



Introduction to the Scale Computing HC3 Hyperconverged Solution on Lenovo Servers

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Provides an overview of the hyperconverged offering from Lenovo and Scale Computing

Explains the benefits to small and mid-sized businesses, as well as distributed enterprises

Describes the three recommended Lenovo server platforms

Provides the bill of materials for each server configurations

Craig Theriac
David Paquette
Aad Dekkers
Edy Schwarz



Abstract

The Scale Computing HC3 hyperconverged solution on Lenovo® servers includes storage, compute, hypervisor, data management, data protection, and disaster recovery capabilities for small, midmarket and distributed enterprises.

This paper describes the major features of the Lenovo-Scale Computing solution. The intended audience for this paper includes IT professionals, technical architects, sales engineers, field consultants, and partner engineers who plan to deploy this solution.

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Introduction

The cooperation between Lenovo and Scale Computing is focused on combining the best technologies for small, midmarket, and distributed enterprises. Lenovo's broad and successful range of server has been combined with efficient, hyperconverged infrastructure software from Scale Computing for simplicity, scalability, and availability.

This solution replaces traditional complex and expensive on premise infrastructures with modern, scalable, state of the art, optimized solutions offering the best value for money.

Business Value

The HC3 hyperconverged solution on Lenovo servers is specifically built for organizations with small IT staffs. HC3 solutions are widely used in the health care, education, manufacturing, financial services, and government industries. They have been specifically built for easy deployment and to be managed by IT administrators who want to spend more time focused on business needs and applications, rather than troubleshooting infrastructure and hardware issues.

Ideal for main offices, remote offices and DR sites, HC3 fits any type of environment where applications need high availability, not high costs and complexity.

The Scale Computing HC3 hyperconverged solution has the following benefits:

- ▶ Virtualization

HC3 forms the basis for a complete 'datacenter in a box' with servers, storage and virtualization integrated into a single appliance to deliver simplicity, availability and scalability.

The integrated hypervisor offers proven, open source technology with no additional licenses that guarantees easy migration from any physical or virtual environment.

- ▶ Storage

Storage is seamlessly integrated in HC3 Software as a global namespace that is local to the applications running on HC3. Even when scaling out, new storage is automatically and seamlessly added to the global storage pool. No more storage subsystem, SAN, or storage protocols to manage.

- ▶ Management

HC3 includes storage, servers, and virtualization in a single solution with unified management. There are no separate management consoles for SANs, servers, and hypervisors as you would expect in other solutions.

- ▶ Scalability

X86 based nodes of different types can be mixed and matched in a single cluster, providing flexibility to build out the perfect infrastructure for applications.

- ▶ Economic savings

The economic value of the Lenovo/Scale Computing solution strongly depends on the starting point and customer situation. In general, moving from the extreme situation where a customer replaces a physical, non-virtualized environment to HC3 and Lenovo servers, the solution has the following benefits:

- Save by increasing server utilization through Virtualization by moving from physical servers to fewer servers with Virtualization (P2V)

- Save on Virtualization licensing (VMware or Microsoft) when moving to HC3 and Lenovo servers
- Save by eliminating SAN/NAS external arrays with HC3 and Lenovo servers
- Save up to 80% of infrastructure management time by using the simplified HC3 web interface running on Lenovo servers and dramatically reduce the number of vendors and management tools and required skills.

Solution Overview

Scale Computing and Lenovo have partnered to combine the proven feature set built into Scale Computing's patented HC3 offering with the industry-leading reliability of Lenovo systems. The result is a world-class hyperconverged solution designed to deliver simplicity, availability, and scalability in an appliance form.

Figure 1 shows the infrastructures needed for virtualization of a traditional data center compared to virtualization with HC3.

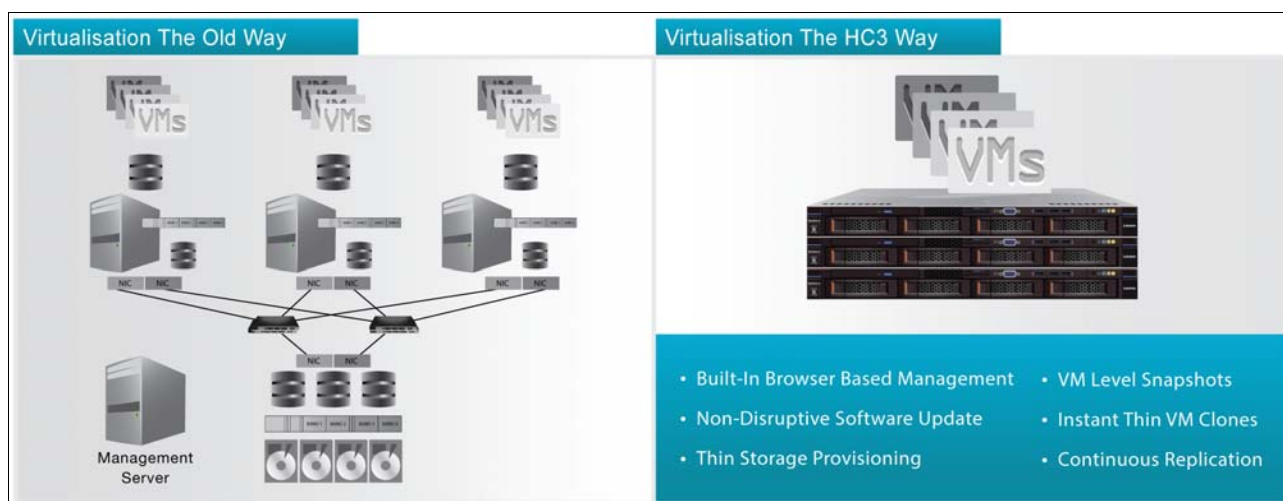


Figure 1 Traditional vs. Modern datacenter infrastructures

The solution has the following characteristics:

► **Simple**

HC3 Software bring storage, servers, virtualization, and management together in a single, unified system. HC3 Software eliminates wasteful management tasks and allows IT administrators to focus on improving business processes. The simplicity of HC3 Software directly impacts IT with higher productivity and lower costs.

► **Available**

Based on simplicity of design, HC3 Software is inherently more stable and more highly available than traditional virtualization solutions. Redundancy, high availability, and resiliency are built into HC3 Software in every way, including built-in disaster recovery features like live migration, failover, backup, replication, and recovery. With HC3 Software, both planned and unplanned downtime can be virtually eliminated, creating more confidence with customers both internal and external.

► **Scalable**

One of the most challenging tasks for IT can be adding capacity to existing infrastructure. With HC3 Software, the simplicity of design and ease of use allow for seamless scaling of infrastructure. New appliances can be added into a running cluster seamlessly, within minutes, without disruption to any running workloads. Nodes with different compute resources and capacities can be used together in nearly any combination to scale out resources as needed.

