



Lenovo XClarity Orchestrator Product Guide

Lenovo XClarity Orchestrator (LXCO) provides centralized monitoring, management, provisioning, and analytics for environments with large numbers of devices. It leverages existing resource managers (such as Lenovo XClarity Administrator, Lenovo XClarity Management Hub and Schneider Electric EcoStruxure IT Expert) across multiple sites to view overall health, collect device inventory and health summaries, drill down into device details, view event and audit logs, and apply updates to managed resources.

XClarity Orchestrator can support an unlimited number of resource managers that collectively manage a maximum of 10,000 devices.



Figure 1. Lenovo XClarity Orchestrator architecture

Did you know?

With the latest support for ThinkEdge Client Devices being managed via the XClarity Management Hub, this enables you to manage Lenovo ThinkSystem, ThinkAgile, ThinkEdge Servers and ThinkEdge client devices all from the one Lenovo XClarity Orchestrator (LXCO) interface for a complete data center-to-edge management solution.

Features

Lenovo XClarity Orchestrator (LXCO) has the following features.

- · Centralized monitoring and management of resources
- Provisioning updates
- Provisioning server configuration
- Provisioning operating systems
- Service and support
- · Business intelligence machine learning and predictive analytics

Centralized monitoring and management of resources

XClarity Orchestrator provides a single interface to monitor and manage resource managers and the devices that are managed through those resource managers.

LXCO provides:

- Summary views of the health of your managed resources, including resource managers, devices, and infrastructure resources (such as PDUs and UPSs)
- Summary and detailed views of component health, asset inventory, warranty status, and advisories for devices across multiple sites
- Aggregation of critical alerts and events, creating custom alerts, and forwarding events to external applications
- Life-cycle control for managed devices (including power operations)
- Launch in context to the user interface for resource managers and managed devices from the device summary pages

Provisioning updates

You can use XClarity Orchestrator to maintain current software levels on managed resources. You can use the updates catalog to know what software levels are available, use update-compliance policies to identify which resources need to be updated based on custom criteria, and then deploy the desired updates to those resources. LXCO ensures that software is provisioned on the target resources in the correct order.

LXCO supports the following provisioning operations:

- Deploying updates to Lenovo XClarity Administrator resource managers.
- Deploying firmware updates to devices that are managed by XClarity Administrator.

For more information about provisioning updates, see Provisioning updates to managed resources.

Provisioning server configuration

You can quickly provision managed servers using a consistent configuration. Configuration settings (such baseboard management controller and UEFI settings) are saved as a pattern that can be applied to multiple servers.

XClarity Orchestrator does not directly deploy configuration patterns to managed servers. Instead, it sends a request to the applicable resource manager to start a job to perform the deployment, and then tracks the progress of the request.

For more information about provisioning server configurations, see Provisioning server configurations.

Provisioning operating systems

You can use XClarity Orchestrator to deploy operating-system images to multiple servers. XClarity Orchestrator does not directly deploy operating system to managed servers. Instead, it sends a request to the applicable XClarity Administrator resource manager to start a job to perform the update, and then tracks the progress of the request.

Note: The OS deployment feature requires XClarity Administrator v4.0 or later.

For more information about provisioning server configurations, see Provisioning operating systems.

Service and support

XClarity Orchestrator can be set up to collect and send diagnostic files automatically to Lenovo Support using Call Home when certain serviceable events occur in managed resources. You can also manually collect diagnostic files, open a problem record, and send diagnostic files to the Lenovo Support Center.

For more information about service and support, see Working with service and support.

Business intelligence machine learning and predictive analytics

XClarity Orchestrator can connect to third-party services (such as Splunk) for business intelligence machine learning and predictive analytics to:

- Collect and display trend data (such as processor and memory utilization, power consumption, temperature, unauthorized access, repeated and lost events, and mean time between processes like firmware updates and system reboots)
- Uses metric data to predict failures (such as repeated events and health reports)
- Create custom analytics reports based on existing data, including alerts, events, device inventory, and device metrics.
- Define custom alert rules that, when enabled, raise alerts when specific conditions exist in your environment.

User Interface

The LXCO User Interface is menu driven and provides the following options:

- Dashboard
- Resources
- Monitoring
- Administration
- Maintenance

Dashboard

The Dashboard is the hub of Lenovo XClarity Orchestrator that provides access to information that is important to you. It contains report cards that each summarize the status of resources and activities in your environment, including devices health, vulnerabilities, compliance, and alerts.



Figure 2. Dashboard

You can also view the following:

- Type, version, status, and connectivity of each resource manager.
- Status of all devices that are managed across all resource managers.
- Detailed information about each device, including the overall summary of device health and status, inventory, alerts and events, usage, and firmware.
- Alerts which can be hardware or management conditions that require investigation and user action. Lenovo XClarity Orchestrator polls the resource managers asynchronously and displays alerts that are received from those managers.
- Historical list of all resource and audit events.
- Events and alerts that are generated by Lenovo XClarity Orchestrator and retrieved from the resource managers.

Resources

From Resources you can navigate to Resource Managers, Servers, Storage, Switches, Chassis Infrastructure and Groups.



Figure 3. Resources menu

The following view is an example of the Servers view, the other options have very similar looking views.

