

Hitachi Ops Center

11.0.4

System Requirements

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Preface

This manual explains the system requirements associated Hitachi Ops Center.

Product version

This document revision applies to Hitachi Ops Center version 11.0.4.

Release notes

Read the release notes before installing and using this product. They may contain requirements or restrictions that are not fully described in this document or updates or corrections to this document. Release notes are available on the Hitachi Vantara documentation website: <https://docs.hitachivantara.com>.

Accessing product documentation

Product user documentation is available on: <https://docs.hitachivantara.com>. Check this site for the most current documentation, including important updates that may have been made after the release of the product.

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The [Hitachi Vantara Support Website](#) is the destination for technical support of products and solutions sold by Hitachi Vantara. To contact technical support, log on to the Hitachi Vantara Support Website for contact information: https://support.hitachivantara.com/en_us/contact-us.html.

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Thank you!

Hitachi Ops Center system requirements

The requirements for Hitachi Ops Center fall into two categories: general (that apply to both OVA and installer environments) and OVA-specific.

Verify that your environment meets the system requirements before beginning the installation process.

Conventions for storage capacity values

Physical storage capacity values (for example, disk drive capacity) are calculated based on the following values:

Physical capacity unit	Value
1 kilobyte (KB)	1,000 (10^3) bytes
1 megabyte (MB)	1,000 KB or $1,000^2$ bytes
1 gigabyte (GB)	1,000 MB or $1,000^3$ bytes
1 terabyte (TB)	1,000 GB or $1,000^4$ bytes
1 petabyte (PB)	1,000 TB or $1,000^5$ bytes
1 exabyte (EB)	1,000 PB or $1,000^6$ bytes

Logical capacity values (for example, logical device capacity, cache memory capacity) are calculated based on the following values:

Logical capacity unit	Value
1 block	512 bytes
1 cylinder	Mainframe: 870 KB Open-systems: <ul style="list-style-type: none">▪ OPEN-V: 960 KB▪ Others: 720 KB
1 KB	$1,024 (2^{10})$ bytes

Logical capacity unit	Value
1 MB	1,024 KB or 1,024 ² bytes
1 GB	1,024 MB or 1,024 ³ bytes
1 TB	1,024 GB or 1,024 ⁴ bytes
1 PB	1,024 TB or 1,024 ⁵ bytes
1 EB	1,024 PB or 1,024 ⁶ bytes

Hitachi Ops Center general requirements (OVA and installer)

The hardware system requirements for Ops Center differ depending on the scale of the system.

If the system scale changes during operation and the result is a mismatch with the scale of the hardware resources, a resource insufficiency might occur. It is recommended that you periodically check the number of resources to detect any mismatches.



Note: For the system requirements, assign 20 GB or more for the OS swap area.
The swap requirements of each product are included in this swap area.

Hardware requirements based on system scale

The following table provides guidelines for determining the size of your environment based on the number of managing targets. Based on the sizing and scalability recommendations, you can identify the hardware requirements and scale your Ops Center environment to meet workload demands.

System scale	Maximum number of resources		
	Storage		
	Volume*	Storage	Volume Pair
Small scale (S)	5,000	3	300
Medium scale (M)	20,000	19	600
Large scale (L)	50,000	30	1,200

* Total number of volumes in all storage systems.

**Note:**

- If your system scale exceeds “Large scale”, contact us.
- When using Analyzer^{*1} to monitor resources (such as VM, ESX, or FC switches) other than storage, see the Analyzer documentation.
- For additional resource information, see [Approximate size of resources regarding system scale \(Reference information\) \(on page 43\)](#)

^{*1} Analyzer server, Analyzer detail view server, Analyzer viewpoint server, Analyzer probe server.

Hitachi Ops Center server hardware requirements

Product	Processor CPU (cores)	Memory	Disk space	Installation location and disk space by folder/directory, and file size
When storage management is performed by the following products in the same configuration: Common Component: Common Services Storage System and Resources Management: Administrator Performance Monitoring: Analyzer server Analyzer detail view server Pair Management:	S: 8 M: 10 L: 14	S: 24 GB (RAM) M: 32 GB (RAM) L: 44 GB (RAM)	S: 450 GB M: 1,000 GB L: 2,000 GB	Common Services: /opt/hitachi/CommonService Analyzer: /opt/hitachi/Analytics Administrator: /opt/rainier Protector: /opt/hitachi/protector

Product	Processor CPU (cores)	Memory	Disk space	Installation location and disk space by folder/directory, and file size
Protector Master Note: For other combinations of products in the same configuration, see Approximate size of resources regarding system scale (Reference information) (on page 43) .				
Hitachi Ops Center OVA	S: 8 M: 12 L: 16	S: 28 GB (RAM) M: 36 GB (RAM) L: 48 GB (RAM)	S: 1,100 GB M: 2,900 GB L: 5,900 GB	Common Services: /opt/hitachi/CommonService Analyzer: /opt/hitachi/Analytics API Configuration Manager: /opt/hitachi/ConfManager Automator: /opt/hitachi/Automation Administrator: /opt/rainier Protector: /opt/hitachi/protector
Hitachi Ops Center Administrator	4	S: 8 GB (RAM), 3 GB (Swap) M: 10 GB (RAM), 3 GB (Swap)	80 GB + 10 GB for temporary	Installation directory: /opt/rainier 80 GB under the Podman root directory (default directory: /var/lib/containers)

Product	Processor CPU (cores)	Memory	Disk space	Installation location and disk space by folder/directory, and file size
		<p>L: 10 GB (RAM), 3 GB (Swap)</p> <p>When other Ops Center products are also installed in the same configuration, or when improving performance*:</p> <p>S: 11 GB (RAM)</p> <p>M: 12 GB (RAM)</p> <p>L: 13 GB (RAM)</p> <p>*The response of some APIs and the operation of graphical user interfaces might be slower.</p>		<p>In addition, a temporary total of 10 GB of available space is required for installation using the application installer. This consists of 10 GB under /var/tmp.</p> <p>Backup file: 1 GB</p> <p>When you use Protector to back up Ops Center applications, the backup files are stored in the Protector repository. Prepare a Protector repository that includes the total size of backup files for each product.</p>
Hitachi Ops Center Analyzer server	<p>S: 5 M: 5 L: 5</p> <p>Note:If Analyzer and Analyzer detail view are installed on the same server, use these values: S: 7, M: 8, L: 8</p>	<p>S: 3 GB (RAM)</p> <p>M: 6 GB (RAM)</p> <p>L: 8 GB (RAM)</p>	100 GB	<p>Installation directory (size based on system scale in the "Disk space" column):</p> <p>/var/opt: 1 GB</p> <p>/var/installation-directory-path: 3 GB</p> <p>Backup file: 10 GB + twice the size of the <i>Analyzer-server-installation-directory/Analytics/data</i></p>