This architecture future-proofs your infrastructure allowing users to add newer, better, faster nodes into the infrastructure as they become available. With HC3, you can simply add capacity and performance as you need it. You no longer have to guess or attempt to forecast for the unknown, what you'll need in 6 months, 1 year, or 2 years.

The HC3 hyperconverged solution on Lenovo servers is delivered as a turnkey solution based on the following components:

- Lenovo ThinkSystem™ SR630, ThinkSystem SR650 and System x3550 M5 rack servers with integrated storage elements
- Scale Computing HC3 KVM-based hyperconverged infrastructure software.

HC3 Overview

The uniqueness of this solution is the patented HC3 software. HC3 is installed by authorized Lenovo channel partners onto specific server nodes, ready to deploy straight out-of-the-box, fine-tuned for each Lenovo node type with nothing additional to license or install. HC3 continuously monitors all virtual machines, software, and hardware components to detect and automatically respond to common infrastructure events, maintain application availability, and simplify data center management.

The Scale Computing solution on Lenovo servers was designed to provide highly available, scalable compute and storage services while maintaining operational simplicity through highly intelligent software automation and architecture simplification. HC3 puts intelligence and automation in the software layer of the infrastructure.

The solution is designed to take advantage of low cost, easily replaceable and upgradable hardware components including the virtualization capabilities built into the Lenovo server architecture. By clustering these components together into a single unified and redundant system, these attributes combine to create a flexible and complete “datacenter in a box”.

Operating like a redundant and elastic “private cloud”, additional nodes can be automatically “incorporated” into the cluster, and with failed hardware being expected, can easily be replaced with minimal effort or disruption.

Server Virtualization features include:

- Integrated hypervisor based on proven, open source technology with no additional licenses
- Integrated web-based management
- Live VM migration
- Cluster to Cluster Replication
- Easy migration from physical or virtual environments with HC3 Move

Storage features include:

- ▶ Software-defined, hybrid storage system
- ▶ High performing spinning disk with optional SSD storage tier
- ▶ Streamlined, direct block-access data path
- ▶ Wide striping across cluster with redundant data placement
- ▶ Thin provisioning, snapshots, cloning
- ▶ Advanced data services like deduplication

Integrated Management features include:

- ▶ Web-based UI with remote site monitoring
- ▶ Web-based console access from within a browser
- ▶ Self-healing including automatic failover of VMs in clusters of 3+ nodes
- ▶ Rolling upgrades and patching with no downtime in clusters of 3+ nodes

Flexible scalability features:

- ▶ Industry-leading, Lenovo hardware
- ▶ Remote HC3 support
- ▶ Turnkey plug and play expansion

HC3 Features

Scale Computing software layer brings a range of capabilities to the Lenovo hardware, from data efficiency, to single-click manageability:

- ▶ **HyperCore**

The heart of the HC3 platform is the HyperCore operating system which includes a fully integrated KVM-based hypervisor with Scale Computing's patented block access, direct attached storage system called SCRIBE. SCRIBE includes HEAT to automate tiering across our own hybrid flash storage architecture.

- ▶ **Scale Computing Reliable Independent Block Engine (SCRIBE)**

SCRIBE is a wide-striped storage architecture that combines all disks in the cluster into a single storage pool that is tiered between flash SSD and spinning HDD storage.

Blocks are striped across all nodes in a cluster redundantly to protect both against individual drive failure and node failure. The use of every drive through wide striping gives a performance advantage to every VM on the cluster.

Performance is also enhanced through direct block access because of the direct integration between the storage and the hypervisor resulting in Hypervisor Embedded Storage. There are no inefficient storage protocols that would normally be found in SAN or NAS-based storage solutions including Virtual Storage Appliance architectures.

- ▶ **HyperCore Enhanced Automated Tiering (HEAT)**

HyperCore Enhanced Automated Tiering is the part of SCRIBE that manages data efficiently between the flash SSD tier and the spinning HDD tier in the cluster storage pool.

HEAT prioritizes blocks of data on SSD or HDD based on a I/O heat map that tracks I/O against each virtual disk. Although HEAT is primarily automation happening behind the scenes, it provides the ability for the user to tune the relative priority of every virtual disk in the cluster to further optimize the SSD usage where it is needed the most.

► **HC3 Web Interface**

The entire HC3 based solution (hardware and software) is managed from a single web interface that can be accessed from any node in a cluster. The simple intuitive interface design allows both storage and compute resource management and virtual machine management from a single screen. Resource statistics are displayed in real-time along with IOPS, both per VM and cluster wide. VM consoles are also immediately available from the web interface.

Figure 2 shows an example of the web interface.



Figure 2 HC3 Web Interface

► **Rapid, Easy Deployment**

A HC3 cluster can be racked, cabled, powered on, configured in a matter of minutes, and VMs can be deployed and running in under an hour. Manage from your preferred web browser to the HC3 web interface. There is no extra software to install, simply upload ISOs to deploy VMs with your required guest OS.

► **Self Healing**

The HC3 architecture is built with layers of redundancy, such as dual active/passive network ports, redundant power supplies, and redundant block storage striped across all cluster nodes. Intelligent automation handles drive failures and node failures, redistributing data across remaining drives and VMs across remaining nodes and automatically absorbing replacement drives and replacement nodes into the resource pools.

► **VM High Availability**

If a node fails within the cluster, all VMs running on that node are automatically failed over to one of the remaining cluster nodes. Failover happens within minutes for minimal

disruption. After the node has been restored or replaced, the VMs can non-disruptively be live migrated back if desired.

▶ **Live VM Migration**

VMs on HC3 clusters can be non-disruptively migrated between nodes with no downtime. This not only allows for rebalancing resource allocation across the cluster but also allows VMs to be relocated automatically during our rolling update process for the HyperCore OS firmware.

▶ **Cluster to Cluster Replication**

VMs can be replicated between two HC3 clusters with native, built-in replication. Replication can be local or remote across any distance and can be configured to replicate changes as often as every 5 minutes. Granular selection of VMs for replication allows a range of between one and all of the VMs on a cluster to be replicated. Replica VMs on the target cluster can be booted up within minutes in the event of a failure of the VM on the primary cluster.

▶ **Snapshot Scheduling**

VM snapshots can be scheduled intuitively and flexibly from the HC3 Web Interface. Schedules can include multiple rules spanning schedule intervals based on minutes to months. Schedules are created as templates that can be assigned to one or more VMs across a cluster.

▶ **Thin VM Cloning**

HC3 uses a unique thin cloning technique that allows cloned VMs to share the same data blocks as their parent VM for storage optimization, but with no dependencies. If the parent is deleted, the clone is not affected and continues operating without disruption.

▶ **Per VM Real-Time Statistics**

In addition to providing cluster-wide utilization of IOPS, Storage, RAM and CPU in the primary web interface dashboard for users, VM-level statistics are provided for each individual VM and updated in real-time.

▶ **Non-Disruptive Scale-Out**

When a cluster needs more resources, a new node can be added within minutes without any downtime to the existing nodes or VMs. After racking, cabling, powering up, and assigning an IP address, the new node and its resources are seamlessly absorbed into the cluster, including the storage capacity being immediately added to the storage pool. Adding nodes results in an immediate performance increase to the running VMs as the resource pool is expanded.