XC =	Hor	me / Resources / Serv	ers						Current scop	e: All Resources 🔻		
ي بر ⇔ يو بر	(Devices	Oldest: 6/ 8 - 7Y9 8 - 702 7 - 7X0 6 - 7X1 5 - 953 5 - 7Y9 4 - 724 4 - 727 4 - 727 4 - 7X2	23/22 2/CT01WW X/CT01WW 5/CT01WW 2/AC1 2/AC1 4/CT02WW 5/CT01WW 4/CT02WW 3/CT01WW	Device Analytics VW Number of Devices VW 5 VW 2 1 - VW 0 0 06/24 06/25 06/26 06/27 06/28 06/29 06/30 VW VW <th>Laci 7 Days *</th> <th colspan="4">Analyze by Machine Type Model * Status on 06/30 (0) 0 - 7Y92/CT01WW (0) 0 - 7D2X/CT01WW (0) 0 - 7X05/CT01WW (0) 0 - 7X12/CT01WW (0) 0 - 7X12/CT01WW (0) 0 - 7324/CT02WW (0) 0 - 7244/CT02WW (0) 0 - 7Z44/CT02WW (0) 0 - 7Z3/CT01WW (0) 0 - 7Z3/CT01WW (0) 0 - 7X21/CT01WW (0) 0 - 7X21/CT01WW</th>			Laci 7 Days *	Analyze by Machine Type Model * Status on 06/30 (0) 0 - 7Y92/CT01WW (0) 0 - 7D2X/CT01WW (0) 0 - 7X05/CT01WW (0) 0 - 7X12/CT01WW (0) 0 - 7X12/CT01WW (0) 0 - 7324/CT02WW (0) 0 - 7244/CT02WW (0) 0 - 7Z44/CT02WW (0) 0 - 7Z3/CT01WW (0) 0 - 7Z3/CT01WW (0) 0 - 7X21/CT01WW			
	Servers	s server : ch-vx7520a mt-x240M5e mt-x240m5d mt-x240c	Launch Remote Control Status - Warning Warning Warning Warning	Power Actions Power Actions Connectivity : Online Online Online Online Online	All Actions Power: On on off off off off	Filters ~ IP Addresses : 192.168.56.199,169 192.168.48.169,169 192.168.48.174,169 192.168.48.168,169	Product Name : ThinkAgile VX7520 Lenovo Flex Syste Lenovo Flex Syste IBM Flex System x	Type-Model : 7Y94/CTO2WW 9532/AC1 9532/AC1 8737/F2G	System Firmware : IVE178J / 3.32 (6/22/ C4E140C / 2.90 (1/1! C4E148E / 3.30 (7/21 B2E1728US / 2.70 (6	See Advisory : 0 0 0 0	arch Q Groups : Not Available Not Available Not Available Not Available	×

Figure 4. Servers view

From each of the views you can then select an individual device for specific information on that device as shown below:

XC larity Orchestrator	X Home / Resources / Servers / mt-	-x240M5e / Summary	Current scope: All Resources 👻 💄 USERID 👻					
1 Dashboard	mt-x240M5e Lenovo Flex System x240 M5 Compute	Status Front Operator Panel Active Alerts	Service Tickets O Open Tickets O Closed Tickets	Warranty Active Starting: 7/31/16, 1:00 AM				
Resources •	Summary		0 In Progress Tickets 0 Other Tickets 0 On Hold Tickets	Expired Ending: 8/9/19, 1:00 AM				
Resource Managers	Inventory							
Servers	Alerts Log Events Log	Quick Actions 2	Inventor	ry Health				
Storage	Firmware	Launch Remote Control	Processors Memory Local Storage	PCI Devices System Board Other				
Switches	Service	👌 Service	2 Installed 8 Installed 4 Installed	10 Installed				
Chassis		Device Information						
Infrastructure		Product Lenovo Flex System x240 M5						
Groups		Name Compute Node User Defined Name mt-x240M5e						
🚣 Monitoring 👻		Health Status Warning 🛓 Power State Off 🕘						
🚽 Provisioning 👻		Hostname mt-x240m5e-imm Rack Name/Unit MT / Unit 1						
🐼 Analytics 👻		IP Addresses						
Administration -		Machine Type 9532						

Figure 5. Device view

Monitoring

Alerts

From Monitoring you can navigate to Alerts

xc	⊟ Hon	ne / Monitoring / Alerts						Current scope: All Resources	USERID ¥
A					Alerts Analytics				Analyze by Severity *
 ♦ • •		38 Alerts	8 Critical 30 Warning 🛦 Oldest: 6/23/22	Nu	mber of Alerts	5/26 06/27 06/28 Time Informational	• • • • • • • • • • • • • •	Status on 06/30 (0) 7 - Critical (0) 26 - Warning ▲	
⊷ بر	Alerts Alerts ind	icate hardware or manageme	ent conditions that need invest	igation and user action.					
	C ®	ଷ୍ଟ୍ଟ ସ	All Actions * Filters *						Search Q X
		Date and Time \sim	Severity 0	Alert 0	Resource 0	Serviceability 0	Resource Type 0	Source Type 0	Groups 0
	0	6/28/23, 3:55 PM	8 Critical	Hard drive 0, (Drive 0) fault.	mt-x240b	None	Server	Device	Not Available
	0	6/28/23, 3:55 PM	Critical	The Drive 0 has been disabl	mt-x240b	Serviceable	Server	Device	Not Available
	0	6/23/23, 7:10 AM	🔺 Warning	The firmware installed on th	XClarity Administrator 0	None	Server	Management	Not Available
	0	6/23/23, 7:10 AM	🛦 Warning	The firmware installed on th	XClarity Administrator 0	None	Server	Management	Not Available
	0	6/22/23, 11:17 AM	😢 Critical	Sensor SysBrd Vol Fault has	mt-x240M5a	Luser	Server	Device	Not Available

Figure 6. Alerts view

Events

From Lenovo XClarity Orchestrator, you have access to a historical list of all resource and audit events.

XC larity Orchestrator	trator X Home / Monitoring / Events Current scope: All Resources * 🛓 USERID *										
n Dashboard	Events The Even	; nt log provides a history of h	nardware and management o	onditions that have been detected	f (resource events) and	d an audit trail of user actions (audi	t events).				
😂 Resources -	Resources Resource Events Audit Events										
∿ Monitoring	C	© a⁺ a′ ⊡	All Actions 👻 Filters 🍷					Search Q X			
Δlerts		Date and Time ~	Severity 0	Event 0	Resource 0	Serviceability :	Resource Type 0	Groups 0			
	0	6/30/23, 10:47 AM	Informational	The SSL/TLS certificate prov	Not Available	None	Not Available	Not Available			
Events	0	6/30/23, 10:47 AM	🛦 Warning	Inventory data could not be	Not Available	LUser	Not Available	Not Available			
Forwarding	0	6/30/23, 10:46 AM	i Informational	One or more external LDAP	Not Available	None	Not Available	Not Available			
Jobs	0	6/30/23, 10:46 AM	S Critical	All external LDAP servers ar	Not Available	Luser	Not Available	Not Available			
👃 Provisioning	- 0	6/30/23, 10:46 AM	🙁 Critical	The device health state cha	Not Available	None	Not Available	Not Available			
Analytics	. 0	6/30/23, 10:45 AM	i Informational	The SSL/TLS certificate prov	Not Available	None	Not Available	Not Available			
Administration	0	6/30/23, 10:45 AM	🗼 Warning	Inventory data could not be	Not Available	LUSER	Not Available	Not Available			
-	0	6/30/23, 10:43 AM	i Informational	The SSL/TLS certificate prov	Not Available	None	Not Available	Not Available			
Maintenance	0	6/30/23, 10:43 AM	🗼 Warning	Inventory data could not be	Not Available	Luser	Not Available	Not Available			
	0	6/30/23, 10:41 AM	🔥 Warning	Inventory data could not be	Not Available	LUSER	Not Available	Not Available			
	0	6/30/23, 10:41 AM	i Informational	The SSL/TLS certificate prov	Not Available	None	Not Available	Not Available			

