



Turbonomic 6.0.11 Release Notes

April 20, 2018

This document describes issues that are addressed in Turbonomic 6.0.11 – Release Date: April 20, 2018. All builds are cumulative. Applying 6.0.11 onto any release of Turbonomic v5.9 or later will include all previous fixes. Please see the Turbonomic documentation for earlier versions of the Release Notes:

<https://greencircle.vmturbo.com/community/products/pages/documentation>

For any questions, please contact Turbonomic Technical Support at support@turbonomic.com, or open a ticket at:

<https://greencircle.vmturbo.com/support>

What's New for Version 6.0

The 6.0 family of Turbonomic releases includes the following new features:

- **User Interface Enhancements**

The new HTML user interface is now the default. Thanks to customer feedback, we have improved a number of the views. New things to see include:

- **Dashboards Page** – Use this page to create custom dashboards that focus on specific areas of your environment.
- **Reporting Page** – Set up subscriptions to standard reports, and generate reports on-demand.
- **Home Page Overviews** – To help you focus on what's important to you, the Home Page now shows overviews for Hybrid, On-Prem, and Cloud environments. You can still use the Search Page to set a scope to your session and drill down to details.
- **Policies and Settings** – The new user interface now exposes a full range of settings for business rules and automation. Use these to set policies for different scopes in your environment.

- **Enhanced Public Cloud Support**

We continue to improve our support on the public cloud. With this release you can see:

- **Enhanced cost analysis**

When calculating placement and resource allocation for workloads on the cloud, Turbonomic uses real data from your cloud accounts to calculate actual cost. The information Turbonomic uses includes Compute

Costs for the workload templates you use, License Costs for the workload OS, Storage Costs based on the storage tier you are using, and IP Cost.

For cloud storage, Turbonomic identifies the right storage tier for your workloads, ensuring you get storage performance without paying more than you need. It also discovers stranded, or "ghost" storage. When you delete a VM in your environment, you can forget to delete the attached storage. Turbonomic discovers and suspends this stranded storage so you don't have to keep paying for it.

In addition, when planning a migration from on-prem to the cloud, Turbonomic can identify stable on-prem workloads that are good candidates for Reserved Instance (RI) pricing. The resulting plan shows the cost savings you can expect by migrating these workloads to RI.

- Relational Database Control

Turbonomic discovers database instances in your cloud environment, and manages them as it does VM workloads. Turbonomic analysis determines correct scaling of your database services, provisioning new instances when necessary and recommending suspension of instances when appropriate.

- Enhanced Target Support

This version of Turbonomic introduces the following target enhancements:

- EMC VPLEX – VPLEX aggregates and refines data collected between connected Storage and Hypervisor targets. Turbonomic supports EMC VPLEX in a local configuration.
- Cisco UCS Central – Cisco UCS Central aggregates multiple Cisco Unified Computing System targets onto a single point of management.
- Storage Logical Pools – With Hitachi Data Systems and EMC VMAX 3, Turbonomic discovers and manages logical pools in your storage network.
- Hyper-V – This release adds support of Hyper-V 2016, and includes a number of improvements to our Hyper-V support.

- Cloud-Native Enhancements

For OpenShift and Kubernetes environments, Turbonomic imports Node and Pod affinity constraints, and uses those constraints in its analysis. In addition, Turbonomic creates groups for containers.

Update Recommendations

You can apply this update to any GA version of Turbonomic from version 5.9 or later, if it is running on CentOS.

NOTE: If your Turbonomic installation is running on an older version, or if it is running on openSUSE, contact Turbonomic Technical Support to confirm your update path.

Update Links

Turbonomic 6.0.11 is available as an offline update. Please see the Green Circle article:

[How To Perform an Operations Manager "Offline Update" - Latest Links Included](#)

Related Green Circle Articles

- Offline and Online Update Instructions:
<https://greencircle.vmturbo.com/docs/DOC-1649>
- Release Notes and Product Documentation:
<https://greencircle.vmturbo.com/community/products/pages/documentation>

Configuration Requirements

For this release of Turbonomic, you should satisfy the following configuration requirements.

