OPTIMIZATION GUIDE

Orion Platform

Version 2018.4

solarwinds

Table of Contents

Optimize and scale

As your environment grows and the number of devices you monitor increases, the strain on your Orion Platform infrastructure also increases.

This guide is intended for Orion Platform users who need to optimize the monitoring performance of their deployment. To access settings, you need Administrator rights.

> ⓘ When your deployment reaches 10,000 monitored elements, review the health of your polling, distribute the load among polling engines, and review your polling and retention settings. Consider taking measures before the polling engine capacity hits the limit of 12,000 elements.

To optimize your deployment:

- Understand your deployment. Make sure your deployment meets the requirements.
- Understand the environment to monitor. Make sure you know the scope of the network environment to monitor, including what elements and what data to monitor.
- Based on the information, optimize the polling and database size.

> 💡 To speed up the optimization process, go to the **Deployment Health page** **in the Orion Web Console** and take the suggested measures.
>
> 1. Click Settings > My Orion Deployment.
>
> 2. Click the Deployment Health tab.
>
> Do you prefer checklists? Go straight to the **Optimization checklist**.

Troubleshoot Orion Deployment issues with Active Diagnostics

Starting with Orion Platform 2018.2, you can display a list of issues or potential issues that might occur in your deployment directly in the Orion Web Console. For each issue, the Orion Health page suggests links to steps that resolve the issue.

The data is gathered by Active Diagnostics. Active Diagnostics is a tool that runs troubleshooting checks against your deployment (both the main polling engine, the database, and any scalability engines you have deployed). These checks are now displayed on the Deployment Health tab (except for silenced tests), directly from the Orion Web Console.

By default, the checks run every day at 23:01. Records are kept in the database for two months. After two months, all but the first database record is deleted from the database. The first record is stored so that you have historical data.

Access the Deployment Health page

1. Log in to the Orion Web Console using an administrator account.
2. Click Settings > My Orion Deployment.
3. Click the Deployment Health tab.

   Review the circles at the top to see the total number of problems, potential issues, or healthy checks for all scalability engines in your environment.
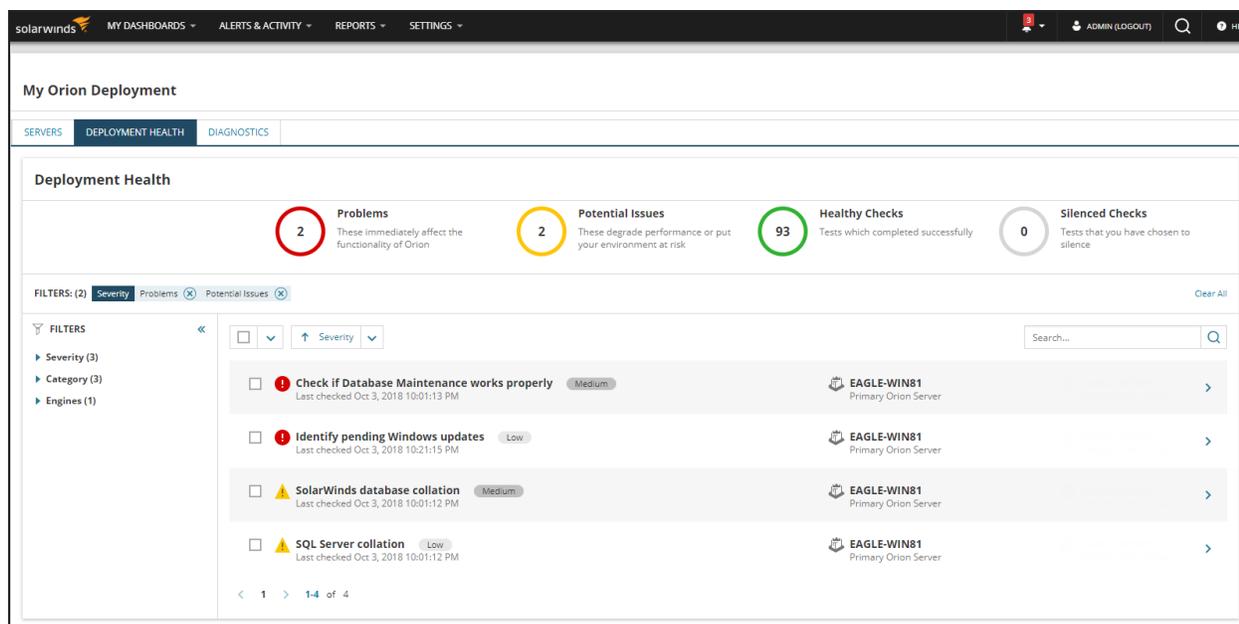
4. In the main pane, review individual items. Sort the issues by priority in descending order to know which issues should be resolved first to improve the health of your Orion Platform.

> ⓘ To re-run the checks, make sure the tests to run are selected, and click Refresh Check.

5. For more details about an issue, click the arrow at the end of the issue row. In the panel, review what went wrong and follow the article link for steps to resolve the issue.

Hide results of tests

If you are only interested in results of specific tests, you can "silence checks", or hide results of non-relevant tests.

When you open the Orion Health page for the first time, the page lists all problems and potential issues. Silence failed tests that do not affect your Orion Platform deployment, or tests that should not appear in the list temporarily.

To silence a check, select it and click Silence Check.

The check is not displayed any more on all polling engines.

To include results of a silenced check in the Orion Health page again:

1. Select Silenced Checks in the Filter.
2. Select the tests to include in the Orion Health page, and click the Unsilence button.

Troubleshoot Active Diagnostics

If the Orion Health page does not list tests, try to troubleshoot the issue based on the error message.

Connection error

1. Refresh the page. For example, press F5 or the refresh button in your browser. If it doesn't resolve the issue, continue with step 2.
2. Log out of the Orion Web Console and log in again. If it doesn't resolve the issue, continue with step 2.
3. Open the Orion Service Manager, for example using the Windows Search function.
4. Restart the SWA Service.

Issues with the connection to the Administration service on a polling engine

Possible messages: Failed to run tests, silence tests, unsilence tests, or load test details.

1. Verify that the server is on.
2. Verify that the SWA service is running. for example, start the Orion Service Manager and review the status of the SWA service. Restart the service.
3. Verify that the polling engine is listed in the OrionServers table:
   a. On the main polling engine, start the Orion Database Manager.
   b. Click Add server, and provide details for the server hosting your SolarWinds Orion database.
   c. Navigate to the OrionServers table, and run the default query.
   d. Verify that the polling engine is in the table.

If the engine is in the Engines section on the Deployment Health tab but not in the database table, it means that it was once added for the installation and was removed later on - uninstalled or deleted. You can thus see some historical data for it but cannot run tests on the engine because it does not exist anymore.

Know your environment

Make sure your deployment meets the requirements for deployed Orion Platform products:

- Orion server hardware and software requirements
- Database requirements
- Commonly overlooked requirements

Hardware and software specifications of your Orion Platform server

1. Check the hardware on your **Orion Platform server**.
2. Verify the Orion Server software: in the Orion Web Console, click Settings > All Settings > Orion Platform Details.

Orion Platform Details

Server

WEB SERVER	NPM-01
SOFTWARE VERSION	Windows Server 2012 R2
OS VERSION	6.3.9600.0
SERVICE PACK	None

Network Elements

TOTAL COUNT	643
NODES	8
INTERFACES	632
VOLUMES	3

3. Compare the deployment specifications with the requirements for Orion Platform:

   Orion Platform product requirements

   Review product requirements in our Success Center:
   NPM 12.3 | 12.2 | 12.1 | 12.0.1 | 12.0

Multi-module requirements

If you are running multiple Orion Platform products, make sure your environment meets the requirements for your environment size.

> 💡 Your first Orion Platform product must meet the minimum system requirements for the product. Typically, you need a single quad-core processor and 8 GB of RAM. For each additional module on the same system, add one CPU core and 2 GB of RAM.

Scalability engine requirements

If you have deployed high availability, additional polling engines, or additional web servers, servers where you have the scalability engines deployed must also meet the requirements:

- Requirements for high availability
- Requirements for additional polling engines
- Requirements for additional web servers

See also:

- Best practices for a stable Orion Platform deployment

SolarWinds Orion SQL database server properties

Polled data is stored in the Orion SQL Database. The database server must meet the requirements, both hardware and software.

When running multiple Orion Platform products, make sure the database properties are enough to run them all. See Multi-module requirements.

Check the database size

1. Start the Database Manager in the SolarWinds Orion > Advanced Features program folder.

2. Add your database server and expand it.

3. Right-click your SolarWinds Orion database, and select Database Details.
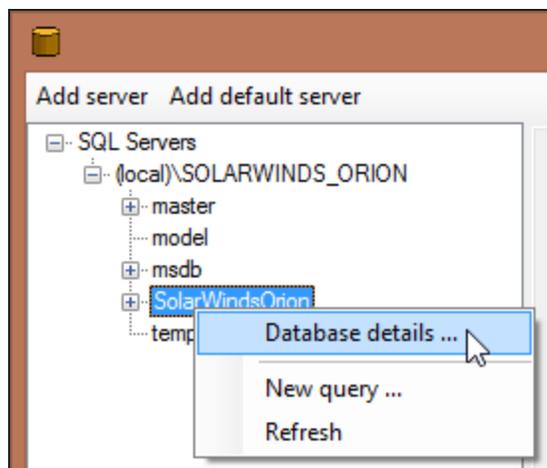
The database size is displayed in the Properties tab.
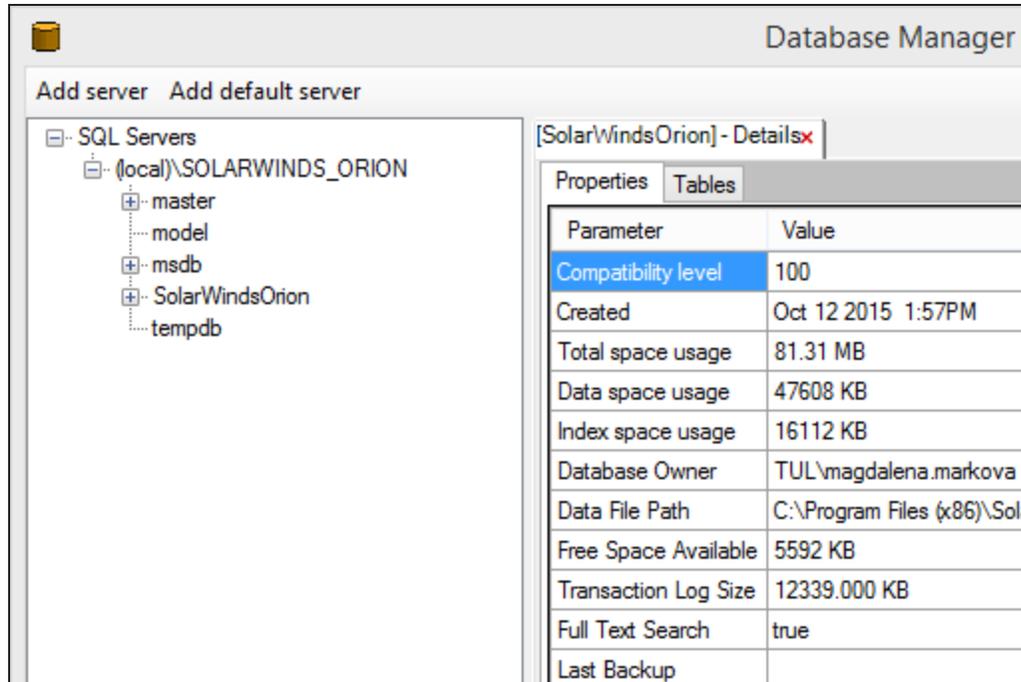
4. Review the total space usage and free space available. If necessary, consider adding disk space.