Figure 7. Events view

Event types explained:

- A resource event identifies a hardware or orchestrator condition that occurred on a managed device, resource manager, or XClarity Orchestrator. You can use these events to track and analyze hardware and orchestrator-server related issues.
- An audit event is a record of user activities that were performed from a resource manager or XClarity Orchestrator. You can use these audit events to track and analyze authentication-related issues.

Data Forwarders

Data Forwarders enable the ability to forward event, inventory, and metric data from Lenovo XClarity Orchestrator to external applications, which can then be used to monitor and analyze data.

XC larity Orchestrator	X Home / Monitoring / Forwarding	/ Data Forwarders		Current scope: All Resources 👻 💄 USERID 👻				
n Dashboard	 Data Forwarders Data Forwarder Filters 	Data Forwarders C + /						
😪 Resources 🛛 👻	Forwarder Destinations	Name :	Description :	Туре о	State ::	Exclude event :		
Monitoring -	Report Forwarders	No data to display						
Alerts		0 Selected / 0 Total						
Events								
Forwarding								
Jobs								
J Provisioning -								

Figure 8. Data Forwarders

Job Status

Jobs are long-running tasks that run in the background. You can view a log of all jobs that are started by Lenovo XClarity Orchestrator.

xc	Home / Monitoring / Jobs Current scope: All Resour									
ft f	Jobs Jobs are longer running tasks performed against one or more target systems. You can choose to delete a job or view its details.									
>	C 📅 C + All Actions * Filters *									
^		Job name 0	Status ~	Progress 0	Start time 0	Complete time 0	Target :	Category 0		
Ł	0	Updating connection deta	Complete	100%	Dec 14, 2022, 8:13:36 AM	Dec 14, 2022, 8:13:36 AM	de-lxca.eu.lenovo.com	Management		
ø	0	Updating connection deta	Complete	100%	Dec 14, 2022, 8:13:30 AM	Dec 14, 2022, 8:13:30 AM	de-lxca.eu.lenovo.com	Management		
\$	0	Connect manager de-lxca	Complete	100%	Dec 13, 2022, 12:37:05 PM	Dec 13, 2022, 12:37:07 PM	Not Available	Management		
	0	Refresh multiple catalogs	 Complete 	100%	Nov 9, 2022, 4:56:09 PM	Nov 9, 2022, 4:58:29 PM	XClarity Orchestrator	Updates		
6	0	Refresh multiple catalogs	 Complete 	100%	Aug 31, 2022, 9:59:50 AM	Aug 31, 2022, 10:03:54 AM	XClarity Orchestrator	Updates		
	0	Refresh multiple catalogs	Complete	100%	Jul 1, 2022, 12:43:15 PM	Jul 1, 2022, 12:53:40 PM	XClarity Orchestrator	Updates		
	0	Updating connection deta	Complete	100%	Jun 27, 2022, 3:13:20 PM	Jun 27, 2022, 3:13:20 PM	ch-lxca.eu.lenovo.com	Management		
	0	Connect manager ch-lxca	 Complete 	100%	Jun 25, 2022, 9:44:44 AM	Jun 25, 2022, 9:44:47 AM	Not Available	Management		
	0	Connect manager mt-lxca	Complete	100%	Jun 23, 2022, 6:07:11 PM	Jun 23, 2022, 6:07:12 PM	Not Available	Management		
	0	Connect manager de-lxca	🕑 Complete	100%	Jun 23, 2022, 5:55:49 PM	Jun 23, 2022, 5:55:51 PM	Not Available	Management		
	0 Selected	/ 24 Total Rows per page: 10 💌								

Figure 9. Job Status

Administration

From Administration you can navigate to:

Security

It is important that you evaluate the security requirements in your environment, understand all security risks, and minimize those risks. Lenovo XClarity Orchestrator includes several features that can help you secure your environment.



Figure 10. Security

See the following security considerations:

• Cryptography considerations

Lenovo XClarity Orchestrator supports TLS 1.2 and stronger cryptographic algorithms for secure network connections. For increased security, only high-strength ciphers are supported.

• Security-certificate considerations

Lenovo XClarity Orchestrator uses SSL certificates to establish secure, trusted communications between XClarity Orchestrator and its managed resource managers (such as Lenovo XClarity Administrator or Schneider Electric EcoStruxure IT Expert) as well as communications with XClarity Orchestrator by users or with different services. By default, XClarity Orchestrator and Lenovo XClarity Administrator use XClarity Orchestrator-generated certificates that are self-signed and issued by an internal certificate authority.

• Authentication-server considerations

You can choose to use the local Lightweight Directory Access Protocol (LDAP) server or another external LDAP server as the authentication server. The *authentication server* is a user registry that is used to authenticate user credentials. Lenovo XClarity Orchestrator supports two types of authentication servers:

- Local authentication server. By default, XClarity Orchestrator is configured to use the local (embedded) LDAP server that resides in the orchestrator server.
- External LDAP server. Microsoft Active Directory is supported as an external LDAP server. This server must reside on an outboard Microsoft Windows server that is connected to the management network.

For more information about setting up external LDAP servers, see Setting up an external LDAP authentication server.

