

# Guide to Microsoft System Center Management Pack for SQL Server Dashboards

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## Microsoft® System Center Operations Manager

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The Operations Manager team encourages you to provide feedback on the management pack by sending it to [sqlmpsfeedback@microsoft.com](mailto:sqlmpsfeedback@microsoft.com).

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### Table of Contents

- [Guide to Microsoft System Center Management Pack for SQL Server Dashboards](#)
  - [Copyright](#)
  - [Table of Contents](#)
  - [Changes History](#)
  - [Supported Configurations](#)

- Files in this Management Pack
- Introduction to Microsoft SQL Server Dashboards Management Pack
  - Datacenter View
    - Datacenter View Tiles
  - Instance View
    - Instance View Tiles
  - Creating and Configuring Datacenter Dashboard
    - Creating Datacenter and Instance Dashboards
      - Creating Custom Management Pack
      - Create Datacenter Dashboard
    - Adjusting Datacenter Dashboard
      - Personalization of Datacenter View
      - Adding Group
        - Enabled States
        - Adding Aggregated Tiles
        - Adding Aggregated Monitor Tile
        - Add Aggregated Performance Tile
      - Adding Virtual Group
    - Adjusting Instance Dashboard
      - Adding Performance Tile
      - Adding Monitor Tile
    - Moving Tiles
    - Performance View and Health Explorer
    - Adding Tiles in Bulk
    - Instance Dashboard Navigation
      - Drill-Down to Related Objects
      - Using "Show alerts" Function
      - Using Navigation Pane
      - SQL Instance Path Property
    - Configuring Run As Profiles
  - SQL Server Web Dashboards
- Appendix: Known Issues and Troubleshooting

## Changes History

September 2020 - 7.0.25.0 CTP

- **What's New**

- Added tiles for Azure SQL Database Management Pack
- Rename tiles for SSRS Management Pack and SQL Server Replication Management Pack

June 2019 - 7.0.16.0

- **What's New**

- Updated Dashboards configuration to show tiles for new MDX performance collections in Analysis Services management packs

February 2018 - 7.0.2.0 RTM

- **Bug Fixes**

- Fixed issue: "DW data early aggregation" rule crashes on SCOM 2016

December - 2016 6.7.15.0 RTM

- **Bug Fixes**

- Fixed issue: Tiles content is replaced with question signs after a long period of inactivity

October 2016 - 6.7.7.0 RTM

- **Bug Fixes**

- Fixed issue: expanding "arrow" has low-contrast color when a health group is collapsed in Instance view (High-Contrast #2 color scheme)
- Fixed issue: in Web console, Dashboards continuously send requests to the database
- Fixed issue: not the first object gets selected in the object list after drill-down
- Fixed issue: horizontal scroll position resets after refreshing the Instance view
- Fixed issue: "No Data" message is displayed on some tiles after upgrading Dashboards management pack from version 6.7.2.0 to 6.7.4.0 or later version
- Fixed issue: on Web console, Dashboards crash when drilling down from Datacenter view to Instance view
- Restored the correct group order in SQL Server Summary dashboard views

September 2016 - 6.7.5.0 CTP2

- **What's New**

- Improved Dashboards performance

- **Bug Fixes**

- Fixed issue: Regular\Virtual group tile will show 0 objects if user adds a new group before the previous one has been saved
- Fixed issue: virtual group filtering for Generic Distributor does not work
- Fixed issue: tooltips on some menus appear in unexpected places
- Fixed issue: Web Console is crashing upon right-clicking the hamburger button
- Fixed issue: button captions are cropped in some dashboard localization packs
- Fixed issue: Instance dashboard displays data for the item that is the first in the list if no items appear after applying a filter
- Fixed issue: the first group object is not in focus after clearing "Filter" field if there were no search results
- Fixed issue: Summary dashboards appear to be in a strange state if one installs only Dashboards MP without SQL MPs
- Fixed issue: Bulk Add Tiles does not trigger the refresh action
- Fixed issue: object and alert counters of Virtual groups containing real groups display zeros
- Fixed issue: an error appears in Web Console when using keyboard for navigation in "Add Aggregated Monitor" dialog
- Fixed issue: unexpected scrolling behavior in the instance view when using mouse scroll
- Fixed issue: markup of the dialog for adding classes gets broken when the scrollbars are displayed

- Fixed issue: wrong width value of the Edit dialog
- Fixed issue: there is no refresh action after saving the edited Virtual Group configuration
- Fixed issue: white-screen exception when working with a dialog in Web console
- Fixed issue: Datacenter and Instance queries fail when a special set of classes is selected

## June 2016 - 6.7.2.0 RTM

- **What's New**

- Changed some stored procedures to improve Dashboards performance

## June 2016 - 6.7.1.0 CTP2.1

- **What's New**

- Improved Dashboards performance

## May 2016 - 6.7.0.0 CTP2

- **What's New**

- Added a feature to support Virtual Groups (groups defined by classes, not by real group instance). This will help users with partial access to use our predefined dashboards
- Added a feature to Bulk Add tiles from the class definition
- Added a feature to ignore some states while calculating the worst state for the Datacenter View State Tile; added a feature to set this ignorance up for each group
- Added a feature to show/hide Instance path in the list on the Instance view
- Added instance path to the Instance Details
- Implemented deferred loading of the instance tiles to make the instance view operation faster
- Implemented a new format for Dashboards configuration providing a smaller size and a single binding
- Implemented a converter from old to new format providing preservation of user changes
- Improved error reporting
- Improved performance of initial load process
- Improved data sources performance
- Improved performance of instance selection (made it asynchronous)
- Improved performance of Datacenter and Instance View Tiles, loading and loaded animations
- Updated Summary dashboard
- The "Known issues and Troubleshooting" section of the guide is updated

- **Bug Fixes**

- Fixed animation issues and minor visual glitches (positioning, size of elements, fonts, main loading animation)

## April 2016 - 6.6.7.30

- **What's New**

- Updated Path search and display
- Added removal of unused elements
- Implemented a deferred loader

- Improved drilldown process
- Added support for SQL Server Replication 2016 MP objects in Summary dashboard

- **Bug Fixes**

- Fixed animation, styles and display issues
- Fixed filter and search issues
- Fixed "Show/Hide Path" button in Silverlight
- Fixed group adding process
- Fixed HighLight; simplified tile adding process

## March 2016 - 6.6.7.6 CTP1

- **What's New**

- Replaced 999+ presentation with a new one (26.2k)
- Added configurable rule to pre-aggregate data in the DW (see the corresponding Known Issue)
- Added second row in the instance view to show Path of the object, and allow searching by Path
- Fixed tooltip presentation on the Instance view
- "Known issues and Troubleshooting" section of the guide is updated

- **Bug Fixes**

- Fixed "The client has been disconnected from the server. Please call ManagementGroup.Reconnect() to reestablish the connection" exception

## November 2015 - 6.6.4.0

- **Bug Fixes**

- Fixed an installation issue on SQL Server 2008
- Fixed permission grants for Alert aggregation table

## November 2015 - 6.6.3.0

- **What's New**

- Implemented batching to all data aggregation mechanisms to ensure low temp database space and log space usage
- Implemented a control bit to divide group from non-group references to save space in aggregated data storage

## October 2015 - 6.6.2.0

- **What's New**

- Improved performance
- Objects with selected monitors are now displayed on the top of the tiles list while editing
- If there are no child elements, Related Objects tile is not displayed in Instance View
- Added Dark, Light and Contrast themes
- Introduced an interface upgrade allowing to display the Dashboard errors
- User rights are now considered in the Dashboard display: the user can see the groups according to his/her access level only; Read-Only mode is implemented, it provides basic functions only:

- navigation, changing of the personalization settings
- Introduced a Dashboard feature allowing to display data from any nesting level within the widgets

- **Bug Fixes**

- Fixed some UI errors, UI design upgraded
- Fixed synchronization errors of the personalization settings

June 2015 - 6.6.0.0

The original release of this management pack

## Supported Configurations

This management pack is designed for the following versions of System Center Operations Manager:

- System Center Operations Manager 2012 R2
- System Center Operations Manager 2016
- System Center Operations Manager 1801
- System Center Operations Manager 1807
- System Center Operations Manager 2019

A dedicated Operations Manager management group is not required for this management pack.

## Files in this Management Pack

The following is a list of files that come with this Management Pack:

- Microsoft.SQLServer.Visualization.Library.mpb
- Microsoft.SQLServer.Generic.Dashboards.mp
- Microsoft.SQLServer.Generic.Presentation.mp

## Introduction to Microsoft SQL Server Dashboards Management Pack

Microsoft SQL Server Dashboards Management Pack provides the ability to create and customize visualization on the fly.

There are two views in SQL Server Dashboards:

- **Datacenter**

This view is an aggregated view.

- **Instance**

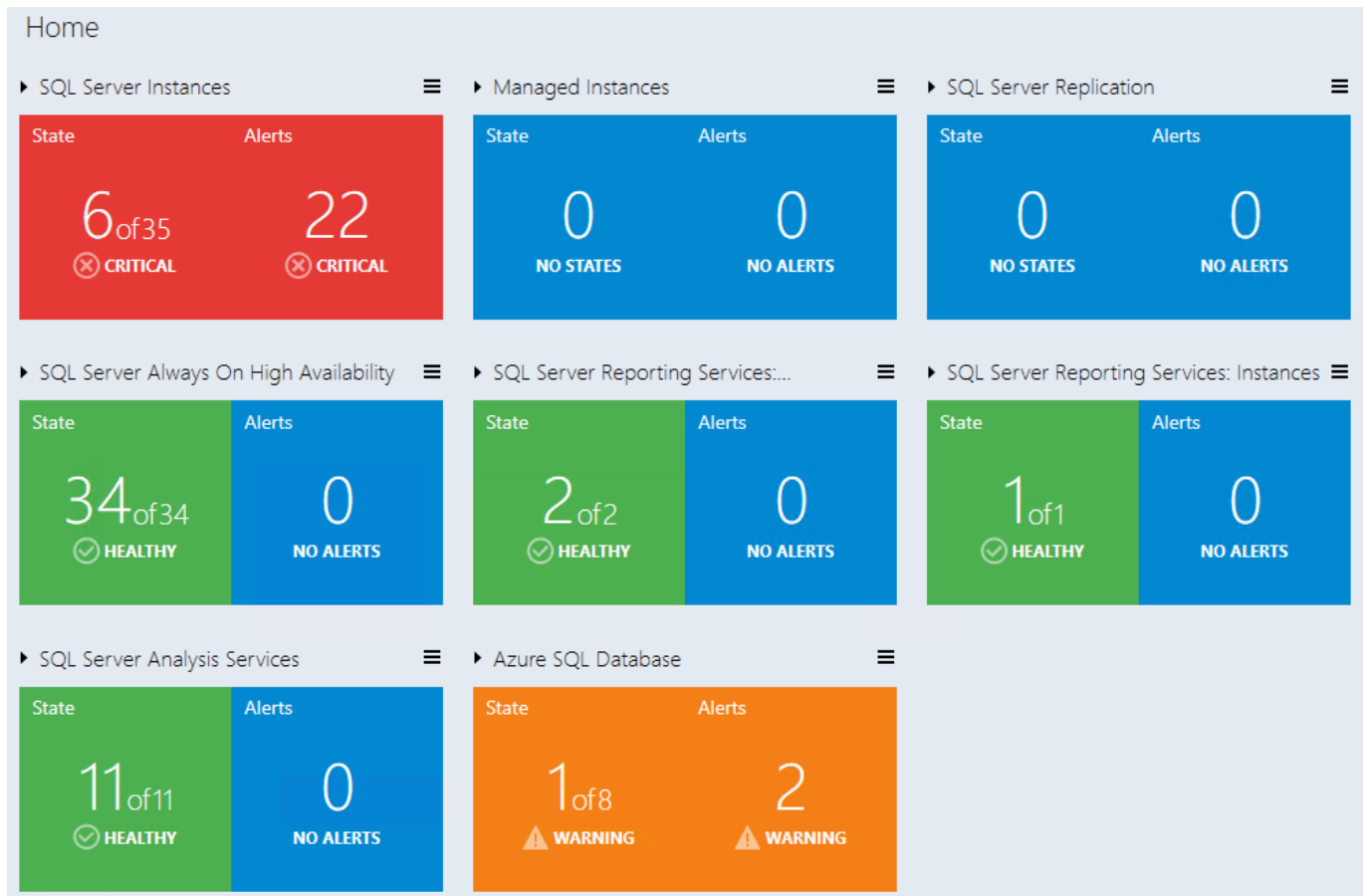
This view provides detailed information about the selected object

### Datacenter View

The **Datacenter** view is the home page of the dashboard. This view provides information about the datacenter health state in an aggregated way.

It is possible to drill down from the **Datacenter** view to the **Instance** view in order to investigate the root cause of the issue.

You can return to the home page from any **Instance** view by clicking **Home** in the navigation pane.

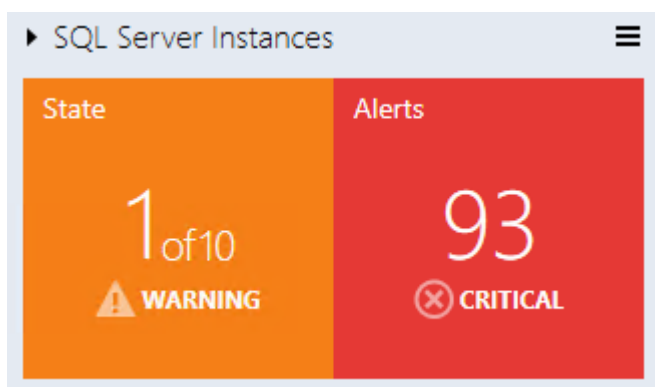


### Datacenter View Tiles

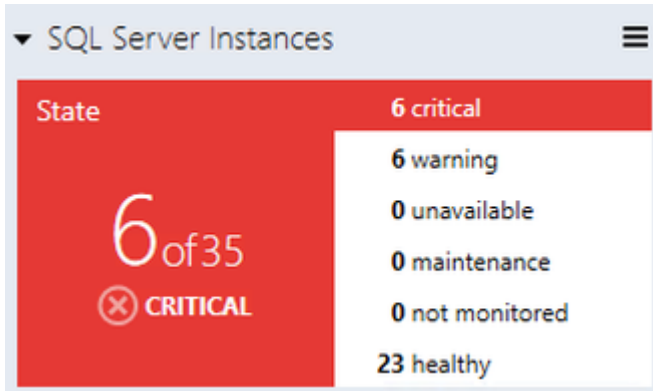
All group tiles on the datacenter view are collapsed by default.

A tile consists of two parts:

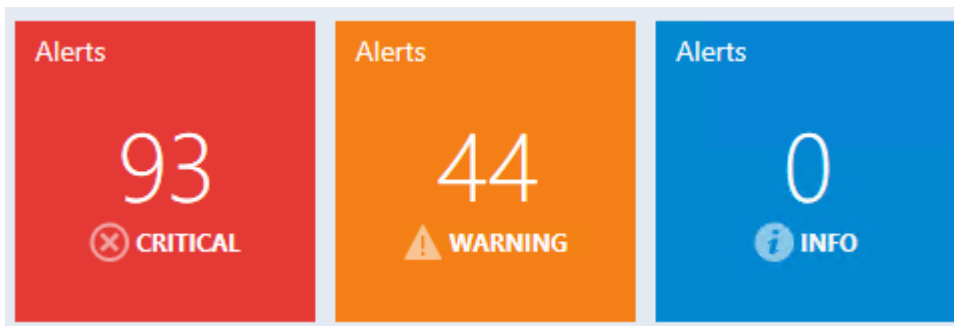
- The left part displays the number of objects within a group in the worst state and a total number of objects.
- The right part of the widget displays the number of alerts with the highest severity.



The expanded mode shows the number of objects in other states in addition to the data displayed in collapsed mode.



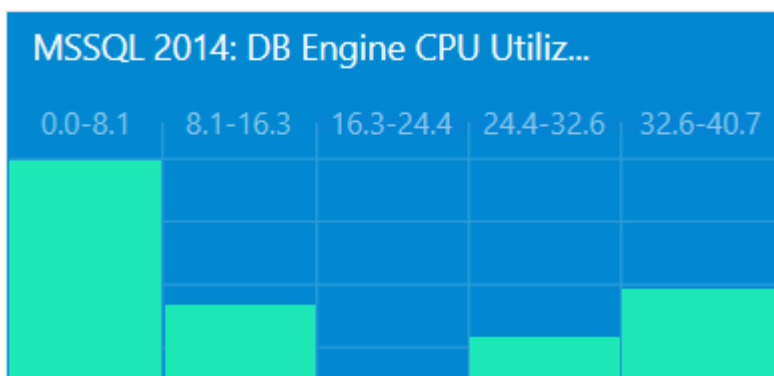
By default, expanded mode displays three Alert widgets: *Critical*, *Warning* and *Info*. The number of alerts for each alert type is displayed in the corresponding widget.




The Aggregated state monitor tile provides the number of object selected classes per state.



The Aggregated performance tile shows five columns. Each column represents the number of object selected classes in the current data range.



