

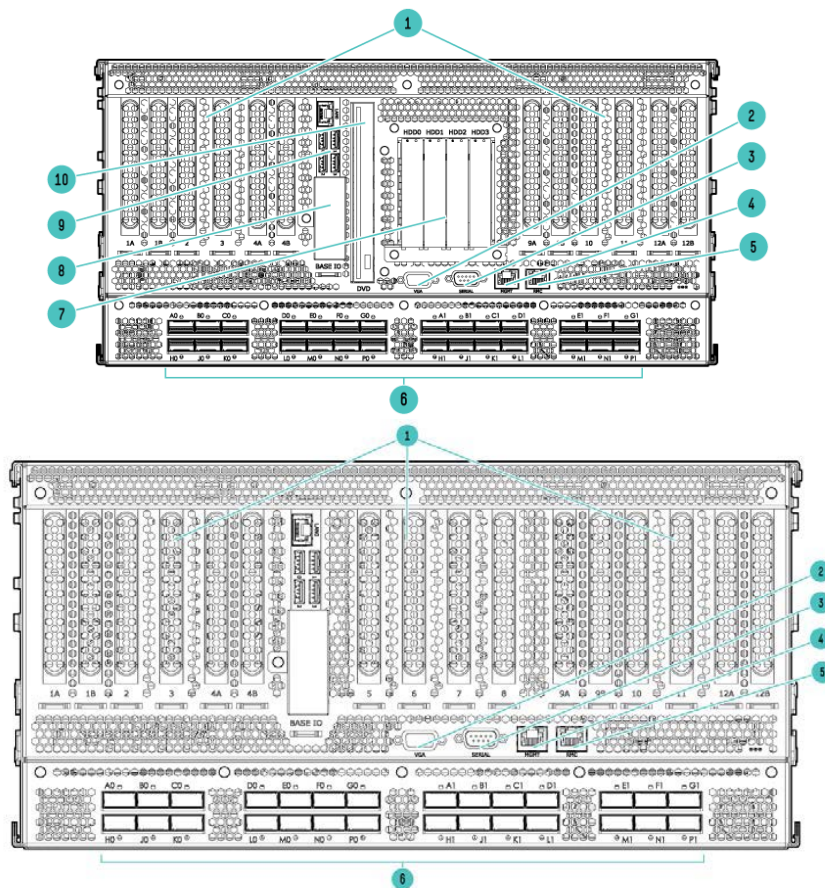
### Overview

### HPE Integrity MC990 X for SAP HANA Tailored Data Center Integration (TDI) Scale-up

The HPE Integrity MC990 X Scale-up for SAP HANA is based on the HPE Integrity MC990 X Server, a rack-mounted 8-socket platform optimized to support your data-intensive workloads. It features the latest enterprise-class Intel® Xeon® processor E7-8800 v4 family, with built-in reliability, to help protect your applications from downtime.

The HPE Integrity MC990 X for SAP HANA TDI Scale-up Solution is certified as a compute block for SAP HANA TDI. All of the configuration rules of the standard MC990 X Server apply to the MC990 X for SAP HANA TDI 8S Scale-up Solution unless otherwise noted below. Use the same rack and rack options as the standard MC990 X server.

This platform is purposefully designed for data-intensive, I/O heavy workloads and comes with up to 12TB of memory to provide a magnitude of performance gains with SAP HANA Workloads. With a maximum of 192 cores of powerful Xeon compute, the MC990 X Scale-up for SAP HANA TDI is ideal to deploy your large SAP HANA Environment, and realize all the benefits of scaling-up. These include lower IT infrastructure costs for footprint, power, cooling, patching, and firmware – ideal when IT resources are thin. A broad portfolio of mission critical HPE Services gives you peace of mind and confidence as you deploy your SAP HANA workloads on the MC990 X Scale-up for SAP HANA TDI.