Product	Processor CPU (cores)	Memory	Disk space	Installation location and disk space by folder/directory, and file size
				<p>When you use Protector to back up Ops Center applications, the backup files are stored in the Protector repository. Prepare a Protector repository that includes the total size of backup files for each product.</p>
Hitachi Ops Center Analyzer detail view server	<p>S: 7 M: 7 L: 7</p> <p>Note: If Analyzer and Analyzer detail view are installed on the same server, use these values: S: 7, M: 8, L: 8</p>	<p>S: 6 GB (RAM) M: 8 GB (RAM) L: 43 GB (RAM)</p>	<p>S: 150 GB M: 700 GB L: 1,700 GB</p> <p>Note: Based on data retention of 365 days</p>	<p>Installation directory (size based on system scale in the "Disk space" column): /data /root: 300 MB /usr/local: 1 GB /home: 100 MB Backup file: Twice the size of the <i>Analyzer-detail-view-installation-destination-directory</i></p> <p>When you use Protector to back up Ops Center applications, the backup files are stored in the Protector repository. Prepare a Protector repository that includes the total size of backup files for each product.</p> <p>Caution:</p> <ul style="list-style-type: none"> ▪ When you run the <code>analytics_install.sh</code> command, do not install Analyzer detail view server on the same disk where the operating system is installed. You must install the software on an unformatted physical disk. Do not install anything else on this partition. ▪ The disk must have more than 5 GB available (with disk usage less than 95%)

Product	Processor CPU (cores)	Memory	Disk space	Installation location and disk space by folder/directory, and file size
				<ul style="list-style-type: none"> ▪ Do not create these directories on a Network File System (NFS) partition. ▪ The installer retrieves the partition details and checks the free disk space. For example, if the /home and /usr/local directories are mounted on the P1 partition, the partition must have a minimum of 1124 MB free.
Hitachi Ops Center Analyzer probe server	S: 2 M: 6 L: 12	Data collection using command device^{*1} S: 6 GB (RAM) M: 26 GB (RAM) L: 40 GB (RAM) Data collection using SVP and REST API^{*2} S: 6 GB (RAM) M: 18 GB (RAM) L: 28 GB (RAM) *1When RAID Agent is configured to monitor storage systems by using Access Type 1 or 2.	S: 150 GB M: 350 GB L: 350 GB Note: <ul style="list-style-type: none"> ▪ Based on the default data collection interval. ▪ If you are monitoring a system that is similar or larger than Large scale, consider installing multiple probe servers. 	Installation directory (size based on system scale in the "Disk space" column): /etc: 100 MB /home: 100 MB /root: 300 MB /usr/local: 1 GB RAID Agent: /opt/jp1pc: S: 6 GB M: 25 GB L: 35 GB /tmp: 350 MB /var: 600 MB Virtual Storage Software Agent: installationdirectory-path/ VirtualStorageSoftwareAgent: 1 GB /var/installationdirectory-path/ VirtualStorageSoftwareAgent: 1 GB /var/log: 7 GB /usr/lib/jvm: 1 GB Analyzer Adapter*:

Product	Processor CPU (cores)	Memory	Disk space	Installation location and disk space by folder/directory, and file size
		<p>*2When RAID Agent is configured to monitor storage systems by using Access Type 3 or 4. If you are performing both data collection by using command devices and data collection by using the SVP and REST API, the system requirements for data collection using command devices apply.</p>		<p>/var/log/: Extra small: 7 GB Small: 7 GB Medium: 7 GB Large: 7 GB</p> <p>*For details on the number of manageable resources for each system scale (Extra small, Small, Medium, and Large), see the table of "When using Analyzer Adapter" in "Hardware sizing based on system scale" of <i>Hitachi Ops Center Analyzer Installation and Configuration Guide</i>.</p> <p>Note: The disk must have more than 5 GB available (with disk usage less than 95%). Do not create these directories on a Network File System (NFS) partition.</p> <p>Backup file: 16 GB</p> <p>When you use Protector to back up Ops Center applications, the backup files are stored in the Protector repository. Prepare a Protector repository that includes the total size of backup files for each product.</p>

Product	Processor CPU (cores)	Memory	Disk space	Installation location and disk space by folder/directory, and file size
		<p>See <i>Hitachi Ops Center Analyzer Installation and Configuration Guide</i>:</p> <ul style="list-style-type: none"> ▪ Configuring the RAID Agent to monitor Hitachi Enterprise Storage Systems ▪ Setting up RAID Agent ▪ Selecting the data collection method 		
Hitachi Ops Center Analyzer viewpoint	S: 3 M: 5 L: 6	S: 5 GB (RAM) M: 9 GB (RAM) L: 30 GB (RAM)	S: 1 TB M: 1 TB L: 4 TB Note: Disk Type: SSD	<p>Installation directory (size based on system scale in the "Disk space" column): <code>/opt/hitachi/analyizer_viewpoint</code></p> <p>Backup file: Same size as <code>/var/opt/hitachi/analyizer_viewpoint</code></p> <p>When you use Protector to back up Ops Center applications, the backup files are stored in the Protector repository. Prepare a Protector repository that includes the total size of backup files for each product.</p>
Hitachi Ops Center Automator	For Standard Mode Minimum:	For Standard Mode	37.1 GB	Windows Installation folder: <code>Program-Files-folder\hitachi</code>