Check the software specifications of your database server

1. Click Settings > All Settings > Database Details.

2. Review the SQL server version, and server software.

3. You can also find here the security model, the user name, and connection timeout.
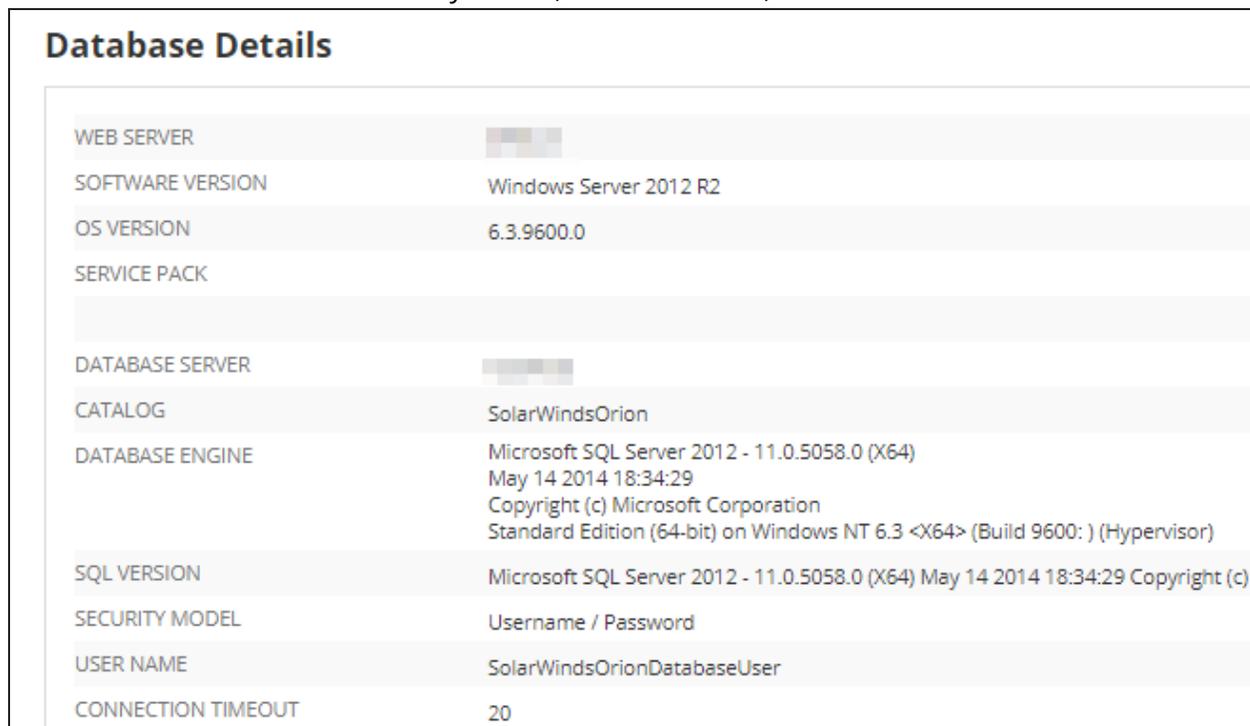
See also:

- [Best practices for optimizing your SQL server](#)
- [Best practices for managing your SQL database](#)

Commonly overlooked requirements

Review latency requirements, exclude files from antivirus protection, and open the ports as required by your deployment.

Orion SQL database requirements

Make sure your deployment meets the Orion SQL database requirements:

- You are **not using SQL Express**: SQL Express is supported for evaluations only. SolarWinds recommends that you use a production system if you plan to upgrade your evaluation to a licensed version.
- You have deployed the **SQL database on a separate server**: Installing the SQL Database and the Main Polling Engine on the same server is supported for evaluations only. For production environments, SQL Database and the Main Polling Engine require separate servers.
- You are **not running SQL 2008 or earlier** on the database server: As of Orion Platform 2017.3, SQL 2008 and earlier is not supported any more. If you are running an SQL 2008 server, you can upgrade only to Core 2017.1 (NPM 12.1).
- Your database is not sharing VM hosting or storage spindles with other performance-intensive applications.

Latency requirements

The latency (RTT) between each Additional Polling Engine and the database server must be **below 300 ms**. Degradation can begin around 200 ms, depending on your utilization.

Ping the Orion SQL Server to find out the current latency, and ensure a reliable static connection between the server and the regions.

Antivirus protection

You have [excluded appropriate directories from antivirus scanning](#).

Port requirements

You have opened all [ports required by your Orion Platform products](#), additional polling engines, and additional web servers, in the correct direction.

What devices to monitor and what do you need to know about them?

Your network consists of physical and virtual elements that communicate with each other. You need to decide what devices (virtual or physical) and what properties of these devices you need to monitor.

Different Orion Platform products monitor different entities. For example, NPM monitors nodes, interfaces, and volumes.

Monitored entities influence:

- The license you need
- The storage you need for the polled data - the more entities you poll, the more storage you need.
- The polling engine performance - the more entities you poll, the more performance you need.

How many entities are in your license?

Review the number of currently monitored entities and find out how many entities are included in your license.

1. Click Settings > All Settings > License Details.
2. Review the total nodes, volumes, HA pools in the license and currently monitored entities.

3. In the module sections, review the allowed number of module-specific entities. For NPM, review the number of interfaces in the license and the number of monitored interfaces.

License Details

MAIN ORION SERVER DETAILS

Orion

Module Name	Orion Platform
Version	2017.3
Service Pack	None
Nodes currently monitored	9
Total nodes in license	500
Volumes currently monitored	19
Total volumes in license	500
Total HA Pools in use	0
Total HA Pools in License	0

NPM

License	Production
Product Name	Network Performance Monitor
Version	12.2
Service Pack	None
Current number of interfaces	101
Allowed number of interfaces	500

> 💡 If you are close to the limit for your current license tier, consider upgrading the license.
>
> If upgrading the license is not an option, review the monitored entities, and remove less important devices from monitoring.

View monitored entities

1. Click Settings > Manage Nodes.

2. Click New Manage Entities page.
   This page lists all entities monitored with your Orion Platform products.

3. Review the list of entities and make sure you are monitoring the critical devices and resources.

> 💡 To remove a node from monitoring, select the node, and click More > Delete.

What data is polled for monitored entities

Data polled for individual entities is specified by so called "pollers". Default pollers are provided by SolarWinds.

Different Orion Platform products monitor different entities, and provide different data for them. For example, NPM monitors the status of your devices, and other network performance metrics, such as:

- Hardware health
- Topology
- Syslogs
- Traps
- Agent

Product-specific monitoring

- Custom monitors (pollers) - NPM
- NetPath™

Optimize polling engines

1. Optimize the health of your monitoring system.

    a. Find out the number of monitored entities

    b. Distribute the load among polling engines

    c. Adjust how often the entities are polled

2. Adjust the amount of data on a page.

3. Adjust polling for special metrics, such as hardware health and metrics specific for your Orion Platform product.

Optimize the health of your monitoring system

To verify the health of your polling, review the polling completion and rate.

Click Settings > All Settings > Polling Engines, and review the values for polling completion and rate.

LAST DATABASE SYNC	27 seconds ago
POLLING COMPLETION	100
ELEMENTS	129
NETWORK NODE ELEMENTS	9
VOLUME ELEMENTS	19
INTERFACE ELEMENTS	101
POLLING RATE	1% of its maximum rate.»
F5 POLLING RATE	0% of its maximum rate.»
HARDWARE HEALTH POLLING RATE	0% of its maximum rate.»
ROUTING POLLING RATE	0% of its maximum rate.»
TOTAL JOB WEIGHT	37
NUMBER OF HW HEALTH MONITORS	6
NUMBER OF HW HEALTH SENSORS	118

Polling completion is the rate of polls across all polling engines completed without the need to delay polls. This value should be around **100**. If you experience significant declines, verify that your Orion Server meets the memory and CPU requirements.

Polling rate indicates the percentage of maximum polling rate for your server. If the polling rate reaches 85%, you will be notified. Consider adding an additional polling engine or return to default polling intervals if you have increased the default settings.

> 💡 Are you polling hardware health, routing information, VIM, universal device pollers, F5 load balancers? Do you have any other Orion Platform products installed? Review the polling rates for product-specific metrics. If the rate is close to 85%, adjust polling intervals and retention settings for the metric.

How many elements are polled by a polling engine?