▶ **Non-Disruptive Rolling Updates**

HC3 receives software/firmware updates directly to the HC3 Web Interface where they can be applied automatically with no downtime. A single click updates the hypervisor, the storage system, the firmware, and any other part of the system. The automated update process will automatically relocate VMs between nodes to free up the nodes, one at a time, to be updated. When all the cluster nodes are updated, the VMs are returned to their original configuration across the cluster.

▶ **Mix and Match Nodes**

You can easily add a Lenovo server as a new node to increase the cluster storage pool at any point. This allows clusters to grow not just linearly but in whatever way is needed or desired. This support for different size cluster nodes can facilitate non-disruptive upgrades to the infrastructure by adding newer, bigger nodes and then retiring or repurposing older small nodes if desired, all while keeping the VMs running.

► **Storage Deduplication and Detail**

HyperCore storage deduplication reduces the storage footprint of data stored on virtual machines. Virtual disks are deduplicated, post-process to eliminate duplicate data blocks and free up storage with minimal impact to running VMs. With deduplication, disks can hold considerably more data than previously allowed within the same physical disk capacity. Along with the deduplication, the storage details available in the HC3 Web interface provide detailed information on utilization and efficiency.

► **Multi-Cluster Remote Management**

HyperCore offers the ability to monitor multiple clusters within the HC3 Web interface. The intuitive design shows the status of multiple clusters that can be local or remote to keep tabs on your entire enterprise of HC3 nodes and clusters. Whether they are single nodes in remote offices or DR targets, or multi-node clusters, the new multi-cluster view provides at-a-glance monitoring of all your HC3 assets.

► **Multi-User Administration and Logging**

HyperCore offers multi-user login and administration so you can better manage your multiple admins. Multiple users may login with their own credentials to perform their own administrative functions. Logging keeps track of administrator access to assist in management and troubleshooting.

► **ScaleCare Remote Support Access**

The HC3 offers a remote access point exclusive to ScaleCare support, to help installation or diagnose support issues and take corrective actions if necessary. This remote access dramatically speeds up support issue resolution by giving ScaleCare support engineers the ability to see issues first hand and in real time.

► **HC3 Cloud Unity**

Scale Computing and Google have created a partnership to announce HC3 Cloud Unity, a hybrid cloud solution that is uniquely easy and affordable. By combining HC3 hyperconverged private cloud infrastructure with Google Cloud Platform, HC3 Cloud Unity connects on-prem and cloud infrastructure in a way that is accessible to any size organization.

HC3 Cloud Unity connects an HC3 system on-prem with an HC3 system instance in Google Cloud Platform, users get a unified management experience for both on-prem and cloud infrastructure. A single HC3 web interface can manage multiple HC3 systems both on-prem and in the cloud.

► **HC3 Edge**

Edge computing fills a gap where neither remote cloud computing nor full datacenter implementations make sense. While remote office/branch office (ROBO) can fall under edge computing, locations with manufacturing equipment, medical facilities, point of sales, IoT devices, and micro-datacenters are all candidates for edge computing.

HC3 Edge is customizable for your edge computing needs. HC3 may already be a fit for some edge computing scenarios with relatively small, single node appliance starting points, but HC3 Edge can go even smaller.

HC3 Edge will not only satisfy your edge computing needs but it will help connect your edge computing infrastructure with your on-prem HC3 hyperconverged private cloud and connect to the public cloud with HC3 Cloud Unity.

HC3 Edge can easily be part of a full-scale hybrid cloud infrastructure ranging across sites and into the public cloud. And, as with mainline HC3 solutions, HC3 Edge will give you the advantage of purchasing only the computing infrastructure you need without having to over-provision.

Deployment Examples

The Lenovo Scale Computing HC3 Solution enables a wide variety of applications and use cases. Typical deployment scenarios include the following:

- ▶ **Datacenter consolidation - Physical to Virtual (P2V) and Virtual to Virtual (V2V)**

HC3 is the excellent environment when moving from a pure physical, virtual or a combination of the two. In both cases, savings will be gained by server consolidation and eliminating licensing costs. With HC3, you can move from a traditional infrastructure to a modern and scalable environment that is optimized for small, midmarket, and distributed enterprises.

- ▶ **Business-critical applications**

Applications such as Microsoft Exchange, SQL Server, SharePoint, Oracle, SAP or industry-specific line-of-business applications will run just like the more traditional hyperconverged application environments such as VDI (Virtual Desktop Infrastructure), VSI (Virtual Server Infrastructure) and Test and Development.

- ▶ **Single-node configurations**

Scale Computing has always offered clusters of three or more appliances (or nodes) but also recognized that there are some use cases where even a 3-node cluster is unnecessary. A single node appliance configuration can be deployed alongside HC3 clusters to enable edge computing and disaster recovery use cases that provide more flexibility and cost savings than traditional cluster configurations.

- ▶ **Edge Computing or ROBO**

For edge computing, which includes remote office/branch office (ROBO) computing, single nodes address the need for very small infrastructure requirements at locations supporting a small number of users. These remote sites, away from the central IT hub, most likely do not have any dedicated IT staff which makes management problematic. Still, these sites often need several services from Active Directory, DNS, messaging and communications, file and print services, among others.

You may be thinking that a low-cost traditional server or two would suffice for these sites, and that is how these sites have traditionally been architected. However, HC3 offers so much more than traditional server architecture for distributed enterprise. With HC3 running at both the central IT hub and the remote sites, the distributed enterprise infrastructure is not only easier to manage, but more resilient and able to be recovered from disaster much more quickly.

Remote management capabilities along with the built-in replication and self-healing alone make HC3 ideal for these remote sites but the fact that HC3 is so simple and easy to use, makes it perfect for sites without dedicated IT staff.

- ▶ **Disaster recovery**

Disaster Recovery (DR) is not a one-size fits all solution. That's why it was built into HC3 to allow you to protect your workloads down to the individual VM level. Depending on your business, you may need to protect only a few critical workloads or you may need to protect most or all your workloads. Just because you have a multi-node HC3 cluster in production does not necessarily mean you need a duplicate cluster for DR.

The single node appliance configuration provides budget-friendly options for protecting critical workloads with replication and failover. If you can identify a handful of critical workloads that will keep your business operation in the event of disaster, you may be able to use a single node appliance to recover those workloads until you can reinstate your full HC3 production cluster. For some organizations, a single node appliance as a local replication target can provide an effective backup solution.

By implementing disaster recovery with HC3, you have great flexibility in choosing the recovery capacity you need and using capabilities that are built in at no extra cost. The single node appliance configuration enables DR to be achieved at a very low cost but with the benefits of continuous replication and failover.

► **Cloud computing**

The background for many hyperconverged infrastructure designs is based on the need to scale out, using smaller x86 type servers as building blocks for both on-premises (Private Cloud) and off premises (Public Cloud) infrastructures.

