    "max":1,
    "min":1,
    "avg":1,
    "total":1
},
"value":1
},
{
    "name":"Mem",
    "capacity":{
        "max":16776692,
        "min":16776692,
        "avg":16776692,
        "total":16776692
    },
    "filters":[
        {
            "type":"relation",
            "value":"bought"
        }
    ],
    "relatedEntity":{
        "uuid":"Virtual_ESX_4238a511-8593-4469-2751-46611e09b6a8",
        "displayName":"hp-esx1.dev.mycorp.com",
        "className":"PhysicalMachine"
    },
    "units":"KB",
    "values":{
        "max":3062497,
        "min":3062497,
        "avg":3062497,
        "total":3062497
    },
    "value":3062497
},
{
    "name":"MemProvisioned",
    "capacity":{
        "max":167766912,
        "min":167766912,
        "avg":167766912,
        "total":167766912
    },
    "filters":[
        {
            "type":"relation",
            "value":"bought"
        }
    ],
    "relatedEntity":{
        "uuid":"Virtual_ESX_4238a511-8593-4469-2751-46611e09b6a8",
        "displayName":"hp-esx1.dev.mycorp.com",
        "className":"PhysicalMachine"
    },
Appendix II: Scenario Peak-of-Peak Full Scenario Input DTO

```
}
]
"relatedEntity":{
  "uuid":"Virtual_ESX_4238a511-8593-4469-2751-46611e09b6a8",
  "displayName":"hp-esx1.dev.mycorp.com",
  "className":"PhysicalMachine"
},
"units":"KB",
"values":{
  "max":4194304,
  "min":4194304,
  "avg":4194304,
  "total":4194304
},
"value":4194304
},
{
  "name":"StorageAmount",
  "capacity":{
    "max":3301375,
    "min":3301375,
    "avg":3301375,
    "total":3301375
  },
  "filters":[
    {
      "type":"relation",
      "value":"bought"
    }
  ],
  "relatedEntity":{
    "uuid":"6f76b47e-e6f0a3fe",
    "displayName":"QSGRID01:ESXDC1DS1",
    "className":"Storage"
  },
  "units":"MB",
  "values":{
    "max":719,
    "min":719,
    "avg":719,
    "total":719
  },
  "value":719
},
{
  "name":"NetThroughput",
  "capacity":{
    "max":3072000,
    "min":3072000,
    "avg":3072000,
    "total":3072000
  },
  "filters":[
    {
      "type":"relation",
      "value":null
    }
  ],
  "relatedEntity":{
    "uuid":"Virtual_ESX_4238a511-8593-4469-2751-46611e09b6a8",
    "displayName":"hp-esx1.dev.mycorp.com",
    "className":"PhysicalMachine"
  },
  "units":"MB",
  "values":{
    "max":719,
    "min":719,
    "avg":719,
    "total":719
  },
  "value":719
}
```

"value": "bought"
],
"relatedEntity": {
  "uuid": "Virtual_ESX_4238a511-8593-4469-2751-46611e09b6a8",
  "displayName": "hp-esx1.dev.mycorp.com",
  "className": "PhysicalMachine"
},
"units": "Kbits/sec",
"values": {
  "max": 0,
  "min": 0,
  "avg": 0,
  "total": 0
},
"value": 0
},
{
  "name": "MemAllocation",
  "capacity": {
    "max": 52503552,
    "min": 52503552,
    "avg": 52503552,
    "total": 52503552
  },
  "filters": [
    {
      "type": "key",
      "value": "VirtualDataCenter::2332ba0f9dc14c07f11adb38e12df43c4bc8ca56"
    },
    {
      "type": "relation",
      "value": "bought"
    }
  ],
  "relatedEntity": {
    "uuid": "2332ba0f9dc14c07f11adb38e12df43c4bc8ca56",
    "displayName": "olga_do_not_touch_1",
    "className": "VirtualDataCenter"
  },
  "units": "KB",
  "values": {
    "max": 3069332,
    "min": 3062497,
    "avg": 3062497,
    "total": 3062497
  },
  "value": 3062497
},
{
  "name": "VCPU",
  "capacity": {
    "max": 5200,
    "min": 5200,
    "avg": 5200,
    "total": 5200
  },
  "filters": [
    {
      "type": "key",
      "value": "VirtualDataCenter::2332ba0f9dc14c07f11adb38e12df43c4bc8ca56"
    },
    {
      "type": "relation",
      "value": "bought"
    }
  ],
  "relatedEntity": {
    "uuid": "2332ba0f9dc14c07f11adb38e12df43c4bc8ca56",
    "displayName": "olga_do_not_touch_1",
    "className": "VirtualDataCenter"
  },
  "units": "VCPU",
  "values": {
    "max": 5200,
    "min": 5200,
    "avg": 5200,
    "total": 5200
  },
  "value": 5200
}
"avg":5200,
"total":5200
},
"filters":[
  {
    "type":"relation",
    "value":"sold"
  }
],
"units":"MHz",
"values":{
  "max":5203,
  "min":5194.67,
  "avg":5194.67,
  "total":5194.67
},
"value":5194.67
},
{
  "name":"Ballooning",
  "capacity":{
    "max":16776692,
    "min":16776692,
    "avg":16776692,
    "total":16776692
  },
  "filters":[
    {
      "type":"relation",
      "value":"bought"
    }
  ],
  "relatedEntity":{
    "uuid":"Virtual_ESX_4238a511-8593-4469-2751-46611e09b6a8",
    "displayName":"hp-esx1.dev.mycorp.com",
    "className":"PhysicalMachine"
  },
  "units":"KB",
  "values":{
    "max":0,
    "min":0,
    "avg":0,
    "total":0
  },
  "value":0
},
{
  "name":"StorageAccess",
  "capacity":{
    "max":5000,
    "min":5000,
    "avg":5000,
    "total":5000
  },
  "filters":[}
Appendix II: Scenario Peak-of-Peak Full Scenario Input DTO

```json
{
    "type": "relation",
    "value": "bought"
},
"relatedEntity": {
    "uuid": "6f76b47e-e6f0a3fe",
    "displayName": "QSGRID01:ESXDC1DS1",
    "className": "Storage"
},
"units": "IOPS",
"values": {
    "max": 0,
    "min": 0,
    "avg": 0,
    "total": 0
},
"value": 0
},
{
    "name": "CPUAllocation",
    "capacity": {
        "max": 31096,
        "min": 31096,
        "avg": 31096,
        "total": 31096
    },
    "filters": [
        {
            "type": "key",
            "value": "VirtualDataCenter::2332ba0f9dc14c07f11adb38e12df43c4bc8ca56"
        },
        {
            "type": "relation",
            "value": "bought"
        }
    ],
    "relatedEntity": {
        "uuid": "2332ba0f9dc14c07f11adb38e12df43c4bc8ca56",
        "displayName": "olga_do_not_touch_1",
        "className": "VirtualDataCenter"
    },
    "units": "MHz",
    "values": {
        "max": 5203,
        "min": 5194.67,
        "avg": 5194.67,
        "total": 5194.67
    },
    "value": 5194.67
},
{
    "name": "IOThroughput",
    "capacity": {
        "max": 294,
        "min": 294,
        "avg": 294,
        "total": 294
    }
}
```
Appendix II: Scenario Peak-of-Peak Full Scenario Input DTO

```
"max":11264000,
"min":11264000,
"avg":11264000,
"total":11264000
},
"reserved":{
    "max":9011200,
    "min":9011200,
    "avg":9011200,
    "total":9011200
},
"filters":[
    {
        "type":"relation",
        "value":"bought"
    }
],
"relatedEntity":{
    "uuid":"Virtual_ESX_4238a511-8593-4469-2751-46611e09b6a8",
    "displayName":"hp-esx1.dev.mycorp.com",
    "className":"PhysicalMachine"
},
"units":"Kbit/sec",
"values":{
    "max":0,
    "min":0,
    "avg":0,
    "total":0
},
"value":0
},
{
    "name":"StorageLatency",
    "capacity":{
        "max":100,
        "min":100,
        "avg":100,
        "total":100
    },
    "filters":[
        {
            "type":"relation",
            "value":"bought"
        }
    ],
    "relatedEntity":{
        "uuid":"6f76b47e-e6f0a3fe",
        "displayName":"QSGRID01:ESXDC1DS1",
        "className":"Storage"
    },
    "units":"msec",
    "values":{
        "max":0.33,
        "min":0.33,
        "avg":0.33,
```
Appendix II: Scenario Peak-of-Peak Full Scenario Input DTO

```
{
  "name": "Q2VCPU",
  "capacity": {
    "max": 20000,
    "min": 20000,
    "avg": 20000,
    "total": 20000
  },
  "reserved": {
    "max": 10000,
    "min": 10000,
    "avg": 10000,
    "total": 10000
  },
  "filters": [
    {
      "type": "relation",
      "value": "bought"
    }
  ],
  "relatedEntity": {
    "uuid": "Virtual_ESX_4238a511-8593-4469-2751-46611e09b6a8",
    "displayName": "hp-esx1.dev.mycorp.com",
    "className": "PhysicalMachine"
  },
  "units": "msec",
  "values": {
    "max": 11,
    "min": 11,
    "avg": 11,
    "total": 11
  },
  "value": 11
},
{
  "name": "VMem",
  "capacity": {
    "max": 4194304,
    "min": 4194304,
    "avg": 4194304,
    "total": 4194304
  },
  "filters": [
    {
      "type": "relation",
      "value": "sold"
    }
  ],
  "units": "KB",
  "values": {
    "max": 2894068,
    "min": 296
  }
}
```
"min":2747267,
"avg":2747267,
"total":2747267
},
"value":2747267
},
{
   "name":"CPU",
   "capacity":{
      "max":10400,
      "min":10400,
      "avg":10400,
      "total":10400
   },
   "filters":[
      {
         "type":"relation",
         "value":"bought"
      }
   ],
   "relatedEntity":{
      "uuid":"Virtual_ESX_4238a511-8593-4469-2751-46611e09b6a8",
      "displayName":"hp-esx1.dev.mycorp.com",
      "className":"PhysicalMachine"
   },
   "units":"MHz",
   "values":{
      "max":5203,
      "min":5194.67,
      "avg":5194.67,
      "total":5194.67
   },
   "value":5194.67
},
{
   "name":"VStorage",
   "capacity":{
      "max":2646,
      "min":1014,
      "avg":2238,
      "total":8952
   },
   "filters":[
      {
         "type":"key",
         "value":"VirtualMachine
e::199bb3ec4f8da89f01c126a6b3df4c1321c4b07d"
      },
      {
         "type":"relation",
         "value":"sold"
      }
   ],
   "units":"MB",
   "values":{

"max": 1016.01,
"min": 142.4,
"avg": 797.61,
"total": 3190.42
},
"value": 797.61
]}

"timeBasedTopologyChanges":{
}
}
Appendix III- Reference Tables

Reference Tables Overview

This section of the Appendix will contain reference tables for common API parameters, separated by endpoint. Note that filter tables may contain other reference tables for completeness.

Action Reference Tables

Action Mode:

• DISABLED:
  Do not recommend or perform the action. When you disable an action, the user interface will no longer display actions of that type.

• RECOMMENDED:
  Recommend the action so a user can execute it via the given hypervisor or by other external means

• MANUAL:
  Recommend the action, and provide the option to execute that action through the Turbonomic user interface or an /actions API request.

• AUTOMATED:
  You have directed Turbonomic to execute the action automatically.

• COLLECTION (UNUSED):
  Legacy action mode, no longer used.

Action State:

• DISABLED:
  An action whose policy has been disabled.

• RECOMMEND:
  An action that cannot be automated due to policy settings or must be executed outside the system, such as the purchase of hardware.

• PENDING_ACCEPT:
  When the action mode is set to manual, a recommended action that has not been accepted or cleared.

• ACCEPTED:
An action that has been accepted, but is not yet in progress.

- **IN_PROGRESS:**
  An action that is being executed.

- **SUCCEEDED:**
  An action that was accepted and completed successfully.

- **FAILED:**
  An action that was accepted and did not complete successfully.

- **REJECTED:**
  When the action mode is set to manual, an action that has been rejected by the user.

- **Cleared:**
  When the action mode is set to manual, an action that is no longer recommended by the market.

- **ACCOUNTING:**
  For cloud entities, an action to resize in order to use a different instance template.

- **QUEUED:**
  When more than 10 actions are to be executed for a single target, Turbonomic will place the 11th and all subsequent actions into a QUEUED state, and they will execute as the previous actions complete.

### Action Type:

- **START:**
  Start an entity, and add it to the Turbonomic market.

- **MOVE:**
  Move an entity from one provider to another. For example, moving a VM between hosts, or a datastore between disk arrays.

- **SUSPEND:**
  Remove capacity from your environment. Suspended entities are not removed from the environment, but will not be used in market decisions. Based on market conditions, suspended entities can be started, re-adding them to the market.

- **ADD PROVIDER:**
  This is equivalent to the **START** action, but for storage entities.

- **CHANGE:**
  Move a virtual machine's storage between datastores.

- **PROVISION:**
  Add capacity to your environment.

- **RECONFIGURE:**
  When a VM is not able to correct a misconfiguration via another type of action. For example, if a placement policy requires a VM to move to a host on a particular cluster, but cross-cluster moves are not permitted.

- **DELETE:**
  This is equivalent to the **SUSPEND** action, but for storage entities.

- **RESERVE_ON_PM:**
When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular host.

- **RESERVE_ON_DS**:
  When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular datastore.

- **RESIZE_FOR_EFFICIENCY**:
  A resize that reduces the capacity of a commodity, such as vCPU, or vMEM.

- **RESIZE_FOR_PERFORMANCE**:
  A resize that increases the capacity of a commodity, such as vCPU, or vMEM.

### Action Filter Criteria:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>actionModeList</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• DISABLED:</td>
</tr>
<tr>
<td></td>
<td>Do not recommend or perform the action. When you disable an action, the user interface will no longer display actions of that type.</td>
</tr>
<tr>
<td></td>
<td>• RECOMMENDED:</td>
</tr>
<tr>
<td></td>
<td>Recommend the action so a user can execute it via the given hypervisor or by other external means</td>
</tr>
<tr>
<td></td>
<td>• MANUAL:</td>
</tr>
<tr>
<td></td>
<td>Recommend the action, and provide the option to execute that action through the Turbonomic user interface or an /actions API request.</td>
</tr>
<tr>
<td></td>
<td>• AUTOMATED:</td>
</tr>
<tr>
<td></td>
<td>You have directed Turbonomic to execute the action automatically.</td>
</tr>
<tr>
<td></td>
<td>• COLLECTION (UNUSED):</td>
</tr>
<tr>
<td></td>
<td>Legacy action mode, no longer used.</td>
</tr>
</tbody>
</table>

| actionStateList |             |
|                | • DISABLED: |
|                |   An action whose policy has been disabled. |
|                | • RECOMMEND: |
|                |   An action that cannot be automated due to policy settings or must be executed outside the system, such as the purchase of hardware. |
|                | • PENDING_ACCEPT: |
|                |   When the action mode is set to manual, a recommended action that has not been accepted or cleared. |
|                | • ACCEPTED: |
|                |   An action that has been accepted, but is not yet in progress. |
|                | • IN_PROGRESS: |
|                |   An action that is being executed. |
|                | • SUCCEEDED: |
|                |   An action that was accepted and completed successfully. |
|                | • FAILED: |

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<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>An action that was accepted and did not complete successfully.</td>
<td>• <strong>REJECTED:</strong> When the action mode is set to manual, an action that has been rejected by the user.</td>
</tr>
<tr>
<td>• <strong>CLEARED:</strong> When the action mode is set to manual, an action that is no longer recommended by the market.</td>
<td>• <strong>ACCOUNTING:</strong> For cloud entities, an action to resize in order to use a different instance template.</td>
</tr>
<tr>
<td>• <strong>QUEUED:</strong> When more than 10 actions are to be executed for a single target, Turbonomic will place the 11th and all subsequent actions into a QUEUED state, and they will execute as the previous actions complete.</td>
<td>actionTypeList</td>
</tr>
<tr>
<td>• <strong>START:</strong> Start an entity, and add it to the Turbonomic market.</td>
<td>• <strong>MOVE:</strong> Move an entity from one provider to another. For example, moving a VM between hosts, or a datastore between disk arrays.</td>
</tr>
<tr>
<td>• <strong>SUSPEND:</strong> Remove capacity from your environment. Suspended entities are not removed from the environment, but will not be used in market decisions. Based on market conditions, suspended entities can be started, re-adding them to the market.</td>
<td>• <strong>ADD PROVIDER:</strong> This is equivalent to the START action, but for storage entities.</td>
</tr>
<tr>
<td>• <strong>CHANGE:</strong> Move a virtual machine's storage between datastores.</td>
<td>• <strong>PROVISION:</strong> Add capacity to your environment.</td>
</tr>
<tr>
<td>• <strong>RECONFIGURE:</strong> When a VM is not able to correct a misconfiguration via another type of action. For example, if a placement policy requires a VM to move to a host on a particular cluster, but cross-cluster moves are not permitted.</td>
<td>• <strong>DELETE:</strong> This is equivalent to the SUSPEND action, but for storage entities.</td>
</tr>
<tr>
<td>• <strong>RESERVE_ON_PM:</strong> When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular host.</td>
<td>• <strong>RESERVE_ON_DS:</strong> When using the deploy/reservation functionality, this is the action to reserve the resources of a VM on a particular datastore.</td>
</tr>
</tbody>
</table>
### Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cleared</td>
<td>Default: false. When true, actions that were removed from the action list before being executed will be returned.</td>
</tr>
</tbody>
</table>
| costType          | • Saving  
  An action that will decrease cloud spending.  
  • Investment  
  An action that will increase cloud spending.                                           |
| cumulative        | Default: false. When true, shows the savings for each action in a scope as a cumulative total, rather than showing the savings for individual actions. |
| environmentType   | • ONPREM:  
  Returns only actions related to entities that are part of your on-premises environment.  
  • CLOUD:  
  Returns only actions related to entities that are part of your cloud environment.     |
| groupBy           | You may group the actions returned by the following criteria: [actionModes, actionStates, actionTypes, risk, riskSeverity, riskSubCategory] |
| hasReservedInstance | Default: false. When true, only actions that are related to reserved instances will be returned.                                         |
| relatedEntityTypes | Returns only actions related to entities of these types within the scope. For example, if your scope is a virtual datacenter and you specify VirtualMachine as a related entity type, the request will include only those actions related to VMs in the specified virtual datacenter. Choose from the following entity types: [ Datacenter, PhysicalMachine, VirtualMachine, Storage, Application, Chassis, DiskArray, IOModule, StorageControl, Switch, VirtualDataCenter, VPod, DPod, Container, Database, DatabaseServerContainer, LogicalPool ] |
| riskSeverityList  | Returns only actions of the given severities. [ Unknown, Normal, Minor, Major, Critical ]                                                |
| riskSubCategoryList | Returns only actions of the given subcategories. [ Performance Assurance, Efficiency Improvement, Prevention, Compliance ] |

### Entity Reference Tables

#### Entity State:

- **ACTIVE:**  
  Entity is actively consuming resources.

- **EVACUATED:**  
  Entity is ready to suspend and will not participate in the market, but will not generate a SUSPEND action.
NOTE: This state replaces the SUSPEND state, and requires additional configuration to enable. Turbonomic does not recommend enabling this state.

- **FAILOVER:**
  This entity is reserved for failover and will not participate in the market.

- **IDLE:**
  Entity is powered off and not actively consuming market resources.

- **LAUNCH:**
  Entity is starting.

- **MAINTENANCE:**
  Entity is in maintenance mode.

- **NOT_MONITORED:**
  Entity is not currently monitored by Turbonomic.

- **QUEUED:**
  Entity is in the process of changing from one state to another.

NOTE: This state is internal to Turbonomic and will not appear in the UI, but may appear in an API response if the call is executed at the precise moment the entity is changing state.

- **RESOURCE_ALLOCATION:**
  Cloud entity is being created.

- **RESOURCE_RELEASE:**
  Cloud Entity is being deleted.

- **SUSPEND:**
  Entity is suspended or the guest OS is in sleep, standby, or suspended state. The entity is not removed from the environment, but will not be used in market decisions. Based on market conditions, suspended entities can be started, re-adding them to the market.

- **SUSPEND_PENDING:**
  Entity is making preparations to suspend, or is the next entity of its type to suspend.

- **TERMINATE_PENDING:**
  Entity is in the process of being deleted.

- **UNKNOWN:**
  Turbonomic is unable to obtain the current state of the entity.
  This occurs when the entity is reported to the hypervisor as having a state of DISCONNECTED, ORPHANED, or INVALID.

**Entity Type:**

- **BUSINESS_UNIT**
- **CLOUD_SERVICE**
- **CONTAINER**
- **DATABASE**
- **DATABASE_SERVER**
- **DATACENTER**
• DISK_ARRAY
• PHYSICAL_MACHINE
• STORAGE
• VIRTUAL_MACHINE
• SWITCH
• VIRTUAL_DATACENTER
• CHASSIS
• STORAGE_CONTROLLER
• IO_MODULE
• APPLICATION_SERVER
• VIRTUAL_APPLICATION
• NETWORK
• APPLICATION
• CONTAINER
• CONTAINER_POD
• LOGICAL_POOL
• DPOD
• VPOD
• LOAD_BALANCER
Groups, Schedules, and Policies are used together in Turbonomic to give you finer control of your environment. The group and schedule must be created before the policy.