1. Click Settings > All Settings > Polling Engines.
2. For each polling engine, review the number of polled elements.

Admin ▶ Details ▶ Polling Engines

Polling Engines

LAST DATABASE UPDATE	1 minutes 5 seconds ago

Polling Engine on DEV-BRN-MMAG-02

ENGINE STATUS	🟢 Polling Engine Active
TYPE OF POLLING ENGINE	Primary
POLLING ENGINE VERSION	SolarWinds Orion Core Services 2017.3
INSTALLER LANGUAGE SELECTION	English
OPERATING SYSTEM REGIONAL SETTING	English
IP ADDRESS	10.140.26.116
LAST DATABASE SYNC	27 seconds ago
POLLING COMPLETION	100
ELEMENTS	129
NETWORK NODE ELEMENTS	9
VOLUME ELEMENTS	19
INTERFACE ELEMENTS	101
POLLING RATE	1% of its maximum rate.» Learn more
F5 POLLING RATE	0% of its maximum rate.» Learn more
HARDWARE HEALTH POLLING RATE	0% of its maximum rate.» Learn more
ROUTING POLLING RATE	0% of its maximum rate.» Learn more
TOTAL JOB WEIGHT	37
NUMBER OF HW HEALTH MONITORS	6
NUMBER OF HW HEALTH SENSORS	118

solarwinds

Distribute the load

- If the number of monitored elements per polling engine is close to 10,000, consider adding another polling engine before you reach the polling limit of 12,000 monitored network elements.

  > ⓘ Unmanaged nodes are also counted as monitored elements.

- If only one polling engine is getting overloaded, redistribute the polling jobs and divide polled nodes among your additional polling engines.
- If the total of monitored elements by your NPM deployment is close to 400,000 elements, deploy the Enterprise Operations Console in a distributed deployment.

Adjust how often metrics are polled

Make sure polling intervals for monitored elements are set to default:

1. Click Settings > All Settings > Polling Settings.

2. Make sure you are using default polling intervals:

   - 10 minutes for nodes
   - 9 minutes for interfaces
   - 15 minutes for volumes

3. Review the polling statistics intervals, and set them to default values.

Orion Polling Settings

POLLING INTERVALS

DEFAULT NODE POLL INTERVAL	120	seconds
DEFAULT INTERFACE POLL INTERVAL	120	seconds
DEFAULT VOLUME POLL INTERVAL	120	seconds
DEFAULT REDISCOVERY INTERVAL	30	minutes
LOCK CUSTOM VALUES	✔	

RE-APPLY POLLING INTERVALS

POLLING STATISTICS INTERVALS

✔ DEFAULT NODE TOPOLOGY POLL INTERVAL	120	minutes
✔ DEFAULT NODE STATISTICS POLL INTERVAL	10	minutes
✔ DEFAULT INTERFACE STATISTICS POLL INTERVAL	9	minutes
✔ DEFAULT VOLUME STATISTICS POLL INTERVAL	15	minutes
✔ INTERFACE DATA OBSOLETE AFTER .... POLLS	3	count

RE-APPLY POLLING STATISTICS INTERVALS

> 💡 To decrease the load on a polling engine:
> - Increase the polling intervals and poll data less frequently than by default.
> - Stop collecting data for some nodes.

Adjust the amount of data displayed on a page

If an Orion Web Console view takes long to load, scan the view for charts and review display settings for the chart.

Adjust settings for individual metrics and polling methods

Make sure your deployment meets the monitoring limits.

Agents

An agent is a software that provides a communication channel between the Orion server and a Windows or Linux /Unix computer. Deploy agents to collect data from Windows or Linux computers by deploying agents.

When you use agents as the polling method, be aware that a single polling engine can support up to 1,000 agents.

Where to check

1. Click Settings > All Settings > Manage Agents.
2. Review the Manage Agents table.

To optimize

- Reduce the number of agents per polling engine to below 1,000.
- Distribute agents among polling engines:
    a. Click Settings > Manage Nodes.
    b. Select the agent node and click More actions > Change polling engine.
    c. Select another polling engine.

    > ⓘ If you don't have additional polling engines deployed, the Change polling engine item is not available.

- Add additional polling engines.

Hardware health

Check the health of hardware health polling, and increase the poll interval for hardware health details if necessary:

1. Click Settings > All Settings > Polling Engines, and review the hardware health polling rate. If it is higher than 85%, review and adjust the poll interval.

2. Click Settings > All Settings > Polling Settings, and review the Hardware health polling settings.

3. Makes sure the Default statistics poll interval set to 10 or more minutes.

HARDWARE HEALTH POLLING		
DEFAULT STATISTICS POLL INTERVAL	10	minutes
DETAILED STATISTICS RETENTION	7	days
HOURLY STATISTICS RETENTION	30	days
DAILY STATISTICS RETENTION	365	days
PREFERRED CISCO MIB	CISCO-ENTITY-SENSOR-MIB ▼	

Topology data

Topology is an intensive polling job. Topology data does not change often on devices, so you don't need to poll this information very often.

> ⓘ Changing the topology settings affects how often your maps are updated.

By default, Orion Platform polls topology data even if you are not using topology widgets. Make sure you are using the default polling settings:

- Default polling is 120 minutes (Orion Platform 2017.3 or later)
- Default polling is 30 minutes (Orion Platform 2017.1 or earlier)

Optimize topology polling

1. Click Settings > All Settings > Polling Engines.

2. Edit the Default node topology poll interval to a few times a day. This setting determines how often the topology data is polled.

3. Go to Advanced Configuration options. Paste the following into your browser search field, right after the hostname or IP address:
   `/Orion/Admin/AdvancedConfiguration/Global.aspx`

4. Set the frequency for topology calculation to 20 hours:
   On the Global tab, search for Topology, and enter 20:00:00 as the
   `TopologyCalculationFrequency`. This setting determines how often Orion Platform takes the
   polled data, performs calculations and places results in the Topology connections. Default node
   topology and topology calculation frequency should match.

Topology	
AutoDependencyDeleteDelayFactor	3
AutoDependencyEnableCacheTopologyConnections	☑
AutoDependencyRootCalculationFactor	1
AutoDependencyTopologyConnectionsCacheRenewalInMinutes	30
TopologyCalculationDelay	00:02:00
TopologyCalculationFrequency	20:00:00
TopologyEnabled	☑

SAVE   CLOSE   RESET ALL TO THE DEFAULT

5. Save your settings and click Restart All to restart the SolarWinds Orion Module Service.

Syslogs

Orion Platform products can handle approximately 2-4 million syslog messages per hour, which is 555 - 1111 messages/second.

If you have additional polling engines, you can share the load between syslog services on each polling engine.

Most syslog messages are non-critical, consider using transparent forwarding and sending all syslogs to a load-balancing system with rules to drop the non-critical messages, and send only the critical syslogs to your Orion server.

Find devices sending syslogs

1. Click Reports > All reports.
2. Search for the report called Devices sending Syslog or SNMP-Traps to Orion.

3. Run the report. It lists all devices sending syslogs and traps to Orion, including their hostname and IP address.

Reduce how long syslog messages are kept in the database

To save space in the database, reduce the number of days syslog and trap data are retained in the database.

1. Click Settings > All Settings > Polling Settings.

2. Scroll down to Syslog messages retention and decrease the number of days to retain syslogs in the database.
   Default: 7 days

   > (i) Resetting the default retention from a high value, such as from 90 days to 7, causes overhead on the Database Maintenance because it will summarize 83 days of data instead of the one day it normally performs. Consider backing up the database, and truncating the Syslog table.

3. Run the Database Maintenance to immediately apply your settings.

Create an SQL Syslog Top Talker report

Use the following SQL query to see 24 hours of data by host, MessageType, and count. You can use this SQL to create an SQL report.

1. Click Reports > All Reports > Manage Reports, and click Create New Report.

2. On Add Content, select Custom Table in Resource.

3. Select Advanced Database Query (SQL, SWQL) as the Selection Method, and SQL as the query type.

4. In the query field, paste the following code, and complete the new report:

```
select nodeid, hostname, SysLogFacility, SysLogSeverity, COUNT(Msgid) as total from Syslog
where DateTime>DATEADD(day, -1, GETDATE() )
group by nodeid, hostname, SysLogFacility,SysLogSeverity
```

order by total, hostname, SysLogFacility,SysLogSeverity desc

Add Content

▷ 1. Resource: **Custom Table** (Reporting)

◢ 2. Select objects you are going to report on...

Selection method:

Advanced Database Query (SQL, SWQL) ▼

Query Type:
○ SWQL   ⦿ SQL

select nodeid, hostname, SysLogFacility, SysLogSeverity, COUNT(Msgid) as total from Syslog
where DateTime>DATEADD(day, -1, GETDATE())
group by nodeid, hostname, SysLogFacility,SysLogSeverity
order by total, hostname, SysLogFacility,SysLogSeverity desc

PREVIEW RESULTS

nodeid	hostname	SysLogFacility	SysLogSeverity	total

Delete all syslogs

Truncating the Syslog table does not put much strain on the SQL server when executing the statement. If you truncate tables, Database Maintenance runs much faster because it does not need to summarize the deleted unnecessary data.

> ⚠ This query deletes all syslog messages in your database. Always back up the database before you start truncating.

1. Back up your SolarWinds Orion database.

2. Run the following query:

```
Truncate Table Syslog
```

> 💡 Consider discarding Syslog rules if you are not using them.

SNMP Traps

Orion Platform products can handle approximately 1-2 million SNMP trap messages per hour, which is 280 -555 traps per second.

Most trap messages are non-critical, consider using transparent forwarding and sending all traps to a load-balancing system with rules to drop the non-critical messages, and send only the critical traps to your Orion server.

Find devices sending SNMP traps

1. Click Reports > All reports.

2. Search for Devices sending syslog or SNMP traps to Orion report.

3. Run the report. It lists all devices sending syslogs and traps to Orion, including their hostname and IP address.

Find out which device is sending the most traps

Run the following query to see 24 hours of traps data by host, traptype, and count.

```
select hostname, Traptype, COUNT(trapid) as total from Traps

where DateTime>DATEADD(day, -1, GETDATE() )

group by hostname, traptype

order by total desc, hostname, traptype
```

ⓘ You can use this query to create a report. Follow the steps in Create a report for syslogs, and replace the syslog query with the traps query.

Disable traps

If you are not using SNMP traps, disable them.

