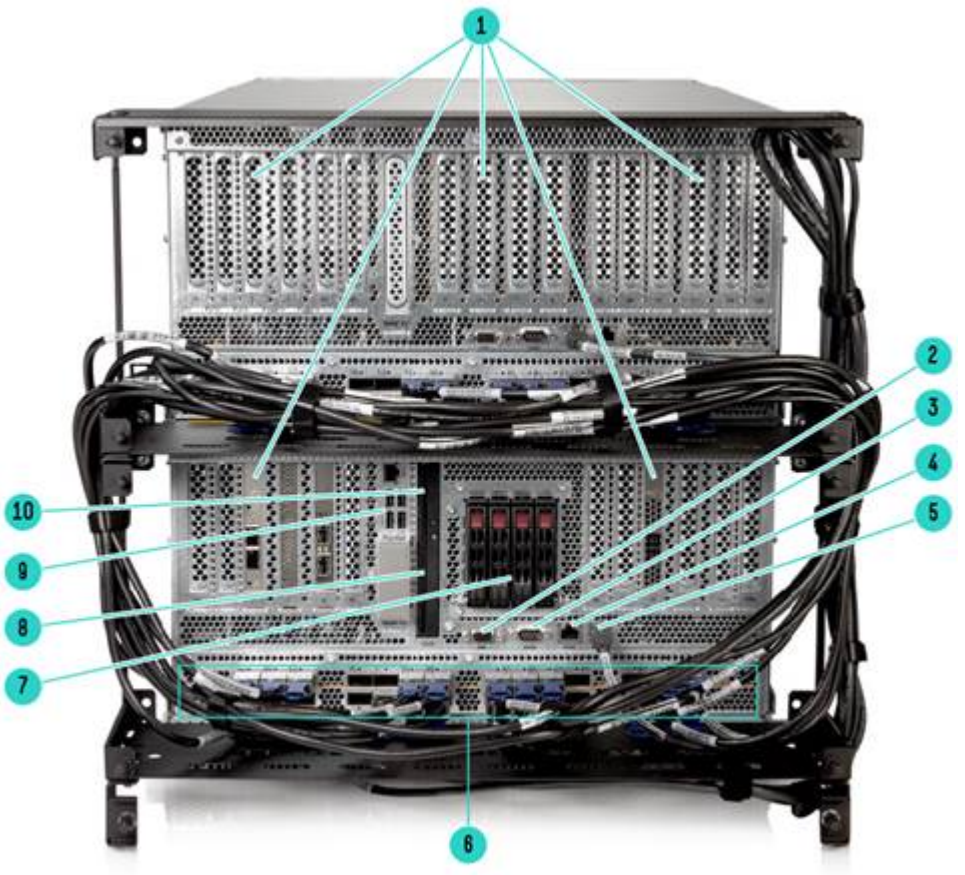
HPE Integrity MC990 X for SAP HANA

The HPE Integrity MC990 X Scale-up for SAP HANA is based on the HPE Integrity MC990 X Server, a scalable, rack-mounted platform optimized to support your data-intensive workloads. It features enterprise-class Intel® Xeon® processor E7-88xxv4 and E7-48xxv4 family, with built-in reliability, to help protect your applications from downtime.

The HPE Integrity MC990 X for SAP HANA 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 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 20TB of memory to provide a magnitude of performance gains with SAP HANA Workloads. With a maximum of 480 cores of powerful Xeon compute, the MC990 X 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 for SAP HANA TDI.



Overview

MC990 X Base 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

MC990 X Expansion Chassis (without bezel)

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

HPE Integrity MC990 X Server

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

Standard Features

Models

The HPE Integrity MC990 X for SAP HANA TDI Scale-up is available in two (2) base configurations:

- HPE MC990 HANA TDI 4S E7-8880 v4 Server
- HPE MC990 HANA TDI 4S E7-8890 v4 Server
- HPE MC990 HANA TDI 4S E7-8891 v4 Server
- HPE MC990 HANA TDI 4S E7-8867 v4 Server
- HPE MC990 HANA TDI 4S E7-4830 v4 Server
- HPE MC990 HANA TDI 4S E7-4850 v4 Server

NOTE: Servers can be configured up to 20-sockets; using 4-socket Expansion servers when scaling

Processors

Four (4) to Twenty (20) Intel® Xeon® E7-4800/8800 v4 processors are configured in increments of four (4) in each server:

- Intel Xeon Processor E7-8880 v4 22-core/2.2GHz/150W/55M
- Intel Xeon Processor E7-8890 v4 24-core/2.2GHz/165W/60M
- Intel Xeon Processor E7-8891 v4 10-core/2.8GHz/165W/60M
- Intel Xeon Processor E7-8867 v4 18-core/2.4GHz/165W/45M
- Intel Xeon Processor E7-4830 v4 14-core/2.0GHz/115W/35M
- Intel Xeon Processor E7-4850 v4 16-core/2.1GHz/115W/40M

NOTE: Servers can be configured up to 20-sockets; using 4-socket Expansion servers when scaling

Memory Modules

DDR4 Registered (R) DIMMs in 8GB, 16GB, 32GB and 64GB capacities. Memory kits sold in quantities of 32 DIMMs.