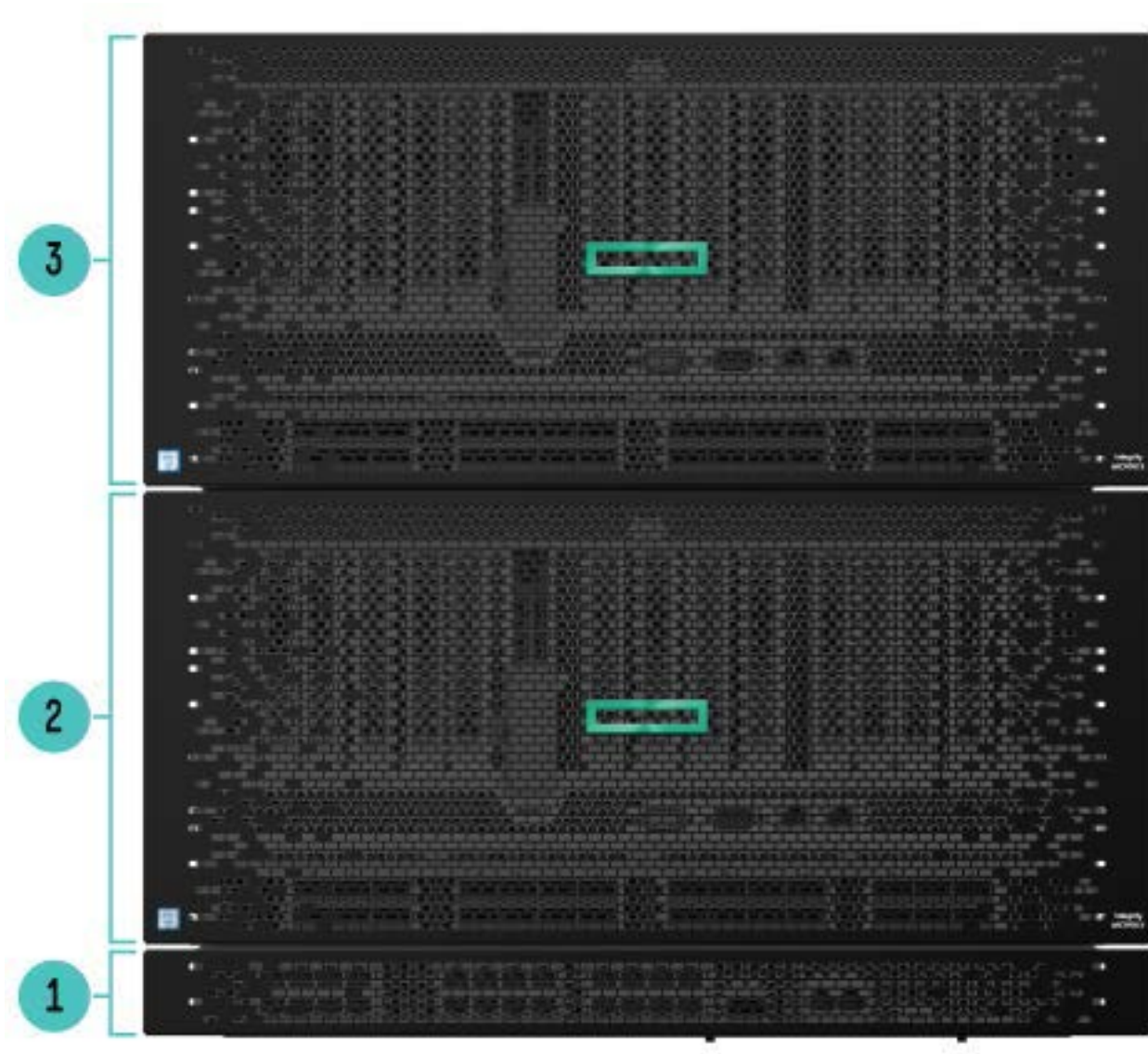
**MC990 X Base Chassis** (without bezel)