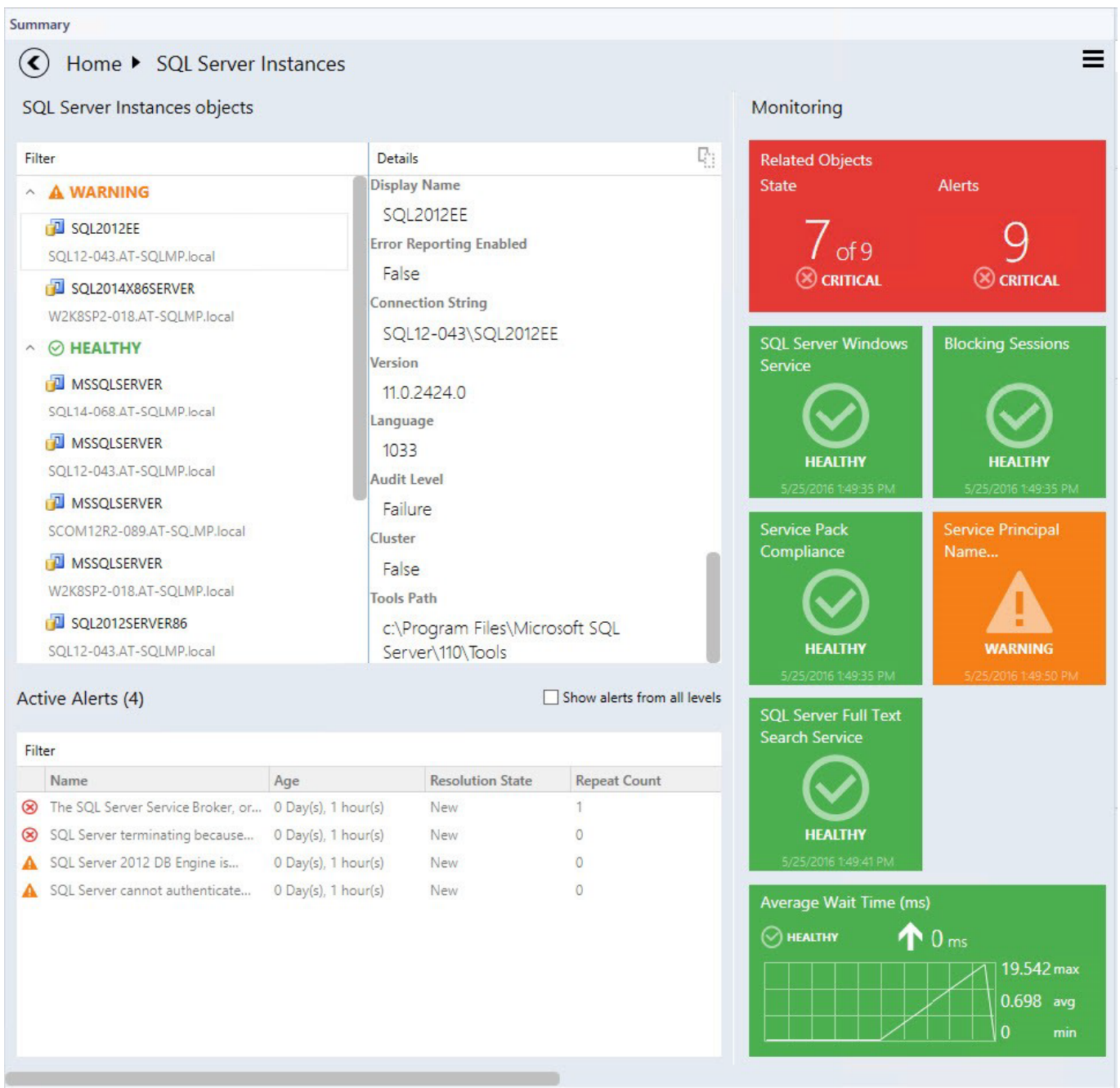


 Note:

- Use the Datacenter View menu button or a group to add a new tile or group.
- It is possible to edit or remove the tile by selecting a corresponding menu item from the right-click context menu.
- Background color, time interval, and refresh rate settings applied to the **Datacenter** view and all **Instance** views can be set from the Datacenter view menu and Instance view menu.

## Instance View

The following is an example of the instance view that is displayed after drilling down into a group or an object from the previous view.



Summary

Home ▶ SQL Server Instances

SQL Server Instances objects

Filter

**WARNING**

- SQL2012EE  
SQL12-043.AT-SQLMP.local
- SQL2014X86SERVER  
W2K8SP2-018.AT-SQLMP.local

**HEALTHY**

- MSSQLSERVER  
SQL14-068.AT-SQLMP.local
- MSSQLSERVER  
SQL12-043.AT-SQLMP.local
- MSSQLSERVER  
SCOM12R2-089.AT-SQLMP.local
- MSSQLSERVER  
W2K8SP2-018.AT-SQLMP.local
- SQL2012SERVER86  
SQL12-043.AT-SQLMP.local

Details

Display Name  
SQL2012EE

Error Reporting Enabled  
False

Connection String  
SQL12-043\SQL2012EE

Version  
11.0.2424.0

Language  
1033

Audit Level  
Failure

Cluster  
False

Tools Path  
c:\Program Files\Microsoft SQL Server\110\Tools

Monitoring

Related Objects

State Alerts

7 of 9  
CRITICAL

9  
CRITICAL

SQL Server Windows Service  
HEALTHY  
5/25/2016 1:49:35 PM

Blocking Sessions  
HEALTHY  
5/25/2016 1:49:35 PM

Service Pack Compliance  
HEALTHY  
5/25/2016 1:49:35 PM

Service Principal Name...  
WARNING  
5/25/2016 1:49:50 PM


SQL Server Full Text Search Service  
HEALTHY  
5/25/2016 1:49:41 PM

Average Wait Time (ms)  
HEALTHY  
0 ms  
19.542 max  
0.698 avg  
0 min

Active Alerts (4)  Show alerts from all levels

Filter

Name	Age	Resolution State	Repeat Count
The SQL Server Service Broker, or...	0 Day(s), 1 hour(s)	New	1
SQL Server terminating because...	0 Day(s), 1 hour(s)	New	0
SQL Server 2012 DB Engine is...	0 Day(s), 1 hour(s)	New	0
SQL Server cannot authenticate...	0 Day(s), 1 hour(s)	New	0

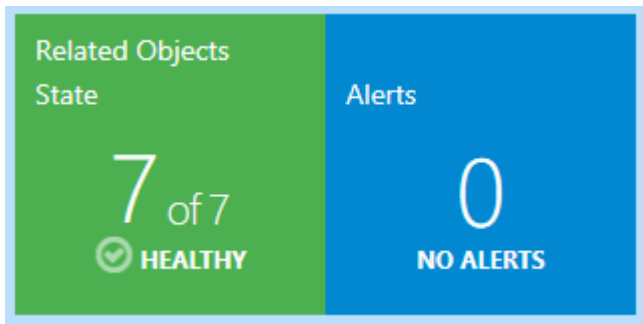
 Note: Double-click the name of an object in the object widget to drill down to the instance dashboard of related objects (double-click the **Related Objects** tile does the same). The **Back** button is available in the upper-left corner of the navigation pane for navigating back to the previous instance view.

## Instance View Tiles

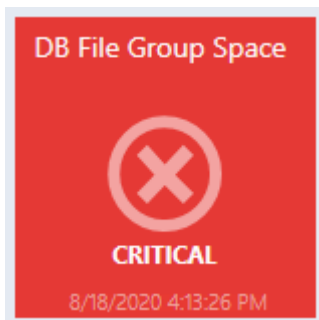
Instance view tiles display information about the current state of the monitors as well as the latest performance data.

Depending on the current state and configuration, these tiles will have different background colors and layout. Please refer to examples below for illustrations of the tile capabilities.

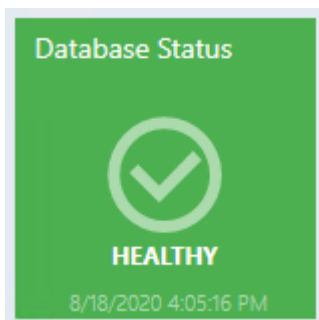
Related objects tile displays the number objects that are either hosted on the selected entity or linked by a containment. Double-clicking the tile opens the instance view for the related objects.



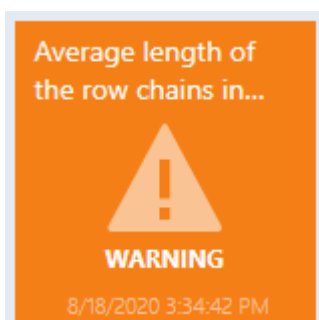
The monitor is in a critical state.



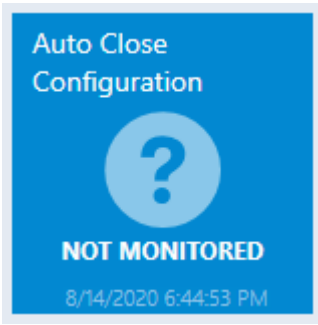
The monitor is in a healthy state.



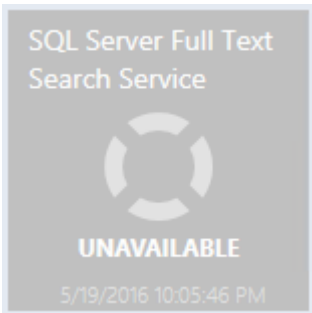
The monitor is in a warning state.



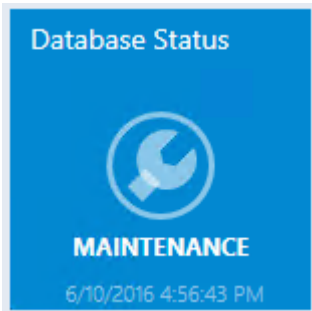
The monitor is disabled.



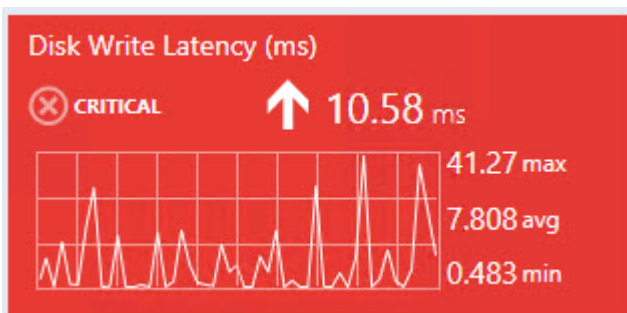
The monitor is unavailable.



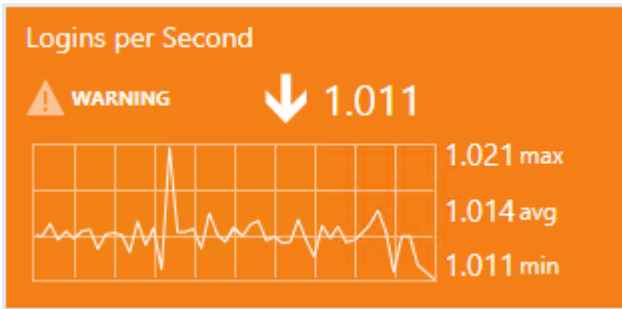
The monitor is under maintenance.



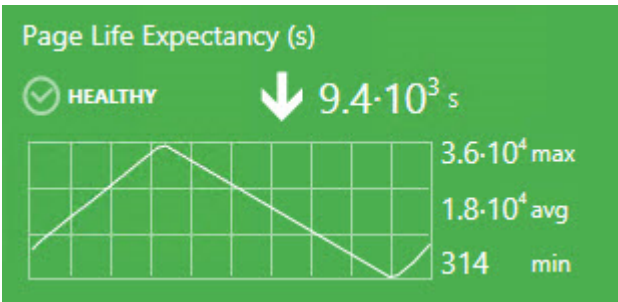
The monitor is in a critical state. The data for the selected Time Range is being displayed.



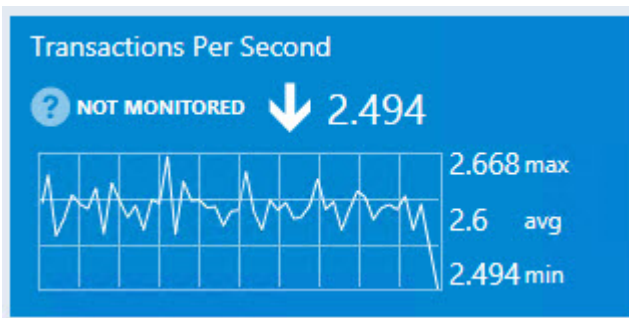
The monitor is in a warning state. The data for the selected Time Range is being displayed.



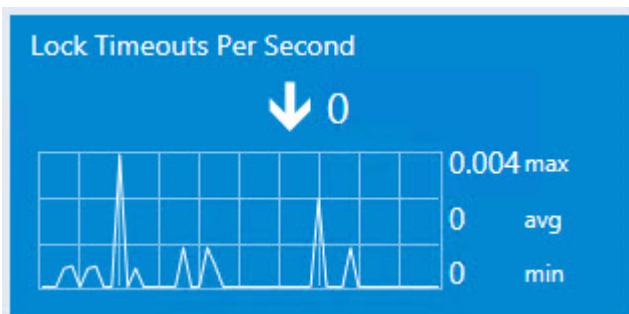
The monitor is in a healthy state. The data for the selected Time Range is being displayed.



The monitor is disabled. The data for the selected Time Range is being displayed.

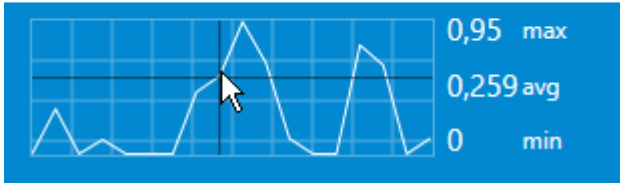


The performance counter has no correlated monitor (note that there is no icon in the top-right corner). The data for the selected time range is being displayed.

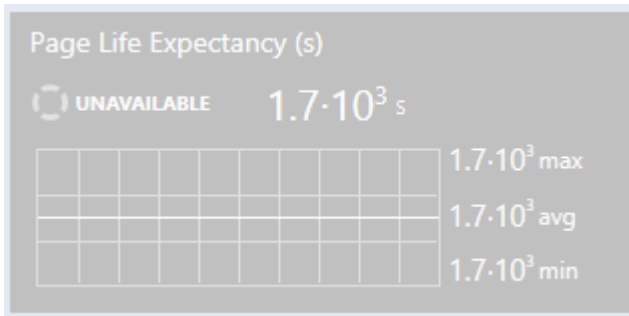


It is possible to view the exact value of the performance metric by hovering the cursor over the performance chart.

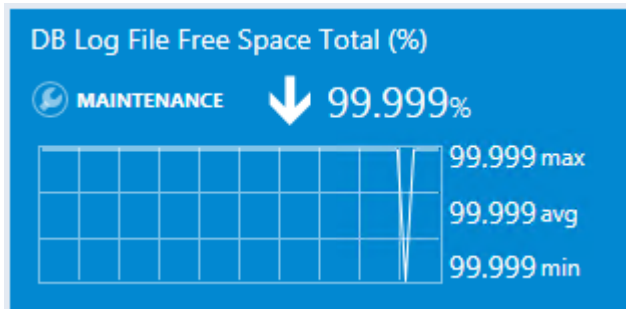
Date 6/10/2015 1:43 Value 0,558 %



The monitor is unavailable. The data for the selected Time Range is being displayed.



The monitor is under maintenance. The data for the selected Time Range is being displayed.



## Creating and Configuring Datacenter Dashboard

### Creating Datacenter and Instance Dashboards

#### Creating Custom Management Pack

It is recommended to store Datacenter dashboards in a separate Management Pack to allow easy exporting and re-using of the configured views.

To create a new management pack:

1. Open the **Administration** view and click **Management Packs**.
2. Right-click **Management Packs** and select **Create Management Pack**.

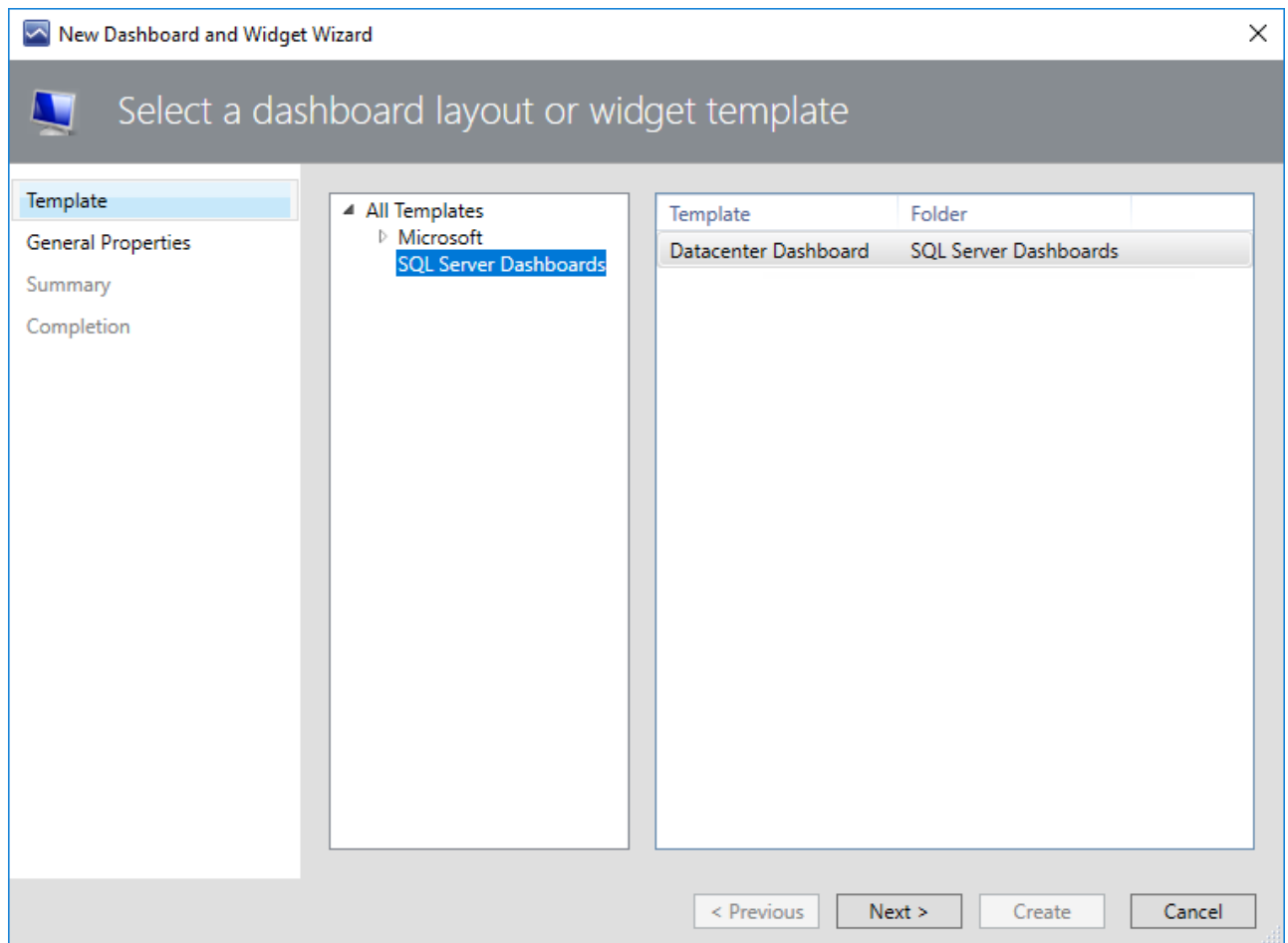
#### Create Datacenter Dashboard

To create a Datacenter dashboard, a user should select the *SQL Server Dashboards* template.

