



Lenovo ThinkAgile CP Hardware Installation Guide



Models: CP4000, CP6000

Note

Before using this information and the product it supports, be sure to read and understand the safety information and the safety instructions, which are available at the following address:

http://thinksystem.lenovofiles.com/help/topic/safety_documentation/pdf_files.html

In addition, be sure that you are familiar with the terms and conditions of the Lenovo warranty for your solution, which can be found at the following address:

<http://datacentersupport.lenovo.com/warrantylookup>

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Chapter 1. ThinkAgile CP Overview

This product overview provides technical information on the Lenovo ThinkAgile CP Series cloud platform, its key features and specifications, components and options, and configuration guidelines.

Lenovo ThinkAgile CP Series is an all-in-one, composable cloud with an integrated application marketplace (Lenovo Cloud Marketplace) and end-to-end automation, delivering a turn-key cloud experience in your own data center. The ThinkAgile CP Series uses modular compute, storage, and networking components paired with the cloud virtualization software to create pools of IT resources, independently scaling and allocating capacity, and automatically configuring resources to fulfill application requirements.

Due to its software-defined modular architecture, the ThinkAgile CP Series platform can be scaled easily by adding more compute and storage resources independently of each other as your needs grow. Suggested workloads for the ThinkAgile CP Series include web services, virtual desktop infrastructure (VDI), enterprise applications, OLTP and OLAP databases, data analytics, application development, cost-optimized virtualization, containers, and other back-office applications.

Key Features

Lenovo ThinkAgile CP Series offers the following key features:

- Modular and scalable ThinkAgile CP Series configurations of an on-premises cloud platform featuring the second generation of the Intel Xeon Processor Scalable Family that are designed to optimize your workload's performance and provide the IT agility for your business demands.
- Factory-preloaded ready-to-go cloud platform that is delivered with all the infrastructure you need for your workloads: Modular and scalable physical and virtual compute, network, and storage resources, and the cloud software.
- Lenovo deployment services that are included with the platform help get customers up and running quickly.
- The cloud software provides a scalable software-defined infrastructure (SDI) that simplifies cloud deployments with integrated compute, storage, networking, security, and management services that manage application infrastructure and automate and orchestrate workload provisioning.
- Extensive security features, such as data at rest encryption, virtualized network and VM-level firewalls, and two-factor authentication help customers meet the most stringent security requirements.
- Centralized cloud-based management automates discovery, deployment, and configuration of cloud resources, and provides automated, non-disruptive software updates.
- Lenovo ThinkAgile Advantage provides a single point of contact for all support issues and integrates support chat and virtual technical assistance into your management interface.

Components

The ThinkAgile CP Series consists of the following components:

- **Storage Blocks**

A Storage Block is a 2U storage enclosure with up to 24 PCIe NVMe SSDs and two controllers for high availability and redundancy. A storage block runs the cloud software that delivers data storage layer to the cloud. It simplifies storage management, provides enterprise-class storage functionality, and enables linear performance and capacity scaling.



Figure 1. Storage block

- **Compute Blocks**

A Compute Block is a modular 2U enclosure that contains up to four nodes, and it delivers processor and memory resources to the cloud. The compute nodes run the cloud hypervisor that combines open KVM-based virtualization software, hardware integration, and automation to orchestrate and deliver an end-to-end compute platform.

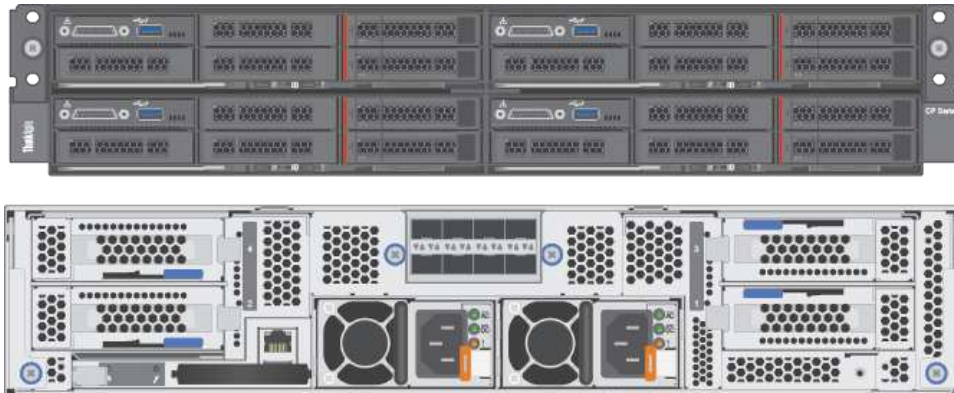


Figure 2. Compute block

- **CP Interconnect**

The Interconnect centralizes connectivity of your on-premises infrastructure to the Cloud Controller and acts as the entry point into your existing network, which connects the Cloud Controller to your environment. The CP Interconnect consists of one or two high-density, ultra-low-latency 10/40 GbE network devices and use specialized cloud software which provides the fabric for your composable environment, automating discovery, onboarding, and device management. Integrated network virtualization secures virtual data center and applications.

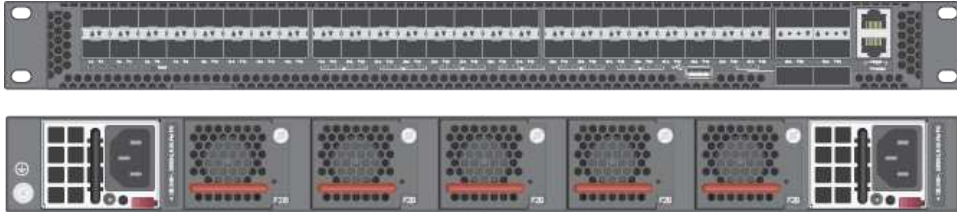


Figure 3. CP Interconnect

- **Management Switch**

The 1 GbE management switch is required to provide out-of-band (OOB) management for the Interconnect, Compute Blocks, and Storage Blocks. The switch can be supplied by Lenovo (ThinkSystem NE0152T RackSwitch), or customers may provide their own switch.



Figure 4. Management switch

- **Cloud Controller**

Cloud Controller orchestrates and manages the on-premises infrastructure and workloads; however, it resides in the cloud. It automates and orchestrates infrastructure provisioning in real time to achieve complete and secure vertical hardware, software and workload integration. It federates and abstracts all physical hardware into a private cloud service.

Cloud Controller provides a single point of management across an unlimited number of ThinkAgile CP stacks with role-based access control, two-factor authentication, and secure HTML and RESTful API interfaces.

ThinkAgile CP4000 series overview

The Lenovo ThinkAgile CP4000 series scales as an initial data-management footprint for managed service provider and cloud service provider environments that start on a smaller scale but are poised for growth. The CP4000 series also supports business continuity when deployed remotely as an off-site backup for disaster recovery.

The Lenovo ThinkAgile CP4000 series consists of the following components:

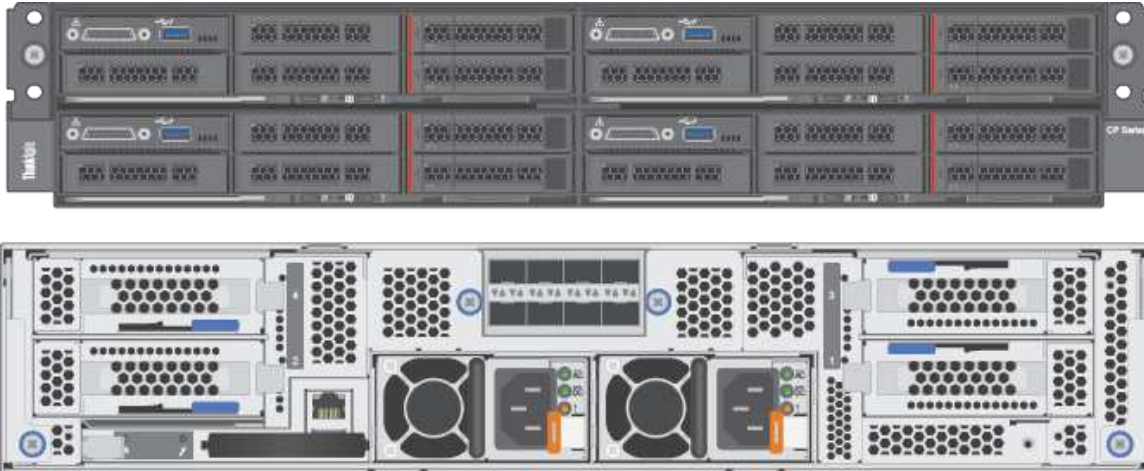
- “Storage block” on page 4
- “Compute block” on page 5
- “Interconnect switch” on page 5
- “Management switch” on page 5
- “Services” on page 6
- “Software” on page 6

Storage block



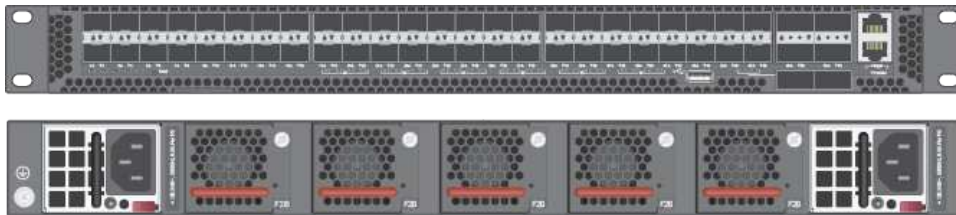
- 1 Storage Block (SB-S10)
- Dual controller - single CPU per controller
- 8x SFP Base-T SFP+ transceivers
- 8x CAT6 cables, 1.5m and other lengths permitted
- 2x CAT5e cables, 1.5m and other lengths permitted
- 32 GB RAM per controller
- 8, 16, 24 drives (8 drives per drive pack)
- 800 GB, 1.6 TB NVMe drives per controller
- Drives must be consistent within a storage block
- Dimensions: 87.6 x 446.4 x 857.2 mm (3.4 x 17.6 x 33.7 inches)
- Maximum weight: 42.0 kg (92.6 lb)

Compute block



- 1 D2 enclosure, fully populated PSU, fan, 220V with 10Gb SFP+ network module
- Minimum 2 SD530 nodes, maximum 4 nodes
- 128 GB, 256 GB RAM per node
- 8+ cores per CPU, 1-2 sockets filled AXQT, and others
- 2x SFP+ DAC cables per node, 1.5m and other lengths permitted
- Boot: 1x SATA 240 GB
- Dimensions: 41.0 x 562.0 x 222.0 mm (1.7 x 22.2 x 8.8 inches)
- Maximum weight: 55 kg (121.2 lb)

Interconnect switch



- 1 or 2 CP-I-10 interconnect switches
- 48x 10 Gb SFP+ fabric ports
- 6x 40 Gb QSFP+ fabric ports
- Dimensions: 438.4 x 473 x 43.4 mm (17.26 x 18.62 x 1.71 inches)
- Maximum weight: 8.95 kg (19.73 lb), with two installed PSUs

Management switch

Lenovo ThinkSystem NE0152T RackSwitch



Note: A dedicated out-of-band (OOB) management switch is required for this solution. If the Lenovo NE0152T is not used, you must provide an OOB management switch with the correct configuration.

Services

Lenovo Deployment Services are mandatory

Lenovo Hardware Installation Service is optional

Software

Software is preloaded on compute, storage, and switch.

ThinkAgile CP6000 series overview

The Lenovo ThinkAgile CP6000 series offering can be scaled up to 40 compute nodes to support mainstream enterprise workloads and mixed-workload environments.

The Lenovo ThinkAgile CP6000 series consists of the following components:

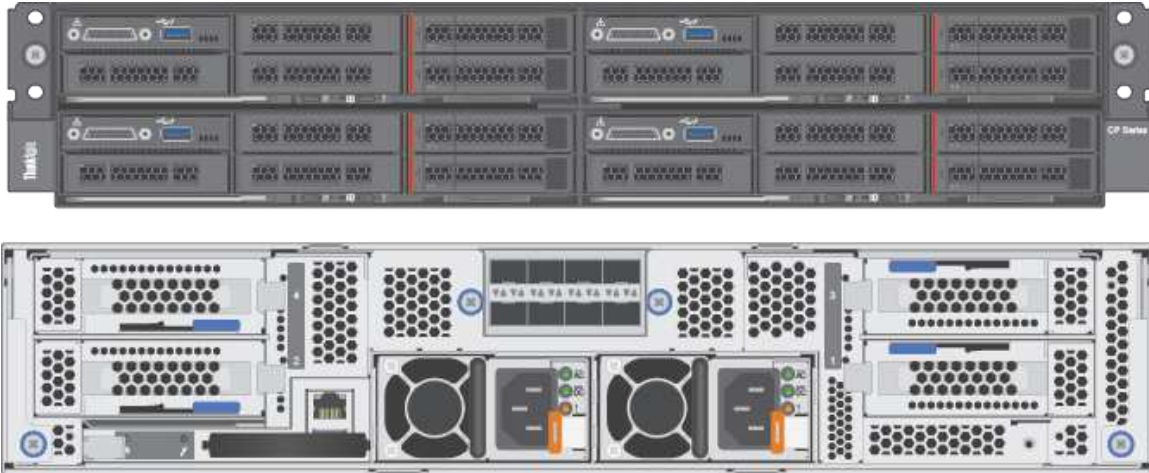
- “Storage block” on page 7
- “Compute block” on page 8
- “Interconnect switch” on page 8
- “Management switch” on page 8
- “Services” on page 9
- “Software” on page 9

Storage block



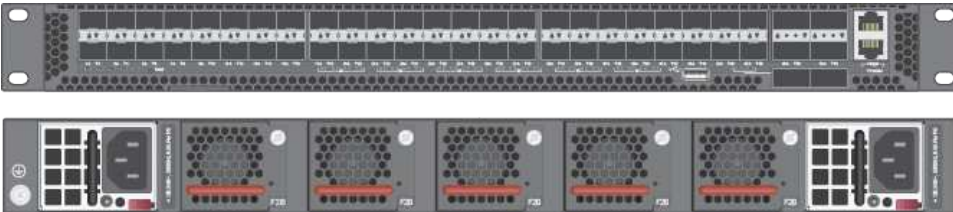
- 1 Storage Block - a maximum 5 blocks (SB-D20)
- Dual controller - 2CPU per controller
- 8x SFP Base-T SFP+ adapters
- 8x CAT6 cables per storage block, 1.5m and other lengths permitted
- 64 GB RAM per controller
- 8, 16, 24 drives (8 drives per drive pack)
- 1.6 TB, 3.2 TB, 6.4 TB NVMe drives per controller
- Drives must be consistent within a controller
- Dimensions: 87.6 x 446.4 x 857.2 mm (3.4 x 17.6 x 33.7 inches)
- Maximum weight: 42.0 kg (92.6 lb)

Compute block



- 1 D2 enclosure, fully populated PSU, fan, 220V with 10Gb SFP+ network module — maximum 10 enclosure
- Minimum 2 SD530 nodes, default 4, maximum 40 nodes
- 128 GB, 256 GB, 384 GB, 512 GB, 768 GB, 1024 GB RAM
- 8+ cores per CPU, 1-2 sockets filled AXQT, and others
- 2x SFP+ DAC cables per node, 1.5m and other lengths permitted
- Boot: 1x SATA 240 GB
- Dimensions: 41.0 x 562.0 x 222.0 mm (1.7 x 22.2 x 8.8 inches)
- Maximum weight: 55 kg (121.2 lbs)

Interconnect switch



- 2 CP-I-10 Interconnect switches
- 48x 10 Gb SFP+ fabric ports
- 6x 40 Gb QSFP+ fabric ports
- Dimensions: 438.4 x 473 x 43.4 mm (17.26 x 18.62 x 1.71 inches)
- Maximum weight: 8.95 kg (19.73 lb), with two installed PSUs

Management switch

Lenovo ThinkSystem NE0152T RackSwitch



Note: A dedicated out-of-band (OOB) management switch is required for this solution. If the Lenovo NE0152T is not used, you must provide an OOB management switch with the correct configuration.

Services

Lenovo Deployment Services are mandatory

Lenovo Hardware Installation Service is optional

Software

Software is preloaded on compute, storage, and switch.

ThinkAgile CP solution components

This section describes the storage and compute blocks components, and information about the available power cords.

Storage block parts list

This section describes the components of the ThinkAgile CP storage block.

The parts listed in the table below fall into these categories:

- **Tier 1 customer replaceable unit (CRU):** Replacing Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request with no service agreement, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the warranty service type designated for your storage.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.
- **Consumable and structural parts:** Purchase and replacement of consumable and structural parts (components such as a cover or bezel) is your responsibility. If Lenovo acquires or installs a structural component at your request, you will be charged for the service.

Table 1. Storage block parts listing

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and structural parts
1	2 Storage controllers		✓		
2	Enclosure		✓		
3	Power supplies	✓			
4	Rail kit				✓
5	2.5-inch drive fillers				✓
6	2.5-inch hot swap drives	✓			

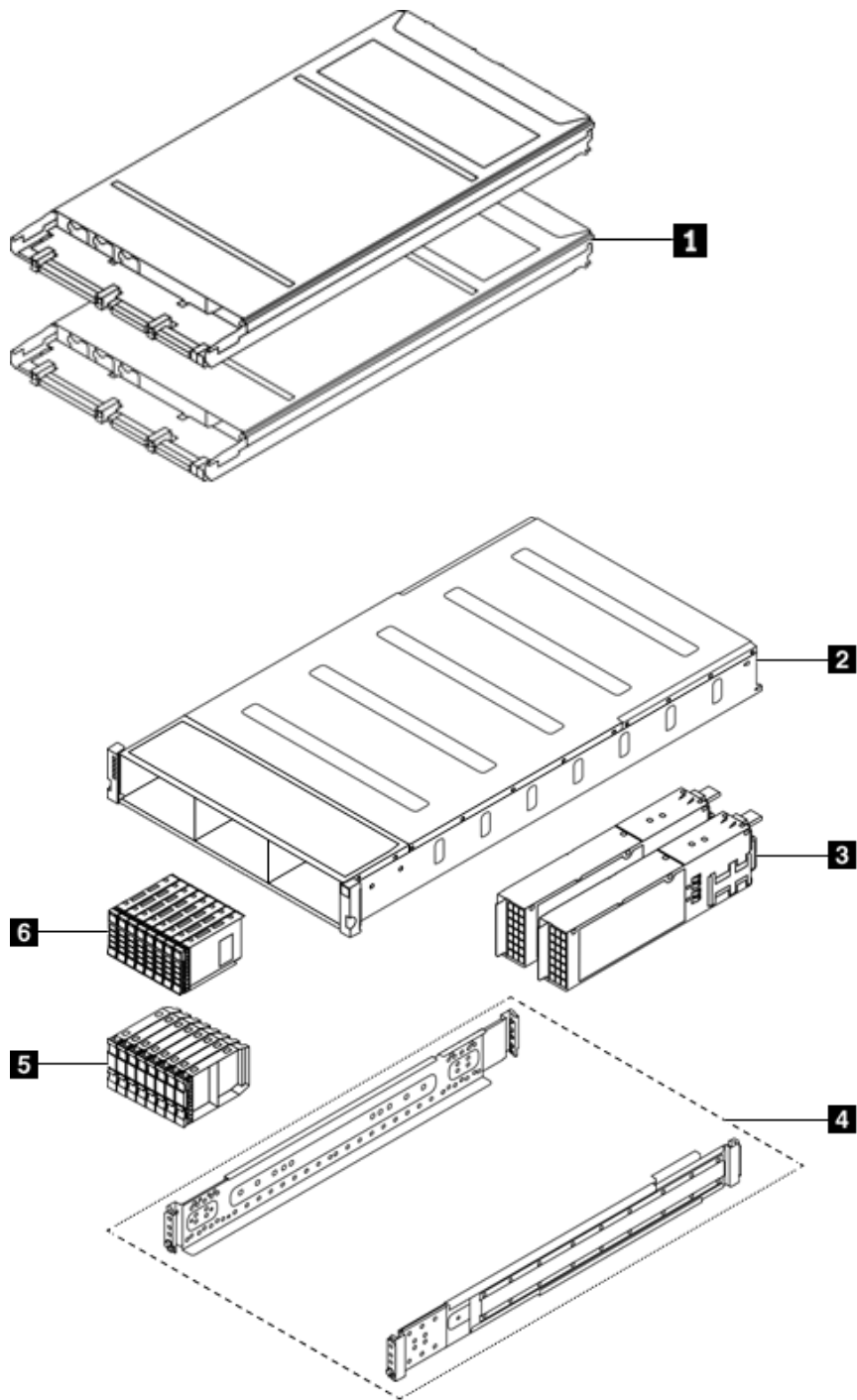


Figure 5. Storage block components

For more information about ordering the parts shown here, see the following website:

[Lenovo Data Center Support page \(7Y66\)](#)

Compute block parts list

This section describes the components of the ThinkAgile CP compute block.