Security Requirements for Browsers

For web browsers to communicate with Apache, the Apache configuration requires TLS version 1.1 or later. To use versions of Microsoft Internet Explorer 9 and 10, you must enable TLS 1.1 or later (in **Internet Options > Advanced**). For more information, see the following Green Circle article:

[The DROWN Attack: Configuring your Turbonomic Web Security](#)

Updating the Tomcat Server

There are circumstances when you might choose to upgrade the Tomcat server on Turbonomic to a later version. In this case you must copy a local configuration file to the tomcat installation.

After you update the Tomcat server:

- Copy the file `/usr/libexec/tomcat/server.local` to `/usr/libexec/tomcat/server`
- To ensure that this server configuration file is executable, perform the command: `chmod 755 /usr/libexec/tomcat/server`

Storage Requirements for the Turbonomic Server

Turbonomic now states 150GB or greater as a requirement for disk storage. For Turbonomic servers hosted on VMware hypervisors, you should provide 150GB *plus* swap space to match the RAM allocation.

Transport Layer Security Requirements

Starting with version 5.4, by default Turbonomic requires Transport Layer Security (TLS) version 1.2 to establish secure communications with targets. Most targets should have TLSv1.2 enabled. However, some targets might not have TLS enabled, or they might have enabled an earlier version. In that case, you will see handshake errors when Turbonomic tries to connect with the target service. When you go to the Target Configuration view, you will see a Validation Failed status for such targets.

In particular, we have found that NetApp filers often have TLS disabled by default, and that the latest version they support is TLSv1. If your NetApp target suddenly fails to validate after installing Turbonomic 5.4 or later, this is probably the cause.

If target validation fails because of TLS support, you might see validation errors with the following strings:

- `No appropriate protocol`
To correct this error, ensure that you have enabled the latest version of TLS that your target technology supports. If this does not resolve the issue, please contact Technical Support.
- `Certificates does not conform to algorithm constraints`
To correct this error, refer to the documentation for your target technology (for example, refer to NetApp documentation) for instructions to generate a certification key with a length of 1024 or greater on your target server. If this does not resolve the issue, please contact Turbonomic Technical Support.

Enabling HTTP and HTTPS Proxies

Turbonomic supports the use of HTTP and HTTPS proxies for internet communication. However, you must edit the Tomcat Server configuration file to add the required system variables.

The file you must edit is on your Turbonomic server at `/usr/libexec/tomcat/server`

In this file, search for the `OPTIONS` statement. It should appear in the config file similar to the following:

```
FLAGS="$( $JAVA_OPTS ) $CATALINA_OPTS "  
OPTIONS=" -Dcatalina.base=$CATALINA_BASE ..."
```

Add the following flags to the `OPTIONS` statement, giving values for your proxies:

```
-Dhttp.proxyHost  
-Dhttp.proxyPort  
-Dhttps.proxyHost  
-Dhttps.proxyPort  
-Dhttp.proxyUser  
-Dhttp.proxyPassword  
-Dhttps.proxyUser  
-Dhttps.propyPassword
```

The resulting OPTIONS statement should be similar to the following:

```
OPTIONS="-Dcatalina.base=${CATALINA_BASE} \  
-Dcatalina.home=${CATALINA_HOME} \  
-Dhttp.proxyHost=111.10.10.123 -Dhttp.proxyPort=123 \  
-Dhttps.proxyHost=112.10.10.123 -Dhttps.proxyPort=456 \  
-Dhttp.proxyUser=user -Dhttp.proxyPassword=password \  
-Dhttps.proxyUser=user -Dhttps.propyPassword=password"
```

Note that the values you provide for this file must match the values you provide when specifying a proxy in the Turbonomic user interface. After you make these changes, restart the Tomcat server.