**MC990 X Expansion Chassis** (without bezel)

1. 20x PCIe 3.0 slots (8x base chassis, 12x expansion chassis)
2. VGA port
3. Serial port
4. Management connector
5. RMC connector

6. 6. 28x NUMalink ports (per chassis)
7. 4x Internal drive-bays (SSD or HDD)
8. 2x 1.8-inch SSD drive bays
9. 4x USB ports & 1x Ethernet port
10. DVD-R or DVD-RW Drive

Overview



HPE Integrity MC990 X Server

- 1. MC990 X Rack Management Controller (RMC)
- 2. MC990 X Base Chassis
- 3. MC990 X Expansion Chassis

## Standard Features

<b>Models</b>	The HPE Integrity MC990 X for SAP HANA TDI Scale-up is available in two (2) configurations: <ul style="list-style-type: none"><li>• HPE MC990 8S E7-8880 v4 Server</li><li>• HPE MC990 8S E7-8890 v4 Server</li></ul>
<b>Processors</b>	Eight (8) Intel® Xeon® E7-8800 v4 processors are configured in each server: <ul style="list-style-type: none"><li>• Intel Xeon Processor E7-8880 v4 22-core/2.2GHz/150W/55M</li><li>• Intel Xeon Processor E7-8890 v4 24-core/2.2GHz/165W/60M</li></ul>
<b>Memory Modules</b>	DDR4 Registered (R) DIMMs in 8GB, 16GB, 32GB and 64GB capacities. Memory kits sold in quantities of 64 DIMMs. <ul style="list-style-type: none"><li>• HPE MC990 512GB (64x8GB) PC4-2133P-R DIMMs (DDR4) Memory Kit</li><li>• HPE MC990 1TB (64x16GB) PC4-2133P-R DIMMs (DDR4) Memory Kit</li><li>• HPE MC990 2TB (64x32GB) PC4-2133P-R DIMMs (DDR4) Memory Kit</li><li>• HPE MC990 4TB (64x64GB) PC4-2133-LR DIMMs (DDR4) Memory Kit</li></ul>
<b>Internal Storage</b>	Internal drives: Two (2) 1.8" SATA solid state drives (SSDs) for boot. <ul style="list-style-type: none"><li>• HPE MC990 400GB Base SATA 1.8in SSD</li></ul>
<b>Internal SAS Controller</b>	HPE MC990 6Gb 4p Internal SAS Controller for internal drives <ul style="list-style-type: none"><li>• Supports RAID 0, 1, 10</li></ul>
<b>Optical Media Drive</b>	One (1) HPE DVD-R Optical Drive
<b>Embedded Ethernet</b>	Embedded 10/100/1000 Base-T LAN (auto sensing; RJ 45 connector). The system auto-selects the Ethernet port speed and type (duplex vs. half-duplex) when the server is booted, based on to what it is connected.
<b>Embedded VGA, USB and Serial ports</b>	15-pin VGA port supports: <ul style="list-style-type: none"><li>• Server-class 2D hardware acceleration support with integrated 24-bit RAMDAC</li><li>• Display resolution up to 1600 x 1200 @ 60Hz</li><li>• <b>Up to 128 Mbytes DDRII memory interface support</b></li></ul> <b>Four (4) USB Type A ports to support general USB applications and optional keyboard and mouse configurations</b> <ul style="list-style-type: none"><li>• <b>9-pin Serial port provides serial access to the individual chassis.</b></li></ul>
<b>I/O Expansion slots</b>	The Integrity MC990 X Server supports twenty (20) PCIe Gen3 slots <ul style="list-style-type: none"><li>• Base chassis: eight (8) PCIe Gen3 slots; four (4) x8 slots and four (4) x16 slots</li><li>• Expansion chassis: twelve (12) PCIe Gen3 slots; eight (8) x8 slots and four (4) x16 slots</li></ul>