Access-control considerations

Lenovo XClarity Orchestrator also uses access-control lists (ACLs) to determine which resources (devices, resource managers, and XClarity Orchestrator) users can access. When a user has access to a specific set of resources, that user can see data (such as inventory, events, alerts, and analytics) that is related to only those resources.

• High availability

For high availability for Lenovo XClarity Orchestrator, you should use the high availability features that are part of the host operating system or hypervisor.

Service and Support

Lenovo XClarity Orchestrator provides a set of tools that you can use to collect and send service files to Lenovo Support, set up automatic notification to service providers when certain serviceable events occur on specific devices, view service-ticket status, and warranty information. You can contact Lenovo Support to get help and technical assistance when you run into problems.

XC larity Orchestrator	X Home / Administration / Service	sources 👻 💄 USERID 👻	
 n Dashboard ⇒ Resources - 	Service Data Service Actions Warranty	Device Service Data Use this page to download diagnostic files collected from the devices. C $\stackrel{\bullet}{=}$ $\stackrel{\bullet}{=}$ $\stackrel{\bullet}{=}$ $\stackrel{\bullet}{=}$ $\stackrel{\bullet}{=}$ All Actoons $\stackrel{\bullet}{=}$ Filters $\stackrel{\bullet}{=}$	Search Q X
<u>∿</u> Monitoring →	Call Home Configuration	File : Device : Date and Time : Groups :	Parse Status :
📙 Provisioning 👻	Periodic Data Upload	7273CT01WW_J802RAVE_xc It-sr650v2c-sc.zeu.lenovo.com 11/17/22_1:07 PM Not Available 0 Selected / 1 Total Rows per page 13 *	Parsing Failed
 Analytics Administration 		Orchestrator Service Data Save the XClarity Orchestrator service data file to your local workstation.	
Security		Save As	
Service and Support			
Networking			(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
Date and Time			

Figure 11. Service and Support

Networking

Within *Networking* you can configure a single network interface (using IPv4 and IPv6 settings), Internet routing settings, and proxy settings

XClarity Orchestrator	K Home / Administration / Networking	Current scope: All Reso	Current scope: All Resources 👻 🚨 USERID 👻		
n Dashboard	IPv4 Configuration	IPv6 Configuration	Quick Access		
🗢 Resources 🗸 🗸	IPv4 Enabled Method Use statically assigned IP address	IPv6 Disabled Method Use stateless address auto configuration	IP Configuration DNS Configuration		
💤 Monitoring 👻	IPv4 Address *	IPv6 Address	Proxy Configuration		
📮 Provisioning 🗸 👻	IPv4 Network Mask *	IPv6 Prefix Length			
🙆 Analytics 👻	IPv4 Default Gateway	IPv8 Default Gateway			
Administration -					
Security	Apply Reset	Apply Reset			
Service and Support	DNS Configuration				
Networking	▲ If you change DNS settings, you must restart the orchestrator server to apply the ch Preferred DNS address type	anges. Host Name			
Date and Time	DHCP DNS Disabled Disabled	Nethod			
مر Maintenance	2nd DNS Address	Domain Name			
	Apply Reset				

Figure 12. Networking

Date & Time

As a requirement you must set up at least one (and up to four) Network Time Protocol (NTP) server to synchronize the timestamps for Lenovo XClarity Orchestrator with events that are received from resource managers.

Note: The XClarity Orchestrator virtual appliance and its host must be set to synchronize to the same time source to prevent inadvertent time mis-synchronization between XClarity Orchestrator and its host.

XC	larity Orchestrator	X Home / Administration / Date and Time	
A	Dashboard	Date and Time Date and time will be automatically synchronized with the NTP Server	
٢	Resources 👻		
^∕	Monitoring -	Date 6/30/23 Time 09:43:26	
Ł	Provisioning -	Time Zone UTC -00:00, Coordinated Universal Time Universal	
ø	Analytics 🗸	Time Zone * UTC -00:00, Coordinated Universal Time Universal	.
\$	Administration -	NTP Servers 🕐	
	Security	NTP Servers 1 FQDN or IP Address * http://www.interconductionscience.com/servers/address/addr	×
	Service and Support	ntp2	×
	Networking	+	
	Date and Time		
J.	Maintenance	Арріу	

Figure 13. Date & Time

Maintenance

Maintenance provides information about License and Orchestrator Server updates.

XClarity Orchestrator	X Home / Maintenance / License				Current scope: All Re	esources 👻 📥 USERID 💌			
n Dashboard	License License Information Orchestrator Server Update C D Image: All Actions * Filters * Search C								
😪 Resources 🗸 👻		Product :	License Key Description	Number of licenses 0	Expiration Date :	Status :			
Nonitoring -		O XClarity Orchestrator	Lenovo SYSTEM X FEATURE O	500	6/11/25	Active			
📮 Provisioning 👻		O XClarity Orchestrator Analytics	Lenovo SYSTEM X FEATURE O	500	6/11/25	Active			
🗔 Analytics 👻		O XClarity Pro	Lenovo SYSTEM X FEATURE O	500	6/11/25	Active			
🔅 Administration 👻		0 Selected / 3 Total Rows per page: 10 🔻							
& Maintenance									

Figure 14. License



Figure 15. LXCO Server updates

Provisioning resources

You can use Lenovo XClarity Orchestrator for the following provisioning options for your managed resources, such as deploying updates to Lenovo XClarity Administrator resource managers and managed servers, configuring managed servers and deploying Operating Systems.

Provisioning updates to managed resources

You can use Lenovo XClarity Orchestrator to maintain current software levels on Lenovo XClarity Administrator resource managers and managed servers. You can use the updates catalog to know what software levels are available, use update-compliance policies to identify which resources need to be updated based on custom criteria, and then deploy the desired updates to those resources.



Figure 16. Provisioning updates to managed resources

For details, see https://pubs.lenovo.com/lxco/provision-updates.html

Provisioning server configurations

Server-configuration patterns are used to quickly configure multiple servers from a single set of defined configuration settings. Each pattern defines the configuration characteristics for a specific type of server. You can create a server pattern by learning the settings from an existing server.

For details, see https://pubs.lenovo.com/lxco/provision-serverconfig.html



Figure 17. Provisioning server configurations

Provisioning operating systems

You can use Lenovo XClarity Orchestrator to manage the OS-images repository and deploy operatingsystem images.