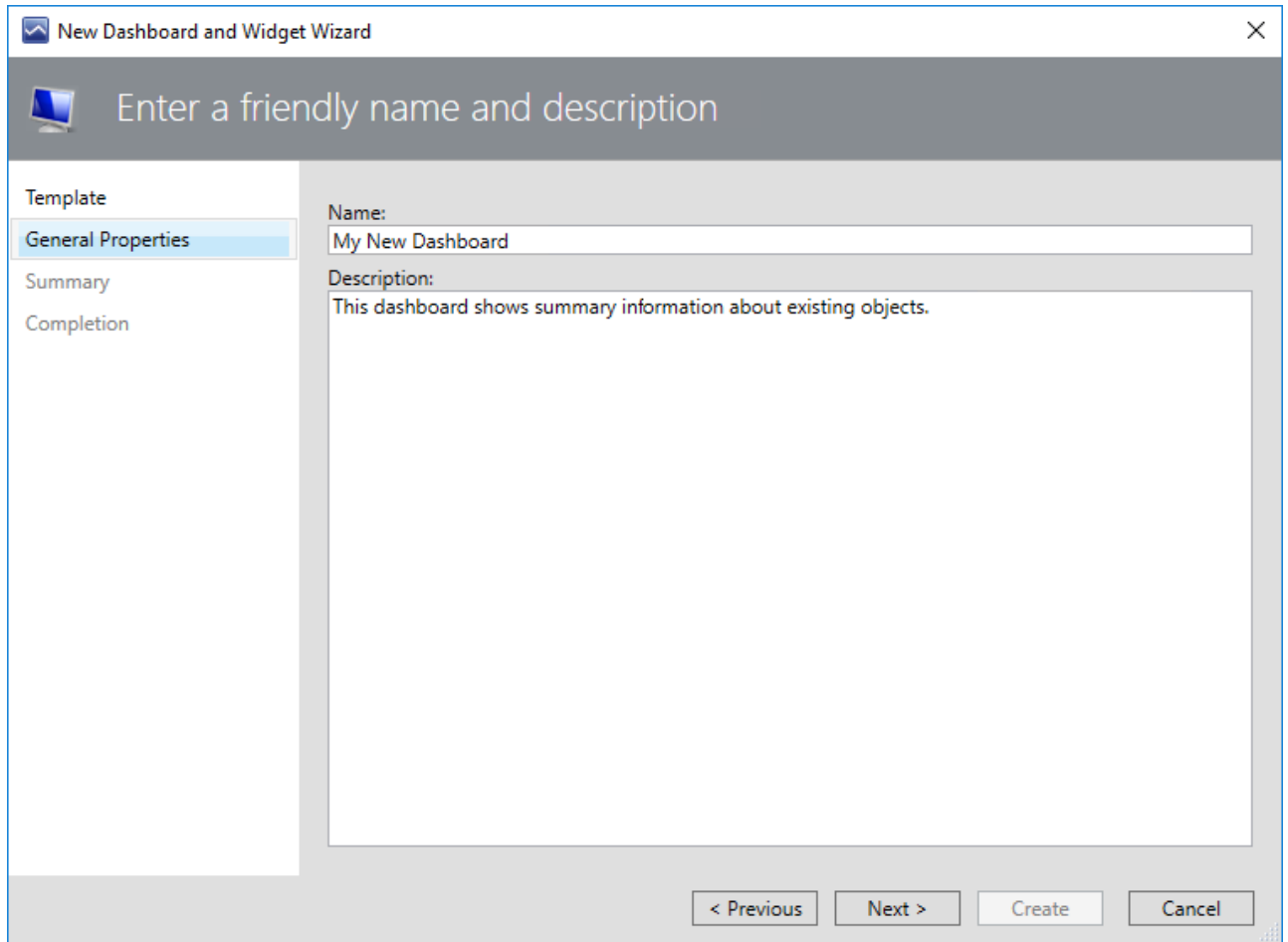
To create a new datacenter dashboard:

1. Open the Operations Manager console.

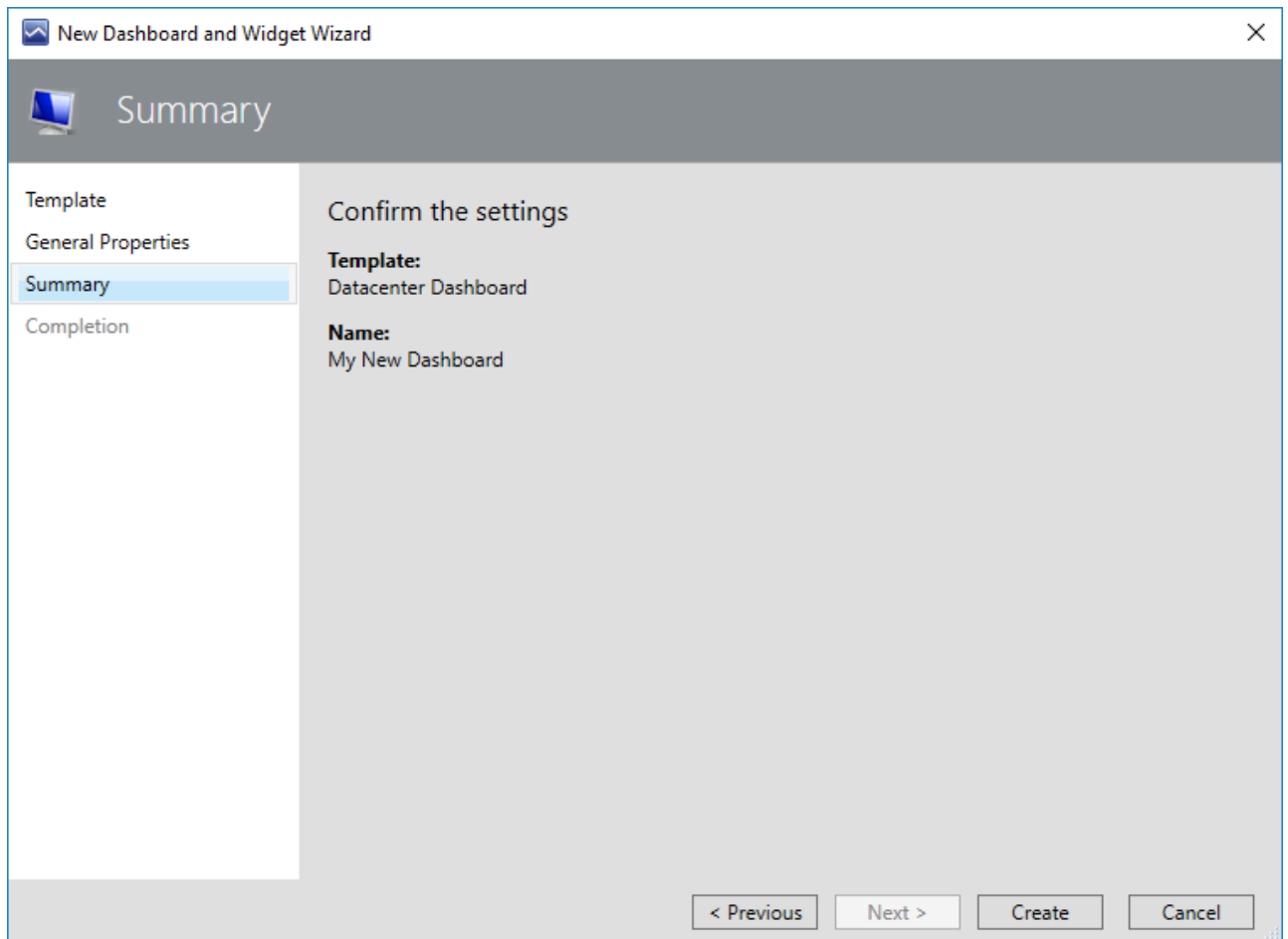
2. In the **Monitoring** view, right-click a folder for a new dashboard and select **New > Dashboard View**.
3. At the **Template** step, select *SQL Server Dashboards* and click **Next**.



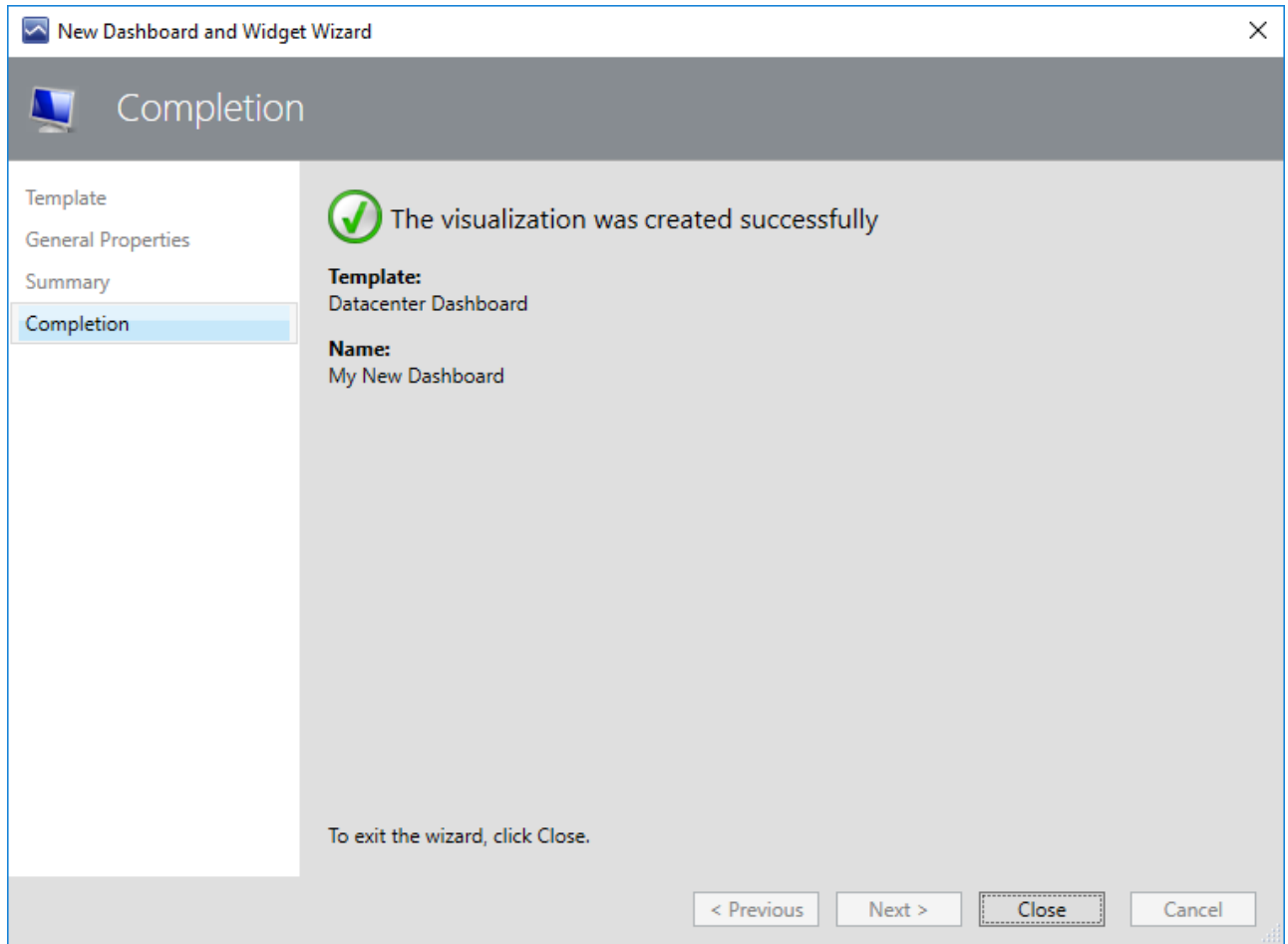
4. At the **General Properties** step, specify a name and description for the template.



5. At the **Summary** step, click **Create** and wait until the dashboard view is created.



6. At the **Completion** step, click **Close**.



A new dashboard has no groups by default and only the *Home* note (not clickable) that represents the root of breadcrumbs and datacenter menu.

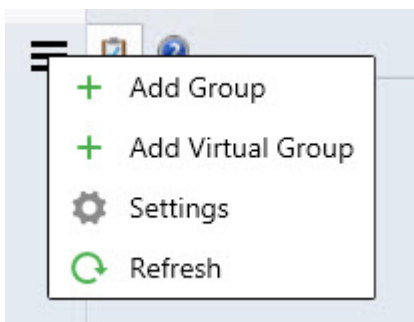
Note that while the dashboard is in the *Loading...* state, the hamburger button and *Home* title are not displayed.

### Adjusting Datacenter Dashboard

To set up a datacenter dashboard, it is necessary to add some groups and to provide corresponding widgets to each group.

#### Personalization of Datacenter View

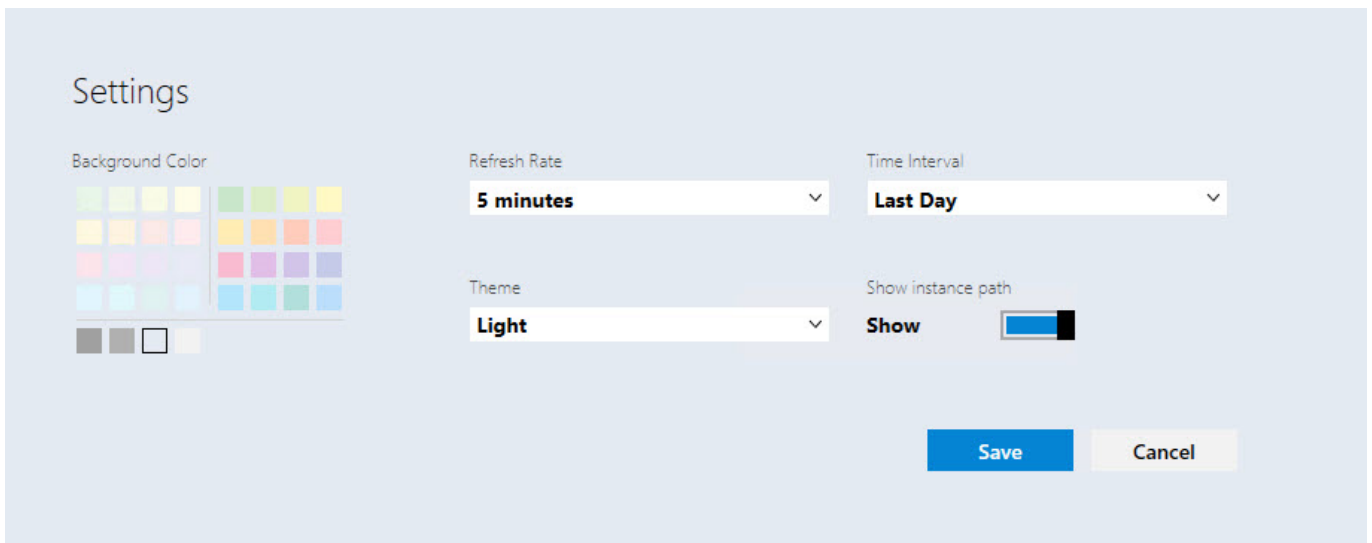
The datacenter dashboard menu is accessible by left or right clicking the menu button. It allows the user to add a group, add a virtual group, configure the settings and refresh the dashboard.