- HPE MC990 256GB (32x8GB) PC4-2400P-R DIMMs (DDR4) Memory Kit
- HPE MC990 512GB (32x16GB) PC4-2400P-R DIMMs (DDR4) Memory Kit
- HPE MC990 1TB (32x32GB) PC4-2400P-R DIMMs (DDR4) Memory Kit
- HPE MC990 2TB (32x64GB) PC4-2400-LR DIMMs (DDR4) Memory Kit

Internal Storage

Internal drives:

Base Server: Two (2) 1.8” SATA solid state drives (SSDs) for boot.

- HPE MC990 400GB Base SATA 1.8in SSD
- HPE MC990 800GB Base SATA 1.8in SSD

Internal drives:

Base Server: Zero (0), two (2) or four (4) 2.5” SAS HDDs or SSDs for boot and/or data

- HPE MC990 600GB 12G SAS 10K 2.5in HDD
- HPE MC990 900GB 12G SAS 10K 2.5in HDD
- HPE MC990 200GB 12G SAS 2.5in MLC SSD
- HPE MC990 400GB 12G SAS 2.5in MLC SSD
- HPE MC990 800GB 12G SAS 2.5in MLC SSD
- HPE MC990 1TB 12G SAS 7.2K 2.5" HDD
- HPE MC990 2TB 12G SAS 7.2K 2.5" HDD
- HPE MC990 1.2TB 12G SAS 10K 2.5" HDD
- HPE MC990 1.6TB 12G SAS 2.5in MLC SSD

Standard Features

- HPE MC990 2TB 6G SATA 7.2K 2.5" HDD
- HPE MC990 1.6TB 6G SATA MLC 2.5" SSD
- HPE MC990 1.9TB 6G SATA MLC 2.5" SSD
- HPE MC990 3.8TB 6G SATA MLC 2.5" SSD

Internal SAS Controller

HPE MC990 6Gb 4p Internal SAS Controller is required when ordering 2.5” internal drives

- Support for four (4) internal Hard Disk Drive (HDDs) or Solid State Drives (SSDs)
- Supports RAID 0, 1, 10

NOTE: Internal SAS Controller occupies 2 PCIe slots, one for e the card and a second one for a Supercap/BBU

Optical Media Drive

One (1) of either the HPE MC990 DVD-R Optical Drive or the HPE MC990 DVD-RW Optical Drive

Embedded Ethernet

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.

Embedded VGA, USB and Serial ports

15-pin VGA port supports:

- Server-class 2D hardware acceleration support with integrated 24-bit RAMDAC
- Display resolution up to 1600 x 1200 @ 60Hz
- Up to 128 Mbytes DDRII memory interface support

Four (4) USB Type A ports to support general USB applications and optional keyboard and mouse configurations

- 9-pin Serial port provides serial access to the individual chassis.

I/O Expansion slots

The Integrity MC990 X Server supports up to fifty-six (56) PCIe Gen3 slots

- Base chassis: eight (8) PCIe Gen3 slots; four (4) x8 slots and four (4) x16 slots
- Expansion chassis: twelve (12) PCIe Gen3 slots; eight (8) x8 slots and four (4) x16 slots

Network Adapters

Support for PCIe Gen3 1 Gb/s and 10 Gb/s network adapters for Local Area Network (LAN)

- HPE MC990 10GbE Fiber 2p Adapter
- HPE MC990 10GBASE-T 2p Adapter
- HPE MC990 1000BASE-T 4p 5719 Adapter
- HPE MC990 1000BASE-T 4p Adapter
- HPE MC990 2P 10GbE Copper I71 Adapter
- HPE MC990 4P 10GbE Copper I71 Adapter
- HPE MC990 2P 10GbE Copper X710 Adapter
- HPE MC990 2P 10GbE SFP+ I71 Adapter
- HPE MC990 4P 10GbE SFP+ I71 Adapter
- HPE MC990 2P 1GbE Copper I35 Adapter
- HPE MC990 2P 1GbE SFP+ I35 Adapter
- HPE MC990 1P 40GbE Copper I71 Adapter
- HPE MC990 2P 40GbE Copper I71 Adapter
- HPE MC990 1P 40GbE SFP+ I71 Adapter
- HPE MC990 2P 40GbE SFP+ I71 Adapter

Standard Features

NOTE: All Optical network adapters include transceivers unless otherwise stated.
NOTE: SAP HANA TDI requires a minimum of one 10/'40 GbE (Fiber or Base-T) for each Base or Expansion Server.