- Disable traps on the Orion Platform products
    1. Open Services, right-click the SolarWinds Trap Service, and stop it.
    2. Right-click the service, select Properties, and select the Startup type Disabled.
- Disable traps on devices

Reduce time to keep traps in the database

To save space in the database, reduce the number of days syslog and trap data are retained in the database.

1. Click Settings > All Settings > Polling Settings.

2. Scroll down to trap messages retention and decrease the number of days to retain traps in the database.
   Default: 7 days

Set up Alert/Filter rules to discard traps

1. On your Orion server, start the Trap Viewer in the SolarWinds Orion > Syslog and SNMP Traps program folder.

2. Add a rule specifying what traps to discard.
   To discard traps from a device, right-click a trap in the Current Traps view, and click Add Rule.

   a. On the General tab, enter * into the Source IP Addresses section.

   b. On the DNS Hostname tab, enter * into the DNS Hostname Pattern field.

   c. On the Alert Actions tab, click Add Action and add Discard Traps and Stop processing traps.

   d. Complete the Add New Trap Rule Wizard.

Specified traps are discarded.

Delete all traps

Truncating the tables with traps data (Traps, TrapVarbinds) does not put much strain on the SQL server when executing the statement.

> ⚠ This query deletes all SNMP trap messages in your database. Always back up the database before you start truncating.

1. Back up your SolarWinds Orion database.

2. Run the following queries:

```
Truncate Table Traps
Truncate Table TrapVarbinds
```

All trap messages are deleted from the database.

Module-specific statistics

In addition, individual Orion Platform products provide additional monitoring options, such as:

- Custom SNMP-based monitors: In NPM, Universal device pollers can collect statistics based on OIDs.
- NetPath™

Universal Device Pollers

With NPM, you can create custom monitors, so-called Universal Device Pollers (UnDP) that return values for specific metrics.

NPM supports up to 10,000 UnDPs per polling engine.

Where to check

1. Click Settings > All Settings > Database Details.

2. Scroll down, click Total elements per poller, and review the number of custom node and custom interface pollers for each polling engine.

To optimize:

When you reach the supported number of UnDPs per polling engine, consider the following recommendations:

- Add additional polling engines.
- Increase polling intervals. UnDPs use the default Node polling intervals:
    a. Click Settings > All Settings > Polling Settings.
    b. Adjust the statistics retention to the default settings or shorter.

DETAILED UNDP STATISTICS RETENTION	3	days
HOURLY UNDP STATISTICS RETENTION	14	days
DAILY UNDP STATISTICS RETENTION	180	days

NetPath™

You can add up to 100 paths per polling engine.

You can add 10-20 paths per probe.

Where to check

1. Click Settings > All Settings > Database Details.

2. Scroll down, click Total elements per poller, and review the number of probes for polling engines.

To optimize:

- Verify that your deployment meets NetPath requirements.
- Distribute NetPath probes among polling engines.
- Add additional polling engines.

Optimize your database

Optimize your deployment by changing how often the data is polled, the time after which the detailed data is aggregated and summarized, and how long you need to keep historical data in the database.

- Find out what tables take up most space in the database
- Set polling settings to defaults
- Set retention settings to defaults
- Optimize log files

> **Database optimization tips**
>
> - Retain the default polling and retention settings.
> - Use the SIMPLE recovery model of your SQL database.
> - Store the data files and log files on different drives.
> - Do not allocate 100% of memory to MS SQL Server services. Allocating 75% should leave enough breathing room for the operating system.

Check what tables are taking up most space in your Orion SQL database

Changing the default polling and retention settings can result in your database filling up fast.

1. Click Settings > All Settings > Database Details.
2. Scroll down, and click Database Statistics.
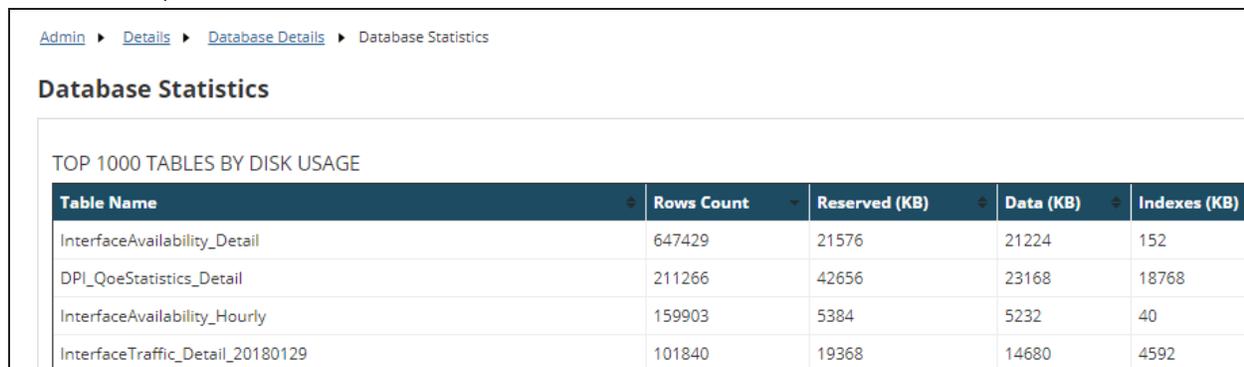
Admin ▸ Details ▸ Database Details ▸ Database Statistics

Database Statistics

TOP 1000 TABLES BY DISK USAGE

Table Name	Rows Count	Reserved (KB)	Data (KB)	Indexes (KB)
InterfaceAvailability_Detail	647429	21576	21224	152
DPI_QoeStatistics_Detail	211266	42656	23168	18768
InterfaceAvailability_Hourly	159903	5384	5232	40
InterfaceTraffic_Detail_20180129	101840	19368	14680	4592

3. Review the most space-demanding tables, and check the polling and retention settings.
4. Compare the number of reserved kb and the actual data in the database. Check polling and retention settings for tables where the actual data is getting close to the reserved limit.

> If the largest tables are for Syslogs or SNMP traps, consider optimizing them.

Set polling settings back to default

1. Click Settings > All Settings > Polling Settings, and make sure the polling intervals and intervals for polling statistics are set to default values.

2. Set polling settings for specific metrics back to default:
   - Statistics poll interval for hardware health polling - 10 minutes
   - Multicast route table poll interval - 10 minutes
   - Routing neighbor poll interval - 5 minutes
   - Routing table poll interval - 180 minutes
   - VRF update poll interval - 180 minutes
   - Wireless heat maps: default client signal strength poll interval - 5 minutes

Set retention settings back to default

Retention settings specify how long the data is kept in the database. By customizing retention settings, you can specify how long to keep data for some metrics, such as interface availability, wireless statistics, in the database.

> 💡 The less data you keep, the better performance your database can have. SolarWinds recommends that you keep the default settings.

Retention settings are further divided into detailed, hourly, and daily.

- **Detailed retention** specifies how long the detailed statistics are in the database. After this time, Orion Platform summarizes the detailed statistics for the metric into one record for each hour.
- **Hourly retention** specifies how long hourly statistics are kept in the database. After this time, the statistics are further summarize into daily statistics.
- **Daily retention** are deleted after the time you specify as Daily retention for statistics.

To reset defaults for retention settings:

1. Click Settings > All Settings > Polling Settings.
2. Review and adjust the retention settings for keeping specific data in the database:

METRIC	DEFAULT DETAILED RETENTION	DEFAULT HOURLY RETENTION	DEFAULT DAILY RETENTION
Node statistics	7 days	30 days	365 days
Container stats	7 days	30 days	365 days
Hardware health	7 days	30 days	365 days
Interface availability	7 days	30 days	365 days
Wireless	3 days	14 days	180 days
UnDP	3 days	14 days	180 days
Events	30 days		
Syslogs and Traps	7 days		

Optimize log files

Log files are an important diagnostic tool. If you increase the logging levels to DEBUG, you might experience disk space issues.

> ℹ️ Before you clean up log files, contact other teams in your organization that use Orion Platform products and get their approval.

Clean up orphaned log files

Delete the log files you do not need, such as files with .log or .log.1-5 suffix.

ⓘ If your Orion Platform is not installed in the default location, adjust the path to correspond with your deployment.

1. Open the command line as an administrator.

2. Run the following commands:

```
del /f /q /s C:\programdata\solarwinds\*.log
del /f /q /s C:\programdata\solarwinds\*.log.*
```