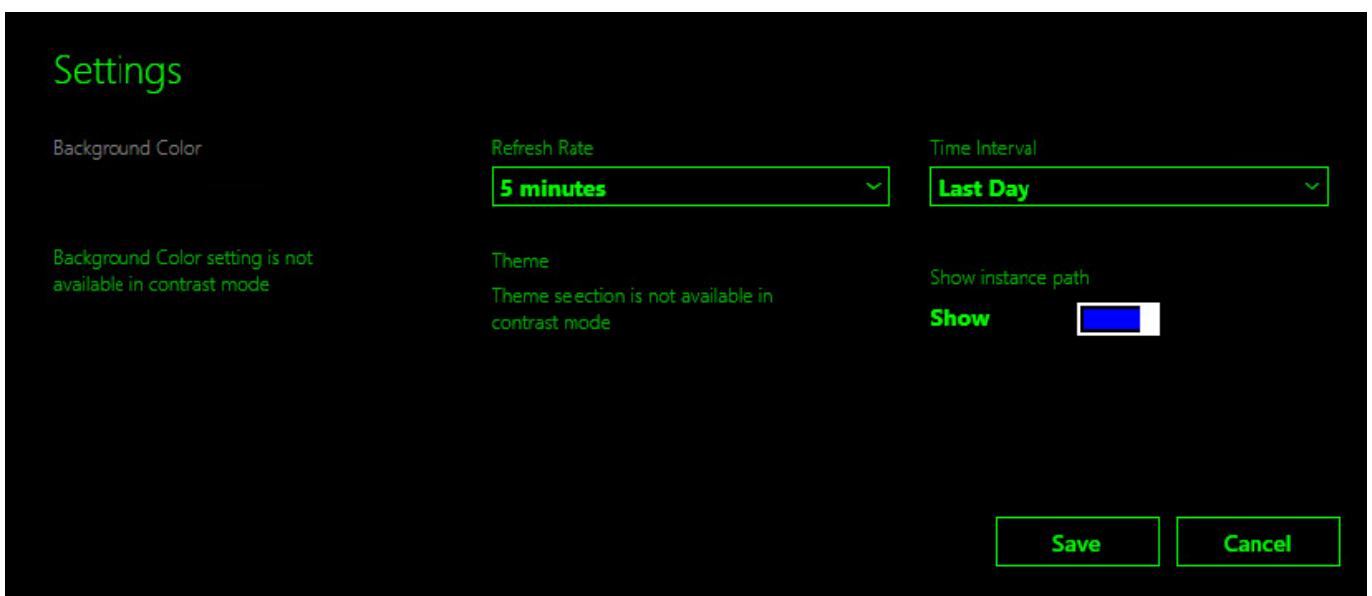


Available settings are as follows:

- *Refresh Rate* – this setting defines how often the dashboard refreshes the data on a client. This setting does not change the actual collection frequency of metrics on a server. The refresh rate can be set to 5 (default), 15 and 30 minutes.
- *Time Interval* – this setting defines for which period the data should be displayed. The performance widget on the instance view depends on this setting. The time interval can be set to *Last Day*, *Last Week* and *Last Two Weeks*.
- *Background Color* – this setting allows changing the background color for all views.
- *Theme* – this setting allows choosing *Light* or *Dark* theme for the dashboard. Background color can be changed manually.
- *Show instance path* checkbox is enabled by default (for more details, see the [SQL Instance Path Property](#) section); when it is unchecked, the *Show* title is changed to *Hide*.



The *Contrast* theme is automatically activated when the corresponding system theme is used. Background and font colors are taken from the system palette.




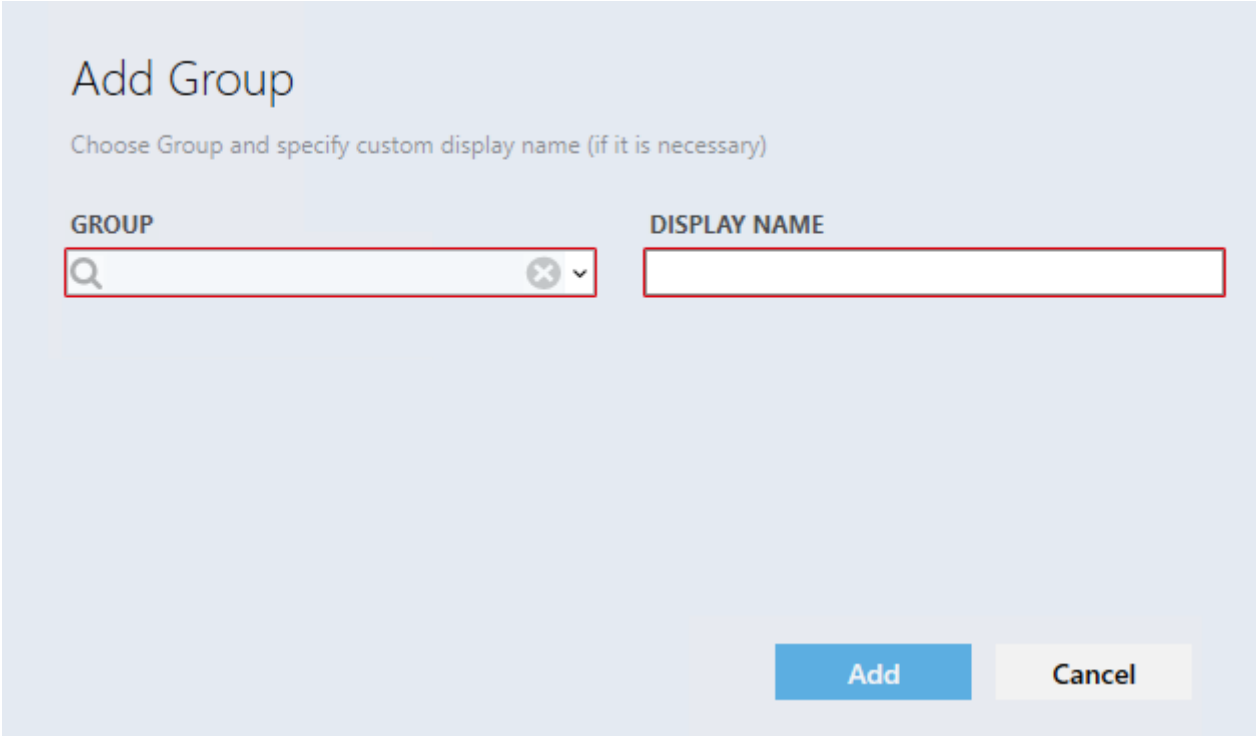
## Adding Group

Click the menu button and select the **Add Group** item from the drop-down list. You can search for the desired group in the **Add group** dialog by typing a corresponding group name.

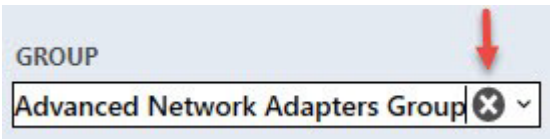
The **Add Group** dialog requires the **GROUP** combobox and the **DISPLAY NAME** field. When the **GROUP** combobox is in the focus, The *It is required to select a group* hint is displayed.

When the **DISPLAY NAME** field is in focus, The *The field is required* hint is displayed. The **GROUP** combobox is in the focus by default after opening the **Add Group** view.

 Note: The red highlighting disappears only after entering valid data in the field.



The user can open the drop-down list with available groups or type part of a group name and best match groups will be displayed in the drop-down list. Information entered in the *GROUP* field can be deleted by clicking the **X** button.




To select a group, choose one in the dropdown list (groups in the dropdown list should be placed in the alphabetical order). The *DISPLAY NAME* field should be populated with the name as well unless the user has already defined a name.

If the selected group is already added to the board, The *The name already exists* hint is displayed when the *DISPLAY NAME* field is in focus.

Note that the **Add** button changes its state when it is disabled.

When the Data Center dashboard is loaded for the first time or refreshed by the refresh option from the Dashboard menu, a special blink animation is displayed.

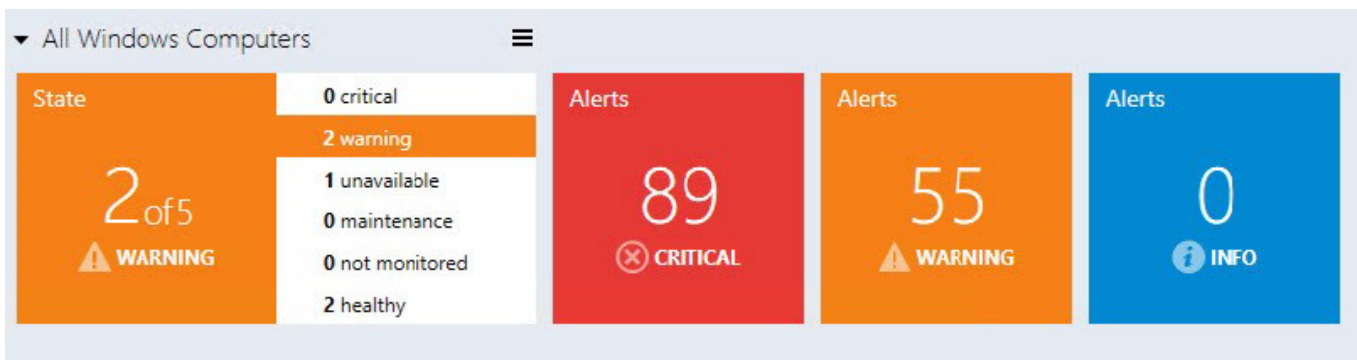
 Note: It is possible to create a custom group and populate it with a desired set of objects. Refer to [TechNet](#) for guidance.

New added group is displayed in the collapsed (minimized) state by default. To expand the panel click the arrow symbol on the right from the group name.



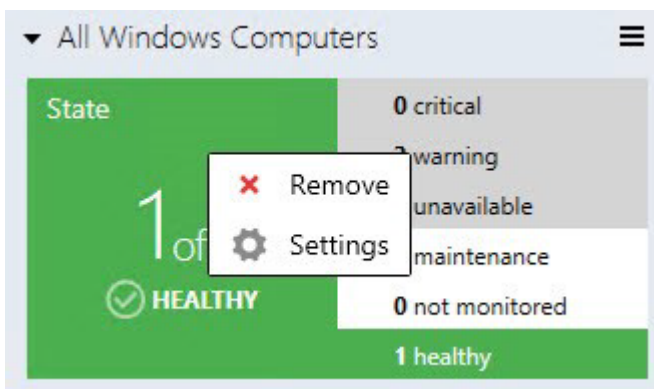
The "State" part of the widget displays the worst state of its object and it is colored according to the represented state (priority list looks like this: critical, warning, unavailable, maintenance, not monitored, healthy). Critical state is red, warning – yellow, unavailable – gray, healthy is green and the rest are blue. For alerts, priority/colors are as follows: critical - red, warning - yellow, info - blue.

In expanded mode, the state widget changes its representation.

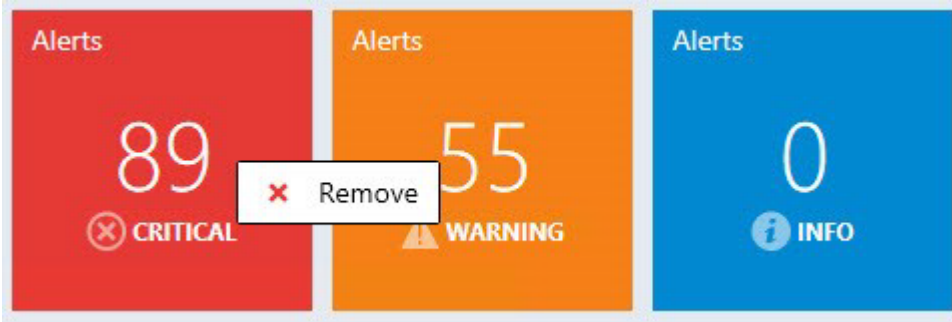


It still displays the worst state and is colored according to the represented state (the priority list looks as follows: critical, warning, unavailable, maintenance, not monitored, healthy), but it also lists all possible states and shows the number of objects in the states.

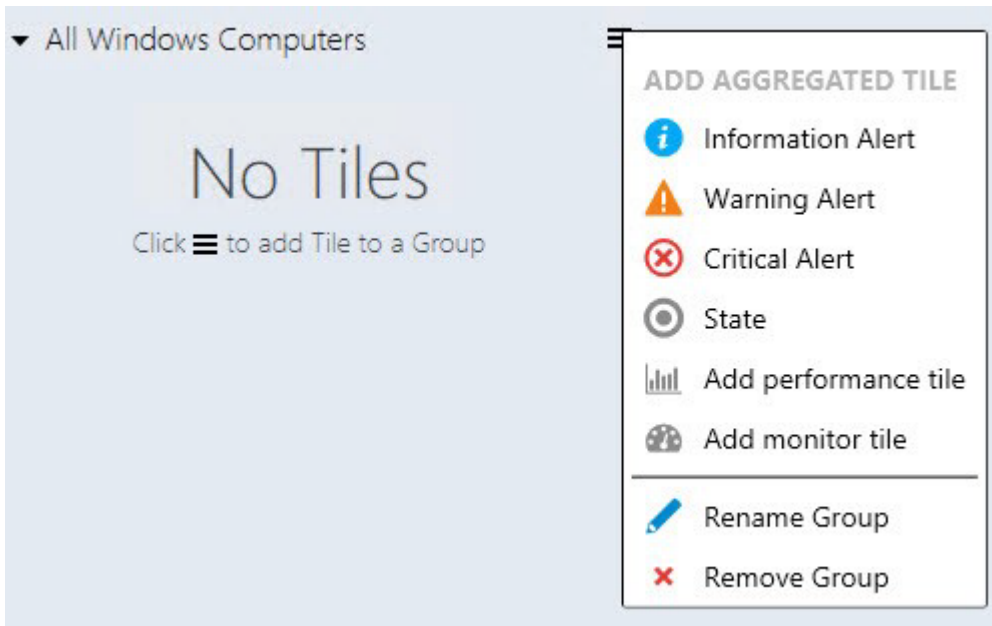
The context menu of the *State* tile allows removing it and opening the *Enabled States* view.



All other tiles (3 types of alerts) can be only removed in the context menu.



Note that if all tiles are removed, the group widget looks as follows:



The remove object dialog is similar for all tiles; only the display name of the object to be removed is different.

The alert widget in the expanded mode is separated by the alert type. Red widget represents critical alerts, orange for warnings and blue widget for info.

#### Enabled States

When the user chooses the *Settings* item in the group context menu (right mouse click at the group), The *Enabled states* view is opened.

## Enabled states

Select states that will be displayed on the state tile

Default	Current
<input checked="" type="checkbox"/> Critical	<input checked="" type="checkbox"/> Critical
<input checked="" type="checkbox"/> Warning	<input checked="" type="checkbox"/> Warning
<input checked="" type="checkbox"/> Unavailable	<input checked="" type="checkbox"/> Unavailable
<input checked="" type="checkbox"/> Maintenance	<input checked="" type="checkbox"/> Maintenance
<input checked="" type="checkbox"/> Not monitored	<input checked="" type="checkbox"/> Not monitored
<input checked="" type="checkbox"/> Healthy	<input checked="" type="checkbox"/> Healthy

Save

Reset to default

Cancel

A user can select states of the group objects, which will be displayed on the state tile in this view.

When the user changes "Default" checkboxes settings, "Current" checkboxes settings are changed for all groups in the current Dashboard View.

Note: If the "Current" group checkboxes settings were changed previously, changing "Default" checkboxes settings will not affect "Current" checkboxes settings till "Reset to default" settings are applied to this group.

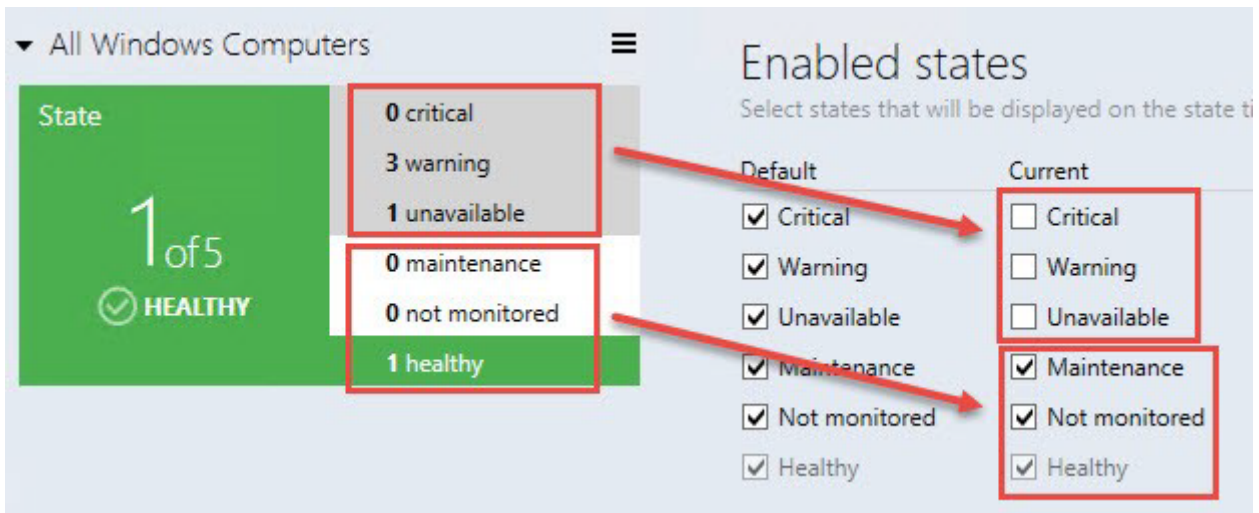
"Current" checkboxes settings applied only for the current Dashboard View group "Enabled states" window has "Save", "Reset to default" and "Cancel" buttons. "Esc" button causes cancel action, while "Enter" button saves the inserted data.

"Reset to default" button is disabled if "Default" checkboxes settings match with "Current" checkboxes settings.


Reset to default

Reset to default

Note that the objects' states unchecked at "Enabled states" view have gray backlight, and their states do not participate in forming of "State" tile.

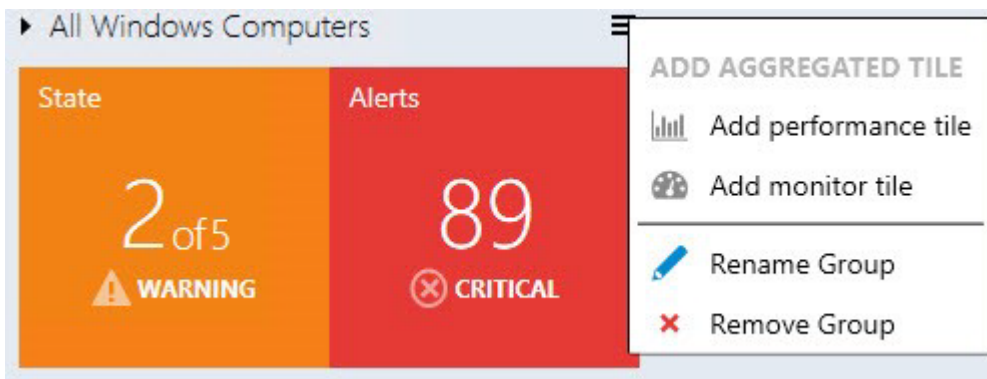


#### Adding Aggregated Tiles

 Note: Aggregated tiles are available in Datacenter view only.

Left or right click the group menu button calls "Add aggregated tile menu".