Fibre Channel Host Bus Adapters

Support for 16 Gb/s Fibre Channel Host Bus Adapters

- HPE MC990 SN1100E 16Gb 2P FC HBA
- Avago Tech (Emulex) LPe16002B 2-port Fibre Channel Host Bus Adapter - C8R39A

NOTE: The Fibre Channel HBAs include transceivers
NOTE: SAP HANA TDI Requires a minimum of one (1) for Each Base and Expansion Server
NOTE: The MC990 X does support Boot from SAN. Please see white paper for details:
https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=a00006145enw&doctype=Technical white paper&doclang=EN_US&searchquery=&cc=us&lc=en

SAS RAID Controllers

Support for 6 Gb/s and 12 Gb/s SAS RAID Controllers

- HPE MC990 6Gb 16p Ext SAS Controller
- HPE MC990 12Gb 8p Ext SAS Controller
- HPE MC990 6Gb 4p Internal SAS Controller (required when using internal 2.5" drives)

Host Channel Adapters

Support for FDR and EDR InfiniBand and 40/100 Gb/s Ethernet Adapter and Intel OmniPath Architecture

- HPE MC990 IB FDR/EN 40Gb 2p QSFP Adapter
- HPE MC990 IB EDR/EN 100Gb 1P QSFP Adapter
- HPE MC990 IB EDR/EN 100Gb 2P QSFP Adapter
- HPE MC990 1-port OPA Adapter

IO Accelerator Cards

Support for Solid State Drive (SSD) IO accelerator cards (PCIe form factor)

- HPE MC990 800GB P3700 PCIe Accelerator
- HPE MC990 2TB P3700 PCIe Accelerator
- HPE MC990 1.6TB NVMe PCIe Accelerator
- HPE MC990 3.2TB NVMe PCIe Accelerator

GPU Modules

Support for GPU modules

- HPE MC990 NVIDIA K80 Dual GPU Module
- HPE MC990 NVIDIA M40 24GB GPU Module
- HPE MC990 NVIDIA M40 12GB GPU Module
- HPE MC990 NVIDIA M60 16GB GPU Module
- HPE MC990 NVIDIA P100 16GB GPU Module
- HPE MC990 NVIDIA M4000 GPU Module
- HPE MC990 NVIDIA M6000 GPU Module

NOTE: When a GPU module is used the power on the overall system may be N+1 depending on specific configuration parameters
NOTE: The P100 GPU Module will require an ambient temperature of 25 °C (77 °F)

Power & Cooling

Each of the MC990 X chassis include four (4) power supplies and four (4) cooling fans

- Four (4) hot-swap 12-Volt, 1600 Watt (Platinum) [200-240 VAC] Power supplies

Standard Features

	per chassis • Four (4) hot-swap cooling fan assemblies per chassis
Key Power & Cooling Features:	• Redundant, hot-swappable power supplies and cooling fans • Online fault detection and ACPI support
Rack Management Controller (RMC)	Each Integrity MC990 X system requires a rack management controller (RMC) located directly below the MC990 X enclosures in a rack-a system consists of 1 to 5 MC990 X chassis The RMC supports powering up and down of the system motherboards and environmental monitoring of all 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.
Adding Additional Chassis to Existing system	The MC990 is modular in design and as such is capable of being upgrading with additional chassis with field upgrades. The Upgrade would include an Instruction code, Scale Activation kit(s) and a set of NUMAlink Cables
Certified Operating Environments	SUSE® Linux® Enterprise Server for SAP 12 SP1 Red Hat® Enterprise Linux 7for SAP HANA VMware vSphere6.5 (up to 8 sockets) **NOTE:** For more information on SAP Certification for HPE Integrity MC990 X please visit the SAP Certified and Supported SAP HANA Hardware Directory: **SAP HANA Hardware Directory** **NOTE:** for specific VMware information please refer to the HPE Support page **http://h17007.www1.hpe.com/us/en/enterprise/servers/supportmatrix/vmware.aspx#.WZ8doellBaR**
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.**

Standard Features

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.