Product	Processor CPU (cores)	Memory	Disk space	Installation location and disk space by folder/directory, and file size
	<p>2 Recommended: 4 For High Performance Mode 8</p> <p>When other Ops Center products are also installed in the same configuration, or when improving performance*: 10 GB (RAM), 13.5 GB (Swap)</p> <p>*The response of some APIs and the response of graphical user interfaces might be slower.</p> <p>For High-performance Mode</p> <p>16 GB (RAM), 13.5 GB (Swap)</p>			<p>4100 MB</p> <p>Database storage folder: <i>Program-Files-folder\hitachi\database\Automation</i></p> <p>3000 MB</p> <p>Backup file: 5 GB or higher is recommended</p> <p>Linux</p> <p>Installation directory: <i>/opt/hitachi</i>: 2440 MB <i>/var/opt/hitachi</i>: 1660 MB</p> <p>Database storage directory: <i>/var/opt/hitachi/database/x64/Automation</i>: 3000 MB</p> <p>Backup file: 5 GB or higher is recommended</p> <p>When you use Protector to back up Ops Center applications, the backup files are stored in the Protector repository. Prepare a Protector repository that includes the total size of backup files for each product.</p>
Hitachi Ops Center API Configuration Manager	<p>S: 2 M: 2 L: 2</p> <p>If linked with Analyzer probe server:</p> <p>4</p> <p>If linked with Automator</p>	<p>S: 0.5 GB (RAM), 0.3 GB (Swap)</p> <p>M: 1 GB (RAM), 0.5 GB (Swap)</p> <p>L: 2 GB (RAM), 0.5 GB (Swap)</p>	11.6 GB	<p>Installation directory:</p> <p>Windows</p> <p><i>Program-Files-folder\hitachi\ConfManager</i>: 11100 MB</p> <p>Linux</p> <p><i>/opt/hitachi/ConfManager</i>: 11600 MB</p> <p>Backup file: 0.5 GB</p>

Product	Processor CPU (cores)	Memory	Disk space	Installation location and disk space by folder/directory, and file size
	(NDM service template): 4	When other Ops Center products are also installed in the same configuration, or when improving performance*: S: 0.8 GB (RAM) M: 1.5 GB (RAM) L: 2.5 GB (RAM) *The response of some APIs might be slower. If linked with Analyzer probe server: 8 GB (RAM) If linked with Automator (NDM service template): 8 GB (RAM)		When you use Protector to back up Ops Center applications, the backup files are stored in the Protector repository. Prepare a Protector repository that includes the total size of backup files for each product.
Hitachi Ops Center Common Services	2	2.5 GB (RAM)	--	Installation directory: /opt/hitachi/CommonService: 1411 MB <i>user-data-directory</i> : 124 MB <i>Log-directory</i> : 1543 MB /var/tmp: 3072 KB /tmp: 3072 KB

Product	Processor CPU (cores)	Memory	Disk space	Installation location and disk space by folder/directory, and file size
				<p>Backup file: 100 MB</p> <p>When you use Protector to back up Ops Center applications, the backup files are stored in the Protector repository. Prepare a Protector repository that includes the total size of backup files for each product.</p>
Hitachi Ops Center Protector Master	S: 4 M: 4 L: 8	S: 8 GB (RAM) M: 8 GB (RAM) L: 16 GB (RAM)	1 GB for Protector + 100 GB for logs Note: On heavily utilized systems, more space may be required.	Windows <i>Program-Files-folder</i> <i>\hitachi\Protector: 1 GB</i> Linux <i>/opt/hitachi/protector: 1 GB</i>
Hitachi Ops Center Protector Client	S: 4 M: 8 L: 16	S: 16 GB (RAM) M: 20 GB (RAM) L: 32 GB (RAM)	500MB for Protector + 16 GB for cache + 16 GB for filter logs	Installation directory: Windows <i>Program-Files-folder</i> <i>\hitachi\Protector: 500 MB</i> Linux <i>/opt/hitachi/protector: 500 MB</i>

Product	Processor CPU (cores)	Memory	Disk space	Installation location and disk space by folder/directory, and file size
			<p>Note: For host-based backups, we recommend that Linux source nodes have a Logical Volume Manager (LVM) on each volume. A minimum of 10 GB of free space is required in the "unused" portion of the LVM in addition to the required space for the allocated storage area. For example, if 100 GB of usable storage is required, then the total disk size is 110 GB.</p>	

Hitachi Ops Center OS support

Product	Recommended installer OS	Supported installer OS	OVA OS (if applicable)
Hitachi Ops Center Administrator	N/A	<ul style="list-style-type: none"> ▪ OS: Red Hat Enterprise Linux 8.8, 8.10, 9.2, 9.4 and Oracle Linux 8.8, 8.10, 9.2, 9.4 ▪ Podman version: 3.3.x, 3.4.x, 4.0.x, 4.1.x, 4.2.x, 4.4.x, 4.6.x, and 4.9.x. <p>Note: Supported versions of Podman dependent libraries are:</p> <ul style="list-style-type: none"> ▪ containers-common <ul style="list-style-type: none"> • for Podman 3.3.x, 3.4.x, 4.0.x, and 4.1.x: 1-3 to 1-39 • for Podman 4.2, 4.4.x, 4.6.x, and 4.9.x: 1-27 to 1-81 (RHEL/OL 8.x) • for Podman 4.2, 4.4.x, 4.6.x, and 4.9.x: 1-27 to 1-91 (RHEL/OL 9.x) ▪ common 2.0.29 or later ▪ runc (only required for RHEL/OL 8.x) 1.0.0-74 or later 	Oracle Linux 9.4 - Ops Center OVA
Hitachi Ops Center Analyzer	Red Hat Enterprise Linux 9.4	<ul style="list-style-type: none"> ▪ Red Hat Enterprise Linux 8.8, 8.10, 9.2, 9.4 (x64) *¹ ▪ Oracle Linux 8.8, 8.10, 9.2, 9.4 (x64) *¹ <p>Note: Do not uninstall the RPM package comprising the minimal installation components when installing the operating system.</p>	Oracle Linux 9.4 - Ops Center OVA - Analyzer OVA

