Network Performance Monitor

Version 12.1

Part 2 of 2: Customize
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Customize SolarWinds NPM

Congratulations on getting started. Now that you have installed, configured, and worked on basic troubleshooting, it is time to customize your SolarWinds NPM environment so that it suits the needs of your monitoring situation. In this part of getting started you will:

- Create and assign custom properties to nodes
- Create dependencies between network elements
- Create a map of your network
- Create custom pages
- Create a dashboard view and work with user permissions
- Create a custom alert and report

The following examples illustrate one approach to using custom properties and creating maps, views, alerts, and reports. The way you customize SolarWinds NPM is up to you. To become familiar with how others are using custom properties, review the examples in [Why use custom properties?](#)

If you are a customer and need assistance, contact our [Support team](mailto:Support team). If you are evaluating the product and need assistance, contact [sales@solarwinds.com](mailto:sales@solarwinds.com).

Related Guide

[Network Performance Monitor Getting Started Guide: Get Started (Part 1 of 2)](#)
Properties and groups

This section contains information for adding custom properties and groups:

- Why use custom properties?
- Add custom properties to nodes
- Create groups

Why use custom properties?

Custom properties are user-defined fields, such as country, building, asset tag, or serial number, that you can associate with monitored network objects.

Every object you monitor includes a list of default properties used to describe the device, such as IP address, host name, MAC address, and so on. You can also create custom properties and use them to create special alerts, reports, views, and groups. Applications can also have custom properties.

⚠️ Read the Creative ways to use custom properties and the Custom properties and how to use them THWACK community posts to learn how some of our customers use custom properties.

Watch this custom properties presentation by Leon Adato, Head Geek and former customer.

Frequently used custom properties include:

**Site**

While the Location property is available by default and returns the city specified in the device's settings, you may need more granular location information.

Examples: Rack_Number, Closet_Location, Building_Name, Building_Floor, Building_Acronym

Use: Create groups of items in the same location, build maps, or route alerting information.

**Function or Type**

SolarWinds recommends organizing your objects by the type or its function.

Examples: Core_Network, WAN_Interface, Wireless, Server, Domain_Controller, VPN, Windows Servers, Linux Servers, Email Service

Use: Apply special alerting criteria depending on the type of element. For example, if any Core_Network element has problems, escalate the case immediately.

**Owner**

You can use multiple custom properties to specify who is responsible for an element to help route alerts or create reports.

Examples: A group owner name, such as Networking, SQL_Admins, AD_Admins, or a specific owner.
Uses:

- Define a Contact Email and On_Call_Phone for owners. If there is a problem with a node, the alert can be routed to the correct person.
- Provide a custom view for owners to see their devices and create custom reports, showing only devices they are responsible for.

Service level

Some monitored elements, such as core routers, switches, and applications, may be important enough for someone to be notified any time of the day when there is a problem.

Examples:

- Mark nodes as Critical, and configure alerts to notify.
- With service levels, this custom property can help you specify whether it is 24x7, a business day, or test node, and alert appropriately.

CUSTOMIZATION CHECKLIST

Before you customize your environment, answer the following questions:

- How would you like to logically organize your devices? For example, Location, Site, Lab, and Rack? Function?
- What data type is each custom property? For example, boolean, integer, drop-down options only, free-entry text?
- What are your owner groups? For example, who is responsible for the Windows servers, Linux servers, devices, applications, and so on?
- What are the sites and locations you want to report and alert on?
- Do you need to distinguish between high impact objects that must be addressed first (for example, production) and low impact objects that are of lesser priority (for example, development)?
- Are there any overrides for specific objects you require for alerting?
- Are there any devices, servers, applications, and so on that you want muted (continue to collect data but not see alerts)? Do you want to stop alerts during different periods of the day or night? This Cutting Down on Alert Noise post provides information on reducing alert noise.
- Do you want to associate any assets with a purchase date, PO number, vendor contact information, and so on?
- Are there any fields you will need to add to allow for integration with other systems? This Orion SDK post provides more information.
**TIPS**

- You can use custom properties to define alerts, reports, and web console views. Use multiple properties together with 'AND' and 'OR' operators for powerful filtering and definition options.
- For each custom property, decide how you are going to use it and how it will work in your environment. For example, instead of a comment on an interface that reads "WAN Link interface - critical interface," try two different Yes/No values, such as "Critical Interface" and "WAN link," which could each apply to multiple interfaces. This approach makes it easier for you to filter reports and alerts. When used together (Critical = true AND WAN link = True), it still applies to that interface.

**Add custom properties to nodes**

Custom properties are user-defined fields, such as country, building, asset tag, or serial number, that you can associate with monitored network objects.

This example shows how to create the Device_OWNER custom property and assign it to multiple nodes. You can use this example to create an application owner, business service owner, or server type owner.

For examples of how other SolarWinds users implement custom properties, see [this THWACK post](#).

1. Click Settings > All Settings, and in the Node & Group Management grouping, click Manage Custom Properties.
2. Click Add Custom Property.

![Manage Custom Properties](image)
3. Select an object type, and click Next.

![Add Custom Property](image)

4. Provide the required information, and click Next.

![Select Property](image)

5. Select Restrict Values, add values for the property, and click Next.

![Restrict Values](image)

6. Click Select Nodes.

![Select Nodes](image)
7. Select the nodes for the custom property, and click Add.