**Groups**

**Sample inputDto for a static group with five VMs:**

**Endpoint:** POST [IP]/api/v3/groups

```json
{
    "isStatic":true,
    "displayName":"Dallas-GroupStatic",
    "memberUuidList":[
        "aws::us-east-1::VM::i-0352d98b60b401d8c",
        "aws::eu-west-3::VM::i-0b425aa80206cd88c",
        "azure::VM::6e60657c-b6d6-48fa-b8a8-865d6d0c1dd4",
        "aws::us-west-2::VM::i-0812e531ea21da00f",
        "aws::us-east-1::VM::i-0e2d4421429b47a2"
    ],
    "criteriaList":[
    ],
    "groupType":"VirtualMachine"
}
```

The UUIDs of the VMs to be included can be found using the search endpoint. Sample Response:

```json
{
    "uuid":"_oR-_4CEPeqCS9SyDmAAYg",
    "displayName":"Dallas-GroupStatic",
    "className":"Group",
}
```
NOTE: The group UUID will be used in creation of the policy.

Schedules

Sample inputDto for a schedule to be run weekly on Friday between the hours of 0000 and 0400 that starts on 2019-12-20 and has no end date:

Endpoint: POST [IP]/api/v3/schedules

```
{
    "displayName":"DallasSched",
    "endTime":"2019-12-20T04:00",
    "startTime":"2019-12-20T00:00",
    "timeZone":"America/Denver",
    "recurrence":{
        "type":"WEEKLY",
        "interval":1,
        "daysOfWeek":[
            "Fri"
        ]
    }
}
```

Sample Response:

```
{
    "uuid":"_zQsfQCEGEeqCS9SyDmAAYg",
    "displayName":"DallasSched",
    "className":"RecurringEvent",
    "startTime":"2019-12-20T00:00:00",
    "endTime":"2019-12-20T04:00:00",
    "recurrence":{
        "type":"WEEKLY",
        "daysOfWeek":[
            "Fri"
        ],
        "interval":1
    }
}
```
Sample inputDto for the same schedule, but with an end date of 2021-08-13:

```
{
  "displayName":"DallasSchedEndDate",
  "endDate":"2021-08-13T23:59:59",
  "endTime":"2019-12-20T04:00",
  "startTime":"2019-12-20T00:00",
  "timeZone":"America/Denver",
  "recurrence":{
    "type":"WEEKLY",
    "interval":1,
    "daysOfWeek":[
      "Fri"
    ]
  }
}
```

Sample Response:

```
{
  "uuid":"_QAZ9QCENEqCS9SyDmAYg",
  "displayName":"DallasSchedEndDate",
  "className":"RecurringEvent",
  "endDate":"2021-08-13T23:59:59",
  "startTime":"2019-12-20T00:00:00",
  "endTime":"2019-12-20T04:00:00",
  "recurrence":{
    "type":"WEEKLY",
    "daysOfWeek":[
      "Fri"
    ],
    "interval":1
  },
  "timeZone":"America/Denver",
  "nextOccurrence":"2019-12-20T00:00:00",
  "nextOccurrenceTimestamp":1576825200000
}
```

| NOTE: | The schedule UUID will be used in creation of the policy. |

**Policy**

Sample inputDto for a policy that automatically takes vCPU and vMem resize up actions:
Endpoint: POST [IP]/api/v3/settingspolicies

{
  "disabled":false,
  "displayName":"Dallas-Policy",
  "scopes":[
    {
      "uuid":"_oR-_4CEPeMQe9yDSmAAYg"
    }
  ],
  "settingsManagers":[
    {
      "uuid":"automationmanager",
      "settings":[
        {
          "uuid":"resizeUpVmemVm",
          "value":"AUTOMATIC"
        },
        {
          "uuid":"resizeUpVcpuVm",
          "value":"AUTOMATIC"
        }
      ]
    }
  ],
  "schedule":{
    "uuid":"_zQsfQCGeegCS9SyDmAYg",
    "displayName":"DallasSched",
    "className":"RecurringEvent",
    "endTime":"2019-12-20T04:00",
    "startTime":"2019-12-20T00:00",
    "timeZone":"America/Denver",
    "recurrence":{
      "type":"WEEKLY",
      "interval":1,
      "daysOfWeek":["Fri"]
    }
  }
}

Note the following values:

- scopes[uuid] is the group UUID.
- settingsManagers[uuid] will be automationmanager when handling action execution.
- settingsManagers[settings] is the UUID and value of the settings to be changed.
- schedule[uuid] is the schedule UUID. You do not have to provide all the schedule information; only the UUID is required.

Sample Response:
Appendix IV: Intersection of Groups, Schedules, Policies

```json
{
    "uuid": "_W-VmCSESaqCS9SyDmAAYg",
    "displayName": "Dallas-Policy",
    "entityType": "VirtualMachine",
    "scopes": [
        {
            "uuid": "_oR-_4CEPeqCS9SyDmAAYg",
            "displayName": "Dallas-GroupStatic",
            "groupType": "VirtualMachine",
            "isStatic": true,
            "logicalOperator": "AND"
        }
    ],
    "settingsManagers": [
        {
            "uuid": "automationmanager",
            "settings": [
                {
                    "uuid": "resizeUpVmemVm",
                    "value": "AUTOMATIC"
                },
                {
                    "uuid": "resizeUpVcpuVm",
                    "value": "AUTOMATIC"
                }
            ]
        }
    ],
    "schedule": {
        "uuid": "_zQsfQCEGEeqCS9SyDmAAYg",
        "displayName": "DallasSched",
        "className": "RecurringEvent",
        "endTime": "2019-12-20T04:00",
        "startTime": "2019-12-20T00:00",
        "timeZone": "America/Denver",
        "recurrence": {
            "type": "WEEKLY",
            "interval": 1,
            "daysOfWeek": [
                "Fri"
            ]
        }
    }
}
```
},
"settingsManagers": [
{
  "uuid": "automationmanager",
  "displayName": "Action Mode Settings",
  "category": "Automation",
  "settings": [
  {
    "uuid": "resizeUpVmemVm",
    "displayName": "vMem Resize Up",
    "value": "AUTOMATIC",
    "defaultValue": "MANUAL",
    "valueType": "STRING",
    "valueObjectType": "String",
    "options": [
      {
        "label": "Disabled",
        "value": "DISABLED"
      },
      {
        "label": "Recommend",
        "value": "RECOMMEND"
      },
      {
        "label": "Manual",
        "value": "MANUAL"
      },
      {
        "label": "Automated",
        "value": "AUTOMATIC"
      }
    ],
    "entityType": "VirtualMachine",
    "sourceGroupName": "Global"
  }
  ],
  "sourceGroupName": "Global"
},
{
  "uuid": "resizeUpVcpuVm",
  "displayName": "vCPU Resize Up",
  "value": "AUTOMATIC",
  "defaultValue": "MANUAL",
  "valueType": "STRING",
  "valueObjectType": "String",
  "options": [
    {
      "label": "Disabled",
      "value": "DISABLED"
    },
    {
      "label": "Recommend",
      "value": "RECOMMEND"
    },
    {
      "label": "Manual",
      "value": "MANUAL"
    }
  ],
  "entityType": "VirtualMachine",
  "sourceGroupName": "Global"
}]}
Modification

The group and schedule can be modified "in place"; you do not need to also modify the policy as long as the UUID for the group and schedule remain the same, the policy will reflect the current values.

To modify an item, pass the DTO with the new information in a PUT call, along with the UUID. For example, to change the group above to have only three of the five VMs, send the following DTO:

**Endpoint (Group):** PUT [IP]/api/v3/groups

```json
{
    "isStatic":true,
    "displayName":"Dallas-GroupStatic",
    "memberUuidList": [ 
        "azure::VM::6e60657c-b6d6-48fa-b8a8-865d6d0c1dd4",
        "aws::us-east-1::VM::i-0e2d04421429b47a2",
        "aws::us-east-1::VM::i-0352d98b60b401d8c"
    ],
    "groupType":"VirtualMachine"
}
```

**Endpoint (Schedule):** PUT [IP]/api/v3/schedules

```json
{
    "isStatic":true,
    "displayName":"DallasScheduler",
    "memberUuidList": [ 
        "_zQsfQCEGEeqCS9SyDmAAYg",
        "displayName":"DallasSched",
        "className":"RecurringEvent",
        "startTime":"2019-12-20T00:00:00",
        "endTime":"2019-12-20T04:00:00",
        "recurrence":{
            "type":"WEEKLY",
            "daysOfWeek": [ "Fri" ],
            "interval":1
        },
        "timezone":"America/Denver",
        "nextOccurrence":"2019-12-20T00:00:00",
        "nextOccurrenceTimestamp":1576825200000
    },
    "disabled":false,
    "readOnly":false,
    "default":false
}
```
"logicalOperator":"OR"
}

Sample Response:

{
   "links": [  
      {  
         "rel": "self",  
         "href": "https://10.10.10.10/api/v3/groups/_OR-_4CEPEeqCS9SyDmAAYg?include_aspects=false"  
      }  
   ],  
   "uuid": "_OR-_4CEPEeqCS9SyDmAAYg",  
   "displayName": "Dallas-GroupStatic",  
   "className": "Group",  
   "environmentType": "CLOUD",  
   "entitiesCount": 3,  
   "membersCount": 3,  
   "costPrice": 0.21560891,  
   "groupType": "VirtualMachine",  
   "severity": "Critical",  
   "isStatic": true,  
   "logicalOperator": "OR",  
   "activeEntitiesCount": 3,  
   "cloudType": "HYBRID"
}
Appendix V: DTO Index

Data transfer objects (DTOs) are used to encapsulate and send data to the Turbonomic API. The following DTOs are used by Turbonomic:

**NOTE:**
The DTO Index is a work in progress, and included in a draft stage for reference. The information contained in the Index is accurate, but may not be complete.

### ActionApiDTO

**Description**
Model to describe an Action

**Required Parameters**
This DTO has no required parameters.
### Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>actionImpactID</td>
<td>type: integer</td>
</tr>
<tr>
<td></td>
<td>format: int64</td>
</tr>
<tr>
<td></td>
<td>description: The ID for the action, which will persist across restarts</td>
</tr>
<tr>
<td>createTime</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: Creation time</td>
</tr>
<tr>
<td>updateTime</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: Update time</td>
</tr>
<tr>
<td>clearTime</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: Execution time</td>
</tr>
<tr>
<td>actionType</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: Type</td>
</tr>
<tr>
<td></td>
<td>enum: ['START', 'MOVE', 'SCALE', 'ALLOCATE', 'SUSPEND', 'PROVISION', 'RECONFIGURE', 'RESIZE', 'DELETE', 'RIGHT_SIZE', 'BUY_RI']</td>
</tr>
<tr>
<td>actionState</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: Action State</td>
</tr>
<tr>
<td></td>
<td>enum: ['PENDING_ACCEPT', 'ACCEPTED', 'REJECTED', 'PRE_IN_PROGRESS', 'POST_IN_PROGRESS', 'IN_PROGRESS', 'SUCCEEDED', 'FAILED', 'RECOMMENDED', 'DISABLED', 'QUEUED', 'CLEARED', 'ACCOUNTING', 'READY']</td>
</tr>
<tr>
<td>actionMode</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: Action Mode</td>
</tr>
<tr>
<td></td>
<td>enum: ['DISABLED', 'RECOMMEND', 'MANUAL', 'AUTOMATIC', 'COLLECTION']</td>
</tr>
<tr>
<td>userName</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: Username of the user that accepted the action</td>
</tr>
<tr>
<td>details</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: A user-readable string describing the action</td>
</tr>
<tr>
<td>importance</td>
<td>type: number</td>
</tr>
<tr>
<td></td>
<td>format: float</td>
</tr>
<tr>
<td></td>
<td>description: Numeric value that describes the priority of the action</td>
</tr>
<tr>
<td>target</td>
<td>description: Target entity for an action. For example, the VM in a Resize Action, or the host for a VM move</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: ServiceEntityApiDTO (on page 391)</td>
</tr>
<tr>
<td>currentEntity</td>
<td>description: Current entity, such as the current host that a VM resides on for a VM move</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: ServiceEntityApiDTO (on page 391)</td>
</tr>
</tbody>
</table>
ActionApiInputDTO

Description
Model to describe a Filter for Actions

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| startTime | • **type**: string  
  • **description**: Start time of the period to filter, based on Actions Creation Time |
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>endTime</strong></td>
<td>- type: string&lt;br&gt;- <em>description</em>: End time of the period to filter, based on Actions Creation Time</td>
</tr>
<tr>
<td><strong>cleared</strong></td>
<td>- type: boolean&lt;br&gt;- <em>description</em>: Filter by Actions Executed</td>
</tr>
<tr>
<td><strong>groupBy</strong></td>
<td>- type: array&lt;br&gt;- <em>description</em>: Fields used to Group the Stats&lt;br&gt;- <em>items</em>: [groupBy Filters (on page 34)]</td>
</tr>
<tr>
<td><strong>relatedEntityTypes</strong></td>
<td>- type: array&lt;br&gt;- <em>example</em>: Selecting a VCD, and specifying &quot;related_entities&quot;: [&quot;VirtualMachine&quot;] will include the actions for any VM in the given VDC&lt;br&gt;- <em>description</em>: Related Entity Types to include from the supply chain for this entity&lt;br&gt;- <em>items</em>: {'type': 'string'}</td>
</tr>
<tr>
<td><strong>environmentType</strong></td>
<td>- type: string&lt;br&gt;- <em>description</em>: Filter the actions by Environment Type&lt;br&gt;- <em>enum</em>: ['ONPREM', 'CLOUD']</td>
</tr>
<tr>
<td><strong>cumulative</strong></td>
<td>- type: boolean&lt;br&gt;- <em>description</em>: Show the action savings as cumulative values</td>
</tr>
<tr>
<td><strong>costType</strong></td>
<td>- type: string&lt;br&gt;- <em>description</em>: Filter the actions by cost Type&lt;br&gt;- <em>enum</em>: ['SAVING', 'INVESTMENT']</td>
</tr>
<tr>
<td><strong>hasReservedInstance</strong></td>
<td>- type: boolean&lt;br&gt;- <em>description</em>: Filter the actions by whether having related reserved instance</td>
</tr>
<tr>
<td><strong>excludeNotifications</strong></td>
<td>- type: boolean&lt;br&gt;- <em>description</em>: Exclude the notifications from the result</td>
</tr>
<tr>
<td><strong>limitEntities</strong></td>
<td>- type: integer&lt;br&gt;- <em>format</em>: int32&lt;br&gt;- <em>description</em>: Limit number of entities in the result</td>
</tr>
<tr>
<td><strong>detailLevel</strong></td>
<td>- type: string&lt;br&gt;- <em>description</em>: Detail level of the Action, 'standard' is the default value&lt;br&gt;- <em>enum</em>: ['STANDARD', 'EXECUTION']</td>
</tr>
<tr>
<td><strong>actionTypeList</strong></td>
<td>- type: array&lt;br&gt;- <em>items</em>: {'type': 'string', 'enum': ['NONE', 'START', 'MOVE', 'SCALE', 'ALLOCATE', 'SUSPEND', 'TERMINATE', 'SPAWN', 'ADD_PROVIDER', 'CHANGE', 'REMOVE_PROVIDER', 'PROVISION', 'RECONFIGURE', 'RESIZE', 'RESIZE_CAPACITY', 'WARN', 'RECONFIGURE_THRESHOLD', 'DELETE', 'RIGHT_SIZE', 'RESERVE_ON_PM', 'RESERVE_ON_DS', 'RESIZE_FOR_EFFICIENCY', 'RESIZE_FOR_PERFORMANCE', 'CROSS_TARGET_MOVE', 'MOVE_TOGETHER', 'ACTIVATE', 'DEACTIVATE', 'BUY_RI']}</td>
</tr>
<tr>
<td><strong>actionStateList</strong></td>
<td>- type: array&lt;br&gt;- <em>items</em>: {'type': 'string', 'enum': ['PENDING_ACCEPT', 'ACCEPTED', 'REJECTED', 'PRE_IN_PROGRESS', 'POST_IN_PROGRESS', 'IN_PROGRESS', 'SUCCEEDED', 'FAILED', 'RECOMMENDED', 'DISABLED', 'QUEUED', 'CLEARED', 'ACCOUNTING', 'READY']}</td>
</tr>
<tr>
<td><strong>actionModeList</strong></td>
<td>- type: array&lt;br&gt;- <em>items</em>: {'type': 'string', 'enum': ['DISABLED', 'RECOMMEND', 'MANUAL', 'AUTOMATIC', 'COLLECTION']}</td>
</tr>
<tr>
<td><strong>riskSeverityList</strong></td>
<td>- type: array&lt;br&gt;- <em>items</em>: {'type': 'string'}</td>
</tr>
<tr>
<td><strong>riskSubCategoryList</strong></td>
<td>- type: array&lt;br&gt;- <em>items</em>: {'type': 'string'}</td>
</tr>
</tbody>
</table>
Appendix V: DTO Index

ActionDetailsApiDTO

Description
Parent class for action details

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>actionType</td>
<td>• type: string</td>
</tr>
</tbody>
</table>

Optional Parameters
This DTO has no optional parameters.

ActionExecutionAuditApiDTO

Description
Model to describe an Action Execution status.

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| executionTime | • type: string  
|             | • description: Start of the execution time       |
| state       | • type: string 
|             | • description: State of the execution             
|             | • enum: ['PENDING_ACCEPT', 'ACCEPTED', 'REJECTED', 'PRE_IN_PROGRESS', 'POST_IN_PROGRESS', 'IN_PROGRESS', 'SUCCEEDED', 'FAILED', 'RECOMMENDED', 'DISABLED', 'QUEUED', 'CLEARED', 'ACCOUNTING', 'READY'] |
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>completionTime</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: End of the execution time</td>
</tr>
<tr>
<td>message</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Status message, if the Action failed, it will contain the Error details</td>
</tr>
<tr>
<td>progress</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
<tr>
<td></td>
<td>• description: Action execution progress value, from 0 to 100</td>
</tr>
</tbody>
</table>

ActionScheduleApiDTO

Description
Model to describe an Action Schedule.

Required Parameters
This DTO has no required parameters.
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• <strong>type:</strong> array</td>
</tr>
<tr>
<td></td>
<td>• <strong>Referenced DTO:</strong> [Link (on page 351)]</td>
</tr>
<tr>
<td>uuid</td>
<td>• <strong>type:</strong> string</td>
</tr>
<tr>
<td>displayName</td>
<td>• <strong>type:</strong> string</td>
</tr>
<tr>
<td>className</td>
<td>• <strong>type:</strong> string</td>
</tr>
<tr>
<td>nextOccurrence</td>
<td>• <strong>type:</strong> string</td>
</tr>
<tr>
<td></td>
<td>• <strong>description:</strong> The time of the next occurrence represented in ISO8601 local time (YYYY-MM-DDTHH:MM:SS). For example, 2019-04-04T19:15.</td>
</tr>
<tr>
<td>nextOccurrenceTimestamp</td>
<td>• <strong>type:</strong> integer</td>
</tr>
<tr>
<td></td>
<td>• <strong>format:</strong> int64</td>
</tr>
<tr>
<td></td>
<td>• <strong>description:</strong> The time of the next occurrence of this schedule represented in Timestamp in milliseconds. For example, 1562100619000</td>
</tr>
<tr>
<td>timeZoneId</td>
<td>• <strong>type:</strong> string</td>
</tr>
<tr>
<td></td>
<td>• <strong>description:</strong> The timezone of the schedule</td>
</tr>
<tr>
<td>mode</td>
<td>• <strong>type:</strong> string</td>
</tr>
<tr>
<td></td>
<td>• <strong>description:</strong> The action mode affected by the schedule</td>
</tr>
<tr>
<td></td>
<td>• <strong>enum:</strong> ['DISABLED', 'RECOMMEND', 'MANUAL', 'AUTOMATIC', 'COLLECTION']</td>
</tr>
<tr>
<td>acceptedByUserForMaintenanceWindow</td>
<td>• <strong>type:</strong> boolean</td>
</tr>
<tr>
<td></td>
<td>• <strong>description:</strong> Boolean signifying acceptance or rejection of the action.</td>
</tr>
<tr>
<td>userName</td>
<td>• <strong>type:</strong> string</td>
</tr>
<tr>
<td></td>
<td>• <strong>description:</strong> The user who accepted the action for the maintenance window.</td>
</tr>
<tr>
<td>remainingTimeActiveInMs</td>
<td>• <strong>type:</strong> integer</td>
</tr>
<tr>
<td></td>
<td>• <strong>format:</strong> int64</td>
</tr>
<tr>
<td></td>
<td>• <strong>description:</strong> The amount of time that the schedule is going to be active at the time of call in milliseconds. This field will not be populated if the schedule is not currently active.</td>
</tr>
</tbody>
</table>
ActionScopesApiInputDTO

Description
Model to describe the request for Actions in multiple Scopes

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>actionInput</td>
<td>• description: List of requested actions</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: ActionApiInputDTO (on page 316)</td>
</tr>
</tbody>
</table>

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>scopes</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: List of uuid to use as scope</td>
</tr>
<tr>
<td></td>
<td>• items: {'type': 'string'}</td>
</tr>
<tr>
<td>relatedType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Get the actions for the entity type related to the scopes</td>
</tr>
<tr>
<td>limitEntities</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
<tr>
<td></td>
<td>• description: Limits the number of returned entities</td>
</tr>
</tbody>
</table>

ActiveDirectoryApiDTO

Description
Model to describe an Active Directory. It contains domain name and server name which are global to Turbonomic server.