Product	Recommended installer OS	Supported installer OS	OVA OS (if applicable)
Hitachi Ops Center Analyzer probe server	Red Hat Enterprise Linux 9.4	<ul style="list-style-type: none"> ▪ Red Hat Enterprise Linux 8.8, 8.10, 9.2, 9.4 (x64) ^{*1} ▪ Oracle Linux 8.8, 8.10, 9.2, 9.4 (Unbreakable Enterprise Kernel) (x64) ^{*1} ▪ Oracle Linux 8.8, 8.10, 9.2, 9.4 (Red Hat Compatible Kernel) (x64) ^{*1} <p>Note: When installing the operating system, select the default software package settings or add a software package with the default settings selected for installation.</p>	Oracle Linux 9.4 - Analyzer probe OVA
Hitachi Ops Center Analyzer viewpoint	Red Hat Enterprise Linux 9.4	<ul style="list-style-type: none"> ▪ Red Hat Enterprise Linux 8.8, 8.10, 9.2, 9.4 (x64) ^{*1} ▪ Oracle Linux 8.8, 8.10, 9.2, 9.4 (Unbreakable Enterprise Kernel) (x64) ^{*1} ▪ Oracle Linux 8.8, 8.10, 9.2, 9.4 (Red Hat Compatible Kernel) (x64) ^{*1} 	Oracle Linux 9.4 - Analyzer viewpoint OVF
Hitachi Ops Center Automator	Red Hat Enterprise Linux 9.4	<ul style="list-style-type: none"> ▪ Red Hat Enterprise Linux 8.8, 8.10, 9.2, 9.4 (x64) ^{*1} ▪ Oracle Linux 8.8, 8.10, 9.2, 9.4 (x64) ^{*1} ▪ Windows Server 2016, 2019, 2022 (x64) <p>Note: Do not uninstall the RPM package comprising the minimal installation components when installing the operating system.</p>	Oracle Linux 9.4 - Ops Center OVA
Hitachi Ops Center API Configuration Manager	Red Hat Enterprise Linux 9.4	<ul style="list-style-type: none"> ▪ Red Hat Enterprise Linux 8.8, 8.10, 9.2, 9.4 (x64) ^{*1} ▪ Oracle Linux 8.8, 8.10, 9.2, 9.4 (x64) ^{*1} ▪ Windows 10 (x64) ▪ Windows Server 2016, 2019, 2022 (x64) 	Oracle Linux 9.4 - Ops Center OVA - Analyzer probe OVA

Product	Recommended installer OS	Supported installer OS	OVA OS (if applicable)
Hitachi Ops Center Common Services	Red Hat Enterprise Linux 9.4	<ul style="list-style-type: none"> ▪ Red Hat Enterprise Linux 8.8, 8.10, 9.2, 9.4 (x64) *¹ ▪ Oracle Linux 8.8, 8.10, 9.2, 9.4 (x64) *¹ <p>Note: Do not uninstall the RPM package comprising the minimal installation components when installing the operating system.</p>	Oracle Linux 9.4 - Ops Center OVA - Analyzer viewpoint OVF
Hitachi Ops Center Protector Master	Red Hat Enterprise Linux 9.4	<ul style="list-style-type: none"> ▪ Red Hat Enterprise Linux 8.8 and newer, 9.0 and newer (x64) *¹ ▪ Oracle Linux 8.8 and newer (x64) *¹ ▪ SUSE 12.0 and newer (x64), 15.0 SP1 only (x64) ▪ Windows Server 2016, 2019, 2022 (x64) 	Oracle Linux 9.4 - Ops Center OVA
Hitachi Ops Center Protector Client	Red Hat Enterprise Linux 9.4	<ul style="list-style-type: none"> ▪ Red Hat Enterprise Linux 8.8 and newer (x64) *¹ ▪ Oracle Linux 8.8 and newer (x64) *¹ ▪ SUSE 12.0 and newer (x64), 15 (x64) ▪ Windows Server 2016, 2019, 2022 (x64) 	Oracle Linux 9.4 - Analyzer probe OVA

*¹ New installations on RHEL 9.x/OL 9.x are supported. However, upgrading from RHEL 8.x/OL 8.x to RHEL 9.x/OL 9.x while the product is installed is not supported.



Note: The preconfigured media includes Oracle Linux. For OS issues, you must purchase support directly from Oracle.

Hitachi Ops Center TLS support

All Ops Center product components support Transport Layer Security (TLS) version 1.2 and 1.3.

Hitachi Ops Center JDK support

This table shows the Java Development Kit (JDK) installed with each product component and any additional supported versions.

Product	Linux JDK versions	Windows JDK versions
Administrator	Amazon Corretto 17	N/A
Analyzer	Hitachi JDK version 11.0 (64-bit)	N/A
Ops Center Analyzer detail view and Analyzer probe	Amazon Corretto 17	N/A
Analyzer viewpoint	Amazon Corretto 11	N/A
Automator	Hitachi JDK version 11.0 (64-bit)	Hitachi JDK version 11.0 (64-bit)
API Configuration Manager	Amazon Corretto 17	Amazon Corretto 17
Common Services	Amazon Corretto 21	N/A
Protector	N/A	N/A

About installing third-party software

Hitachi Ops Center does not support installing other software products on the management server, but allows for software required by corporate policy (such as anti-virus programs and third-party monitoring agents). Note that Hitachi Vantara does not take responsibility for, or support any interactions between, the third-party programs and Ops Center software.

Hitachi Ops Center supported storage systems

Hitachi Ops Center supports the following storage systems:

Storage System	SVOS version	Microcode/Firmware version
VSP One B24, B26, B28	SVOS 10.2.1 or later	A3-02-01 or later
VSP E1090, E1090H	SVOS 9.8 or later	93-06-21 or later
VSP E590H, E790H	SVOS 9.7 or later	93-05-01 or later
VSP E590, E790	SVOS 9.5.1 or later	93-03-21 or later
VSP E990	SVOS 9.3 or later	93-02 or later
VSP 5000 series	SVOS 9.2 or later	90-02-xx or later
VSP G1x00, VSP F1500	SVOS 8.3 or later	80-06-63 or later

Storage System	SVOS version	Microcode/Firmware version
VSP G/F350, G/F370, G/F700, G/F900	SVOS 8.3.1 or later	88-02-11 or later
VSP G200, G/F400, G/F600, G/F800 (including storage systems with optional NA modules)	SVOS 7.4 or later	83-05-29 or later
VSP N400, N600, N800	SVOS 7.4.1 or later	83-06-01 or later
Hitachi NAS Platform (HNAS) firmware and System Management Unit (SMU)	N/A	13.5 or later

Port and firewall requirements

If you are using a firewall, you might have to register a firewall exception manually depending on the environment. For more information, see the documentation for each product.