For further assistance, contact Technical Support.

Enabling HTTP to HTTPS Redirects for the REST API

Starting with version 5.9.1, Turbonomic redirects http requests to the user interface and the REST API over to HTTPS. For the user interface to display, this redirect must be in place.

If you are updating from a version of Turbonomic that is earlier than 5.9.1, then you must restart the httpd service on the Turbonomic server. A restart enables this redirect after such an update.

To restart the httpd service, use the following command: `service httpd restart`

For more information, contact Technical Support.

Enabling IOPS and Network Monitoring for OpenStack Mitaka

The Target Configuration Guide gives instructions to connect to OpenStack targets. However, if you are running OpenStack Mitaka, you must perform additional configuration on the Mitaka platform to enable IOPS and Network data collection from Physical Machines. For those instructions, please see the Green Circle article, [Enabling OpenStack PM Metric Collection](#).

SMI-S Provider Versions for EMC VNX and EMC VMAX Storage Solutions

To connect to EMC VNX and VMAX disk arrays, Turbonomic uses EMC SMI-S providers that have the given disk arrays added to them. Note that VNX and VMAX support different versions of SMI-S Providers:

- VNX
For VNX and VNX2 arrays, use SMI-S version 4.6.2, based on Solutions Enabler 7.6.2. We have verified Turbonomic control of VNX block storage using SMI-S version 4.6.2 as a target.
- VMAX
For VMAX arrays, use SMI-S version 8.1, which is included in Solutions Enabler 8.1 – We have verified Turbonomic control of VMAX storage arrays using SMI-S version 8.1 as a target.

Known Issues

- The browser that you use for the Turbonomic user interface must be synchronized with the Turbonomic server to within one minute. Without this synchronization, Turbonomic can show incorrect metric values.
- When setting up a Migrate To Cloud plan, it is possible to choose a group of *cloud* VMs to migrate. You can run such a plan to simulate migration from one region to another. However, if you choose to migrate to a complete Cloud Service Provider (choose from Providers instead of Regions or Groups), then the plan will show inconsistent results. For example, the plan results can indicate that you have no VMs at all.
To plan for migrations across an entire service provider, you should use the Optimize Cloud plan.
- In OpenStack environments, when you set up reservations to deploy workloads via OpenStack templates you must constrain the deployment to the OpenStack datacenter.
When you define the workload to deploy, you specify a template to deploy and any constraints that you want Turbonomic to respect. To deploy an OpenStack template, turn on the **Limit initial placement to locations you specify** constraint, and manually choose the datacenter or datacenters that support the OpenStack template.
- Turbonomic now requires HTTPS to connect to the user interface, and to connect to the API. Also, API connections no longer accept clear-text authentication, so you cannot include authentication in URLs to execute API commands. Instead, you should use curl commands to execute API commands.
To support HTTPS, Turbonomic includes a self-signed certificate by default. We recommend that you install a certificate from a trusted Certificate Authority. If you do not install a trusted certificate, you can still use curl to execute API commands if you include the `-k` flag.
- After editing the IP address of a Turbonomic target or deleting a Turbonomic target, we recommend that you restart Tomcat in order for the Supply Chain to correctly reflect the changes.
- Turbonomic policies include a default policy named **Global Actions Mode**. You can use this policy to globally disable all actions in Turbonomic. If you turn on the setting to disable all actions, then `Disabled` takes effect for all actions. However, in the default policies the action modes remain as you have set them. The user interface does not show that you have globally disabled these actions.
- For cases where a actions indicate provisioning new hosts, the Optimized Improvements chart does not include the hosts to provision in the After Plan section.
The target configuration documentation for HPE 3Par targets does not clarify the required permissions for discovery and monitoring vs. action execution.
For discovery and monitoring, Turbonomic requires the `Browse` permission on applicable domains. For action execution, Turbonomic requires the `Edit` permission.
- If you use Google Chrome for the Turbonomic user interface, you must turn off the Chrome Preview mode before you download reports.
- In AWS environments that use RI templates across access regions, you should be sure to have a single master account, and include that master and all sub accounts as Turbonomic targets.
If you experience situations where RI actions seem to recommend templates that are not available in the indicated regions, verify that you have included all the sub accounts as targets. If the problem persists, contact Technical Support.
- Under some circumstances in AWS environments, Turbonomic cannot recommend changing a workload from on-demand billing to an RI purchase plan. This occurs when the name, description, and platform fields of the workload's image do not clearly identify the OS. In that case, Turbonomic cannot identify the RI that matches the given workload.
To enable RI optimization for all of your AWS workloads, make sure the image fields include a clear OS name such as `ubuntu`, `centos`, or `Windows 10`. If your account can find an RI that matches the identified OS, then Turbonomic can recommend switching that workload to an RI purchase plan.
- Do not make policy settings on parent groups (groups of groups).
When you make policy settings on a parent group, Turbonomic resets the setting to the default every time you