## Services And Support

<b>Network Adapters</b>	Supports 10 Gb/s RDMA network adapters for Local Area Network (LAN) <ul style="list-style-type: none"><li>• HPE MC990 10GBASE-T 2p RDMA Adapter</li></ul>
<b>Fibre Channel Host Bus Adapters</b>	Support for 16 Gb/s Fibre Channel Host Bus Adapters <ul style="list-style-type: none"><li>• HPE MC990 SN1100E 16Gb 2P FC HBA<ul style="list-style-type: none"><li>– Avago Tech (Emulex) LPe16002B 2-port Fibre Channel Host Bus Adapter</li></ul></li></ul>
<b>SAS RAID Controllers</b>	Support for 6 Gb/s and 12 Gb/s SAS RAID Controllers <ul style="list-style-type: none"><li>• HPE MC990 6Gb 16p Ext SAS Controller</li><li>• HPE MC990 12Gb 8p Ext SAS Controller</li><li>• HPE MC990 6Gb 4p Internal SAS Controller (required when using internal drives)</li></ul>
<b>InfiniBand Host Channel Adapters</b>	Support for Fourteen-Data Rate (FDR) InfiniBand and 40 Gb/s Ethernet Adapter <ul style="list-style-type: none"><li>• HPE MC990 IB FDR/EN 40Gb 2p QSFP Adapter</li></ul>
<b>IO Accelerator Cards</b>	Support for Solid State Drive (SSD) IO accelerator cards <ul style="list-style-type: none"><li>• HPE MC990 800GB P3700 SSD Accelerator</li><li>• HPE MC990 2TB P3700 SSD Accelerator</li></ul>
<b>Power &amp; Cooling</b>	Each of the two MC990 X chassis include four (4) power supplies and four (4) cooling fans <ul style="list-style-type: none"><li>• Eight (8) hot-swap 12-Volt, 1600 Watt (Platinum) [200-240 VAC] Power supplies</li><li>• Eight (8) hot-swap cooling fan assemblies</li></ul>
<b>Key Power &amp; Cooling Features:</b>	Redundant, hot-swappable power supplies and cooling fans <ul style="list-style-type: none"><li>• Online fault detection and ACPI support</li></ul>
<b>Rack Management Controller (RMC)</b>	Each Integrity MC990 X Scale-up for SAP HANA TDI has a rack management controller (RMC) located directly below the MC990 X enclosures in a rack. The RMC supports powering up and down of the system motherboards and environmental monitoring of both Integrity MC990 X chassis units within the server. In addition, the RMC provides the top layer of system control for Integrity MC990 X system.  One GigE port from each MC990 X chassis connects to the RMC via Cat-5 cable.
<b>Certified Operating Environments</b>	<ul style="list-style-type: none"><li>• SUSE® Linux® Enterprise Server 12 SP1</li></ul> <p><b>NOTE:</b> For more information on the HPE Certified and Supported Hewlett Packard Enterprise servers for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Support Matrix at: <a href="http://www.hpe.com/info/ossupport">http://www.hpe.com/info/ossupport</a></p>

## Standard Features

### HPE Serviceguard for Linux

HPE Serviceguard for Linux x86 is high availability clustering software designed to protect applications and services from planned and unplanned downtime.

Serviceguard for Linux (SGLX) ensures 24x7 application availability by packaging an application or service with its associated resources, and moving that package to other servers as needed. Packages can be moved automatically when Serviceguard detects a failure in a resource, or manually in order to perform system maintenance or upgrades. By monitoring the health of each server (node) within a cluster, Serviceguard for Linux quickly responds to failures such as those that affect processes, memory, LAN media and adapters, disk, operating environments, and more.

Serviceguard for Linux also includes many out-of-the-box features that ensure scalability and allow intricate control over cluster configuration, and optimizes in-house expertise for businesses already running Serviceguard for HP-UX. Application Integration Toolkits are also available, and serve to quickly integrate complex applications into a Serviceguard for Linux cluster. The Application Integration Toolkit portfolio includes the Serviceguard Toolkit for NFS and the Serviceguard Contributed Toolkit Suite which are available at no charge. In addition to high availability within a data center, the Serviceguard for Linux offers a powerful and comprehensive suite of disaster recovery solutions.