The parts listed in the table below fall into these categories:

- **Tier 1 customer replaceable unit (CRU):** Replacing Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request with no service agreement, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the warranty service type designated for your compute.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.
- **Consumable and structural parts:** Purchase and replacement of consumable and structural parts (components such as a cover or bezel) is your responsibility. If Lenovo acquires or installs a structural component at your request, you will be charged for the service.

Table 2. Compute block part listing

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
1	PCIe adapter	✓			
2	Air baffle				✓
3	Processor and heat sink assembly (85mm heat sink)			✓	
4	Processor and heat sink assembly (108mm heat sink)			✓	
5	Processor and heat sink assembly (108mm heat sink)			✓	
6	Processor and heat sink assembly (T-shaped heat sink)			✓	
7	Trusted Cryptographic Module			✓	
8	M.2 backplane	✓			
9	DIMM	✓			
10	2.5-inch drive bay blank (for empty bays next to the backplane)				✓
11	2.5-inch drive bay blank panel (for drive bays on the backplane)	✓			
12	2.5-inch hot-swap drive	✓			
13	Compute node tray			✓	
14	KVM breakout module	✓			
15	2.5-inch 6-drive hot-swap SAS/SATA backplane			✓	
16	2.5-inch 6-drive hot-swap SAS/SATA/NVMe backplane			✓	
17	2.5-inch 4-drive hot-swap SAS/SATA backplane			✓	
18	2.5-inch 4-drive hot-swap NVMe backplane			✓	
19	Compute block cover	✓			

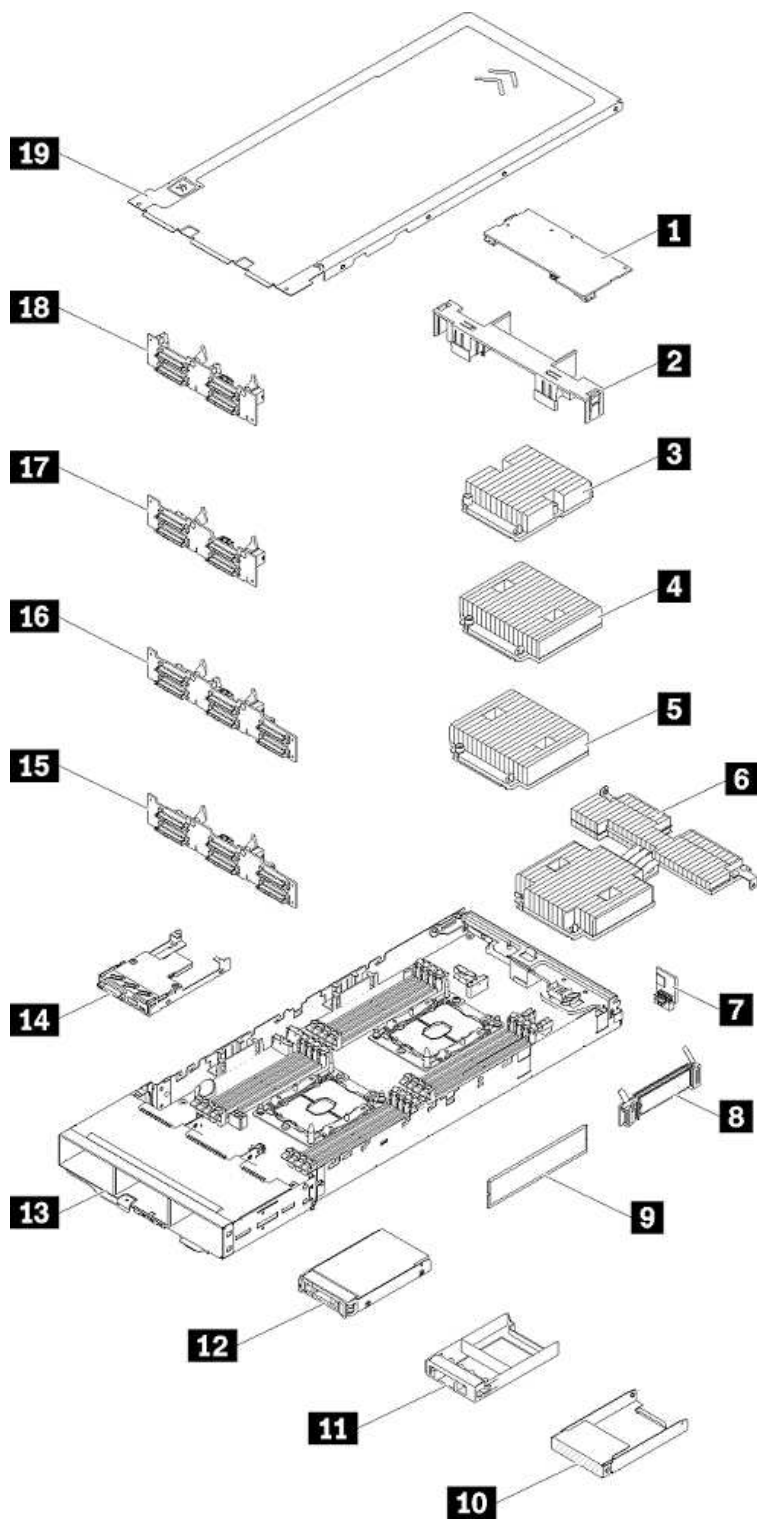


Figure 6. Compute block components

For more information about ordering the parts shown here, see the following website:

[Lenovo Data Center Support page \(7X20\)](#)

Power cords

Information about the power cords available for the ThinkAgile CP storage and compute blocks.

Several power cords are available, depending on the country and region where ThinkAgile CP is installed.

To view the power cords that are available for a component:

- Interconnect switch
 1. Go to: [Lenovo Data Center Support page \(7Y67\)](#)
 2. Click **Parts**
 3. Click **Select Commodity** and choose Line Cords
- Compute block
 1. Go to: [Lenovo Data Center Support page \(7X20\)](#)
 2. Click **Parts**
 3. Click **Select Commodity** and choose Line Cords
- Storage block
 1. Go to: [Lenovo Data Center Support page \(7Y66\)](#)
 2. Click **Parts**
 3. Click **Select Commodity** and choose Line Cords

Notes:

- For your safety, a power cord with a grounded attachment plug is provided to use with this product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.
- Power cords for this product that are used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).
- For units intended to operate at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, type SVT or SJT, three-conductor cord, a maximum of 15 feet (4.6 meters) in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.
- For units intended to operate at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet (4.6 meters) in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.
- For units intended to operate at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which you install the equipment.
- Power cords for a specific country or region are usually available only in that country or region.

Chapter 2. Installation Guidelines

This section covers the installation guidelines that need to be followed when installing components in your ThinkAgile CP solution.

Before installing optional devices, read the following notices carefully:

Attention: Exposure to static electricity may lead to system halt and loss of data. Prevent this problem by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.

- Read the safety information and guidelines to ensure that you work safely.
 - A complete list of safety information for all products is available: [Safety Information](#)
 - The following guidelines are available as well: “[Handling static-sensitive devices](#)” on page 17 and “[Working inside the solution with the power on](#)” on page 16.
- Make sure the components that you are installing are supported by the solution.
- When you install a new solution, apply the latest firmware. This will ensure that any known issues are addressed, and that your solution is ready to work with optimal performance. Contact Lenovo Support for firmware updates.

Important: Some cluster solutions require specific code levels or coordinated code updates. If the component is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

- It is good practice to make sure that the solution is working correctly before you install an optional component.
- Keep the working area clean, and place removed components on a flat and smooth surface that does not shake or tilt.
- Do not attempt to lift an object that may be too heavy for you. If you have to lift a heavy object, read the following precautions carefully:
 - Make sure that you can stand steadily without slipping.
 - Distribute the weight of the object equally between your feet.
 - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
 - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Back up all important data before you make changes related to the disk drives.
- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.
- To view the error LEDs on the system board and internal components, leave the power on.
- You do not have to turn off the solution to remove or install hot-swap power supplies, hot-swap fans, or hot-plug USB devices. However, you must turn off the solution before you perform any steps that involve removing or installing adapter cables, and you must disconnect the power source from the solution before you perform any steps that involve removing or installing a riser card.
- Blue on a component indicates touch points, where you can grip to remove a component from or install it in the solution, open or close a latch, and so on.
- The Red strip on the drives, adjacent to the release latch, indicates that the drive can be hot-swapped if the solution and operating system support hot-swap capability. This means that you can remove or install the drive while the solution is still running.

Note: See the system specific instructions for removing or installing a hot-swap drive for any additional procedures that you might need to perform before you remove or install the drive.

- After finishing working on the solution, make sure you reinstall all safety shields, guards, labels, and ground wires.

System reliability guidelines

Review the system reliability guidelines to ensure proper system cooling and reliability.

Ensure that the following requirements are met:

- When the server comes with redundant power, a power supply must be installed in each power-supply bay.
- Adequate space around the server must be spared to allow server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place any object in front of the fans.
- For proper cooling and airflow, refit the server cover before you turn the power on. Do not operate the server for more than 30 minutes with the server cover removed, for it might damage server components.
- Cabling instructions that come with optional components must be followed.
- A failed fan must be replaced within 48 hours since malfunction.
- A removed hot-swap fan must be replaced within 30 seconds after removal.
- A removed hot-swap drive must be replaced within two minutes after removal.
- A removed hot-swap power supply must be replaced within two minutes after removal.
- Every air baffle that comes with the server must be installed when the server starts (some servers might come with more than one air baffle). Operating the server with a missing air baffle might damage the processor.
- All processor sockets must contain either a socket cover or a processor with heat sink.
- When more than one processor is installed, fan population rules for each server must be strictly followed.
- Do not operate the enclosure without the System Management Module (SMM) assembly installed. Operating the solution without the SMM assembly might cause the system to fail. Replace the SMM assembly as soon as possible after removal to ensure proper operation of the system.

Working inside the solution with the power on

You may need to keep the power on with the solution cover removed to look at system information on the display panel or to replace hot-swap components. Review these guidelines before doing this.

Attention: The solution may stop and loss of data may occur when internal solution components are exposed to static electricity. To avoid this problem, always use an electrostatic-discharge wrist strap or other grounding systems when working inside the solution with the power on.

- Avoid loose-fitting clothing, particularly around your forearms. Button or roll up long sleeves before working inside the solution.
- Prevent your necktie, scarf, badge rope, or long hair from dangling into the solution.
- Remove jewelry, such as bracelets, necklaces, rings, cuff links, and wristwatches.
- Remove items from your shirt pocket, such as pens and pencils, in case they fall into the solution as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hairpins, or screws into the solution.

Handling static-sensitive devices

To reduce the possibility of damage from electrostatic discharge, review these guidelines before you handle static-sensitive devices.

Attention: Exposure to static electricity may lead to system halt and loss of data. Prevent this problem by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.

- Limit your movement to prevent building up static electricity around you.
- Take additional care when handling devices during cold weather, as heating reduces indoor humidity and increases static electricity.
- Always use an electrostatic-discharge wrist strap or other grounding system, especially when working inside the solution with the power on.
- While the device is still in its static-protective package, touch it to an unpainted metal surface on the outside of the solution for at least two seconds. This drains static electricity from the package and your body.
- Remove the device from the package and install it directly into the solution without putting it down. If you must put the device down, put it back into the static-protective package. Never place the device on the solution or on any metal surface.
- When handling a device, carefully hold it by the edges or the frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Keep the device out of others' reach to prevent damage.

Chapter 3. ThinkAgile CP Setup

This section covers the required steps to install the ThinkAgile CP solution into a rack. This includes installing the storage block, the compute block, the interconnect switches and the management switch (optional).

Install ThinkAgile CP hardware in a rack

Procedures for installing ThinkAgile CP hardware in a rack.

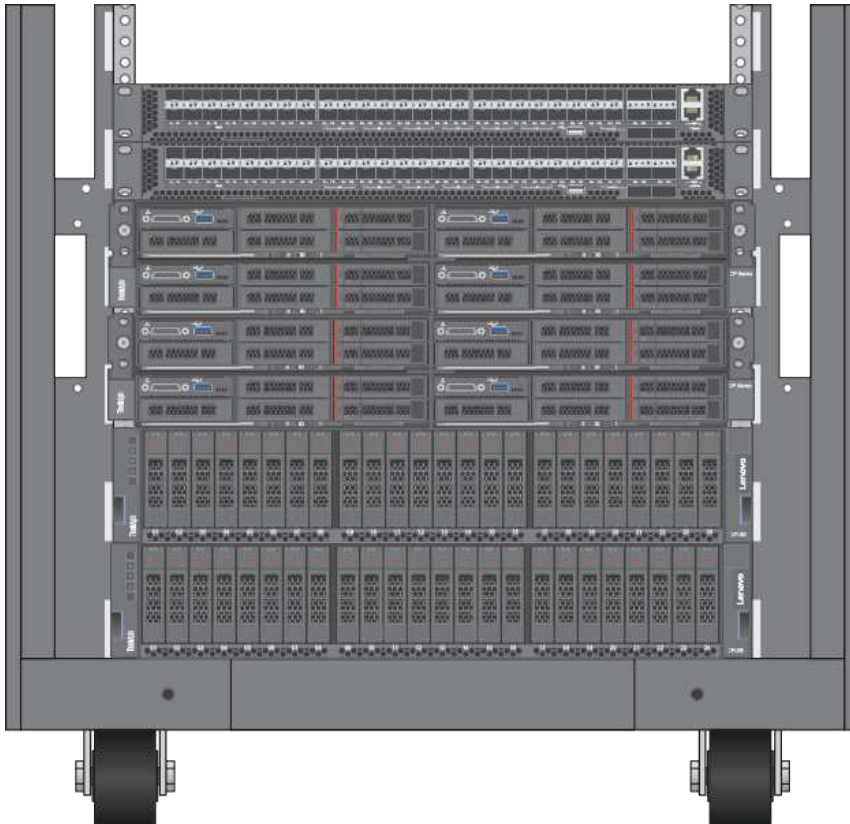


Figure 7. ThinkAgile CP hardware installed into a rack

Required tools

You need the following tools or equipment to install the ThinkAgile CP solution into a rack:

- Standard flat-blade screwdriver
- #2 Phillips screwdriver
- Electrostatic discharge wrist strap

ThinkAgile CP Package Contents

This section includes the package contents for the ThinkAgile CP solution.

The ThinkAgile CP solution is delivered in several boxes:

- Storage block box
- Compute block box
- Interconnect switch box
- Ship group box
- Management switch box (optional)

Attention:

- The number of boxes depends on the number of storage and compute blocks included in your ThinkAgile CP configuration.
- Check the contents of each box before installing the ThinkAgile CP solution. If any of the box items are missing or are damaged, contact your place of purchase.

Storage block box

The storage block box contains the following items:

- One storage block
- One storage slide rails box:
 - One left slide rail
 - One right slide rail
 - Six M5 screws
 - Eight screws for square hole rack
- Two Category 5e patch cables
- Eight Category 6 patch cables
- Eight SFP+ 10 GbE transceivers

Compute block box

The compute block box contains the following items:

- One compute block
- One compute slide rails box:
 - One left slide rail
 - One right slide rail
 - Two M5 screws
 - Two washers
- One Category 5e patch cable
- Two power cords
- Two SFP+ 10 GbE Direct Attach Cables (DACs)

Interconnect switch box

The interconnect switch box contains the following items:

- One CP-I-10 interconnect switch
- One mounting kit for standard 19-inch equipment rack:
 - Two rails
 - Two rear-post brackets
 - Two front-post brackets
 - Two ear-locking screws
 - 20 screws
- One power cord
- One DB9-to-RJ45 console cable
- Two QSFP+ 40 GbE Direct Attach Cables (DACs)

Ship group box

The ship group box contains the following items:

- One cable management arm box:
 - One cable management arm
 - One *ThinkSystem D2 Cable Management Arm* installation document
- Four power cords
- Four KVM adapters with:
 - One KVM port connector
 - One serial connector
 - One VGA video connector
 - Two USB device connectors
- Two Category 5e patch cables
- Eight SFP+ 10 GbE Direct Attach Cables (DACs)
- One bag with M5 screws and two types of cage nuts
- Six velcro straps bags
- One *Safety & Regulatory Information* document
- One *Important Notices* document
- One *Storage Block Read Me* document
- One *Compute Block Read Me* document
- One *Rack Installation Guide* document
- One *Interconnect Read Me* document
- One *Interconnect Quick Start Guide* document

Management switch box (optional)

If you purchased a Lenovo ThinkSystem NE0152T RackSwitch as the management switch, then the following items are found in the box:

- One ThinkSystem NE0152T RackSwitch unit with rear-to-front airflow
- One two-post mounting kit for standard 19-inch equipment rack:
 - Two mounting brackets
 - Eight M4 screws
 - Four M6 screws
 - Four M6 clip nuts
 - Four M6 cage nuts
 - Four M6 locking washers
- One console cable kit that includes:
 - One mini-USB-to-RJ45 serial cable (not used with this product)
 - One Category 5e patch cable
 - One DB9-to-RJ45 adapter
- One power cord retention kit
- One *Documentation CD*, that includes the *Systems Information* document
- One *Environmental Notices CD*
- One *Important Notices* document
- One *Warranty Information* document

Install the ThinkAgile CP storage block

Procedures for installing ThinkAgile CP storage block in a rack.

To install the ThinkAgile CP storage block in a rack, you must do the following:

1. Unpack the storage block box and check the contents
2. Install the slide rails in the rack
3. Install the storage enclosure

Firstly, unpack the storage block box and check the contents:

- One storage block
- One storage slide rails box:
 - One left slide rail
 - One right slide rail
 - Six M5 screws
 - Eight screws for square hole rack
- Two Category 5e patch cables
- Eight Category 6 patch cables
- Eight SFP+ 10 GbE transceivers

Note: If any of the slide box items are missing or are damaged, contact your place of purchase.