8. Click Select Nodes.

9. Specify the value of the custom property, and click Submit.

   Assign value for "Device_Owner" to selected Nodes

   New York IT Department

To assign other values for the custom property to nodes, click Add More, and repeat steps 6-9.

10. Repeat steps 1 - 9 to create the Email_Address custom property.

    The selected nodes now have a responsible person (Owner) and email address assigned to them. The custom properties can be used for creating alerts and reports.

You can see all custom properties assigned to a node in the Custom Properties for Nodes resource on the Node Details view.

   You can also apply custom properties by directly editing the node properties.

Create groups

A group is a collection of monitored objects. For example, you can group nodes from the same location, group all your WAN interfaces, or group all devices owned by a certain department. Or, you can group all Windows servers, or SQL servers, or web servers. You can then create alerts and reports or restrict access for the group.
The example below shows how to create a NY IT Department group and add five nodes to it.

1. Click Settings > All Settings, and in the Node & Group Management grouping, click Manage Groups.
2. Click Add New Group.
3. Provide the required information, and click Next.

![Add New Group](image)

4. Select the monitored objects that fit the group definition, and click Add to Group.

![Add Orion Objects to your new group](image)

- Select a custom property in the Group by list.
5. Click Create Group.
The new group appears in the Manage Groups list.

Click the group to display the Group Details view.
Views and maps

This section contains information on adding custom views and maps to your dashboard:

- How custom views and maps work
- Create a view and add resources
- Edit a view
- Edit a resource
- Create a custom table resource
- Create Network Atlas maps
- Add maps into the Orion Web Console
- Customize menu bars
- Add your logo

How custom views and maps work

Orion Web Console views are configurable pages of network information that can include maps, charts, summary lists, reports, events, and links to other resources. Summary views provide data about multiple objects. Detail views provide more information for a specific object.

For example, the default Summary view displays an overview of all monitored nodes. Clicking on a node in the Summary view opens the Node Details page for that node, where you can see all of the statistics monitored for that device.

CUSTOMIZE VIEWS

Customizing views can include the following activities:

- Create a view and limit it to show nodes of a group.
- Add or remove resources.
- Create subviews to further organize resources for a device.
- Create a map and add it to the Orion Web Console.
- Change the position of resources and change the layout of columns.
- Add the view to the menu bar of a user so that the view is easily accessible, and set the view as the home page.

To customize views and maps, the user must have the following privileges set to Yes:

- Allow Administrator Rights
- Allow Account to Customize Views

Plan what should be on a view before you create it.

<table>
<thead>
<tr>
<th>OPTION</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify objects to see on the view.</td>
<td>Select the appropriate object type, such as nodes, interfaces, groups, applications, and so on.</td>
</tr>
<tr>
<td>View information for all objects of the selected object type.</td>
<td>Select a Summary view.</td>
</tr>
<tr>
<td>View details for a selected object.</td>
<td>Select a Details view.</td>
</tr>
<tr>
<td>Select information about the objects you want to see.</td>
<td>Select resources.</td>
</tr>
<tr>
<td>Divide the information into several tabs.</td>
<td>Enable Left Navigation.</td>
</tr>
<tr>
<td>Optimize the view for large screens or mobile devices.</td>
<td>Create a Network Operations Center (NOC) view.</td>
</tr>
<tr>
<td>Limit what devices should be displayed on the view.</td>
<td>Add a limitation.</td>
</tr>
<tr>
<td>Access the view from the Menu Bar.</td>
<td>Add the view into the menu bar.</td>
</tr>
</tbody>
</table>

Create a view and add resources

Views are configurable pages of network information that can include maps, charts, summary lists, reports, events, and links to other resources. Summary views provide data about multiple objects. Detail views provide more information for a specific object.

This example shows how to create the New York IT Department Summary view and add the following resources:

- Active Alerts
- Hardware Health Overview
- Interfaces with High Percent Usage
- Top 10 Nodes by Current Response Time
- Custom Table
- Map
Check out this video on creating a new view.

1. Log in to the Orion Web Console, and click Settings > All Settings.
2. Click Add New View in the Views grouping.
3. Name the view, and select the view type.

![Add New View](image)

4. Click Submit.

You have now created an empty view. The Customize view page opens automatically. Add resources that contain the information you want to see.

Check out this video on adding and customizing resources.

1. On the Customize page, click + next to the column that you want to add the resources.

![Resources](image)

To open the Customize view page, click Settings > All Settings > Manage Views. Select the view, and click Edit.
2. Select resources in the middle pane, and click Add Selected Resources.

You can limit offered resources by criteria in the Group by list, or search for a resource in the Search box.

3. Use the arrow icons next to the columns to move resources between columns.

4. Click Done.

The view should now be populated with the resources you selected.
Edit a view

You can modify views to suit your needs, including adding and changing columns, moving resources, and creating subviews to help you manage the information that appears on the view.

This example shows how to create an Interview Details subview and add interface-specific resources. To make the view more manageable, the example adds a limitation that includes only objects relevant to the New York IT Department group.

ADD COLUMNS

Resources on views are divided into columns.

On the Customize Page, click Add New Column.

You do not have to add resources here. You can click Done, and drag resources between the columns on the view.

CHANGE COLUMN WIDTH

To change a column width, position the cursor between the columns and drag the column border to achieve the appropriate width.