In this menu, the user can add performance tile, add monitor tile, rename and remove the group.



#### Adding Aggregated Monitor Tile

From Group options menu, the user may call "Add Aggregated Monitor Tile" dialog; while the content is being loaded, a pre-loader is displayed.

# Add Aggregated Monitor Tile

Choose appropriate monitor for all suitable classes

## DISPLAY NAME

This field is required

## ADD MONITOR TILE

SQL Server 2012 DB Engine

SQL Server 2014 DB Engine

SQL Server 2016 DB Engine

SQL 2014 Mirroring Witness Role

Please choose Monitor for at least one Class item

Add

Cancel

The left part of Aggregated Monitor tile consists of a colored donut, which displays relative share of objects in one state against objects in other states, with the total number of entities.



The right part of the tile has a list of states and the number of objects in the states. If there are no objects in a state, a line representing the state is not displayed. Hovering over donut's part, its objects amount or state name changes the backlight.

All aggregated monitor elements have corresponding tooltips:



Add Aggregated Performance Tile



From Group options menu, the user may call "Add Aggregated Performance Tile" dialog; while the content is being loaded, a pre-loader is displayed.

**Add Aggregated Performance Tile**  
Choose appropriate performance rule for all suitable classes.

**DISPLAY NAME**

This field is required


CLASS	PERFORMANCE RULE
System Center Managed Computer (Server...	Q [x] v
Windows Domain Controller	Q [x] v
.NET Application Monitoring Agent	Q [x] v
Agent	Q [x] v

Please choose Performance Rule for at least one Class item

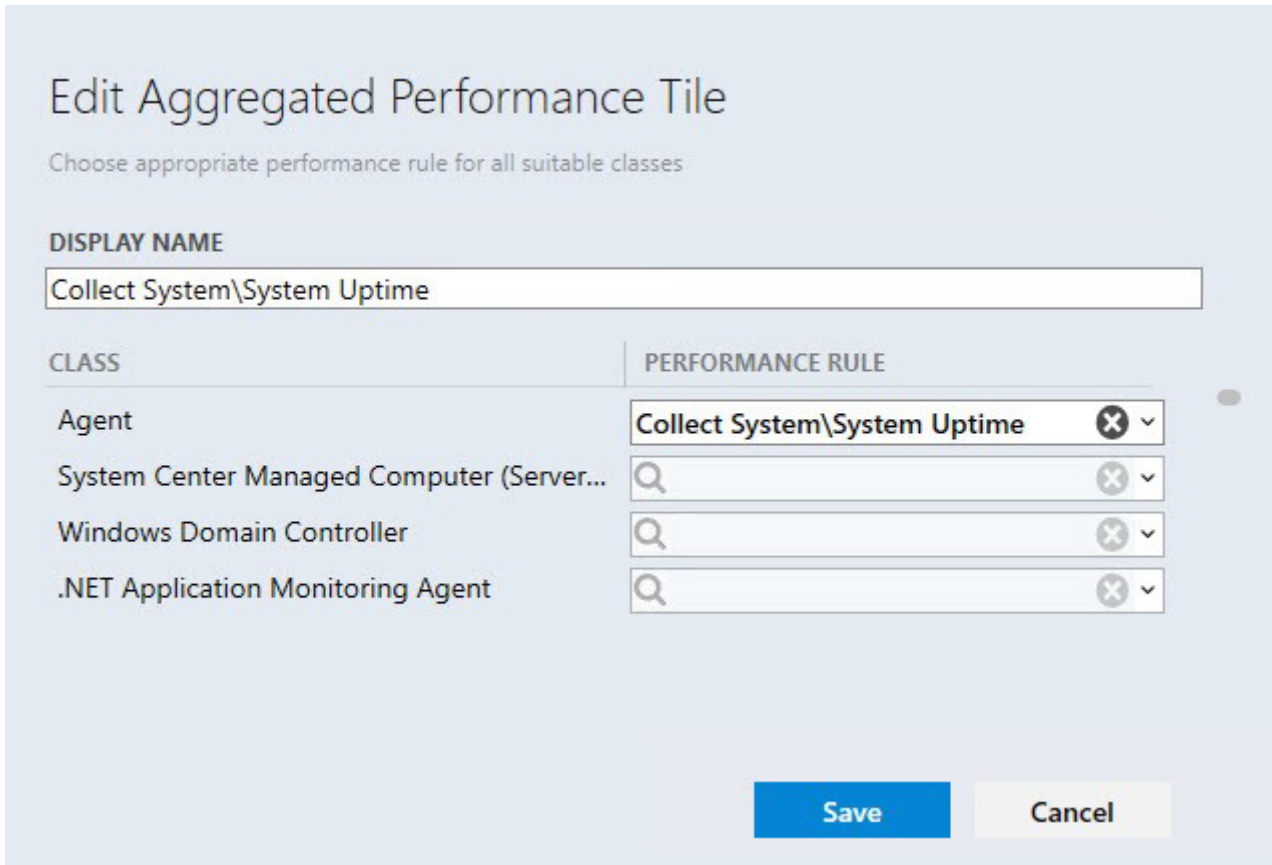
**Add** **Cancel**

Display name is a required field that will be automatically populated when the user selects a performance rule. Another selected rule will not override the field. Auto-fill mechanism does not work if the user has already populated the field.

The **CLASS** column displays all classes, the group contains. The **PERFORMANCE RULE** column displays all performance rules of the class.

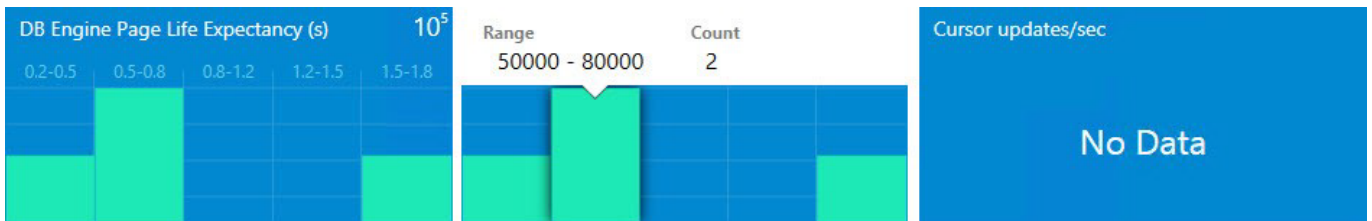
 Note: if all class rules have the same prefix (e.g. "MSSQL SERVER 2014:") the prefix is not displayed. Parent classes are displayed firstly in alphabet order in "CLASS" list, and then children classes are displayed in alphabet order. Rules in "PERFORMANCE RULE" dropdown list are also displayed in alphabet order. The classes for which the rules have already been selected are displayed firstly.



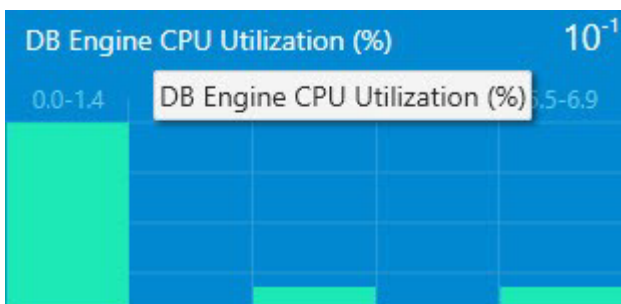


The "X" button wipes the selected data. Validation messages disappear when conditions are met.

Enter and Esc buttons have Save and Cancel configuration correspondingly. When the user adds a performance tile into a collapsed group, the group is expanded automatically and the screen is centered on the widget.



A performance tile has 5 columns. Each column represents a range of values. Upon hovering over a column, a tooltip with detailed information is displayed. In the top right corner of the widget, the degree of the values can be displayed. If chosen performance rule(s) return nothing, the widget displays "No Data" message. Values the widgets return appear to be the last values received from the agents. The Aggregated performance tile name has a corresponding tooltip:



#### Adding Virtual Group

A virtual group with many classes can be added to Datacenter Dashboard.

**Add Virtual Group**  
Select displayed classes and specify display name

**DISPLAY NAME**

**CLASS**

Please choose at least one Class

**Add** **Cancel**

### Adjusting Instance Dashboard

Note: Instance tiles are available in the instance view only.

By double-clicking any group of a group widget or a virtual group, the user drills down to the instance dashboard. The object tree is displayed at the top of the instance dashboard view.

Home ▶ SQL Server Instances ▶ sql17-1-sql\MSSQLSERVER ▶ distribution2017 ▶ PRIMARY

The user will see a list of group objects in the first level of the group or virtual group.

Home ▶ **SQL Server Instances**  
SQL Server Instances objects

If the user drills-down into the group object, the list of group object children will be displayed:

Home ▶ SQL Server Instances ▶ **MSSQLSERVER**  
MSSQLSERVER children

Note that if the group object or its child does not have any child, the user can't drill-down into it.

The **Back** button opens previous Instance Dashboard. The user can click on any element to navigate directly to its dashboard. All objects of the group or children of the object are sorted by their state; the most critical ones are placed on the top of the list.

The **Details** widget lists all properties of the selected entity. When the user opens the dashboard, the first element is selected automatically, but if the user selects another object, the selection remains even if a refresh

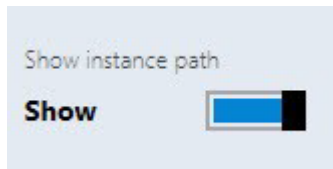
event occurs.

By clicking icon in the header of the dashboard all data is copied into the clipboard. If the user hovers over a property in the details widget, a similar button is displayed in there to allow copying the property data.

Filter searches through entity name and entity path or thought entity name only.



(It depends on the configuration of "Show instance path" checkbox in "Settings" view).



"Active alerts" displays all object alerts excluding the closed ones (custom alerts are displayed as well).

Active Alerts (2)  Show alerts from all levels

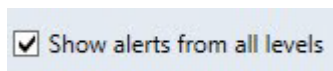
Filter

	Name	Age	Resolution State	Repeat Count
⊗	The SQL Server Service Broker, or...	0 Day(s), 6 hour(s)	New	1
⚠	SQL 2012 DB Average Wait Time...	0 Day(s), 0 hour(s)	New	0

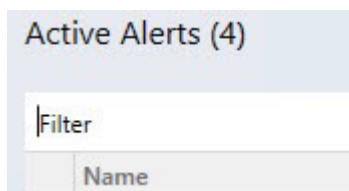
 Note: number of active alerts is displayed in brackets next to the "Active Alerts" title.

### Active Alerts (15)

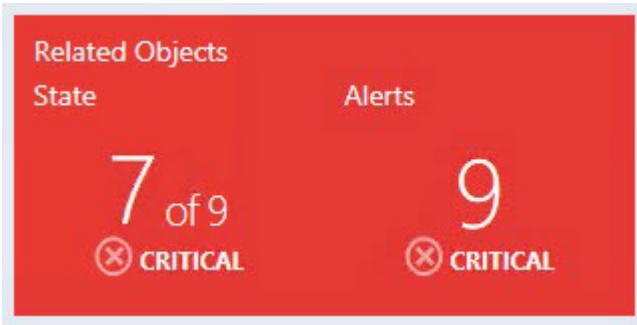
Object alerts and its children's alerts are displayed if "Show alerts from all levels" checkbox is switched on.



Alerts can be filtered by their names by means of "Filter" field.



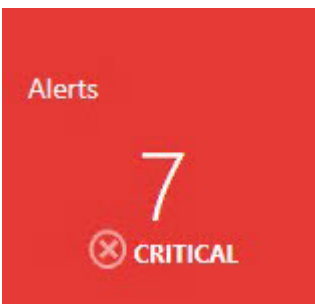
"Related objects" and "Alerts" tile is displayed by default and cannot be deleted. The tile has logic similar to aggregated state tile. By double-clicking on the tile, the user drills-down further to the children of the selected object.



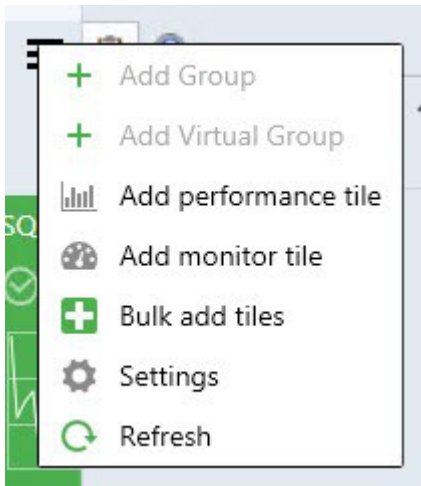
The **Related objects** tile shows object's next level children. The color of the tile complies the worst state color of its children. Under the name of the tile, the user can see amount of object children in the worst state and the total number of children. The state name and state icon of the worst object children state is displayed under the number of the object children.



The **Alerts** tile displays the amount of its children worst alerts + its children's children worst alerts. The color of the tile complies the color of its children's worst alerts. The severity name and severity icon of its worst children's alerts is displayed under the number of alerts.



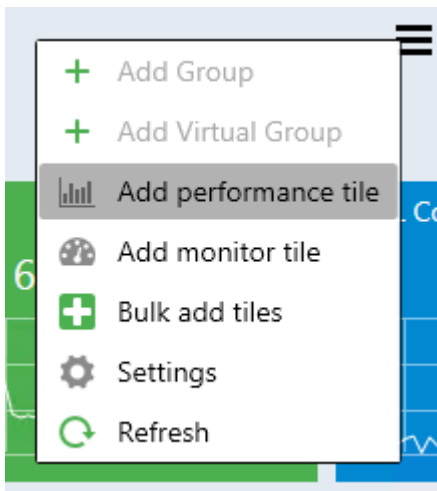
From the menu of Monitoring section, the user can add a performance tile, add a monitor tile, add performance and monitor tile by using "Bulk add tiles" view, customize dashboard view settings by using "Settings" menu and refresh dashboard view.



Double-clicking on performance tile opens a performance view. Double-clicking on monitor tile opens Health explorer.

### Adding Performance Tile

Double-click the Group to drill-down from Datacenter to Instance level. Click the menu button to add a performance tile.



In the **Add Performance Tile** dialog, select a performance tile.

# Add Performance Tile

Select size of tile, appropriate performance rule and optionally monitor (not applicable for small tiles)

## PERFORMANCE RULE

Performance Rule mapping has to be selected

## RELATED MONITOR

## DISPLAY NAME

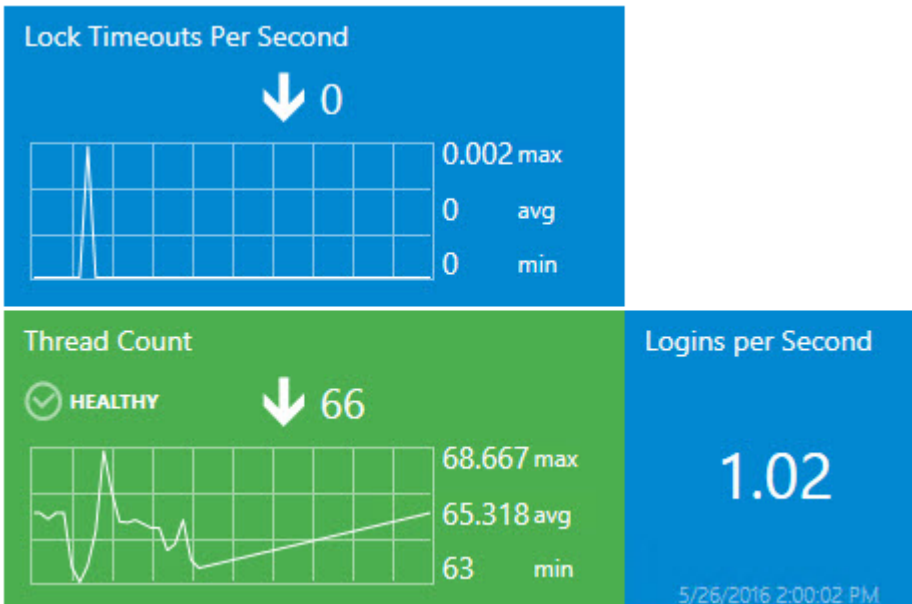
## SIZE

 1x1  2x1

Add

Cancel

There are 3 types of performance tiles: 2x1 without a linked monitor, 2x1 with a linked monitor and 1x1 tile.



Display name is populated automatically when a user selects the rule for the first time. The drop-down supports advanced filtering options based on the entered text.

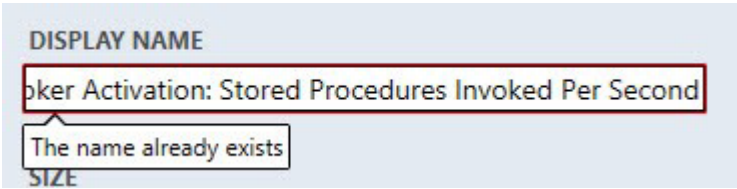
If the user adds same tile twice and uses automatic display name population, the date and time are added automatically to the rule\monitor name at the **DISPLAY NAME** field.

<b>PERFORMANCE RULE</b> tion: Stored Procedures Invoked Per Second	<b>DISPLAY NAME</b> red Procedures Invoked Per Second 16-05-26 03:26:07
-----------------------------------------------------------------------	----------------------------------------------------------------------------

If all rules have similar prefix, the prefix is not displayed in the alike rules.

The circle with a cross removes all data from the field.