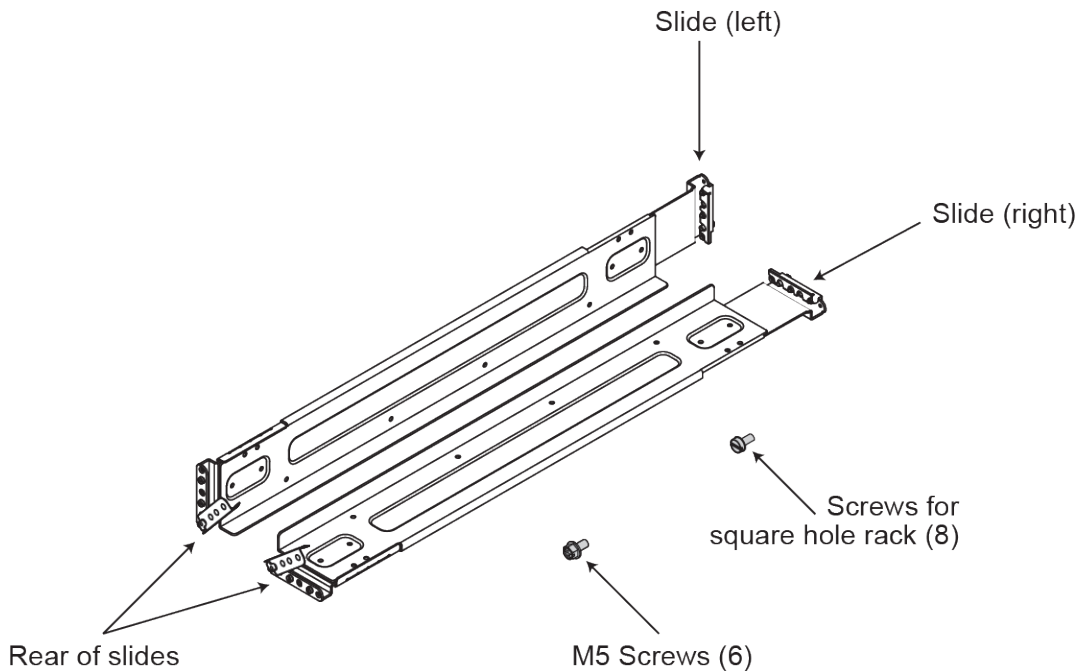


Figure 8. ThinkAgile CP storage slide box contents

Attention: You can install the rails into the racks with round holes or square holes. Each rail comes preinstalled with four screw pins used for round holes. The screw pins used for square holes are provided separately. Ensure that you use the pins that are appropriate for the mounting holes in your rack. Refer to the following figure.

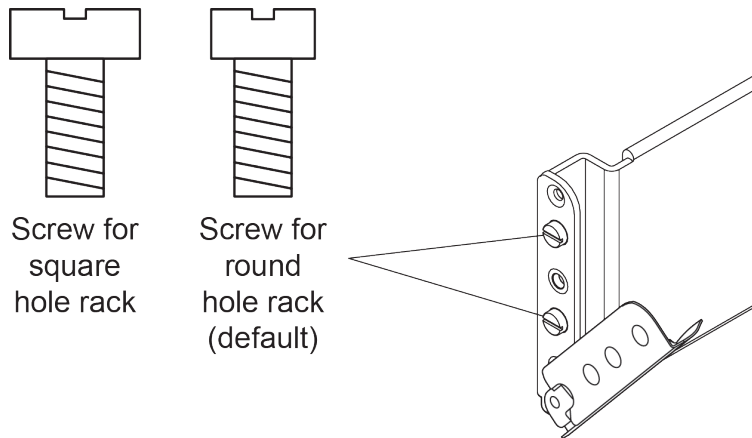


Figure 9. Screw pin types included with rail kit

Install the storage slide rails into a round hole rack

Procedures for installing ThinkAgile CP storage block slide rails in a round hole rack.

To install the ThinkAgile CP storage block slide rails in a round hole rack, do the following:

Attention: Ensure that you install the rear mounting rail brackets before installing the front mounting brackets.

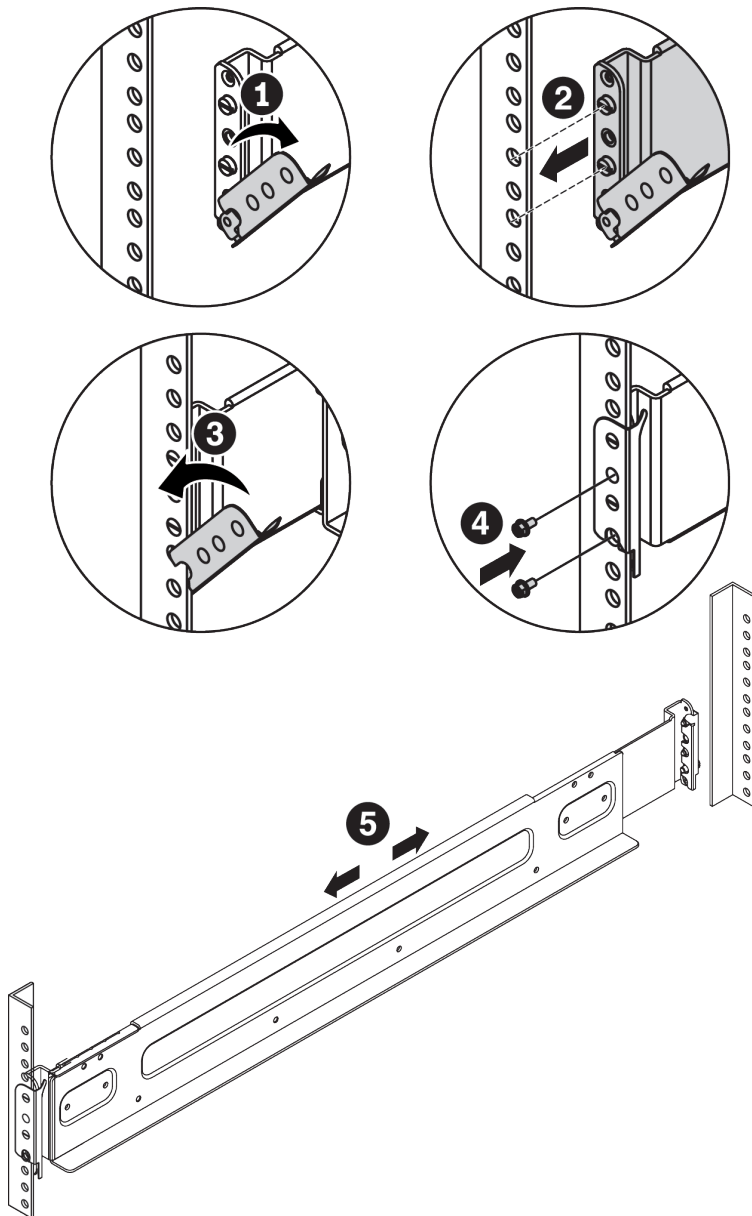


Figure 10. Installing the rail in a round hole rack

- Step 1. Open the hinge bracket on the rear of the rail.
- Step 2. Line up the pins on the rear of the rail with the corresponding holes in the rear-mounting flange of the rack, and then insert the pins into the holes in the rack flange.
- Step 3. Close the hinge bracket to secure the rail to the rack flange.
- Step 4. Secure the rear mounting bracket of the rail with two M5 screws.

- Step 5. Extend the rail until the front mounting bracket of the rail reaches the front rack.
- Step 6. Repeat steps [Step 1 1 on page 25](#) through [Step 3 3 on page 25](#) to install the front rail mounting bracket to the front mounting flange.

Note: Do not secure the front mounting bracket of the rail with screws until you install the storage enclosure into the rack.

- Step 7. Repeat steps [Step 1 1 on page 25](#) through [Step 6 6 on page 26](#) to install the opposite rail in the rack.

The installation of the storage block slide rails in a round hole rack is now complete.

To continue with the installation of the ThinkAgile CP storage block, follow these steps: [“Install the storage enclosure” on page 29](#)

Install the storage slide rails into a square hole rack

Procedures for installing ThinkAgile CP storage block slide rails in a square hole rack.

To install the ThinkAgile CP storage block slide rails in a square hole rack, do the following:

Attention: Ensure that you install the rear mounting rail brackets before installing the front mounting brackets.

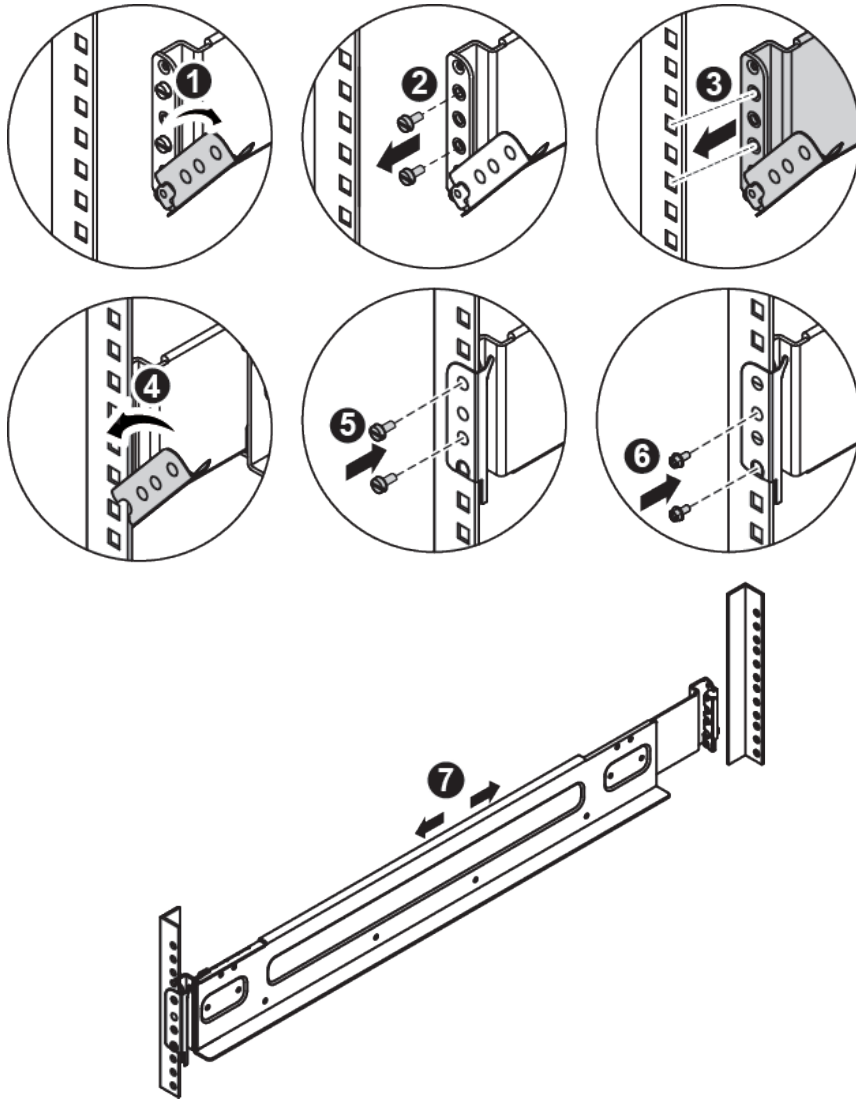


Figure 11. Installing the rail in a square hole rack

- Step 1. Open the hinge bracket on the rear of the rail.
- Step 2. Remove the preinstalled screw pins for round hole rack.
- Step 3. Line up the holes on the rear of the rail with the corresponding holes in the rear-mounting flange of the rack.
- Step 4. Close the hinge bracket to secure the rail to the rack flange.
- Step 5. Secure the rear mounting bracket of the rail with two screws for square hole rack.

- Step 6. Secure the rear mounting bracket of the rail with two M5 screws.
- Step 7. Extend the rail until the front mounting bracket of the rail reaches the front rack.
- Step 8. Repeat steps [Step 1 1 on page 27](#) through [Step 5 5 on page 27](#) to install the front rail mounting bracket to the front mounting flange.

Attention:

- For the front mounting bracket, the screws for square hole rack need to be fastened in the same holes as the preinstalled screws for round hole rack. Otherwise, the storage enclosure cannot be secured to the front mounting bracket.
 - After fastening the two screws for square hole rack, do not further secure the front mounting bracket of the rail with screws until you install the storage enclosure into the rack.
- Step 9. Repeat steps [Step 1 1 on page 27](#) through [Step 8 8 on page 28](#) to install the opposite rail in the rack.

The installation of the storage block slide rails in a square hole rack is now complete.

The next step is to install the storage enclosure: [“Install the storage enclosure” on page 29](#)

Install the storage enclosure

Procedures for installing ThinkAgile CP storage enclosure in a rack.

To install the ThinkAgile CP storage enclosure on the slide rails, do the following:

CAUTION:

Ensure that at least two people lift and install the enclosure together.

Step 1. Remove both of the side covers on the enclosure by grasping and pulling out the bottom of each side cover, and then pulling it straight up.

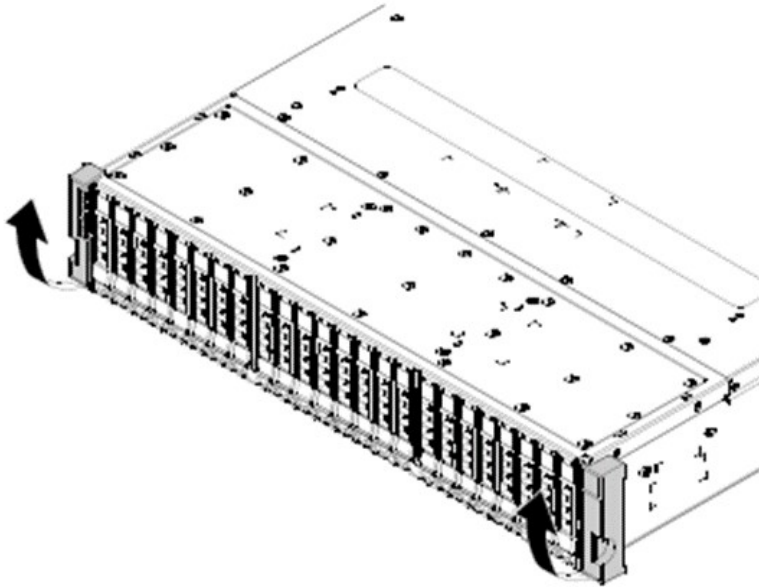


Figure 12. Removal of side cover

Step 2. Lift the enclosure and slowly place the enclosure on the rail.

Step 3. Carefully slide the enclosure into the rack along the rails until the enclosure is fully inserted.

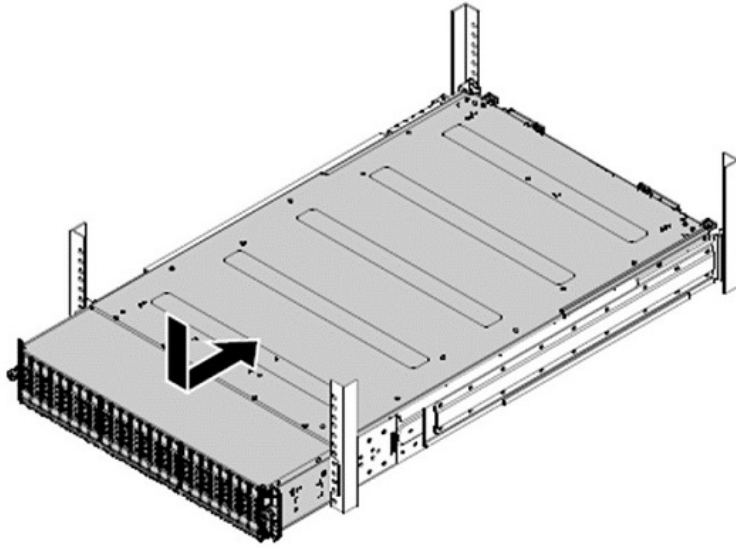


Figure 13. Installing the enclosure into the rack

Step 4. Secure the enclosure with the thumbscrews and the M5 screws on the front.

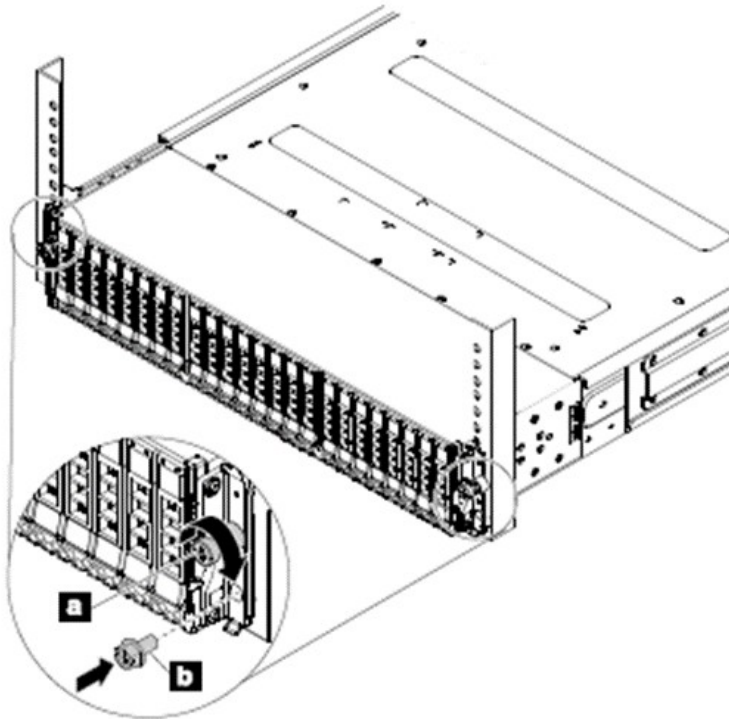


Figure 14. Installing screws on front of enclosure

Step 5. On each side of the storage enclosure, fit the hook on the top of the side cover and push the bottom of it inward to reinstall the side cover to the storage enclosure.

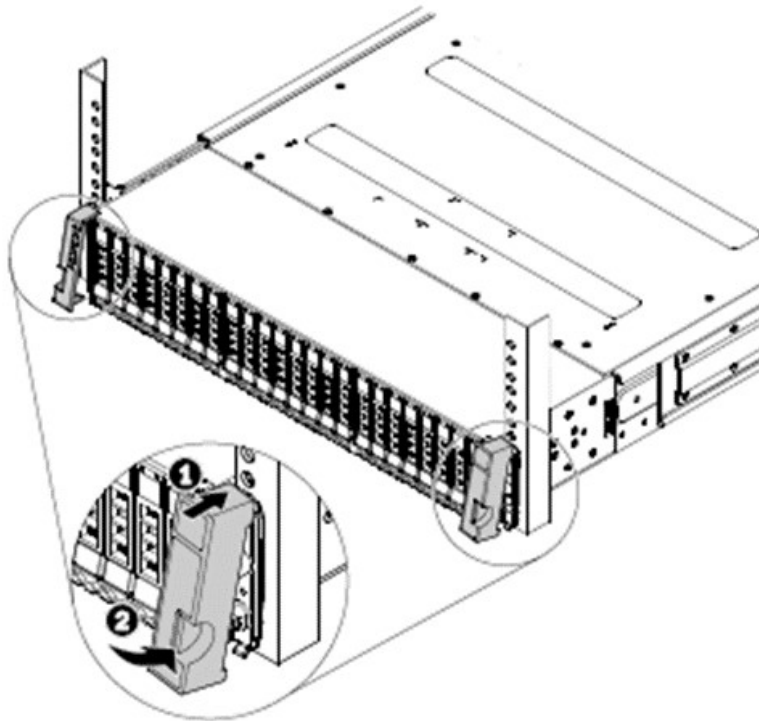


Figure 15. Reinstalling the side cover

The installation of the storage block in a rack is now complete.

Install the ThinkAgile CP compute block

Procedures for installing ThinkAgile CP compute block in a rack.

To install the ThinkAgile CP compute block in a rack, do the following:

1. Unpack the compute block box and check the contents
2. Install the slide rails into the rack
3. Install the enclosure on the slide rails
4. Slide the compute enclosure into the rack

Firstly, unpack the storage block box and check the contents:

- One compute block
- One compute slide rails box:
 - One left slide rail
 - One right slide rail
 - Two M5 screws
 - Two washers
- One Category 5e patch cable
- Two power cords
- Two SFP+ 10 GbE Direct Attach Cables (DACs)

Note: If any of the slide box items are missing or are damaged, contact your place of purchase.