Required Parameters

This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>domainName</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: The domain name of current active directory</td>
</tr>
<tr>
<td>loginProviderURI</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: The server name of current active directory</td>
</tr>
<tr>
<td>isSecure</td>
<td>• type: boolean</td>
</tr>
<tr>
<td></td>
<td>• description: The server name of current active directory</td>
</tr>
<tr>
<td>groups</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: Active directory groups defined in Ops Mgr for current active directory</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: ActiveDirectoryGroupApiDTO (on page 322)</td>
</tr>
</tbody>
</table>

ActiveDirectoryGroupApiDTO

Description

Model to describe an Active Directory Group. Active Directory groups are used to manage user authentication. You can specify role and scope for the group, and any member of the AD group can log into Turbonomic with those privileges.

Required Parameters

This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>type: array</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>type: string</td>
</tr>
<tr>
<td>className</td>
<td>type: string</td>
</tr>
<tr>
<td>type</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: The user type for current active directory group</td>
</tr>
<tr>
<td>roleName</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: The user role name of current active directory group</td>
</tr>
<tr>
<td>scope</td>
<td>type: array</td>
</tr>
<tr>
<td></td>
<td>description: The scope of current active directory group</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: GroupApiDTO (on page 344)</td>
</tr>
</tbody>
</table>

AddObjectApiDTO

Description
Model to describe an add change in the scenario

Required Parameters
This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>projectionDays</td>
<td>• <em>type</em>: array</td>
</tr>
<tr>
<td></td>
<td>• <em>description</em>: List of projection days, indicate when to apply the changes</td>
</tr>
<tr>
<td></td>
<td>• <em>items</em>: {'type': 'integer', 'format': 'int32'}</td>
</tr>
<tr>
<td>target</td>
<td>• <em>description</em>: Target of the change, entity or group</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: [BaseApiDTO (on page 324)]</td>
</tr>
<tr>
<td>count</td>
<td>• <em>type</em>: integer</td>
</tr>
<tr>
<td></td>
<td>• <em>format</em>: int32</td>
</tr>
<tr>
<td></td>
<td>• <em>description</em>: How many times to apply the add change</td>
</tr>
<tr>
<td>targetEntity</td>
<td>type: string</td>
</tr>
<tr>
<td>EntityType</td>
<td>• <em>description</em>: Type of entity to add from group target</td>
</tr>
</tbody>
</table>

BaseApiDTO

Description
Basic informations of an entity

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• <em>type</em>: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: [Link (on page 351)]</td>
</tr>
<tr>
<td>uuid</td>
<td>• <em>type</em>: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• <em>type</em>: string</td>
</tr>
<tr>
<td>className</td>
<td>• <em>type</em>: string</td>
</tr>
</tbody>
</table>
BusinessUnitApiDTO

Description
Model to describe the property of a business unit.

Required Parameters
This DTO has no required parameters.
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links               | • type: array  
  • Referenced DTO: Link (on page 351) |
| uuid                | • type: string |
| displayName         | • type: string |
| className           | • type: string |
| environmentType     | • type: string  
  • description: Environment type  
  • enum: ['CLOUD', 'ONPREM', 'HYBRID'] |
| discount            | • type: number  
  • format: float  
  • description: Entity discount percentage |
| priceAdjustment     | • description: Entity price adjustment percentage  
  • Referenced DTO: PriceAdjustmentDTO (on page 369) |
| accountId           | • type: string  
  • description: Account ID |
| master              | • type: boolean  
  • description: Flag which shows whether this account is master or not |
| associatedTargetId  | • type: integer  
  • format: int64  
  • description: Target which is associated with this account |
| budget              | • description: Budget of the business unit, user only need to set value and units(monthly)  
  • Referenced DTO: StatApiDTO (on page 399) |
| businessUnitType    | • type: string  
  • description: Type of the business unit instance  
  • enum: ['BUDGET', 'DISCOUNT', 'PRICE_ADJUSTMENT', 'DISCOVERED'] |
| cloudType           | • type: string  
  • description: Type of the cloud target which is related to current business account.  
  • enum: ['AWS', 'AZURE', 'GCP', 'UNKNOWN'] |
| riSupported         | • type: boolean  
  • description: Flag which shows whether this account is RI supported |
| childrenBusinessUnits | • type: array  
  • description: UUIDs of the discovered children business units that will share the budget or discounts configuration of this business unit.  
  • Referenced DTO: TargetApiDTO (on page 411) |
| costPrice           | • type: number  
  • format: float  
  • description: Cost price per Hour |
| severity            | • type: string  
  • description: Calculated using the highest severity of the member entities  
  • enum: ['UNKNOWN', 'NORMAL', 'MINOR', 'MAJOR', 'CRITICAL'] |
| membersCount        | • type: integer  
  • format: int32  
  • description: Number of members of the business unit |
| memberType          | • type: string  
  • description: The type of service entities comprising the business unit |
| related             | • description: The rate card and the custom pricing information the business unit is using  
  • Referenced DTO: BusinessUnitRelatedApiDTO (on page 328) |
| resourceGroupsCount | • type: integer  
  • format: int32  
  • description: The number of Resource Groups belonging to the business unit |
| displayable         | • type: boolean  
  • description: Whether business unit is displayable or not |
| pricingIdentifiers  | • type: object  
  •◦ type: string |
| hasRelatedTarget    | • type: boolean  
  • description: Flag which shows whether this account is associated with target or not.  
  • DEPRECATED: use associatedTargetId instead. |
BusinessUnitApiInputDTO

Description
Model to describe the parameters for creating a business unit.

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Name of the business unit</td>
</tr>
</tbody>
</table>

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>budget</td>
<td>• description: Budget of the business unit, user only need to set value • Referenced DTO: StatApiDTO (on page 399)</td>
</tr>
<tr>
<td>childrenBusinessUnits</td>
<td>• type: array • description: UUIDs of the discovered children business units, that will share the budget or discounts configuration of this business unit. • items: {'type': 'string'}</td>
</tr>
<tr>
<td>discount</td>
<td>• type: number • format: float • description: Business unit enterprise-level discount percentage. It will come to effect if cloud service or template-level discounts are not configured.</td>
</tr>
<tr>
<td>priceAdjustment</td>
<td>• description: Business unit enterprise-level price adjustment percentage. It will come to effect if cloud service or template-level discounts are not configured. • Referenced DTO: PriceAdjustmentDTO (on page 369)</td>
</tr>
<tr>
<td>targets</td>
<td>• type: array • items: {'type': 'string'}</td>
</tr>
<tr>
<td>nameWithBusinessAccountType</td>
<td>• type: string</td>
</tr>
</tbody>
</table>

BusinessUnitPriceAdjustmentApiDTO

Description
Price adjustment values for cloud services and templates related to a business unit. The price adjustment configured on an user-defined business unit apply to cloud services and templates offered by the children business units.
Appendix V: DTO Index

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| servicePriceAdjustments | • type: array  
                        |  
                        |  • description: Price adjustment information for the related cloud services and templates.  
                        |  • Referenced DTO: CloudServicePriceAdjustmentApiDTO (on page 329)          |
| serviceDiscounts       | • type: array  
                        |  
                        |  • description: Discount information for the related cloud services and templates.  
                        |  • Referenced DTO: CloudServicePriceAdjustmentApiDTO (on page 329)          |

BusinessUnitRelatedApiDTO

Description
Model to describe relationship between a business unit and its related rate cards and price adjustments

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| rateCard      | • description: Rate Card related to this Business Unit.  
               |  • Referenced DTO: BaseApiDTO (on page 324)                                |
| priceAdjustment | • description: Price Adjustment related to this Business Unit.  
                |  • Referenced DTO: BaseApiDTO (on page 324)                                |

BusinessUserSessionApiDTO

Description
Session information for a connection established by BusinessUser to an entity (VM or other)
Required Parameters

This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: Link [on page 351]</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>businessUserUuid</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: UUID of the connected BusinessUser</td>
</tr>
<tr>
<td>connectedEntityUuid</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: UUID of the entity that user has a connection to</td>
</tr>
<tr>
<td>duration</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int64</td>
</tr>
<tr>
<td></td>
<td>• description: Time elapsed since the session start in seconds- sessions are always timed</td>
</tr>
</tbody>
</table>

CloudServicePriceAdjustmentApiDTO

Description

Price adjustments for cloud service and related templates specified for a certain pricing model.

Required Parameters

This DTO has no required parameters.
Appendix V: DTO Index

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• <strong>type</strong>: array&lt;br&gt;• <strong>Referenced DTO</strong>: Link <em>(on page 351)</em>&lt;br&gt;<strong>Referenced DTO</strong>: Link <em>(on page 351)</em></td>
</tr>
<tr>
<td>uuid</td>
<td>• <strong>type</strong>: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• <strong>type</strong>: string</td>
</tr>
<tr>
<td>className</td>
<td>• <strong>type</strong>: string</td>
</tr>
<tr>
<td>environmentType</td>
<td>• <strong>type</strong>: string&lt;br&gt;• <strong>description</strong>: Environment type&lt;br&gt;• <strong>enum</strong>: ['CLOUD', 'ONPREM', 'HYBRID']</td>
</tr>
<tr>
<td>discount</td>
<td>• <strong>type</strong>: number&lt;br&gt;• <strong>format</strong>: float&lt;br&gt;• <strong>description</strong>: Entity discount percentage</td>
</tr>
<tr>
<td>priceAdjustment</td>
<td>• <strong>description</strong>: Entity price adjustment percentage&lt;br&gt;• <strong>Referenced DTO</strong>: PriceAdjustmentDTO <em>(on page 369)</em></td>
</tr>
<tr>
<td>pricingModel</td>
<td>• <strong>type</strong>: string&lt;br&gt;• <strong>description</strong>: Pricing model, 'On demand' for time-based, 'Reserved' for coupon-based, 'Spot' for customer bidding&lt;br&gt;• <strong>enum</strong>: ['ON_DEMAND', 'RESERVED', 'SPOT']</td>
</tr>
<tr>
<td>templateDiscounts</td>
<td>• <strong>type</strong>: array&lt;br&gt;• <strong>description</strong>: Discount values for the templates offered by the cloud service under certain pricing model.&lt;br&gt;• <strong>Referenced DTO</strong>: TemplatePriceAdjustmentDTO <em>(on page 417)</em></td>
</tr>
<tr>
<td>templatePriceAdjustments</td>
<td>• <strong>type</strong>: array&lt;br&gt;• <strong>description</strong>: Price adjustment values for the templates offered by the cloud service under certain pricing model.&lt;br&gt;• <strong>Referenced DTO</strong>: TemplatePriceAdjustmentDTO <em>(on page 417)</em></td>
</tr>
</tbody>
</table>

CloudServicePricingModelApiDTO

Description
Cloud service + pricing model pair that is available for a business unit.

Required Parameters
This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>environmentType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Environment type</td>
</tr>
<tr>
<td></td>
<td>• enum: ['CLOUD', 'ONPREM', 'HYBRID']</td>
</tr>
<tr>
<td>discount</td>
<td>• type: number</td>
</tr>
<tr>
<td></td>
<td>• format: float</td>
</tr>
<tr>
<td></td>
<td>• description: Entity discount percentage</td>
</tr>
<tr>
<td>priceAdjustment</td>
<td>• description: Entity price adjustment percentage</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: PriceAdjustmentDTO (on page 369)</td>
</tr>
<tr>
<td>pricingModel</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Pricing model, 'On demand' for time-based, 'Reserved' for coupon-based, 'Spot' for customer bidding</td>
</tr>
<tr>
<td></td>
<td>• enum: ['ON_DEMAND', 'RESERVED', 'SPOT']</td>
</tr>
</tbody>
</table>

ConfigChangesApiDTO

Description
Policies and Settings changes in the scenario

Required Parameters
This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| addPolicyList      | • type: array  
                    • description: List of Placement Policies to add  
                    • Referenced DTO: PolicyApiDTO (on page 365) |
| removePolicyList   | • type: array  
                    • description: List of Placement Policies to remove  
                    • Referenced DTO: PolicyApiDTO (on page 365) |
| automationSettingList | • type: array  
                        • description: List of automation settings  
                        • Referenced DTO: SettingApiDTOString (on page 395) |
| removeConstraintList | • type: array  
                         • description: List of constraints to remove  
                         • Referenced DTO: RemoveConstraintApiDTO (on page 379) |
| riSettingList      | • type: array  
                    • description: List of Reserved Instance settings  
                    • Referenced DTO: SettingApiDTO (on page 393) |
| osMigrationSettingList | • type: array  
                          • description: List of OS migration settings  
                          • Referenced DTO: SettingApiDTOString (on page 395) |
| includedCoupons    | • description: List of Included Coupons (RIs) and related information  
                    • Referenced DTO: IncludedCouponsApiDTO (on page 346) |
| subscription       | • description: Subscription  
                    • Referenced DTO: BusinessUnitApiDTO (on page 325) |

ConstraintApiDTO

Description

Model to describe the property of constraints, corresponding to entities constraints view in ui.

Required Parameters

This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array&lt;br&gt;• Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>relation</td>
<td>• type: string&lt;br&gt;• enum: ['sold', 'bought']</td>
</tr>
<tr>
<td>entityType</td>
<td>• type: string&lt;br&gt;• description: entity type of providers or consumers</td>
</tr>
<tr>
<td>relatedEntities</td>
<td>• type: array&lt;br&gt;• description: if relation is sold they are consumers, if bought they are providers&lt;br&gt;• Referenced DTO: ServiceEntityApiDTO (on page 391)</td>
</tr>
<tr>
<td>numPotentialEntities</td>
<td>• type: integer&lt;br&gt;• format: int32&lt;br&gt;• description: how many other providers/consumers can fulfill the constraint</td>
</tr>
<tr>
<td>placementOptions</td>
<td>• type: array&lt;br&gt;• description: A list of constraints prevent finding better placement for an entity&lt;br&gt;• Referenced DTO: PlacementOptionApiDTO (on page 362)</td>
</tr>
</tbody>
</table>

ConstraintApiInputDTO

Description
Model to describe the property of constraints

Required Parameters
This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>relation</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• enum: ['sold', 'bought']</td>
</tr>
<tr>
<td>placementOptions</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: A list of constraints prevent finding better placement for an entity</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: PlacementOptionApiInputDTO (on page 363)</td>
</tr>
</tbody>
</table>

CpuModelApiDTO

Description

Model to describe a Template: contains the resources used to Deploy a VM or to Add Workload/Supply in a Plan

Required Parameters

This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>numCores</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
<tr>
<td></td>
<td>• description: Number of Cores</td>
</tr>
<tr>
<td>speed</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
<tr>
<td></td>
<td>• description: Speed</td>
</tr>
<tr>
<td>scalingFactor</td>
<td>• type: number</td>
</tr>
<tr>
<td></td>
<td>• format: double</td>
</tr>
<tr>
<td></td>
<td>• description: Scaling Factor</td>
</tr>
<tr>
<td>modelName</td>
<td>• type: string</td>
</tr>
</tbody>
</table>
CriteriaOptionApiDTO

Description
Generic model used to describe a search criteria option

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: value</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: value to display, more readable</td>
</tr>
<tr>
<td>subValues</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: possible sub-values associated with the main value</td>
</tr>
<tr>
<td></td>
<td>• items: {'type': 'string}</td>
</tr>
</tbody>
</table>

DemandEntityInfoDTO

Description
Model to describe a reservation entity

Required Parameters
This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links       | • type: array  
  • Referenced DTO: [Link](on page 351) |
| uuid        | • type: string |
| displayName | • type: string |
| className   | • type: string |
| template    | • Referenced DTO: [BaseApiDTO](on page 324) |
| deploymentProfile | • Referenced DTO: [BaseApiDTO](on page 324) |
| operationalCost | • type: string |
| placements  | • Referenced DTO: [PlacementInfoDTO](on page 361) |

DemandReservationApiDTO

Description

Basic informations of an entity

Required Parameters

This DTO has no required parameters.
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td><code>type: array</code>&lt;br&gt;Referenced DTO: [Link](on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td><code>type: string</code></td>
</tr>
<tr>
<td>displayName</td>
<td><code>type: string</code></td>
</tr>
<tr>
<td>className</td>
<td><code>type: string</code></td>
</tr>
<tr>
<td>prefix</td>
<td><code>type: string</code></td>
</tr>
<tr>
<td>count</td>
<td><code>type: integer</code>&lt;br&gt;<code>format: int32</code></td>
</tr>
<tr>
<td>status</td>
<td><code>type: string</code></td>
</tr>
<tr>
<td>reserveDateTime</td>
<td><code>type: string</code></td>
</tr>
<tr>
<td>expireDateTime</td>
<td><code>type: string</code></td>
</tr>
<tr>
<td>deployDateTime</td>
<td><code>type: string</code></td>
</tr>
<tr>
<td>reserveCount</td>
<td><code>type: integer</code>&lt;br&gt;<code>format: int32</code></td>
</tr>
<tr>
<td>deployCount</td>
<td><code>type: integer</code>&lt;br&gt;<code>format: int32</code></td>
</tr>
<tr>
<td>placementExpirationDateTime</td>
<td><code>type: string</code></td>
</tr>
<tr>
<td>placementResultMessage</td>
<td><code>type: string</code>&lt;br&gt;Details of placement during failure or success</td>
</tr>
<tr>
<td>constraintInfos</td>
<td><code>type: array</code>&lt;br&gt;Referenced DTO: [ReservationConstraintApiDTO](on page 381)]</td>
</tr>
<tr>
<td>demandEntities</td>
<td><code>type: array</code>&lt;br&gt;Referenced DTO: [DemandEntityInfoDTO](on page 335)]</td>
</tr>
</tbody>
</table>

### DemandReservationParametersDTO

**Description**

No description available.
Appendix V: DTO Index

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>placementParameters</td>
<td>• description: Placement parameters</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: PlacementParametersDTO (on page 363)</td>
</tr>
</tbody>
</table>

DeploymentProfileApiDTO

Description

Model to describe a Deployment Profile, including target and provider entity parameters

Required Parameters

This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>account</td>
<td>• description: Business account related to the Deployment Profile</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
<tr>
<td>deployParameters</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: Target and Provider parameters of the Deployment Profile</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: DeploymentProfileTargetApiDTO (on page 339)</td>
</tr>
</tbody>
</table>

DeploymentProfileParamApiDTO

Description

Provider-specific Deployment Profile parameters
Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| parameterType  | • type: string  
                 • description: Parameter type. For vCenter, this can be a folder, osConfiguration, or image. For all other technologies, this must be an image.  
                 • enum: ['image', 'folder', 'osConfiguration'] |
| properties     | • type: array  
                 • description: A NameValueInputDTO describing the name and value of the parameter.  
                 • Referenced DTO: NameValueInputDTO (on page 357) |

DeploymentProfileProviderApiDTO

Description
Deployment profile Provider properties

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| provider  | • description: Provider UUID  
                 • Referenced DTO: BaseApiDTO (on page 324) |
| parameters| • type: array  
                 • description: A DeploymentProfileParamApiDTO describing the parameters for the provider entities  
                 • Referenced DTO: DeploymentProfileParamApiDTO (on page 338) |

DeploymentProfileTargetApiDTO

Description
Deployment Profile Target properties
Appendix V: DTO Index

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| targetType | • type: string  
• description: Target type for the deployment profile  
• enum: ['vCenter', 'AWS', 'Azure', 'Softlayer'] |
| providers | • type: array  
• description: DeploymentProfileProviderApiInputDTO describing the provider entity parameters  
• Referenced DTO: [DeploymentProfileProviderApiDTO](on page 339) |

DesktopPoolEntityAspectApiDTO

Description
No description available.

Required Parameters
This DTO has no required parameters.

Optional Parameters

EntityActionsApiDTO

Description
Basic informations of an entity + actions

Required Parameters
This DTO has no required parameters.
Appendix V: DTO Index

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>realtimeMarketReference</td>
<td>• description: In case of a Plan Market Entity, this contains the original entity from the Real Time Market</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
<tr>
<td>actions</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: List of actions for this entity</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: ActionApiDTO (on page 314)</td>
</tr>
</tbody>
</table>

Entity Aspect

Description

Parent class for entity aspects

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>• type: string</td>
</tr>
</tbody>
</table>

Optional Parameters

This DTO has no optional parameters.