MOVE RESOURCES ON VIEWS

To move resources within a column or between columns on a subview, drag the handle at the top of the resource to the new location.
If there is too much information on the view, group and divide resources into subviews.

1. On the Customize view, select Enable Left Navigation.
   
   To open the Customize view page, click Settings > All Settings > Manage Views. Select the view, and click Edit.

2. Click Add Tab.
3. Type a name for the new tab, and click Update.
4. Select an icon, and add resources.
5. Click Done.

To save space on the views, click the double arrow button to minimize subviews.

LIMIT OBJECTS ON THE VIEW

Check out this video on adding view limitations.

You can limit the monitored elements that are included in a view, which limits the contents of all the resources on the view. You can also limit some resources by using a SWQL query on the resource.
The example below shows how to limit a view to display only monitored elements owned by the NY IT Department.

1. On the Customize view, click Edit in the View Limitation area.

   ![View Limitation](image)

   **View Limitation**
   
   You can create a view limitation that

   ![No View Limitation defined](image)

   2. Select a type of limitation, and click Continue.

   ![Select Limitation Type](image)

   - Group of Volumes
   - Single Group
   - Group of Groups
   - Group Name Pattern

3. Configure the limitation as instructed.

   ![Configure Limitation](image)

   **Configure Limitation**
   
   SINGLE GROUP
   Limit the Account to a Single Group

   ![New York IT Department](image)

   4. Click Submit.

   The view now only displays objects defined by the limitation.

Now you have created the New York IT Department view. To make it accessible for users, you must first add it to a menu bar, and assign the menu bar to the users. You cannot see the view without making it accessible first. See [Customize menu bars](#).

### Edit a resource

The Orion Web Console provides different resources that you can [add to a view](#), and each resource has an Edit button, so you can change things such as the title, and other features. Different types of resources have different things you can edit.

The example below shows how to sort and filter objects in resources.

**CHANGE RESOURCE NAME AND NUMBER OF DISPLAYED OBJECTS**

To change a resource name, click Edit, and adjust the Title.
To change the number of objects in Top N resources, click Edit, and change the Maximum Number to Display.

**SORT OBJECTS IN RESOURCES**

The following example shows you how to sort a tree resource according to properties.

1. Click Edit in the resource.
2. Select a property in the Level 1, 2, and 3 lists.

![Grouping Nodes](image)

3. Define how you want to display objects that do not have the selected property.

![Put nodes with null values for the grouping property](image)

When completed, nodes in the resource are grouped according to the selected properties.

**FILTER OBJECTS DISPLAYED IN A RESOURCE**

You can use custom SWQL filters to define what objects a resource should display, hiding any irrelevant objects.

In this example, the Top Interfaces by Traffic resource will be customized not to show WAN and Core links.

1. Click Edit in the resource.
2. Enter a SWQL query.

![Filter Interfaces](image)

3. Click Show Filter Examples to display examples of SWQL queries, and node and interface properties that can be used in the query.

3. Click Submit.
Create a custom table resource

Resource data can be displayed as pie charts, bar charts, line charts, tree views, and tables. The example below shows how to create a custom table composed of the Node, Status, Device Owner, and Email Address Columns.

1. Locate the blank custom table resource on the New York IT Summary view added in Create a view and add resources.
2. Click Configure this resource.

3. Enter a title, and click Select Data Source.

4. Select the object you want to report on, for example, Node.
5. Define a condition that specifies the type of nodes to include, for example, all nodes owned by the New York IT Department.
6. Click Add column, select properties, and click Add Column. This example includes the Device_Owner and Email_Address custom properties.

The custom table resource populates with the node status, the owner, and a contact email address.

Create Network Atlas maps

Network Atlas is an application for creating custom maps and network diagrams. Network Atlas Maps are most useful for mapping network infrastructure, however, some customers use this feature to map business services and composite applications that are static.

You can export or print maps, and view them in the Orion Web Console
Before you start creating maps, prepare a map management strategy. Consider the following recommendations:

- Map only static objects. If objects move, you need to adjust their location on maps, and it is difficult to keep maps up-to-date.
- Build maps to match the column width of your Orion Web Console views. Rescaling maps in views results in distorting of icons and texts.

The Network Atlas application is pre-installed with your Orion Platform product.

To install Network Atlas on a remote computer, log in to the Orion Web Console, click the Network Atlas download link in the Map resource, and install the application. If the link is not displayed, click Edit in the map resource, and select Show Network Atlas Download link.
The example below shows how to create a map for the New York IT Department group, and add the map to the Orion Web Console.

ℹ️ You need map management rights to run Network Atlas.

1. Start the Network Atlas in the SolarWinds program folder.
2. Enter your Orion Web Console credentials and the Orion server address, and click Connect.

ifar you are running Network Atlas on the same server as SolarWinds NPM, confirm the default localhost in the Address field, and connect to Orion.


4. Click Background, and specify the background. You can use a local image, link an online image, delete the default background, or use a background color.

ℹ️ Background images should match the pixel width of columns in your Orion Web Console views.
5. Select a Group by item, and expand Orion objects.

6. Drag objects to the map in the main pane.

- A checkmark next to a node or network resource indicates you have already added it to your map.
- Click a network resource in the left pane to select the object on the map.