For details, see https://pubs.lenovo.com/lxco/provision-os.html



Figure 18. Provisioning operating systems

Analytics

Lenovo XClarity Orchestrator generates analytics alerts based on known hardware and firmware issues, monitors trends to detect anomalies that occur in your managed resources and builds heuristics that can calculate the likelihood of impending problems or failures. The trends are visualized as queries, graphs, and charts that show the compliance status, problem history, and breakdown of resources that have the most problems. You can then analyze these trends to get insights into the cause of problems and resolve them quickly.

Important: The analytics functions are supported for ThinkAgile, ThinkSystem, and ThinkEdge servers running XCC firmware v1.4 or later.

To use the analytics functions, a Lenovo XClarity Orchestrator Analytics license is needed for each device that supports the analytics functions. See the Download and ordering information section for ordering information.

For more information on the capabilities of XClarity Orchestrator Analytics see https://pubs.lenovo.com/lxco/analyze.html

Licensing

Lenovo XClarity Orchestrator is a for-fee application and thus requires a Software entitlement license to be purchased. When managing XClarity Administrator resource Managers this is additional to the XClarity Pro Licensing which is required for the resource managers (i.e. XClarity Administrator). You can use XClarity Orchestrator for free for up to 90 days using the free-trial license; however, after the free trial expires, you must purchase and install Lenovo XClarity Orchestrator Standard licenses for all managed devices to continue using XClarity Orchestrator.

License options for XClarity Orchestrator include:

- Lenovo XClarity Orchestrator. This license provides entitlement for service and support and enablement of all management functions for a single device.
- Lenovo XClarity Orchestrator Edge Client Devices Licensing. This license provides entitlement for service and support and enablement of all management functions for a single Edge Client device.
- Lenovo XClarity Orchestrator Analytics. This license provides entitlement to use the analytics functions within XClarity Orchestrator for each managed device supporting this capability.

You must purchase a license for each managed device. A license is not tied to specific devices.

License compliance is determined based on the number of devices that are managed by XClarity Orchestrator. The number of managed devices must not exceed the total number of licenses in all active license keys. If XClarity Orchestrator is not in compliance with the installed licenses (for example, if licenses expire or if managing additional devices exceeds the total number of active licenses), you have a grace period of 90 days to install appropriate licenses.

If licenses are already installed, new licenses are *not* required when upgrading to a new release of XClarity Orchestrator.

For information about purchasing XClarity Orchestrator licenses, contact your Lenovo representative or authorized business partner.

Download and ordering information

Lenovo XClarity Orchestrator is available to download from Lenovo at the following link:

https://datacentersupport.lenovo.com/solutions/ht509976-lenovo-xclarity-orchestrator

The download includes a 90-day evaluation license.

Lenovo XClarity Orchestrator, Lenovo XClarity Orchestrator Edge Client Devices and Lenovo XClarity Orchestrator Analytics software entitlements licenses are available as 1-year, 3-year, or 5-year software subscription and support.

Lenovo XClarity Orchestrator and Lenovo XClarity Orchestrator Analytics licenses are available on a permanaged-endpoint basis or per-managed-chassis basis. The per chassis licenses offer a more costeffective way of purchasing licenses for the Flex System environment. Lenovo XClarity Orchestrator Edge Client Devices Licenses are available on a per-managed-client basis.

When you purchase XClarity Orchestrator, the order is fulfilled via electronic software delivery (ESD) using the Lenovo Key Management System (LKMS). The order is placed onto LKMS using an email address for the end user who has ordered the code. This email address is where the Activation Code is sent in PDF format (the email will come from kmsdev@lenovo.com). The recipient email address is the login to the LKMS system for administration and to manage the LKMS inventory.

The Activation code is redeemed via LKMS and the information about the *end customer* should be entered during the redemption process. The customer information is then used to send the electronic proof of entitlement (will come from sw_override@lenovo.com) and a welcome letter along with an explanation of how to obtain the code from the LKMS Site: https://fod.lenovo.com/lkms.

Although a full description of how to apply the XClarity Orchestrator licenses is available at the following link: https://pubs.lenovo.com/lxco/install-lxco-license.html

The part numbers for the different LXCO offerings are listed in the following tables.

Part number	Feature code	Description					
Per managed er	Per managed endpoint						
7S0X0001WW	S2JR	Lenovo XClarity Orchestrator, per Managed Endpoint w/1 Yr SW S&S					
7S0X0002WW	S2JS	Lenovo XClarity Orchestrator, per Managed Endpoint w/3 Yr SW S&S					
7S0X0003WW	S2JT	Lenovo XClarity Orchestrator, per Managed Endpoint w/5 Yr SW S&S					
Per managed Fle	ex System Chass	is					
7S0X0004WW	S2JU	Lenovo XClarity Orchestrator, per Managed Chassis w/1 Yr SW S&S					
7S0X0005WW	S2JV	Lenovo XClarity Orchestrator, per Managed Chassis w/3 Yr SW S&S					
7S0X0006WW	S2JW	Lenovo XClarity Orchestrator, per Managed Chassis w/5 Yr SW S&S					

Table 1. Ordering information - Lenovo XClarity Orchestrator

Table 2. Ordering	information -	Lenovo	XClarity 0	Orchestrator	Edge	Client

Part number	Feature code	Description		
Per managed client				
7S0X000EWW	SAYR	Lenovo XClarity Orchestrator Edge Client– Per Managed Client with 1Year SW S&S		
7S0X000FWW	SAYS	Lenovo XClarity Orchestrator Edge Client – Per Managed Client with 3 Years SW S&S		
7S0X000GWW	SAYT	Lenovo XClarity Orchestrator Edge Client – Per Managed Client with 5 Years SW S&S		