HPE Services

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**

HPE Custom Deployment Services

HPE Pointnext Consulting has been delivering SAP Infrastructure solutions to customers for over 20 years. Utilizing the HPE framework for deploying custom SAP HANA Solutions, HPE Pointnext help customers quickly realize return on investment and reduce total cost of ownership from a customized SAP HANA TDI landscape. These services are tailored to meet specific customer needs that reduce risks and empower IT organizations to own and manage their SAP HANA environments.

The HPE Pointnext Deployment Services framework is delivered uniformly globally, offering customers scale and uniformity of the same experience at any and all locations worldwide. The SAP HANA Tailored Data Center Integration model provides flexibility, but it also introduces new considerations and risks that must be mitigated. HPE Pointnext Consulting provides guidance to customers to tackle these risks proactively and helps customers optimize the benefits of adopting SAP HANA. The framework is comprised of 5 phases and each phase has activities and deliverables to ensure your technical and business requirements are met.

For more information, visit: **http://www.hpe.com/services/consulting**

HPE Pointnext Services and Support

Protect your business beyond warranty with HPE Support Services

HPE Pointnext 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.

HPE Proactive Care Advanced

This is the recommended support for Mission Critical and SAP HANA environments. It builds on HPE Proactive Care, providing additional benefits such as the assignment of a dedicated, local account support manager (ASM) for collaboration and best

practices and critical event management that provides 24x7 response and IT service restoration with incident follow-up to prevent a repeat. All of this is designed to give you an incredibly personalized, high-touch support experience that keeps your system fully available and running at peak performance.

HPE Proactive Care
HPE Proactive Care begins with providing all of the benefits of proactive monitoring and reporting to put in place the fundamentals needed for stability and availability of the IT environment. Proactive Care helps in problem prevention, with predictive analytics, personalized analysis with recommendations and advice paired with rapid access to technical experts to help rapidly resolve any problem. You receive an enhanced call experience and a single point of contact for the support of all covered components. Customers can customize their Proactive Care reactive support level by selecting either 6-hour call-to-repair, 24x7 with 4-hour onsite response, or next-business day onsite response.

HPE Foundation Care
Provides flexibility to customize your reactive support level by selecting either 6hour call-to-repair, 24x7 with 4-hour onsite response, or Next Business Day onsite response. The HPE Foundation Care with 6-hour call-to-repair is the highest level commitment to repair hardware within six hours after the initial hardware service request has been received and respond to software questions within two hours.

HPE Datacenter Care service
HPE Datacenter Care helps improve IT stability and security, increase the value of IT, and enable agility and innovation. It is a structured framework of repeatable, tested, and globally available services “building blocks.” 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 HPE via a single point of accountability for HPE and others’ products.

HPE Technology Services Support Credits
Offer flexible services and technical skills to meet your changing IT demands. With a menu of service that is tailored to suit your needs, you get additional resources and specialist skills to help you maintain peak performance of your IT. Offered as annual credits, you can plan your budgets while proactively responding to your dynamic business.

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.

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

Standard Features

Hewlett Packard Enterprise quality standards. The service highlights include: planning, deployment on site, Installation verification tests, and customer orientation session.

Parts and Materials
HPE will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements. Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services. The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HPE due to malfunction.