7. If the nodes on your map are connected directly, click Connect Now on the Home ribbon to create links automatically.

8. To create links between nodes that are not directly connected, create map links manually:
   a. Click Home > Straight Line.
   b. Click an object with the line drawing tool to begin drawing the link.
   c. Click a second object to finish drawing the link.
9. To edit the appearance of links:
   a. Click Home > Select in the Tools group.
   b. Right-click the link, and select Properties.
   c. Click Appearance in the left pane of the Link Properties tab.
   d. Configure link Width, Color, and Style.

   ![Link Properties](image)

   e. Click OK.

10. Save the map.

When you are complete, you can Add maps into the Orion Web Console.

WHAT ELSE CAN YOU DO WITH MAPS?

- Link dynamic maps as the background for Network Atlas maps. For example, you can link a weather map showing which locations might be affected by bad weather.
- Nest maps within maps, so that you can navigate between levels. For example, if you click a location on a map, you will be able to display a network diagram for the location.
- Visualize the wireless signal strength provided by your access points in wireless heat maps. This helps you locate blind spots, and add more access points to optimize your wireless network.
- On wireless heat maps in the Orion Web Console, you can view the location of clients connected to your wireless access points.
- Customize what you want to see in tooltips when you hover over individual objects in an Orion Web Console map.

Add maps into the Orion Web Console

Network Atlas is an application for creating custom maps and network diagrams. Network Atlas Maps are most useful for mapping network infrastructure, however, some customers use this feature to map business services and composite applications that are static.

You can export or print maps, and view them in the Orion Web Console
The example below shows how to add a Network Atlas map to the Orion Web Console.

You need View Customization rights to add maps.

1. Open the view where you want to add a map.
2. If the Map resource is not on the view, click Customize Page and add the resource.
3. Click Edit in the Map resource.
   - On the Edit page, you can select Display Cached Map While the New Map Is Being Loaded. Enabling this option can improve performance of maps containing many nested objects that must be queried for status each time the map is refreshed.
4. Select your map, and click Submit.
   Your map is now visible in the Orion Web Console.

Create a NOC view

Check out this video on creating a NOC view.

A Network Operations Center (NOC) view provides a single page view of critical statistics that can fit on a TV screen or a mobile device. Subviews rotate automatically on the screen so each subview is available as a separate slide.

Headers and footers are compressed in NOC views, increasing the available space to display resources.

The example below shows how to configure a NOC view for the New York IT Summary view.

1. Click Settings > All Settings.
2. In the View group, click Manage Views.
3. Select the view you want to configure as a NOC view, and click Edit.
4. On the Customize view page, select Enable NOC View.
5. If the view consists of multiple tabs, specify the rotation interval.

6. Click Done & Go to NOC.

When you open the view, you can switch to the NOC mode by clicking the Show in NOC mode button in the top right corner of the view.

Customize menu bars

Check out this video on customizing the menu bar.

My Dashboards provide menu bars with shortcuts to Orion Web Console views. The default menu bars include Home, and a menu bar for each installed Orion Platform product.

Click My Dashboards to show the default menus.

You can customize views and labels offered in default menus for individual users.
If you do not need to see all items in menu bars, and prefer navigating to display items in a menu bar, click My Dashboards > Collapse.

When you have a list of items you want users to access from My Dashboards, create a menu bar.

1. Click My Dashboards > Configure.
2. Scroll to the bottom of the page, and click New Menu Bar.
3. Name the menu bar.
4. Drag views from the Available items column into Selected items.

5. Click Submit.

The new menu bar is created. You can now assign it to users who will see the items in My Dashboards.
The items users see in My Dashboards and in Alerts & Activity are specified in their user accounts.

💡 Improve performance by setting the Home Page View to a view with a limited number of resources on it.

1. Click Settings > All Settings in the menu bar.
2. In the User Accounts grouping, click Manage Accounts.
3. Select a user, and click Edit.
4. Scroll down to Default Menu Bars and Views, and select top menu bars from the lists.

<table>
<thead>
<tr>
<th>Select the menu bar for this account. To view the contents of each</th>
<th>New York</th>
</tr>
</thead>
<tbody>
<tr>
<td>HomeTab Menu Bar</td>
<td></td>
</tr>
<tr>
<td>NetworkTab Menu Bar</td>
<td>Network_TabMenu</td>
</tr>
</tbody>
</table>

5. Select Yes for the items the user will see in the Alerts & Activity menu bar.

<table>
<thead>
<tr>
<th>Show Alerts Menu</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Show Events Menu</td>
<td>Yes</td>
</tr>
<tr>
<td>Show Syslog Menu</td>
<td>Yes</td>
</tr>
<tr>
<td>Show Traps Menu</td>
<td>Yes</td>
</tr>
<tr>
<td>Show Message Center Menu</td>
<td>Yes</td>
</tr>
</tbody>
</table>

6. Select an item and use the arrows to change the order of menu bars. Select an item from the list to specify the default Home page view.

7. Click Submit.

The user can now use the specified links in My Dashboards and Alerts & Activity menu bars.
Add your logo

You can customize the Orion Web Console to display your logo at the top of every page.

1. Create a graphic to replace the SolarWinds logo.
   - The recommended logo size is 250 x 50 pixels. The maximum allowed size is 900 x 500 pixels.

2. Place your graphic in the images directory.
   - The default location of the directory is C:\Inetpub\SolarWinds\NetPerfMon\.