restart. This can have unintended consequences if you want these policies to implement business rules that control Turbonomic actions.

When setting up policies, be sure you set them to individual groups. If necessary, create a custom group for the settings you want to apply.

- In order to perform VM moves between Hyper-V servers in the same cluster, you must select `Discover Host Cluster` when adding one of the clustered hosts as a target.
- When using the Firefox browser, platform diagnostics cannot be downloaded. To download diagnostics, you must use another browser.
- The Deployer user type has access to all settings, instead of the subset of settings indicated in the User Management menu.
- In Azure environments, storage cost depends on the type of storage you have purchased. For unattached, unmanaged standard storage, you are charged for utilized storage. However, Turbonomic calculates cost based on what storage has been allocated. As a result, calculated costs can be higher than actual costs.

In reports this can show in two ways:

- Current costs can be overstated
- Potential savings for moves to other storage can be overstated

For nightly plans, Turbonomic executes plans for ten clusters each night. In environments with more than ten clusters, plans and views that rely on the generated data can be out of date or incomplete. For example, headroom charts for some clusters can show a `No Data` message if the plan for that cluster has not been run yet.

- After executing **Settings : Maintenance Options : Export Current Environment**, the user interface sometimes shows that the export failed even though the export is still running successfully.

If you are exporting a large topology, the user interface response can time out and show this warning after 60 seconds, even though the export continues to run.

If you experience this situation, restart the Turbonomic server. This restarts the HTTP server with a 10 minute timeout setting, which should be sufficient to export most environments. If the problem persists after a restart, contact technical support.

- Storage Suspend actions appear grouped with Delete Wasted Files actions in the Delete category of pending actions.

For example, assume you are viewing the On-Prem Overview on the Home Page, and the Pending Actions chart does not list Suspend Storage actions. However, if you hover on the Storage tier of the Supply Chain, the tooltip shows that you have actions to execute on Storage. These actions would be to suspend storage.

When viewing the overview, it is always a good idea to hover on any tier of the Supply Chain that is not completely green. The tooltip gives you extra information about that tier, including a count of actions.

To see the specific storage actions, click the Storage tier in the Supply Chain, and then view the Actions list.

- When running a Replace Workload plan to replace certain VMs with a template, under some circumstances the plan replaces the VM with a copy of an existing VM. For this reason, you should not configure a Replace Workload plan.

To get the same effect as a Replace Workload plan, you should configure the plan to remove the VMs you want to replace, and then configure it to add instances of a template or VM copy. For example, remove three VMs, and then add three instances of a VM template.

- For Load Balancer entities, the Transactions Per Second data can be incomplete.
- When setting up a custom plan, the user interface allows you to set a scope that includes public cloud entities. If you run such a custom plan, you can see unexpected or incorrect plan results. You should not set a scope that contains public cloud entities.