Entity Price DTO

Description

Context-specific price. For example the base rate of a template in the context of certain business unit.

Required Parameters

This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links     | • type: array  
            • Referenced DTO: Link (on page 351) |
| uuid      | • type: string |
| displayName | • type: string |
| className | • type: string |
| price     | • type: number  
            • format: float  
            • description: Price in the context of a related entity |

EntityStatsApiDTO

Description
Basic informations of an entity + statistics

Required Parameters
This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: [Link](on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>environmentType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Environment type</td>
</tr>
<tr>
<td></td>
<td>• enum: ['CLOUD', 'ONPREM', 'HYBRID']</td>
</tr>
<tr>
<td>realtimeMarketReference</td>
<td>• description: In case of a Plan Market Entity, this contains the original entity from the Real Time Market</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: [BaseApiDTO](on page 324)</td>
</tr>
<tr>
<td>stats</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: Collected monitoring statistics</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: [StatSnapshotApiDTO](on page 405)</td>
</tr>
</tbody>
</table>

FilterApiDTO

Description

Model used to filter Groups or Entities, every filter is built using a filterType + expType + expVal

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>caseSensitive</td>
<td>• type: boolean</td>
</tr>
<tr>
<td></td>
<td>• description: Whether the regex is case sensitive</td>
</tr>
<tr>
<td>expType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Type of comparator used while building a filter, the allowable values are 'EQ', 'NEQ' for strings, 'EQ', 'NEQ', 'GT', 'LT', 'GTE', 'LTE' for numbers</td>
</tr>
<tr>
<td></td>
<td>• enum: ['EQ', 'NEQ', 'GT', 'LT', 'GTE', 'LTE']</td>
</tr>
<tr>
<td>expVal</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Regex to be searched for</td>
</tr>
<tr>
<td>filterType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Internal name for criterion such as pmsByName, pmsByDC, storageByPMCluster</td>
</tr>
</tbody>
</table>
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| singleLine | • type: boolean  
  • description: Whether the regex dot matches all characters including line break characters. Defaults to false. |

GroupApiDTO

Description

Model to describe a Group: a collection of Entities

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| groupType | • type: string  
  • description: The type of service entities comprising the group |
| isStatic  | • type: boolean  
  • description: True if group is static |
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links          | • type: array  
                • Referenced DTO: [Link](on page 351)                                    |
| uuid           | • type: string                                                             |
| displayName    | • type: string                                                             |
| className      | • type: string                                                             |
| environmentType| • type: string  
                • description: Environment type  
                • enum: ['CLOUD', 'ONPREM', 'HYBRID']                                        |
| entitiesCount  | • type: integer  
                • format: int32  
                • description: Number of entities of the Group                           |
| membersCount   | • type: integer  
                • format: int32  
                • description: Number of members of the Group                             |
| costPrice      | • type: number  
                • format: float  
                • description: Cost of the Group per Hour: sum of the costs of the member entities |
| severity       | • type: string  
                • description: Calculated using the highest severity of the member entities  
                • enum: ['UNKNOWN', 'NORMAL', 'MINOR', 'MAJOR', 'CRITICAL']             |
| state          | • type: string  
                • description: Calculated using the state of the member entities  
                • enum: ['UNKNOWN', 'ACTIVE']                                           |
| remoteld       | • type: string  
                • description: The identifier of this Group on the remote target, if applicable |
| scope          | • type: array  
                • description: Scope within which the criteria have to be applied to the list of specific entity type  
                • Referenced DTO: [FilterApiDTO](on page 343)                        |
| memberUuidList | • type: array  
                • description: Uuid list for members of the group - if group is static  
                • Referenced DTO: [StatSnapshotApiDTO](on page 405)                |
| temporary      | • type: boolean  
                • description: The Group is only valid for a limited period of time, it will be removed automatically |
| activeEntitiesCount | • type: integer  
                • format: int32  
                • description: The active entities count of a group                 |
| cloudType      | • type: string                                                             |
|               | • description: Type of the Cloud if environmentType = CLOUD.  
                • enum: ['AWS', 'AZURE', 'GCP', 'HYBRID', 'UNKNOWN']            |
| source         | • description: The Source of the Group  
                • Referenced DTO: [TargetApiDTO](on page 411)               |
| memberTypes    | • type: array  
                • description: The types for immediate members of the group.          |
| entityTypes    | • type: array  
                • description: The types of entities contained in the group. This includes types of entities in nested levels of the group if the group is nested. |
| aspects        | • type: object  
                • description: Additional info about the Group categorized as Aspects  
                • Referenced DTO: [EntityAspect](on page 341)                    |
| vendorIds      | • type: object  
                • description: The mapping of target identifier to vendor-provided identity of this group, if the group is discovered  
                • Referenced DTO: [EntityAspect](on page 341)                    |
HttpProxyDTO

Description
Model to describe http proxy settings, like username, password, port number and host

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>isProxyEnabled</td>
<td>type: boolean</td>
</tr>
<tr>
<td></td>
<td>description: whether proxy is enabled or not, required</td>
</tr>
</tbody>
</table>

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>type: array</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: [Link](on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>type: string</td>
</tr>
<tr>
<td>className</td>
<td>type: string</td>
</tr>
<tr>
<td>proxyHost</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: proxy host</td>
</tr>
<tr>
<td>proxyPortNumber</td>
<td>type: integer</td>
</tr>
<tr>
<td></td>
<td>format: int32</td>
</tr>
<tr>
<td></td>
<td>description: proxy host port number</td>
</tr>
<tr>
<td>userName</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: proxy username</td>
</tr>
<tr>
<td>password</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: proxy password</td>
</tr>
<tr>
<td>portNumber</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: proxy host port number. DEPRECATED: use proxyPortNumber instead.</td>
</tr>
</tbody>
</table>

IncludedCouponsApiDTO

Description
Included RI/Coupon and related information in the scenario
Appendix V: DTO Index

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| includedCouponOidsList  | • type: array  
• description: User selected list of RIs to be included in plans  
• items: {'type': 'int64' |
| iswhiteList             | • type: boolean                                                             |

InputFieldApiDTO

Description
Basic informations of an entity

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| name      | • type: string  
• description: Name of the field, used for field identification. |
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: [Link](on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>value</td>
<td>• type: string, description: Field value. Used if field holds primitive value (String, number or boolean)</td>
</tr>
<tr>
<td>defaultValue</td>
<td>• type: string, description: Default value of the field</td>
</tr>
<tr>
<td>isMandatory</td>
<td>• type: boolean, description: Whether the field is mandatory. Valid targets must have all the mandatory fields set.</td>
</tr>
<tr>
<td>isSecret</td>
<td>• type: boolean, description: Whether the field is secret. This means, that field value is stored in an encrypted value and not shown in any logs.</td>
</tr>
<tr>
<td>isTargetDisplayName</td>
<td>• type: boolean, description: Whether the field is used as a target display name.</td>
</tr>
<tr>
<td>valueType</td>
<td>• type: string, description: Type of the value this field holds</td>
</tr>
<tr>
<td></td>
<td>• enum: ['STRING', 'BOOLEAN', 'NUMERIC', 'LIST', 'OBJECT', 'GROUP_SCOPE']</td>
</tr>
<tr>
<td>specificValueType</td>
<td>• type: string, description: A specific Type of the value that can't be described in valueType</td>
</tr>
<tr>
<td>description</td>
<td>• type: string, description: Additional information about what the input to the field should be</td>
</tr>
<tr>
<td>verificationRegex</td>
<td>• type: string, description: The regex pattern that needs to be satisfied for the input field text</td>
</tr>
<tr>
<td>groupProperties</td>
<td>• type: array, description: Group scope structure, filled if this field represents group scope value</td>
</tr>
<tr>
<td></td>
<td>• items: {'type': 'array', 'items': {'type': 'string'}}</td>
</tr>
<tr>
<td>allowedValues</td>
<td>• type: array, description: Potential values for this field. If nonempty, value must be one of the choices in the list.</td>
</tr>
<tr>
<td></td>
<td>• items: {'type': 'string'}</td>
</tr>
<tr>
<td>dependencyKey</td>
<td>• type: string, description: A key of a dependency account value field. If this value is not set, field is declared without any dependencies. If an annotated account value field has a dependency it means that its presence is logically driven by the dependency field. This field is expected to be available ONLY when field specified by @code dependencyKey has value @code {dependencyValue}. If this field is not available because of unmet dependency, this field will not be validated and stored in target configuration data. If a</td>
</tr>
</tbody>
</table>
LicenseApiDTO

Description
Model to describe properties of a license

Required Parameters
This DTO has no required parameters.
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| **links**      | • **type**: array  
                 | • Referenced DTO: [Link](on page 351)            |
| **uuid**       | • **type**: string                                |
| **displayName**| • **type**: string                                |
| **className**  | • **type**: string                                |
| **licenseOwner**| • **type**: string  
                | • **description**: The owner of current license |
| **email**      | • **type**: string  
                | • **description**: The email of current license |
| **expirationDate**| • **type**: string  
                | • **description**: The expiration date of current license |
| **features**   | • **type**: array  
                | • **description**: List of features contained in current license  
                | • **uniqueItems**: True  
                | • **items**: {'type': 'string'} |
| **numLicensedEntities**| • **type**: integer  
                | • **format**: int32  
                | • **description**: The number of licensed sockets |
| **numInUseEntities**| • **type**: integer  
                | • **format**: int32  
                | • **description**: The number of sockets in use |
| **edition**    | • **type**: string  
                | • **description**: The edition of the current license |
| **filename**   | • **type**: string  
                | • **description**: The name of the uploaded file |
| **countedEntity**| • **type**: string  
                | • **description**: Indicates which entity type is counted with respect to licensing  
                | • **enum**: ['VM', 'SOCKET'] |
| **expirationDateTime**| • **type**: string  
                | • **format**: date-time |
| **errorReasons**| • **type**: array  
                | • **description**: Indicate why the license is invalid  
                | • **uniqueItems**: True  
                | • **items**: {'type': 'string', 'enum': ['DUPLICATE_LICENSE', 'EXPIRED', 'INVALID_EMAIL', 'INVALID_CONTENT_TYPE', 'INVALID_LICENSE_KEY', 'INVALID_LICENSE_TYPE_CWOM_ONLY', 'INVALID_LICENSE_TYPE_FREEMIUM_NOT_ALLOWED', 'INVALID_FEATURE_SET', 'INCOMPATIBLE']} |
| **isExpired**  | • **type**: boolean                                |
| **isValid**    | • **type**: boolean                                |
Link

Description
No description available.

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• ◦ attribute: True</td>
</tr>
<tr>
<td>href</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• ◦ attribute: True</td>
</tr>
</tbody>
</table>

LoadChangesApiDTO

Description
Workload utilization changes in the scenario

Required Parameters
This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| baselineDate      | type: string  
|                   | description: Baseline date |
| peakBaselineList  | type: array  
|                   | description: List of peak baseline changes  
|                   | Referenced DTO: PeakBaselineApiDTO (on page 361) |
| utilizationList   | type: array  
|                   | description: List of utilization changes  
|                   | Referenced DTO: UtilizationApiDTO (on page 421) |
| maxUtilizationList| type: array  
|                   | description: List of max utilization changes  
|                   | Referenced DTO: MaxUtilizationApiDTO (on page 356) |
| overlayStatsList  | type: array  
|                   | description: List of stat changes to override the plan commodities values with the provided input  
|                   | Referenced DTO: EntityStatsApiDTO (on page 342) |

LogEntryApiDTO

Description

Basic informations of an entity

Required Parameters

This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links                | type: array
|                      | Referenced DTO: Link (on page 351) |
| uuid                 | type: string |
| displayName          | type: string |
| className            | type: string |
| logActionTime        | type: integer
|                      | format: int64 |
| targetSE             | type: string |
| targetUuid           | type: string |
| currentSE            | type: string |
| currentSEUuid        | type: string |
| newSE                | type: string |
| newSEUuid            | type: string |
| category             | type: string |
| subCategory          | type: string |
| description          | type: string |
| shortDescription     | type: string |
| state                | type: string |
| severity             | type: string |
| count                | type: integer
|                      | format: int64 |
| total                | type: integer
|                      | format: int64 |
| user                 | type: string |
| type                 | type: string |
| importance           | type: number
|                      | format: float |
| reasonCommodity      | type: string |
| reasonCommodityRelationType | description: The commodity that was the reason for the action. |
| logDBId              | type: integer
|                      | format: int64 |
LoggingApiDTO

Description
Model to describe the component logging level

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>componentLoggingLevel</td>
<td>• type: object</td>
</tr>
<tr>
<td></td>
<td>• description: A map from component name to logging level, component could be</td>
</tr>
<tr>
<td></td>
<td>Discovery, Monitoring, Presentation, Abstraction, Analysis, Extension; logging levels could be INFO, WARN, DEBUG, TRACE</td>
</tr>
<tr>
<td></td>
<td>• ◦ type: string</td>
</tr>
<tr>
<td></td>
<td>• ◦ enum: ['WARN', 'INFO', 'DEBUG', 'TRACE']</td>
</tr>
</tbody>
</table>

MarketApiDTO

Description
Model to describe a Market

Required Parameters
This DTO has no required parameters.
### Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>state</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: State</td>
</tr>
<tr>
<td></td>
<td>• enum: ['CREATED', 'READY_TO_START', 'RUNNING', 'COPYING', 'SUCCEEDED', 'STOPPING', 'STOPPED', 'DELETING']</td>
</tr>
<tr>
<td>stateProgress</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
<tr>
<td></td>
<td>• description: State progress indicated by a percentage, used in RUNNING state</td>
</tr>
<tr>
<td>scenario</td>
<td>• description: Scenario used to create the Plan, only for Plan Market</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: ScenarioApiDTO (on page 386)</td>
</tr>
<tr>
<td>saved</td>
<td>• type: boolean</td>
</tr>
<tr>
<td></td>
<td>• description: Shows if a Plan Market is saved</td>
</tr>
<tr>
<td>unplacedEntities</td>
<td>• type: boolean</td>
</tr>
<tr>
<td></td>
<td>• description: Unplaced entities, shows if there are entities that could not be placed in the Plan Market</td>
</tr>
<tr>
<td>runDate</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Shows when a Plan Market started running</td>
</tr>
<tr>
<td>runCompleteDate</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Shows when a Plan Market was completed</td>
</tr>
<tr>
<td>violations</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: Violations generated in a Plan Market</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: ServiceEntityApiDTO (on page 391)</td>
</tr>
<tr>
<td>relatedPlanMarkets</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: Related Plan Markets generated by particular Scenarios</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: MarketApiDTO (on page 354)</td>
</tr>
<tr>
<td>environmentType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Environment type</td>
</tr>
<tr>
<td></td>
<td>• enum: ['HYBRID', 'CLOUD', 'ONPREM']</td>
</tr>
<tr>
<td>planDestination</td>
<td>• description: Plan destination where the plan results would be stored, only for Plan Market.</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
</tbody>
</table>
MasterImageEntityAspectApiDTO

Description
No description available.

Required Parameters
This DTO has no required parameters.

Optional Parameters

MaxUtilizationApiDTO

Description
Model to describe a max utilization change in the scenario

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>projectionDay</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
<tr>
<td></td>
<td>• description: Projection day, indicate when to apply the change</td>
</tr>
<tr>
<td>target</td>
<td>• description: Target of the change, entity or group. If empty, assumes global scope</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
<tr>
<td>maxPercentage</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
<tr>
<td></td>
<td>• description: Max utilization threshold percentage change</td>
</tr>
<tr>
<td>selectedEntityType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Type of entity to select in global scope configuration</td>
</tr>
<tr>
<td>globalScope</td>
<td>• type: boolean</td>
</tr>
</tbody>
</table>
MigrateObjectApiDTO

Description
Model to describe a replace change in the scenario

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>destination</td>
<td>• description: Destination of the migration</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
<tr>
<td>source</td>
<td>• description: Source of the migration, entity or group</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
</tbody>
</table>

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>projectionDay</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
<tr>
<td></td>
<td>• description: Projection day, indicate when to apply the change</td>
</tr>
<tr>
<td>destinationEntityType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Entity type of migration destination, default is VirtualMachine. Case 1, migration source VirtualMachine: destination entity must be VirtualMachine. Case 2, migration source Database Server: destination entity can be VirtualMachine or DatabaseServer.</td>
</tr>
<tr>
<td></td>
<td>• enum: ['VirtualMachine', 'DatabaseServer']</td>
</tr>
<tr>
<td>removeNonMigratingWorkloads</td>
<td>• type: boolean</td>
</tr>
<tr>
<td></td>
<td>• description: If true, remove the existing Virtual Machines, Databases and Database Servers from the scope that are not migrating, so that only the newly migrated entities are included in the plan results.</td>
</tr>
</tbody>
</table>

NameValueInputDTO

Description
Deployment Profile provider parameters

Required Parameters
This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| name      | • type: string  
           | • description: Parameter type. For vCenter, this can be a name or id. For all other target types, this must be an id.  
           | • enum: ['name', 'id']  |
| value     | • type: string |

NoDetailsApiDTO

Description
No description available.

Required Parameters
This DTO has no required parameters.

Optional Parameters

PMDiskAspectApiDTO

Description
Model to describe the Disk's attributes

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>• type: string</td>
</tr>
</tbody>
</table>
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| diskCapacity | • type: integer  
|             | • format: int64  
|             | • description: Disk Capacity                                                 |
| diskRole    | • type: string  
|             | • description: Disk Role                                                     |
|             | • enum: ['CAPACITY', 'CACHE']                                                |

PMDiskGroupAspectApiDTO

Description
Model to describe Physical Machine's DiskGroup attributes

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>• type: string</td>
</tr>
</tbody>
</table>

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| disks     | • type: array  
|           | • description: Disks                                                        |
|           | • Referenced DTO: PMDiskAspectApiDTO (on page 358)                          |

PMEntityAspectApiDTO

Description
No description available.

Required Parameters
This DTO has no required parameters.
Optional Parameters

PatchedTargetDataApiDTO

Description
Model to describe a patched target data.

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>patchedFields</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: Patched target fields.</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: PatchedTargetFieldApiDTO</td>
</tr>
<tr>
<td></td>
<td>(on page 360)</td>
</tr>
<tr>
<td>probeType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Probe type of the patched target.</td>
</tr>
</tbody>
</table>

Optional Parameters

PatchedTargetFieldApiDTO

Description
Model to describe a field in patched target data.

Required Parameters

This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>fieldName</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Patched field name.</td>
</tr>
<tr>
<td>fieldValue</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Patched field value.</td>
</tr>
</tbody>
</table>
PeakBaselineApiDTO

Description
Model to describe a peak baseline change in the scenario

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>date</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Date of the utilization peak</td>
</tr>
<tr>
<td>target</td>
<td>• description: Target of the change</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
</tbody>
</table>

PlacementInfoDTO

Description
No description available.

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>computeResources</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: ResourceApiDTO (on page 384)</td>
</tr>
<tr>
<td>storageResources</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: ResourceApiDTO (on page 384)</td>
</tr>
<tr>
<td>networkResources</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: ResourceApiDTO (on page 384)</td>
</tr>
</tbody>
</table>
PlacementOptionApiDTO

Description
Model to describe the property of provider options.