Table 3. Ordering information - Lenovo XClar	rity Orchestrator Analytics
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Part number	Feature code	Description	
Per managed endpoint			
7S0X0007WW	S2JX	Lenovo XClarity Orchestrator Analytics, per Managed Endpoint w/1 Yr SW S&S	
7S0X0008WW	S2JY	Lenovo XClarity Orchestrator Analytics, per Managed Endpoint w/3 Yr SW S&S	
7S0X0009WW	S2JZ	Lenovo XClarity Orchestrator Analytics, per Managed Endpoint w/5 Yr SW S&S	
Per managed Flex System chassis			
7S0X000AWW	S2K0	Lenovo XClarity Orchestrator Analytics, per Managed Chassis w/1 Yr SW S&S	
7S0X000BWW	S2K1	Lenovo XClarity Orchestrator Analytics, per Managed Chassis w/3 Yr SW S&S	
7S0X000CWW	S2K2	Lenovo XClarity Orchestrator Analytics, per Managed Chassis w/5 Yr SW S&S	

Supported host systems

XClarity Orchestrator runs in a virtual appliance on a host system. The following hypervisors are supported for installing XClarity Orchestrator:

- Microsoft Windows Server 2022 with Hyper-V installed (LXCO v2.0.0)
- Microsoft Windows Server 2019 with Hyper-V installed
- VMware ESXi 7.0
- VMware ESXi 6.7, U1, U2, and U3
- VMware ESXi 6.5, U1 and U2

However to view the latest Host software supported, as new versions are released please refer to the following link for the latest information:

https://pubs.lenovo.com/lxca/lxca_whatsnew

For Hyper-V, the virtual appliance is a virtual-disk image (VHD). For VMware ESXi, the virtual appliance is an OVF template.

The host system that is running the Lenovo XClarity Orchestrator virtual machine has the following *minimum* requirements:

- 4 virtual processor cores
- 16 GB memory
- 551 GB storage, across two attached disks.
 - 251 GB minimum for the virtual appliance (disk 0)
 - 100 GB for the updates repository (disk 1)
 - 200 GB for the OS-images repository (disk 2)

Note: You cannot increase or decrease the size of the disk that is used for the updates repository and OS-images repository.

Software prerequisites

XClarity Orchestrator requires the following software.

• Authentication server. XClarity Orchestrator uses an internal Lightweight Directory Access Protocol (LDAP) server, by default, for authentication.

If you choose to use an external authentication server, the following LDAP servers are supported:

- · Microsoft Active Directory running on Windows Server 2008 or later
- NTP server. A Network Time Protocol (NTP) server is required to ensure that timestamps for all events and alerts that are received from the resource managers and managed devices are synchronized with XClarity Orchestrator. Ensure that the NTP server is accessible over the management network (typically the Eth0 interface).

Consider using the local system on which XClarity Orchestrator is installed as the NTP server. If you do, ensure that the local system is accessible over the management network.

Supported managed endpoints

XClarity Orchestrator can support an unlimited number of resource managers that collectively manage a maximum of 10,000 devices.

XClarity Orchestrator supports the following resource managers.

• Lenovo XClarity Management Hub

XClarity Orchestrator manages, monitors, and provisions ThinkEdge Client devices that are under management by a Management Hub instance.

You can find a complete list of supported ThinkEdge Client devices and options (such as I/O, DIMMs, and storage adapters), minimum required firmware levels, and limitations considerations from the following page:

https://datacentersupport.lenovo.com/us/en/solutions/ht503455

For general information about hardware configurations and options for a specific device, see the Lenovo ServerProven web site, https://serverproven.lenovo.com/.

The XClarity Management Hub runs in a virtual appliance on a host system. The following hypervisors are currently supported for installing Lenovo XClarity Management Hub.

- VMware ESXi 7.0, U1, U2, and U3
- VMware ESXi 6.7, U1, U2, and U3

For VMware ESXi, the virtual appliance is an OVF template.

Note: For VMware ESXi 6.7 U2, you must use the ISO image VMware-ESXi-6.7.0.update02-13981272-LNV-20190630.iso or later.

Further Hardware and Software requirements for the XClarity Management hub can be found at the following link: https://pubs.lenovo.com/lxco/plan-prereqs-hub.html

• Lenovo XClarity Administrator v2.6 or later

XClarity Orchestrator manages, monitors, and provisions physical devices with management controllers that are under management by an XClarity Administrator instance.

XClarity Orchestrator supports all devices that are supported by XClarity Administrator and Lenovo XClarity Management Hub except where noted. You can find a complete list of supported devices and options (such as I/O, DIMM, and storage adapters), minimum required firmware levels, and limitations considerations from the following Lenovo XClarity Support webpages:

- ThinkSystem, ThinkAgile, ThinkEdge, System x, Converged HX, and NeXtScale rack and tower servers
- Flex System devices and ThinkSystem compute nodes
- ThinkServer rack and tower servers
- RackSwitch devices
- Storage devices

For general information about hardware configurations and options for a specific device, see the Lenovo ServerProven web site, https://serverproven.lenovo.com/.

Note: The OS deployment feature requires XClarity Administrator v4.0 or later.

• Schneider Electric EcoStruxure IT Expert

XClarity Orchestrator manages and monitors infrastructure resources, such as PDUs and UPSs, that are managed by EcoStruxure IT Expert

• VMware vRealize Operations Manager

XClarity Orchestrator monitors virtual workload metrics from vRealize Operations Manager.

Note: vRealize Operations Manager is not included in the list of resource managers, as it does not manage devices in XClarity Orchestrator.

Supported web browsers

The XClarity Orchestrator web interface works with the following web browsers.

- Chrome 80.0 or later
- Firefox ESR 68.6.0 or later
- Microsoft Edge 40.0 or late
- Safari 13.0.4 or later (running on macOS 10.13 or later)

Integration

XClarity Orchestrator supports the following integration applications:

- XClarity Orchestrator app for Splunk
- ServiceNow for XClarity Orchestrator
- XClarity Orchestrator Integration with Terraform

XClarity Orchestrator app for Splunk

Splunk is a tool for data-center operators to track and analyze event logs and other data. In due course Lenovo provides a Lenovo XClarity Orchestrator app for Splunk that analyzes events that are surfaced by XClarity Orchestrator and presents the analysis in a set of dashboards. You will be able monitor the dashboards in this app as an aid to find potential problems in your environment so that you can react before serious issues occur.

The XClarity Orchestrator app will provide the following functions:

• Monitoring of hardware events in an XClarity Orchestrator managed environment.