To run plans for the public cloud, choose the **Migrate to Public Cloud** or the **Optimize Cloud** plan type.

- In AWS environments, the calculation of license costs for RI workloads does not correctly factor in both the on-demand and the RI billing.

- The user interface does not accept edits to existing automation policies. If you need to change a policy, delete it and create a new policy with the settings you want.
- In AWS environments a Reserved Instance (RI) can be associated with a region or an availability zone. For RIs associated with regions, the Turbonomic scale actions assume reservations are regional. As a result, actions may resize a VM based on its reserved cost, but the VM charges will actually use the on-demand cost. If this occurs, use the AWS console to change the scope of the RI to "regional".
- In vCenter environments, you might see unusually high storage latency values or excessive recommendations to provision new storage. There is a known problem with the storage latency values that vCenter Server versions 6.5.u1x and earlier return via the API. These versions can return unusually high storage latency values. Turbonomic considers storage latency when calculating whether to move a VM to existing storage, or whether to provision new storage. Because of this known problem, Turbonomic can incorrectly recommend provisioning storage when moves are appropriate. If you encounter this problem, then you should create a policy that disables storage moves for VMs that are managed by vCenter Server versions 6.5.u1x and earlier. To create this policy:
 - Create a VM group that contains all the affected VMs. Note that Turbonomic automatically creates a group named `VMs_vCenter` that you might be able to use.
 - Create a new VM automation policy. This policy will disable storage move actions.
 - Set the group that you created to be the policy scope.
 - Under **Action Automation** add the `Storage Move` action and set it to `Disabled`.
- In cases where actions recommend that you suspend hosts, the Optimal Improvements chart can show utilization on the remaining hosts as though the hosts to suspend are still active. The result is incorrectly low values for utilization on the hosts in the After Plan section of the chart.
- Turbonomic can automate resize actions for datastores. However after executing the action, the hypervisor that is stitched to the datastore requires a refresh before it can recognize that change. Because Turbonomic uses the hypervisor to discover the datastore, then Turbonomic will not recognize the change either. As a result, Turbonomic might recommend the same action again, even though the datastore has already been resized. To avoid this situation, Turbonomic suggests that you set the Action Mode for storage resize actions to `Recommend`.
- Navigating to the Policy View will show default settings for entities not yet available in Turbonomic, and internally-named entity groups.
- When targets are added that introduce the Logical Pool entity to the Supply Chain, scoping to the Logical Pool entity will not show data for that entity.
- For Cloud Foundry environments, the Turbonomic market can incorrectly identify the VM that hosts a container. This can happen when two or more cloud targets have VMs with the same internal IP address. For a container that is hosted on a VM with that address, Turbonomic cannot assure that it hosts the container on the correct VM.
- Turbonomic generates special average or max utilization templates that it uses when calculating cluster headroom. You should not edit these templates, because Turbonomic will overwrite your changes the next time it generates the templates. However, the Template Catalog presents these templates as editable.
- Under some circumstances in a NetApp environment, execution of a storage move action will fail.
- When you set up a Migrate Workload plan, you can choose the workloads to migrate from a list of VM GROUPS or a list of VM ENTITIES. When the user interface first shows the list of VM GROUPS, the list actually shows individual VMs, not VM groups. If you show VM ENTITIES and then show VM GROUPS again, the group list displays correctly. You should never use duplicate names for groups of the same entity type. However, the user interface does not validate group names to keep you from creating a duplicate name.
- To avoid timeout issues when working with saved plans, you should only delete one saved plan at a time.
- **Customer Issue 98320**

In Turbonomic you can create policies with a scope to a dynamic group. If changes in your environment remove all the members of the group for that policy, then Turbonomic deletes the policy definition.

- **Customer Issue 97962**

Automation policies for hosts include analysis settings for Desired State. The desired state settings affect Turbonomic analysis to give more emphasis to assuring performance or to increased utilization of infrastructure. You can specify Desired State globally in the Host default policy, or you can specify different Desired State settings for different scopes of hosts.