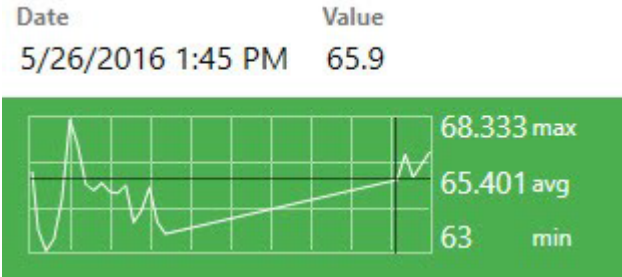
When a rule is selected, validation messages disappear and the **Add** button becomes enabled. When the user tries to add performance tile with already existed **DISPLAY NAME**, the corresponding error tooltip message is displayed:



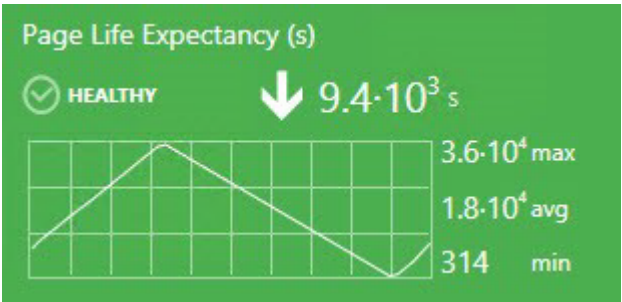
If the user selects a monitor, the tile would have linked monitor and the tile color will depend on the monitor state. If the user selected a monitor, but set 1x1 size right after, the data in the monitor field becomes disabled and is not saved in the configuration if the user added the tile, but becomes enabled again if the user returns 2x1 size.



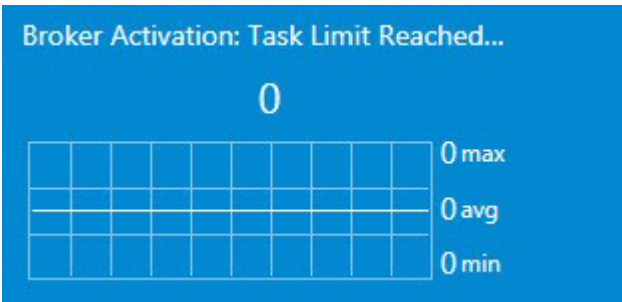
Upon hovering over the graph, a tooltip with the date and value is displayed.



The widget has kind of trend line, which is represented by the arrow. Near the arrow, a user can see the last value of the index.

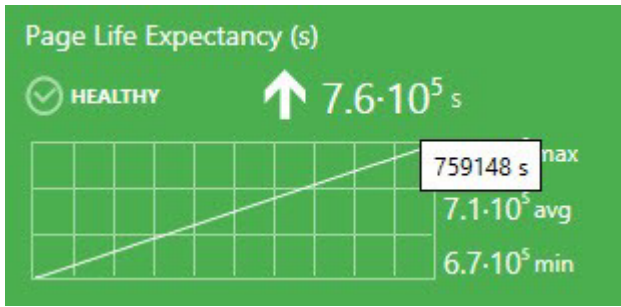


If the rule value has not been changed during the displayed period, the trend arrow is not displayed.



Note that if the index last value is too long to be fully displayed in the tile, it is displayed in the tooltip.





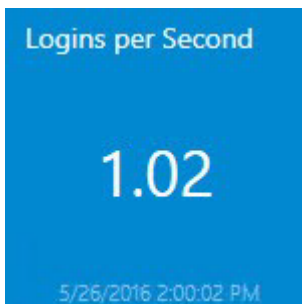
The minimum, maximum and average rule value is displayed near the chart.

Measurement units are displayed if the rule has them in its name in brackets.

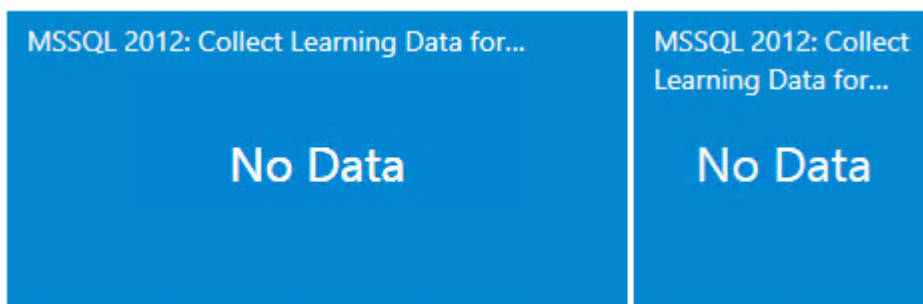
The user can select a period to be displayed in the 2x1 tile chart of the dashboard view **Settings** menu.



The 1x1 tile displays only the last value. The same data is displayed in the 2x1 version right under the widget name.

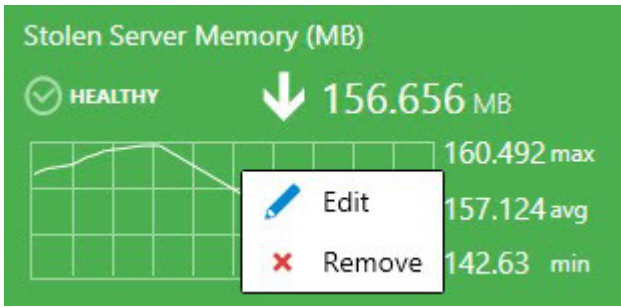


Please note that the last value of date and time is displayed under the rule last value in the 1x1 performance tile. If there is no data in the System Center Operations Manager database for the set period, the widget returns "No Data" message.



Two options are available by the right-clicking the tile: **Edit** and **Remove**.

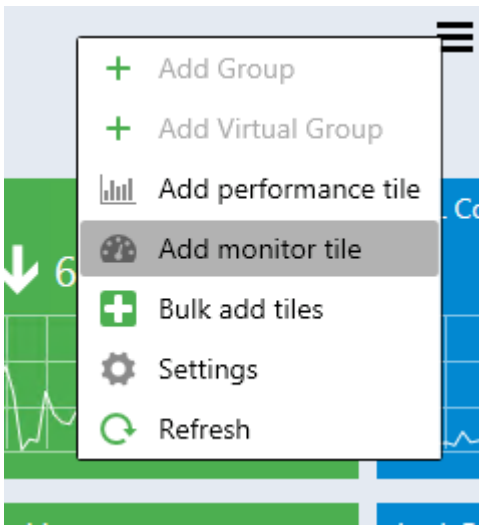




### Adding Monitor Tile

Double-click the Group to drill-down from Datacenter to the Instance level.

Click the menu button to add a monitor tile.



In the **Add Monitor Tile** dialog, select a monitor.

## Add Monitor Tile

Select appropriate monitor

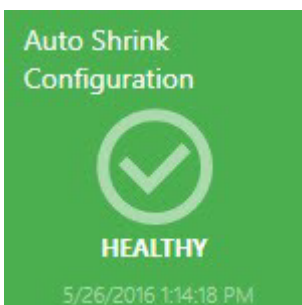
**ADD MONITOR TILE**

Monitor mapping has to be selected

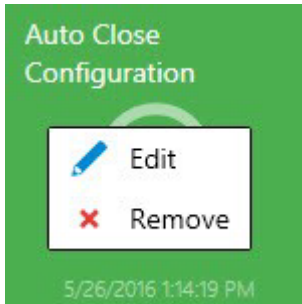
**DISPLAY NAME**

Add
Cancel

The control has the logic similar to the performance dialog.



The monitor has a name, state indicator and the date when the state has been changed for the last time. Two options are available by right-clicking the tile: **Edit** and **Remove**:



## Moving Tiles

The tiles can be moved by means of drag-n-drop.

Datacenter dashboards allow the following methods of tile moving:

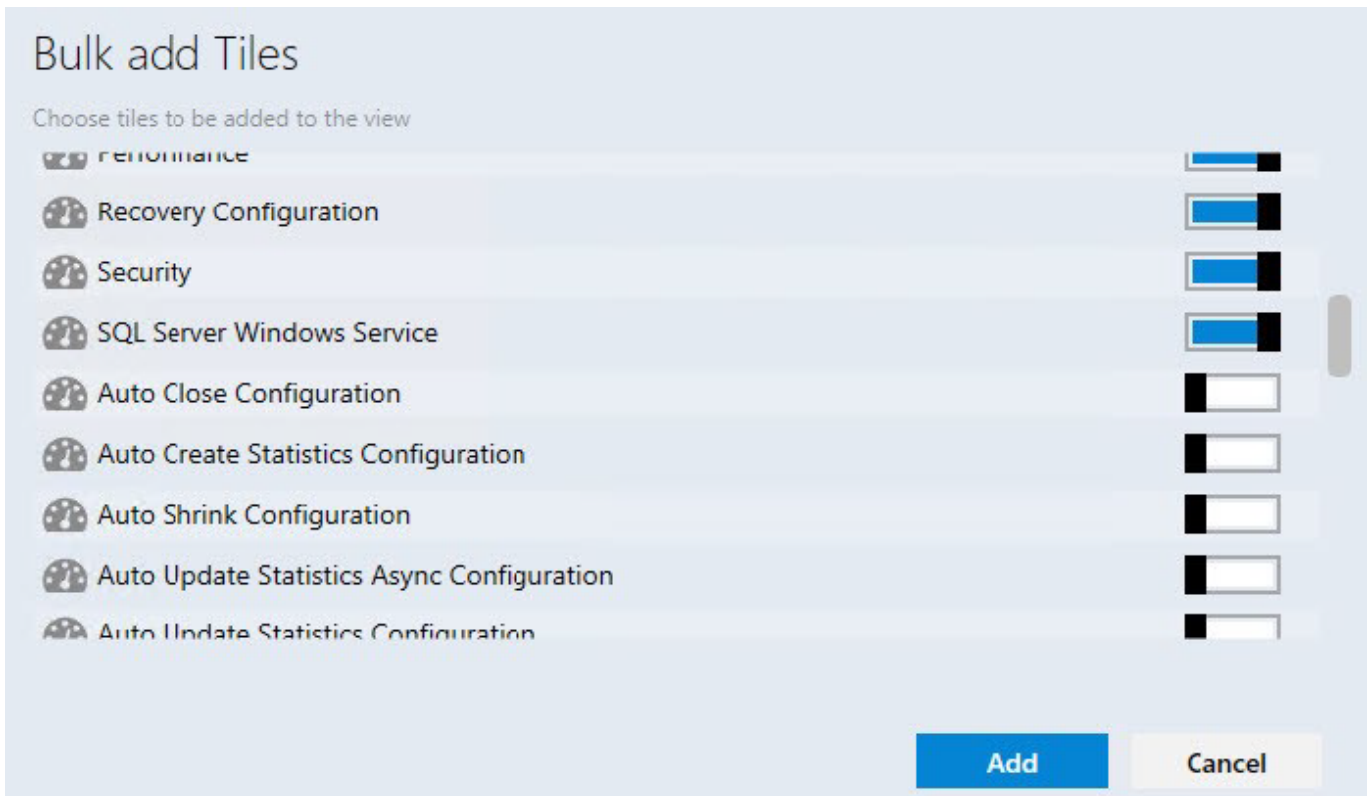
- Moving of the groups in Datacenter View.
- Moving of the aggregated tiles within the expanded group in Datacenter View.
- Moving of the tiles in Instance View.

## Performance View and Health Explorer

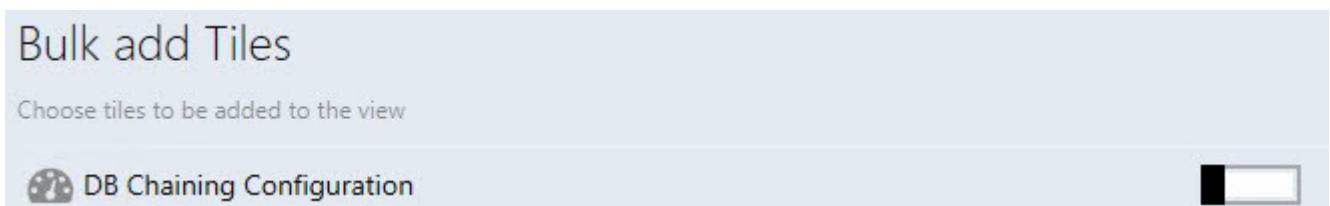
To open Performance View and Health Explorer, it is necessary to double-click the corresponding tile (performance tile and monitor tile respectively).

## Adding Tiles in Bulk

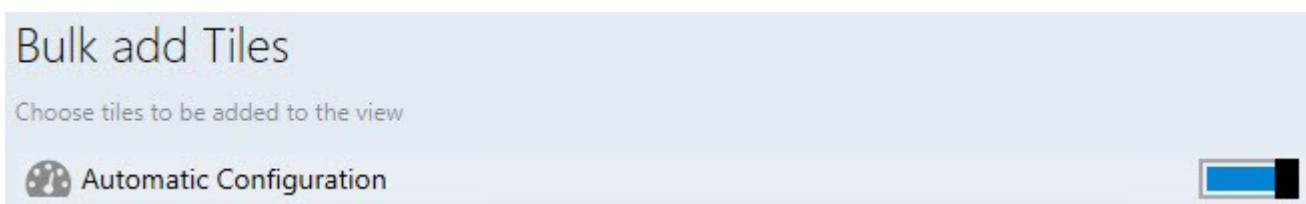
The user can use the **Bulk add Tiles** menu to quickly add monitors and performance tiles to the instance view (all object rules and monitors are displayed in the **Chose tiles to be added to the view** list).



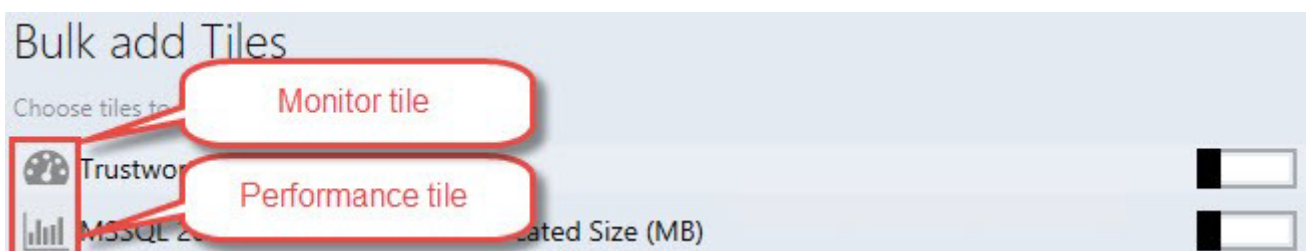
The checkboxes for already added tiles are switched off (monitor tiles that are added as part of 2x1 performance tile are considered already added).



Note that checkboxes are switched on for the tiles that have not been added to the instance view yet.



Performance and monitor tiles have different icons:



The same performance and monitor tiles can be added many times by means of the **Bulk add Tiles** menu. The date and time parameters will be added to **DISPLAY NAME** for each subsequent adding of repeated performance\monitor tiles.

ADD MONITOR TILE	DISPLAY NAME
Auto Close Configuration <span>✕</span> <span>▼</span>	Auto Close Configuration 16-05-30 02:44:51

## Instance Dashboard Navigation

### Drill-Down to Related Objects

Drilling-down can be performed as follows:

1. In the left pane, select an object.

2. In the right pane, double click the **Related Objects State** widget.


### Using "Show alerts" Function

The function allows seeing the list of alerts in the object. To activate the function, select the **Show alerts from all events** checkbox.

NETBIOS Computer Name  
SQL14-029  
Virtual Machine Name

### Active Alerts (1)

Show alerts from all levels

Filter				
Name	Age	Resolution State	Repeat Count	
 MSSQL 2014: SQL Server cannot...	4 Day(s), 3 hour(s)	New	0	

### Using Navigation Pane

To move to any location in the path just click it. To move to the parent view click button.

My SQL Server Dashboards

Home ▶ SQL Server 2014 DB Engine Group ▶ SQL2014

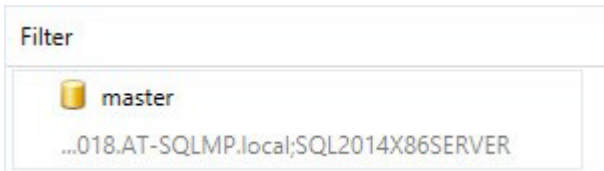
SQL2014 children

Filter	Details
<b>NOT MONITORED</b>	Type Name SQL Server 2014 DB
Resource Pool Group	Display Name master
<b>HEALTHY</b>	Path SQL12-013.AZ2.local\SQL2014 \master
master	Database Name master
model	Recovery Model SIMPLE
msdb	Database Autogrow Set True
SQLAgent\$SQL2014	Log Autogrow Set True
tempdb	Updateability

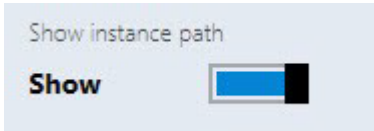
Monitoring

Related Objects State	Alerts
2 of 2 HEALTHY	0 NO ALERTS

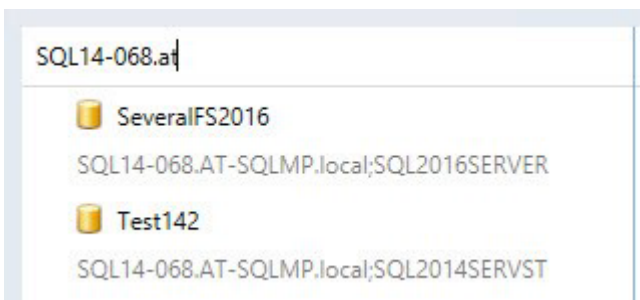
### SQL Instance Path Property



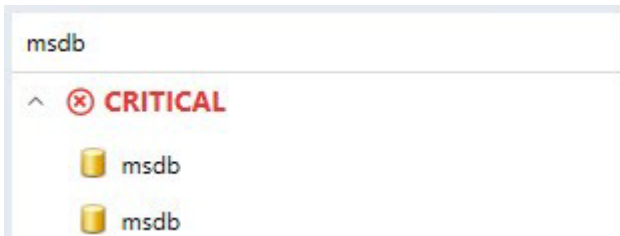
A dashboard object path is shown after switching on the **Show instance path** checkbox in the **Settings** menu:



The user can search objects in the instance view by the path and by name if the **Show instance path** checkbox is switched on. To perform a search, start typing the name of the object in the **Filter** field.



Note that the user can search objects in the instance view by name only if the **Show instance path** checkbox is switched off.



The user can search objects in the instance view by any part of the object path and by any part of the object name.