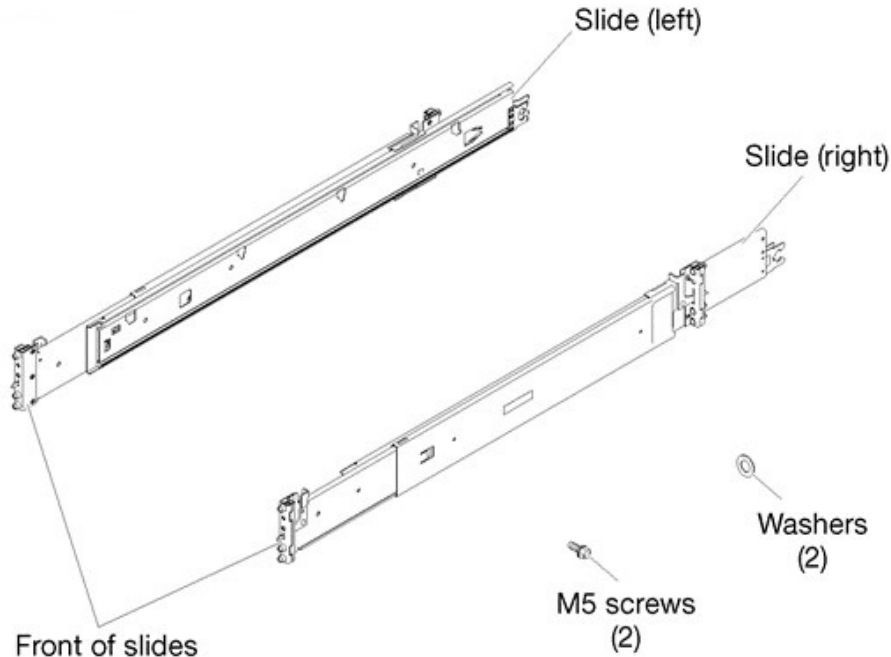


Figure 16. ThinkAgile CP compute slide rails box contents

Install the compute slide rails

Procedures for installing ThinkAgile CP compute block slide rails in a rack.

The slide rails are extensible as shown in the following illustration:

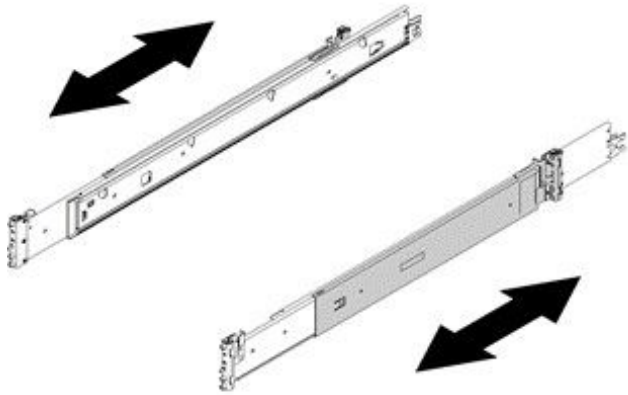


Figure 17. Slide rails

To install the ThinkAgile CP compute block slide rails, do the following:

- Step 1. Ensure that the slide rail is shortened to its shortest position.
- Step 2. From the front of the rack cabinet, line up the pins on the rear of the slide rail with the flange holes at the rear of the rack.
- Step 3. Push the slide rail so that the pins and the latch snap into place.

Note: The holes on the rack are either be square-shaped or round-shaped.

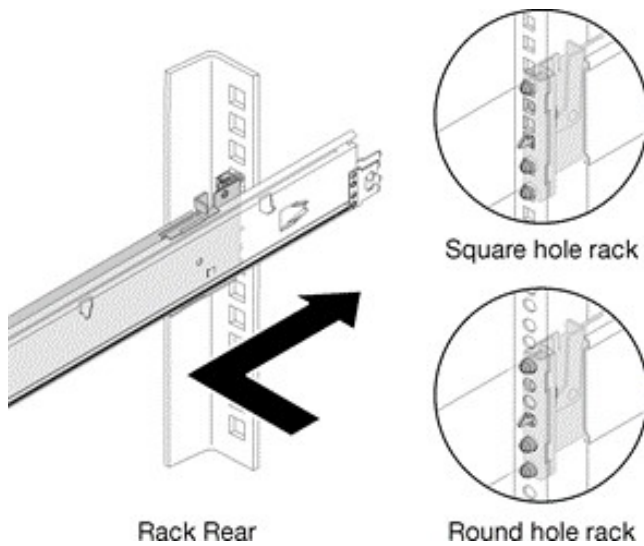


Figure 18. Left slide rear installation

Step 4. Pull the slide forward and insert the pins and the latch into the flange holes at the front of the rack.

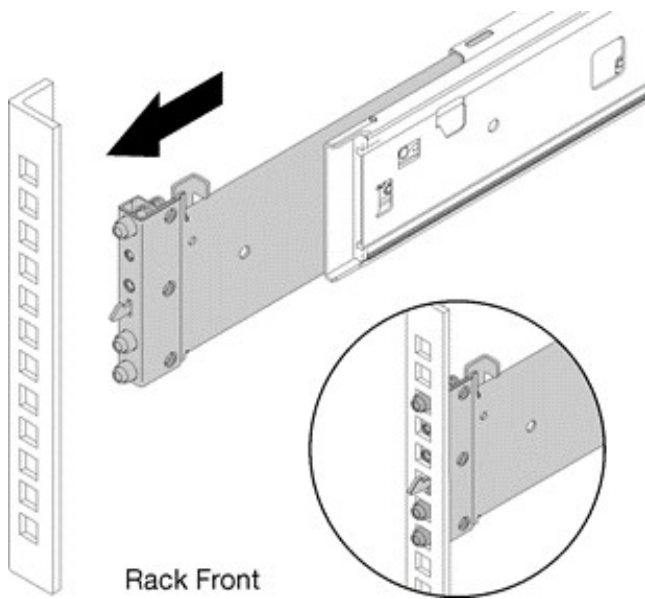


Figure 19. Left slide front installation

Step 5. Repeat steps [Step 1 1 on page 33](#) through [Step 4 4 on page 34](#) to install the other slide rail. Ensure that each slide rail is securely engaged in the flange by:

1. Inspecting to confirm that the hook has caught in the rack.
2. Moving the slide rail backward and forward to ensure that it does not pop out.

Step 6. Insert a M5 screw and washer into the rear bracket of each slide rail, and then fasten the two M5 screws to secure the slide rails to the rack flanges.

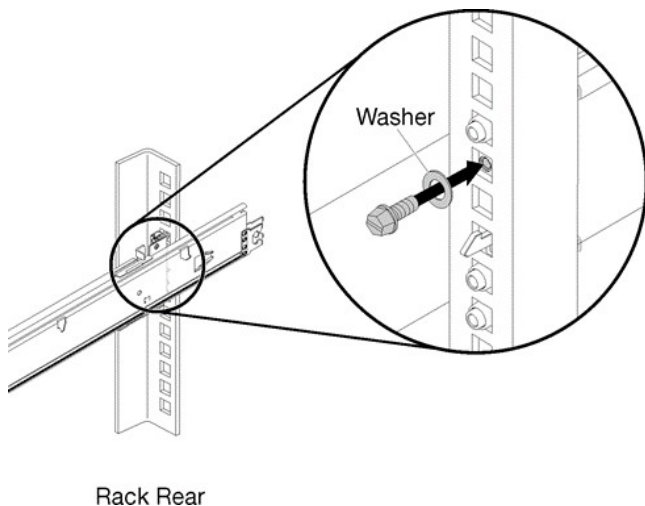


Figure 20. Securing the compute block slide rails

The installation of the compute block slide rails in a rack is now complete.

To continue with the installation of the ThinkAgile CP compute block, follow these steps: [“Install the compute enclosure” on page 35](#)

Install the compute enclosure

Procedures for installing ThinkAgile CP compute enclosure in a rack.

CAUTION:

Ensure that at least two people lift and install the enclosure together.

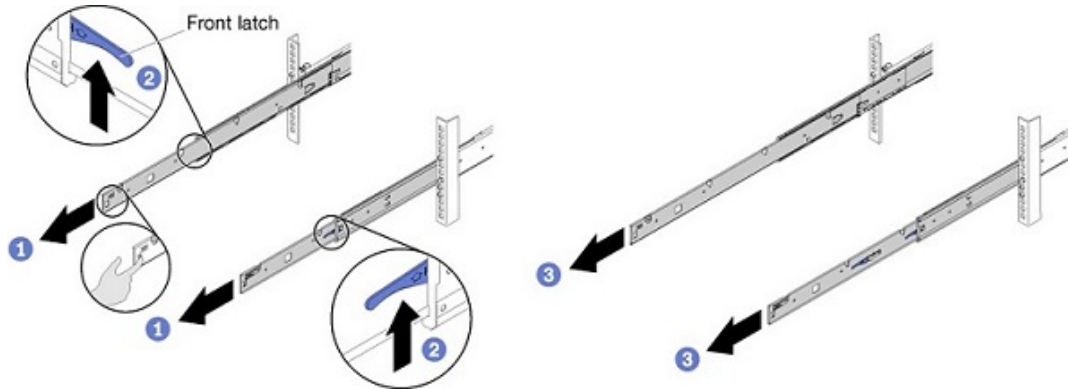


Figure 21. Front latches on slide rails

To install the ThinkAgile CP compute enclosure on the slide rails, do the following:

- Step 1. Pull the slide rails forward until the rails click into place.
- Step 2. Push up the front latches.
- Step 3. Pull the slide rails all the way out.

Attention: You can only install the compute block enclosure successfully when the slide rails are fully extended.

- Step 4. Remove all compute nodes and the shuttle from the enclosure.
- Step 5. Carefully lift the enclosure.
- Step 6. Tilt and lower the enclosure; then, push the slide rails toward the enclosure and make sure the farthest nailheads on each side go into the slots on the slide rails.

Step 7. Slowly lower the enclosure and ensure that the other three nailheads on each side slip into the slots.

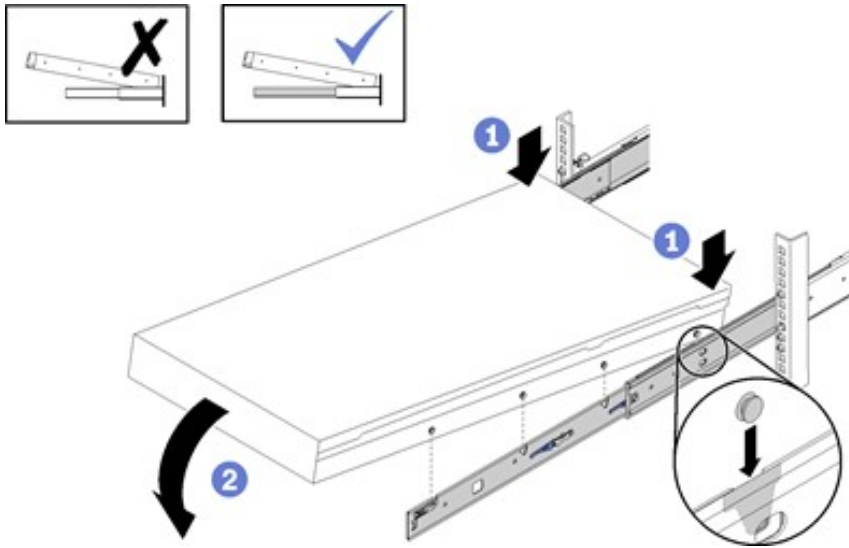


Figure 22. ThinkAgile CP compute enclosure installation

Step 8. To slide the ThinkAgile CP compute enclosure into the rack, first push up the rear latches on the slide rails.

Step 9. Push the enclosure until the slide rails click into place.

Step 10. Push up the front latches on the slide rails.

Step 11. Push the enclosure all the way into the rack.

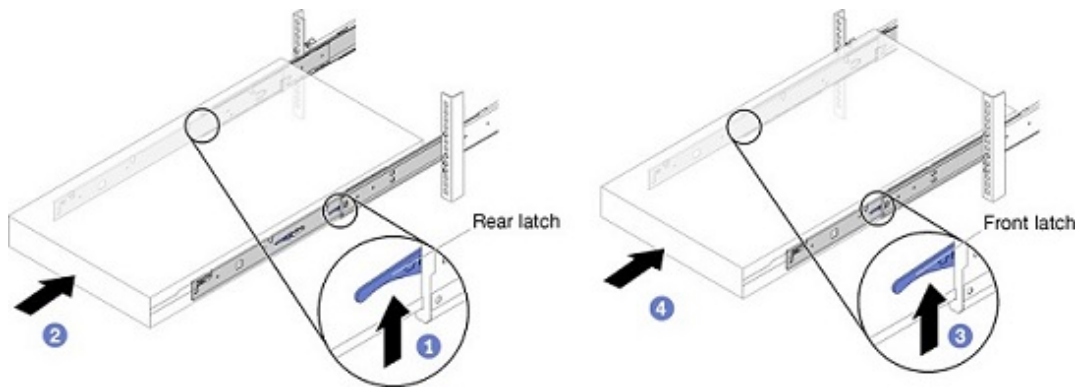


Figure 23. Enclosure installation into rack

Step 12. Fasten the two thumbscrews located on the front of the compute enclosure.

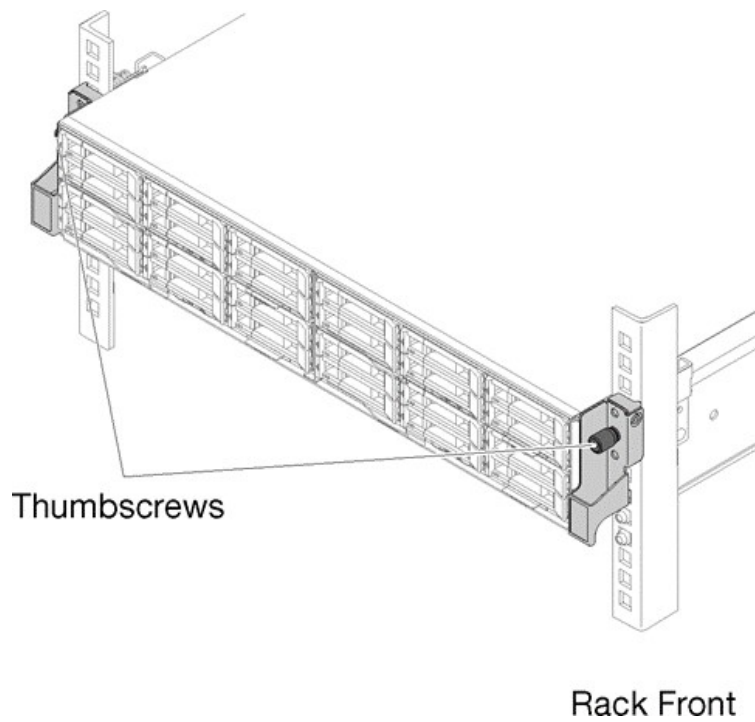


Figure 24. Compute enclosure thumbscrews

Step 13. Insert back into the enclosure the shuttle and all the previously removed compute nodes.

The installation of the compute block in a rack is now complete.

Install the ThinkAgile CP interconnect switch

Procedures for installing ThinkAgile CP interconnect switch in a rack.

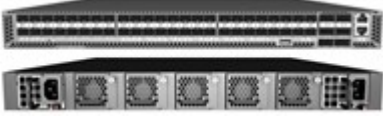
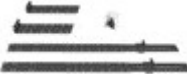

Attention:

- The switch drawings in this topic are for illustration only and may not match your specific switch model.
- If you are using a non-Lenovo switch as the management switch, keep 1U of empty space between the interconnect switches and the management switch so that power or network cables can use this space.

To install the ThinkAgile CP interconnect, do the following:

Note: When installing two interconnects, make sure that you install the secondary interconnect lower in the rack than the primary interconnect. The secondary interconnect is labeled with a rack location label that is lower than the rack location label of the primary interconnect.

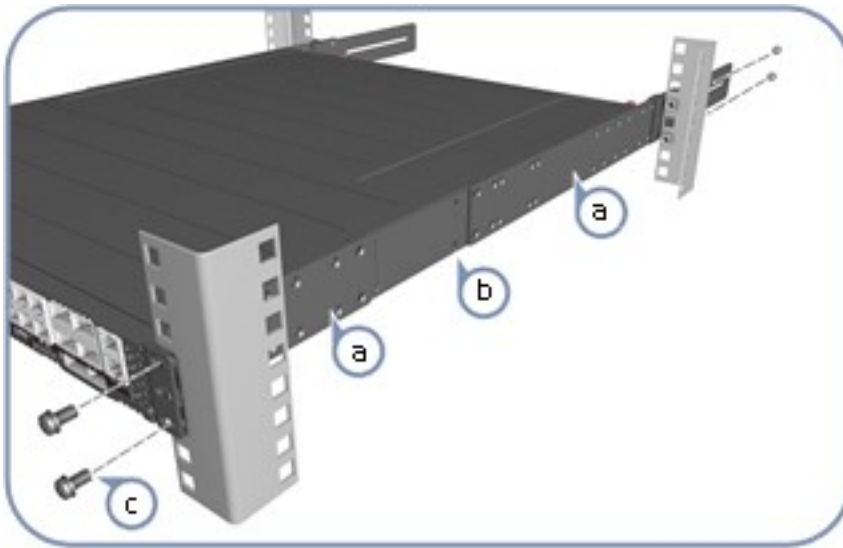
Step 1. Unpack the switch and check the contents.

Component	Description
	7Y67 switch
	Rack mounting kit <ul style="list-style-type: none">• 2 front-post brackets• 2 rear-post brackets• 20 screws• 2 ear-locking screws
	Console cable, RJ-45 to DB-9

CAUTION:

The switch includes plug-in power supply (PSU) and fan tray modules that are installed into its chassis. All installed modules must have a matching airflow direction. That is, if the installed power modules have a front-to-back (F2B) airflow direction, all the installed fan tray modules must also have an F2B airflow direction.

Step 2. Attach the brackets.



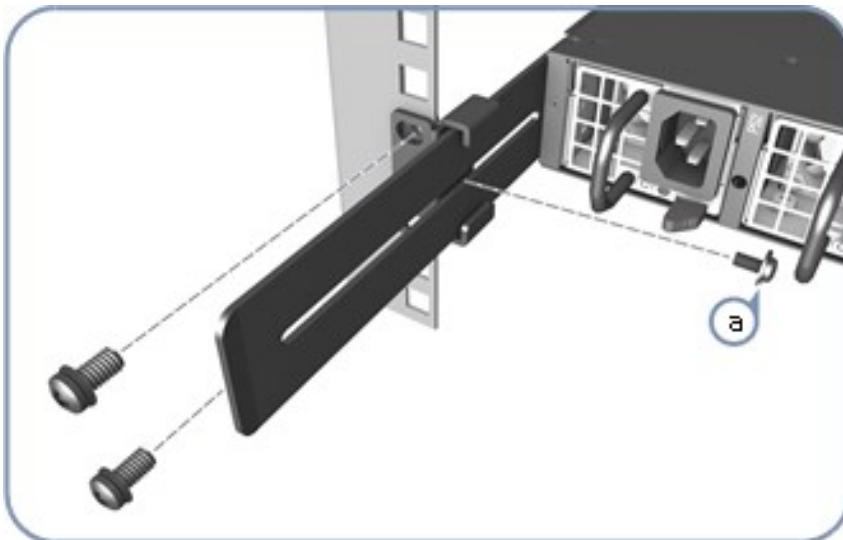
CAUTION:

Installing the switch in a rack requires two people. One person should position the interconnect switch in the rack, while the other secures it using the rack screws.

- a. Attach each of the rails to the interconnect switch using four of the included rail screws.
- b. Use an additional two screws to secure each of the rails at the midpoint on the sides of the interconnect switch.
- c. Use the screws and cage nuts supplied with the rack to secure the switch in the rack.