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array&lt;br&gt;• Referenced DTO: Link (<a href="#">on page 351</a>)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>constraintType</td>
<td>• type: string&lt;br&gt;• description: constraint type, if a commodity is AccessCommodity, then the class name of that commodity is a constraint type&lt;br&gt;• enum: ['ApplicationCommodity', 'ClusterCommodity', 'DataCenterCommodity', 'DatastoreCommodity etc']</td>
</tr>
<tr>
<td>scope</td>
<td>• description: scope or placement policy&lt;br&gt;• Referenced DTO: BaseApiDTO (<a href="#">on page 324</a>)</td>
</tr>
<tr>
<td>target</td>
<td>• description: for placement policy, if it's an user placement policy is null.&lt;br&gt;• Referenced DTO: TargetApiDTO (<a href="#">on page 411</a>)</td>
</tr>
<tr>
<td>numPotentialEntities</td>
<td>• type: integer&lt;br&gt;• format: int32&lt;br&gt;• description: example: other VMs, which buys this constraint but not on this host</td>
</tr>
<tr>
<td>key</td>
<td>• type: string&lt;br&gt;• description: commodity key, this information is needed when trying to retrieve the interaction of providers or consumers</td>
</tr>
<tr>
<td>currentEntities</td>
<td>• type: array&lt;br&gt;• description: for consumers only. example: VMs, which are currently on this host per constraint they are buying&lt;br&gt;• Referenced DTO: ServiceEntityApiDTO (<a href="#">on page 391</a>)</td>
</tr>
</tbody>
</table>
PlacementOptionApiInputDTO

**Description**
Model to describe the property of provider options.

**Required Parameters**
This DTO has no required parameters.

**Optional Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>constraintType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: constraint type, if a commodity is AccessCommodity, then the class name of that commodity is a constraint type</td>
</tr>
<tr>
<td></td>
<td>• enum: ['ApplicationCommodity', 'ClusterCommodity', 'DataCenterCommodity', 'DatastoreCommodity etc']</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>key</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: commodity key, this information is needed when trying to retrieve the intersection of providers or consumers</td>
</tr>
</tbody>
</table>

PlacementParametersDTO

**Description**
No description available.

**Required Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>count</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
<tr>
<td></td>
<td>• description: Number of Virtual Machines to Place</td>
</tr>
</tbody>
</table>
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| templateID   | • **type**: string  
|              | • **description**: Template Uuid used for the Placement                      |
| entityNames  | • **type**: array  
|              | • **description**: Name of the Placed Virtual Machine                       |
|              | • **items**: {'type': 'string'}                                              |
| constraintIDs| • **type**: array  
|              | • **description**: List of uuids that will define the constraints that new VMs should be compliant to, allowed uuids are: Cluster, Datacenter, VirtualDataCenter, Network, Placement Policy  |
|              | • **uniqueItems**: True  
|              | • **items**: {'type': 'string'}                                              |
| geographicRedundancy | • **type**: boolean  
|                      | • **description**: Enable Geographic Redundancy                              |

### PlanDestinationApiDTO

#### Description

Model to describe a plan destination. A plan destination is an external destination where plan results can be uploaded.
Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| businessUnit| • **description**: Business account to plan destination.  
|             | • Referenced DTO: [BaseApiDTO](on page 324)                                 |
| exportDescription| • **type**: string  
|             | • **description**: Plan export description message on this plan destination. |
| exportProgressPercentage| • **type**: integer  
|             | • **format**: int32  
|             | • **description**: Plan export progress percentage on this plan destination. |
| exportState| • **type**: string  
|             | • **description**: Plan export state on this plan destination.  
|             | • **enum**: ['NONE', 'REJECTED', 'IN_PROGRESS', 'SUCCEEDED', 'FAILED']      |
| hasExportedData| • **type**: boolean  
|             | • **description**: Boolean, true if this plan destination has uploaded data. |
| market| • **description**: Plan market currently uploaded to plan destination.  
|             | • Referenced DTO: [BaseApiDTO](on page 324)                                 |
| numErrors| • **type**: integer  
|             | • **format**: int32  
|             | • **description**: Number of errors on the plan destination.                |

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links| • **type**: array  
|             | • Referenced DTO: [Link](on page 351)                                      |
| uuid| • **type**: string |
| displayName| • **type**: string |
| className| • **type**: string |

PolicyApiDTO

**Description**

Model to describe a Workload policy, used to manage the entities in the Environment. e.g. Restrict the number of VMs that can use a given datastore, Limit VM mobility by restricting a collection of VMs to a specified cluster or group of
hosts, Expand VM mobility by merging a number of clusters, Keep workload running on hosts that have the required licenses

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>type</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Type</td>
</tr>
<tr>
<td></td>
<td>• enum: ['AT_MOST_N', 'BIND_TO_GROUP', 'BIND_TO_COMPLEMENTARY_GROUP',</td>
</tr>
<tr>
<td></td>
<td>'MUST_RUN_TOGETHER', 'AT_MOST_N_BOUND', 'MERGE', 'BIND_TO_GROUP_AND_LICENSE',</td>
</tr>
<tr>
<td></td>
<td>'BIND_TO_GROUP_AND_GEO_REDUNDANCY']</td>
</tr>
<tr>
<td>name</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Name of the policy</td>
</tr>
<tr>
<td>enabled</td>
<td>• type: boolean</td>
</tr>
<tr>
<td></td>
<td>• description: Shows if the policy is enabled</td>
</tr>
<tr>
<td>capacity</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
<tr>
<td></td>
<td>• description: Indicate the max workload entities at the same time per placement entites, used when type is AT_MOST_N_BOUND</td>
</tr>
<tr>
<td>commodityType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Commodity type used for the policy</td>
</tr>
<tr>
<td>mergeType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Type of Group that is merged, used only when type is MERGE</td>
</tr>
<tr>
<td></td>
<td>• enum: ['Cluster', 'StorageCluster', 'DataCenter', 'DesktopPool']</td>
</tr>
<tr>
<td>consumerGroup</td>
<td>• description: Consumer Group, used when type is any but MERGE</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
<tr>
<td>providerGroup</td>
<td>• description: Provider Group, used when type is any but MERGE</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
<tr>
<td>mergeGroups</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: List of Groups to merge, used when type is MERGE</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
</tbody>
</table>
# PolicyApiInputDTO

## Description
Model to describe a Placement Policy

### Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| policyName | - type: string  
             - description: Name of the policy |
| type       | - type: string  
             - description: type  
             - enum: ['AT_MOST_N', 'BIND_TO_GROUP', 'BIND_TO_COMPLEMENTARY_GROUP', 'MUST_RUN_TOGETHER', 'AT_MOST_N_BOUND', 'MERGE', 'BIND_TO_GROUP_AND_LICENSE', 'BIND_TO_GROUP_AND_GEO_REDUNDANCY'] |

### Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| sellerUuid | - type: string  
             - description: Uuid of the provider Group in a Placement Policy |
| buyerUuid | - type: string  
             - description: Uuid of the consumer Group in a Placement Policy |
| mergeUuids | - type: array  
             - description: Uuids of the Groups in a Merge Policy  
             - items: {'type': 'string'} |
| mergeType | - type: string  
             - description: Group Type in a Merge Policy  
             - enum: ['Cluster', 'StorageCluster', 'DataCenter', 'DesktopPool'] |
| capacity | - type: integer  
             - format: int32  
             - description: For an AT_MOST_N or AT_MOST_N_BOUND policy, the number of consumers to allow on a provider entity |
| enabled | - type: boolean  
             - description: Whether to enable the policy |
PortChannelApiDTO

Description
Model to describe a Port Channel

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links     | • type: array  
           • Referenced DTO: Link (on page 351) |
| uuid      | • type: string |
| displayName | • type: string |
| className | • type: string |
| capacity  | • description: Capacity values  
           • Referenced DTO: StatValueApiDTO (on page 406) |
| values    | • description: Contains Average, Min, Max, Total  
           • Referenced DTO: StatValueApiDTO (on page 406) |
| units     | • type: string  
           • description: Units, used for Commodities stats. E.G. $/h |
| ports     | • type: array  
           • description: List of ports in the channel  
           • Referenced DTO: StatApiDTO (on page 399) |
| filters   | • type: array  
           • description: describe the grouping options used to generate the output  
           • Referenced DTO: StatFilterApiDTO (on page 401) |

PortsAspectApiDTO

Description
No description available.
Required Parameters
This DTO has no required parameters.

Optional Parameters

PriceAdjustmentDTO

Description
No description available.

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| type      | • type: string  
            • enum: ['DISCOUNT', 'INCREASE'] |
| value     | • type: number  
            • format: float |

ProbeApiDTO

Description
Model to describe a probe.
Appendix V: DTO Index

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| category  | • type: string  
            • description: Probe category. |
| id        | • type: integer  
            • format: int64  
            • description: Probe id. |
| type      | • type: string  
            • description: Probe type. |

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links     | • type: array  
            • Referenced DTO: Link [on page 351] |
| uuid      | • type: string |
| displayName | • type: string |
| className | • type: string |
| error     | • type: string  
            • description: Unexpected error while collecting probe information |

ProbePropertyApiDTO

Description
Model to describe a probe property

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| name      | • type: string  
            • description: Probe property name. |
| value     | • type: string  
            • description: Probe property value. |
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| probeId   | - type: integer  
            - format: int64  
            - description: Probe id. |
| targetId  | - type: integer  
            - format: int64  
            - description: Target id. |

**ProbePropertyNameValuePairApiDTO**

Description
Model to describe a name/value pair for probe properties.

**Required Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| name      | - type: string  
            - description: Probe property name. |
| value     | - type: string  
            - description: Probe property value. |

**Optional Parameters**
This DTO has no optional parameters.

**ProductCapabilityDTO**

Description
Model to describe Product Capability information.

**Required Parameters**
This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>deploymentMode</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Deployment mode, affects hiding / showing multiple UI views, options</td>
</tr>
<tr>
<td></td>
<td>• enum: ['SAAS', 'SERVER']</td>
</tr>
<tr>
<td>reportingEnabled</td>
<td>• type: boolean</td>
</tr>
</tbody>
</table>

ProductVersionDTO

Description
No description available.

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>versionInfo</td>
<td>• type: string</td>
</tr>
<tr>
<td>version</td>
<td>• type: string</td>
</tr>
<tr>
<td>build</td>
<td>• type: string</td>
</tr>
<tr>
<td>commit</td>
<td>• type: string</td>
</tr>
<tr>
<td>branch</td>
<td>• type: string</td>
</tr>
<tr>
<td>buildUser</td>
<td>• type: string</td>
</tr>
<tr>
<td>gitDescription</td>
<td>• type: string</td>
</tr>
<tr>
<td>updates</td>
<td>• type: string</td>
</tr>
<tr>
<td>marketVersion</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
</tbody>
</table>
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ProvisionActionDetailsApiDTO

Description
No description available.

Required Parameters
This DTO has no required parameters.

Optional Parameters

PurchaseProfileDTO

Description
Model to describe a set of preferences for purchasing RIs

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cloudType</td>
<td>• type: string&lt;br&gt;• description: Cloud type&lt;br&gt;• enum: ['AWS', 'AZURE', 'GCP', 'HYBRID', 'UNKNOWN']</td>
</tr>
<tr>
<td>paymentOption</td>
<td>• type: string&lt;br&gt;• description: Preferred payment option&lt;br&gt;• enum: ['ALL_UPFRONT', 'PARTIAL_UPFRONT', 'NO_UPFRONT']</td>
</tr>
<tr>
<td>reservedInstanceType</td>
<td>• type: string&lt;br&gt;• description: Preferred offering class (Standard or Convertible)&lt;br&gt;• enum: ['STANDARD', 'CONVERTIBLE']</td>
</tr>
<tr>
<td>termYears</td>
<td>• type: integer&lt;br&gt;• format: int32&lt;br&gt;• description: Number of years in preferred term</td>
</tr>
</tbody>
</table>
Optional Parameters

**RIPurchaseProfilesSettingApiDTO**

**Description**
No description available.

**Required Parameters**
This DTO has no required parameters.

**Optional Parameters**

**RangeApiDTO**

**Description**
Model to describe the Range of a Value in the Settings

**Required Parameters**
This DTO has no required parameters.

**Optional Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| step                | • **type**: number  
|                     | • **format**: double  
|                     | • **description**: The Step scale factor of the slider                      |
| labels              | • **type**: array  
|                     | • **description**: Labels to show in the values of the slider               |
|                     | • **items**: {**type**: 'string'                                           |
| customStepValues    | • **type**: array  
|                     | • **description**: Custom step values when the slider step is not constant |
|                     | • **items**: {**type**: 'integer', **format**: 'int32'                     |
# RateCardApiDTO

## Description

Model to describe a ratecard.

### Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| info      | **description**: List of business unit UUID's related to this rate card.  
**Referenced DTO**: RateCardInfoApiDTO *(on page 376)* |

### Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links     | *type*: array  
**Referenced DTO**: Link *(on page 351)* |
| uuid      | *type*: string |
| displayName | *type*: string |
| className | *type*: string |
| type      | *type*: string  
**description**: Type of rate card", example = "AWS, Azure"  
**enum**: ['AWS', 'AZURE', 'GCP', 'HYBRID', 'UNKNOWN'] |
| related   | **description**: List of business units related to this rate card.  
**Referenced DTO**: RateCardRelatedApiDTO *(on page 376)* |
| validation | **description**: Rate card validation.  
**Referenced DTO**: RateCardValidationApiDTO *(on page 376)* |
| valid     | *type*: boolean |
| default   | *type*: boolean |
| fileName  | *type*: string |
RateCardInfoApiDTO

Description
Model to describe the attributes of a ratecard.

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>businessUnitsIds</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: List of business units associated to this rate card.</td>
</tr>
<tr>
<td></td>
<td>• items: {'type': 'string'}</td>
</tr>
</tbody>
</table>

Optional Parameters

This DTO has no optional parameters.

RateCardRelatedApiDTO

Description
Model to describe the related business units of this ratecard.

Required Parameters

This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>businessUnits</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: List of business units related to the ratecard</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: BusinessUnitApiDTO (on page 325)</td>
</tr>
</tbody>
</table>

RateCardValidationApiDTO

Description
Model to validate the RateCard
Appendix V: DTO Index

Required Parameters

This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| name      | type: string  
            description: Name of the rate card file |
| status    | type: string  
            example: VALID, INVALID  
            description: Validation Status  
            enum: ['VALID', 'INVALID'] |
| message   | type: string  
            example: Validation was successful, Validation failed  
            description: Reason for validation failure or success. |

RecurrenceApiDTO

Description

Model to describe the Schedule for a Settings Policy

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| type      | type: string  
            description: Type of the recurrence, Enum: DAILY, WEEKLY, MONTHLY  
            enum: ['DAILY', 'WEEKLY', 'MONTHLY'] |
### Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>daysOfWeek</td>
<td>- type: array&lt;br&gt;- description: The day of week that the recurrence will occur. Required if the type of recurrence is WEEKLY, or if the type is MONTHLY and a week for the monthly recurrence has been set.&lt;br&gt;- items: {'type': 'string', 'enum': ['Sun', 'Mon', 'Tue', 'Wed', 'Thu', 'Fri', 'Sat']}</td>
</tr>
<tr>
<td>daysOfMonth</td>
<td>- type: array&lt;br&gt;- description: When recurrence type is MONTHLY, the date to apply the monthly recurrence&lt;br&gt;- items: {'type': 'integer', 'format': 'int32'}</td>
</tr>
<tr>
<td>weekOfTheMonth</td>
<td>- type: array&lt;br&gt;- description: When recurrence type is MONTHLY, which week of the month to apply the recurrence. A value of -1 indicates last week, 0 indicates this week, and so on.&lt;br&gt;- items: {'type': 'integer', 'format': 'int32'}</td>
</tr>
<tr>
<td>interval</td>
<td>- type: integer&lt;br&gt;- format: int32&lt;br&gt;- description: Frequency of the recurrence based on the recurrence type. For example, an interval of '2' with a recurrence type of MONTHLY will occur every two months.</td>
</tr>
</tbody>
</table>

### RegionAspectApiDTO

**Description**

No description available.

**Required Parameters**

This DTO has no required parameters.

**Optional Parameters**

### RelievePressureObjectApiDTO

**Description**

Model to describe a relieve pressure change in the scenario: minimum amount of Actions Moves that will relieve the pressure on the over-utilized clusters
Appendix V: DTO Index

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| projectionDay | • type: integer  
• format: int32  
• description: Projection day, indicate when to apply the change         |
| sources      | • type: array  
• description: Sources of the change, List of Clusters that are overloaded  
• Referenced DTO: BaseApiDTO (on page 324)                                |
| destinations  | • type: array  
• description: Destinations of the change, List of Clusters where VMs can move to  
• Referenced DTO: BaseApiDTO (on page 324)                                |

RemoveConstraintApiDTO

Description
Model to describe a constraint change in the scenario

Required Parameters
This DTO has no required parameters.
**Optional Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>constraintType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Type of the constraint to remove</td>
</tr>
<tr>
<td></td>
<td>• enum: ['DataCenterCommodity', 'ClusterCommodity', 'NetworkCommodity', 'DatastoreCommodity', 'StorageClusterCommodity', 'GlobalIgnoreConstraint']</td>
</tr>
<tr>
<td>projectionDay</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
<tr>
<td></td>
<td>• description: Projection day, indicate when to apply the change</td>
</tr>
<tr>
<td>target</td>
<td>• description: Target of the change, when not provided change applied to plan scope</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: [BaseApiDTO](on page 324)</td>
</tr>
<tr>
<td>targetEntityType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: EntityType to target with constraint configuration</td>
</tr>
<tr>
<td></td>
<td>• enum: ['VirtualMachine', 'Container', 'ContainerPod']</td>
</tr>
</tbody>
</table>

**RemoveObjectApiDTO**

**Description**
Model to describe a remove change in the scenario

**Required Parameters**
This DTO has no required parameters.

**Optional Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>projectionDay</td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• format: int32</td>
</tr>
<tr>
<td></td>
<td>• description: Projection day, indicate when to apply the change</td>
</tr>
<tr>
<td>targetEntityType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Type of entity to remove from group target</td>
</tr>
<tr>
<td>target</td>
<td>• description: Target of the change, entity or group</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: [BaseApiDTO](on page 324)</td>
</tr>
</tbody>
</table>
ReplaceObjectApiDTO

Description
Model to describe a migration change in the scenario

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>projectionDay</td>
<td>- type: integer</td>
</tr>
<tr>
<td></td>
<td>- format: int32</td>
</tr>
<tr>
<td></td>
<td>- description: Projection day, indicate when to apply the change</td>
</tr>
<tr>
<td>target</td>
<td>- description: Target of the change, entity or group</td>
</tr>
<tr>
<td></td>
<td>- Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
<tr>
<td>template</td>
<td>- description: Template used for the replace</td>
</tr>
<tr>
<td></td>
<td>- Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
<tr>
<td>targetEntityType</td>
<td>- type: string</td>
</tr>
<tr>
<td></td>
<td>- description: Type of entity to remove from group target</td>
</tr>
</tbody>
</table>

ReservationConstraintApiDTO

Description
The constraints user specified when running reservation which limit where templates could be placed.

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>constraintType</td>
<td>- type: string</td>
</tr>
<tr>
<td></td>
<td>- description: Type of constraint</td>
</tr>
<tr>
<td></td>
<td>- enum: ['CLUSTER', 'DATA_CENTER', 'VIRTUAL_DATA_CENTER', 'POLICY', 'NETWORK']</td>
</tr>
<tr>
<td>uuid</td>
<td>- type: string</td>
</tr>
<tr>
<td></td>
<td>- description: UUID of the constraint</td>
</tr>
</tbody>
</table>
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links     | type: array  
            Referenced DTO: [Link](on page 351) |
| displayName | type: string |
| className | type: string |

ReservedInstanceApiDTO

Description

Model to describe a Reserved Instance

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| cloudType | type: string  
            description: Cloud Type  
            enum: ['AWS', 'AZURE', 'GCP', 'HYBRID', 'UNKNOWN'] |
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links     | - **type**: array  
  - Referenced DTO: [Link](on page 351) |
| uuid      | - **type**: string |
| displayName | - **type**: string |
| className | - **type**: string |
| template  | - **description**: Related template  
  - Referenced DTO: [BaseApiDTO (on page 324)](on page 324) |
| platform  | - **type**: string  
  - **description**: Platform name  
  - **enum**: ['UNKNOWN', 'LINUX', 'RHEL', 'SUSE', 'WINDOWS', 'WINDOWS_WITH_SQL_STANDARD', 'WINDOWS_WITH_SQL_WEB', 'WINDOWS_WITH_SQL_SERVER_ENTERPRISE', 'LINUX_WITH_SQL_STANDARD', 'LINUX_WITH_SQL_WEB', 'LINUX_WITH_SQL_SERVER_ENTERPRISE'] |
| type      | - **type**: string  
  - **description**: Reserved instance type  
  - **enum**: ['STANDARD', 'CONVERTIBLE'] |
| location  | - **description**: Location, either a zone or a data center if zone is not available  
  - Referenced DTO: [BaseApiDTO (on page 324)](on page 324) |
| accountId | - **type**: string  
  - **description**: Account ID |
| accountDisplayName | - **type**: string  
  - **description**: Account display name |
| targetId  | - **type**: string  
  - **description**: The associated target ID of the account |
| masterAccountId | - **type**: string  
  - **description**: Master account ID |
| term      | - **description**: Term, unit is Year  
  - Referenced DTO: [StatApiDTO (on page 399)](on page 399) |
| payment   | - **type**: string  
  - **description**: Payment option  
  - **enum**: ['ALL_UPFRONT', 'PARTIAL_UPFRONT', 'NO_UPFRONT'] |
| onDemandPrice | - **description**: On-demand price, saving is RI price minus on-demand price  
  - Referenced DTO: [StatApiDTO (on page 399)](on page 399) |
| costPrice | - **description**: Total monthly cost  
  - Referenced DTO: [StatApiDTO (on page 399)](on page 399) |
| coupons   | - **description**: Total coupons and used coupons, utilization = numOfCouponsUsed / numOfCoupons  
  - Referenced DTO: [StatApiDTO (on page 399)](on page 399) |
| totalCoupons | - **type**: number |
### ReservedInstancePurchaseSettingsDTO

**Description**
No description available.

**Required Parameters**
This DTO has no required parameters.

**Optional Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>awsProfile</td>
<td>• Referenced DTO: PurchaseProfileDTO (on page 373)</td>
</tr>
<tr>
<td>azureProfile</td>
<td>• Referenced DTO: PurchaseProfileDTO (on page 373)</td>
</tr>
</tbody>
</table>

### ResourceApiDTO

**Description**
Model to describe the Resources of a Template

**Required Parameters**
This DTO has no required parameters.

**Optional Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| stats     | • **type**: array  
            • **description**: Statistics, e.g. Number of CPU, Memory size, Disk size, ...  
            • Referenced DTO: StatApiDTO (on page 399) |
| provider  | • **description**: Entity provider  
            • Referenced DTO: BaseApiDTO (on page 324) |
| type      | • **type**: string  
            • **description**: Type of the resource |
| template  | • **type**: string  
            • **description**: Template used to fulfill the resources |
RoleApiDTO

Description
Model to describe a User Role, it describe the permissions of an user over the Ops. Manager capabilities

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>name</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Name of the role</td>
</tr>
</tbody>
</table>

SAMLIdpApiDTO

Description
Model to describe an SAML IDP. It contains IDP URL and is SAML ONLY enabled or not.