Product	Source	Source port	Target	Target port (default)
Hitachi Ops Center Administrator	Administrator server	any/tcp	Ops Center Common Services	443/tcp
		any/tcp	Protector server	443/tcp
		any/udp	Active Directory server	389/udp
		any/tcp		389/tcp
		any/udp	DNS server	53/udp
		any/tcp		53/tcp
		any/tcp	Cisco Switch Brocade Switch with Fabric OS 8.2.2a	22/tcp
		any/tcp	Brocade Switch with Fabric OS 9.x	443/tcp

Product	Source	Source port	Target	Target port (default)
		any/tcp	VSP One Block 20	443/tcp
		any/udp (bridge mode * ¹) 33000-33999/udp (host mode * ²)	VSP G130, G/F350, G/F370, G/F700, G/F900 (controller) VSP G200, G/F400, G/F600, G/F800 (controller) VSP N series (controller) VSP E series (controller)	31001-31002/udp
		any/tcp	VSP G130, G/F350, G/F370, G/F700, G/F900 (SVP)	443/tcp
		any/tcp	VSP G200, G/F400, G/F600, G/F800 (SVP)	1099/tcp
		any/udp (bridge mode * ¹) 33000-33999/udp (host mode * ²)	VSP N series (SVP)	51099-51355/tcp
		any/udp	VSP E series (SVP)	31001-31002/udp
		any/tcp	VSP F1500 and VSP G1x00	8443/udp (n/a for VSP E series)
		any/tcp		443/tcp
		any/tcp		1099/tcp
		any/tcp		51099-51100/tcp
		any/udp (bridge mode * ¹) 33000-33999/udp (host mode * ²)		31001/udp
		any/tcp		8443/tcp
		any/tcp		443/tcp

Product	Source	Source port	Target	Target port (default)
		any/tcp		11099/tcp
		any/tcp		51099-51100/tcp
		any/udp (bridge mode * ¹) 33000-33999/udp (host mode * ²)		31001/udp
		any/tcp	VSP One SDS Block	443/tcp
VSP One Block 20 VSP G130, G/F350, G/F370, G/F700, G/F900 (controller) VSP G200, G/F400, G/F600, G/F800 (controller) VSP N series (controller) VSP E series (controller)	31001-31002/udp	Administrator server		any/udp (bridge mode * ¹) 33000-33999/udp (host mode * ²)
VSP G130, G/F350, G/F370, G/F700, G/F900 (SVP) VSP G200, G/F400, G/F600, G/F800 (SVP) VSP N series (SVP) VSP E series (SVP)	31001-31002/udp	Administrator server		any/udp (bridge mode * ¹) 33000-33999/udp (host mode * ²)

Product	Source	Source port	Target	Target port (default)
	VSP F1500 and VSP G1x00	31001/udp	Administrator server	any/udp (bridge mode * ¹) 33000-33999/udp (host mode * ²)
	VSP 5000 series	31001/udp	Administrator server	any/udp (bridge mode * ¹) 33000-33999/udp (host mode * ²)
	Storage systems (SNMP)	any/udp	Administrator server	162/udp
	Client	any/tcp	Administrator server	443/tcp 20961/tcp Note: When using Administrator with Common Services or Protector, use a port other than the default (443), which causes a conflict. We suggest 20961.
	Client (Device Manager - Storage Navigator)	any/tcp	Administrator server	443/tcp
		any/tcp	VSP 5000 series VSP F1500 and VSP G1x00 VSP E series (SVP)	80/tcp
		any/tcp	VSP 5000 series	443/tcp
		any/tcp	VSP F1500 and VSP G1x00	5443/tcp
		any/tcp	VSP E series (SVP)	11099/tcp (VSP 5000 series only)

Product	Source	Source port	Target	Target port (default)
		any/tcp	VSP G130, G/F350, G/F370, G/F700, G/F900 (SVP)	1099/tcp (N/A VSP 5000 series)
		any/tcp	VSP G200, G/F400, G/F600, G/F800 VSP N series (SVP)	51100/tcp
	Client	any/tcp	VSP One Block 20 VSP One SDS Block	443/tcp
Hitachi Ops Center Analyzer	Client	any/tcp	Analyzer server	22015/tcp
		any/tcp		22016/tcp
	Analyzer server	any/tcp	RAID Agent server	24221/tcp
		any/tcp		24222/tcp
		any/tcp		22/tcp
		any/tcp	Ops Center Common Services	443/tcp
		any/tcp	Common component	22031-22032/tcp 22035-22038/tcp
Hitachi Ops Center Analyzer detail view	Client	any/tcp	Analyzer detail view server	8443/tcp
	Analyzer server	any/tcp		8443/tcp
	Analyzer probe server	any/tcp		9092/tcp
	Analyzer detail view server	any/tcp	Common Services	443/tcp

Product	Source	Source port	Target	Target port (default)
Hitachi Ops Center Analyzer probe server	Analyzer probe server (Required only when using data transfer protocol. Close these ports if not required.)	any/tcp	Analyzer detail view server	22/tcp
		any/tcp		7443/tcp
		any/tcp	Intermediate FTP server	21/tcp
		any/tcp		22/tcp
		any/tcp		990/tcp
	Analyzer probe server	any/tcp	Analyzer detail view server	8443/tcp
	SNMP Manager server	any/udp		9191/udp
	Client	any/tcp	Analyzer probe server	8443/tcp
	Analyzer probe server	any/tcp	Common Services	443/tcp
		any/tcp	RAID Agent server	24221/tcp (non-SSL)
		any/tcp	RAID Agent server	24222/tcp (SSL)
		any/tcp	Hitachi Ops Center API Configuration Manager server	23450 (non-SSL)
		any/tcp	Hitachi Ops Center API Configuration Manager server	23451 (SSL)
		any/tcp	HNAS SMU	22/tcp
		any/tcp	HNAS REST API Server	8443/tcp
		any/tcp	Virtual Storage Software Agent server	24081/tcp

Product	Source	Source port	Target	Target port (default)
		any/tcp	VMware vCenter Server/ Vmware ESXi Host	443/tcp
		any/tcp	Windows Host/Hyper-V	135/tcp
		any/tcp	Windows Host/Hyper-V	445/tcp
		any/tcp	Systems managed by Hardware Management Console (HMC)	12443/tcp
		any/tcp	Brocade FC Switch	22/tcp
		any/tcp	Brocade FC Switch	80 (non-SSL)
		any/tcp	Brocade FC Switch	443 (SSL)
		any/tcp	DCNM Server	80 (non-SSL)
		any/tcp	DCNM Server	443 (SSL)
		any/tcp	Cisco FC Switch	22/tcp
		any/tcp	Linux host	22/tcp
	Linux host	any/tcp	Analyzer probe server	1111/tcp
	RAID Agent	any/tcp	VSP 5000 series	443/tcp, 11099/ tcp, 51099/tcp, 51100/tcp
		any/tcp	VSP E990, VSPG/F350, G/ F370, G/F700, G/F900, VSPG200, G/ F400, G/F600, G/F80	443/tcp, 1099/ tcp, 51099/tcp, 51100-51355/tc p