**NOTE: For more information on HPE Serviceguard for Linux (SGLX) reference the [SGLX QuickSpecs](#).**

### Warranty

Three-year parts, 3 Year Labor and 3 Year on-site limited global warranty.

Protected by Hewlett Packard Enterprise Services and a worldwide network of Hewlett Packard Enterprise Authorized Channel Partners.

### Storage support

The MC990 X Server uses industry standard components such as the Intel Xeon processor E7-8800 family, the LPe16002B Fibre Channel adapter, and standard Linux distributions. As such, external storage array interoperability with the MC990 X Server is like any other industry standard server and can be used with storage arrays supporting servers configured with these industry standard components.

Supported HPE Storage arrays include:

- HPE 3PAR StoreServ 20000/8000/7000/10000 Storage
- HPE MSA 2040 Storage
- HPE XP7 Storage
- HPE XP P9500 Storage

For detailed information on supported HPE Storage devices, please visit the HPE SPOCK website.

## Services And Support

### HPE Technology Services

#### Protect your business beyond warranty with HPE Support Services

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. HPE Support Services enable you to order the right service level, length of coverage and response time as you purchase your new server, giving you full entitlement for the selected support.

#### Foundation Care 24x7, Support Service

HPE Foundation Care 24x7 connects you to Hewlett Packard Enterprise 24 hours a day, seven days a week for assistance on resolving issues. Hardware onsite response within four hours if needed; collaborative software included in this Care Pack service provides troubleshooting assistance on industry leading software running on your Hewlett Packard Enterprise server. Simplify your support experience and make Hewlett Packard Enterprise your first call for hardware or software questions.

<https://www.hpe.com/h20195/V2/GetDocument.aspx?docname=4AA4-8876ENW&cc=us&lc=en>

#### Foundation Care NBD, Support Service

HPE Foundation Care Next Business Day connects you to Hewlett Packard Enterprise during business hours for assistance on resolving issues – features next business day hardware onsite response if needed and software call back within two hours. Collaborative software support is included and provides troubleshooting assistance on industry leading software running on your server. Simplify your support experience and make Hewlett Packard Enterprise your first call for hardware or software questions.

<https://www.hpe.com/h20195/V2/GetDocument.aspx?docname=4AA4-8876ENW&cc=us&lc=en>

#### HPE Datacenter Care service

HPE Datacenter Care helps you improve IT stability and security, increase the value of IT, and enable agility and innovation. You can deploy, operate, and evolve your datacenter wherever you are on your IT journey. With HPE Datacenter Care, you benefit from a personalized relationship with Hewlett Packard Enterprise via a single point of accountability for Hewlett Packard Enterprise and multivendor products.

#### HPE Server Hardware Installation

Provides for the basic hardware installation of Hewlett Packard Enterprise branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

<https://www.hpe.com/h20195/V2/GetPDF.aspx/5981-9356EN.pdf>

#### HPE Installation and Startup of HPE Servers

Provides for the installation of your new server and operating system. This service will assist in bringing your new HPE server and operating system into operation in a timely and professional manner. This service provides a trained Hewlett Packard Enterprise service specialist to perform an installation that meets Hewlett Packard Enterprise quality standards. The service highlights include: planning, deployment on site, Installation verification tests, and customer orientation session.