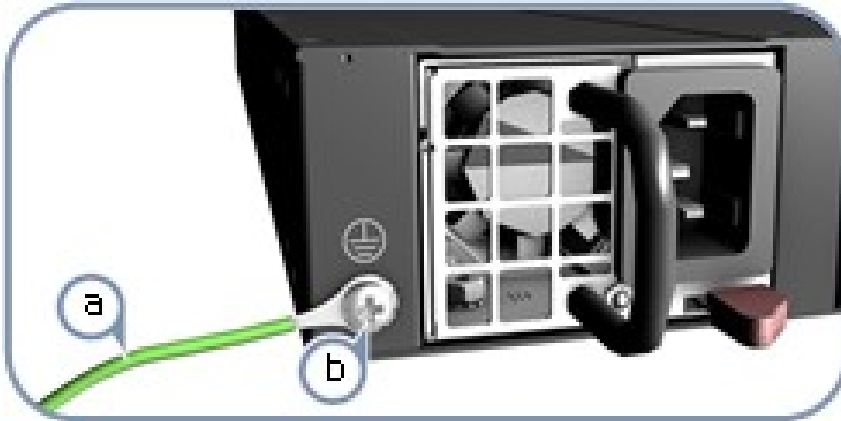
Note: Make sure that you attach the cage nuts to the rack before installing the interconnect switch.

Step 3. Adjust the rear-post rail flange and then lock the position of the rear-post rail flange using the included position-locking screws.



Note: You can also adjust the rear-post rail flange to fit different rack depths from 56 cm to 75 cm.

Step 4. Ground the interconnect switch.

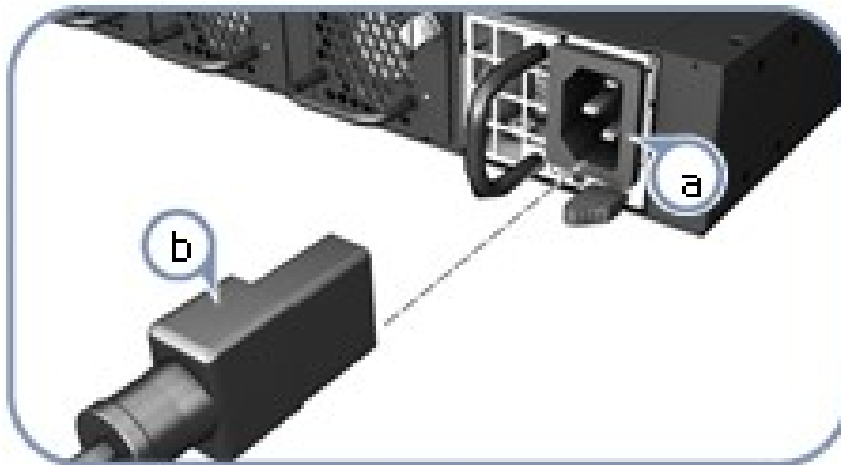


- a. Ensure the rack is properly grounded and in compliance with ETSI ETS 300 253. Verify that there is a good electrical connection to the grounding point on the rack (no paint or isolating surface treatment).
- b. Attach the grounding wire #14 AWG to the grounding point on the switch rear panel. Then connect the other end of the wire to the rack ground.

CAUTION:

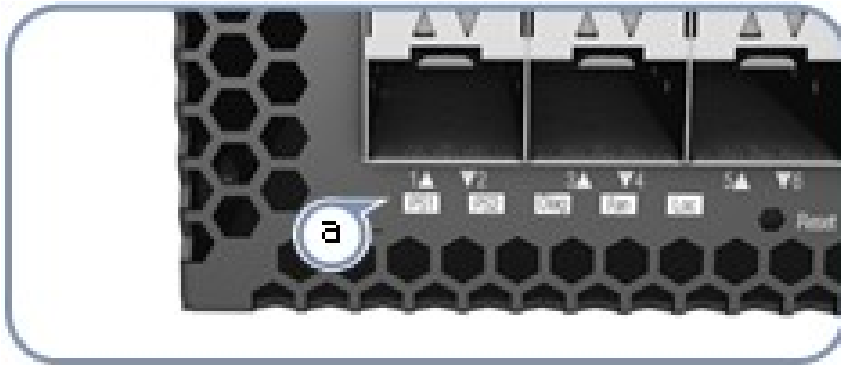
The earth connection must not be removed unless all supply connections have been disconnected.

Step 5. Connect the power.

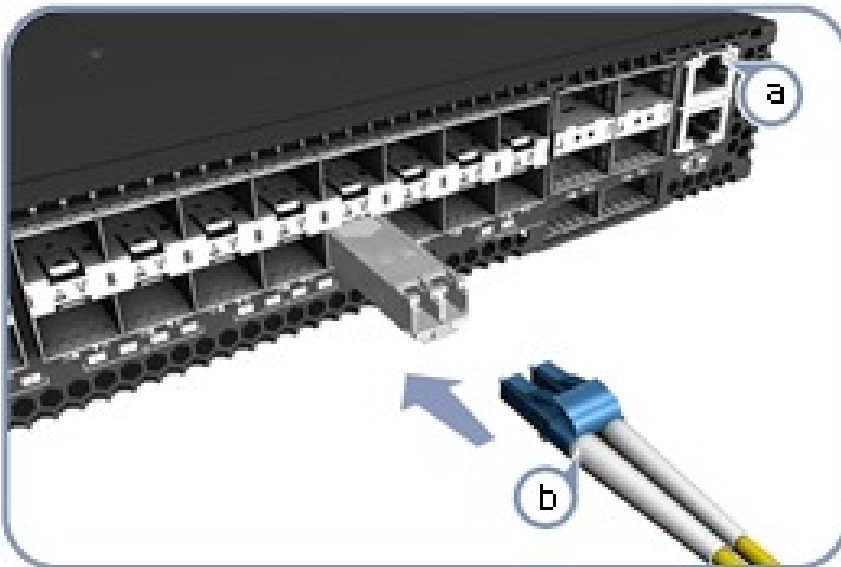


- a. Install one or two AC power modules in the switch. The switch supports up to two PSUs that must have the same matching airflow direction as the installed fan tray.
- b. Connect an external AC power source to the modules.

Step 6. Verify basic switch operation by checking the system LEDs. When operating normally, the PSU1/ PSU2, Diag, and Fan LEDs should all be green.



Step 7. Connect the network cables.



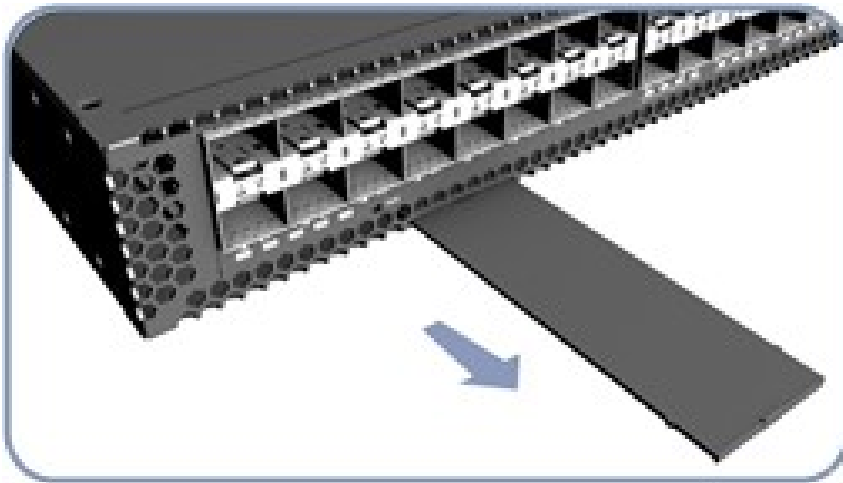
- a. For the RJ-45 Management port, connect 100-ohm Category 5, 5e or better twisted-pair cable.
- b. Connect DAC cables to the SFP+/QSFP+ slots. Or first install SFP+/QSFP+ transceivers and then connect fiber optic cabling to the transceiver ports.

The following transceivers are supported:

- 40G QSFP+ SR4 Transceiver 90Y3505
- 10G BASE-T (RJ45) SFP Transceiver SBB7A02090
- 10G SFP+ SR Transceiver 46C3446

Note: As connections are made, check the port status LEDs to be sure the links are valid.

Step 8. View the product label. The switch product label is located below SFP+ ports 7–12 on left side of the front panel. Pull the label out to view the product information.



The installation of the interconnect switch is now complete.

Install the management switch (optional)

This section covers the procedures to install the ThinkSystem NE0152T RackSwitch as the management switch in a ThinkAgile CP solution.

Note: A dedicated out-of-band (OOB) management switch is required for this solution. If the Lenovo ThinkSystem NE0152T RackSwitch is not used, you must provide an OOB management switch with the correct configuration. Disregard this procedure if you are not including the NE0152T as the management switch in your solution.

This section describes how to install the NE0152T switch in a standard 19-inch equipment rack using the mounting kit included with the switch.

The following parts are included in the standard mounting kit:

Item number	Description	Quantity
1	Mounting brackets	2
2	M4 screws	8
3	M6 screws	4
4	M6 clip nuts	4
5	M6 cage nuts	4
6	M6 locking washers	4

Attention:

- The rack-mounting frame may be unable to support the weight of the switch with only the front post mounting brackets (2-post application). If the switch has an undesirable amount of sag, it is recommended to use a 4-post mounting kit.
- For earthquake stability, mount the switch in a 4-post rack.
- If you are using a non-Lenovo switch as the management switch, keep 1U of empty space between the interconnect switches and the management switch so that power or network cables can use this space.

Statement 26

CAUTION:



Do not place any object on top of rack-mounted devices.

To install the ThinkSystem NE0152T RackSwitch in a standard equipment rack, complete the following steps:

- Step 1. Locate, record, and retain the product switch information in order to configure and register your product.
- Step 2. Attach a mounting bracket (item 1 in the illustration) to each side of the switch with M4 screws (item 2). Torque the screws to approximately 2.0 newton-meters (Nm) \pm 0.1 Nm (17.7 inch-pounds).

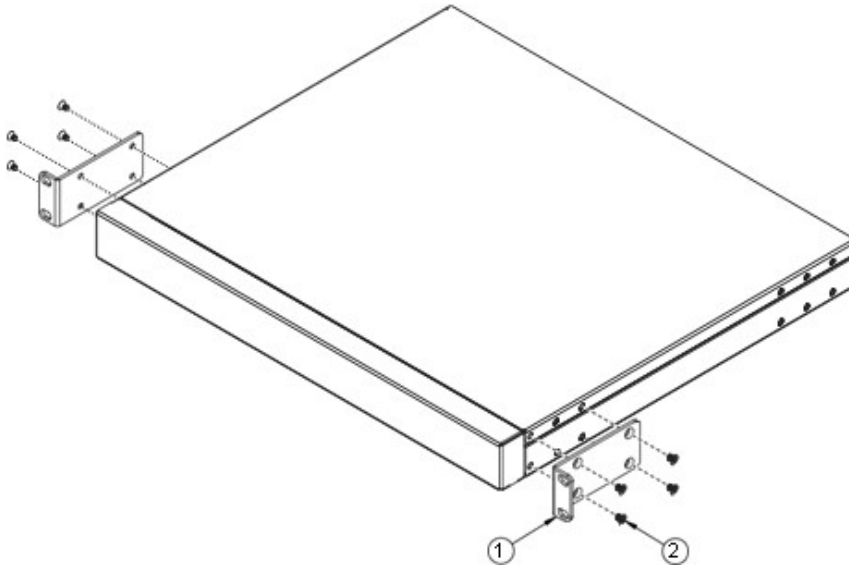


Figure 25. Attaching mounting brackets to switch

- Step 3. From the front, slide the switch into the rack at the desired height.
- Step 4. Secure the switch unit to the rack posts with M6 screws (item 3 in illustration), washers (item 6), and either clip nuts (item 4) or cage nuts (item 5). Torque the screws to approximately 5.7 Nm \pm 0.1 Nm (50 inch-pounds).

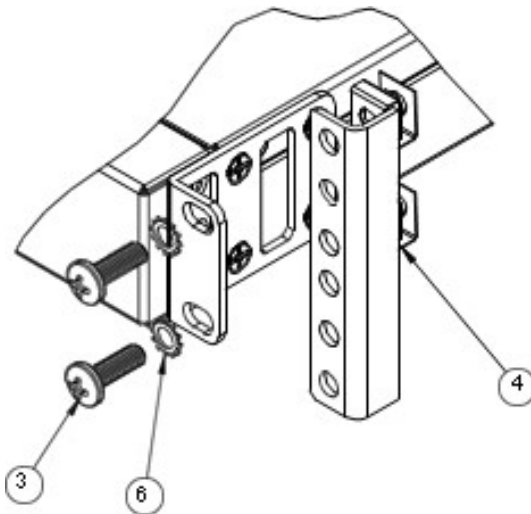


Figure 26. Securing switch to rack posts

Step 5. Connect all external cables.

Step 6. If not using the 1U air-duct option, install the power cord retention clip.

Note: The power cord retention clip is not used when the 1U air-duct option is installed.

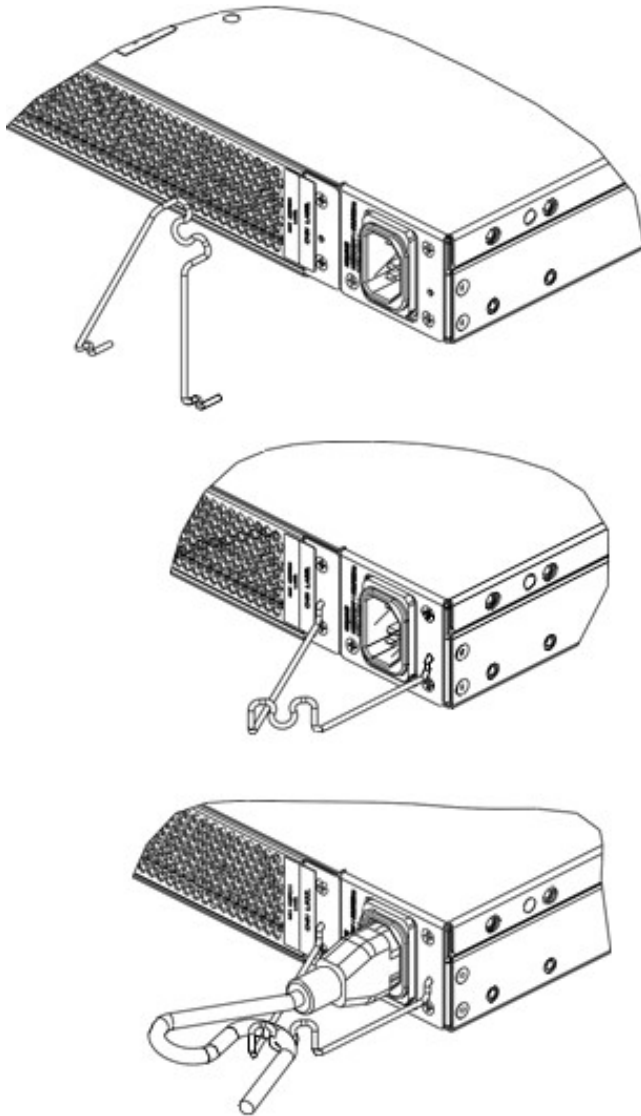


Figure 27. Installing power cord retention clip

The installation of the management switch is now complete.

Cabling the ThinkAgile CP components

Procedures for cabling the ThinkAgile CP components in a rack.

Your ThinkAgile CP configuration determines how it is cabled. There are two (2) general configurations: single-interconnect and dual-interconnect. Follow the sequence as outlined in the following table:

Cabling task	Single-interconnect configuration	Dual-interconnect configuration
OOB interconnect network	✓	✓
Compute block	✓	✓
Storage block	✓	✓
Peer link	<i>Not required</i>	✓
Customer data center network	✓	✓

Cabling a single-interconnect configuration

Procedures for cabling the ThinkAgile CP single-interconnect switch configuration.

Complete these procedures to cable a single-interconnect configuration.

Hardware management network connections

Connect the following ports to the management switch:

- Interconnect port 47 using a SFP+ Direct Attach Cable (DAC)
- Compute block port (C.M.) using a RJ45 patch cable
- Upper storage block port (S.U.M.) using a RJ45 patch cable
- Lower storage block port (S.L.M.) using a RJ45 patch cable

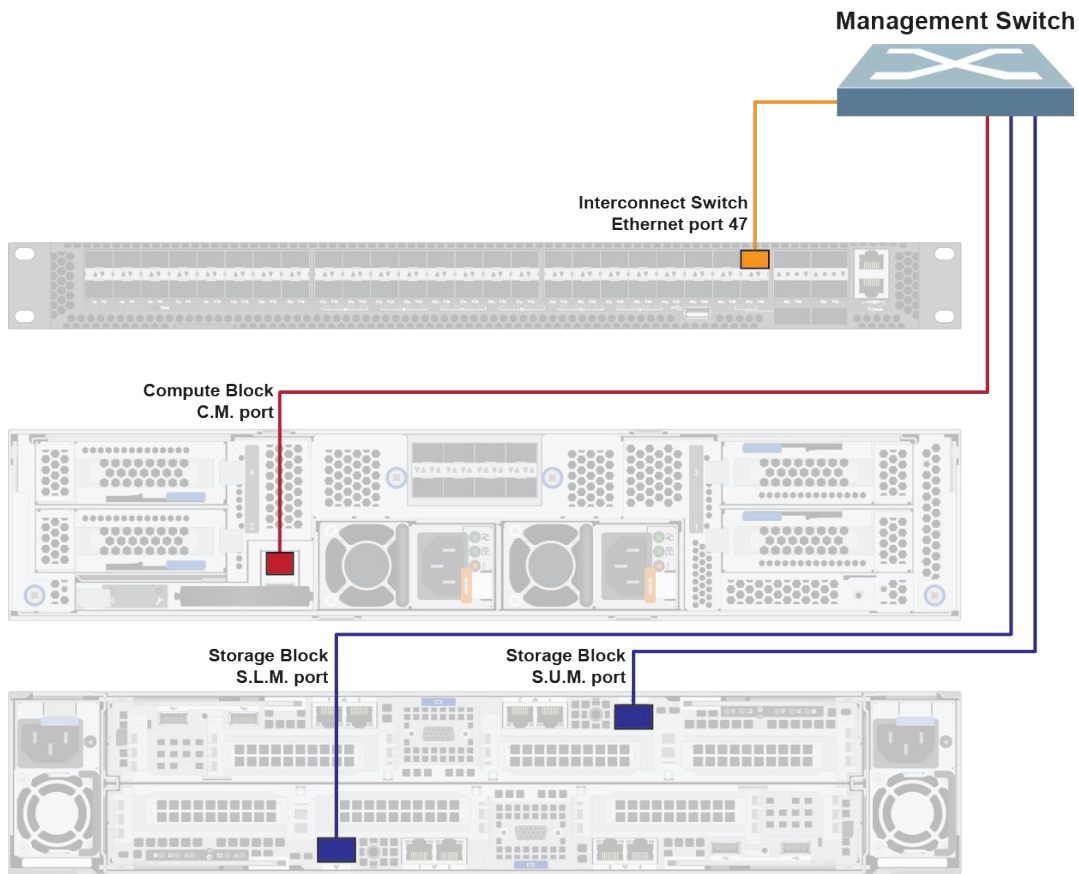
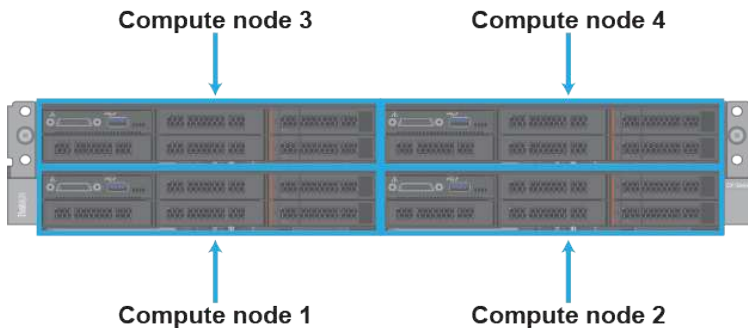


Figure 28. Hardware management network connectivity in a single interconnect configuration

Note: If not using the Lenovo ThinkSystem NE0152T RackSwitch as the management switch, you may require different cables for the management network connections.