A path line of an object without a path is hidden; path lines of all other instances are displayed.











Filter	Details
<ul style="list-style-type: none"> <li>📁 STcond2014 ...018.AT-SQLMP.local;SQL2014X86SERVER</li> <li>📁 tempdb W2K8SP2-018.AT-SQLMP.local;MSSQLSERVER</li> <li>📁 tempdb ...018.AT-SQLMP.local;SQL2014X86SERVER</li> <li>🌐 W2K8SP2-018.AT-SQLMP.local</li> <li>^ ? <b>NOT MONITORED</b></li> <li>📁 Sub1</li> <li>📁 Sub2</li> <li>^ ✓ <b>HEALTHY</b></li> <li>🌐 SCOM12R2-089.AT-SQLMP.local</li> <li>🌐 SQL14-068.AT-SQLMP.local</li> </ul>	<p><b>Path</b> W2K8SP2-018.AT-SQLMP.local;SQL2014X86SERVER</p> <p><b>Database Autogrow Set</b> True</p> <p><b>User Access</b> MULTI_USER</p> <p><b>Collation</b> SQL_Latin1_General_CP1_CI_AS</p> <p><b>Resource Pool</b></p> <p><b>Log Autogrow Set</b> True</p> <p><b>Database Name</b></p>

A tooltip with the object name and object path appears when the user hovers over the dashboard object and the **Show instance path** checkbox is enabled/disabled.

Filter	Details
<ul style="list-style-type: none"> <li>📁 STcond2014 ...018.AT-SQLMP.local;SQL2014X86SERVER</li> <li>📁 tempdb W2K8SP2-018.AT-SQLMP.local;MSSQLSERVER</li> </ul>	<p><b>Install Type</b> Full</p>

STcond2014  
W2K8SP2-018.AT-SQLMP.local;SQL2014X86SERVER

A tooltip with the object name appears only when the user hovers over the dashboard object with the empty path line.

Filter	Details
 STcond2014 ...018.AT-SQLMP.local;SQL2014X86SERVER	<b>Install Type</b> Full
 tempdb W2K8SP2-018.AT-SQLMP.local;MSSQLSERVER	<b>Organizational Unit</b> CN=Computers, SQLMP;DC=loca
 tempdb ...018.AT-SQLMP.local;SQL2014X86SERVER	<b>Active Directory SID</b>
 W2K8SP2-018.AT-SQLMP.local	<b>Physical Processors</b> 1
^  <b>NOT MONITORED</b>	<b>Network Name</b> SCOM12R2-089.
 Sub1	<b>IP Address</b> 172.31.3.223,
 Sub2	
^  <b>HEALTHY</b>	
 SCOM12R2-089.AT-SQLMP.local	
 SQL14-068.AT-SQLMP.local	

The **Filter** field is cleared every time the user changes the dashboard level.

A user can use the filter field even if the dashboard group has objects with the empty path line and objects with a path at the path line simultaneously.

### Configuring Run As Profiles

When the management pack is imported for the first time, it creates a new Microsoft SQL Server visualization library Run As Profile, which allows creating low privilege environments for System Center Operations Manager.

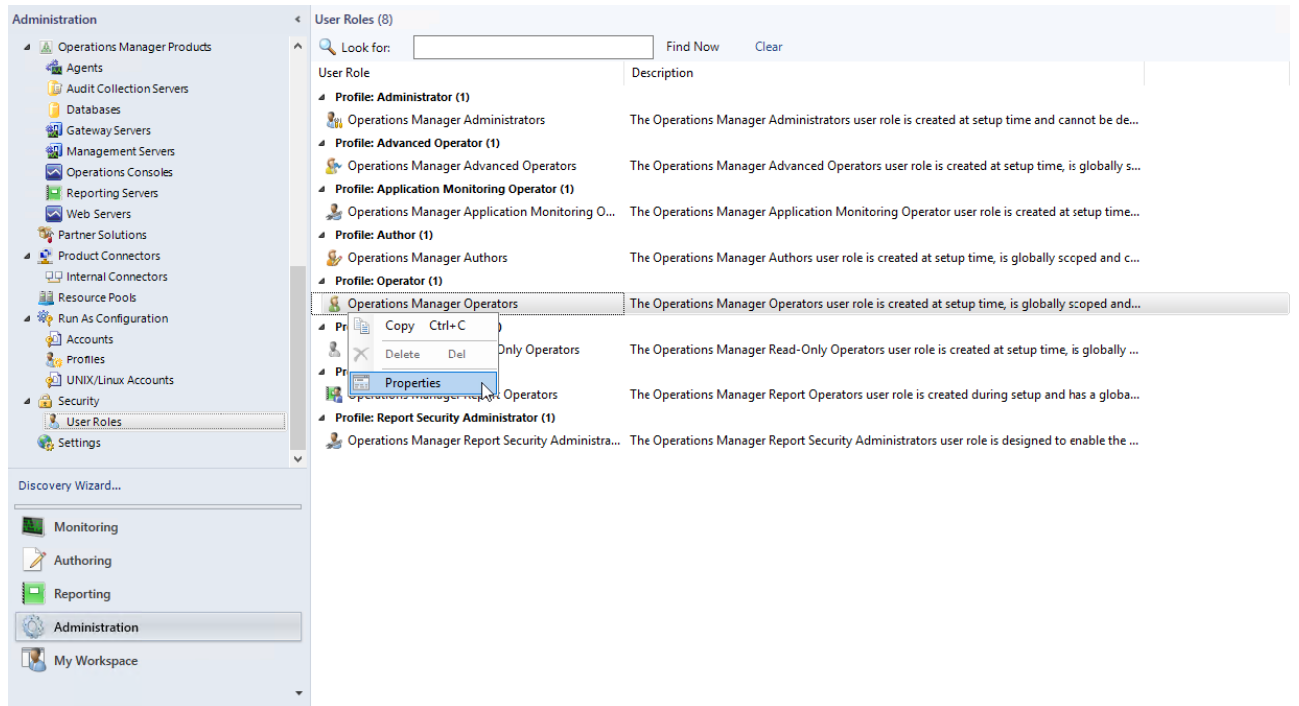
To configure permissions on the System Center Operations Manager management server:

1. Create an SSVISLIB account on the domain controller.
2. Grant Local Administrator permissions to the SSVISLIB account.

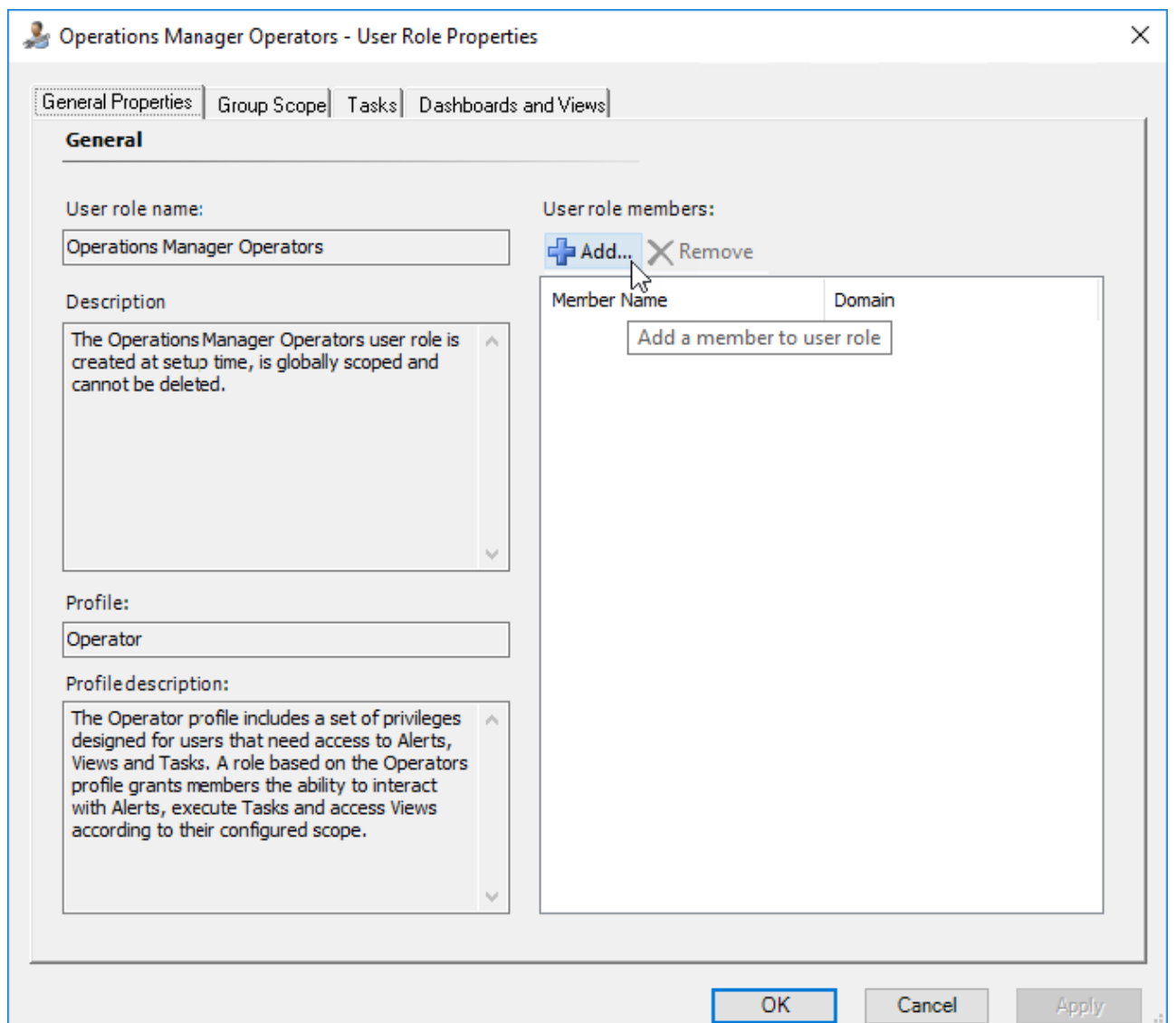
To configure permissions on System Center Operations Manager:

1. Open the System Center Operations Manager console.
2. Open the **Administration** view.
3. In the navigation pane, select **User Roles** under the **Security** folder.
4. Right-click the **Operations Manager Operators** role and select **Properties**.



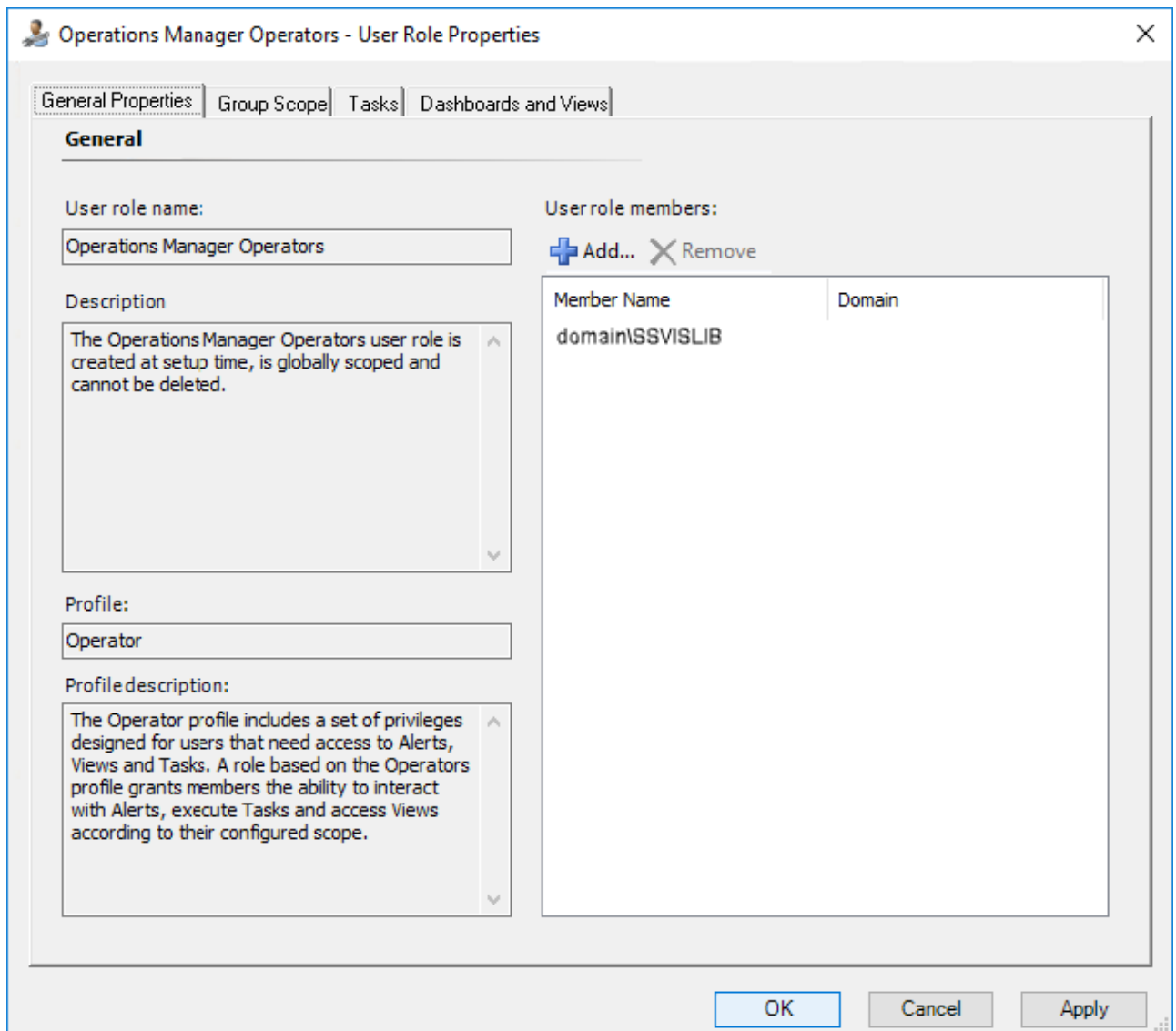


5. On the **General Properties** tab, click **Add**.



6. Find the SSVISLIB user and click **OK**.

7. Click **OK** to save the changes and close the **User Role Properties** dialog.



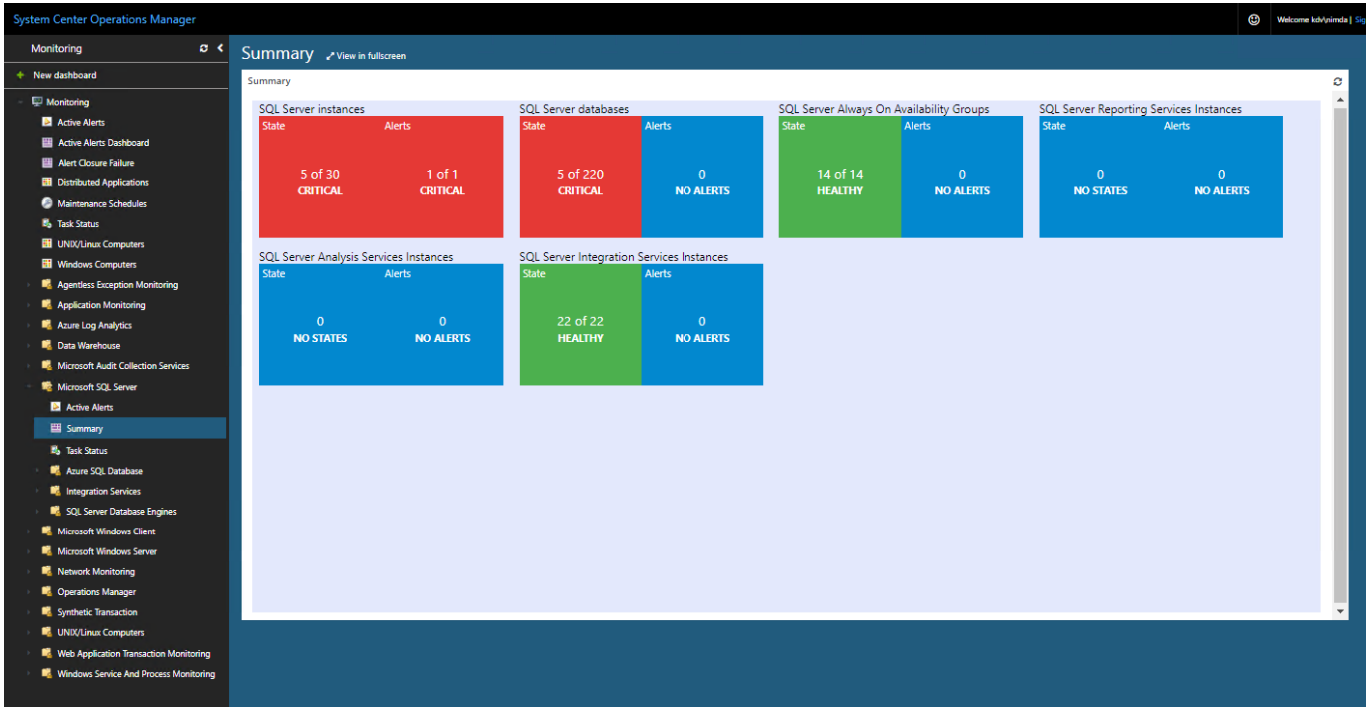
## SQL Server Web Dashboards

With System Center Operations Manager 2019, you can access SQL Server dashboards using a web browser.