Depending on the nature of the business we expect cost, compliance, regulatory, latency, familiarity, and privacy concerns to be the basis of what the split between public and private will be. In any case, the needs for on premises infrastructure will be based on scalability, availability, and simplicity. The functionality of the HC3 hyperconverged solution is designed to address the large number of small, midmarket, and distributed enterprise in combination with global or in most case local managed/cloud service providers.

Hardware Components

This section describes the major hardware components of the solution.

Lenovo ThinkSystem SR630 rack server

Lenovo ThinkSystem SR630 is an ideal 2-socket 1U rack server for small businesses up to large enterprises that need industry-leading reliability, management, and security, as well as maximizing performance and flexibility for future growth. The server is based on the high performance Intel Xeon Scalable Family processors.

The SR630 server is designed to handle a wide range of workloads, such as databases, virtualization and cloud computing, virtual desktop infrastructure (VDI), infrastructure security, systems management, enterprise applications, collaboration/email, streaming media, web, and HPC.



Figure 3 Lenovo ThinkSystem SR630

Specifications of the solution

The Lenovo-Scale Computing offering is available in many different configurations to meet all customer requirements but below are example configurations, from an entry level system, up to a more performance driven setup to help show the breadth of the options supported on the SR630. The tables in this section help you identify which configuration would fit your workload requirements.

Table 1 Specifications of the Lenovo - Scale Computing offerings with SR630 servers

	Base	Standard	Power
SR630 3-node cluster	Compute: <ul style="list-style-type: none"> ▶ 24 cores / 48 threads ▶ 2.1GHz ▶ 288GB RAM Storage: <ul style="list-style-type: none"> ▶ SAS raw capacity: 18TB ▶ SSD raw capacity: 2.88TB ▶ Total: 20.88TB (10.44TB usable) Network: <ul style="list-style-type: none"> ▶ 12 x 1GbE bonded active/passive 	Compute: <ul style="list-style-type: none"> ▶ 48 cores / 96 threads ▶ 2.1 GHz ▶ 576GB RAM Storage: <ul style="list-style-type: none"> ▶ SAS raw capacity: 36TB ▶ SSD raw capacity: 5.76TB ▶ Total: 41.76TB (20.88TB?usable) Network: <ul style="list-style-type: none"> ▶ 12 x 10GbE SFP+ bonded active/passive 	Compute: <ul style="list-style-type: none"> ▶ 60 cores / 120 threads ▶ 2.2GHz ▶ 1152GB RAM Storage: <ul style="list-style-type: none"> ▶ SAS raw capacity: 72TB ▶ SSD raw capacity: 11.52TB ▶ Total: 83.52TB (41.76TB usable) Network: <ul style="list-style-type: none"> ▶ 12 x 10GbE SFP+ bonded active/passive
SR630 Node specs	CPU: Intel 4110 RAM: 96GB Storage: <ul style="list-style-type: none"> ▶ NL-SAS: 3 x 2TB ▶ SSD: 960GB Network: 4 x 1GbE	CPU: 2 x Intel 4110 RAM: 192GB Storage: <ul style="list-style-type: none"> ▶ NL-SAS: 3 x 4TB ▶ SSD: 1.92GB Network: 4 x 10GbE SFP+	CPU: 2 x Intel 4114 RAM: 384GB Storage: <ul style="list-style-type: none"> ▶ NL-SAS: 3 x 8TB ▶ SSD: 3.84TB Network: 4 x 10GbE SFP+

Table 2 Deployment Ready Offerings for Lenovo ThinkSystem SR630

	SR630 Spinning Drive Configuration	SR630 with Hybrid Drive Configuration
Use Case	Small, ROBO, Single Node DR target	Standard SMB Datacenter
Compute	1-2x Intel Xeon SP CPUs	1-2x Intel Xeon SP CPUs
RAM	64 GB to 768 GB	64 GB to 768 GB
HDD storage	4 x 7200RPM SATA	3 x 7200RPM SATA
SSD storage	None	1 x S4500 or S4600 Intel SSD
Network	4 x 1GbE or 4 x 10GbE	4 x 1GbE or 4 x 10GbE
Single Node Capable	Yes	No

Detailed ThinkSystem SR630 configurations

Table 3 Deployment Ready Offerings for the ThinkSystem SR630

Feature code	Description	Quantity
7X02CTO1WW	ThinkSystem SR630 - 3yr Warranty	1
AUW2	ThinkSystem SR630 3.5" Chassis with 4 Bays	1
AUW8	ThinkSystem SR530/SR630/SR570 3.5" SATA/SAS 4-Bay Backplane	1
AUNL	ThinkSystem 430-8i SAS/SATA 12Gb HBA	1
AUWE	ThinkSystem SR630 x8ML2/x16 PCIe LP+LP Riser 1 Kit	1
AUWQ	Lenovo ThinkSystem 1U LP+LP BF Riser Bracket	1
AVWA	ThinkSystem 750W (230/115V) Platinum Hot-Swap Power Supply	2

Feature code	Description	Quantity
Networking LOM adapter options		
AUKK	ThinkSystem 10Gb 4-port SFP+ LOM	1
AUKH	ThinkSystem 1Gb 4-port RJ45 LOM	
Processor options		
AWEE	Intel Xeon Silver 4110 8C 85W 2.1GHz Processor	1 - 2
AWEC	Intel Xeon Silver 4114 10C 85W 2.2GHz Processor	
AWER	Intel Xeon Silver 4116 12C 85W 2.1GHz Processor	
AWDU	Intel Xeon Gold 5115 10C 85W 2.4GHz Processor	
B137	Intel Xeon Gold 5117 14C 105W 2.0GHz Processor	
AWEP	Intel Xeon Gold 5118 12C 105W 2.3GHz Processor	
AWE6	Intel Xeon Gold 5120 14C 105W 2.2GHz Processor	
AWED	Intel Xeon Gold 5122 4C 105W 3.6GHz Processor	
AWEL	Intel Xeon Gold 6126 12C 125W 2.6GHz Processor	
AWEB	Intel Xeon Gold 6128 6C 115W 3.4GHz Processor	
AWEN	Intel Xeon Gold 6130 16C 125W 2.1GHz Processor	
AWDY	Intel Xeon Gold 6132 14C 140W 2.6GHz Processor	
AWE9	Intel Xeon Gold 6134 8C 130W 3.2GHz Processor	
AWE3	Intel Xeon Gold 6136 12C 150W 3.0GHz Processor	
AWDZ	Intel Xeon Gold 6138 20C 125W 2.0GHz Processor	
AWE1	Intel Xeon Gold 6140 18C 140W 2.3GHz Processor	
AWDW	Intel Xeon Gold 6142 16C 150W 2.6GHz Processor	
AWE7	Intel Xeon Gold 6144 8C 150W 3.5GHz Processor	
AWE0	Intel Xeon Gold 6146 12C 165W 3.2GHz Processor	
AWDX	Intel Xeon Gold 6148 20C 150W 2.4GHz Processor	
AWDT	Intel Xeon Gold 6150 18C 165W 2.7GHz Processor	
AWDV	Intel Xeon Gold 6152 22C 140W 2.1GHz Processor	
AWDN	Intel Xeon Gold 6154 18C 200W 3.0GHz Processor	
Memory options		
AUNC	ThinkSystem 16GB TruDDR4™ 2666 MHz (2Rx8 1.2V) RDIMM	up to 768GB
AUND	ThinkSystem 32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	