Compute block connections (single-interconnect configuration)

The compute block consists of an enclosure with up to four compute nodes, which are numbered as follows:



Connect the compute nodes according to the populated compute node location and corresponding port mapping. The cables to be used are clearly labeled; make sure that you use the correct cables.

You need two SFP+ Direct Attach Cables (DACs) for each populated compute node.

The compute block port mapping is as follows:

Front compute node location	Back network port mapping	Network interconnect port
Top left	Compute node 3, port 1 (C.3.1)	Interconnect, port 5
	Compute node 3, port 2 (C.3.2)	Interconnect, port 6
Top right	Compute node 4, port 1 (C.4.1)	Interconnect, port 7
	Compute node 4, port 2 (C.4.2)	Interconnect, port 8
Bottom left	Compute node 1, port 1 (C.1.1)	Interconnect, port 1
	Compute node 1, port 2 (C.1.2)	Interconnect, port 2
Bottom right	Compute node 2, port 1 (C.2.1)	Interconnect, port 3
	Compute node 2, port 2 (C.2.2)	Interconnect, port 4

Note: You only need to cable the number of compute nodes that are installed in the compute enclosure.

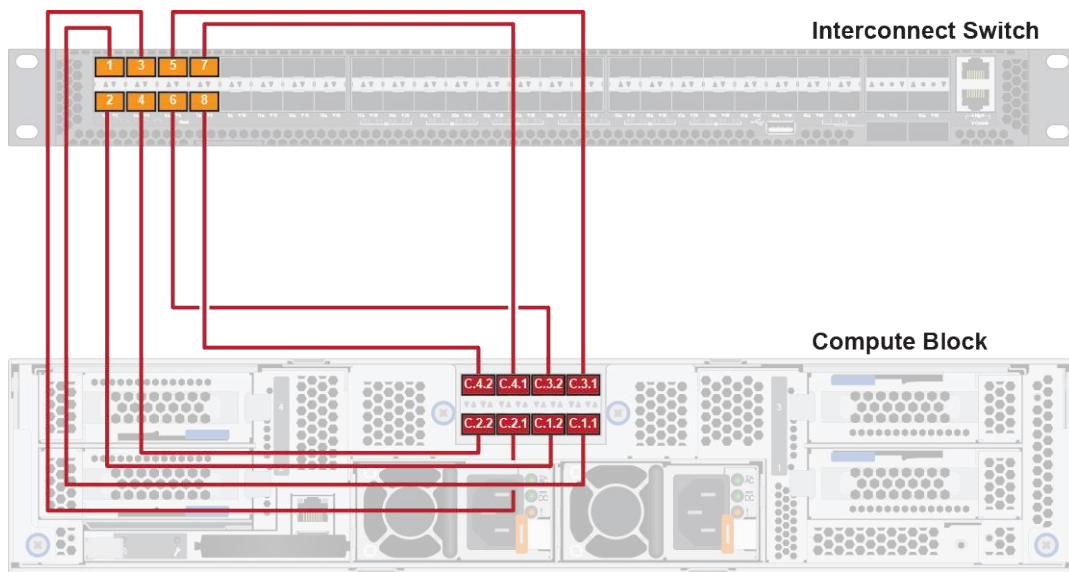


Figure 29. Single—interconnect configuration — compute node and network interconnect connections

Storage block connections (single-interconnect configuration)

Connect the storage controllers according to the populated controller location and corresponding port mapping. The cables to be used are clearly labeled; make sure that you use the correct cables.

You need eight Category 6 patch cables and eight SFP+ transceivers. Attach a single SFP+ transceiver to each patch cable.

The storage block port mapping is as follows:

Front storage controller location	Back network port mapping	Network interconnect port
Upper	Upper storage controller, port 1 (S. U.1)	Interconnect, port 17
	Upper storage controller, port 2 (S. U.2)	Interconnect, port 20
	Upper storage controller, port 3 (S. U.3)	Interconnect, port 21
	Upper storage controller, port 4 (S. U.4)	Interconnect, port 24
Lower	Lower storage controller, port 1 (S. L.1)	Interconnect, port 25
	Lower storage controller, port 2 (S. L.2)	Interconnect, port 28
	Lower storage controller, port 3 (S. L.3)	Interconnect, port 29
	Lower storage controller, port 4 (S. L.4)	Interconnect, port 32

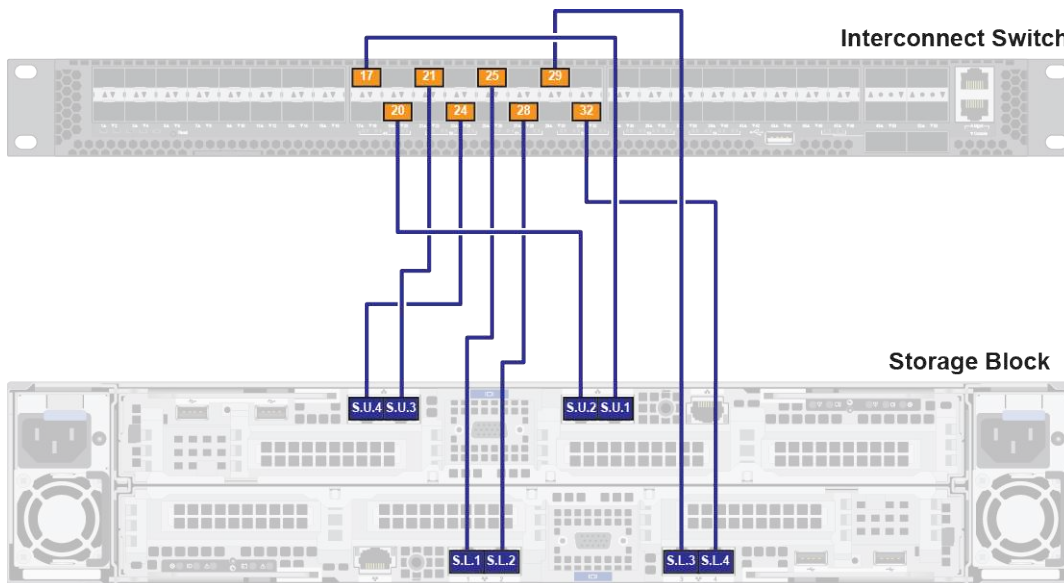


Figure 30. Single—interconnect configuration — storage block and network interconnect connections

Single direct link topology

This section covers details about the single direct link topology.

Based on the single direct link topology and the uplink bandwidth option (10 Gbps or 40 Gbps) for the customer data center connection, use the following port connectivity diagram:

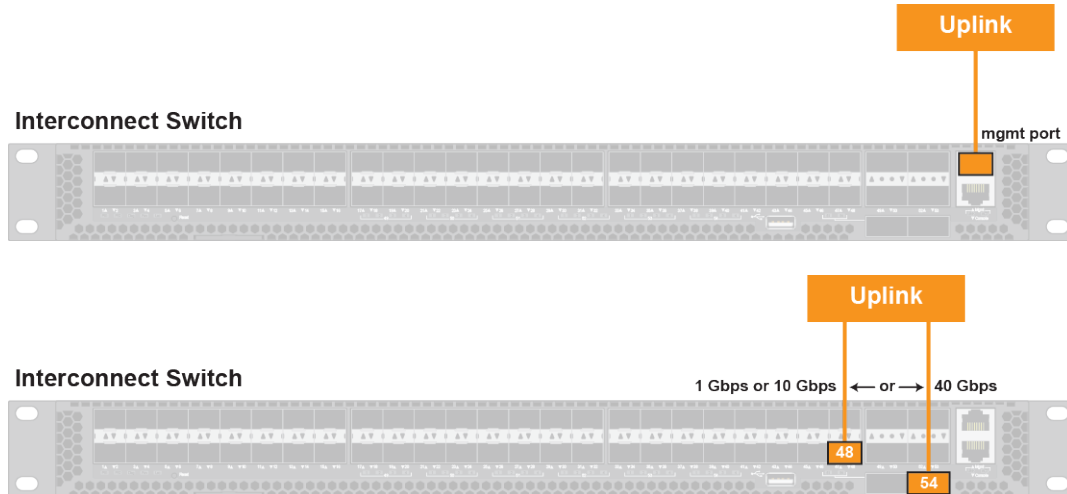


Figure 31. Customer data center connection: single direct link

Notes:

- The interconnect switch requires a single 1 Gbps copper connection (RJ45) from the out-of-band (OOB) management port on the interconnect switch to the management switch or the OOB interconnect network.
- Ports 51 and 54 of the interconnect switch do not have LED status indicators.

The following table provides the ports from the interconnect switch which need to be connected to the customer data center network.

Uplink bandwidth option	Network interconnect ports
10 Gbps data center network uplink	Interconnect, Mgmt port Interconnect, port 48
40 Gbps data center network uplink	Interconnect, Mgmt port Interconnect, port 54

Note: Choose either the 10 Gbps or the 40 Gbps option.

Table 3. Single direct link topology specifications

Configuration	Single physical trunk port
OOB Interconnect Network	One access port for the interconnect switch connected to the management switch or VLAN
Requirements	STP required

Note: The uplink VLAN must be different than the OOB management VLAN.

Single Direct Link Topology

Configuration File
/etc/cloudistics/cldtx_switch_resource.sh

INTERCONNECT_CONFIG="Option1"
Single switch
Single uplink port

Legend:

- ▽ access port - OOB management VLAN - untagged
- OOB management port - VLAN unaware
- LAG port - uplink VLAN - tagged:
port 48 for 10 Gbps connection, or
port 54 for 40 Gbps connection

Note: The uplink VLAN must be different than the OOB management VLAN

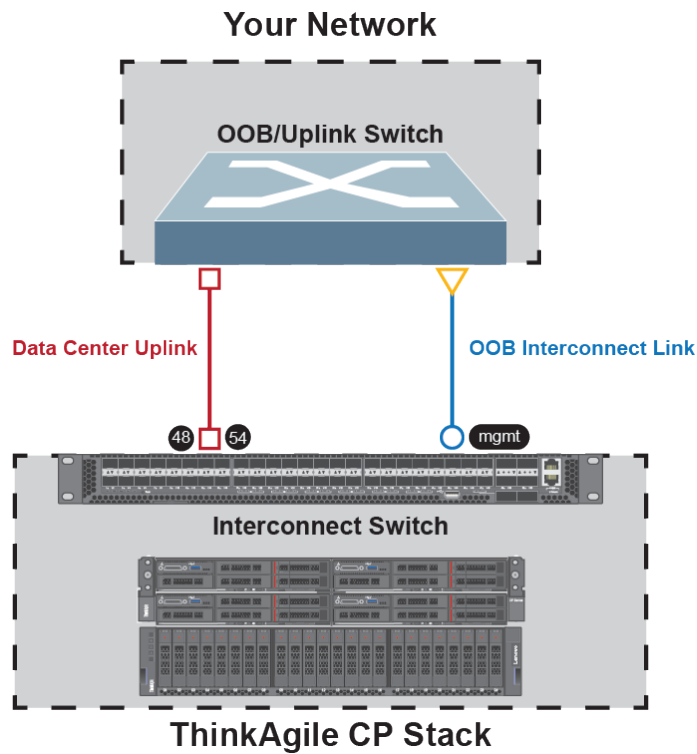


Figure 32. Single direct link topology

Dual direct link topology

This section covers details about the dual direct link topology.

Based on the dual direct link topology and the uplink bandwidth option (10 Gbps or 40 Gbps) for the customer data center connection, use the following port connectivity diagram:



Figure 33. Customer data center connection: dual direct link

Notes:

- The interconnect switch requires a single 1 Gbps copper connection (RJ45) from the out-of-band (OOB) management port on the interconnect switch to the management switch or the OOB interconnect network.
- Ports 51 and 54 of the interconnect switch do not have LED status indicators.

The following table provides the ports from the interconnect switch which need to be connected to the customer data center network.

Uplink bandwidth option	Device	Network interconnect ports
10 Gbps data center network	Primary device	Interconnect, Mgmt port Interconnect, port 48
	Secondary device	Interconnect, port 46
40 Gbps data center network	Primary device	Interconnect, Mgmt port Interconnect, port 54
	Secondary device	Interconnect, port 53

Note: Choose either the 10 Gbps or the 40 Gbps option.

Table 4. Dual direct link topology specifications

Configuration	Redundant single physical trunk ports
OOB Interconnect Network	One access port for the interconnect switch connected to the management switch or VLAN
Requirements	STP required

Note: The uplink VLAN must be different than the OOB management VLAN.

Dual Direct Link Topology

Configuration File

/etc/cloudistics/cldtx_switch_resource.sh

INTERCONNECT_CONFIG="Option1"

Single switch

Two independent uplink ports

Legend:

▽ access port - OOB management VLAN - untagged

○ OOB management port - VLAN unaware

□ LAG port - uplink VLAN - tagged:

ports 46 and 48 for 10 Gbps connection, or

ports 53 and 54 for 40 Gbps connection

Note: The uplink VLAN must be different than the OOB management VLAN

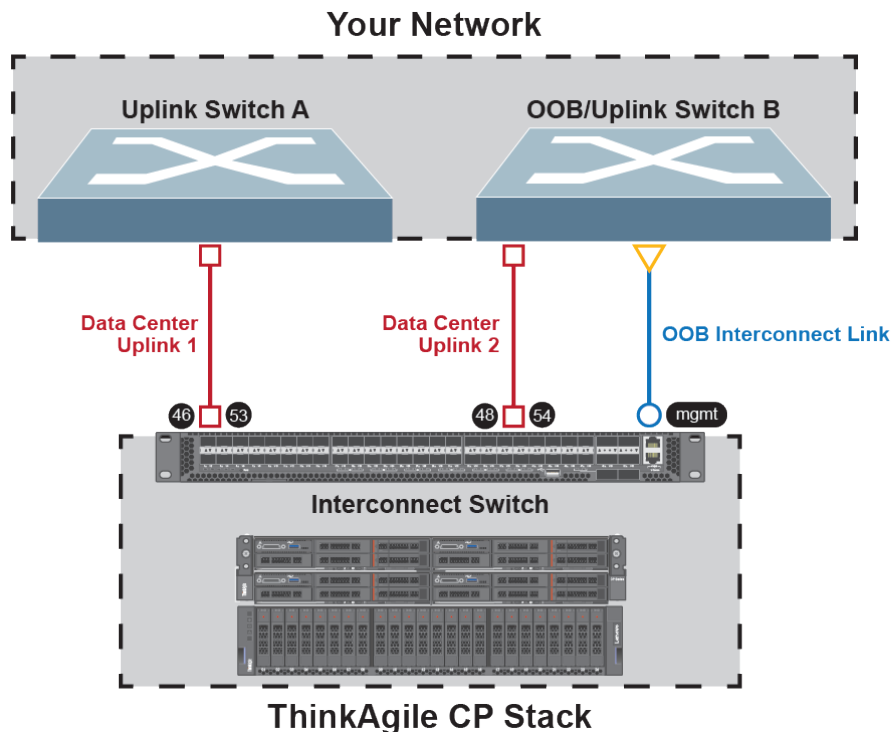


Figure 34. Dual direct link topology

Link Aggregation Group (LAG) direct link topology

This section covers details about the Link Aggregation Group (LAG) direct link topology.

Based on the LAG direct link topology and the uplink bandwidth option (10 Gbps or 40 Gbps) for the customer data center connection, use the following port connectivity diagram:



Figure 35. Customer data center connection: LAG direct link

Notes:

- The interconnect switch requires a single 1 Gbps copper connection (RJ45) from the out-of-band (OOB) management port on the interconnect switch to the management switch or the OOB interconnect network.
- Ports 51 and 54 of the interconnect switch do not have LED status indicators.

The following table provides the ports from the interconnect switch which need to be connected to the customer data center network.

Uplink bandwidth option	Device	Network interconnect ports
10 Gbps data center network	Primary device	Interconnect, Mgmt port Interconnect, port 48
	Secondary device	Interconnect, port 46
40 Gbps data center network	Primary device	Interconnect, Mgmt port Interconnect, port 54
	Secondary device	Interconnect, port 53

Note: Choose either the 10 Gbps or the 40 Gbps option.

Table 5. LAG direct link topology specifications

Configuration	Both sides configured as trunk ports with LAG
OOB Interconnect Network	One access port for the interconnect switch connected to the management switch or VLAN
Requirements	<ul style="list-style-type: none"> • LACP enabled • STP required

Note: The uplink VLAN must be different than the OOB management VLAN.

LAG Direct Link Topology

Configuration File

/etc/cloudistics/cldtx_switch_resource.sh

INTERCONNECT_CONFIG="Option1"

Single switch

Two uplink ports as members of the a LAG

Legend:

▽ access port - OOB management VLAN - untagged

○ OOB management port - VLAN unaware

□ LAG port - uplink VLAN - tagged:

ports 46 and 48 for 10 Gbps connection, or

ports 53 and 54 for 40 Gbps connection

Note: The uplink VLAN must be different than the OOB management VLAN

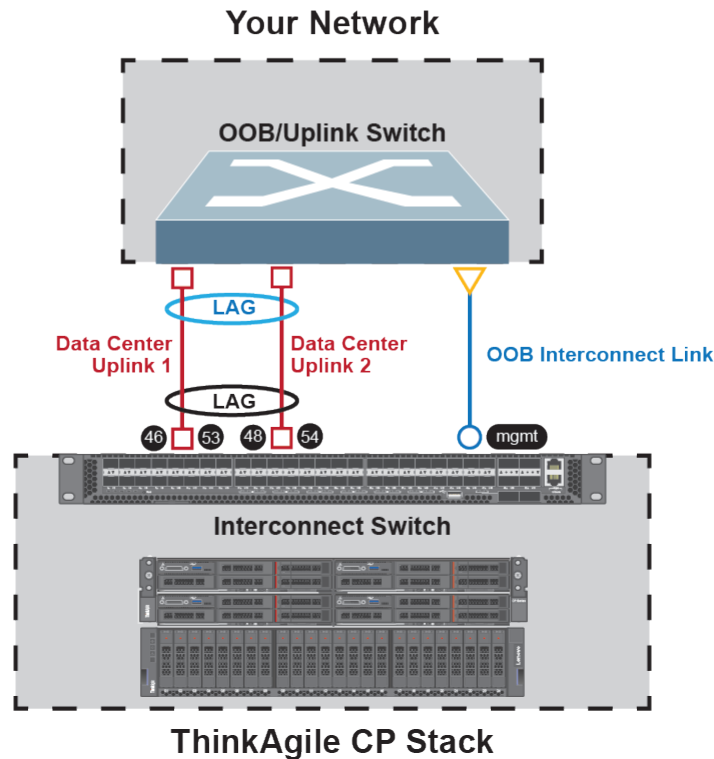


Figure 36. LAG direct link topology

Cabling a dual-interconnect configuration

Procedures for cabling the ThinkAgile CP dual-interconnect switch configuration.