Turbonomic plans only use the global setting that you have in the Host default policy. The plans ignore scoped settings for Desired State.

- Turbonomic introduces a scaling constraint that you can use to exclude specific templates from move actions (VM, only) or resize actions (VMs and database instances on the cloud). For example, workload resizing in the cloud changes the template that defines the workload. To constrain resize actions for a scope of workloads, you can exclude certain templates for that scope.

In Azure environments, when you set policies to exclude templates for resize actions on Database Instances, the template exclusion initially fails. If this occurs, you can force Turbonomic to recalculate actions, and those actions will then recognize your template settings. To do this, change the action mode for an action in this policy, and apply that change. Then reset the action mode to its original value and apply it again.

- To ensure that Turbonomic recommends the most appropriate actions for AWS environments, you must make specific settings for default policies in your Turbonomic installation. After adding an AWS target, then perform these steps:

- Click **Settings: Policies** to navigate to the Policy Management page.
- Ensure datastore browsing is disabled for the Storage Defaults policy.

Find the Storage Defaults policy and make sure that the option for Disable Datastore Browsing is ON.

- Make the following settings for the Virtual Machine Defaults policy:

- * For **Action Automation**, set the following actions to **Manual**:

- * Resize Up

- * Resize Down

- * Storage Move

- * Start

- * For **Resize Recommendation Incrementing Constants**, drag the Rate of Resize slider to **High**.

- When running plans to migrate workload to the cloud, be sure to choose the **Migrate to Cloud** option, and do not use the **Workload Migration** option. If you use **Workload Migration**, you can successfully set up a migration to the cloud, but the resulting plan might not choose the least expensive regions for workload placement.

In AWS environments, Turbonomic discovers data from a given AMI to determine the OS of an associated VM. The OS influences cost calculations.

If you delete the AMI from your environment, then Turbonomic cannot discover the OS, and so it assumes a free Linux OS. This can result in incorrect calculations of cost in plans and in evaluations of real-time costs.

- If you deploy a Relational Database instance in AWS and then stop it, the Turbonomic user interface still shows that instance as active.
- After restarting the Turbonomic server, users must log into new sessions in order to continue using the user interface or the API.
- To enable the best resize-down performance for VCPU on the cloud, you should set the global VCPU Resize Increment to 1 MHz.
- For Migrate to Cloud plans, when you migrate a VM that has an attached ISO image, the plan shows a move of a non-existent OGB disk. This OGB disk is a representation of the ISO image, and you can ignore the move action. The other plan actions for the VM are correct.
- To set up a Migrate to Cloud plan, you specify the scope of VMs that you want to migrate to the cloud. Currently, the plan configuration only supports a scope of one group or one VM. If you want to migrate workloads that are currently in different groups, then you can create a static or a dynamic group to include those workloads and migrate them to the cloud.

- Turbonomic supports logging in to AWS targets via AWS Identity and Access Management (IAM) with IAM Users or IAM Roles. To enable using Roles, you must run the Turbonomic software on an EC2 instance in the AWS cloud, and you must have the Turbonomic instance run as the IAM Role, and connect to the AWS target accounts with the appropriate IAM Role. To perform these actions, please contact Technical Support.
- For Tomcat, SQLServer, WebSphere, and other application or database targets that use a scope to identify target instances, Turbonomic can fail to validate or discover the targets. If you add a target via scope, and that scope does not have any VMs to host the target applications, then the target will not validate. If you later add hosts for the applications to that scope, Turbonomic does not dynamically recognize the change and then validate and discover. Even if you execute a Validate command for that target, Turbonomic can validate but it will not run discovery.

To avoid this problem, make sure your applications are running on hosts before you configure the target. If you have encountered this problem (you added hosts to a scope after configuring the target), delete the target from Turbonomic and set a new target with this scope.