Product	Source	Source port	Target	Target port (default)
		any/tcp	VSP G1000, G1500, and VSP F1500	443/tcp, 1099/tcp, 51099/tcp, 51100/tcp
		any/tcp	HUS VM	1099/tcp, 51099/tcp, 51100/tcp
		any/tcp	GUM (CTL)	80 (non-SSL)
		any/tcp	GUM (CTL)	443 (SSL)
		any/tcp	VSP One Block 20	443/tcp
	Analyzer detail view server	any/tcp	On-demand real time monitoring module	24262/tcp
Hitachi Ops Center Analyzer viewpoint	Client	any/tcp	Analyzer viewpoint	OVF: 443/tcp Installer: 25442/tcp (If you are using the installer, you can change this port if desired.)
	Analyzer viewpoint	any/tcp	Analyzer server	22016/tcp
	Ops Center Common Services	any/tcp	Analyzer viewpoint	443/tcp
	Client	any/tcp	Automator server	22015/tcp (non-SSL)
Hitachi Ops Center Automator		any/tcp		22016/tcp (SSL)
Automator server	any/tcp	Ops Center Common Services	443/tcp	
	any/tcp	Operation target	22/tcp	
	any/tcp		23/tcp	
	any/tcp, any/udp		445/tcp or udp	

Product	Source	Source port	Target	Target port (default)
		any/tcp		135/tcp
		any/tcp		139/tcp
		any/tcp	SMTP server	25/tcp
		any/tcp, any/udp	Kerberos server	88/tcp or udp
		any/tcp	LDAP directory server	389/tcp
		any/udp	Radius server	1812/udp
		any/tcp	Servers registered to Web Service connections (such as API Configuration Manager server, Administrator server)	Web Service connection ports/tcp
Hitachi Ops Center API Configuration Manager	REST API clients	any/tcp	API Configuration Manager server	23450/tcp
		any/tcp		23451/tcp
	API Configuration Manager server	any/tcp	Storage system (SVP)	443/tcp
		any/tcp		1099/tcp
		any/tcp		11099/tcp
		any/tcp		51099/tcp
		any/tcp		51100/tcp
		any/tcp	Storage system (GUM)	443/tcp
		any/tcp	API Configuration Manager server (same as the source)	4369/tcp
		any/tcp		23452/tcp
		any/tcp		23453/tcp
		any/tcp		23455/tcp
		any/tcp		23459/tcp

Product	Source	Source port	Target	Target port (default)
	API Configuration Manager server	35049/udp-36048/udp	Storage system (SVP)	31001/udp
		35049/udp-36048/udp	Storage system (GUM)	31001/udp
		35049/udp-36048/udp		37001/udp
	API Configuration Manager server	37001/udp-38000/udp	Relay server	proxyPort/udp
	Relay server	Proxyport	API Configuration Manager server	37001/udp to 38000/udp
	Storage system (SVP)	any/tcp		23454/tcp
	Storage system (SVP)	31001/udp		35049/udp to 36048/udp
	Storage system (Controller)	any/tcp		23454/tcp
	Storage system (Controller)	31001/udp 37001/udp		35049/udp to 36048/udp
	Storage system (SVP)	any/tcp	Storage system (SVP)	1099/tcp
		any/tcp		51099/tcp to 51335/tcp
		any/tcp	Storage system (GUM)	443/tcp
	Storage system (SVP)	35049/udp-36048/udp	Storage system (GUM)	37001/udp
	Storage system (GUM)	37001/udp	Storage system (SVP)	35049/udp to 36048/udp
Hitachi Ops Center Common Services	Client	any/tcp	Ops Center Common Services	443/tcp

Product	Source	Source port	Target	Target port (default)
Ops Center Common Services	any/tcp	Administrator server (Installed on other management servers)		443/tcp
	any/tcp	Administrator server (Installed on Ops Center OVA or installed by using Server Express installer)		20961/tcp
	any/tcp	Automator server		22016/tcp
	any/tcp	Analyzer server		22016/tcp
	any/tcp	Analyzer viewpoint		443/tcp
	any/tcp	Protector server (Installer on other management servers)		443/tcp
	any/tcp	Protector server (Installed on Ops Center OVA or installed by using Server Express installer)		20964/tcp
	any/tcp	LDAP	389/tcp	
	any/udp		389/udp	
	any/tcp	LDAPS	636/tcp	
	any/udp		636/udp	
	any/tcp	Kerberos	88/tcp	
	any/udp		88/udp	

Product	Source	Source port	Target	Target port (default)
Hitachi Ops Center Protector	Client	any/tcp	Protector server	20964/tcp
	Protector nodes	any/tcp	Protector nodes	30304/tcp
	Protector server	any/tcp	Ops Center Common Services	443/tcp
*1 The allocated port numbers are used when selecting bridge mode during installation.				
*2 The allocated port numbers are used when selecting host mode during installation.				

Virtualization software (Installer)

- VMware vSphere Hypervisor (VMware ESXi) 7.0, 8.0, 8.0 update 1, 8.0 update 2, or 8.0 update 3
- Microsoft Hyper-V
- Linux KVM



Note:

- When running Hyper-V or KVM, you must use the product installers.
- For KVM support, you must install Protector ISM, CM-REST, and Analyzer RAID Agent on the host OS.
- Only VMware supports OVA installations.
- VMware vSphere HA is available for all Hitachi Ops Center products.

Hitachi Ops Center web client requirements

Web browser	Version
Chrome	Latest version of stable channel
Edge	Latest version of stable channel
Firefox	ESR 128.x

OS changes based on security best practices (OVA)

The following OS setting changes are applied to the OVA to strengthen security. You can revert to the original settings if necessary. These OS settings can also be applied for the Ops Center products installed by using the installer.

Note that Hitachi Vantara does not take responsibility for, or support any interactions between, third-party programs and these OS settings.