3. Click Settings > All Settings in the menu bar.

4. In the Product Specific Settings grouping, click Web Console Settings.

5. Ensure the Site Logo box is selected, and click Browse to navigate to your logo.

6. Click Submit.

![Orion Summary Home with new logo]
Custom alerts and reports

This sections guides you in creating custom alerts and reports:

- Create a custom alert
- How thresholds work
- Edit a global threshold
- Create a custom report

Create a custom alert

⚠️ Check out this video on creating an alert.

In this scenario, an alert is defined on the two nodes (a router and switch) in the New York IT office that have GB (gigabit) interfaces. When these interfaces go down, the New York offices lose internet connectivity. It is vital that the IT team knows that there is a problem.

The alert should trigger when the status of either interface is down (not equal to Up). This alert is also configured to send an email to the New York IT team every minute, and if the alert is not acknowledged in 10 minutes, the alert escalates and sends an email to the Director of IT.

1. Click Settings > All Settings.
2. Under Alerts & Reports, click Manage Alerts.
3. Click Add New Alert.
4. Enter a name and description, and click Next.
5. Define the scope of the alert.
   In this example, the alert applies only to nodes owned by the New York IT Department and have GigabitEthernet in the name.
6. Define the trigger condition, and click Next.
   In this example, the alert is triggered when the status of the interface is not equal to Up.

   ![The actual trigger condition:]

   Define the trigger condition, and click Next.

   ![The actual trigger condition:]

7. On the Reset condition panel, click Next.
10. On the Add Action dialog box, select Send an Email/Page, and click Configure Action.
11. On the Configure action dialog box, enter a name, recipients, message, and SMTP server details.
12. Click Execution settings, configure the email to be sent every minute, and click Add Action.

   ![Configure Action: Send An Email/Page]

   Name of action
   Problem with Gigabit link in NY

   1. Recipients NY-IT@mail.com
   2. Message Alert \(N=\text{Alerting}; M=\text{AlertName}\) at \(N=\text{Alerting}; M=\text{AlertTriggerTime}; F=\text{DateTime}\)
   3. SMTP Server 10.199.66.5

   ![Configure Action: Send An Email/Page]

   Time of Day Schedule is controlled on the alert level, no additional schedule for this action needed

   ![Configure Action: Send An Email/Page]

   Execution settings
   - Do not execute this action if the alert has been acknowledged already (Recommended)
   - Repeat this action every X minutes until the alert is acknowledged
   - Repeat this action every: 1 Minutes

   ADD ACTION  CANCEL

13. Click Add Escalation Level.
14. On the Trigger Actions panel, set the wait time.
   In this example, if the alert is not acknowledged within 10 minutes, an email is sent to the Director of IT.

   ![Add Action and Assign Action](image)

   ![Wait: 10 Minutes](image)

15. In the Escalation Level 2 section, click Add Action, and configure an escalation email to be sent.
   In this example, an email is sent to the Director of IT.

   ![Escalation Level 2 Configuration](image)

16. On the Trigger Actions panel, click Next.

17. On the Reset Action panel, click Next.

18. On the Summary panel, review the alert configuration, and click Submit.
   The alert appears on the Manage Alerts page.

   ![Alert Manager and Action Manager](image)

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**How thresholds work**

Alerts are triggered when a monitored value exceeds a threshold. Orion comes with predefined static thresholds for most statistics, but you can override these thresholds and customize them on a per-object basis.

Orion provides two threshold levels: critical and warning. A value that crosses a warning threshold appears yellow, and a critical threshold appears red.

If you want to change the predefined value for a threshold, you use a static threshold or a dynamic baseline threshold.
- **Static threshold.** A constant value that you set for your threshold. For example, the warning threshold for response time might be 500 ms, and the critical value might be 1000 ms. You should be familiar with the performance of that object to know what a reasonable value for a static threshold is.

- **Dynamic baseline threshold.** Data for a statistic are collected for a week, and then used to calculate mean and standard deviation. The warning and critical threshold values are defined as 2 and 3 standard deviations above the mean, respectively. For example, if the mean value for packet loss for a specific node is 0%, the warning threshold for packet loss would be 3% (+2 standard deviations) and the critical threshold would be 4% (+3 standard deviations). Dynamic baseline thresholds are the most accurate way to define thresholds for a specific device.

Baselines are calculated once, after data has been collected for a week. You can recalculate baselines on demand.

**Edit a global threshold**

The following statistics have built-in global thresholds, which is a threshold that applies to every monitored node in Orion:

- Average CPU load
- Disk Usage
- Percent memory Used
- Percent Packet Loss
- Response Time
To edit global statistics, click Settings > All Settings, and in the Thresholds & Polling group, click Orion Thresholds.

Create a custom report

You can combine any Orion Web Console resource or chart into a report. The following example illustrates a custom report for the New York IT team that provides information on the availability of devices for the last 30 days, open alerts, and an infrastructure map.

1. Click Reports > All Reports > Manage Reports > Create New Report.
2. On the Layout Builder panel, click Add Content. You may be prompted to add content as soon as you click Create New Report.
3. Select the first resource to add to the report and click Select and Continue. Some resources require you to choose a specific object to report on. For example, if you want to track how many people use a specific application, you must choose the application when adding the resource. The Layout Builder view is displayed with the selected resource added.
4. In the Content area, add resources and sections to the report.
   a. Click Add content to add resources to your report.
   b. Click Add section to add more rows of content to this report.