Reset logging to default

1. Launch the Orion Log Adjuster in the SolarWinds Orion > Documentation and Support program folder.

2. Click Reset to defaults, and click Apply.
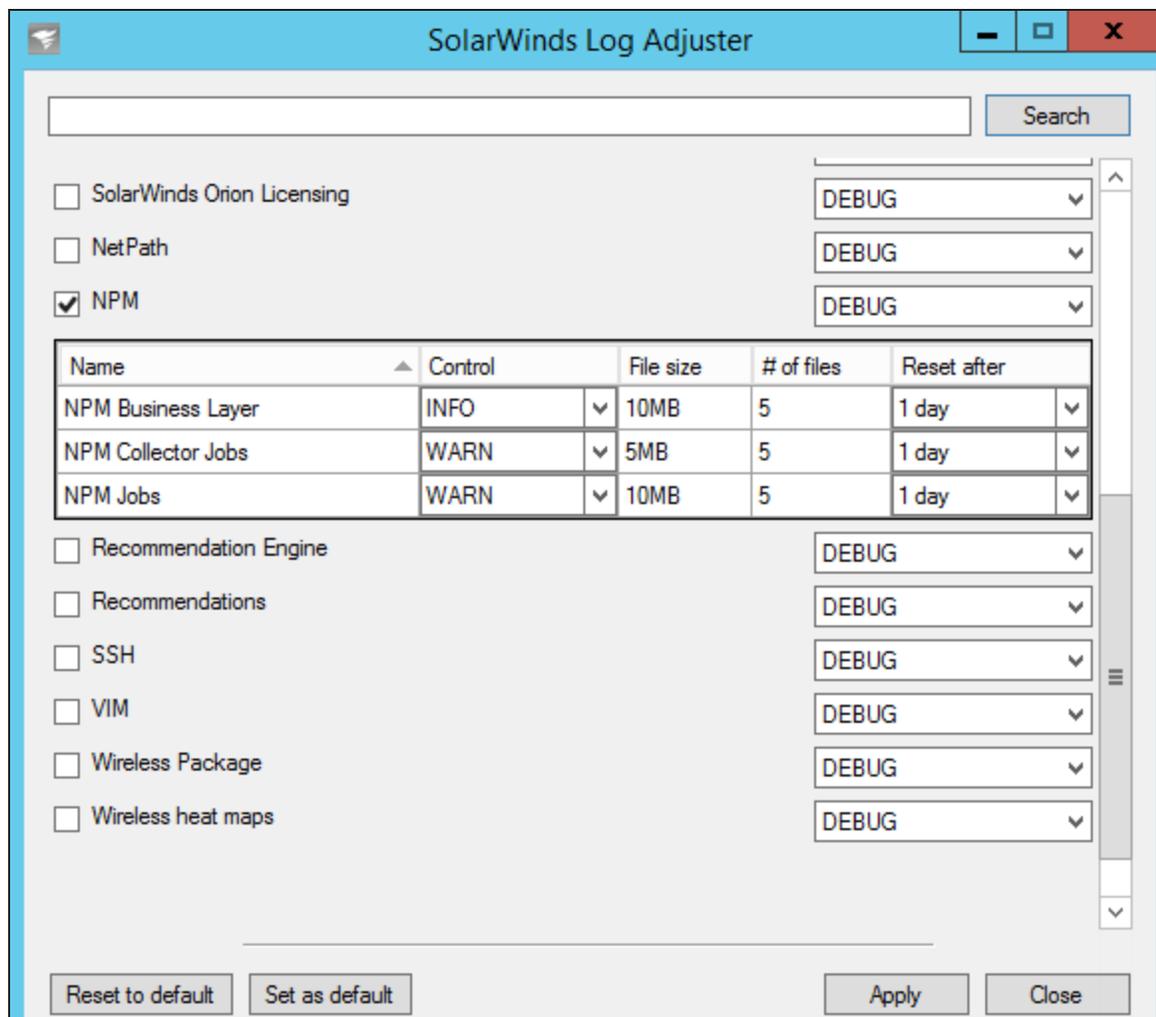
For more information, see the article on [Low disk space due to large diagnostics](#).

Optimize the performance of the Orion Web Console

Your Orion Web Console may be slow because of many reasons. The following steps help you troubleshoot and optimize the Orion Web Console performance:

- Find out how many users are logged in at the same time.
- Find out the load on the server.
- If only one Orion Web Console page is slow, skim it for charts and check how much data they display.

> ⓘ The performance might also be affected by the database maintenance, or polling issues.
>
> The Orion Web Console runs on IIS. Consider testing the standard IIS fine-tuning techniques to optimize the Orion Web Console performance.

Find the number of users logged in at the same time

NPM 12.0 and later supports up to 25-50 concurrent users.

Run the following query to find out how many users are logged concurrently:

```
SELECT accountid, accountenabled, lastlogin

From [dbo].[Accounts]

order by lastlogin desc
```

If the number of users logged in simultaneously is close to 50, add an additional web server.

Find out more about the current performance of the Orion Web Console

By default, the Orion Web Console is installed on the main polling engine server. Review the performance of the server. If the polling engine is already overloaded, consider installing an additional web server.

Review the performance of the Internet Information Services (IIS) worker process (w3wp.exe) in your Task Manager.

The memory usage of the `w3wp.exe` on a healthy Orion Web Console is 100 - 650 MB. If the usage is higher, IIS and the Orion Web Console are under pressure. Distribute the load by adding an additional web server.
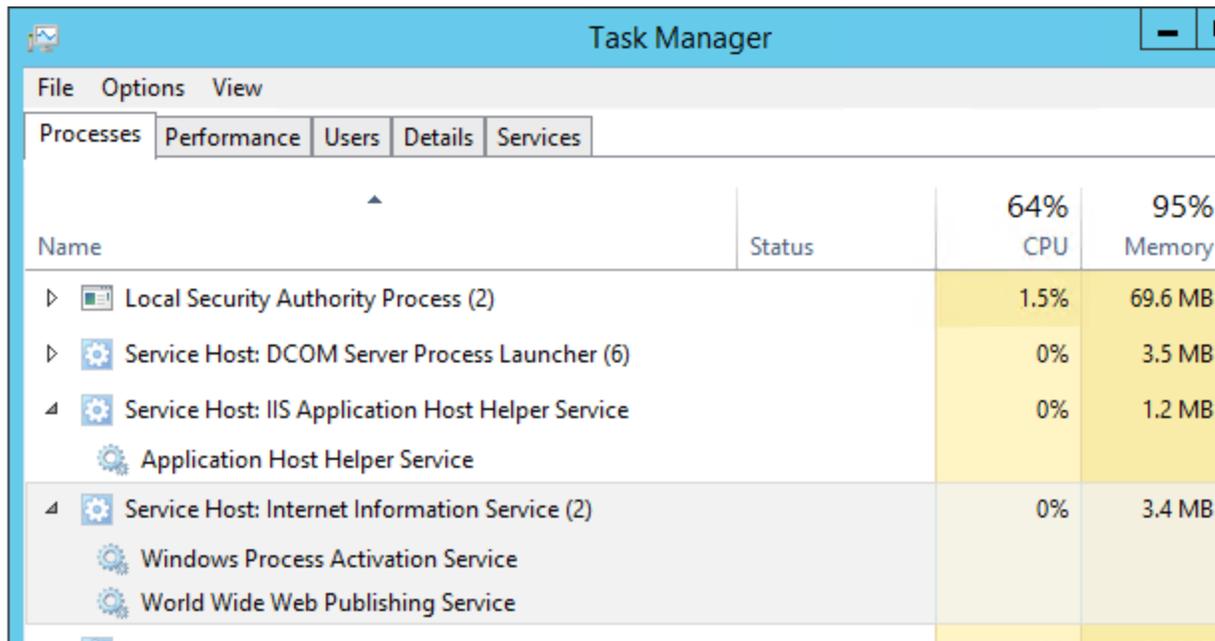
Task Manager				
File Options View				
Processes	Performance	Users	Details	Services
			64% CPU	95% Memory
Name		Status		
▷ 🔲 Local Security Authority Process (2)			1.5%	69.6 MB
▷ ⚙ Service Host: DCOM Server Process Launcher (6)			0%	3.5 MB
◢ ⚙ Service Host: IIS Application Host Helper Service			0%	1.2 MB
⚙ Application Host Helper Service				
◢ ⚙ Service Host: Internet Information Service (2)			0%	3.4 MB
⚙ Windows Process Activation Service				
⚙ World Wide Web Publishing Service				

An Orion Web Console page is slow

By default, Orion Web Console charts are set to display one day of data, with a sample each 30 minutes. Customizing charts to display huge amounts of data (such as display the data for the past year, with data for each 6 hours as a sample) can slow down the display of the Orion Web Console considerably.

> 💡 Your customization is automatically saved and it is applied for all users. Make sure you revert chart settings back to default when you've seen the data.

1. Find out which view is slow, and skim it for charts.

   > ℹ If you have SolarWinds SAM installed and have the AppStack widget on the view, consider moving the AppStack widget to a separate view.

2. Review the chart settings to see what data it shows. Showing data for a past year with a sample every 6 hours means loading huge chunks of data, thus causing performance issues.

3. Revert the chart settings to defaults.

Don't forget about the system maintenance

To maintain a healthy system, run the database maintenance regularly.

Database maintenance is an automatic process that optimizes the size of your SolarWinds Orion database. Database maintenance aggregates the data collected for a certain period and calculates new statistical values, based on the aggregated data. The detailed data is discarded, and only the aggregated statistics stay in the database.

Database maintenance runs every day at a specified time, by default at 2.15 am, and it should not take longer than two hours. Depending on the data granularity and retention period, you may need to configure your database differently.

> The more granularity and the longer the retention period, the larger the database.

Specify when the maintenance runs

Make sure database maintenance runs after business hours.

1. Log in to the Orion Web Console using an administrator account.
2. Click Settings > All Settings.
3. Click Polling Settings in the Thresholds & Polling grouping.
4. Scroll down to Database Settings, and enter an Archive Time.

DATABASE SETTINGS

ARCHIVE TIME   2:15 AM

5. Click Submit.

Database maintenance runs every day at the specified time.

Run Database Maintenance manually

When in doubt, run the maintenance manually.

1. Start Database Maintenance in the SolarWinds Orion > Advanced Features program folder.
2. Click Start.

Database maintenance runs immediately.

Find out how long the Database Maintenance takes

Database maintenance is a process that might affect the performance of your Orion Platform deployment.

By default, your database maintenance starts at 2.15 am. For a healthy SQL server, it should run for 5 - 30 minutes.

If the database maintenance runs longer than two hours, investigate the tables with long maintenance times.

> ⚠️ The database maintenance running longer than six hours or not completing at all indicates major issues in your deployment and results in performance issues.

1. Open the `swdebugMaintenance.log` at `C:\ProgramData\Solarwinds\Logs\Orion\swdebugMaintenance.log`.

2. Review the timestamp at the top to find out when the maintenance started.

3. Scroll down and review the timestamp when the maintenance finished, and calculate how long the maintenance took.

4. If the maintenance took more than two hours, skim the timestamps to investigate for which table the maintenance took long to complete.

5. When you have identified the table with issues, consider troubleshooting the elements that store data in the table.

Collect diagnostics from the Orion Web Console

Starting with Orion Platform 2018.4, you can collect diagnostics for your polling engines remotely from the Orion Web Console. You can then review the diagnostics or share them with SolarWinds support.

1. Log in to the Orion Web Console.

2. Click Settings > My Orion Deployment, and then click the Diagnostics tab.

3. Select the server(s) to collect diagnostics from.

4. Click Collect Diagnostics. The Collect Diagnostics wizard opens.

5. Specify what diagnostics to collect and click Next.

   - To collect all diagnostics, select All.
   - To collect specific diagnostics, select Custom, and then select the data to be collected (either a diagnostics category or only specific items).

6. Review the path for saving the diagnostics archive on the server, and click the Collect button. The Orion Platform starts collecting the diagnostics. The progress is displayed by a progress bar.