For more information: **http://www.hpe.com/services**

How to Order

Integrity MC990 X for SAP HANA TDI		
MC990 X Racks	MC990 X can be racked in many of the HPE G2 Enterprise Series and Advanced Series racks, and the HPE D-Rack. If the MC990 X will be configured as 16-sockets (4-chassis) or more the HPE 800mm wide racks or D-Rack are required. Complete ordering rules can be found in the MC990 X server menu and in the ordering & configuration tools. The MC990 X can also be rack mounted in 3rd party rack. Specific rules and guidelines for this are available here: **http://h20565.www2.hpe.com/hpsc/doc/public/display?docId=a00008634en_us**	
	The following HPE racks are supported with MC990 X::	
	HPE 22U 600x1075mm Adv G2 Shck Rack	P9K04A
	HPE 36U 600x1075mm Adv G2 Kit Shock Rack	P9K06A
	HPE 42U 600x1200mm Adv G2 Kit Shock Rack	P9K10A
	HPE 42U 600x1075mm Adv G2 Kit Shck Rack	P9K08A
	HPE 42U 800x1075mm Adv G2 Shock Rack	P9K12A
	HPE 42U 800x1200mm Adv G2 Kit Shock Rack	P9K16A
	HPE 42U 600x1075 Ent G2 Shock Rack	P9K38A
	HPE 42U 600x1200 Ent G2 Shock Rack	P9K40A
	HPE 42U 800x1075 Ent G2 Shock Rack	P9K42A
	HPE 42U 800x1200 Ent G2 Shock Rack	P9K46A
	HPE 48U 600x1075 Ent G2 Shock Rack	P9K50A
	HPE 48U 600x1200 Ent G2 Shock Rack	P9K52A
	HPE 48U 800x1075 Ent G2 Shock Rack	P9K54A
	HPE 48U 800x1200 Ent G2 Shock Rack	P9K58A
	HPE 42U 610mm x 1156mm D-Rack	H7C27A
	HPE D-Rack 42U 610mm x 1156mm Extended	Q2T97A
	Additional information on HPE Racks can be found here: HPE G2 Enterprise Series Racks QuickSpecs: **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=a00002907enw** HPE G2 Advanced Series Racks QuickSpecs: **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c05324689**	
MC990 X Power Distribution Options	The following PDUs are supported with MC990 X-refer to the server menu for ordering & configuration rules.	
	HPE G2 Basic Mdlr 14.4kVA/C19 INTL PDU	P9Q51A
	HPE G2 Basic Mdlr 3Ph 17.3kVA/NA/JP PDU	P9Q60A
	HPE G2 Basic Mdlr 3Ph 22kVA/C19 INTL PDU	P9Q63A
	HPE G2 Basic Mdlr 4.9kVA/C19 NA/JP PDU	P9Q39A
		P9Q44A
		P9Q66A
		H7C28A
		H7C29A
		H7C30A

How to Order

	HPE G2 Basic 7.3kVA/(12) C13 INTL PDU	H7C32A
	Two C13 PDU Power Bar Kit	P9Q41A
	HPE D-Rack 21 x 3-Phase 240V NA/JP PDU	P9Q45A
	HPE D-Rack 21 x 3-Phase 400V INTL PDU	P9Q50A
	HPE D-Rack 8 x Single-Phase 240V NA PDU	P9Q61A
	HPE D-Rack 8 x Single-Phase 240V INTL PDU	P9Q62A
	HPE D-Rack 8 x Single-Phase 240V AU PDU	P9Q64A
	HPE G2 Basic 4.9kVA/(20) C13 NA/JP PDU	P9Q65A
	HPE G2 Basic 7.3kVA/(20) C13 INTL PDU	
	HPE G2 Basic 11kVA/C13 C19 INTL PDU	
	HPE G2 Basic 3Ph 17.3kVA/C13 NA/JP PDU	
	HPE G2 Basic 3Ph 17.3kVA/C19 NA/JP PDU	
	HPE G2 Basic 3PH 22Kk VA/C13 INTL PDU	
	HPE G2 Basic 3Ph 22kVA/(36) C13 INTL PDU	

HPE D-Rack

The HPE D-Rack is available for MC990 X in two models:

- HPE 42U 610mm x 1156mm D-Rack (H7C27A)
- HPE D-Rack 42U 610mm x 1156mm Extended (Q2T97A) The extended rack includes a 2U extension for a total of 44 rack units (44U). Two additional codes are added to the quote for the bracket and support

Dimensions for a single 24-inch wide 42U rack (200 cm)	Height: 78.75 in. Width: 24.0 in. (60.9 cm) Depth: 45.5 in. (115.6 cm)
Shipping dimensions (single rack) (225.8 cm)	Height: 88.88 in. Width: 44.0 in. (111.8 cm) Depth: 62.75 in. (159.4 cm)
Weight (single rack) kg)	386 lb. (175.1
Shipping weight (single rack)	856 lb. (388.3 kg)
Static load (max) kg)	2400 lb. (1088.6
Dynamic load (max rolling)	2500 lb. (1134kg)
42U rack access requirements: (121.9 cm)	Front: 48 in. Rear: 48 in. (121.9 cm) Top: 18 in. (45.7 cm)

Integrity MC990 X Servers	HPE Integrity MC990 HANA TDI 4-socket E7-8880 v4 Base Server	Q2F37A
	HPE Integrity MC990 HANA TDI 4-socket E7-8890 v4 Base Server	Q2F38A
	HPE Integrity MC990 HANA TDI4-socket E7-8891 v4 Base Server	Q7E94A
	HPE Integrity MC990 HANA TDI 4-socket E7-8867 v4 Base Server	Q7E95A