- If multiple targets are added to Turbonomic with identical identifying fields, you will not be able to distinguish these targets from one another via the API or UI. To avoid this, ensure that you add targets with unique identifying fields.

Customers upgrading from 5.7 or 5.8 versions of Turbonomic might need to reset their custom policies for disk arrays.

Starting with version 6.0, Turbonomic changes the way it creates groups categorized as Storage by Disk Array. In earlier versions, these groups included placeholder disk arrays (arrays that are not discovered through a disk array target). Turbonomic no longer includes these disk arrays in the Storage by Disk Array category of groups.

If you have upgraded from 5.7 or 5.8, and you used any Storage by Disk Array groups to set Turbonomic policy overrides to your disk arrays, then you will lose these settings as a result of this change to groups. You must reset these policy settings to your disk array groups in the upgraded version of Turbonomic.

- Upgrades from an earlier version can result in the database storing plans from the earlier version, yet the user interface does not show these plans. This is known when upgrading from 5.8.5 to 5.9.1. It might also occur for any upgrades with plans stored in the database.
- When you set up action orchestration in an Automation Policy, you should be sure that the scope is for this policy does not include conflicts with individual entities. If a single entity is in two scopes, and one scope enables orchestration while the other scope does not, then Turbonomic arbitrarily chooses either orchestration or a Turbonomic action mode.
For example, assume two groups - GroupA and GroupB, and assume a host named MyHost is in both groups. If you configure action orchestration for hosts in GroupA but you do not for hosts in GroupB, then you cannot be sure that Turbonomic will call the action orchestrator for actions on MyHost.
- Assume you have application or database servers as targets, and they use dynamic groups to define their scopes for monitoring. If you add new application or database servers to these dynamic groups, or if you shut down and then restart an existing server, then Turbonomic fails to discover the change and these servers will not appear in the UI. To resolve this problem, execute a manual rediscovery of the affected target.
- On rare occasions the user interface for adding a target displays a blank page. If that occurs, refresh the browser to display the Add Target controls.
- For WebSphere, Tomcat, and SQLServer targets, you can set a scaling policy to be horizontal or vertical. To set scaling for these targets, you must set it both in the Turbonomic user interface, and also in the properties file for the given probe. This means that for any of these targets, all discovered entities must use the same scaling property. For help with scaling policies for these targets, contact Technical Support.
- Under some circumstances when using the Deploy View, the user interface can fail to respond. After you request a placement, if the placement recommendation does not appear within one to two minutes, reload the browser running Turbonomic to reset the user interface.

- If you ignore hyperthreading for a scope that is less than a datacenter and then restart tomcat for the Turbonomic application, then Turbonomic does not calculate the CPU capacity correctly for the affected scope of hosts. If this problem occurs, perform a full rediscovery to show correct CPU capacity.
- When you reserve resources for VMs that you will deploy in the future, Turbonomic initially calculates these reserved resources as CPU Provisioned, Memory Provisioned, and Storage Provisioned. However, these resources ultimately revert back to values that do not include the reserved VMs.
- There is a rare case where Turbonomic can lose the cluster relationship for VMs running on a host. Assume you move a host out of a cluster, and directly into the datacenter (not into a cluster). Next you create a new cluster and then move the host into that cluster. In this case, the VMs on that host will not belong to any PM cluster. This can also affect Provider Virtual Datacenters that belong to the new cluster.
To avoid this problem, create the cluster first, and move the host directly into it. If this problem occurs, rediscover your environment to establish the correct cluster relationships.
- For VMs running on Hyper-V, if you set a VCPU limit (limit VCPU to less than 100%), then the VCPU utilization data that VM returns to Turbonomic is not correct. As a result, Turbonomic will not recommend that you increase the VCPU limit.
- In OpenStack environments, it is possible to place a VM belonging to a specific cluster (a VM flavor that is set via extra specifications) onto a host that is not a member of that cluster. Turbonomic cannot identify this configuration error, and will not recommend a move to place the VM on an appropriate host.
You can implement placement policies to ensure that VMs always get placed on the correct hosts. This can work even if there is no host cluster to match the VM flavor. However, in that case the user interface will not show these VMs as members of a PM cluster.
- In the JSON REST API, you can execute a DELETE method for Market and Market_default. The API should prohibit DELETE methods for these resources. If you are programming with the API, do not execute a DELETE on these market resources.