7. When finished, click the diagnostics link to download the archive.

ⓘ To download multiple archives, select the polling engines and click the Download All button above the list of polling engines.

Troubleshoot collecting diagnostics

Review the message and troubleshoot the issue.

General troubleshooting steps

1. Make sure the SWA service is up and running on all remote servers.

2. On each polling engine server, start the Orion Service Manager, and review the status of the SWA service. If it isn't up and running, restart it.

3. Review SWA logs for Diagnostics.exe on the remote server.

4. If the message informs you about insufficient disk space, free up some disk space on the server hosting your Orion Web Console, or open Diagnostics on the Web on an additional web server with more free space.

ⓘ If the issues persist, log in to the server hosting the polling engine and start Orion Diagnostics via SolarWinds Orion > Orion Diagnostics the Windows Start menu.

An error occurred while starting diagnostics

1. Open the Registry Editor, and navigate to `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\SolarWinds\Orion\SWA\Diagnostics` registry.

2. Make sure that the "Save Folder" key exists and that path in it is correct.

Downloading diagnostics failed

1. Open the Registry Editor and navigate to `HKEY_LOCAL_ MACHINE\SOFTWARE\Wow6432Node\SolarWinds\Orion\SWA\Diagnostics` registry.

2. Right-click the Diagnostics folder and click Permissions. Make sure that your account has Full Control.

3. Check the access to the folder specified in the registry:

   a. Open the SaveFolder key and copy the path to the folder.

   b. Open the folder and verify that the user logged in to the Orion Web Console has write permissions for the folder.

Optimization checklist

The number of things to check is rather long, and so the items are divided into the following sections:

- Requirements
- Polling performance
- Database performance
- Orion Web Console performance

Check requirements

WHAT TO CHECK?

☐ **Does your Orion Platform server meet the hardware and software requirements?**

Check the hardware of your Orion Platform server. To verify the Orion Server software, you can also click Settings > All Settings > Orion Platform Details in the Orion Web Console.

If you are running multiple Orion Platform products, make sure your environment meets the requirements for your environment size.

» Learn more

☐ **Does your SolarWinds Orion database server meet the hardware and software requirements?**

For the Orion SQL Database details, click Settings > All Settings > Database Details.

» Learn more

☐ **Do the deployed Orion Platform products require an additional database?**

If deployed Orion Platform products require an additional database, for example NTA, make sure the server hosting the database meets software and hardware requirements.

» Learn more

☐ **Do you have scalability engines**, such as additional polling engines and additional web servers deployed?

Make sure your environment meets the requirements for your environment size.

» Learn more

☐ **Do you run multiple Orion Platform products?**

If you are running multiple Orion Platform products, make sure your environment meets the requirements for your environment size.

»Learn more

WHAT TO CHECK?

☐ **Make sure you haven't overlooked any requirements**, including:

- You are not using SQL Express as your database.
- You are not running SQL 2008 or earlier as your database.
- Latency between your additional polling engines and the database is less than 300 ms.
- You have excluded all necessary directories from antivirus scanning.
- You have opened all ports required by your Orion Platform products, additional polling engines, and additional web servers are open.

Optimize the performance of polling engines

WHAT TO CHECK?

☐ **Are your polling engines healthy?**

Click Settings > All Settings > Polling Engines, and review the values for polling completion and rate.

Polling completion should be 100% and polling rate should not exceed 85%.

If the general polling rate exceeds 85%, change polling intervals or distribute the polled nodes between your polling engines.

» Learn more

☐ **How many elements do you poll per polling engine?**

Each polling engine can monitor up to 12,000 elements. If you reach 10,000 elements per polling limit, consider the following measures:

- Distribute the load among your polling engines: Change the polling engine used for polling your nodes.
- Add an additional polling engine. For some Orion Platform products, you can also stack licenses.
- Stop collecting data for nodes or interfaces that are not vital for your environment.

To troubleshoot:

1. Find out how many polling engines you have deployed.

   a. Click Settings > All Settings > Polling Engines.

   b. Check the polling rate and polling completion for each polling engine.
   If the polling engine is getting overloaded, adjust polling settings.

2. Check the number of elements in your license.

   a. Click Settings > All Settings > License Details.

   b. See how many elements you are monitoring and how many you still have in your license.
   If you're getting close to the license limit, upgrade the license.

» Learn more

WHAT TO CHECK?

☐ **Have you changed the default polling settings?**

Click Settings > All Settings > Polling Settings and make sure you are using the default polling intervals:

- 10 minutes for nodes
- 9 minutes for interfaces
- 15 minutes for volumes

You can also decrease the polling intervals to poll data less frequently or stop collecting data for some nodes.

» Learn more

☐ **Do you use agents as the polling method?**

Check the agents: Click Settings > All Settings > Manage Agents.

You can have up to 1,000 agents per polling engine. If you have over 1,000 agents per polling engine:

- Reduce the number of agents.
- Distribute agents between polling engines.

» Learn more

☐ **Are you polling hardware health?**

Verify the polling rate: Click Settings > Polling Settings > Polling Engines.

Ensure the hardware health polling rate is below 85% to ensure optimal performance of your system. If the polling rate is close to 85%, reduce the Default statistics polling interval for Hardware Health Polling to 10 minutes (default) or less.

» Learn more

☐ **Are you using Orion Maps?**

Maps require collecting topology data. Topology data does not change very often.

1. Set the interval for polling topology data to the default value. In Orion Platform 2017.3 and later, this is 120 minutes.
   Click Settings > All Settings > Polling Engines, and set Default node topology poll interval to 120.

2. Decrease the frequency for calculating topology.

   a. In your web browser address line, paste
      `/Orion/Admin/AdvancedConfiguration/Global.aspx` after the hostname or IP address of your Orion Platform server.

      On the Global tab, type 20:00:00 as the `TopologyCalculationFrequency`. Topology data is now calculated every 20 hours.

» Learn more

WHAT TO CHECK?

☐ **Are you using Syslogs?**

Orion Platform products can handle approximately 2-4 million syslog messages per hour, which is 555 - 1111 messages/second.

> ⓘ To monitor up to 1000 events/second, you can use [Log Manager for Orion](#).

- Be aware of the devices that send syslog messages:

  Click Reports > All Reports > Devices sending Syslog or SNMP Traps to Orion, and run the report.

- Reduce how long syslogs are kept in the database:

  a. Click Settings > All Settings > Polling Settings.

  b. Set Syslog messages retention to 7 days or less.

  c. Run the Database maintenance. In case of big changes (such as from 90 to 7 days), Database Maintenance might affect the performance of your server.

- Delete all syslogs:

  a. Back up your database.

  b. Run the following SQL query: `Truncate Table Syslog`

- If you are not using Syslog rules, consider discarding them.

» [Learn more](#)

WHAT TO CHECK?

☐ **Are you using SNMP Traps?**

Orion Platform products can handle approximately 1-2 million SNMP trap messages per hour, which is approximately 280-555 messages per second.

- Be aware of the devices sending trap messages:

  Click Reports > All Reports > Devices sending Syslog or SNMP Traps to Orion, and run the report.

- Find out which device is sending the most traps:

  a. Open the Database Manager, and run the following query to see 24 hours of traps data by host, traptype, and count.

  > select hostname, Traptype, COUNT(trapid) as total from Traps
  >
  > where DateTime>DATEADD(day, -1, GETDATE())
  >
  > group by hostname, traptype
  >
  > order by total desc, hostname, traptype

- Disable traps

  If you are not using SNMP traps, disable them on devices or in Orion Platform products.

  Disable traps in Orion Platform products:

  a. Open Services, right-click the SolarWinds Trap Service, and stop it.
  b. Right-click the service, select Properties, and select the Startup type Disabled.

- Reduce how long traps are kept in the database :
  a. Click Settings > All Settings > Polling Settings.
  b. Set Trap messages retention to 7 days or less.

- Set up Alert/Filter rules to discard traps:
  a. Open the Trap Viewer and add a rule specifying traps to be discarded.

- Delete all SNMP traps:
  a. Back up your database.
  b. Run the following SQL queries:

  ```
  Truncate Table Traps
  Truncate Table TrapVarbinds
  ```

  » Learn more

WHAT TO CHECK?

☐ **Are you using Universal Device Pollers (NPM)?**

NPM supports up to 10,000 UnDPs per polling engine.

1. Check the number of UnDPs per polling engine: Click Settings > All Settings > Database Details.

2. Click the Total elements per poller, and review custom node and interface pollers per polling engine.

3. If there are more than 10,000 UnDPs per polling engine, scale your environment, or increase polling intervals to keep data for a shorter time.

   a. Click Settings > All Settings > Polling Settings, and make sure UnDP statistic retention settings are default or less (3 days for detailed, 14 days for hourly, and 180 days for daily statistics)

» Learn more

☐ **Are you using NetPath™?**

You can add up to 100 paths per polling engine.

You can add 10-20 paths per probe.

1. Check the number of probes per polling engine: Click Settings > All Settings > Database Details.

2. Click the Total elements per poller, and review probes per polling engine.

To optimize:

- Verify that your deployment meets NetPath requirements.
- Distribute NetPath probes among polling engines.
- Add additional polling engines.

» Learn more

Optimize the database performance

💡 **Database optimization tips**

- Retain the default polling and retention settings. Default settings are suggested so that new data are polled often enough and are kept long enough in the database to draw conclusions on issues in your network.
- When configuring your SQL database, use the SIMPLE recovery model.
- Store the data files and log files on different drives.
- Do not allocate 100% of memory to MS SQL Server services. Allocating 75% should leave enough breathing room for the operating system.

WHAT TO CHECK?

☐ **Do you have enough space in the database?**

Check the database size and the requirements!

» Learn more

☐ **What tables take most space in your database?**

The largest tables are using the most resources and could be slowing your performance. Retaining data longer than necessary could slow down the database performance, the responsiveness of your Orion Platform products, and reports.

1. Click Settings > All Settings > Database Details, and scroll down to Database Statistics.
2. Check the polling and retention settings for the largest tables, make sure you are using default values.

If the largest tables are syslogs or traps, consider optimizing them.

» Learn more

☐ **Do you use default polling settings for all metrics?**

Click Settings > All Settings > Polling Settings, and make sure the polling intervals and intervals for polling statistics are set to default values.