Feature code	Description	Quantity
SSD drive options		
B0Z4	ThinkSystem 3.5" Intel S4500 480GB Entry SATA 6Gb Hot Swap SSD	1, 0
B0Z5	ThinkSystem 3.5" Intel S4500 960GB Entry SATA 6Gb Hot Swap SSD	
B0Z6	ThinkSystem 3.5" Intel S4500 1.92TB Entry SATA 6Gb Hot Swap SSD	
B0Z7	ThinkSystem 3.5" Intel S4500 3.84TB Entry SATA 6Gb Hot Swap SSD	
B0ZU	ThinkSystem 3.5" Intel S4600 480GB Mainstream SATA 6Gb Hot Swap SSD	
B0ZV	ThinkSystem 3.5" Intel S4600 960GB Mainstream SATA 6Gb Hot Swap SSD	
B109	ThinkSystem 3.5" Intel S4600 1.92TB Mainstream SATA 6Gb Hot Swap SSD	
HDD drive options		
AUU4	ThinkSystem 3.5" 1TB 7.2K SAS 12Gb Hot Swap 512n HDD	3, 4
AUU5	ThinkSystem 3.5" 2TB 7.2K SAS 12Gb Hot Swap 512n HDD	
AUU6	ThinkSystem 3.5" 4TB 7.2K SAS 12Gb Hot Swap 512n HDD	
AUU7	ThinkSystem 3.5" 6TB 7.2K SAS 12Gb Hot Swap 512e HDD	
B0YR	ThinkSystem 3.5" 8TB 7.2K SAS 12Gb Hot Swap 512e HDD	

Additional Resources:

- ▶ Lenovo Press product guide
<https://lenovopress.com/lp0643-lenovo-thinksystem-sr630-server>
- ▶ Lenovo XClarity™ Administrator management software
<https://lenovopress.com/tips1200-lenovo-xclarity-administrator>

Lenovo ThinkSystem SR650 rack server

Lenovo ThinkSystem SR650 is an ideal 2-socket 2U rack server for small businesses up to large enterprises that need industry-leading reliability, management, and security, as well as maximizing performance and flexibility for future growth.

The SR650 server is designed to handle a wide range of workloads, such as databases, virtualization and cloud computing, virtual desktop infrastructure (VDI), enterprise applications, collaboration/email, and business analytics and big data.



Figure 4 Lenovo ThinkSystem SR650

Specifications of the solution

The Lenovo-Scale Computing offering is available in many different configurations to meet all customer requirements but below are example configurations, from an entry level system, up to a more performance driven setup to help show the breadth of the options supported on the SR650. The tables in this section help you identify which configuration would fit your workload requirements.

Table 4 Specifications of the Lenovo - Scale Computing offerings with SR650 servers

	Base	Standard	Power
SR650 3-node cluster	Compute: <ul style="list-style-type: none"> ▶ 48 cores / 96 threads ▶ 2.1GHz ▶ 384GB RAM Storage: <ul style="list-style-type: none"> ▶ SAS raw capacity: 54TB ▶ SSD raw capacity: 8.64TB ▶ Total: 62.64TB (31.32TB usable) Network: <ul style="list-style-type: none"> ▶ 12 x 10GbE SFP+ bonded active/passive 	Compute: <ul style="list-style-type: none"> ▶ 48 cores / 96 threads ▶ 2.1 GHz ▶ 576GB RAM Storage: ? <ul style="list-style-type: none"> ▶ SAS raw capacity: 108TB ▶ SSD raw capacity: 17.28TB ▶ Total: 125.28TB (62.64TB usable) Network: <ul style="list-style-type: none"> ▶ 12 x 10GbE SFP+ bonded active/passive 	Compute: <ul style="list-style-type: none"> ▶ 60 cores / 120 threads ▶ 2.2GHz ▶ 1152GB RAM Storage: <ul style="list-style-type: none"> ▶ SAS raw capacity: 216TB ▶ SSD raw capacity: 34.56TB ▶ Total: 250.56TB (125.28TB usable) Network: <ul style="list-style-type: none"> ▶ 12 x 10GbE SFP+ bonded active/passive
SR650 Node specs	CPU: 2 x Intel 4110 RAM: 128GB Storage: <ul style="list-style-type: none"> ▶ NL-SAS: 9 x 2TB ▶ SSD: 3 x 960GB Network: 4 x 10GbE	CPU: 2 x Intel 4110 RAM: 192GB Storage: <ul style="list-style-type: none"> ▶ NL-SAS: 9 x 4TB ▶ SSD: 3 x 1.92GB Network: 4 x 10GbE SFP+	CPU: 2 x Intel 4114 RAM: 384GB Storage: <ul style="list-style-type: none"> ▶ NL-SAS: 9 x 8TB ▶ SSD: 3 x 3.84TB Network: 4 x 10GbE SFP+

Table 5 Deployment Ready Offerings for Lenovo ThinkSystem SR650

	SR630 with Hybrid Drive Configuration
Use Case	Large SMB Datacenter
Compute	2x Intel Xeon SP CPUs
RAM	128 GB to 768 GB
HDD storage	9 x 7200RPM SATA
SSD storage	3 x S4500 or S4600 Intel SSD
Network	4 x 10GbE
Single Node Capable	Yes

Detailed ThinkSystem SR650 configurations

Table 6 Deployment Ready Offerings for the ThinkSystem SR630

Feature code	Description	Quantity
7X06CTO1WW	ThinkSystem SR650 - 3yr Warranty	1
AUVW	ThinkSystem SR650 3.5" Chassis with 8 or 12 bays	1
AUR9	ThinkSystem SR650/SR550/SR590 3.5" SATA/SAS 12-Bay Backplane	1