For more information: <http://www.hpe.com/services>

## Technical Specifications

Integrity MC990 X for SAP HANA TDI	HPE Integrity MC990 X for SAP HANA TDI 8S Scale-up Solution <b>NOTE: This SKU is used instead of H7B86A and is used to indicate an SAP TDI configuration. This SKU should be added below all the hardware SKUs that will be integrated into the server and before the SLES SAP LTU SKU.</b>	P9U94A
MC990 X Racks and Accessories	HPE MC990 42U 600x1075mm Adv Shock Rack H7B84A HPE MC990 42U 600x1200mm Adv Shock Rack H7B85A HPE MC990 8.3kVA 40A NA/JP PDU (single-phase) H7B87A HPE MC990 Basic Modular 9.2kVA 40A High Voltage INTL PDU H7B88A HPE MC990 4.9kVA 24A NA/JP PDU (single-phase) H7B96A HPE MC990 17.3kVA 48A 3-Phase NA/JP PDU H7B89A HPE MC990 Basic Modular 22kVA 32A 3-phase INTL PDU H7B90A HPE MC990 Two C13 PDU Power Bar Kit H7B91A <b>NOTE: Integrity MC990 X servers must be factory integrated in an MC990 X rack (H7B84A or H7B85A)</b> <b>NOTE: Two (2) 3-Phase PDUs required per rack when configured with 1-3 servers</b> <b>NOTE: Two (2) single-phase PDUs required per rack when configured with 1 server; four (4) single-phase PDUs required per rack when configured with 2-3 servers</b> <b>NOTE: Two (2) H7B91A power bar kits required for each server.</b>	
Integrity MC990 X Servers	<b>NOTE: All Integrity MC990 X servers include eight (8) Intel® Xeon® E7-8800 v4 family processors, 192 DDR4 memory DIMM slots, two (2) 1.8” SSD Base IO bays, four (4) internal 2.5” drive bays, and 20 PCIe Gen3 slots. The MC990 X servers must add a 1U Rack Management Controller (RMC) to the order.</b> HPE Integrity MC990 8-socket E7-8880 v4 Server H7B51B HPE Integrity MC990 8-socket E7-8890 v4 Server H7B52B <b>NOTE: Max 3x MC990 X Servers per MC990 42U rack</b>	
Rack Management Controller (RMC)	HPE MC990 Rack Management Controller H7B94A <b>NOTE: When ordering MC990 X Servers one RMC must be ordered per MC990 X Server.</b>	
System Memory	HPE MC990 DDR4 512GB (64x8GB) Memory Kit H7B63A HPE MC990 DDR4 1TB (64x16GB) Memory Kit H7B64A HPE MC990 DDR4 2TB (64x32GB) Memory Kit H7B65A HPE MC990 DDR4 4TB (64x64GB) Memory Kit H7B95A <b>NOTE: Min one (1), max three(3)</b> <b>NOTE: Memory must be installed in groups of 64 DIMMs; each memory kit includes 64 DIMMs</b> <b>NOTE: All DIMM slots to be populated with the same DIMM type/capacity</b>	

## Technical Specifications

<b>Base IO Drives</b>	<p><b>NOTE: The MC990 X Server requires boot from the Base IO 1.8" SSD drives</b></p> <p>HPE MC990 400GB Base SATA (1.8in) Solid State Drive <span style="float: right;">H7B55A</span></p> <p><b>NOTE: Must order two (2)</b></p>
<b>Network Adapters</b>	<p>HPE MC990 10GbE 2-port SFP+ RDMA Adapter <span style="float: right;">H7B78A</span></p> <p><b>NOTE: Must order two (2)</b></p>
<b>Internal Optical Drives</b>	<p>HPE MC990 DVD-Read Drive <span style="float: right;">H7B67A</span></p> <p><b>NOTE: Min one (1), max one (1)</b></p>
<b>Supported Operating Systems</b>	<p>SUSE Linux Enterprise Server SAP 2 Sockets or 1-2 VM 3yr Subscription 24x7 Support <span style="float: right;">N0U73A</span></p> <p>Flexible LTU</p> <p>SUSE Linux Enterprise Server SAP 2 Sockets or 1-2 VM 5yr Subscription 24x7 Support <span style="float: right;">N0U75A</span></p> <p>Flexible LTU</p> <p><b>NOTE: Min 4, max 4; SLES for SAP HANA 12 SP1</b></p>

**Integrity MC990 X  
TDI Support  
Services**

**Deployment and Integration Services for Integrity MC990 X TDI**

Hewlett Packard Enterprise has deployed over 2000 SAP HANA systems for our customers. Who better than SAP's Pinnacle Award recipient for "Rapid Deployment Partner of the Year" to maximize the time-to-value of your Integrity MC990 X investment?