5. To filter a resource to include a specific set of data, click Edit Resource. Not all resources can be filtered.
6. Filter the resource and click Submit. Each resource has different filter options.

    Edit Resource: Availability of Each Node
    Title:
    Availability of Each Node
    Subtitle:
    Time Period:
    Select a Time Period: [Today] ▼
    - or -
    Beginning Date/Time: [ ]
    Ending Date/Time: [ ]
    Filter Nodes (SQL)
    Dovico_Owner Like 'Now*'

    Filters are optional and can be used to limit the list of Nodes displayed. This is an advanced feature. We recommend you have a basic understanding of SQL Queries. 
    » Show Filter Examples
    SUBMIT

7. After adding and filtering the resource, enter a report name, and click Next.
8. On the Preview panel, click Next.
9. Add report properties, such as categories, custom properties, or limitations, and click Next.
10. To schedule the report, click Schedule this report to run regularly, create a new schedule or assign a schedule, and click Next.
    You can schedule a report to be generated, emailed, saved, or printed.
11. Review the Summary and click Submit to save the report.
The following example shows the completed New York monthly report.
Reduce alerting noise

This section includes techniques for reducing alert noise:

- Complex trigger conditions
- Alerts with multi-element triggers
- Use duration in the alert trigger
- The 'Do Not Alert' alert
- Send alerts to specific contacts
- Alerts with device-specific thresholds
- Single alert when multiple devices go down
- Define object dependencies
- Event correlation alerts (Y after X)

Complex trigger conditions

Use the Advanced options in the trigger conditions to create complex conditions, such as alerting when an application is down and when your failover server is active for more than an hour.

Complex conditions are generally enabled by users who are comfortable with building normal trigger conditions, or who have trialed alerts using the normal trigger conditions and require more control over the trigger conditions to better refine the environmental conditions that trigger an alert.

Do not use complex conditions until you have tested the trigger conditions individually. Creating an alert with complex conditions without testing it may prevent you from receiving important alerts.

HOW CONDITION BLOCKS ARE EVALUATED

The condition blocks are evaluated at the same time. If they are all true based on the conditions, the alert triggers. For example, condition A, B, and C must be true in order for the alert to trigger.

(Condition A) & (Condition B) & (Condition C)

Condition blocks are evaluated using variations of AND, so the trigger condition in each section must be met.
A condition block can be evaluated at a different time than other condition blocks. For example, if you want to be alerted if the backup system is active for more than an hour, you can choose to wait an hour after the primary condition block, where the application going down is the trigger condition, before evaluating whether the backup system is still active.

**AGGREGATE ALERTS**

With complex conditions enabled, you can choose to trigger alerts only when multiple objects meet the trigger condition.

After you have enabled complex conditions, the following option is available in your trigger condition:

- **Condition must exist for more than** [ ] minutes
- **Alert can be triggered if** [ ] more or equal [ ] objects (at the same time) have met the specified condition

This setting then combines all alerts that would be sent for each object into a single alert.

- Do not use this setting until you are confident that the trigger condition is correct. This setting can prevent important alerts from triggering.

**Alerts with multi-element triggers**

You can use complex conditions to trigger alerts when objects meet separate trigger conditions at the same time. For example, if you have two applications on two separate servers, you can still manage if you lose one application. However, if you lose both applications, you need the system to send a critical alert.

- Complex conditions should be used with caution. SolarWinds recommends testing each trigger condition individually before combining them.

On the Trigger Conditions panel, expand Advanced options, and select Enable complex conditions.

With a standard alert, you can create an alert for each of the two applications. With a complex condition, you can create a single alert where the application would have to fail on both Server A and Server B in order to generate an alert.
In this example, the primary trigger condition is written for Server A.

Click Add Section and write a trigger condition for Server B.

In this example, both conditions must resolve to TRUE in order for the alert to fire, but do not have to relate to each. The condition blocks are evaluated at the same time. If they are all TRUE based on the conditions, the alert triggers. You can add additional conditions to configure granular and complex alerts.

Using condition blocks is a great way to reduce alerts. Instead of receiving an alert for each element, you can receive a single alert.
USE INSTANCE NAMES

In the example above, a specific node name is selected in the condition. This works well if the alert has a very limited scope. Another approach is to use instance names in the condition.

Use duration in the alert trigger

Using durations for alerts is a great way to reduce the total number of alerts you receive. There are times when you want an alert to trigger as soon as the condition is detected. Other times, you may only want the alert to trigger when a condition exists for more than a certain amount of time.

For example, the WAN link out of your corporate headquarters might occasionally spike over 80% utilization. However, you only want to be alerted if the link is more than 80% for longer than 10 minutes. Set conditions to receive an alert when the utilization on the WAN link is over 80% for 10 minutes, and you will only receive an alert when there is a sustained spike.
The following example illustrates an alert that includes duration. Ensure that you select the Condition must exist check box and enter a duration.

![Alert example](image)

**The 'Do Not Alert' alert**

You can use custom properties to suppress alerts from being triggered when an object goes down. In this case, include a custom property in the alert condition that stops the alert from being fired.

1. Click Settings > All Settings.
2. In the Node & Group Management group, click Manage Custom Properties.
3. Click Add Custom Property.
4. Create a Boolean (Yes/No) custom property called `AlertOnThis`.
5. Click Select Nodes.
6. Select all of the nodes on the system.
7. Click the green arrow to move all selected nodes to the right.
8. Set the AlertOnThis property to Yes.