Fixed Issues

- **Customer Issue 100138**
Fixed: For aggregated installations of Turbonomic, after updating the aggregating instance, the configuration fails to discover the underlying instances.
- **Fixed:** Security risks have been detected.
- **Customer Issue 99715**
Fixed: Under some circumstances a user can only add and validate a single Pure Storage target.
- **Customer Issue 99962**
Fixed: Under some circumstances Turbonomic does not correctly recognize when a shut-down host is moved to a different cluster. For example, assume you put a host in maintenance mode, and then move it to a different cluster. When you power the host up again, Turbonomic moves VMs from the original cluster onto the host.
- **Fixed:** CPU Provisioned Used and Memory Provisioned Used settings made for a host do not take effect on the given host.
- **Fixed:** Cannot create groups of VMs based on their disk arrays
- **Fixed:** Under some circumstances for XtremeIO environments, Turbonomic discovers a lower IOPs capacity on the storage controller than it discovers on the underlying disk array.
- **Fixed:** For Oracle database server targets, if the underlying VM reboots, then Turbonomic cannot rediscover the database server. To workaround this problem you must restart tomcat.

- **Customer Issue 100219**
Fixed: In Azure environments, if requests to the Azure API for VM power state time out, Turbonomic interprets that to mean the VM is powered down.
- **Fixed:** For Migrate to Cloud plans, if you add multiple VMs to migrate individually, or if you add multiple groups individually, the plan does not consistently recognize all the VMs to migrate. To work around this issue, add all the VMs to a single group and migrate that group.
- **Customer Issue 100082**
Fixed: In Azure environments, Turbonomic recommends storage move actions even though for Azure it does not support analysis to generate these actions.
- **Fixed:** In AWS environments, if a load balancer group uses the same display names as other applications in the environment, Turbonomic does not correctly discover both the load balancer group and the other applications.
- **Customer Issue 98195**
Fixed: In some environments the Health Monitor reports excess consumption of memory for the Turbonomic instance.
- **Fixed:** In very large environments, the performance of display in the Expense vs Budget chart is unacceptable.
- **Customer Issue 99161**
Fixed: Under some circumstances Turbonomic fails to generate a RightSize report.
- **Fixed:** When displaying dashboards, Turbonomic unnecessarily checks for updates.
- **Fixed:** In large environments, performance is unacceptable as the Supply Chain updates in response to user interface gestures.
- **Fixed:** Turbonomic does not successfully send subscribed-to reports via email.
- **Fixed:** After adding custom chart widgets to the Home Page, Turbonomic does not always display the Home Page correctly. If you log out of the user interface and then log in again, the Home Page does not display the custom widgets. However, if you click the Home Button the display updates to include the custom widgets.
- **Fixed:** Performance when loading the actions list is unacceptable.
- **Fixed:** Performance for the Pending Actions chart is unacceptable, and it blocks further user interface while generating its display.
- **Fixed:** When creating a group, the user interface can reject the group name as a duplicate name even if the name is just similar to another group name.
- **Fixed:** For the classic user interface and API 1, complete display of plan results requires an administrator account. Accounts with a role of advisor cannot see the full plan results.
- **Fixed:** In cases where discovery has not completed (for example, after restarting tomcat) executing a Workload Placement call fails even if the environment has capacity for the desired workload. Instead of failing, the placement action should retry until discovery is complete.