Engage the HPE Consulting Services for SAP TDI to deploy and rapidly integrate the MC990 X systems into your SAP HANA TDI environment. Talk with your account representative to include these services with your system.

**Hardware Installation and Startup Services for Integrity MC990 X TDI**

An experienced service partner like Hewlett Packard Enterprise can help you quickly and cost-effectively get your TDI infrastructure up and running at peak performance to quickly realize a return on your investment. Hewlett Packard Enterprise provides the same Installation and Startup Services for TDI Compute Blocks as are available for the Integrity MC990 X Server.

Hewlett Packard Enterprise provides hardware installation and startup services to assist in bringing your new HPE server and operating system into operation in a timely and professional manner.

**Support Services for Integrity MC990 X TDI**

HPE provides the same support offering for Integrity MC990 X TDI as the MC990 X server. HPE Support Services enable you to order the right service level, length of coverage, and response time as you purchase your new server. For MC990 X, Hewlett Packard Enterprise offers Foundation Care 24x7, Foundation Care Next Business Day and Datacenter Care. HPE Datacenter Care is the Hewlett Packard Enterprise most flexible service offering that is scalable and provides integrated HW/SW, proactive and reactive support for the customer's environment.

See the HPE Technology Services section of this document for more details on Integrity MC990 X support services.



## Technical Specifications

### Site Planning for MC990 X Server

System Unit	Dimensions		
	Height		11U 19.0 inches (48.3 cm)—includes 5U base chassis
	Width		5U expansion chassis and 1U RMC
	Depth		17.5 inches (44.5 cm)
			31.8 inches (80.8 cm)—without bezel
			38.1 inches (96.8 cm)—with bezel
	<b>Weight</b>	Maximum	292lbs (132.4 kg) (fully populated)
	<b>Power Specifications</b>	Voltage Range	100 - 120 VAC 200 - 240 VAC
		Maximum Current	14 Amps @ 100VAC, 10 Amps @ 200VAC per power Supply
		Frequency Range	50 - 60 Hz
	<b>BTU Rating</b>	Maximum	35.96 kBTU//hr (3.0. Tons) , 10.54KW
	<b>Power Supply Output</b>	Maximum	12-Volt, 1600 Watt (Platinum) [200-240 VAC] 12-Volt, 1130 Watt (Platinum) [100-120 VAC]
	<b>System Inlet Temperature</b>	Temperature tolerance (operating)	+5 °C (41 °F) to +35 °C (95 °F) (up to 1500 m / 5000 ft.) +5 °C (41 °F) to +30 °C (86 °F) (1500 m to 3000 m /5000 ft. to 10,000 ft.) De-rate max ambient temperature by 1.8 °F (1 °C) per 1000 ft. (305 m) of altitude above 5000 ft. (1525 m)
		Non-Operating Temperature	-40 °C (-40 °F) to +60 °C (140 °F)
	<b>Humidity (noncondensing)</b>	Relative humidity	20% to 80% operating (no condensation) 8% to 80% non-operating (no condensation)
	<b>Altitude</b>	Operating	10,000 ft. (3,049 m)
		Non-operating	40,000 ft. (12,195 m) non-operating
	<b>Airflow</b>	Intake (front)	650 CFM Max (1104 m3/hr)
		Exhaust (rear)	475 CFM typical (407 m3/hr)
	<b>Acoustics (sound power)</b>	Rack Mount	Approximately 77 dBA (at rear of rack)