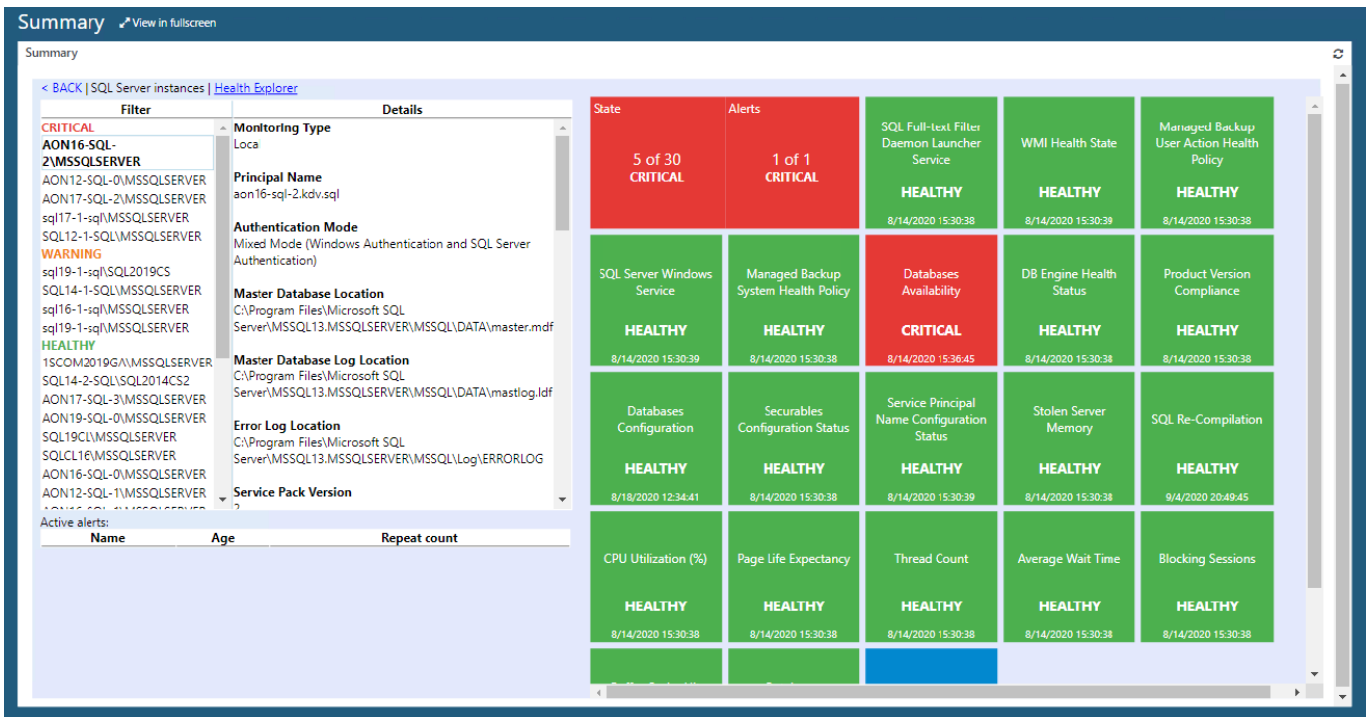
To open web dashboards:

1. Navigate to <http://localhost/OperationsManager> using a web browser.
2. Open the **Monitoring** view, navigate to **Monitoring** > **Microsoft SQL Server** and click **Summary**.

 Note: Make sure that you have installed the **Web console** component in the **Operations Manager Setup** wizard.



When on the **Summary** page, click a tile to drill-down and review detailed information about the state and alerts.



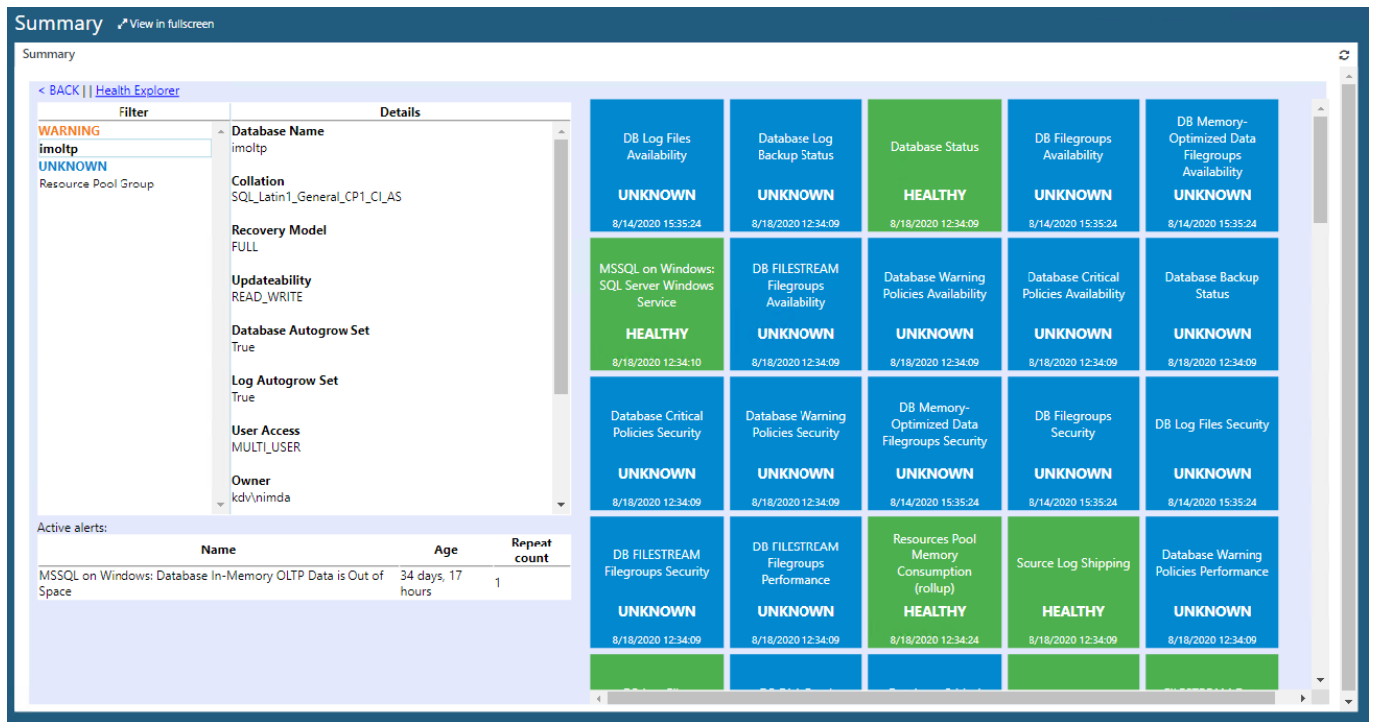
The **Filter** column in the left pane shows objects that might be in the *Critical*, *Warning* or *Healthy* state. You can select an object to review its details such as *Monitoring Type*, *Principal Name*, *Authentication Mode* etc. in the **Details** column.

Filter	Details
<b>CRITICAL</b>	<b>Monitoring Type</b>
AON16-SQL-2\MSSQLSERVER	Local
AON12-SQL-0\MSSQLSERVER	<b>Principal Name</b>
AON17-SQL-2\MSSQLSERVER	aon16-sql-2.kdv.sql
sql17-1-sql\MSSQLSERVER	<b>Authentication Mode</b>
SQL12-1-SQL\MSSQLSERVER	Mixed Mode (Windows Authentication and SQL Server Authentication)
<b>WARNING</b>	<b>Master Database Location</b>
sql19-1-sql\SQL2019CS	C:\Program Files\Microsoft SQL Server\MSSQL13.MSSQLSERVER\MSSQL\DATA\master.mdf
SQL14-1-SQL\MSSQLSERVER	<b>Master Database Log Location</b>
sql16-1-sql\MSSQLSERVER	C:\Program Files\Microsoft SQL Server\MSSQL13.MSSQLSERVER\MSSQL\DATA\mastlog.ldf
sql19-1-sql\MSSQLSERVER	<b>Error Log Location</b>
<b>HEALTHY</b>	C:\Program Files\Microsoft SQL Server\MSSQL13.MSSQLSERVER\MSSQL\Log\ERRORLOG
1SCOM2019GA\MSSQLSERVER	<b>Service Pack Version</b>
SQL14-2-SQL\SQL2014CS2	2
AON17-SQL-3\MSSQLSERVER	
AON19-SQL-0\MSSQLSERVER	
SQL19CL\MSSQLSERVER	
SQLCL16\MSSQLSERVER	
AON16-SQL-0\MSSQLSERVER	
AON12-SQL-1\MSSQLSERVER	
AON16-SQL-4\MSSQLSERVER	

The right pane consists of tiles that show the health state of various components that belong to the object that you select in the **Filter** column.

State	Alerts	SQL Full-text Filter Daemon Launcher Service	WMI Health State	Managed Backup User Action Health Policy
5 of 30 <b>CRITICAL</b>	1 of 1 <b>CRITICAL</b>	<b>HEALTHY</b>	<b>HEALTHY</b>	<b>HEALTHY</b>
		8/14/2020 15:30:38	8/14/2020 15:30:39	8/14/2020 15:30:38
SQL Server Windows Service	Managed Backup System Health Policy	Databases Availability	DB Engine Health Status	Product Version Compliance
<b>HEALTHY</b>	<b>HEALTHY</b>	<b>CRITICAL</b>	<b>HEALTHY</b>	<b>HEALTHY</b>
8/14/2020 15:30:39	8/14/2020 15:30:38	8/14/2020 15:36:45	8/14/2020 15:30:38	8/14/2020 15:30:38
Databases Configuration	Securables Configuration Status	Service Principal Name Configuration Status	Stolen Server Memory	SQL Re-Compilation
<b>HEALTHY</b>	<b>HEALTHY</b>	<b>HEALTHY</b>	<b>HEALTHY</b>	<b>HEALTHY</b>
8/18/2020 12:34:41	8/14/2020 15:30:38	8/14/2020 15:30:39	8/14/2020 15:30:38	9/4/2020 20:49:45
CPU Utilization (%)	Page Life Expectancy	Thread Count	Average Wait Time	Blocking Sessions
<b>HEALTHY</b>	<b>HEALTHY</b>	<b>HEALTHY</b>	<b>HEALTHY</b>	<b>HEALTHY</b>
8/14/2020 15:30:38	8/14/2020 15:30:38	8/14/2020 15:30:38	8/14/2020 15:30:38	8/14/2020 15:30:38

In the right pane, you can click the first tile in the top-left corner that shows **State** and **Alerts** to drill-down into the health hierarchy even further.



To get back to the previous view, you can click **Back**. You can also launch **Health Explorer**.

[< BACK | SQL Server instances | Health Explorer](#)

## Appendix: Known Issues and Troubleshooting

Configuration of signed SQL Server Dashboards cannot be saved if Default Management Pack is removed

**Issue:** Signed SQL Server Dashboards store their configuration changes in Default Management Pack (Microsoft.SystemCenter.OperationsManager.DefaultUser).

**Resolution:** Import Default Management Pack. In further versions of the MP, it will be possible to set a custom MP to store the configuration.

SQL Server Dashboards may display obsolete data

**Issue:** The Operations Manager database should be synchronized with Data Warehouse. If the default synchronizing procedure has not been executed for a long period, the Dashboards become unable to get the most recent data.

**Resolution:** Restart System Center Data Access service and perform other required actions to reactivate Delta Synchronization.

The Operations Manager console may crash in case of SCOM server connection failure

**Issue:** If the Operations Manager console loses connection to SCOM server, SQL Server Dashboards may crash. It can happen due to network issues or SCOM server issues (e.g. if the console is left unattended for a long time).

**Resolution:** Check connection with SCOM server. Reopen the Operations Manager console.

When configuration of a SQL Server Dashboards is edited simultaneously by a few operators, the last change is applied only

**Issue:** When a user edits SQL Server Dashboard from the Operations Manager console and Web console simultaneously, the "Last changes apply" algorithm is implemented to resolve this situation.

**Resolution:** Reopen the Dashboard, or wait until the data is refreshed.

The Operations Manager console may behave unresponsive in case of a configuration save failure

**Issue:** In some rare cases, SCOM is unable to save updated Dashboard configuration successfully. In this case, dialogs on SQL Server Dashboards become unresponsive (e.g. OK button in "Add Group" dialog). The user can find error details in Application event log.

**Resolution:** Reopen the Operations Manager console.

Objects may be displayed with "Not monitored" state in case if there are 1000 objects or more

**Issue:** When there are 1000 objects or more discovered simultaneously (and the discovery process is not over yet), the Dashboard may be loaded correctly, but all objects will have "Not monitored" state.

**Resolution:** Wait until the data is refreshed.

Alerts may be displayed with "0" value in case if there are 5000 objects or more

**Issue:** When there are approximately 5000 objects or more discovered simultaneously (and the discovery process is not over yet), it is possible that the number of objects will be loaded and displayed correctly, but the alerts will be displayed with 0 value.

**Resolution:** Wait until the data is refreshed.

Silverlight version of the Operations Manager console may not receive remote changes

**Issue:** Any changes made in Silverlight version of the Operations Manager console from a remote workstation may not be saved.

**Resolution:** Reopening of the Dashboard or reloading of the console is ineffective. To apply any changes, please access the console directly.

Usage of some special Windows themes may lead to a crash of the Operations Manager console

**Issue:** Some changes in Windows color scheme (e.g. changing of foreground text color to another color) may lead to a crash of the Operations Manager console.

**Resolution:** Please use standard Windows themes and text colors.

Procedures are not deleted from data warehouse storage

**Issue:** The stored procedures may remain in data warehouse storage even after uninstallation of GPMP.

**Resolution:** After uninstallation of the manager packs, the stored procedures are to be deleted manually.

### Timeouts difficulty

**Issue:** While working with the Dashboard (especially while processing large data volumes), a user may face a situation when the processes cannot be completed within the preset timeout.

**Resolution:** Timeout values for queries execution in Datawarehouse DB may be set by the user manually via the server registry. One can create "HKLM\SOFTWARE\Microsoft\Microsoft Operations Manager\3.0\Data Warehouse" key and add REG\_DWORD type value with "Search Command Timeout Seconds" name. The server will use this value instead of default 180 seconds.

### Certain display problems may occur while working with the groups in web version of the Operations Manager console

**Issue:** A problem with displaying add/delete forms may occur while using Silverlight web version of the Operations Manager console: the text of the form may be loaded earlier than the form itself, if the Dashboard contains eight or more groups.

**Resolution:** Unknown.

### Certain problems may occur while working with some older versions of the Management Pack

**Issue:** The following versions of SQL Server Management Pack are considered as deprecated and suspended:

- 6.1.314.35
- 6.1.400.0
- 6.3.173.0
- 6.3.173.1
- 6.4.0.0
- 6.4.1.0
- 6.5.1.0
- 6.5.4.0
- 6.6.0.0
- 6.6.2.0
- 6.6.3.0

**Resolution:** Please use up-to-date versions of the Management Pack (starting from version 6.6.4.0)

### Dashboards may work slowly if used rarely

**Issue:** When used rarely or after a long break, the dashboards may work rather slowly due to large amounts of the collected data to be processed; especially, it is related to large environments (2000+ objects).

**Resolution:** Below is a "warming up" script, which may be used to create an SQL job to run on some schedule. Before scheduling it as an SQL job, please test how long these queries will be executing (if you schedule it to run too often, it may affect the server performance). If you have dashboards with thousands of objects to load, then time to load the content will be 10+ seconds anyway. It was tested with 600 000 objects, and the dashboard loading time was 1-2 minutes.

```
USE [OperationsManagerDW]
EXECUTE [sdk].[Microsoft_SQLServer_Visualization_Library_UpdateLastValues]
EXECUTE [sdk].[Microsoft_SQLServer_Visualization_Library_UpdateHierarchy]
```

## Dashboards may crash upon upgrade

**Issue:** In some cases, upon upgrade of the dashboards to version 6.6.7.30 or newer, the Operations Manager console may crash with “ObjectNotFoundException” error.

**Resolution:** Wait until the importing process is completed, and restart the Operations Manager console. Mind that the Operations Manager console restarting is essential after upgrade of the dashboards. Otherwise, the dashboards will not work.

## Colors in Microsoft Silverlight may be assigned incorrectly

**Issue:** ComboBox colors and main ScrollViewer background may be displayed incorrectly, especially in the dark theme.

**Resolution:** Unknown.

## Certain issues may appear during rapid changes performed in Datacenter view

**Issue:** If user rapidly changes datacenter dashboard views while the loader is displayed, the last selected view can still be opened, but the queries of the previously closed views will not be cancelled.

**Resolution:** Unknown.

## Dashboards may get stuck while loading

**Issue:** When there are more than 50K objects on a Dashboard monitored by multi-instance performance collection rules, Datawarehouse DB statistics may get broken, and the Dashboard loading time could get much longer than usual. Moreover, extensive TempDB and Log space usage (~2-5 GB) can be noticed.

**Resolution:** Wait for some time until the Dashboard is loaded, then run sp\_updatestats stored procedure in Datawarehouse DB.

## Outdated group names may be displayed in the Instance view

**Issue:** If a group is renamed, or any already renamed groups are present in SCOM, the old group names may be displayed in SQL Server Dashboards Instance view. In addition, if some groups are renamed in SCOM after importing the dashboards, their old names may be still displayed in the Instance view.

**Resolution:** Unknown.

## Limited access role users may not see SQL instances on SQL Server Roles dashboard

**Issue:** If a user is assigned to a limited access role (e.g. with access to SSAS Instance group, SSRS Instance Group, and SQL Server DB Engine Group only), no SQL instances are visible on SQL Server Roles dashboard.



**Resolution:** As long as SQL Server Roles dashboard is currently based on Server Roles Group, the user should obtain access to "Server Roles Group" to make SQL instances visible on the dashboard.

Datacenter view dashboard refresh animation is not displayed

**Issue:** When the Datacenter view dashboard is refreshed by means of the corresponding button in the hamburger drop-down menu, no refresh animation is displayed.

**Resolution:** Unknown.

Distributed Applications added on Datacenter view may show up as "No States"

**Issue:** When adding a Distributed Application on Dashboards Main view, it appears as "No States."

**Resolution:** SQL Dashboards can work only with objects belong to a group even when "Add Virtual Group" is used to add objects on Dashboards. However, a Distributed Application may not have any group, which it belongs to, and this causes the issue. To solve the issue, create a new group and put all your distributed applications in it or configure a dynamic population.