Feature code	Description	Quantity
AUNM	ThinkSystem 430-16i SAS/SATA 12Gb HBA	1
AURQ	Lenovo ThinkSystem 2U 3FH Riser Bracket	1
AURB	ThinkSystem 2U x8 x16ML2 PCIE FH Riser 1	1
AVWA	ThinkSystem 750W (230/115V) Platinum Hot-Swap Power Supply	2
Networking LOM adapter		
AUKK	ThinkSystem 10Gb 4-port SFP+ LOM	1
Processor options		
AWEE	Intel Xeon Silver 4110 8C 85W 2.1GHz Processor	2
AWEC	Intel Xeon Silver 4114 10C 85W 2.2GHz Processor	
AWER	Intel Xeon Silver 4116 12C 85W 2.1GHz Processor	
AWDU	Intel Xeon Gold 5115 10C 85W 2.4GHz Processor	
B137	Intel Xeon Gold 5117 14C 105W 2.0GHz Processor	
AWEP	Intel Xeon Gold 5118 12C 105W 2.3GHz Processor	
AWE6	Intel Xeon Gold 5120 14C 105W 2.2GHz Processor	
AWED	Intel Xeon Gold 5122 4C 105W 3.6GHz Processor	
AWEL	Intel Xeon Gold 6126 12C 125W 2.6GHz Processor	
AWEB	Intel Xeon Gold 6128 6C 115W 3.4GHz Processor	
AWEN	Intel Xeon Gold 6130 16C 125W 2.1GHz Processor	
AWDY	Intel Xeon Gold 6132 14C 140W 2.6GHz Processor	
AWE9	Intel Xeon Gold 6134 8C 130W 3.2GHz Processor	
AWE3	Intel Xeon Gold 6136 12C 150W 3.0GHz Processor	
AWDZ	Intel Xeon Gold 6138 20C 125W 2.0GHz Processor	
AWE1	Intel Xeon Gold 6140 18C 140W 2.3GHz Processor	
AWDW	Intel Xeon Gold 6142 16C 150W 2.6GHz Processor	
AWE7	Intel Xeon Gold 6144 8C 150W 3.5GHz Processor	
AWE0	Intel Xeon Gold 6146 12C 165W 3.2GHz Processor	
AWDX	Intel Xeon Gold 6148 20C 150W 2.4GHz Processor	
AWDT	Intel Xeon Gold 6150 18C 165W 2.7GHz Processor	
AWDV	Intel Xeon Gold 6152 22C 140W 2.1GHz Processor	
AWDN	Intel Xeon Gold 6154 18C 200W 3.0GHz Processor	
Memory options		
AUNC	ThinkSystem 16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	up to 768GB
AUND	ThinkSystem 32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	

Feature code	Description	Quantity
SSD drive options		
B0Z4	ThinkSystem 3.5" Intel S4500 480GB Entry SATA 6Gb Hot Swap SSD	3
B0Z5	ThinkSystem 3.5" Intel S4500 960GB Entry SATA 6Gb Hot Swap SSD	
B0Z6	ThinkSystem 3.5" Intel S4500 1.92TB Entry SATA 6Gb Hot Swap SSD	
B0Z7	ThinkSystem 3.5" Intel S4500 3.84TB Entry SATA 6Gb Hot Swap SSD	
B0ZU	ThinkSystem 3.5" Intel S4600 480GB Mainstream SATA 6Gb Hot Swap SSD	
B0ZV	ThinkSystem 3.5" Intel S4600 960GB Mainstream SATA 6Gb Hot Swap SSD	
B109	ThinkSystem 3.5" Intel S4600 1.92TB Mainstream SATA 6Gb Hot Swap SSD	
HDD drive options		
AUU4	ThinkSystem 3.5" 1TB 7.2K SAS 12Gb Hot Swap 512n HDD	9
AUU5	ThinkSystem 3.5" 2TB 7.2K SAS 12Gb Hot Swap 512n HDD	
AUU6	ThinkSystem 3.5" 4TB 7.2K SAS 12Gb Hot Swap 512n HDD	
AUU7	ThinkSystem 3.5" 6TB 7.2K SAS 12Gb Hot Swap 512e HDD	
B0YR	ThinkSystem 3.5" 8TB 7.2K SAS 12Gb Hot Swap 512e HDD	

Additional Resources:

- ▶ Lenovo Press product guide:
<https://lenovopress.com/lp0644-lenovo-thinksystem-sr650-server>
- ▶ Lenovo XClarity management software:
<https://lenovopress.com/tips1200-lenovo-xclarity-administrator>

Lenovo System x3550 M5 rack server

The versatile 1U two-socket Lenovo System x3550 M5 rack server fuels almost any workload from infrastructure to Big Data with industry-leading reliability. It comes integrated with up to two Intel Xeon processors E5-2600 v4 series (44 cores per system), faster, energy-efficient TruDDR4 Memory, and up to 12 drives of storage.



Figure 5 Lenovo System x3550 M5

Highlights

- ▶ Optimize your workloads with choice of flexible storage-based configurations, designed for infrastructure basics to business-critical applications

- ▶ Reduce unplanned downtime and minimize costs with industry-leading reliability features and tools
- ▶ Simplify server management with Lenovo XClarity
- ▶ Safeguard enterprise data with built-in Lenovo Trusted Platform Assurance, an exclusive set of security features and practices
- ▶ Gain superior performance with Intel Xeon E5-2600 v4 processors (up to 44 cores per server), 1.5TB TruDDR4 2400MHz Memory, end-to-end 12Gbps RAID support—devices and infrastructure
- ▶ Reduce datacenter costs with smart energy-efficient features, including extended operating temperature, Titanium power supplies (up to 96 percent efficiency), active/standby power supply modes, dual fan zone design, TruDDR4 Memory (with up to 45 percent lower energy use over DDR3), and optional Lenovo XClarity Energy Manager
- ▶ Run more virtual machines and workloads with up to 22 percent more cores than the previous generation

For additional information, please refer to:

- ▶ Lenovo Press product guide
<https://lenovopress.com/lp0067-lenovo-system-x3550-m5-machine-type-8869>
- ▶ 3D Interactive Tour
<https://lenovopress.com/lp0481-system-x3550-m5-interactive-3d-tour>
- ▶ Lenovo XClarity management software
<https://lenovopress.com/software/management/xclarity>

Specifications of the solution

The Lenovo-Scale Computing offering is available in three different configurations to meet all customer requirements, from an entry level system, up to a more performance driven setup. The tables in this section help you identify which configuration would fit your workload requirements.