9. For devices for which you do not want to receive an alert, set the custom property to False.
10. Define the alert to trigger when the AlertOnThis custom property is equal to Yes and the Node Status is equal to Down.

If you use the AlertOnThis custom property, every alert must include the AlertOnThis check. Otherwise, all nodes will trigger alerts regardless of how this custom property is set.

Send alerts to specific contacts

When you have people or groups that are responsible for different monitored objects, you might only want them to receive alerts for objects for which they are responsible.

1. Create a custom property called ContactEmail.
2. Enter the email address for each monitored object.
3. Create an alert that sends an email when an object goes down.
4. On the Trigger Action page in the Alert builder wizard, add an Email action. Because you want the recipient of the email to be variable depending on who the ContactEmail is, you need to add a variable to the Recipients section.

The variable ensures that your alert email is only delivered to people who are listed in the ContactEmail custom property.

The To: field does not have an Insert Variable button, so if you have labeled your custom property something other than ContactEmail, open the Message section, click Insert Variable to find the custom property, and cut and paste the variable into the To field.
Alerts with device-specific thresholds

You can set different alert thresholds per device, interface, or other monitored element. For example, it is acceptable to you if most of your nodes reach a 90% threshold for CPU load, but you want a few nodes to alert when they reach a 70% threshold. You can set CPU thresholds locally on a node, and then create a generic alert that notifies you when a threshold has been reached.

1. Begin by creating the actual trigger condition with a double value comparison.
   a. Click the plus sign.
   b. Select Add Double Value Comparison.
      The trigger condition fields expand, and you can enter a double value comparison trigger.

2. Include the threshold in the trigger condition.
   An alert will be triggered when the threshold value is reached.

Single alert when multiple devices go down

There are situations when multiple devices go down, and instead of getting an alert for each device, you only want to receive one alert that notifies you that something is wrong. A multiple device alert is closely related to a dependency alert, where Orion detects a down status for a network element because an object in front of the network element is down. For example, if a router goes down, Orion detects that all servers behind the router are also down because Orion cannot communicate with the servers. But, the servers behind the router are still physically up, they are just reported as down. In this case, the alerts triggered can be numerous and inaccurate. You can create a dependency between the router and servers so that when the router goes down, only a single alert is triggered.
With a multiple devices go down alert, the devices reported as down are actually down. For example, you monitor the network connections to multiple remote sites. You need an alert that notifies a group that addresses network issues, like when the carrier loses connectivity to several sites simultaneously. Unless you configure the alert to trigger when multiple devices go down, you will receive one alert for each site. The following alert only triggers when more than 10 sites go down at the same time.

**USE GROUPS**

You can also use groups to alert you when multiple devices go down. In this approach, create a group and assign related devices to it. In this scenario, an alert is only triggered when all devices in the group are down, and not just a subset of devices. Using groups saves you time when configuring alerts, and is also useful when you have load balanced devices and you only care when all the devices are down, not just when some are down.

**Define object dependencies**

On your network, there are objects that are dependent on other devices to function. For example, all monitored objects behind an edge router are dependent on that router for connectivity. If the router has problems or goes down, any dependent devices will also appear to have problems, and you will receive status alerts about those devices as well.

However, if you define those nodes as being dependent on the edge router, you will not get false alerts about the status of dependent nodes when the parent object has issues.
When you use dependencies, consider the following:

- Dependencies themselves do not prevent alerts from being triggered. Instead, dependencies prevent the child objects from going down, and as a result, down node alerts are not triggered. By using dependencies, status alerts are prevented from triggering, but all other alerts are triggered.
- A child object can have several parents, and the child's status only turns to Unreachable if all parents in all defined dependencies go down.

In this example, you will create a dependency between a router and all the devices monitored by an IT department. This dependency can be used to limit an alert, which is then triggered only for the router that goes down, and not when a monitored device is unreachable because the router is down.

1. Click Settings > All Settings in the menu bar.
2. In the Node & Group Management grouping, click Manage Dependencies.
3. Click Add New Dependency.
4. Select the parent object or group, and click Next.
5. Type a Dependency Name, select the child entities, and click Next.
6. Review the settings for the dependency. If there are active alerts on child objects, they are listed on this view.

7. Click Submit.

The dependency appears on the Manage Dependencies page.

You can also display the dependency on custom views in the Orion Web Console.

**Event correlation alerts (Y after X)**

You may have some conditions you want to alert on if Y happens after X. For example, you might want to receive an alert if there is a problem with your failover. In this example, if node A goes down, the alert waits 5 minutes, and then checks that node B is up. If node B is not up, the alert is triggered.

Make sure to select a And then after value, which is located between the alert sections.
Then, in the secondary section, configure the actual trigger condition so that Node Name is equal to Node B and Node Status is equal to Down.
Troubleshoot network issues with Performance Analysis dashboards

With complex networks consisting of cloud, hybrid IT, virtualization, storage area networks, and so on, multi-faceted IT issues can be difficult to pinpoint and diagnose. When an issue surfaces, for example a badly performing application or server, the investigation can take significant time to locate the core issue. The problem could be in storage, network connectivity, user access, or a mix of resources and configurations.

To investigate the issue, create troubleshooting projects with the Performance Analysis (PerfStack™) dashboard that visually correlate historical data from multiple SolarWinds products and entity types in a single view.