- /etc/modprobe.d/CIS.conf

Additional settings:

```
install cramfs /bin/true
install freevxfs /bin/true
install jffs2 /bin/true
install hfs /bin/true
install hfsplus /bin/true
install squashfs /bin/true
install udf /bin/true
install vfat /bin/true
install dccp /bin/true
install sctp /bin/true
install rds /bin/true
install tipc /bin/true
```

- /etc/fstab

Original settings:

/dev/mapper/ol-home	/home	xfs	defaults	0 0
---------------------	-------	-----	----------	-----

Additional settings:

/dev/mapper/ol-home	/home	xfs	defaults,nodev	0 0
---------------------	-------	-----	----------------	-----

- /etc/sysctl.conf

Additional settings:

```
net.ipv4.conf.default.accept_redirects = 0
net.ipv4.conf.all.accept_redirects = 0
net.ipv4.conf.default.send_redirects = 0
net.ipv4.conf.all.send_redirects = 0
net.ipv4.conf.all.secure_redirects = 0
net.ipv4.conf.default.secure_redirects = 0
net.ipv6.conf.all.accept_redirects = 0
net.ipv6.conf.default.accept_redirects = 0
net.ipv4.icmp_echo_ignore_broadcasts = 1
net.ipv4.icmp_ignore_bogus_error_responses = 1
net.ipv4.conf.all.rp_filter = 1
net.ipv4.conf.default.rp_filter = 1
net.ipv4.tcp_synccookies = 1
net.ipv6.conf.all.accept_ra = 0
net.ipv6.conf.default.accept_ra = 0
kernel.randomize_va_space = 2
net.ipv4.conf.all.log_martians = 1
net.ipv4.conf.default.log_martians = 1
fs.suid_dumpable = 0
net.ipv4.conf.all.accept_source_route = 0
net.ipv4.conf.default.accept_source_route = 0
net.ipv4.ip_forward = 0
```

- /etc/motd, /etc/issue, /etc/issue.net

Additional settings:

Authorized uses only. All activity may be monitored and reported.



Note: The default lines that identify the system name and kernel version for the login prompt in /etc/issue and /etc/issue.net have been removed.

- Affected OVA/OVFs and exceptions

Item	OVA
/etc/modprobe.d/CIS.conf	Hitachi Ops Center OVA *1 Analyzer OVA Analyzer probe OVA Analyzer viewpoint OVF *2
/etc/fstab	Analyzer probe OVA
/etc/sysctl.conf	Hitachi Ops Center OVA *3*4 Analyzer OVA *3

Item	OVA
	Analyzer probe OVA *3 Analyzer viewpoint OVF
/etc/motd, /etc/issue, /etc/ issue.net	Hitachi Ops Center OVA Analyzer OVA Analyzer probe OVA Analyzer viewpoint OVF
	*1 Except "install udf /bin/true" *2 Except "install vfat /bin/true" *3 Except ipv6 settings. *4 Except "net.ipv4.ip_forward = 0"

Hitachi Ops Center OVA requirements

Included products

The Hitachi Ops Center OVA includes the following products:

- Hitachi Ops Center Administrator
- Hitachi Ops Center Analyzer
- Hitachi Ops Center Analyzer detail view
- Hitachi Ops Center Automator
- Hitachi Ops Center API Configuration Manager
- Hitachi Ops Center Common Services
- Hitachi Ops Center Protector Master

Virtualization software (OVA)

The Ops Center OVA installation requires VMware vSphere Hypervisor (VMware ESXi) 7.0, 8.0, 8.0 update 1, 8.0 update 2, or 8.0 update 3.

Guest OS

Oracle Linux 9.4 (Architecture x86_64)

Virtual machine resource settings

The hardware system requirements for Ops Center differ depending on the scale of the system. For details of the scale, see "Hardware requirements based on system scale".

Item	Value
CPU	S: 8 cores M: 12 cores L: 16 cores
Memory	S: 28 GB (RAM) M: 36 GB (RAM) L: 48 GB (RAM)
Disk size	S: 600 GB M: 1,200 GB L: 2,300 GB When you use Protector to back up: S: 1,100 GB M: 2,900 GB L: 5,900 GB

Analyzer OVA requirements

Included products

The Analyzer OVA includes the following products:

- Hitachi Ops Center Analyzer
- Hitachi Ops Center Analyzer detail view

Virtualization software

VMware vSphere Hypervisor (VMware ESXi) 7.0, 7.0 update 3, 8.0, 8.0 update 1, 8.0 update 2, or 8.0 update 3



Note: Linux KVM and Microsoft Hyper-V are not supported because only VMware supports OVA installations.

Guest OS

Oracle Linux 9.4 (Architecture x86_64)

Virtual machine resource settings

The hardware system requirements for Ops Center differ depending on the scale of the system. For details of the scale, see "Hardware requirements based on system scale".

Item	Value
CPU	S: 7 cores M: 8 cores L: 8 cores
Memory	S: 12 GB (RAM) M: 20 GB (RAM) L: 28 GB (RAM)
Disk size	S: 250 GB M: 900 GB L: 1,800 GB

Installation directory

/opt/hitachi

Analyzer probe OVA requirements

Included products

The Ops Center Analyzer probe OVA includes the following products:

- Hitachi Ops Center Analyzer probe
- Hitachi Ops Center Analyzer Virtual Storage Software Agent
- Hitachi Ops Center API Configuration Manager
- Hitachi Ops Center Protector Client

Virtualization software

VMware vSphere Hypervisor (VMware ESXi) 7.0, 7.0 update 3, 8.0, 8.0 update 1, 8.0 update 2, or 8.0 update 3



Note: Linux KVM and Microsoft Hyper-V are not supported because only VMware supports OVA installations.

Guest OS

Oracle Linux 9.4 (Architecture x86_64)

Virtual machine resource settings

The hardware system requirements for Ops Center differ depending on the scale of the system. For details of the scale, see "Hardware requirements based on system scale".