METRIC	DEFAULT DETAILED RETENTION	DEFAULT HOURLY RETENTION	DEFAULT DAILY RETENTION
Node statistics	7 days	30 days	365 days
Container stats	7 days	30 days	365 days
Hardware health	7 days	30 days	365 days
Interface availability	7 days	30 days	365 days
Wireless	3 days	14 days	180 days
UnDP	3 days	14 days	180 days
Events	30 days		
Syslogs and Traps	7 days		

» Learn more

WHAT TO CHECK?

☐ **Is your database maintenance healthy?**

1. Make sure that the database runs outside of office hours.

    a. Click Settings > All Settings > Polling Settings.

    b. Set the Archive Time in the Database Settings section to be outside of your office hours.

2. Find out how long the maintenance takes and troubleshoot tables that take long to maintain.

    > ⓘ The maintenance of a healthy database should take 5-30 minutes.

    a. Open the `swdebugMaintenance.log` at `C:\ProgramData\Solarwinds\Logs\Orion\swdebugMaintenance.log`.

    b. Compare the start and end time stamp, and search for tables where the maintenance gets stuck or takes a long time.

    » [Learn more](#)

☐ **Aren't log files taking up too much space in your database?**

> ⓘ Before you clean up log files, contact other teams in your organization that use Orion Platform products and get their approval.

1. Clean up the orphaned log files:
    Run the following commands:

    ```
    del /f /q /s C:\programdata\solarwinds\*.log

    del /f /q /s C:\programdata\solarwinds\*.log.*
    ```

2. Reset logging to default levels:
    Run the Orion Log Adjuster, click Reset to defaults, and click Apply.

    » [Learn more](#)

Optimize the performance of your Orion Web Console

WHAT TO CHECK?

☐ **How many users are logged in the Orion Web Console at the same time?**

If the number of users logged in simultaneously is close to 50, add an additional web server.

Run the following query in the Database Manager:

```
SELECT accountid, accountenabled, lastlogin

From [dbo].[Accounts]

order by lastlogin desc
```

» Learn more

☐ **What is the current performance of your Orion Web Console?**

If the memory usage of yourOrion Web Console is close to or more than 650 MB, add an additional polling web server to distribute the load.

» Learn more

☐ **Is it just one Orion Web Console page that is slow?**

1. Find out which page is slow.
2. Are there any charts with changed display settings on the page?
   a. Click Edit on the widget, and revert to the defaults.
3. Do you have the AppStack widget on the page?
   a. Remove the AppStack widget from the view.
   b. Add AppStack to a new view.
   c. Add the AppStack view to My Dashboards.

» Learn more

☐ **Are you using custom queries in alerts and reports?**

Be aware that each custom query represents an interaction with the database and should be as efficient as possible. If you use customized queries, consult your database administrator to find out possible impact on your system.

Multi-module system guidelines

If you are installing more than one SolarWinds Orion Platform product, use these **recommended guidelines** for hardware and software deployment. The information here should be considered guidelines only. You can choose to use more or less hardware, but your performance may vary depending on your deployment scenario.

In Amazon Web Services (AWS), the Elastic Block Storage (EBS) volumes are not your dedicated hardware devices. For SQL and NTA Flow Storage Database or Log Manager database, SolarWinds recommends using dedicated instance EBS volumes for medium and large deployments. For large deployments, SolarWinds recommends EBS with provisioned IOPS for high performance for intensive database workloads.

If you have only one SolarWinds Orion module, see the system requirements listed in the installation guide for that module.

> ⚠️ **End-of-support notices**
>
> Orion Platform 2018.4 products are no longer compatible with the following operating system and database versions:
>
> - Windows Server 2012 and 2012 R2
> - SQL Server 2012, 2012 SP1, 2012 SP2, 2012 SP3, and 2012 SP4
>
> To use the new features introduced in Orion Platform 2018.4, upgrade your environment at your earliest convenience.

How do I calculate hardware requirements for my Orion server?

Your first Orion Platform product must meet the minimum system requirements in the appropriate Administrator Guide. Typically, you need a single quad-core processor and 8 GB of RAM. For each additional module on the same system, add one CPU core and 2 GB of RAM.

MODULES	CPU	RAM
1	Required: 4 cores Recommended: 8 cores	Required: 8 GB Recommended: 16 GB
2	Required: 5 cores Recommended: 10 cores	Required: 10 GB Recommended: 18 GB
3	Required: 6 cores Recommended: 12 cores	Required: 12 GB Recommended: 20 GB
4	Required: 7 cores Recommended: 14 cores	Required: 14 GB Recommended: 22 GB
5	Required: 8 cores Recommended: 16 cores	Required: 16 GB Recommended: 24 GB
6	Required: 9 cores Recommended: 18 cores	Required: 18 GB Recommended: 26 GB
7	Required: 10 cores Recommended: 20 cores	Required: 20 GB Recommended: 28 GB

MODULES	CPU	RAM
8	Required: 11 cores Recommended: 22 cores	Required: 22 GB Recommended: 30 GB
9	Required: 12 cores Recommended: 24 cores	Required: 24 GB Recommended: 32 GB
10	Required: 13 cores Recommended: 26 cores	Required: 26 GB Recommended: 34 GB

Small deployment guidelines

Modules	Choose up to 3 modules: • IPAM IP1000 - IP4000 • NCM DL50 - DL200 • NPM SL100 - SL500 (including up to 10 remote agents for DPI) • SAM AL150 - AL300 • UDT UT2500 - 5000 • VMAN VMS8 - VMS64 　If you use VMAN Recommendations, increase the total memory on the server by 4 GB. • VNQM IPSLA 5 - IPSLA 25 (up to 5,000 operations) • WPM 5 - WPM 20 ⓘ You can install Log Manager for Orion, NTA, or SCM as part of a small deployment, but it is not included in this configuration. Use the Medium Deployment guidelines for these Orion Platform products.
Orion server	Physical server or virtual machine • CPU: 4 cores + 1 core for each additional module • RAM: 8 GB + 2 GB for each additional module 💡 How do I calculate hardware requirements? • Storage: 150 GB, 15,000 RPM • 1 x 1 Gb dedicated NIC • Windows Server 2016, Standard or Datacenter Edition The SolarWinds Orion installer installs IIS and .NET 4.6.2 or later if they are not already on your server.

SolarWinds Orion SQL database server	Physical server recommended
	• Quad core processor or better
	• 16 GB RAM
	• 100 GB[1] (or more) storage in RAID 1+0 configuration (RAID 5 not supported)
	• Windows Server 2016, Standard or Datacenter Edition
	• SQL Server 2017, 2016, or 2014, Standard or Enterprise Edition
	💡 SolarWinds recommends SQL Server 2016 SP1 or later.

Amazon Web Service VMs

Orion server	m4.large Recommended: m4.xlarge
Primary database server (SolarWinds Orion database)	r4.xlarge When using the Amazon RDS as your database server for small environments, use the **db.r4.xlarge** template.

Medium deployment guidelines

Modules	NPM SL500 - SL2000
	NTA for NPM SL2000
	• 50,000 FPS received sustained on the main polling engine
	2 - 4 additional modules:
	• IPAM IP16,000
	• Log Manager for Orion LM10 - LM250
	• NCM DL500 - DL1000
	• SAM AL700 - AL1100
	• SCM SCM50 - SCM1000
	• UDT UT10,000 - 25,000
	• VMAN VMS112 - VMS320 If you use VMAN Recommendations, increase the total memory on the server by 8 GB.
	• VNQM IPSLA 25 - IPSLA 50 (up to 10,000 operations)
	• WPM 50 - WPM 200

---

[1]More or less space may be needed depending on your data retention policies, number of elements measured, and polling frequency.

Orion server	Physical server or virtual machine
	• CPU: 4 cores + 1 core for each additional module
	• RAM: 8 GB + 2 GB for each additional module
	💡 [How do I calculate hardware requirements](#)?
	• 150 GB, 15,000 RPM
	• 1 x 1 Gb dedicated NIC
	• Windows Server 2016, Standard or Datacenter Edition
	The SolarWinds Orion installer installs IIS and .NET 4.6.2 or later if they are not already on your server.
SolarWinds Orion SQL database server	Physical server recommended
	• Dual quad core processor or better
	• 64 GB RAM
	• 250 GB[1] (or more) storage in RAID 1+0 configuration (RAID 5 not supported)
	• Hardware RAID Controller (software RAID not supported)
	• Windows Server 2016, Standard or Datacenter Edition
	• SQL Server 2017, 2016, or 2014, Standard or Enterprise Edition
	💡 SolarWinds recommends SQL Server 2016 SP1 or later.

[1]More or less space may be needed depending on your data retention policies, number of measured elements, and polling frequency.

NTA Flow Storage database server specifications	Physical server or virtual machine
	- Quad core processor or better 16 GB[1] RAM 100 GB - 1 TB[2] of storage capacity on local NTFS disk 1 x 1 Gb dedicated NIC - Windows Server 2016, Standard or Datacenter Edition **Storing flow data in NTA** **NTA 4.0**: if the NTA server is running a 32-bit operating system, NTA stores the flow data in the SQL database (NTA Flow Storage FastBit database is not installed). See NTA 4.x Installation: FAQs **NTA 4.1 and later** requires a 64-bit operating system. SolarWinds recommends a separate NTA Flow Storage database. **NTA 4.4** requires an instance of MS SQL Server 2016 SP1 or later for storing flow data. See NTA 4.4 requirements for more details.
Log Manager for Orion database	Physical server or virtual machine
	- Quad core processor or better 16 GB RAM 100 GB - 1 TB[3] of storage capacity on local NTFS disk 1 x 1 Gb dedicated NIC - Windows Server 2016, Standard or Datacenter Edition - Supported collations: - English with collation setting SQL_Latin1_General_CP1_CI_AS - English with collation setting SQL_Latin1_General_CP1_CS_AS

Amazon Web Service VMs

Orion server	m4.2xlarge
Primary database server (SolarWinds Orion database)	r4.xlarge When using the Amazon RDS as your database server for medium environments, use the **db.r4.xlarge** template.

---

[1]Increase the NTA Flow Storage database RAM as the database size increases.