With Performance Analysis dashboards, you can do the following:

- Compare and analyze multiple metric types in a single view, including status, events, and statistics.
- Compare and analyze metrics for multiple entities in a single view, including, nodes, interfaces, volumes, applications, and more.
- Correlate data from across the Orion Platform on a single shared time line.
- Visualize hybrid data for on-premises, cloud, and everything in between.
- Share a troubleshooting project with your teams and experts to review historical data for an issue.

PerfStack is designed for expert users to quickly sift through data. If you need help to select relevant metrics or more automated troubleshooting, consider using AppStack or NetPath™.

Troubleshoot intermittent network slowdowns

This topic provides an example of how you can troubleshoot an issue where a router drops or delays packets. Bandwidth issues are already ruled out.

This example describes creating a Performance Analysis dashboard (PerfStack™) that correlates the following metrics to investigate the cause of the network slowdown:

- Average Response Time (ms) and Percent Loss to assess the symptoms of the problem: how fast is the network getting your traffic to the server and how much of your traffic is lost.
- Average CPU Load and Average Percent Memory Used to verify whether the system-wide resources are not overloaded and thus causing the issue.
- Buffer Misses due to No RAM and Total Number of Buffer Misses to see if high RAM usage impacted how the router allocates RAM for traffic forwarding.
- Small, Medium, Big, Large, and Huge Buffer Misses to investigate which size packets are causing the generic buffer misses you found.
To troubleshoot the network slowdown:

1. Click My Dashboards > Home > Performance Analysis.
2. Click Add Entities, add the node to the Metric Palette, and select the node.
3. Expand the Response Time History metric group, and drag Average Response Time and Percent Loss to a new chart.

The graph shows that both average response time and percent packet loss are low. The response time ranges from 2 to 7 ms.
4. To investigate the load, add Average CPU Load and Average Percent Memory metrics to a new graph. Add the memory load in percent to be able to compare the two metrics. In this example, the CPU load is low (about 5%). The used Average Percent Memory is 18.7%, and so it is not the cause of the issue. The issue might be caused by the allocation of buffer for sending packets.

5. Investigate whether it is a buffer issue:
   a. Add the Total Number of Buffer Misses to a new graph. In this scenario, there are spikes in the Total Number of Buffer Misses graph.
   b. To find out whether they are caused by a lack of RAM, add Buffer Misses due to No RAM to the Buffer Misses chart. In this example, Buffer Misses due to no RAM are zero, so insufficient RAM is not the cause of the spikes in buffer misses.
6. To investigate the buffer misses, add metrics for all types of buffer misses into a new graph. The following example shows the size of the packets that are being dropped. In this scenario, all buffer misses values are zero except for small buffer misses. Small buffer misses are thus the cause of the issue. To resolve the issue, increase the buffer size for small buffers, or configure the router to have a larger boundary.

- To share the dashboard, simply share the URL. The URL contains all data to recreate the view.
To keep the featured metrics in the dashboard for later use, click Save and enter a name for the Performance Analysis project. You can click Load to view the project again.

Troubleshoot slow resources in a branch office

This topic provides an example of how you can troubleshoot an issue where employees in a branch office are complaining about slow resources.

Use Performance Analysis (PerfStack™) to correlate metrics, find out the cause of the issue, and resolve the issue.

This type of problem in this environment is often due to problems on the WAN interface. Use PerfStack to analyze the interface.

In this example, the Performance Analysis project includes the following metrics:

- Status to know whether the interface is up or whether the status is changing.
- Average Transmit bps to investigate the amount of traffic.
- Transmit Percent Utilization to investigate how close the interface is to being fully saturated.
- Transmit Discards and Percent Discards to investigate discarded data.
Start your analysis with the Branch Office WAN router (BOWAN).

1. Click My Dashboards > Home > Performance Analysis.
2. Locate the interface:
   a. In the Metric Palette, click Add Entities.
   b. Enter the router name into the entity filter, select the router, and click Add Selected Items.
   c. Expand nodes, position the mouse over the router, and click the Add Related Entities button. Related entities, such as groups and interfaces, display in the Metric Palette.
3. Add status information to the dashboard:
   a. Select the Core Uplink interface in the Metric Palette.
   b. Expand Status, Event, Alerts in Metrics and drag Status into the chart area.
4. Investigate the utilization of the interface:
   a. Drag Average Transmit bps into a new chart. The traffic is not very high, it is around 9 Mbps.
      To filter available metrics, type a part of the metric name into the field, for example transmit.
   b. Drag Transmit Percent Utilization into the chart. The percent utilization is high, it is around 95%.
      The two metrics indicate that 9 Mbps is approximately 95% of the interface utilization.
5. To understand if high utilization is resulting in discarded frames, drag Transmit Discards and Percent Discards into a new chart. The interface discards 100% of the traffic. Discards can be caused by hardware or configuration issues.

6. To verify the configuration and acting state on the port, log in to the device and check the configuration. For example, go to the BOWAN details view, and click telnet in the Node Details resource.
In this example, you discover that the interface is configured to run at 10 Mb. However, it is a Gigabit interface and it should be running at 1,000 Mbps. Correct the configuration to resolve the issue.

- To share the dashboard, simply share the URL. The URL contains all data to recreate the view.
- To keep the featured metrics in the dashboard for later use, click Save and enter a name for the Performance Analysis project. You can click Load to view the project again.