Hardware management network connections (dual-interconnect configuration)

Connect the following ports to the management switch:

- Primary interconnect port 47 using a SFP+ Direct Attach Cable (DAC)
- Compute block port (C.M.) using a RJ45 patch cable
- Upper storage block port (S.U.M.) using a RJ45 patch cable
- Lower storage block port (S.L.M.) using a RJ45 patch cable

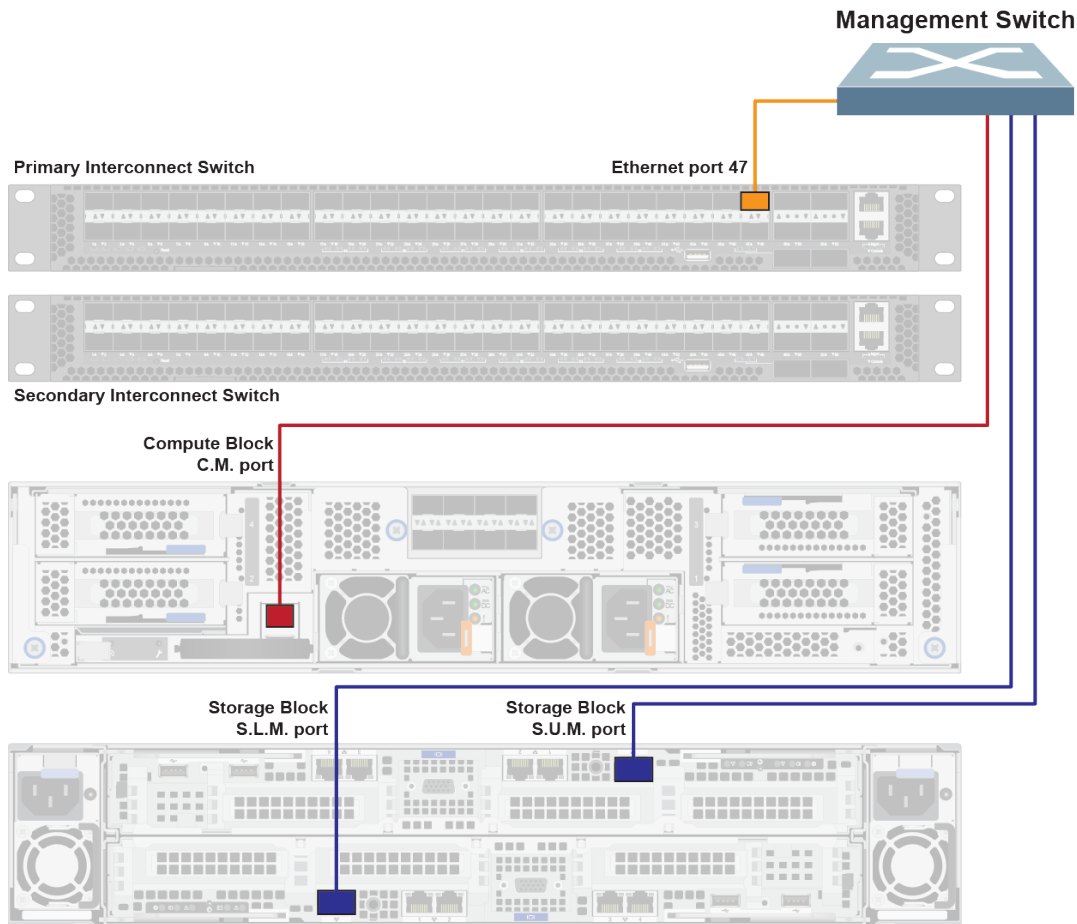
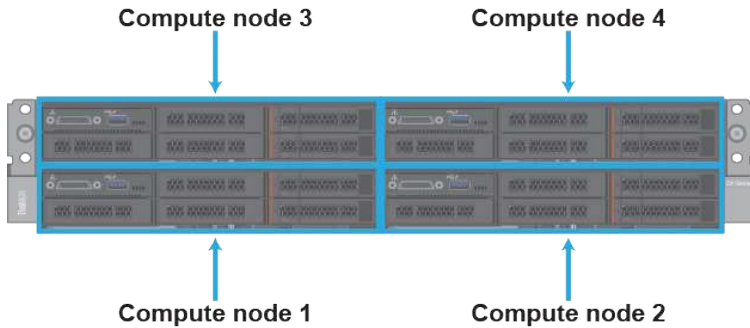


Figure 37. Hardware management network connectivity in a dual—interconnect configuration

Note: If not using the Lenovo ThinkSystem NE0152T RackSwitch as the management switch, you may require different cables for the management network connections.

Compute block connections (dual-interconnect configurations)

The compute block consists of an enclosure with up to four compute nodes, which are numbered as follows:



Connect the compute nodes according to the populated compute node location and the corresponding port mapping. The cables to be used are clearly labeled; make sure that you use the correct cables.

You need two SFP+ Direct Attach Cables (DACs) for each populated compute node.

The compute block port mapping is as follows:

Front compute node location	Back network port mapping	Network interconnect port
Top left	Compute node 3, port 1 (C.3.1)	Primary interconnect, port 3
	Compute node 3, port 2 (C.3.2)	Secondary interconnect, port 3
Top right	Compute node 4, port 1 (C.4.1)	Primary interconnect, port 4
	Compute node 4, port 2 (C.4.2)	Secondary interconnect, port 4
Bottom left	Compute node 1, port 1 (C.1.1)	Primary interconnect, port 1
	Compute node 1, port 2 (C.1.2)	Secondary interconnect, port 1
Bottom right	Compute node 2, port 1 (C.2.1)	Primary interconnect, port 2
	Compute node 2, port 2 (C.2.2)	Secondary interconnect, port 2

Note: You only need to cable the number of compute nodes that are installed in the compute enclosure.

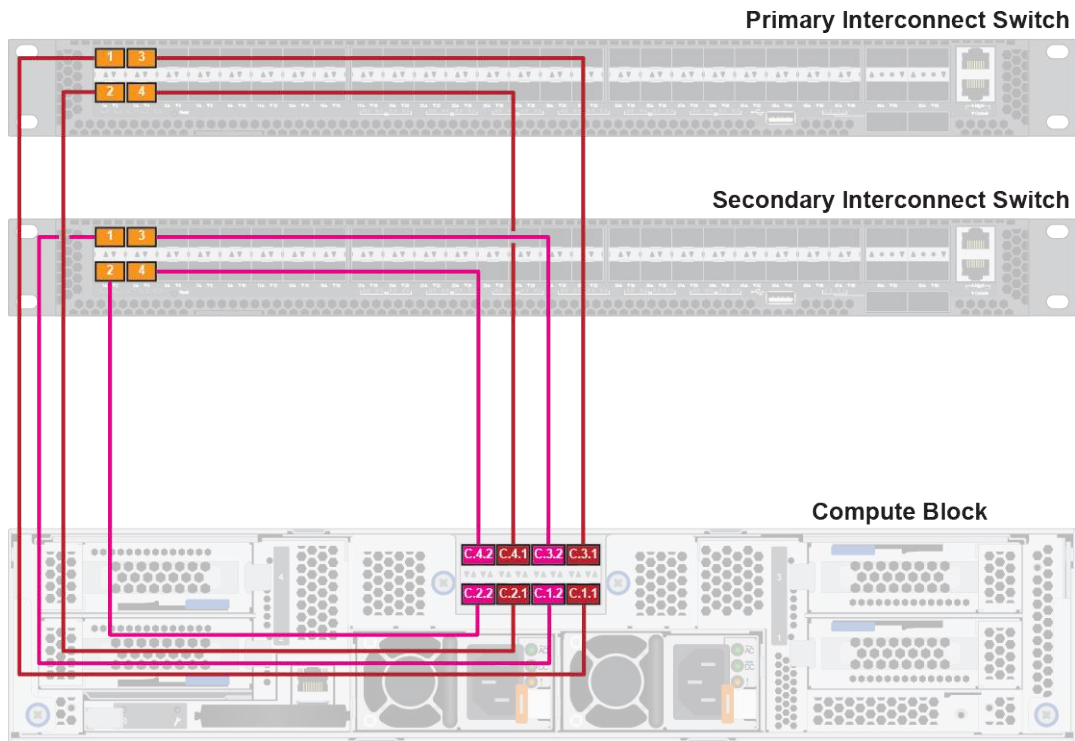


Figure 38. Dual—interconnect configuration — compute node and network interconnect connections

Storage block connections (dual-interconnect configurations)

Connect the storage controllers according to the populated controller location and corresponding port mapping and interconnect. The cables to be used are clearly labeled; make sure that you use the correct cables.

You need eight Category 6 patch cables and eight SFP+ transceivers. Attach a single SFP+ transceiver to each patch cable.

The storage block port mapping is as follows:

Front storage controller location	Back network port mapping	Network interconnect port
Upper	Upper storage controller, port 1 (S. U.1)	Primary interconnect, port 17
	Upper storage controller, port 2 (S. U.2)	Primary interconnect, port 20
	Upper storage controller, port 3 (S. U.3)	Secondary interconnect, port 17
	Upper storage controller, port 4 (S. U.4)	Secondary interconnect, port 20
Lower	Lower storage controller, port 1 (S. L.1)	Primary interconnect, port 21
	Lower storage controller, port 2 (S. L.2)	Primary interconnect, port 24
	Lower storage controller, port 3 (S. L.3)	Secondary interconnect, port 21

Front storage controller location	Back network port mapping	Network interconnect port
	Lower storage controller, port 4 (S.L.4)	Secondary interconnect, port 24

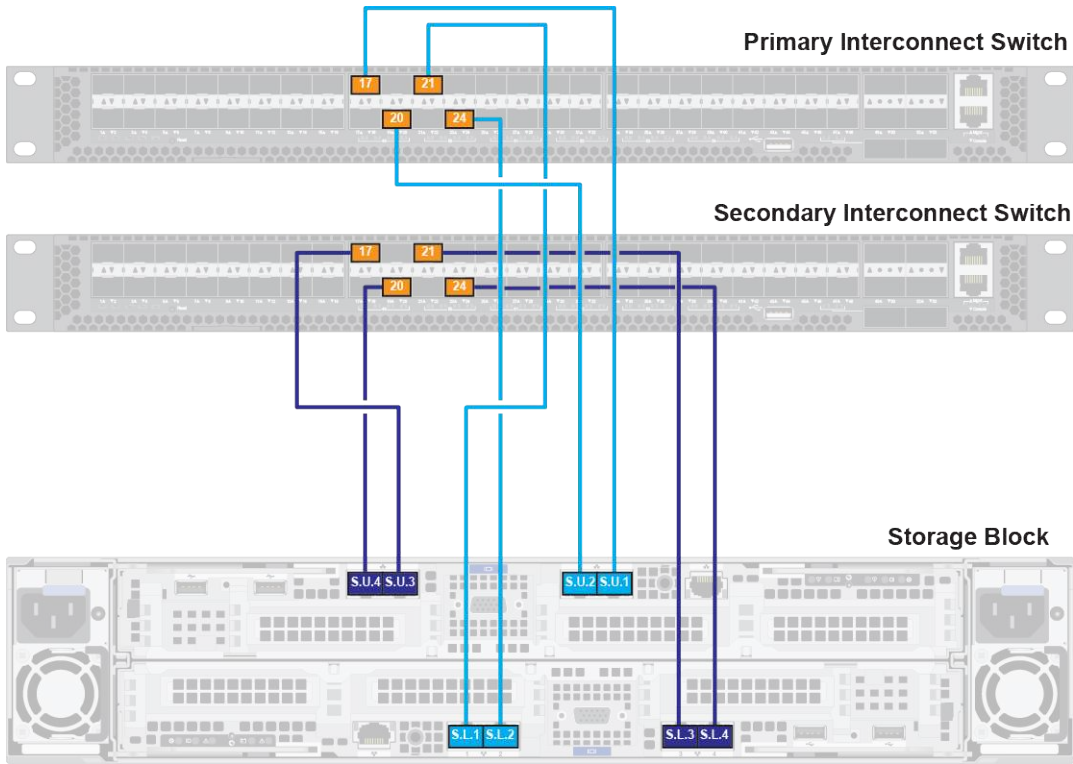


Figure 39. Dual—interconnect configuration — storage block and network interconnect connections

Peer-link connection (dual-interconnect configuration)

Set up the peer link between the interconnects using the QSFP+ Direct Attach Cables (DACs) that are provided with the configuration.

1. Connect port 49 on the primary interconnect to port 49 on the secondary interconnect.
2. Connect port 50 on the primary interconnect to port 50 on the secondary interconnect.

Primary Interconnect Switch



Secondary Interconnect Switch

Figure 40. Dual-interconnect configuration — inter-interconnect link network connectivity

X-Link option 1 (MLAG to MLAG) topology

This section covers details about X-Link option 1 topology.

Based on the X-Link option 1 topology and the uplink bandwidth option (10 Gbps or 40 Gbps) for the customer data center connection, use the following port connectivity diagram:

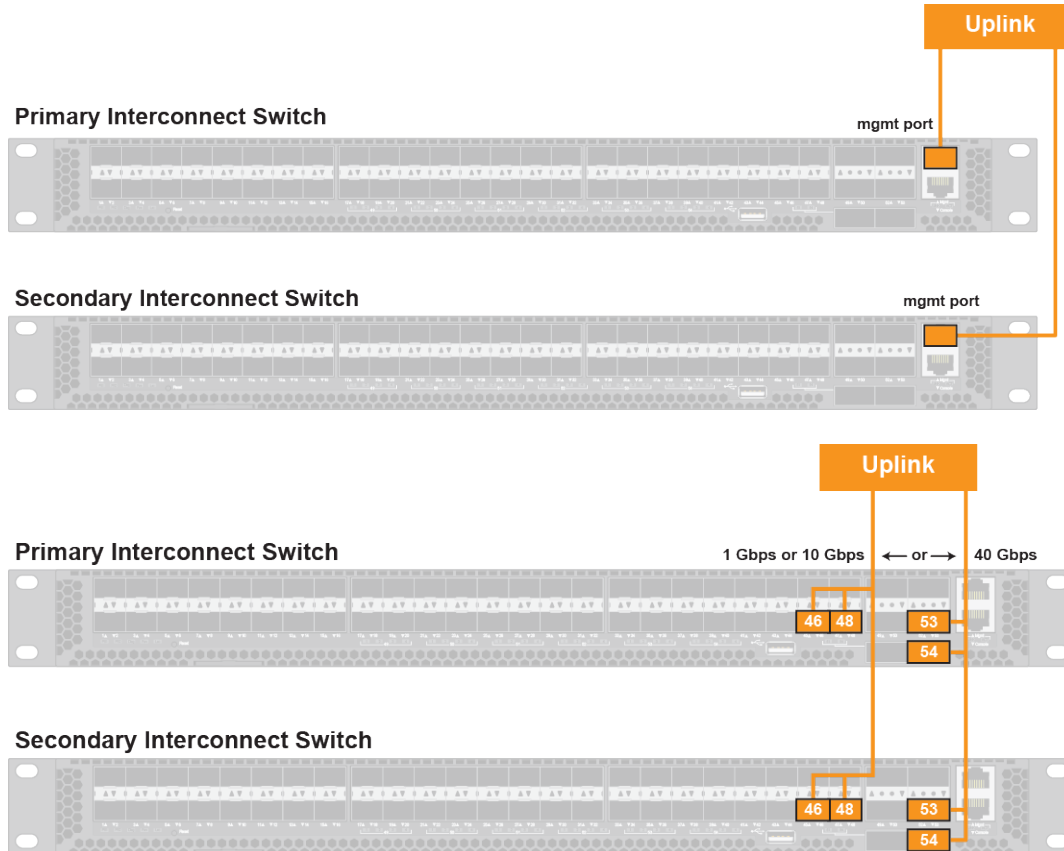


Figure 41. Customer data center network connection

Notes:

- The interconnect switch requires a single 1 Gbps copper connection (RJ45) from the out-of-band (OOB) management port on the interconnect switch to the management switch or the OOB interconnect network.
- Ports 51 and 54 of the interconnect switch do not have LED status indicators.

The following tables provide the ports from the interconnect switches which need to be connected to the customer data center network.

Table 6. 10 Gbps interconnect ports

Interconnect ports	Customer uplink device
Primary interconnect, Mgmt port	Device A – 1 Gbps available port
Primary interconnect, port 46	Device A
Primary interconnect, port 48	Device B
Secondary interconnect, Mgmt port	Device B - 1 Gbps available port

Table 6. 10 Gbps interconnect ports (continued)

Interconnect ports	Customer uplink device
Secondary interconnect, port 46	Device A
Secondary interconnect, port 48	Device B

Table 7. 40 Gbps interconnect ports

Interconnect Ports	Customer Uplink Device
Primary interconnect, Mgmt port	Device A – 1 Gbps available port
Primary interconnect, port 53	Device A
Primary interconnect, port 54	Device B
Secondary interconnect, Mgmt port	Device B - 1 Gbps available port
Secondary interconnect, port 53	Device A
Secondary interconnect, port 54	Device B

Note: Choose either the 10 Gbps or the 40 Gbps option.

Table 8. X-Link option 1 topology specifications

Configuration	<ul style="list-style-type: none"> • Customer side configured with Multi-enclosure link aggregation network (MLAG) on each switch • Network interconnect as MLAG • Operates as one logical port
OOB Interconnect Network	One access port for each interconnect switch connected to the management switch or VLAN
Requirements	<ul style="list-style-type: none"> • LACP enabled • STP required

Note: The uplink VLAN must be different than the OOB management VLAN.

X-LINK Option 1 Topology

```
Configuration File
/etc/cloudistics/cldtx_switch_resource.sh
```

```
INTERCONNECT_CONFIG="Option1"
Dual switch
Four uplink ports (two per interconnect) as members of a single MLAG
```

- Legend:**
- ▽ access port - OOB management VLAN - untagged
 - OOB management port - VLAN unaware
 - LAG port - uplink VLAN - tagged:
 - ports 46 and 48 for 10 Gbps connection, or
 - ports 53 and 54 for 40 Gbps connection

Note: The uplink VLAN must be different than the OOB management VLAN

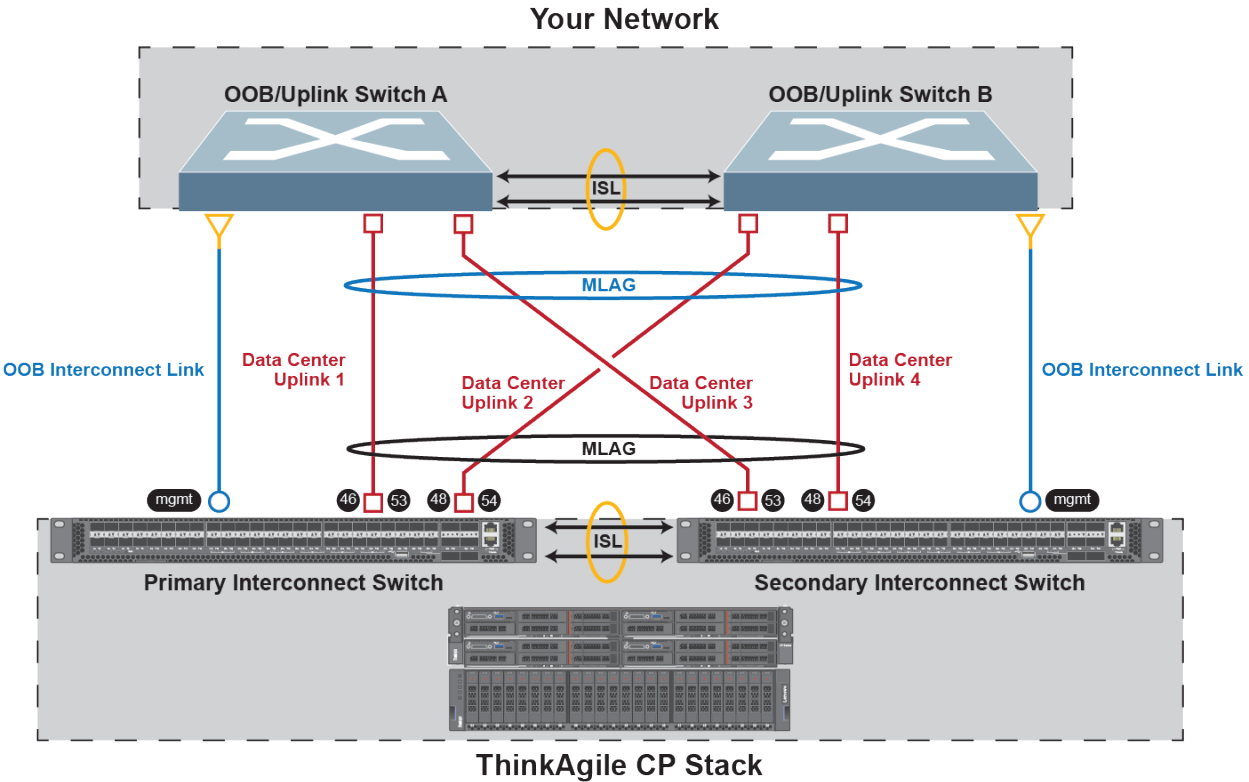


Figure 42. X-Link option 1 topology

X-Link option 2A (MLAG to LAG) topology

This section covers details about X-Link option 2A topology.