## Technical Specifications

### Integrity MC990 X system rack physical specifications

<b>Feature</b>	<b>1075mm rack</b>		
		Dimensions for a single 24-inch wide 42U rack	Height: 78.97 in. (200.6 cm) Width: 23.54 in. (59.8 cm) Depth: 44.3 in. (112.5 cm)
		Shipping dimensions (single rack)	Height: 85.35 in. (216.8 cm) Width: 35.43 in. (90.0 cm) Depth: 50.87 in. (129.2 cm)
		Weight (single rack)	233 lb. (106 kg)
		Shipping weight (single rack)	446 lb. (203 kg)
		System installed weight (single rack) (max)	525 lb. (238.1 kg)
		Static load (max)	3000 lb. (1360.8 kg)
		Dynamic load (max rolling)	2500 lb. (1134kg)
		Dynamic (max configured)	2250 lb. (1020.6 kg)
		42U rack access requirements	Front: 48 in. (121.9 cm) Rear: 48 in. (121.9 cm) Top: 18 in. (45.7 cm)
	<b>1200mm rack</b>	Dimensions for a single 24-inch wide 42U rack	Height: 78.97 in. (200.6 cm) Width: 23.54 in. (59.8 cm) Depth: 49.61 in. (126.0 cm)
		Shipping dimensions (single rack)	Height: 85.35 in. (216.8 cm) Width: 35.43 in. (90.0 cm) Depth: 57.87 in. (147.0 cm)
		Weight (single rack)	282 lb. (128 kg)
		Shipping weight (single rack)	507 lb. (230 kg)
		System installed weight (single rack) (max)	574 lb. (260.4 kg)
		Static load (max)	3000 lb. (1360.8 kg)
		Dynamic load (max rolling)	2500 lb. (1134kg)
		Dynamic (max configured)	2250 lb. (1020.6 kg)
		42U rack access requirements	Front: 48 in. (121.9 cm) Rear: 48 in. (121.9 cm) Top: 18 in. (45.7 cm)

**Technical Specifications**

<b>Rack Management Controller (RMC) Specifications</b>	<b>42U Rack Access Requirements</b>	Height	1U 1.72 inches (44 mm)
		Width	17.2 inches (43.7 cm)
		Depth	29.84 inches (75.8 cm)
		Weight	20 lbs (9.1 kg)
		Chassis power supply	Two per RMC
		Chassis power cords	Two 8-ft (2.4 m) drop cables
		Chassis power requirements	
		Voltage:	100-120V (90-132 VAC min/max)
		Frequency:	50-60 Hz (47-63 Hz min/max) (50W) per supply
		Power:	200-240V (180-264 VAC min/max)
		Hold-up time:	20 ms
		RMC power: single-phase	NEMA 5-15R (x2) N. America/Japan
		100-120 VAC RMC power: single-phase 200-240 VAC	IEC320-C13 (x2) N. America/Japan & Int'l
		Air flow (front to back)	Maximum = 35 CFM (60 m <sup>3</sup> ) per hour
		Acoustical noise	Approximately 68 dBA

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<b>Regulatory Compliance</b>	<b>Regulatory Model Number (MC990 X)</b>	RSVLA-RE01: HPE Integrity MC990 X Server
	<b>Regulatory Model Number (RMC)</b>	RSVLA-RE02: Rack Management Controller (RMC)
	<b>Electromagnetic interference</b>	Complies with Part 15 of the FCC Rules as a Class A digital device. CAN ICES-3(A)/NMB-3(A). Manufacturer's Declaration to CISPR 32, CISPR 24, EN 55032, EN 55024, EN 61000-3-2, EN 61000-3-3. VCCI (Japan) Registered, Korea Certification, BSMI (Taiwan) Certification.
	<b>Safety</b>	Complies with IEC 60950, EN 60950, EN 62479, UL 60950, and CSA 60950. CSA and UL Certified.

## Summary of Changes

Date	Version History	Action	Description of Change
15-Aug-2016	Version 1	Created	Document Created



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