How to Order

	HPE Integrity MC990 HANA TDI 4-socket E7-4830 v4 Base Server	Q7E96A
	HPE Integrity MC990 HANA TDI 4-socket E7-4850 v4 Base Server	Q7E97A
	HPE Integrity MC990 HANA TDI 4-socket E7-8880 v4 Expansion Server	Q2F39A
	HPE Integrity MC990 HANA TDI 4-socket E7-8890 v4 Expansion Server	Q2F40A
	HPE Integrity MC990 HANA TDI 4-socket E7-8891 v4 Expansion Server	Q7E99A
	HPE Integrity MC990 HANA TDI 4-socket E7-8867 v4 Expansion Server	Q7F00A
	HPE Integrity MC990 HANA TDI 4-socket E7-4830 v4 Expansion Server	Q7F01A
	HPE Integrity MC990 HANA TDI 4-socket E7-4850 v4 Expansion Server	Q7F02A
	NOTE: Max 3x MC990 X 8-socket servers per 42U rack; each MC990 X 8S server = 10U plus 1U RMC **NOTE:** Max 4x MC990 X 4-socket base servers per MC990 42U rack; each MC990 X 4S base server = 5U plus 1U RMC **NOTE:** MC990 X 4S base servers plus MC990 X 4S expansion servers plus RMC(s) must equal 42U or less per 42U rack	
Rack Management Controller (RMC)	HPE Integrity Rack Management Controller **NOTE:** When ordering MC990 X Servers one RMC must be ordered per MC990 X Server.	H7B94B
Scale activation kits	HPE MC990 8-socket Interconnect and Scale Activation Kit	H7C10A
	HPE MC990 12-socket Interconnect and Scale Activation Kit	H7C11A
	HPE MC990 16-socket Interconnect and Scale Activation Kit	H7C12A
	HPE MC990 20-socket Interconnect and Scale Activation Kit	H7C13A
	NOTE: When configuring MC990 X 4S servers as 4-socket to 20-socket systems, the appropriate scale activation kit must be ordered.	
MC990 X Bulkhead options	HPE MC990 12-slot PCIe Module	H7C23A
	HPE MC990 Disk Riser and 8-slot PCIe Module	H7C24A
	HPE MC990 Compute Only Module (no PCIe slots)	H7C25A
	NOTE: Each MC990 X 4S Expansion chassis requires one of the above bulkhead options..	
System Memory	HPE MC990 DDR4 256GB (32x8GB) Memory Kit	H7C06A
	HPE MC990 DDR4 512GB (32x16GB) Memory Kit	H7C07A
	HPE MC990 DDR4 1TB (32x32GB) Memory Kit	H7C08A
	HPE MC990 DDR4 2TB (32x64GB) Memory Kit	H7C09A
	NOTE: Memory must be installed in groups of 32 DIMMs for 4S base servers and expansion servers; each memory kit includes 32 DIMMs. **NOTE:** All DIMM slots to be populated with the same DIMM type/capacity.	
Base IO Drives	**NOTE: If booting from disk** the MC990 X Server requires either the Base IO 1.8” SSD drives or the internal 2.5” drives listed in a later	