Required Parameters
This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: Link [on page 351]</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>idpURL</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: The SAML IDP URL</td>
</tr>
<tr>
<td>isSAMLOnly</td>
<td>• type: boolean</td>
</tr>
<tr>
<td>isSingleLogoutEnabled</td>
<td>• type: boolean</td>
</tr>
</tbody>
</table>

STEntityAspectApiDTO

Description

No description available.

Required Parameters

This DTO has no required parameters.

Optional Parameters

ScenarioApiDTO

Description

Model to describe a What-If Scenario, composed by a list of changes

Required Parameters

This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>owners</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: Users that owns the scenario</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: UserApiDTO (on page 419)</td>
</tr>
<tr>
<td>type</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Type of the scenario</td>
</tr>
<tr>
<td>scope</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: List of entities/group that define the Scope</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
<tr>
<td>projectionDays</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: List of days that define when the scenario should run</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: ScenarioChangeApiDTO (on page 387)</td>
</tr>
<tr>
<td>timebasedTopologyChanges</td>
<td>• Referenced DTO: TimeBasedTopologyChangesApiDTO (on page 417)</td>
</tr>
</tbody>
</table>

ScenarioChangeApiDTO

Description
Model to describe a change in the Scenario, e.g. Add/Remove/Replace entities, change utilization, Add/Remove workload policies

Required Parameters
This DTO has no required parameters.
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>type: array, Referenced DTO: [Link](on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>type: string</td>
</tr>
<tr>
<td>className</td>
<td>type: string</td>
</tr>
<tr>
<td>index</td>
<td>type: integer, format: int32, description: Index used to identify a change, used on remove</td>
</tr>
<tr>
<td>description</td>
<td>type: string, description: Description, e.g. Added n entities, Removed workload policy</td>
</tr>
<tr>
<td>mergeType</td>
<td>type: string, description: Merge type, used when type is SET_WORKLOAD_PLACEMENT, enum: ['Cluster', 'StorageCluster', 'Datacenter', 'DesktopPool']</td>
</tr>
<tr>
<td>targets</td>
<td>type: array, description: List of Entities/Groups affected by the change, Referenced DTO: [BaseApiDTO](on page 324)</td>
</tr>
<tr>
<td>value</td>
<td>type: string, description: if type ADDED: count to add, if SET_USED: percentage of util to increment/decrement, if SET_UTILIZATION: max percentage of utilization, if SET_HIST_BASELINE: time when to load the baseline, if SET_PEAK_BASELINE: time when to load the peak baseline, if CONSTRAINTCHANGED: true/false, if SET_WORKLOAD_PLACEMENT: ADDED, ENABLED, DISABLED, REMOVED</td>
</tr>
<tr>
<td>enable</td>
<td>type: boolean, description: used when type ADD_HIST, INCLUDE_RESERVED, ENABLE, DISABLED</td>
</tr>
<tr>
<td>capacity</td>
<td>type: number, format: float, description: Indicate the max workload entities at the same time per placement entities, used when type is SET_WORKLOAD_PLACEMENT and policyType AT_MOST_N_BOUND</td>
</tr>
<tr>
<td>center</td>
<td>type: number, format: float, description: Percentage of the Desired state Center, used when type is SET</td>
</tr>
<tr>
<td>diameter</td>
<td>type: number, format: float, description: Percentage of the Desired state Diameter, used when type is SET</td>
</tr>
</tbody>
</table>
ScheduleApiDTO

Description
Model to describe the Schedule for a Settings Policy

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| endTime   | - type: string  
             - format: date-time  
             - description: End time in hours and minutes for the scheduled period in ISO8601. For example, 2019-04-04T19:15 |
| startDate | - type: string  
             - format: date-time  
             - description: Start date of the schedule period, expressed using ISO8601 Format (YYYY-MM-DDTHH:MM:SS). This date is local to the timezone of the instance |
| startTime | - type: string  
             - format: date-time  
             - description: Start time in hours and minutes for the scheduled period in ISO8601. For example, 2019-04-04T17:15 |
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: <a href="#">Link</a></td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>endDate</td>
<td>• type: string&lt;br&gt;• format: date&lt;br&gt;• description: End date of the schedule period, expressed using ISO8601 Format (YYYY-MM-DDTHH:MM:SS). This date is local to the timezone of the instance.</td>
</tr>
<tr>
<td>recurrence</td>
<td>• description: Recurrence setup&lt;br&gt;• Referenced DTO: <a href="#">RecurrenceApiDTO</a></td>
</tr>
<tr>
<td>timeZone</td>
<td>• type: string&lt;br&gt;• description: The time zone name based on tz database</td>
</tr>
<tr>
<td>nextOccurrence</td>
<td>• type: string&lt;br&gt;• description: The date and time of the next occurrence of this schedule represented in ISO8601 local time (YYYY-MM-DDTHH:MM:SS). For example, 2019-04-04T19:15</td>
</tr>
<tr>
<td>nextOccurrenceTimestamp</td>
<td>• type: integer&lt;br&gt;• format: int64&lt;br&gt;• description: The date and time of the next occurrence of this schedule represented in Timestamp in milliseconds. For example, 1562100619000</td>
</tr>
<tr>
<td>remainingTimeActiveInMs</td>
<td>• type: integer&lt;br&gt;• format: int64&lt;br&gt;• description: The amount of time that the schedule is going to be active at the time of call in milliseconds. This field will not be populated if the schedule is not currently active.</td>
</tr>
</tbody>
</table>

## ScopeUuidsApiInputDTO

### Description

Model to describe the request by UUIDs
Appendix V: DTO Index

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| uuids     | type: array  
            • description: List of uuids  
            • items: {'type': 'string  
            • maxItems: 2147483647  
            • minItems: 1 |

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| topologyContextId | type: string  
            • description: Topology context ID associated with the requested items |

ServiceEntityApiDTO

Description

Model to describe an Entity, e.g. Virtual Machine, Physical Machine, Storage

Required Parameters

This DTO has no required parameters.
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>type: array&lt;br&gt;Referenced DTO: [Link](on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>type: string</td>
</tr>
<tr>
<td>className</td>
<td>type: string</td>
</tr>
<tr>
<td>priceIndex</td>
<td>type: number&lt;br&gt;format: float&lt;br&gt;description: Price index of the Entity</td>
</tr>
<tr>
<td>state</td>
<td>type: string&lt;br&gt;description: State&lt;br&gt;enum: ['IDLE', 'RESOURCE_ALLOCATION', 'LAUNCH', 'ACTIVE', 'RESOURCE_RELEASE', 'SUSPEND', 'SUSPEND_PEND', 'TERMINATE_PEND', 'NOT_MONITORED', 'MAINTENANCE', 'FAILOVER', 'UNKNOWN', 'EVACUATED', 'QUEUED']</td>
</tr>
<tr>
<td>severity</td>
<td>type: string&lt;br&gt;description: Highest severity of the Actions related to this entity&lt;br&gt;enum: ['UNKNOWN', 'NORMAL', 'MINOR', 'MAJOR', 'CRITICAL']</td>
</tr>
<tr>
<td>placedOn</td>
<td>type: string&lt;br&gt;description: The className of entities successfully placed on, used for Unplaced entities in a Plan Market</td>
</tr>
<tr>
<td>notPlacedOn</td>
<td>type: string&lt;br&gt;description: The className of entities could not be placed on, used for Unplaced entities in a Plan Market</td>
</tr>
<tr>
<td>unplacedExplanation</td>
<td>type: string&lt;br&gt;description: The reason(s) the entity could not be placed</td>
</tr>
<tr>
<td>costPrice</td>
<td>type: number&lt;br&gt;format: float&lt;br&gt;description: Cost price per Hour</td>
</tr>
<tr>
<td>discoveredBy</td>
<td>description: Target that discovered the entity&lt;br&gt;Referenced DTO: [TargetApiDTO](on page 411)</td>
</tr>
<tr>
<td>remoteld</td>
<td>type: string&lt;br&gt;description: The identifier of this instance on the remote target from which it was discovered (DEPRECATED)</td>
</tr>
<tr>
<td>realtimeMarketReference</td>
<td>description: In case of a Plan Market Entity, this contains the original entity from the Real Time Market&lt;br&gt;Referenced DTO: [BaseApiDTO](on page 324)</td>
</tr>
<tr>
<td>providers</td>
<td>type: array&lt;br&gt;description: List of Providers</td>
</tr>
<tr>
<td>consumers</td>
<td>type: array&lt;br&gt;description: List of Consumers</td>
</tr>
</tbody>
</table>
SettingActivePolicyApiDTO

**Description**
Model to describe a Settings Policy that affect the value of a Setting

**Required Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| numEntities | • **type**: integer  
  • **format**: int32  
  • **description**: Number of entities affected by the Settings Policy value |
| settingsPolicy | • **description**: Settings Policy that affects the final value of a Setting  
  • Referenced DTO: BaseApiDTO (on page 324) |
| value | • **type**: string  
  • **description**: Setting value declared in the Settings Policy |

**Optional Parameters**

---

SettingApiDTO

**Description**
Generic model to describe a Setting. Sub types include StringSettingApiDTO and RIPurchaseProfilesSettingApiDTO.

**Required Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>• <strong>description</strong>: Value of the setting. Type indicated by the <code>valueObjectType</code> field. The default type is 'String'</td>
</tr>
</tbody>
</table>
### Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: <a href="#">Link</a></td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>valueDisplayName</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Display Name of the Value, in case the value is a Template or another entity</td>
</tr>
<tr>
<td></td>
<td>• readOnly: True</td>
</tr>
<tr>
<td>defaultValue</td>
<td>• description: Default value before any change</td>
</tr>
<tr>
<td></td>
<td>• readOnly: True</td>
</tr>
<tr>
<td>categories</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: Category and sub categories of the setting</td>
</tr>
<tr>
<td></td>
<td>• readOnly: True</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: <a href="#">SettingOptionApiDTO</a></td>
</tr>
<tr>
<td>min</td>
<td>• type: number</td>
</tr>
<tr>
<td></td>
<td>• format: double</td>
</tr>
<tr>
<td></td>
<td>• description: If type is NUMERIC, this define the min limit</td>
</tr>
<tr>
<td></td>
<td>• readOnly: True</td>
</tr>
<tr>
<td>max</td>
<td>• type: number</td>
</tr>
<tr>
<td></td>
<td>• format: double</td>
</tr>
<tr>
<td></td>
<td>• description: If type is NUMERIC, this define the max limit</td>
</tr>
<tr>
<td></td>
<td>• readOnly: True</td>
</tr>
<tr>
<td>entityType</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Entity type for this Setting</td>
</tr>
<tr>
<td>range</td>
<td>• description: Range options for the value of the setting</td>
</tr>
<tr>
<td></td>
<td>• readOnly: True</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: <a href="#">RangeApiDTO</a></td>
</tr>
<tr>
<td>scope</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Define the visibility of the setting. E.G. a Local Setting is only visible when associated with an Entity/Group</td>
</tr>
<tr>
<td></td>
<td>• readOnly: True</td>
</tr>
<tr>
<td></td>
<td>• enum: [GLOBAL', 'LOCAL']</td>
</tr>
<tr>
<td>activeSettingsPolicies</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• description: List of Settings Policies that are affecting the final value of this setting</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: <a href="#">SettingActivePolicyApiDTO</a></td>
</tr>
<tr>
<td>sourceGroupName</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Source group name for setting value</td>
</tr>
<tr>
<td>sourceGroupUuid</td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• description: Source group uuid for setting value</td>
</tr>
</tbody>
</table>
SettingApiDTOString

Description
Generic model to describe a Setting. Sub types include StringSettingApiDTO and RIPurchaseProfilesSettingApiDTO.

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>• <strong>description</strong>: Value of the setting. Type indicated by the <code>valueObjectType</code> field. The default type is <code>String</code>.</td>
</tr>
</tbody>
</table>
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array&lt;br&gt;• Referenced DTO: [Link](on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>valueDisplayName</td>
<td>• type: string&lt;br&gt;• description: Display Name of the Value, in case the value is a Template or another entity&lt;br&gt;• readOnly: True</td>
</tr>
<tr>
<td>defaultValue</td>
<td>• description: Default value before any change&lt;br&gt;• readOnly: True</td>
</tr>
<tr>
<td>categories</td>
<td>• type: array&lt;br&gt;• description: Category and sub categories of the setting&lt;br&gt;• readOnly: True&lt;br&gt;• Referenced DTO: [SettingOptionApiDTO](on page 397)</td>
</tr>
<tr>
<td>min</td>
<td>• type: number&lt;br&gt;• format: double&lt;br&gt;• description: If type is NUMERIC, this define the min limit&lt;br&gt;• readOnly: True</td>
</tr>
<tr>
<td>max</td>
<td>• type: number&lt;br&gt;• format: double&lt;br&gt;• description: If type is NUMERIC, this define the max limit&lt;br&gt;• readOnly: True</td>
</tr>
<tr>
<td>entityType</td>
<td>• type: string&lt;br&gt;• description: Entity type for this Setting</td>
</tr>
<tr>
<td>range</td>
<td>• description: Range options for the value of the setting&lt;br&gt;• readOnly: True&lt;br&gt;• Referenced DTO: [RangeApiDTO](on page 374)</td>
</tr>
<tr>
<td>scope</td>
<td>• type: string&lt;br&gt;• description: Define the visibility of the setting. E.G. a Local Setting is only visible when associated with an Entity/Group&lt;br&gt;• readOnly: True&lt;br&gt;• enum: ['GLOBAL', 'LOCAL']</td>
</tr>
<tr>
<td>activeSettingsPolicies</td>
<td>• type: array&lt;br&gt;• description: List of Settings Policies that are affecting the final value of this setting&lt;br&gt;• Referenced DTO: [SettingActivePolicyApiDTO](on page 393)</td>
</tr>
<tr>
<td>sourceGroupName</td>
<td>• type: string&lt;br&gt;• description: Source group name for setting value</td>
</tr>
<tr>
<td>sourceGroupUuid</td>
<td>• type: string&lt;br&gt;• description: Source group uuid for setting value</td>
</tr>
</tbody>
</table>
SettingOptionApiDTO

**Description**
No description available.

**Required Parameters**
This DTO has no required parameters.

**Optional Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>label</td>
<td>• <em>type</em>: string</td>
</tr>
<tr>
<td>value</td>
<td>• <em>type</em>: string</td>
</tr>
</tbody>
</table>

SettingsManagerApiDTO

**Description**
Model to describe a Category Manager for the settings

**Required Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| category  | • *type*: string  
            • *description*: Category of the Manager |
| settings  | • *type*: array  
            • *description*: List of Settings contained in the Manager |

**Optional Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links     | • *type*: array  
            • *Referenced DTO*: Link ([on page 351](#)) |
| uuid      | • *type*: string |
| displayName | • *type*: string |
| className | • *type*: string |
**SettingsPolicyApiDTO**

**Description**
Model to describe a Setting Policy: a group of Settings that are applied based on Scope and/or Schedule

**Required Parameters**
This DTO has no required parameters.

**Optional Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>type: array</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>type: string</td>
</tr>
<tr>
<td>className</td>
<td>type: string</td>
</tr>
<tr>
<td>entityType</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: Type of the Settings Policy. E.G. VirtualMachine, PhysicalMachine, ...</td>
</tr>
<tr>
<td>scopes</td>
<td>type: array</td>
</tr>
<tr>
<td></td>
<td>description: List of scopes where the settings are applied, on create/edit, only Uuid is required. If null it's considered Global scope</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: GroupApiDTO (on page 344)</td>
</tr>
<tr>
<td>settingsManagers</td>
<td>type: array</td>
</tr>
<tr>
<td></td>
<td>description: List of groups of Settings to activate in this Policy</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: SettingsManagerApiDTO (on page 397)</td>
</tr>
<tr>
<td>schedule</td>
<td>description: Schedule to define when the settings are applied</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: ScheduleApiDTO (on page 389)</td>
</tr>
<tr>
<td>disabled</td>
<td>type: boolean</td>
</tr>
<tr>
<td></td>
<td>description: Control if the policy is Enabled or Disabled</td>
</tr>
<tr>
<td>note</td>
<td>type: string</td>
</tr>
<tr>
<td></td>
<td>description: Note for this Policy</td>
</tr>
<tr>
<td>readOnly</td>
<td>type: boolean</td>
</tr>
<tr>
<td></td>
<td>description: If true, prevents users from deleting or modifying the SettingPolicy.</td>
</tr>
<tr>
<td>default</td>
<td>type: boolean</td>
</tr>
</tbody>
</table>
StatApiDTO

**Description**
Model to describe a Statistic

**Required Parameters**
This DTO has no required parameters.
### Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>- <strong>type:</strong> array&lt;br&gt;- <strong>Referenced DTO:</strong> Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>- <strong>type:</strong> string</td>
</tr>
<tr>
<td>displayName</td>
<td>- <strong>type:</strong> string</td>
</tr>
<tr>
<td>className</td>
<td>- <strong>type:</strong> string</td>
</tr>
<tr>
<td>name</td>
<td>- <strong>type:</strong> string&lt;br&gt;- <strong>description:</strong> Name</td>
</tr>
<tr>
<td>capacity</td>
<td>- <strong>description:</strong> Capacity values, used for Commodities stats&lt;br&gt;- <strong>Referenced DTO:</strong> StatValueApiDTO (on page 406)</td>
</tr>
<tr>
<td>reserved</td>
<td>- <strong>description:</strong> Reserved values, used for Commodities stats&lt;br&gt;- <strong>Referenced DTO:</strong> StatValueApiDTO (on page 406)</td>
</tr>
<tr>
<td>relatedEntityType</td>
<td>- <strong>type:</strong> string&lt;br&gt;- <strong>description:</strong> E.G. virtual machine</td>
</tr>
<tr>
<td>filters</td>
<td>- <strong>type:</strong> array&lt;br&gt;- <strong>description:</strong> describe the grouping options used to generate the output&lt;br&gt;- <strong>Referenced DTO:</strong> StatFilterApiDTO (on page 401)</td>
</tr>
<tr>
<td>relatedEntity</td>
<td>- <strong>description:</strong> Provider or Consumer of the Statistic, 'relatedEntity' and 'numRelatedEntities' are mutually exclusive&lt;br&gt;- <strong>Referenced DTO:</strong> BaseApiDTO (on page 324)</td>
</tr>
<tr>
<td>numRelatedEntities</td>
<td>- <strong>type:</strong> integer&lt;br&gt;- <strong>format:</strong> int32&lt;br&gt;- <strong>description:</strong> Number of providers or consumers for this statistic, 'relatedEntity' and 'numRelatedEntities' are mutually exclusive</td>
</tr>
<tr>
<td>units</td>
<td>- <strong>type:</strong> string&lt;br&gt;- <strong>description:</strong> Units, used for Commodities stats. E.G. $/h</td>
</tr>
<tr>
<td>values</td>
<td>- <strong>description:</strong> Contains Average, Min, Max, Total&lt;br&gt;- <strong>Referenced DTO:</strong> StatValueApiDTO (on page 406)</td>
</tr>
<tr>
<td>value</td>
<td>- <strong>type:</strong> number&lt;br&gt;- <strong>format:</strong> float&lt;br&gt;- <strong>description:</strong> Simple value, equal to values.avg. (Deprecated)</td>
</tr>
<tr>
<td>histUtilizations</td>
<td>- <strong>type:</strong> array&lt;br&gt;- <strong>description:</strong> Commodity historical utilization values&lt;br&gt;- <strong>Referenced DTO:</strong> StatHistUtilizationApiDTO (on page 402)</td>
</tr>
<tr>
<td>percentile</td>
<td>- <strong>description:</strong> Commodity percentile utilization statistic. (Deprecated)&lt;br&gt;- <strong>Referenced DTO:</strong> StatPercentileApiDTO (on page 403)</td>
</tr>
</tbody>
</table>
StatApiInputDTO

Description
Model to describe the request of a Stat

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>• <strong>type</strong>: string</td>
</tr>
<tr>
<td></td>
<td>• <strong>description</strong>: Name of the stat</td>
</tr>
<tr>
<td>relatedEntityType</td>
<td>• <strong>type</strong>: string</td>
</tr>
</tbody>
</table>
|                        | • **description**: Used to get stats from different entity types in the supply chain of `{uuid}`
|                        | E.G. costPrice of the VMs where the scope is a PM                           |
| filters                | • **type**: array                                                           |
|                        | • **description**: Filters to apply to the requested stats. Commodities supported values: key = {commodity_key}, relation = sold | bought, virtualDisk = `{uuid}`. Cost Price supported values: cumulative = true | false, cloudService = `{uuid}`, target = `{uuid}`, CSP = `{name}`, category = `{name}`, businessUnit = `{uuid}`, costComponent = COMPUTE | IP | LICENSE | STORAGE, costComponentArtifact = `{key}`. Action stats supported values: actionTypes = `{actionType}`, actionModes: `{action_mode}`, actionStates: `{action_state}`, riskSubCategory: Performance Assurance | Efficiency Improvement | Prevention | Compliance, riskSeverity: UNKNOWN | NORMAL | MINOR | MAJOR | CRITICAL |
|                        | • **Referenced DTO**: [StatFilterApiDTO (on page 401)]                     |
| groupBy                | • **type**: array                                                           |
|                        | • **description**: Execute a groupBy on the values of the stats. Commodities supported values: key, relatedEntity, virtualDisk. Cost Price supported values: cloudService, target, CSP, category, businessUnit, costComponent, costComponentArtifact. Action stats supported values: actionTypes, actionModes, actionStates, risk, riskSubCategory, riskSeverity |
|                        | • **items**: `{type`: 'string

StatFilterApiDTO

Description
Model to describe the filter applied to a Statistic
Appendix V: DTO Index

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>type: string, description: type of the filter, E.G: actionTypes, category, ...</td>
</tr>
</tbody>
</table>

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>type: string, description: value of the filter</td>
</tr>
</tbody>
</table>

StatHistUtilizationApiDTO

Description

Model to describe a historical utilization statistic, e.g. the P95 VCPU or P95 VMEM of a VM over (up to) NN days observation period.