Table 7 Specifications of the Lenovo - Scale Computing offerings

	Base	Standard	Power
x3550 M5 3-node cluster	Compute: <ul style="list-style-type: none"> ▶ 24 cores ▶ 48 threads ▶ 2.1GHz ▶ 192GB RAM Storage: <ul style="list-style-type: none"> ▶ SAS Raw Capacity: 18TB ▶ SSD Raw Capacity: 2.4TB ▶ Total: 20.4TB (10.2TB usable) Network: <ul style="list-style-type: none"> ▶ 12 x 1GbE bonded active/passive 	Compute: <ul style="list-style-type: none"> ▶ 48 cores ▶ 96 threads ▶ 2.1 GHz ▶ 384GB RAM Storage: <ul style="list-style-type: none"> ▶ SAS raw capacity: 36TB ▶ SSD raw capacity: 3.6TB ▶ Total 39.6TB (19.8TB usable) Network: <ul style="list-style-type: none"> ▶ 12 x 10GbE SFP+ bonded active/passive 	Compute: <ul style="list-style-type: none"> ▶ 48 cores ▶ 96 threads ▶ 2.1GHz ▶ 768GB RAM Storage: <ul style="list-style-type: none"> ▶ SAS Raw Capacity: 72TB ▶ SSD Raw Capacity: 4.8TB ▶ Total Raw/Usable: 76.8TB /38.4TBu Network: <ul style="list-style-type: none"> ▶ 12 x 10GbE SFP+ bonded active/passive
x3550 M5 Node specs	CPU: E5-2620v4 RAM: 64GB Storage: <ul style="list-style-type: none"> ▶ NL-SAS: 3 x 2TB ▶ SSD: 800GB Network: 4 x 1GbE	CPU: 2 x E5-2620v4 RAM: 128GB Storage: <ul style="list-style-type: none"> ▶ NL-SAS: 3 x 4TB ▶ SSD: 1.2TB Network: 4 x 10GbE SFP+	CPU: 2 x E5-2620v4 RAM: 256GB Storage: <ul style="list-style-type: none"> ▶ NL-SAS: 3 x 8TB ▶ SSD: 1.6TB Network: 4 x 10GbE SFP+

Table 8 Deployment Ready Offerings for Lenovo System x3550 M5

	x3550 M5 Spinning Drive Configuration	x3550 M5 with Hybrid Drive Configuration
Use Case	Small, ROBO, Single Node DR target	Standard SMB Datacenter
Compute	1-2x E5-26xx v4	1-2x E5-26xx v4
RAM	64 GB to 768 GB	64 GB to 768 GB
HDD storage	4 x 7200RPM SATA	3 x 7200RPM SATA
SSD storage	None	1 x S3610 SSD
Network	4 x 1GbE or 4 x 10GbE	4 x 1GbE or 4 x 10GbE
Single Node Capable	Yes	No

Detailed Lenovo x3550 M5 configurations

Table 9 Deployment Ready Offerings for the Lenovo System x3550 M5 - E5-2620 v4 with 2.5" drives

Part number	Description	Quantity
Base		
8869-EJG	TopSeller™ x3550 M5, Xeon 8C E5-2620 v4 85W 2.1GHz/2133MHz/20MB, 1x16GB, O/Bay HS 2.5in SAS/SATA, SR M5210, 750W p/s, Rack	1
Memory options		
46W0829	16GB TruDDR4 Memory (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	3, 7, 11
46W0833	32GB TruDDR4 Memory (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	4, 8, 12
46W0841	64GB TruDDR4 Memory (4Rx4, 1.2V) PC4-19200 PC4 2400MHz LP LRDIMM	4, 8, 12
HDD drive options for Spinning Disk configuration		
00NA491	1TB 7.2K 12Gbps NL SAS 2.5 G3HS HDD	4
00NA496	2TB 7.2K 12Gbps NL SAS 2.5 G3HS HDD	
HDD drive options for Hybrid configuration		
00NA491	1TB 7.2K 12Gbps NL SAS 2.5 G3HS HDD	3
00NA496	2TB 7.2K 12Gbps NL SAS 2.5 G3HS HDD	
SSD drive options for Hybrid configuration		
00YK212	Intel S3610 480GB Enterprise Mainstream SATA G3HS 2.5 SSD	1
00YK217	Intel S3610 800GB Enterprise Mainstream SATA G3HS 2.5 SSD	
00YK222	Intel S3610 1.2TB Enterprise Mainstream SATA G3HS 2.5 SSD	
00YK227	Intel S3610 1.6TB Enterprise Mainstream SATA G3HS 2.5 SSD	
Networking options		
00KA066	System x3550 M5 PCIe Riser 2, 1-2 CPU (LP x16 CPU0 + LP x16 CPU1)	1
01DA900	Intel X710-DA2 2x10GbE SFP+ Adapter	2
Additional processor		

Part number	Description	Quantity
00YE895	Intel Xeon Processor E5-2620 v4 8C 2.1GHz 20MB Cache 2133MHz 85W	1
Additional power supply		
00KA096	System x® 750W High Efficiency Platinum AC Power Supply	1

Table 10 Deployment Ready Offerings for the Lenovo System x3550 M5 - E5-2640 v4 with 2.5" drives

Part number	Description	Quantity
Base		
8869-ELG	TopSeller x3550 M5, Xeon 10C E5-2640 v4 90W 2.4GHz/2133MHz/25MB, 1x16GB, O/Bay HS 2.5in SAS/SATA, SR M5210, 750W p/s, Rack	1
Memory options		
46W0829	16GB TruDDR4 Memory (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	3, 7, 11
46W0833	32GB TruDDR4 Memory (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	4, 8, 12
46W0841	64GB TruDDR4 Memory (4Rx4, 1.2V) PC4-19200 PC4 2400MHz LP LRDIMM	4, 8, 12
HDD drive options for Spinning Disk configuration		
00NA491	1TB 7.2K 12Gbps NL SAS 2.5 G3HS HDD	4
00NA496	2TB 7.2K 12Gbps NL SAS 2.5 G3HS HDD	
HDD drive options for Hybrid configuration		
00NA491	1TB 7.2K 12Gbps NL SAS 2.5 G3HS HDD	3
00NA496	2TB 7.2K 12Gbps NL SAS 2.5 G3HS HDD	
SSD drive options for Hybrid configuration		
00YK212	Intel S3610 480GB Enterprise Mainstream SATA G3HS 2.5 SSD	1
00YK217	Intel S3610 800GB Enterprise Mainstream SATA G3HS 2.5 SSD	
00YK222	Intel S3610 1.2TB Enterprise Mainstream SATA G3HS 2.5 SSD	
00YK227	Intel S3610 1.6TB Enterprise Mainstream SATA G3HS 2.5 SSD	
Networking options		
00KA066	System x3550 M5 PCIe Riser 2, 1-2 CPU (LP x16 CPU0 + LP x16 CPU1)	1
01DA900	Intel X710-DA2 2x10GbE SFP+ Adapter	2
Additional processor		
00YE897	Intel Xeon Processor E5-2640 v4 10C 2.4GHz 25MB Cache 2133MHz 90W	1
Additional power supply		
00KA096	System x 750W High Efficiency Platinum AC Power Supply	1

Table 11 Deployment Ready Offerings for the Lenovo System x3550 M5 - E5-2620 v4 with 3.5" drives