How to Order

	section. HPE MC990 400GB Base SATA (1.8in) Solid State Drive HPE MC990 800GB Base SATA (1.8in) Solid State Drive **NOTE:** Base IO 1.8” SSDs are ordered in quantities of zero (0) or two (2) **NOTE:** If Base IO SSDs are ordered, both need to be of the same capacity **NOTE:** Base IO SSDs will be configured as software RAID 1 **NOTE:** If Base IO SSDs are not ordered, internal 2.5” drives are required for boot	H7B55C H7B56C
Network Adapters	HPE MC990 10GbE Fiber 2-port Adapter HPE MC990 10BASE-T 2-port Adapter HPE MC990 1000BASE-T 4-port 5719 Adapter HPE MC990 1000BASE-T 4-port Adapter HPE MC990 2P 10GbE Copper I71 Adapter HPE MC990 4P 10GbE Copper I71 Adapter HPE MC990 2P 10GbE Copper X710 Adapter HPE MC990 2P 10GbE SFP+ I71 Adapter HPE MC990 4P 10GbE SFP+ I71 Adapter HPE MC990 2P 1GbE Copper I35 Adapter HPE MC990 2P 1GbE SFP+ I35 Adapter HPE MC990 1P 40GbE Copper I71 Adapter HPE MC990 2P 40GbE Copper I71 Adapter HPE MC990 1P 40GbE SFP+ I71 Adapter HPE MC990 2P 40GbE SFP+ I71 Adapter **NOTE:** SAP HANA TDI requires a minimum of one 10/40 GbE (Fiber or Base-T) for each Base or Expansion Server.	H7B72A H7B74A H7B75A H7B76A Q2T98A Q2T99A Q2U00A Q2U01A Q2U02A Q2U03A Q2U04A Q2U05A Q2U06A Q2U07A Q2U08A
Fibre Channel Host Bus Adapters	HPE MC990 X HANA TDI SN1100E 16Gb FC HBA **NOTE:** The Q0D73A and H7B97A are the same card as LPe16002B FC HBA - C8R39A **NOTE:** SAP HANA TDI Requires a minimum of one (1) for Each Base and Expansion Server for FC connected storage	Q0D73A
Host Channel Adapters	HPE MC990 InfiniBand FDR/Ethernet 40Gb 2-port QSFP Adapter HPE MC990 InfiniBand EDR/Ethernet 100Gb 1P QSFP Adapter HPE MC990 Infiniband EDR/Ethernet 100Gb 2P QSFP Adapter HPE MC990 1-port Omni-Path Architecture Adapter	H7B79A Q2U09A Q2U10A Q6L32A
IO Accelerators	HPE MC990 800GB P3700 PCIe Accelerator HPE MC990 2TB P3700 PCIe Accelerator HPE MC990 1.6TB NVMe PCIe Accelerator HPE MC990 3.2TB NVMe PCIe Accelerator	H7B80A H7B81A Q2U11A Q2U12A

How to Order

GPU Modules	HPE MC990 NVIDIA Tesla K80 Dual GPU Module	H7B98A
	HPE MC990 NVIDIA M40 24GB GPU Module	Q2T80A
	HPE MC990 NVIDIA M40 12GB GPU Module	Q2T81A
	HPE MC990 NVIDIA M60 16GB GPU Module	Q2T82A
	HPE MC990 NVIDIA P100 16GB GPU Module	Q2T83A
	HPE MC990 NVIDIA M4000 GPU Module	Q2T91A
	HPE MC990 NVIDIA M6000 GPU Module	Q2T92A
	NOTE: When a GPU module is used the power on the overall system may be N+1 depending on specific configuration parameters **NOTE:** The P100 GPU Module will require an ambient temperature of 25 °C (77 °F)	
SAS RAID Controllers	HPE MC990 6Gb 16-port External SAS Controller	H7B69A
	HPE MC990 12Gb 8-port External SAS Controller	H7B70A
	HPE MC990 4P Internal 9361 SAS/RAID Controller **NOTE:** The Q2U17A internal SAS controller is required when internal 2.5” drives are ordered. **Occupies 2 PCIe slots**	Q2U17A
Internal 2.5” Hard Disk Drives (HDDs)	HPE MC990 600GB 12G SAS 10K SFF (2.5in) Hard Disk Drive	H7B57B
	HPE MC990 900GB 12G SAS 10K SFF (2.5in) Hard Disk Drive	H7B58B
	HPE MC990 1TB 12G SAS 7.2K 2.5" Hard Disk Drive	Q2T62A
	HPE MC990 2TB 12G SAS 7.2K 2.5" Hard Disk Drive	Q2T63A
	HPE MC990 1.2TB 12G SAS 10K 2.5" Hard Disk Drive	Q2T61A
	HPE MC990 2TB 6G SATA 7.2K 2.5" Hard Disk Drive	Q2T60A
	NOTE: Must order in quantities of zero (0), two (2), or four (4) drives **NOTE:** All drives must be of the same type and capacity **NOTE:** The Q2U17A internal SAS controller is required when internal 2.5” drives are. Occupies 2 PCIe slots ordered **NOTE:** Drives will be configured as RAID 1 when shipped; can be reconfigured in the field or onsite	
Solid State Drives (SSDs)	HPE MC990 200GB 12G SAS SFF (2.5in) MLC Solid State Drive	H7B59A
	HPE MC990 400GB 12G SAS SFF (2.5in) MLC Solid State Drive	H7B60A
	HPE MC990 800GB 12G SAS SFF (2.5in) MLC Solid State Drive	H7B61A
	HPE MC990 1.6TB 12G SAS SFF (2.5in) MLC Solid State Drive	H7B62A
	HPE MC990 1.6TB 6G SATA MLC 2.5" Solid State Drive	Q2U13A
	HPE MC990 1.9TB 6G SATA MLC 2.5" Solid State Drive	Q2U14A
	HPE MC990 3.8TB 6G SATA MLC 2.5" Solid State Drive	Q2U15A
	NOTE: Must order in quantities of zero (0), two (2), or four (4) drives **NOTE:** All drives must be of the same type and capacity **NOTE:** The Q2U17A internal SAS controller is required when internal 2.5” drives are **ordered. Occupies 2 PCIe slots** **NOTE:** Drives will be configured as RAID 1 when shipped; can be reconfigured in the field or onsite	