Quickly identify trends based on hardware events, including hardware failures, power/thermal thresholds that were exceeded, and predictive failure alerts (PFAs). Events are categorized by source, type of device that generated the events, and whether service is required

• Auditing for security changes that occur in the resource managers (such as XClarity Administrator).

Security events can help identify whether unauthorized personnel are attempting to access your computing resources. This might include events showing that new users have been added/deleted, what IP addresses users are using to access the XClarity Orchestrator, the time and dates when they are accessing resources, and any changes to the security settings of the XClarity Orchestrator (including user IDs on the XClarity Orchestrator). Visual representations show changes in these activities, which could identify if an attack is occurring.

Auditing for the provisioning of resources that are managed by XClarity Orchestrator

This includes:

- Configuration pattern deployment
- Bare-metal OS deployments -This can help identify how much change is occurring to the configuration of servers and if the changes were authorized.

Auditing can help identify how much change is occurring to the configuration of servers and if the changes were authorized.

You can download the XClarity Orchestrator app for Splunk from Splunkbase.

ServiceNow for XClarity Orchestrator

ServiceNow for Lenovo XClarity Orchestrator is a plug-in for ServiceNow that integrates with XClarity Orchestrator. It retrieves inventory data from XClarity Orchestrator into the ServiceNow configuration management database (CMDB), and enables event management, including viewing the information of fans, power supplies, and switches, and monitoring events of the Lenovo servers.

ServiceNow for XClarity Orchestrator connects to XClarity Orchestrator to synchronize inventory data between ServiceNow and XClarity Orchestrator using an HTTPS connection.

The primary feature of ServiceNow for XClarity Orchestrator is to retrieve inventory data from registered XClarity Orchestrator instances import the data into the ServiceNow CMDB and enable event management. The incidents updated in the ServiceNow Incident table are reflected back to the XClarity Orchestrator instances.

ServiceNow for XClarity Orchestrator supports the following features:

- Register XClarity Orchestrator with ServiceNow
- Import inventories and map them into the ServiceNow CMDB
- Set up ServiceNow for XClarity Orchestrator as an event monitor in XClarity Orchestrator
- · Raise incidents for serviceability events
- Send incident details to the XClarity Orchestrator instance that passed the generated event
- · Send incident updates from ServiceNow to XClarity Orchestrator
- Provide email notification for any changes/updates in the Incident Table

For more information on the XClarity Orchestrator plug-in for ServiceNow, see: https://pubs.lenovo.com/lxco/lxco_servicenow_iug.pdf

XClarity Orchestrator Integration with Terraform

Terraform is an open-source *infrastructure as code* software tool for changing, configuring, and automating infrastructure (resources) using a set of predefined declarative definitions. The Lenovo XClarity Orchestrator provider is a plugin for Terraform that you can use to automatically monitor, manage, and provision resources that are managed by XClarity Orchestrator.

You can use Terraform configurations to perform the following functions.

- Managing resource managers. Retrieve information about, connect, and disconnect resource managers.
- Managing servers. Retrieve information about and modify the power state of servers.
- **Provisioning updates**. Create, modify, and, assign update-compliance policies, and apply updates to one or more resources.
- **Provision server configuration**. Create, assign and deploy configuration settings on managed servers to comply with a defined server-configuration pattern.

For more information on the XClarity Orchestrator Integration for Terraform see: https://pubs.lenovo.com/lxco/lxco-pdf-terraform.pdf

Getting Support for XClarity Orchestrator

For details on support for XClarity solutions see: https://datacentersupport.lenovo.com/us/en/solutions/ht507079#2

Seller training courses

The following sales training courses are offered for employees and partners (login required). Courses are listed in date order.

1. Partner Technical Webinar - Lenovo Xclarity Orchestrator

2024-04-11 | 60 minutes | Employees and Partners

In this 60-minute replay, Chuck Weber, WW Marketing, Sr. Product Manager - Systems Management delivered a 101 level overview of Lenovo Xclarity Orchestrator. He covered what it is, and how it fits in the One Lenovo story.

Published: 2024-04-11 Length: 60 minutes Employee link: Grow@Lenovo Partner link: Lenovo Partner Learning Course code: 040524

2. VTT: Management of Low-End Edge - March 2024

2024-03-13 | 64 minutes | Employees Only

XClarity Orchestrator supports the management of both ISG XCC-based servers and IDG low-end edge devices. This session will cover the architecture of the current solution, along with a demo. In addition, a proposed new architecture for future support of low-end edge devices will be covered

Published: 2024-03-13 Length: 64 minutes Employee link: Grow@Lenovo Course code: DVSYS207

3. XClarity Orchestrator Overview

2024-02-27 | 10 minutes | Employees and Partners

Spend time with Alex and Jeff as they explain what Lenovo XClarity Orchestrator is, what it can do, and what its primary features are. After completing this course, you should be able to list the benefits of using Lenovo XClarity Orchestrator, describe the live monitoring system, summarize the security capabilities, and discover the predictive analytics solutions. Last updated: January 2024

Published: 2024-02-27 Length: 10 minutes Employee link: Grow@Lenovo Partner link: Lenovo Partner Learning Course code: DLXCO100

4. XClarity Orchestrator Analytics Capabilities

2024-02-20 | 10 minutes | Employees and Partners

Spend time with Alex and Jeff as they give more details about Lenovo XClarity Orchestrator's analytic capabilities and how it can predict failures and unpleasant situations in your environment. After completing this course, you should be able to create a custom analytics query, view the resource performance heatmap, discover possible vulnerabilities, generate custom alert rules, and show applicable advisory tips. Last updated: January 2024

Published: 2024-02-20 Length: 10 minutes Employee link: Grow@Lenovo Partner link: Lenovo Partner Learning Course code: DLXCF101

5. XClarity Orchestrator Management Capabilities

2024-02-20 | 15 minutes | Employees and Partners

Spend time with Alex and Jeff as they give more details about what Lenovo XClarity Orchestrator's management capabilities and how it can handle a big fleet of servers. After completing this course, you should be able to describe the main dashboard information, define the resource managers, recognize the live monitoring capabilities, demonstrate the tasks associated with provisioning systems, and summarize the administration options. Last updated: January 2024

Published: 2024-02-20 Length: 15 minutes Employee link: Grow@Lenovo Partner link: Lenovo Partner Learning Course code: DLXCF100

6. Lenovo XClarity Orchestrator

2023-12-18 | 60 minutes | Employees and Partners

This course contains a demo with an overview of the Lenovo XClarity family of products and covers guidelines regarding how to use Lenovo XClarity Orchestrator.