Part number	Description	Quantity
Base		
8869EAG	TopSeller x3550 M5, Xeon 8C E5-2620v4 85W 2.1GHz/2133MHz/20MB, 1x16GB, O/Bay HS 3.5in SATA/SAS, SR M5210, 750W p/s, Rack	1
Memory options		
46W0829	16GB TruDDR4 Memory (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	3, 7, 11
46W0833	32GB TruDDR4 Memory (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	4, 8, 12
46W0841	64GB TruDDR4 Memory (4Rx4, 1.2V) PC4-19200 PC4 2400MHz LP LRDIMM	4, 8, 12
HDD drive options for Spinning Disk configuration		
00FN188	2TB 7.2K 12Gbps NL SAS 3.5 G2HS 512e HDD	4
00FN208	4TB 7.2K 12Gbps NL SAS 3.5 G2HS 512e HDD	
00FN228	6TB 7.2K 12Gbps NL SAS 3.5 G2HS 512e HDD	
00WH121	8TB 7.2K 12Gbps NL SAS 3.5 G2HS 512e HDD	
HDD drive options for Hybrid configuration		
00FN188	2TB 7.2K 12Gbps NL SAS 3.5 G2HS 512e HDD	3
00FN208	4TB 7.2K 12Gbps NL SAS 3.5 G2HS 512e HDD	
00FN228	6TB 7.2K 12Gbps NL SAS 3.5 G2HS 512e HDD	
00WH121	8TB 7.2K 12Gbps NL SAS 3.5 G2HS 512e HDD	
SSD drive options for Hybrid configuration		
00YK237	Intel S3610 480GB Enterprise Mainstream SATA HS 3.5 SSD	1
00YK242	Intel S3610 800GB Enterprise Mainstream SATA HS 3.5 SSD	
00YK247	Intel S3610 1.2TB Enterprise Mainstream SATA HS 3.5 SSD	
00YK252	Intel S3610 1.6TB Enterprise Mainstream SATA HS 3.5 SSD	
Networking options		
00KA066	System x3550 M5 PCIe Riser 2, 1-2 CPU (LP x16 CPU0 + LP x16 CPU1)	1
01DA900	Intel X710-DA2 2x10GbE SFP+ Adapter	2
Additional processor		
00YE895	Intel Xeon Processor E5-2620 v4 8C 2.1GHz 20MB Cache 2133MHz 85W	1
Additional power supply		
00KA096	System x 750W High Efficiency Platinum AC Power Supply	1

Networking recommendations

There are several important guidelines and recommendations for networking equipment and its use with Scale Computing HC3-based clusters. This section covers general concepts rather than specific configuration options. If you need information on specific configuration

information for a switch or other networking product you can refer to the guides in the Scale Computing Knowledge.

Minimum requirements for the 1 GbE switch

When using 1 GbE switches other than a recommended switch, the following features and attributes should be considered. Optional attributes are strongly encouraged but may not be required depending on your deployment needs.

- ▶ Managed switch
- ▶ 72/144 mpps for 24/48 port switches respectively
- ▶ Allows disabling of spanning tree protocol (STP) at the switch level
- ▶ Supports 802.3x ow control
- ▶ (Optional*) VLAN support
- ▶ (Optional) Allows disabling of spanning tree protocol (STP) on a per port basis
- ▶ (Optional) Offers rapid spanning tree protocol (Rapid STP)
- ▶ (Optional) Stacking or dedicated interconnect for High Availability (HA)

Minimum requirements for the 10 GbE switch

When using 10 GbE switches other than a recommended switch, the following features and attributes should be considered. Optional attributes are strongly encouraged but may not be required depending on your deployment needs.

- ▶ Managed switch
- ▶ SFP+ ports - twinax cables are recommended as they are inexpensive and compatible
- ▶ Allows disabling of spanning tree protocol (STP) at the switch level
- ▶ Supports 802.3x ow control
- ▶ (Optional*) VLAN support
- ▶ (Optional) Allows disabling of spanning tree protocol (STP) on a per port basis
- ▶ (Optional) Offers rapid spanning tree protocol (Rapid STP)
- ▶ (Optional) Stacking or dedicated interconnect for High Availability (HA)

Recommended Lenovo Switches

The recommended 1 GbE switches are as follows:

- ▶ Lenovo RackSwitch™ G7028
<https://lenovopress.com/tips1268-lenovo-rackswitch-g7028>
- ▶ Lenovo RackSwitch G8052
<https://lenovopress.com/tips1270-lenovo-rackswitch-g8052>

The recommended 10 GbE switches are as follows:

- ▶ Lenovo RackSwitch G8124E
<https://lenovopress.com/tips1271-lenovo-rackswitch-g8124e>
- ▶ Lenovo RackSwitch G8272
<https://lenovopress.com/tips1267-lenovo-rackswitch-g8272>

Resources

- ▶ Scale Computing
<http://www.scalecomputing.com>

- ▶ Lenovo rack servers home page:
<https://www3.lenovo.com/us/en/data-center/servers/racks/c/racks>
- ▶ Datasheets:
 - ThinkSystem SR630: <https://lenovopress.com/ds0031>
 - ThinkSystem SR650: <https://lenovopress.com/ds0032>
 - System x3550 M5: <http://bit.ly/2odSCVk>
- ▶ Product Guides:
 - ThinkSystem SR630: <https://lenovopress.com/lp0643>
 - ThinkSystem SR650: <https://lenovopress.com/lp0644>
 - System x3550 M5: <https://lenovopress.com/lp0068>

Change history

- ▶ May 30, 2018:
 - Added information on SR630 and SR650 configurations, “Hardware Components” on page 11
- ▶ September 29, 2017:
 - Added content to “HC3 Features” on page 6

Authors

This paper was produced by the following team of specialists:

Craig Theriac is the Director of Product Management at Scale Computing overseeing the roadmap for the HC3 family of products and their HyperCore operating system. Prior to Scale Computing, Craig was the CEO and founder of FitQuake, Inc., a management software start-up designed to automate the back office operations for small businesses in the health and fitness industry. Prior to taking the entrepreneurial path, Craig held several positions at regional and national public accounting firms working as a CPA specializing in small business accounting and taxes.

David Paquette is the Product Marketing Manager at Scale Computing. He oversees all of the outgoing content and messaging for Scale Computing and their HC3 family of products and services. David Came to Scale Computing after his roles as Product Manager and Product Marketing Manager at Vision Solutions/Double-Take Software. David was with Vision Solutions/Double-Take Software for over 16 years in a number of roles also including Systems Engineer, QA Manager, and QA Engineer.

Aad Dekkers leads the marketing organization and is responsible for all marketing, channel activities and investments to support the rapid growth of Scale Computing in EMEA. Before Scale Computing, Aad worked for Springpath. where he was responsible for the launch and roll out of Cisco HyperFlex (Cisco’s hyperconverged solution based on Springpath software and Cisco UCS Servers) in EMEA. Prior to that, Aad has had extensive experience within the ICT market and with different marketing and sales jobs, including positions at companies like EVault (Seagate), MTI Europe, NetApp, Sun Microsystems, ICL and Tulip Computers International.

Edy Schwarz is the EMEA Strategic Partner Vendor Alliance Manager at Lenovo. With more than 10 years experience in the IT industry in different multinational companies and 3 years at Lenovo. Edy's expertise includes product marketing, development engineering, systems architecture and software engineering. Started as Software developer for Web Application, he then focused his skills on developing new solutions for the enterprise server and storage market with a quick experience in the High Performance Computing segment.

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- ▶ Mauro Iotti, Lenovo
- ▶ Lidia Wojdat-Vogelsang, Lenovo

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