Based on the X-Link option 2A topology and the uplink bandwidth option (10 Gbps or 40 Gbps) for the customer data center connection, use the following port connectivity diagram:

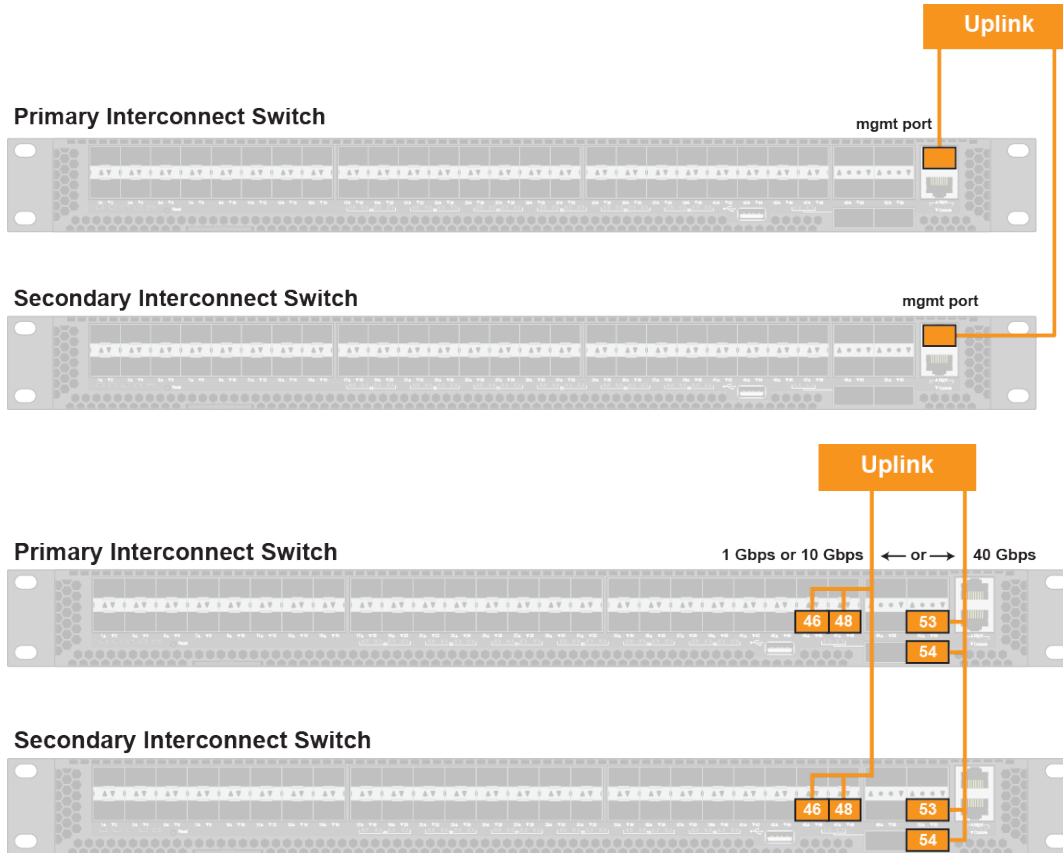


Figure 43. Customer data center network connection

Notes:

- The interconnect switch requires a single 1 Gbps copper connection (RJ45) from the out-of-band (OOB) management port on the interconnect switch to the management switch or the OOB interconnect network.
- Ports 51 and 54 of the interconnect switch do not have LED status indicators.

The following tables provide the ports from the interconnect switches which need to be connected to the customer data center network.

Table 9. 10 Gbps interconnect ports

Interconnect ports	Customer uplink device
Primary interconnect, Mgmt port	Device A – 1 Gbps available port
Primary interconnect, port 46	Device A
Primary interconnect, port 48	Device B
Secondary interconnect, Mgmt port	Device B - 1 Gbps available port

Table 9. 10 Gbps interconnect ports (continued)

Interconnect ports	Customer uplink device
Secondary interconnect, port 46	Device A
Secondary interconnect, port 48	Device B

Table 10. 40 Gbps interconnect ports

Interconnect Ports	Customer Uplink Device
Primary interconnect, Mgmt port	Device A – 1 Gbps available port
Primary interconnect, port 53	Device A
Primary interconnect, port 54	Device B
Secondary interconnect, Mgmt port	Device B - 1 Gbps available port
Secondary interconnect, port 53	Device A
Secondary interconnect, port 54	Device B

Note: Choose either the 10 Gbps or the 40 Gbps option.

Table 11. X-Link option 2A topology specifications

Configuration	<ul style="list-style-type: none"> • Customer side configured with LAG on each switch • Network interconnect as Multi-enclosure link aggregation network (MLAG) • Operates as one LAG forwarding and one LAG standby
OOB Interconnect Network	One access port for each interconnect switch connected to the management switch or VLAN
Requirements	<ul style="list-style-type: none"> • LACP enabled • STP Version 3 required: <ul style="list-style-type: none"> – 1 logical interface forwarding – 1 logical interface blocking

Note: The uplink VLAN must be different than the OOB management VLAN.

X-LINK Option 2A Topology

Configuration File

/etc/cloudistics/cldtx_switch_resource.sh

INTERCONNECT_CONFIG="Option2"

Dual switch

Four uplink ports (two per interconnect) as members of two MLAGs

Each interconnect MLAG is connected to a separate data center LAG

Legend:

▽ access port - OOB management VLAN - untagged

○ OOB management port - VLAN unaware

□ LAG port - uplink VLAN - tagged:

ports 46 and 48 for 10 Gbps connection, or

ports 53 and 54 for 40 Gbps connection

Note: The uplink VLAN must be different than the OOB management VLAN

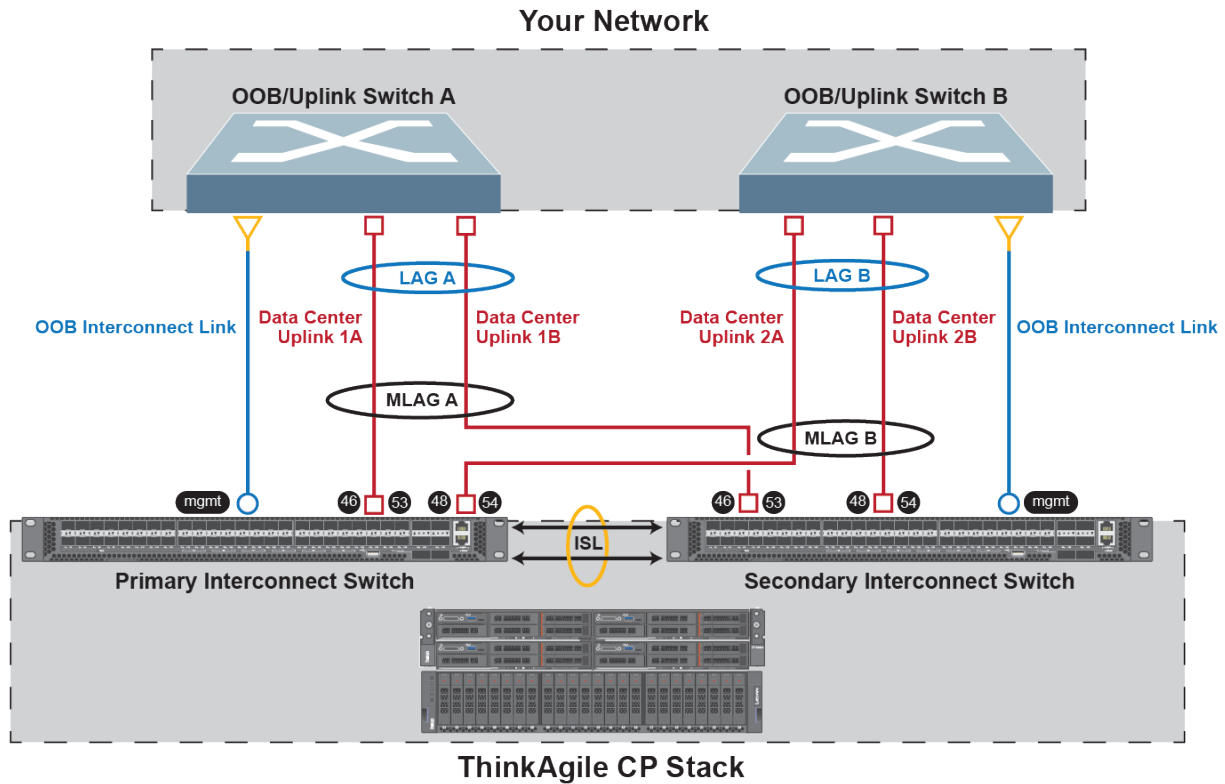


Figure 44. X-Link topology option 2A

X-Link option 2B (MLAG to LAG) topology

This section covers details about X-Link option 2B topology.

Based on the X-Link option 2B topology and the uplink bandwidth option (10 Gbps or 40 Gbps) for the customer data center connection, use the following port connectivity diagram:

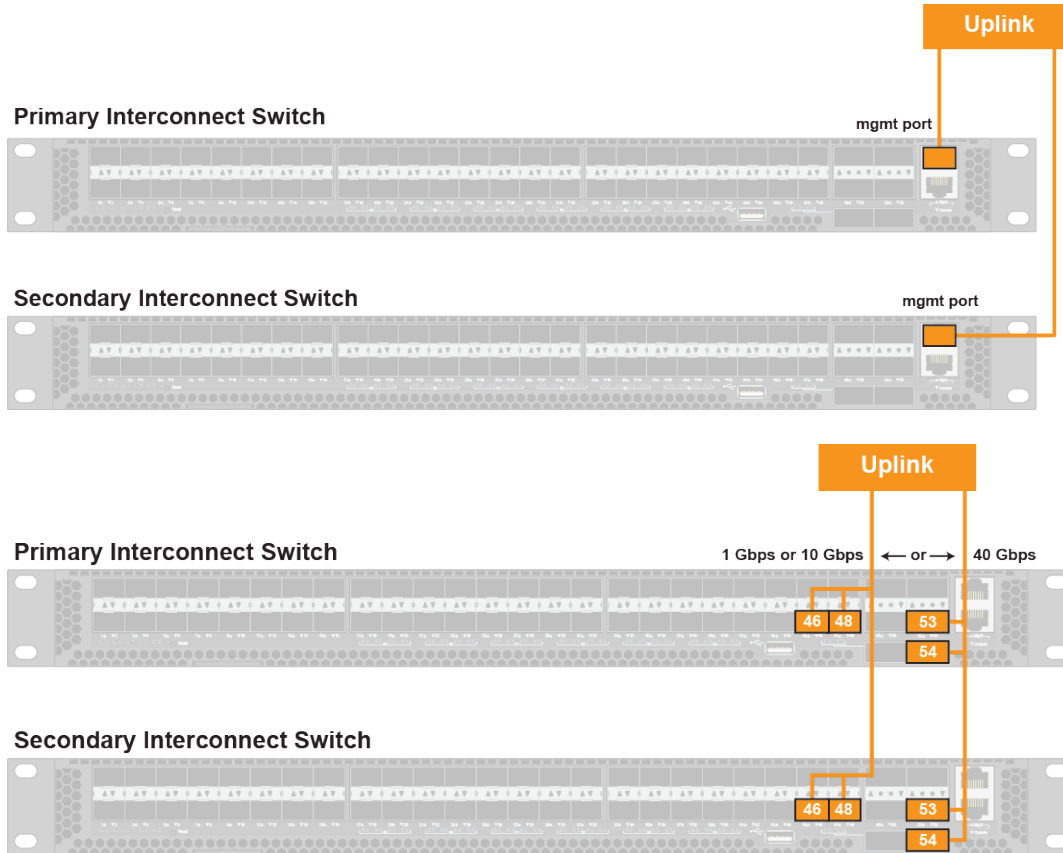


Figure 45. Customer data center network connection

Notes:

- The interconnect switch requires a single 1 Gbps copper connection (RJ45) from the out-of-band (OOB) management port on the interconnect switch to the management switch or the OOB interconnect network.
- Ports 51 and 54 of the interconnect switch do not have LED status indicators.

The following tables provide the ports from the interconnect switches which need to be connected to the customer data center network.

Table 12. 10 Gbps interconnect ports

Interconnect ports	Customer uplink device
Primary interconnect, Mgmt port	Device A – 1 Gbps available port
Primary interconnect, port 46	Device A
Primary interconnect, port 48	Device B
Secondary interconnect, Mgmt port	Device B - 1 Gbps available port

Table 12. 10 Gbps interconnect ports (continued)

Interconnect ports	Customer uplink device
Secondary interconnect, port 46	Device A
Secondary interconnect, port 48	Device B

Table 13. 40 Gbps interconnect ports

Interconnect Ports	Customer Uplink Device
Primary interconnect, Mgmt port	Device A – 1 Gbps available port
Primary interconnect, port 53	Device A
Primary interconnect, port 54	Device B
Secondary interconnect, Mgmt port	Device B - 1 Gbps available port
Secondary interconnect, port 53	Device A
Secondary interconnect, port 54	Device B

Note: Choose either the 10 Gbps or the 40 Gbps option.

Table 14. X-Link option 2B topology specifications

Configuration	<ul style="list-style-type: none"> • Customer side configured with LAG • Network interconnect as Multi-enclosure link aggregation network (MLAG) • Operates as one LAG forwarding and one LAG standby
OOB Interconnect Network	One access port for each interconnect switch connected to the management switch or VLAN
Requirements	<ul style="list-style-type: none"> • LACP enabled • STP required

Note: The uplink VLAN must be different than the OOB management VLAN.

X-LINK Option 2B Topology

Configuration File

```
/etc/cloudistics/cldtx_switch_resource.sh
```

```
INTERCONNECT_CONFIG="Option1"
```

Dual switch

Four uplink ports (two per interconnect) as members of a single MLAG

Legend:

- ▽ access port - OOB management VLAN - untagged
- OOB management port - VLAN unaware
- LAG port - uplink VLAN - tagged:
 - ports 46 and 48 for 10 Gbps connection, or
 - ports 53 and 54 for 40 Gbps connection

Note: The uplink VLAN must be different than the OOB management VLAN

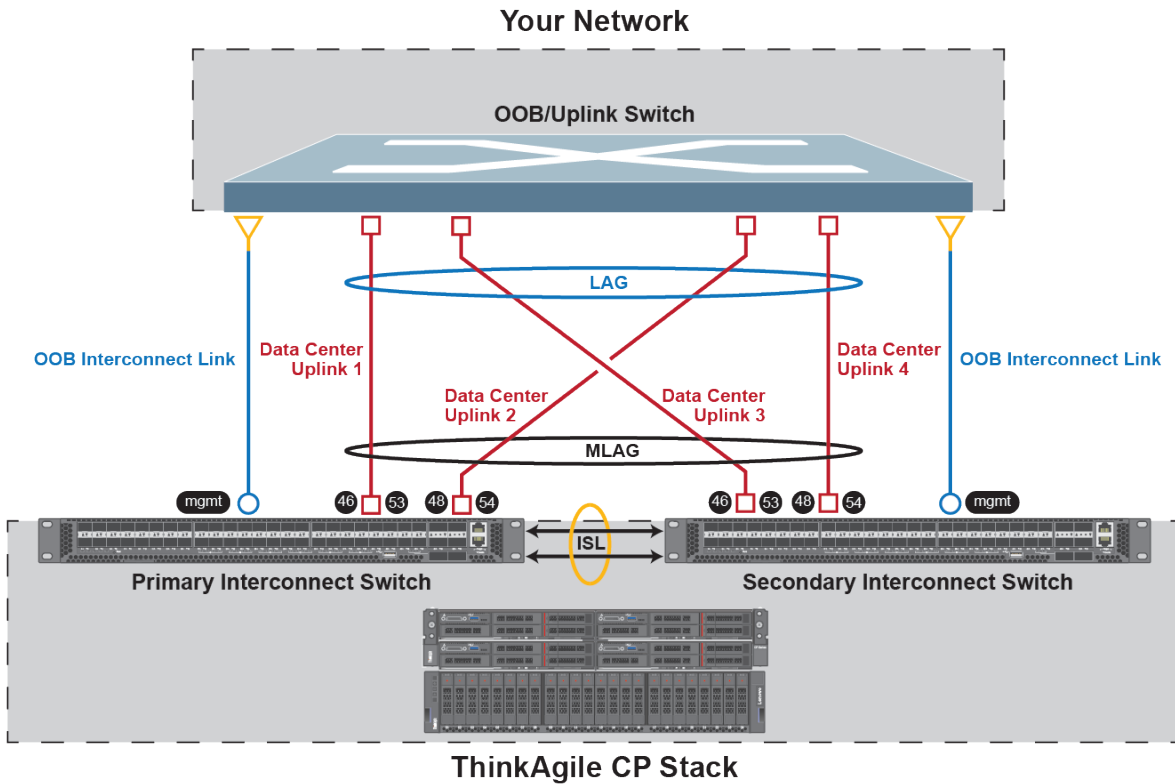


Figure 46. X-Link option 2B topology

Engaging Lenovo Services

Lenovo Professional Services performs a specific set of activities to ensure successful deployment of the ThinkAgile CP products.

Note: The on-site engagement's success depends on careful planning and pre-work. See https://thinkagile.lenovofiles.com/help/topic/thinkagile_cp/planning_considerations.html for more details.

The on-site installation and configuration activities that Lenovo Professional Services performs include the following:

- Review the deployment worksheet completed during the pre-deployment engagement.
- Verify that the customer network is ready.
- Verify the as-shipped product configuration.
- Connect the top-of-rack switches to the customer network.

- Perform basic network configuration to integrate the ThinkAgile CP rack into the customer environment.
- Ensure that the product adheres to the ThinkAgile CP Best Recipe firmware profile.
- Configure the ThinkAgile CP user interface (e.g., SMTP, Pulse, containers) and license.
- Verify the product environment, to ensure a successful handover.
- Provide a knowledge transfer to the customer. This includes basic operational tasks and the support plan.

Lenovo Professional Services will provide information about the configured system, for your records.

The following items are not in the scope of the initial ThinkAgile CP engagement. Many of these can be handled via other available Professional Services offerings.

- Hardware installation services
- Server applications installation or configuration
- Advanced hypervisor configuration
- Complete administrative or operations training
- Data migration from existing storage systems and hypervisor environments
- Installation assistance for nonstandard hardware components or components not purchased from Lenovo. Be aware that this activity can affect support for the product.

Chapter 4. Licensing considerations

The following table explains the details of the ThinkAgile CP Guardian edition.

	Guardian
Operating System (for compute nodes and storage controllers)	RHEL 7
Network Operating System for Interconnect Switches	Pica8 OS
At-Rest Encryption	✓
Compliance	
KMIP Compliant	✓
FIPS 140-2	✓
Common Criteria	✓
USGv6 (DOD IPv6)	✓
STIG	✓

Chapter 5. Getting help and technical assistance

This section covers how to get help or technical assistance for the ThinkAgile CP solution.

If you need help, service, or technical assistance or just want more information about Lenovo products use the Lenovo Support Plan for ThinkAgile CP.

Details for the ThinkAgile CP Support Plan are available at the following site:

<https://datacentersupport.lenovo.com/products/solutions-and-software/thinkagile-cp/>

Lenovo