Required Parameters

This DTO has no required parameters.
### Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| type                                     | • **type**: string  
• **description**: Historical utilization type                              |
| usage                                    | • **type**: number  
• **format**: float  
• **description**: Historical usage                                             |
| capacity                                 | • **type**: number  
• **format**: float  
• **description**: Historical capacity                                           |
| resizeMaxScalingObservationPeriod        | • **type**: number  
• **format**: float  
• **description**: Resize max scaling observation period. Affects on amount of data points considered for action generation process. Value in days. |
| resizeScalingAggressiveness              | • **type**: number  
• **format**: float  
• **description**: Resize scaling aggressiveness. Describes how aggressively Turbonomic will resize in response of resource utilization. Value in percents. 100% least aggressive, 95% most aggressive. |

### StatPercentileApiDTO

**Description**

Model to describe a percentile utilization statistic, e.g. the P95 VCPU or P95 VMEM of a VM over (up to) NN days observation period. (Deprecated)

**Required Parameters**

This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>percentileUtilization</td>
<td>• type: number&lt;br&gt;• format: float&lt;br&gt;• description: Percentile utilization</td>
</tr>
<tr>
<td>resizeMaxScalingObservationPeriod</td>
<td>• type: number&lt;br&gt;• format: float&lt;br&gt;• description: Resize max scaling observation period</td>
</tr>
<tr>
<td>resizeScalingAggressiveness</td>
<td>• type: number&lt;br&gt;• format: float&lt;br&gt;• description: Resize scaling aggressiveness</td>
</tr>
</tbody>
</table>

StatPeriodApiInputDTO

Description
Model to describe the request for Statistics by a Time range

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>statistics</td>
<td>• type: array&lt;br&gt;• description: List of requested statistics, if empty all stats will be processed&lt;br&gt;• Referenced DTO: StatApiInputDTO (on page 401)</td>
</tr>
</tbody>
</table>

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>startDate</td>
<td>• type: string&lt;br&gt;• description: Start time of the period to filter, if empty the current stats will be processed</td>
</tr>
<tr>
<td>endDate</td>
<td>• type: string&lt;br&gt;• description: End time of the period to filter, if empty the current stats will be processed</td>
</tr>
</tbody>
</table>
StatScopesApiInputDTO

Description
Model to describe the request for Statistics in multiple Scopes

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| scopes    | type: array  
  description: List of uuid to use as scope  
  items: {'type': 'string'} |
| period    | description: List of requested statistics  
  Referenced DTO: StatPeriodApiInputDTO (on page 404) |
| relatedType | type: string  
  description: Get the stats for the entity type related to the scopes |

StatSnapshotApiDTO

Description
Model to describe the Statistics of a snapshot, contains a list of Statistics for a moment in time

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| statistics | type: array  
  description: List of statistics, e.g. Price Index, Commodities values, Cost price, Number of VMs in a Group, ...  
  Referenced DTO: StatApiDTO (on page 399) |
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links     | - type: array  
            - Referenced DTO: Link (on page 351) |
| uuid      | - type: string |
| displayName | - type: string |
| className | - type: string |
| date      | - type: string  
            - description: When the statistics were recorded |
| epoch     | - type: string  
            - description: An indicator of whether the snapshot represents historical, projected or plan data. Should be used in conjunction with the date field to understand the context of this stat snapshot.  
            - enum: ['HISTORICAL', 'CURRENT', 'PROJECTED', 'PLAN_SOURCE', 'PLAN_PROJECTED'] |

StatValueApiDTO

Description
Model to describe a single statistic, e.g. the CPU of a PM Group

Required Parameters
This DTO has no required parameters.
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| max       | type: number  
|           | format: float  
|           | description: Max value  |
| min       | type: number  
|           | format: float  
|           | description: Min value  |
| avg       | type: number  
|           | format: float  
|           | description: Average value  |
| total     | type: number  
|           | format: float  
|           | description: Total value - sum of average values in a group  |
| totalMax  | type: number  
|           | format: float  
|           | description: Total max value - sum of max values in a group  |
| totalMin  | type: number  
|           | format: float  
|           | description: Total min value - sum of min values in a group  |

### StringSettingApiDTO

#### Description

No description available.

#### Required Parameters

This DTO has no required parameters.
Optional Parameters

SupplyChainStatsApiInputDTO

Description
Model to describe a Filter for Entities

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| uuids      | • **type:** array  
|            | • **description:** List of uuids used to build the supply chain  
|            | • **items:** {'type': 'string'}  
|            | • **maxItems:** 2147483647  
|            | • **minItems:** 1 |

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| types      | • **type:** array  
|            | • **description:** List of Types to filter  
|            | • **items:** {'type': 'string'} |
| states     | • **type:** array  
|            | • **description:** List of States to filter  
|            | • **items:** ['IDLE', 'RESOURCE_ALLOCATION', 'LAUNCH', 'ACTIVE', 'RESOURCE_RELEASE', 'SUSPEND', 'SUSPEND_PENDING', 'TERMINATE_PENDING', 'NOT_MONITORED', 'MAINTENANCE', 'FAILOVER', 'UNKNOWN', 'EVACUATED', 'QUEUED'] |
| groupBy    | • **type:** array  
|            | • **description:** List of fields used to group the Stats  
|            | • **items:** ['entityType', 'state', 'severity', 'riskSubCategory', 'template', 'target', 'businessUnit', 'resourceGroup'] |
| environmentType | • **type:** string  
|                | • **description:** Filter the actions by Environment Type  
|                | • **enum:** ['ONPREM', 'CLOUD'] |
SupplychainApiDTO

Description
Model to describe the Supply Chain: the Environment is described as a chain between Producers and Consumers

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• Referenced DTO: [Link](on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>seMap</td>
<td>• type: object</td>
</tr>
<tr>
<td></td>
<td>• description: Model to describe the type of Entity associated with a SupplyChainEntry</td>
</tr>
<tr>
<td></td>
<td>• ◦ Referenced DTO: [SupplychainEntryDTO](on page 409)</td>
</tr>
</tbody>
</table>

SupplychainEntryDTO

Description
Model to describe a Supply Chain Entry

Required Parameters
This DTO has no required parameters.
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>links</strong></td>
<td>• type: array&lt;br&gt;• <strong>Referenced DTO:</strong> Link (<a href="#">on page 351</a>)</td>
</tr>
<tr>
<td><strong>uuid</strong></td>
<td>• type: string</td>
</tr>
<tr>
<td><strong>displayName</strong></td>
<td>• type: string</td>
</tr>
<tr>
<td><strong>className</strong></td>
<td>• type: string</td>
</tr>
<tr>
<td><strong>depth</strong></td>
<td>• type: integer&lt;br&gt;• <strong>format:</strong> int32&lt;br&gt;• <strong>description:</strong> Number to indicate the level of depth of the Entity type in the Supply Chain</td>
</tr>
<tr>
<td><strong>entitiesCount</strong></td>
<td>• type: integer&lt;br&gt;• <strong>format:</strong> int32&lt;br&gt;• <strong>description:</strong> Number of entity in this level of depth</td>
</tr>
<tr>
<td><strong>healthSummary</strong></td>
<td>• type: object&lt;br&gt;• <strong>description:</strong> Entities count by Severity&lt;br&gt;• ◦ type: integer&lt;br&gt; ◦ <strong>format:</strong> int32</td>
</tr>
<tr>
<td><strong>stateSummary</strong></td>
<td>• type: object&lt;br&gt;• <strong>description:</strong> Entities count by State&lt;br&gt; • ◦ type: integer&lt;br&gt; ◦ <strong>format:</strong> int32</td>
</tr>
<tr>
<td><strong>connectedProviderTypes</strong></td>
<td>• type: array&lt;br&gt;• <strong>description:</strong> List of provider types connected to this level of depth&lt;br&gt; • <strong>uniqueItems:</strong> True&lt;br&gt; • items: {‘type’: ‘string’}</td>
</tr>
<tr>
<td><strong>connectedConsumerTypes</strong></td>
<td>• type: array&lt;br&gt;• <strong>description:</strong> List of consumer types connected to this level of depth&lt;br&gt; • <strong>uniqueItems:</strong> True&lt;br&gt; • items: {‘type’: ‘string’}</td>
</tr>
<tr>
<td><strong>instances</strong></td>
<td>• type: object&lt;br&gt;• <strong>description:</strong> List of entities in this level of depth&lt;br&gt; • ◦ <strong>Referenced DTO:</strong> ServiceEntityApiDTO (<a href="#">on page 391</a>)</td>
</tr>
</tbody>
</table>
# TagApiDTO

## Description
Tag information

## Required Parameters
This DTO has no required parameters.

## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| key       | - type: string  
           | - description: Tag key |
| values    | - type: array  
           | - description: Tag value  
           | - items: {'type': 'string'} |

# TargetApiDTO

## Description
Model to describe a Target. Targets are used to discover the components to create a connected virtual environment.

## Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| type      | - type: string  
           | - description: Probe type. Turbonomic ships with the following probe types: AppDynamics, Dynatrace, Datadog, Arista, AWS, Azure, Cisco APIC, Cisco HyperFlex, Cisco UCS Central, Cisco UCS Director, Cisco UCS Manager, CloudFoundry, CloudStack, Dell Compellent, Docker, EMC ScaleIO, EMC VMAX, EMC VNX, EMC VPLEX, EMC XtremIO, Hitachi Vantara, HP OneView, HPE 3PAR, Hyper-V, IBM PowerVM, JBoss, JVM, MSExchange, MySQL, NetApp, NetFlow, NetScaler, Nutanix, OpenStack, Oracle, Pivotal Ops Manager, Pure, Red Hat Virtualization Manager, sFlow, SNMP, SoftLayer, SQLServer, Tetration, Tomcat, vCenter, vCloudDirector, VMM, WebLogic, WebSphere, WMI, XenServer, |
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| **links**       | • type: array  
  • Referenced DTO: [Link](#) |
| **uuid**        | • type: string |
| **displayName** | • type: string |
| **className**   | • type: string |
| **category**    | • type: string  
  • example: Application Server, Billing, Cloud Management, Database Server, Fabric, Guest OS Processes, HYPERCONVERGED, HYPervisor, Load Balancer, Network, Operations Manager Appliance, ORCHESTRATOR, PaaS, Storage, Storage Browsing, WINDOWS APPLICATION. There are also categories Custom and UNKNOWN to be used for new probe development.  
  • description: Probe category. |
| **currentBusinessAccount** | • description: Business account associated with the target (Deprecated)  
  • Referenced DTO: [BusinessUnitApiDTO](#) |
| **identifyingFields** | • type: array  
  • description: Array of field names used to differentiate probes of the same category. Most typically either the name/address field, or a combination of address and port.  
  • Referenced DTO: [InputFieldApiDTO](#) |
| **lastValidated** | • type: string  
  • description: Date of the last validation |
| **status**      | • type: string  
  • example: Validated, VALIDATION FAILED, UNKNOWN  
  • description: Description of the status of the most recent Validation Operation. |
| **derivedTargets** | • type: array  
  • description: Targets derived (created by discovery of) this target  
  • Referenced DTO: [TargetApiDTO](#) |
| **patchedTargets** | • type: array  
  • description: Targets patched by this target  
  • Referenced DTO: [PatchedTargetDataApiDTO](#) |
| **readonly**    | • type: boolean  
  • description: Whether the target cannot be changed through public APIs. |
TemplateApiDTO

Description
Model to describe a Template: contains the resources used to Deploy a VM or to Add Workload/Supply in a Plan

Required Parameters
This DTO has no required parameters.
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links         | - type: array  
                - Referenced DTO: [Link](on page 351)  
| uuid          | - type: string  
| displayName   | - type: string  
| className     | - type: string  
| price         | - type: number  
                - format: float  
                - description: The estimated cost of the template. Used for Physical Machine and Storage templates where the hardware cost is known.  
| model         | - type: string  
                - example: Cisco UCS B200 M5 (Intel Xeon Gold 5115, 2.40 GHz), PowerEdge R940 (Intel Xeon Gold 6136, 3.00 GHz), etc.  
                - description: The model of the entire Physical Machine system.  
| cpuModel      | - type: string  
                - example: Intel Xeon Gold 6130, AMD Opteron 6166 HE, etc.  
                - description: The model of the CPU in the Physical Machine.  
| vendor        | - type: string  
                - example: Cisco, Microsoft, HP, Novell  
                - description: Vendor of the templated entity  
| description   | - type: string  
                - description: Description  
| image         | - type: string  
                - description: Container Profile image  
| imageTag      | - type: string  
                - description: (UNUSED) Container Profile image tag  
| cmdWithArgs   | - type: string  
                - description: (UNUSED) Container command with Arguments  
| dbEngine      | - type: string  
                - example: PostgreSql, AuroraMySQL, SqlServer  
                - description: Database engine, used for Database templates  
| dbEdition     | - type: string  
                - example: Standard One, Enterprise, Premium_P2  
                - description: Database edition, used for Database templates  
| computeResources | - type: array  
                - description: ResourceApiDTO describing the compute resources. Max 1 per template.  
                - Referenced DTO: [ResourceApiDTO](on page 384)  
| storageResources | - type: array  
| discovery     | - type: boolean  
                - example: False  
                - description: Indicates if the template is discovered or manually created  
                - enum: [True, False]  
| family        | - type: string  
                - example: standardDSv2Family, standardNCFamily, r5d, r3  
                - description: For cloud templates, the instance family.  
| enableMatch   | - type: boolean  
                - example: False  
                - description: Add to Infrastructure Cost Policy. Infrastructure Cost policies group hardware devices according to their cost  

---

**Turbonomic, Inc. www.turbonomic.com**
TemplateApiInputDTO

Description
Model to describe a Template: contains the resources used to Deploy a VM or to Add Workload/Supply in a Plan

Required Parameters
This DTO has no required parameters.
# Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| displayName   |  • type: string  
                • description: Name of the template |
| className     |  • type: string  
                • description: className  
                • enum: ['VirtualMachine', 'PhysicalMachine', 'Storage', 'Container'] |
| price         |  • type: number  
                • format: float  
                • description: Cost price |
| model         |  • type: string  
                • description: The Model of the entire Physical Machine system. For example: Cisco UCS B200 M5 (Intel Xeon Gold 5115, 2.40 GHz) vs. PowerEdge R940 (Intel Xeon Gold 6136, 3.00 GHz) |
| cpuModel      |  • type: string  
                • description: The model of the CPU in the Physical Machine. This is separate from the model of the entire Physical Machine. For example: Intel Xeon Gold 6130 vs. AMD Opteron 6166 HE |
| vendor        |  • type: string  
                • description: Vendor |
| description   |  • type: string  
                • description: Description |
| image         |  • type: string  
                • description: Profile image, used for Container templates |
| imageTag      |  • type: string  
                • description: Profile image tag, used for Container templates |
| cmdWithArgs   |  • type: string  
                • description: Command with Arguments, used for Container templates |
| computeResources |  • type: array  
                • description: Compute resources: Number of CPU, CPU speed, Memory size, ...  
                • Referenced DTO: [ResourceApiDTO (on page 384)](on page 384)  
                • maxItems: 1  
                • minItems: 0 |
| storageResources |  • type: array  
                • description: Storage resources: Disk I/O, Disk Size, Percentage of Disk consumed  
                • Referenced DTO: [ResourceApiDTO (on page 384)](on page 384) |
| networkResources |  • type: array  
                • description: Network resources  
                • Referenced DTO: [ResourceApiDTO (on page 384)](on page 384) |
| infrastructureResources |  • type: array  
                • description: Infrastructure resources: Power, Size, Cooling  
                • Referenced DTO: [ResourceApiDTO (on page 384)](on page 384) |
TemplatePriceAdjustmentDTO

Description
Price adjustment information for a template within a business unit and specified pricing model.

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>type: array</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: Link (on page 351)</td>
</tr>
<tr>
<td>uuid</td>
<td>type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>type: string</td>
</tr>
<tr>
<td>className</td>
<td>type: string</td>
</tr>
<tr>
<td>environmentType</td>
<td>type: string, description: Environment type</td>
</tr>
<tr>
<td></td>
<td>enum: ['CLOUD', 'ONPREM', 'HYBRID']</td>
</tr>
<tr>
<td>discount</td>
<td>type: number, format: float, description: Entity discount percentage</td>
</tr>
<tr>
<td>priceAdjustment</td>
<td>description: Entity price adjustment percentage</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: PriceAdjustmentDTO (on page 369)</td>
</tr>
<tr>
<td>family</td>
<td>type: string, description: Family of a template, group of similar purpose templates. Available only for virtual machine templates.</td>
</tr>
<tr>
<td>pricesPerDatacenter</td>
<td>type: array, description: Template base rates per data center, provided for information purpose.</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: EntityPriceDTO (on page 341)</td>
</tr>
</tbody>
</table>

TimeBasedTopologyChangesApiDTO

Description
Topology changes based on a timeframe in the scenario
Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>includeReservation</td>
<td>• type: boolean&lt;br&gt;• description: Add the workload that is currently reserved</td>
</tr>
<tr>
<td>reservationCount</td>
<td>• type: integer&lt;br&gt;• format: int32&lt;br&gt;• description: # of currently reserved VMs&lt;br&gt;• readOnly: True</td>
</tr>
<tr>
<td>addHistoryVMs</td>
<td>• type: boolean&lt;br&gt;• description: Should historical vmNetGrowth be considered</td>
</tr>
<tr>
<td>vmNetGrowth</td>
<td>• type: integer&lt;br&gt;• format: int32&lt;br&gt;• description: Number of workloads added during the last month&lt;br&gt;• readOnly: True</td>
</tr>
</tbody>
</table>

TopologyChangesApiDTO

Description
Topology changes in the scenario

Required Parameters
This DTO has no required parameters.
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| addList    | • type: array  
            • description: List of add changes in the Topology  
            • Referenced DTO: AddObjectApiDTO (on page 323) |
| removeList | • type: array  
            • description: List of remove changes in the Topology  
            • Referenced DTO: RemoveObjectApiDTO (on page 380) |
| replaceList| • type: array  
            • description: List of replace changes in the Topology  
            • Referenced DTO: ReplaceObjectApiDTO (on page 381) |
| migrateList| • type: array  
            • description: List of migrate changes in the Topology  
            • Referenced DTO: MigrateObjectApiDTO (on page 357) |
| relievePressureList | • type: array  
                            • description: List of relieve pressure changes in the Topology  
                            • Referenced DTO: RelievePressureObjectApiDTO (on page 378) |

## UserApiDTO

### Description
Model to describe an User

### Required Parameters
This DTO has no required parameters.
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>links</td>
<td>• type: array&lt;br&gt;• Referenced DTO: <a href="#">Link</a></td>
</tr>
<tr>
<td>uuid</td>
<td>• type: string</td>
</tr>
<tr>
<td>displayName</td>
<td>• type: string</td>
</tr>
<tr>
<td>className</td>
<td>• type: string</td>
</tr>
<tr>
<td>username</td>
<td>• type: string&lt;br&gt;• description: Username</td>
</tr>
<tr>
<td>password</td>
<td>• type: string&lt;br&gt;• description: Encoded password</td>
</tr>
<tr>
<td>roleUuid</td>
<td>• type: string&lt;br&gt;• description: Role Id</td>
</tr>
<tr>
<td>roleName</td>
<td>• type: string&lt;br&gt;• description: Role name&lt;br&gt;• enum: ['administrator', 'automator', 'deployer', 'advisor', 'observer']</td>
</tr>
<tr>
<td>loginProvider</td>
<td>• type: string&lt;br&gt;• description: Provider for the login&lt;br&gt;• enum: ['Local', 'LDAP']</td>
</tr>
<tr>
<td>type</td>
<td>• type: string&lt;br&gt;• description: type&lt;br&gt;• enum: ['DedicatedCustomer', 'SharedCustomer']</td>
</tr>
<tr>
<td>scope</td>
<td>• type: array&lt;br&gt;• description: List of scopes that the User is allowed to see&lt;br&gt;• Referenced DTO: <a href="#">GroupApiDTO</a></td>
</tr>
<tr>
<td>features</td>
<td>• type: array&lt;br&gt;• description: List of features that the user is allowed to see&lt;br&gt;• items: {'type': 'string'}</td>
</tr>
<tr>
<td>authToken</td>
<td>• type: string&lt;br&gt;• description: The secured user token</td>
</tr>
<tr>
<td>showSharedUserSC</td>
<td>• type: boolean</td>
</tr>
</tbody>
</table>
UtilizationApiDTO

Description
Model to describe a utilization change in the scenario

Required Parameters
This DTO has no required parameters.

Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>projectionDay</td>
<td>type: integer</td>
</tr>
<tr>
<td></td>
<td>format: int32</td>
</tr>
<tr>
<td></td>
<td>description: Projection day, indicate when to apply the change</td>
</tr>
<tr>
<td>target</td>
<td>description: Target of the change, entity or group</td>
</tr>
<tr>
<td></td>
<td>Referenced DTO: BaseApiDTO (on page 324)</td>
</tr>
<tr>
<td>percentage</td>
<td>type: integer</td>
</tr>
<tr>
<td></td>
<td>format: int32</td>
</tr>
<tr>
<td></td>
<td>description: Utilization percentage change</td>
</tr>
</tbody>
</table>

VMEntityAspectApiDTO

Description
No description available.

Required Parameters
This DTO has no required parameters.

Optional Parameters

VirtualDiskApiDTO

Description
Model to describe a Virtual Disk
Required Parameters

This DTO has no required parameters.
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>links</strong></td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• <strong>Referenced DTO</strong>: Link (<a href="#">on page 351</a>)</td>
</tr>
<tr>
<td><strong>uuid</strong></td>
<td>• type: string</td>
</tr>
<tr>
<td><strong>displayName</strong></td>
<td>• type: string</td>
</tr>
<tr>
<td><strong>className</strong></td>
<td>• type: string</td>
</tr>
<tr>
<td><strong>tier</strong></td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• <strong>description</strong>: The tier of the Virtual Disk</td>
</tr>
<tr>
<td><strong>actions</strong></td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• <strong>description</strong>: The related action: Move or Delete</td>
</tr>
<tr>
<td></td>
<td>• <strong>Referenced DTO</strong>: ActionApiDTO (<a href="#">on page 314</a>)</td>
</tr>
<tr>
<td><strong>stats</strong></td>
<td>• type: array</td>
</tr>
<tr>
<td></td>
<td>• <strong>description</strong>: The related statistics</td>
</tr>
<tr>
<td></td>
<td>• <strong>Referenced DTO</strong>: StatApiDTO (<a href="#">on page 399</a>)</td>
</tr>
<tr>
<td><strong>attachedVirtualMachine</strong></td>
<td>• <strong>description</strong>: The Virtual Machine if the disk is attached</td>
</tr>
<tr>
<td></td>
<td>• <strong>Referenced DTO</strong>: BaseApiDTO (<a href="#">on page 324</a>)</td>
</tr>
<tr>
<td><strong>provider</strong></td>
<td>• <strong>description</strong>: The Storage provider</td>
</tr>
<tr>
<td></td>
<td>• <strong>Referenced DTO</strong>: BaseApiDTO (<a href="#">on page 324</a>)</td>
</tr>
<tr>
<td><strong>dataCenter</strong></td>
<td>• <strong>description</strong>: The DataCenter where the VirtualDisk resides</td>
</tr>
<tr>
<td></td>
<td>• <strong>Referenced DTO</strong>: BaseApiDTO (<a href="#">on page 324</a>)</td>
</tr>
<tr>
<td><strong>environmentType</strong></td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• <strong>description</strong>: Environment type</td>
</tr>
<tr>
<td></td>
<td>• <strong>enum</strong>: ['CLOUD', 'ONPREM', 'HYBRID']</td>
</tr>
<tr>
<td><strong>lastModified</strong></td>
<td>• type: integer</td>
</tr>
<tr>
<td></td>
<td>• <strong>format</strong>: int64</td>
</tr>
<tr>
<td></td>
<td>• <strong>description</strong>: Last Modified</td>
</tr>
<tr>
<td><strong>businessAccount</strong></td>
<td>• <strong>description</strong>: Business Account</td>
</tr>
<tr>
<td></td>
<td>• <strong>Referenced DTO</strong>: BaseApiDTO (<a href="#">on page 324</a>)</td>
</tr>
<tr>
<td><strong>resourceGroup</strong></td>
<td>• <strong>description</strong>: Resource Group</td>
</tr>
<tr>
<td></td>
<td>• <strong>Referenced DTO</strong>: BaseApiDTO (<a href="#">on page 324</a>)</td>
</tr>
<tr>
<td><strong>creationTime</strong></td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• <strong>description</strong>: Creation time</td>
</tr>
<tr>
<td><strong>skuName</strong></td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• <strong>description</strong>: Sku name</td>
</tr>
<tr>
<td><strong>snapshotId</strong></td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• <strong>description</strong>: Snapshot id</td>
</tr>
<tr>
<td><strong>encryption</strong></td>
<td>• type: string</td>
</tr>
<tr>
<td></td>
<td>• <strong>description</strong>: Encryption</td>
</tr>
<tr>
<td><strong>attachmentState</strong></td>
<td>• type: string</td>
</tr>
</tbody>
</table>
VirtualDisksAspectApiDTO

**Description**
No description available.

**Required Parameters**
This DTO has no required parameters.

**Optional Parameters**

WidgetApiDTO

**Description**
Basic informations of an entity

**Required Parameters**
This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links      | • type: array  
• Referenced DTO: [Link (on page 351)](#) |
| uuid       | • type: string |
| displayName| • type: string |
| className  | • type: string |
| type       | • type: string  
• Referenced DTO: [BaseApiDTO (on page 324)](#) |
| scope      | • Referenced DTO: [BaseApiDTO (on page 324)](#) |
| startPeriod| • type: string |
| endPeriod  | • type: string |
| row        | • type: integer  
• format: int32 |
| column     | • type: integer  
• format: int32 |
| sizeRows   | • type: integer  
• format: int32 |
| sizeColumns| • type: integer  
• format: int32 |
| widgetsetId| • type: integer  
• format: int64 |
| widgetElements| • type: array  
• Referenced DTO: [WidgetItemApiDTO (on page 425)](#) |

WidgetItemApiDTO

Description

Basic informations of an entity

Required Parameters

This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links     | • type: array  
            • Referenced DTO: Link (on page 351) |
| uuid      | • type: string |
| displayName | • type: string |
| className | • type: string |
| row       | • type: integer  
            • format: int32 |
| column    | • type: integer  
            • format: int32 |
| type      | • type: string |
| widgetId  | • type: integer  
            • format: int64 |
| properties | • type: object  
            • ◦ type: string |
| stats     | • type: array  
            • Referenced DTO: StatApiInputDTO (on page 401) |
| datasets  | • type: array  
            • items: {type: 'string' } |

WidgetsetApiDTO

**Description**

Basic informations of an entity

**Required Parameters**

This DTO has no required parameters.
Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links       | • type: array  
             • Referenced DTO: Link (on page 351) |
| uuid        | • type: string |
| displayName | • type: string |
| className   | • type: string |
| scope       | • type: string |
| startPeriod | • type: string |
| endPeriod   | • type: string |
| widgets     | • type: array  
             • Referenced DTO: WidgetApiDTO (on page 424) |
| category    | • type: string |
| scopeType   | • type: string |
| username    | • type: string |
| isSharedWithAllUsers | • type: boolean |

WorkflowApiDTO

Description
Model to describe a Workflow

Required Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| discoveredBy | • description: Target that discovered this workflow  
               • Referenced DTO: TargetApiDTO (on page 411) |
## Optional Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| links       | • type: array  
              • Referenced DTO: [Link](on page 351)  |
| uuid        | • type: string  |
| displayName | • type: string  |
| className   | • type: string  |
| description | • type: string  
              • description: Description of the workflow  |
| entityType  | • type: string  
              • description: Type of the entity associated  |
| actionType  | • type: string  
              • description: Type of the action associated  |
| parameters  | • type: array  
              • description: Input parameters for the workflow  
              • Referenced DTO: [InputFieldApiDTO](on page 347)  |
| scriptPath  | • type: string  
              • description: Full path to workflow script (e.g. path to an ActionScript executable)  |
| actionPhase | • type: string  
              • description: Action Phase to which workflow applies  |
| timeLimitSeconds | • type: integer  
              • format: int64  
              • description: Time limit for workflow execution, in seconds  |
Entity Statistics

Turbonomic monitors the following statistics for entities in your environment:

Application Statistics

*priceIndex*

  The degree of risk for the application

*Produces*

  **Not Implemented:** The number of entities connected to this provider, used in calculating pricing.

*VCPU*

  The percentage utilization of the VCPU allocated for the hosting VM.

*VMem*

  The percentage utilization of the VMem allocated to the hosting VM.

*VStorage*

  Virtual storage allocated to the application, measured in Kbytes.

Business Application Statistics

*priceIndex*

  The degree of risk for the business application.

*Produces*

  **Not Implemented:** The number of entities connected to this provider, used in calculating pricing.

*ResponseTime*
Entity Statistics

Response time, measured in ms.

**SLACommodity**
A measure of the level of expected service of the Business Application

**Transaction**
Transactions per second

Chassis Statistics

**Cooling**
Allocated cooling indicates the highest acceptable running temperature for a physical device, such as a chassis in a compute fabric.

**Power**
A measure of the power that is consumed by a physical device.

**priceIndex**
The degree of risk for the chassis.

**Produces**

*Not Implemented:* The number of entities connected to this provider, used in calculating pricing.

**Space**
When known, the amount of physical hardware that can be used in conjunction with this entity. For example, the number of spaces in a server rack.

Container Statistics

**priceIndex**
The degree of risk for the container

**Produces**

*Not Implemented:* The number of entities connected to this provider, used in calculating pricing.

**VCPU**
The percentage utilization of the VCPU allocated for the hosting entity.

**VMem**
The percentage utilization of the VMem allocated to the hosting entity.
ContainerPod Statistics

**CPUAllocation**
- Calculated as CPU capacity multiplied by CPU Overprovisioned Percentage setting

**CPURequestAllocation**
- Amount of Kubernetes CPU resource requests

**MemAllocation**
- Allocation resource that binds a container to a container pod

**MemRequestAllocation**
- Amount of Kubernetes Mem resource requests

**NumberConsumers**
- Number of containers running on the container pod

**priceIndex**
- The degree of risk for the container pod

**Produces**
- **Not Implemented**: The number of entities connected to this provider, used in calculating pricing.

**VCPU**
- The percentage utilization of the VCPUs allocated to the container pod

**VCPURequest**
- Amount of Kubernetes VCPU resource requests

**VMem**
- The percentage utilization of the VMem allocated by the hosting entity.

**VMemRequest**
- Amount of Kubernetes VMem resource requests

**VStorage**
- Virtual storage allocated to a container pod, measured in Kbytes

Database Statistics

**costPrice**
- The cost of the entity. Only available for cloud entities.

**DBMem**
- The memory in use by the database, as a percentage of the allocated capacity. Database configuration determines the capacity for this resource. Note that for databases, Turbonomic uses this resource to
drive actions, instead of the VMem on the hosting VM. This means that actions are driven by the actual memory consumption on the database.

**IOTerhroughput**

Capacity and utilization of data rate through the database’s IO adapter, measured in Kbits/sec.

**LICENSE_ACCESS**

Description of available licenses

**priceIndex**

The degree of risk for the database

**Produces**

*Not Implemented*: The number of entities connected to this provider, used in calculating pricing.

**Transaction**

Transactions per second

**VCPU**

The percentage utilization of the VCPU allocated for the hosting VM.

**VMem**

The percentage utilization of the VMem allocated to the hosting VM.

**VStorage**

Virtual storage allocated to the database, measured in Kbytes.

---

**DataCenter Statistics**

**Ballooning**

Ballooning capacity, measured in KBytes. This capacity is the greater of 65% of the VMem configured for all powered-on VMs that the PM hosts, or the physical memory capacity.

**Cooling**

Allocated cooling indicates the highest acceptable running temperature for a physical device, such as a chassis in a compute fabric.

**CPU**

Host CPU capacity, measured in MHz. This shows what percentage of CPU cycles are devoted to processing instructions.

**CPUAllocation**

Calculated as CPU capacity multiplied by CPU Overprovisioned Percentage setting

**CPUProvisioned**

The aggregate Overprovisioned CPU capacity and utilization on the host, in KB. Capacity is a function of the overprovisioning percentage specified for the host.

**HOST_LUN_ACCESS**
Whether or not this Datacenter has LUN access to the host

**IOTThroughput**

The data rate through the PM’s IO adapters, measured in Kbytes per second.

**Mem**

The aggregate percentage of the PM’s memory that is reserved or in use, measured in Kbytes.

**MemAllocation**

Allocation and utilization of the datacenter memory, measured in KB

**MemProvisioned**

Overprovisioned MEM capacity and utilization on the host, in KB. Capacity is a function of the overprovisioning percentage specified for the host.

**NetThroughput**

The aggregate data rate through the PM’s network adapters

**numContainers**

**numCPUs**

Host CPU capacity, measured in MHz. This shows what percentage of CPU cycles are devoted to processing instructions

**numHosts**

The number of hosts in the Datacenter

**numSockets**

The number of sockets in the Datacenter

**numStorages**

The number of storages in the Datacenter

**numVDCs**

The number of Virtual Datacenters in the Datacenter

**numVMs**

The number of VMs in the Datacenter

**Power**

A measure of the power that is consumed by a physical device.

**priceIndex**

The degree of risk for the datacenter

**Produces**

**Not Implemented**: The number of entities connected to this provider, used in calculating pricing.

**Q[1/2/4/8/16/32/64]VCPU**

Ready queue capacity and wait time, measured in ms. Turbonomic monitors 1-CPU, 2-CPU, 4-CPU, up to 64-CPU ready queues.

**Space**
Entity Statistics

When known, the amount of physical hardware that can be used in conjunction with this entity. For example, the number of spaces in a server rack.

**StorageAccess**

IOPS capacity and utilization

**StorageAmount**

The storage capacity, reserved storage, and utilized storage for this entity's storage in MB

**StorageProvisioned**

Overprovisioned MEM capacity and utilization on the host, in KB. Capacity is a function of the overprovisioning percentage specified for the host.

**Swapping**

The capacity, reserved capacity, and utilization for rate of memory swapping to disk, in bits per second.

IOModule Statistics

**Cooling**

Allocated cooling indicates the highest acceptable running temperature for a physical device, such as a chassis in a compute fabric.

**NetThroughput**

The data rate through the entity's network adapters, measured in Kbytes/second

**PortChannel**

The data rate through the port channel, measured in Kbytes/second

**Power**

A measure of the power that is consumed by a physical device.

**priceIndex**

The degree of risk for the IO Module

**Produce**

**Not Implemented:** The number of entities connected to this provider, used in calculating pricing.

**Space**

When known, the amount of physical hardware that can be used in conjunction with this entity. For example, the number of spaces in a server rack.

PhysicalMachine Statistics

**Ballooning**
Ballooning capacity, measured in KBytes. This capacity is the greater of 65% of the VMem configured for all powered-on VMs that the PM hosts, or the physical memory capacity.

CPU
  CPU capacity, CPU reserved, and CPU utilized, in MHz.

CPUAllocation
  CPU capacity, as allocated to the host, in MHz.

CPUProvisioned
  Overprovisioned CPU capacity and utilization on the host, in MHz. Capacity is a function of the overprovisioning percentage specified for the host.

HOST_LUN_ACCESS
  Whether or not this PM has LUN access to the host

IOThroughput
  Capacity and utilization of data rate through the host’s IO adapter, measured in Kbits/sec.

Mem
  The percentage of the PM’s memory that is reserved or in use, measured in Kbytes.

MemAllocation
  Allocation and utilization of host memory, measured in KB.

MemProvisioned
  Overprovisioned MEM capacity and utilization on the host, in KB. Capacity is a function of the overprovisioning percentage specified for the host.

NetThroughput
  Capacity and utilization of data rate through the host’s Network adapter, measured in Kbits/sec.

numCPUs
  The number of CPUs on the host.

numSockets
  The number of sockets discovered on this host.

priceIndex
  The degree of risk for the host.

Produces
  Not Implemented: The number of entities connected to this provider, used in calculating pricing.

Q[1/2/4/8/16/32/64]VCPU
  Ready queue capacity and wait time, measured in ms. Turbonomic monitors 1-CPU, 2-CPU, 4-CPU, up to 64-CPU ready queues.

StorageAmount

Swapping
  The capacity, reserved capacity, and utilization for rate of memory swapping to disk, in bits per second.
Storage Statistics

priceIndex
The degree of risk for the storage entity.

Produces
Not Implemented: The number of entities connected to this provider, used in calculating pricing.

StorageAccess
IOPS capacity and utilization

StorageAllocation
Storage capacity, as allocated to the host, in KB.

StorageAmount
The storage capacity, reserved storage, and utilized storage for this entity in MB

StorageLatency
The capacity, reserved amount, and utilized amount of latency for storage transactions, in msecs.

StorageProvisioned
Overprovisioned storage capacity and utilization on the entity, in MB. Capacity is a function of the overprovisioning percentage specified for the entity.

StorageController Statistics

CPU
CPU capacity, CPU reserved, and CPU utilized for the storage controller, in MHz.

priceIndex
The degree of risk for the disk array.

Produces
Not Implemented: The number of entities connected to this provider, used in calculating pricing.

StorageAccess
IOPS capacity and utilization

StorageAmount
The storage capacity, reserved storage, and utilized storage for this entity's storage in MB

StorageLatency
The capacity, reserved amount, and utilized amount of latency for storage transactions, in msecs.
Switch Statistics

**NetThroughput**
The data rate through the entity's network adapters, measured in Kbytes/second.

**PortChannel**
The data rate through the port channel, measured in Kbytes/second.

**priceIndex**
The degree of risk for the Switch.

**Produces**
*Not Implemented*: The number of entities connected to this provider, used in calculating pricing.

VirtualDataCenter Statistics

**CPUAllocation**
Host CPU capacity, measured in MHz. This shows what percentage of CPU cycles are devoted to processing instructions

**CPURequestAllocation**
Host CPU capacity, measured in MHz. This shows what percentage of CPU cycles are devoted to processing instructions

**MemAllocation**
Allocation and utilization of the virtual datacenter memory, measured in KB

**MemRequestAllocation**
Allocation and utilization of the virtual datacenter memory, measured in KB

**priceIndex**
The degree of risk for the virtual datacenter

**Produces**
*Not Implemented*: The number of entities connected to this provider, used in calculating pricing.

**StorageAllocation**
Storage capacity, as allocated to the virtual datacenter, in KB

VirtualMachine Statistics

**Ballooning**
Ballooning capacity, measured in KBytes. This capacity is the greater of 65% of the VMem configured for all powered-on VMs that the PM hosts, or the physical memory capacity
Entity Statistics

CPU
Host CPU capacity, measured in MHz. This shows what percentage of CPU cycles are devoted to processing instructions

CPUAllocation
CPU capacity, as allocated to the host, in MHz

CPUProvisioned
Overprovisioned CPU capacity and utilization on the entity, in Mhz. Capacity is a function of the overprovisioning percentage specified for the entity.

HOST_LUN_ACCESS
Whether or not this Virtual Machine has LUN access to the host

IOThroughput
Capacity and utilization of data rate through the virtual machine's IO adapter, measured in Kbits/sec

Mem
The percentage of the PM's memory that is reserved or in use by the VM, measured in Kbytes.

MemAllocation
Storage capacity, as allocated to the virtual machine, in KB

MemProvisioned
Overprovisioned Mem capacity and utilization on the entity, in Kbytes. Capacity is a function of the overprovisioning percentage specified for the entity.

NetThroughput
The data rate through the entity's network adapters, measured in Kbytes/second

numVCPUs
The number of VCPUs allocated to the Virtual Machine

priceIndex
The degree of risk for the Virtual Machine

Produces
Not Implemented: The number of entities connected to this provider, used in calculating pricing.

StorageAccess
IOPS capacity and utilization

StorageAmount
The storage capacity, reserved storage, and utilized storage for this entity's storage in MB

StorageLatency
The capacity, reserved amount, and utilized amount of latency for storage transactions, in msecs

StorageProvisioned
Overprovisioned storage capacity and utilization on the entity, in MB. Capacity is a function of the overprovisioning percentage specified for the entity.
**Swapping**

The capacity, reserved capacity, and utilization for rate of memory swapping to disk, in bits per second.

**VCPU**

The percentage utilization of the VCPU allocated for the hosting VM.

**VMem**

The percentage utilization of the VMem allocated by the host.

**VStorage**

Virtual storage allocated to a VM, measured in Kbytes.