Item	Value
CPU	S: 4 cores M: 8 cores L: 16 cores
Memory	<p>Data collection using command device^{*1}</p> <p>S: 12 GB (RAM) M: 32 GB (RAM) L: 52 GB (RAM)</p> <p>Data collection using SVP and REST API^{*2}</p> <p>S: 8 GB (RAM) M: 20 GB (RAM) L: 36 GB (RAM)</p> <p>*1When RAID Agent is configured to monitor storage systems by using Access Type 1 or 2.</p> <p>*2When RAID Agent is configured to monitor storage systems by using Access Type 3 or 4. If you are performing both data collection by using command devices and data collection by using the SVP and REST API, the system requirements for data collection using command devices apply.</p>

Item	Value
	<p>See <i>Hitachi Ops Center Analyzer Installation and Configuration Guide</i>:</p> <ul style="list-style-type: none"> ▪ Configuring the RAID Agent to monitor Hitachi Enterprise Storage Systems ▪ Setting up RAID Agent ▪ Selecting the data collection method
Disk space	<p>S: 300 GB</p> <p>M: 500 GB</p> <p>L: 500 GB</p>

Installation directory

/opt/hitachi

Analyzer viewpoint OVF requirements

Included products

The Ops Center Analyzer viewpoint OVF includes the following products:

- Hitachi Ops Center Analyzer viewpoint
- Hitachi Ops Center Common Services

Virtualization software

Product name	Version
VMware	vCenter Server
	ESXi

Guest OS

Oracle Linux 9.4 (Architecture x86_64)

Virtual machine resource settings

The hardware system requirements for Ops Center differ depending on the scale of the system. For details of the scale, see "Hardware requirements based on system scale".

Item	Value
CPU	S: 4 cores M: 6 cores L: 6 cores
Memory	S: 12 GB (RAM) M: 16 GB (RAM) L: 44 GB (RAM)
Disk size	S: 1,000 GB M: 1,000 GB L: 4,000 GB

Installation directory

/opt/hitachi

Hitachi Ops Center Server Express installer requirements

Included products

The Server Express installer includes the following products:

- Hitachi Ops Center Administrator
- Hitachi Ops Center Analyzer
- Hitachi Ops Center Analyzer detail view
- Hitachi Ops Center Analyzer viewpoint
- Hitachi Ops Center Automator
- Hitachi Ops Center API Configuration Manager
- Hitachi Ops Center Common Services
- Hitachi Ops Center Protector Master

Supported OS

Red Hat Enterprise Linux 8.8, 8.10, 9.2, 9.4 (x64)
 Oracle Linux 8.8, 8.10, 9.2, 9.4 (Unbreakable Enterprise Kernel) (x64)
 Oracle Linux 8.8, 8.10, 9.2, 9.4 (Red Hat Compatible Kernel) (x64)

Hitachi Ops Center Client Express installer requirements

Included products

The Client Express installer includes the following products:

- Hitachi Ops Center Analyzer probe server
- Hitachi Ops Center Protector Client
- Hitachi Ops Center API Configuration Manager

Supported OS

Red Hat Enterprise Linux 8.8, 8.10, 9.2, 9.4 (x64)
 Oracle Linux 8.8, 8.10, 9.2, 9.4 (Unbreakable Enterprise Kernel) (x64)
 Oracle Linux 8.8, 8.10, 9.2, 9.4 (Red Hat Compatible Kernel) (x64)

Approximate size of resources regarding system scale (Reference information)

This table contains approximate resource maximum numbers associated with the system scale.

System scale	Maximum number of resources		
	Storage		
	LUN	Host Group	HBA WWN/iSCSI Name*
Small scale	20,000	500	500
Medium scale	80,000	2,500	2,000
Large scale	200,000	5,000	5,000

System scale	Maximum number of resources					
	Storage					
	LUN	Host Group	HBA WWN/iSCSI Name*			
If you will manage a system that exceeds Large scale, contact customer support.						
* World Wide Name or iSCSI name of the host bus adapter registered to the host group						

Combined system requirements of Ops Center products

Representative combinations of products and hardware system requirements are as follows.

Management Server

Product	Product sets								
	A	B	C	D	E	F ¹	G	H ²	I ³
Common Services	✓	✓	✓	✓	✓	✓	✓		✓
Administrator	✓	✓	✓	✓	✓	✓	✓		
Analyzer server			✓	✓	✓	✓	✓	✓	
Analyzer detail view server	✓		✓	✓	✓	✓	✓	✓	
Protector Master		✓		✓	✓	✓	✓		
Automator						✓ ⁴	✓ ⁴		
API Configuration Manager					✓	✓	✓		
Analyzer viewpoint							✓		✓
1. Hitachi Ops Center OVA 2. Analyzer OVA 3. Analyzer viewpoint OVF									

Product	Product sets								
	A	B	C	D	E	F ¹	G	H ²	I ³
4. Add the hardware resources (CPU 4 core and Memory 12 GB) if High Performance Mode of Automator is used.									

Resource	Resource sets								
	A	B	C	D	E	F	G	H	I
Processor CPU (cores)	S	8	8	8	8	8	8	7	4
	M	10	10	10	10	12	12	8	6
	L	14	14	14	14	16	16	8	6
Memory (GB)	S	20	22	23	24	28	28	32	12
	M	23	23	29	32	36	36	48	16
	L	28	32	36	44	48	48	76	44
Disk space (GB)	S	240	200	340	450	460	500	1,500	250
	M	790	200	890	1,000	1,010	1,050	2,050	900
	L	1,790	200	1,890	2,000	2,010	2,050	6,050	1,800
									1,000

Analyzer probe server (Analyzer probe OVA)

Product	Product sets	
	A	
Analyzer probe server	✓	
Protector Client	✓	
API Configuration Manager	✓	

Resource	Resource sets	
	A	
Processor CPU (cores)	S	4

Resource	Resource sets	
	A	
	M	8
	L	16
Memory (GB)	S	<p>Data collection using command device (Access Type 1 or 2)</p> <p>12</p> <p>Data collection using SVP and REST API (Access Type 3 or 4)</p> <p>8</p>
	M	<p>Data collection using command device (Access Type 1 or 2)</p> <p>32</p> <p>Data collection using SVP and REST API (Access Type 3 or 4)</p> <p>20</p>
	L	<p>Data collection using command device (Access Type 1 or 2)</p> <p>52</p> <p>Data collection using SVP and REST API (Access Type 3 or 4)</p> <p>36</p>
Disk space (GB)	S	200
	M	400
	L	400

For combinations other than the listed in the previous section, add the values of the system requirement for each product or contact customer support.

Hitachi Vantara

Corporate Headquarters
2535 Augustine Drive
Santa Clara, CA 95054 USA

HitachiVantara.com/contact