[2]More or less space may be required, depending on your data retention policies and the number of stored flows. You need approximately 8 GB of additional storage for every 1,000 flows retained for 30 days. For example, if you want 50,000 flows stored for 30 days, you need a base of 100 GB plus an additional 400 GB of storage.

[3]More or less space may be required, depending on the number of stored events. Log Manager for Orion supports 1,000 Events per Second across all polling engines.

NTA Flow Storage	r3.xlarge
Log Manager for Orion database	r3.xlarge

Large deployment guidelines

Modules

NPM SLX (with multiple polling engines)

NTA for NPM SLX

- 50,000 FPS received sustained on the main polling engine
- Up to 6 polling engines (5 in addition to the main polling engine) for 300,000 FPS received sustained

Any combination of these modules:

- IPAM IPX
    - 750,000 IP
- Log Manger for Orion LM250 - LM1000
- NCM DLX
    - 1 APE for every 10,000 devices, for NCM 7.1 and later
    - Maximum of 30,000 devices per NCM instance (that is, NCM server + 2 NCM APEs)
- SAM ALX
    - 1 APE for every 10,000 component monitors
    - Maximum of 50,000 component monitors per primary Orion SAM server + 4 APEs
- SCM SCM5000
- UDT UTX
    - 150,000 ports per polling engine
- VMAN VMS480 and higher
  If you use VMAN Recommendations, increase the total memory on the server by 16 GB.
  For every 3000 VMs, SolarWinds recommends that you add an additional free polling engine. Additional polling engines for VMAN are free of charge.
- VNQM IPX
    - ~5,000 IP SLA operations per polling engine

Orion server	Physical server or virtual machine (VM) - CPU: 4 cores + 1 core for each additional module - RAM: 8 GB + 2 GB for each additional module 💡 [How do I calculate hardware requirements](#)? - Storage: 150 GB, 15,000 RPM 1 x 1 Gb dedicated NIC - Windows Server 2016, Standard or Datacenter Edition The SolarWinds Orion installer installs IIS and .NET 4.6.2 or later if they are not already on your server.
SolarWinds Orion SQL database server	Physical server recommended - Dual/quad core processor or better 128 GB RAM - Hardware RAID Controller (software RAID not supported) - Disk Subsystem 1 Array 1: 2 x 146 GB 15,000 disks RAID 1 (mirroring) operating system - Disk Subsystem 2 Array 2: 2 x 146 GB 15,000 disks RAID 1 (Pagefile + extra storage) - Disk Subsystem 3 Array 3: with 6x 15,000 146 GB or 300 GB disks configured in a RAID 1+0 arrays to allow for maximum write performance. This is for your SQL MDF AND FILEGROUPS - Disk Subsystem 4 Array 4: with 4x 15,000 146 GB or 300 GB disks configured in a RAID 1+0 arrays to allow for maximum write performance. This is for your SQL LDF Transaction LOG file - Disk Subsystem 5 Array 5: with 4x 15k 146 GB or 300 GB disks configured in a RAID 1+0 array for your tempdb data file - Disk Subsystem 6 Array 6: with 4x 15k 146 GB or 300 GB disks configured in a RAID 0 array for your tempdb log file 1 Gb LAN port - Windows Server 2016, Standard or Datacenter Edition - SQL Server 2017, 2016, or 2014, Standard or Enterprise Edition 💡 SolarWinds recommends SQL Server 2016 SP1 or later.

NTA Flow Storage server	Physical server or virtual machine
	- Quad core processor or better 16 GB[1] RAM 100 GB - 1 TB[2] of storage capacity on local NTFS disk 1 x 1 Gb dedicated NIC - Windows Server or 2016, Standard or Datacenter Edition
	Storing flow data in NTA
	NTA 4.0: if the NTA server is running a 32-bit operating system, NTA stores the flow data in the SQL database (NTA Flow Storage FastBit database is not installed). See NTA 4.x Installation: FAQs **NTA 4.1 and later** requires a 64-bit operating system. SolarWinds recommends a separate NTA Flow Storage database. **NTA 4.4** requires an instance of MS SQL Server 2016 SP1 or later for storing flow data. See NTA 4.4 requirements for more details.
Additional polling engine server	Virtual machine recommended
	- Quad core processor or better 32 GB RAM 150 GB, 15,000 RPM 1 x 1 Gb dedicated NIC - Windows Server 2016
	The SolarWinds Orion installer installs IIS and .NET 4.6.2 or later if they are not already on your server.
Log Manager for Orion database	Physical server or virtual machine
	- Quad core processor or better 16 GB RAM 100 GB - 1 TB[3] of storage capacity on local NTFS disk 1 x 1 Gb dedicated NIC - MS SQL Server 2016 with SP1 and later, Standard or Datacenter Edition - Supported collations: - English with collation setting SQL_Latin1_General_CP1_CI_AS - English with collation setting SQL_Latin1_General_CP1_CS_AS

---

[1]Increase the NTA Flow Storage database RAM as the database size increases.

[2]More or less space may be required, depending on your data retention policies and the number of stored flows. You need approximately 8 GB of additional storage for every 1,000 flows retained for 30 days. For example, if you want 50,000 flows stored for 30 days, you need a base of 100 GB plus an additional 400 GB of storage.

[3]More or less space may be required, depending on the number of stored events. Log Manager for Orion supports 1,000 Events per Second across all polling engines.

Amazon Web Service VMs

Orion server	m5d.2xlarge
Primary database server (SolarWinds Orion database)	r5d.2xlarge When using the Amazon RDS as your database server for large environments, use **db.r4.4xlarge** template.
NTA Flow Storage	r5d.4xlarge
Log Manager for Orion database	r5d.4xlarge

Extra large deployment guidelines

To monitor up to 400,000 elements, ensure your deployment meets the following minimum requirements. Extra large environment require deploying Additional Polling Engines to scale your deployment.

Disk Performance is measured using IOPS.

CPU recommendations use the PassMark score (© 2018 PassMark® Software, obtained at https://www.cpubenchmark.net/high_end_cpus.html on April 9, 2018).

> 💡 **How do I find out the PassMark score of my server?**
>
> 1. Download the Pass Mark Performance Test (© 2018 PassMark® Software, obtained at https://www.passmark.com/products/pt.htm on April 9, 2018).
>
> 2. Run it on your server to find out a PassMark score of your server.

Orion server	- CPUs with a total combined PassMark score of 7,000 or higher - Calculate RAM according to the number of modules: 8 GB + additional 2 GB for each module - Disk: Read/Write I/O performance of 800 IOPS
Additional polling engine server	- Quad core processor or better 32 GB RAM - Storage: 150 GB, 15,000 RPM 1 x 1 Gb dedicated NIC - Windows Server 2016, Standard or Datacenter Edition
SolarWinds Orion SQL database server	Minimum: - CPUs with a total combined PassMark score of 32,000 or higher 256 GB RAM - Disk: Read/Write I/O Performance of 30,000 IOPs - Enterprise edition of the following MS SQL Server versions: - MS SQL Server 2014, 2014 SP1 or 2014 SP2 - MS SQL Server 2016 SP1, 2016 SP2 - MS SQL Server 2017 (including Linux installs) <blockquote>💡 SolarWinds recommends SQL Server 2016 SP1 or later.</blockquote>Recommended: 4 CPU/ 60 cores 512 GB 190,000 IOPS or better 1 Gbit dedicated NIC

NTA Flow Storage database	Physical server or virtual machine
	• Quad core processor or better
	• 16 GB[1] RAM
	• 100 GB - 1 TB[2] of storage capacity on local NTFS disk
	• 1 x 1 Gb dedicated NIC
	• Windows Server 2016 or later, Standard or Datacenter Edition
	Storing flow data in NTA
	• **NTA 4.0**: if the NTA server is running a 32-bit operating system, NTA stores the flow data in the SQL database (NTA Flow Storage FastBit database is not installed). See NTA 4.x Installation: FAQs
	• **NTA 4.1 and later** requires a 64-bit operating system. SolarWinds recommends a separate NTA Flow Storage database.
	• **NTA 4.4** requires an instance of MS SQL Server 2016 SP1 or later for storing flow data. See NTA 4.4 requirements for more details.
Log Manager for Orion database	Physical server or virtual machine
	• Quad core processor or better
	• 16 GB RAM
	• 100 GB - 1 TB[3] of storage capacity on local NTFS disk
	• 1 x 1 Gb dedicated NIC
	• MS SQL Server 2016 with SP1 and later, Standard or Datacenter Edition
	• Supported collations:
	○ English with collation setting SQL_Latin1_General_CP1_CI_AS
	○ English with collation setting SQL_Latin1_General_CP1_CS_AS

Amazon Web Service

Orion server	m5.4xlarge
Additional polling engine server	m5.xlarge

---

[1]Increase the NTA Flow Storage database RAM as the database size increases.

[2]More or less space may be required, depending on your data retention policies and the number of stored flows. You need approximately 8 GB of additional storage for every 1,000 flows retained for 30 days. For example, if you want 50,000 flows stored for 30 days, you need a base of 100 GB plus an additional 400 GB of storage.

[3]More or less space may be required, depending on the number of stored events. Log Manager for Orion supports 1,000 Events per Second across all polling engines.

Primary database server (SolarWinds Orion database)	r5d.4xlarge (database server)
	db.r4.8xlarge (Amazon RDS)
NTA Flow Storage database	r5d.4xlarge
Log Manager for Orion database	r5d.4xlarge

Change polling engine node assignments

Reassigning nodes to new polling engines may be required in the following situations:

- Moving or renaming your Orion server
- Deleting an existing polling engine
- Merging two or more Orion servers
- Deploying Additional Polling Engines to distribute the load

To change the polling engine that polls a node:

1. Log in to the Orion Web Console as an administrator.
2. Click Settings > Manage Nodes.
3. Select the node for which you want to change the polling engine.
4. Click More Actions, and click Change Polling Engine.

   (i) The current number of Assigned Objects is listed for each available polling engine. This number is updated with each automatic polling engine synchronization. Updates to the Assigned Objects count can only be completed for polling engines that are operationally up.

5. Select the polling engine, and click Change Polling Engine.

Your Orion Platform product polls the node using the selected polling engine.