Learning Objectives:

- Describe when to use Lenovo XClarity Orchestrator.
- Recognize the menu options and screens.
- Explain how to update firmware with Lenovo XClarity Orchestrator.
- Recall how to apply a configuration pattern using Orchestrator.
- Describe the analytics capabilities of the Lenovo XClarity Orchestrator.

Published: 2023-12-18 Length: 60 minutes Employee link: Grow@Lenovo Partner link: Lenovo Partner Learning Course code: DLXCO103

7. VTT: What's new in Lenovo XClarity Orchestrator 2.0 - July 2023 2023-07-13 | 61 minutes | Employees Only

Join this session to learn more about the new functions and features in the newly released Lenovo XClarity Orchestrator 2.0. One of the exciting new capabilities in Orchestrator 2.0 is the ability to manage ThinkEdge Client and Server products.

Published: 2023-07-13 Length: 61 minutes Employee link: Grow@Lenovo Course code: DVSYS202

8. VTT: Understanding Lenovo xClarity - June 2023 2023-06-14 | 71 minutes | Employees Only

Join us as we review the individual products that make up the XClarity Management Suite and discuss the development roadmap for XClarity.

Published: 2023-06-14 Length: 71 minutes Employee link: Grow@Lenovo Course code: DVSYS201

9. Lenovo XClarity Management Hub for Edge Server Devices

2023-06-08 | 50 minutes | Employees and Partners

This course offers a comprehensive overview and demonstration of the enhanced capability to manage ThinkEdge Server Devices through Lenovo XClarity Management Hub in Lenovo XClarity Orchestrator (LXCO).

Published: 2023-06-08 Length: 50 minutes Employee link: Grow@Lenovo Partner link: Lenovo Partner Learning Course code: DXCO201

10. Lenovo XClarity Management Hub for Edge Client Devices 2023-06-08 | 50 minutes | Employees and Partners

This course offers a comprehensive overview and demonstration of the enhanced capability to manage ThinkEdge Client Devices through Lenovo XClarity Management Hub in Lenovo XClarity Orchestrator (LXCO).

Published: 2023-06-08 Length: 50 minutes Employee link: Grow@Lenovo Partner link: Lenovo Partner Learning Course code: DXCO202

11. Partner Technical Webinar - XClarity Workshop Lite

2022-08-10 | 60 minutes | Partners Only

In this 60-minute replay, Marilee Smith, NA Technical Trainer and XClarity SME showed an abridged version of the XClarity Workshop for Partners. She gave an overview of the XClarity family and then gave a bit more depth and short demo of XClarity Controller, Essentials, Provisioning Manager, Administrator, Orchestrator and Integrator.

Published: 2022-08-10 Length: 60 minutes Partner link: Lenovo Partner Learning Course code: 080522

Related links

For more information, see the following resources:

- XClarity Orchestrator download (includes 90-day trial license) https://datacentersupport.lenovo.com/solutions/ht509976-lenovo-xclarity-orchestrator
- Lenovo XClarity Orchestrator Online Product Information Center https://pubs.lenovo.com/lxco/
- Lenovo XClarity Orchestrator product publications in PDF format: https://pubs.lenovo.com/lxco/lxco-pdfs.html
- XClarity Orchestrator app for Splunk User's Guide https://pubs.lenovo.com/lxco/lxco-pdf-splunk_v1.0.0.pdf
- Lenovo XClarity discussion forum https://forums.lenovo.com/t5/Lenovo-XClarity/bd-p/xc01 eg
- Lenovo XClarity support page https://datacentersupport.lenovo.com/documents/LNVO-XCLARIT
- Lenovo XClarity Administrator product guide: https://lenovopress.lenovo.com/tips1200-lenovo-xclarity-administrator
- Lenovo XClarity Administrator Download, Updates and Repository Pack page https://datacentersupport.lenovo.com/documents/LNVO-LXCAUPD
- Lenovo Key Management System https://fod.lenovo.com/lkms
- Lenovo Key Management System user guide, Using Lenovo Features on Demand https://lenovopress.com/redp4895
- Lenovo XClarity Controller Online Documentation Portal https://pubs.lenovo.com/lxcc-overview/
 - Lenovo XClarity Controller2 Online Documentation Servers with 4th Gen Intel Xeon and AMD EPYC processors https://pubs.lenovo.com/xcc2/
 - Lenovo XClarity Controller Online Documentation Servers with 3rd Gen Intel Xeon processors and 2nd/3rd Gen AMD EPYC processors https://pubs.lenovo.com/xcc-amd/
 - Lenovo XClarity Controller Online Documentation Servers with 1st/2nd Gen Intel Xeon processors
 - https://pubs.lenovo.com/xcc/
- Integrated Management Module 2 Online Documentation http://systemx.lenovofiles.com/help/topic/com.lenovo.sysx.imm2.doc/product_page.html
- Chassis Management Module 2 Online Documentation
 http://flexsystem.lenovofiles.com/help/topic/com.lenovo.acc.cmm.doc/cmm_product_page.html

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Lesley Bain is an IT consultant with Lenovo in Scotland, UK. She has been with IBM/Lenovo combined for 20 years working with x86 Server Hardware and related solutions. Her areas of expertise include x86 Integrated Platform Management, Centralized Management Solutions from IBM and Lenovo, and Integration with Enterprise Management and Virtualization Solutions. Lesley is involved in all aspects to do with presales engagement activities, including Lenovo technical field team enablement, Lenovo Business Partner and customer presentations, demonstrations, proofs of concept, and solution design. She has co-authored three IBM Redbooks publications on systems management solutions and four Lenovo Press publications on Systems Management Solutions, she has also presented at various technical conferences over the years. Lesley holds a Bachelor of Science degree in Computing Information Systems from Glasgow Caledonian University, Scotland, UK

Related product families

Product families related to this document are the following:

• Lenovo XClarity

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