How to Order

Internal Optical Drives	HPE MC990 DVD-Read-Write Drive	H7B66A
	HPE MC990 DVD-Read Drive	H7B67A
	NOTE: Min one (1), max one (1)	
Additional Chassis for Upgrade	The MC990 is modular in design and as such is capable of being upgrading with additional chassis with field upgrades.	
	HPE MC990 Upgrade Flag	Q2T94A
	HPE MC990 8S Scale Activation Kit (utilized when growing for a 4 socket to 8 socket system i.e. adding one chassis	H7C10A
	HPE MC990 4S Upg Scale Activation Kit (utilized when expanding beyond 8 sockets, Quantity 1 required for each 4 socket chassis added to system)	Q2U16A
	HPE MC990 NUMAlink 7 copper .75m cable	Q2T85A
	HPE MC990 NUMAlink 7 copper 1.5m cable	Q2T86A
	HPE MC990 NUMAlink 7 copper 1m cable	Q2T87A
	HPE MC990 NUMAlink 7 copper 2m cable	Q2T88A
	HPE MC990 NUMAlink 7 copper 3m cable	Q2T89A
	NOTE: H7C10A is utilized when growing a 4 socket system to an 8 socket system **NOTE:** Q2U16A is utilized for growing a system beyond 8 sockets. Quantity of 1 Q2U16A is required for each 4 socket chassis added to a system **NOTE:** Quantity and Length of NUMAlink cables is determined by the ending size of your system. Please refer to quoting tools for quantities required	
Foundation Software	Foundation software is required for all MC990 X systems where SUSE or RedHat Linux is used.. the version selected must match the operating system environment	
	HPE Foundation SW 2 RHEL Lic RTU	Q7N11A
	HPE Foundation SW 2 SLES Lic RTU	Q7N12A
	HPE Foundation SW 2 Oracle Lic RTU	Q7N16A
	HPE Foundation SW 2 FIO RHEL	Q7N13A
	HPE Foundation SW 2 FIO SLES	Q7N14A
	HPE Foundation SW 2 FIO Oracle	Q7N15A
	HPE Foundation SW 2 RHEL Media	Q7Y82A
	HPE Foundation SW 2 SLES Media	Q7Y83A
	HPE Foundation SW 2 Oracle Media	Q7Y84A
	NOTE: One RTU license is required per system. Additionally 1 of either the FIO or Media kits are also required. It is permissible to order both Media and FIO	
Supported Operating	SUSE Linux Enterprise Server SAP 2 Sockets or 1-2 VM 3yr	N0U73A
	Subscription 24x7 Support Flexible LTU	N0U75A

How to Order

Systems

SUSE Linux Enterprise Server SAP 2 Sockets or 1-2 VM 5yr Subscription 24x7 Support Flexible LTU	L5P71A
RHEL SAP 1-2 Sckt Phscl 3yr 24x7 LTU	L5P72A
RHEL SAP 1-2 Sckt Phscl 5yr 24x7 LTU	BD711A
VMware vSphere Standard 1 Processor 3yr Software	BD512A
VMware vSphere Standard 1 Processor 5yr Software	BD713A
VMware vSphere Enterprise 1 Processor 3yr Software	BD513A
VMware vSphere Enterprise 1 Processor 5yr Software	BD715A
VMware vSphere Enterprise Plus 1 Processor 3yr Software	BD514A
VMware vSphere Enterprise Plus 1 Processor 5yr Software	

NOTE: For Linux based O/S - Must order 1 x SLES OR RHEL subscription per every 2 sockets to a max of 10 (20 socket system)
NOTE: for VMware based systems 1 license per socket is required (up to 8 sockets)

Integrity MC990 X TDI Services and Support

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.

Deployment and Integration Services for Integrity MC990 X for SAP HANA 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 Pointnext 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.

Support Services for HPE Integrity MC990 X for SAP HANA TDI

HPE Pointnext operational 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 term you select. HPE provides the same support offering for Integrity MC990 X for SAP TDI as the MC990 X server:

- HPE Foundation Care
- HPE Datacenter Care for SAP HANA TDI

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

NOTE: Support for the SAP HANA software requires a separate support agreement with SAP.

NOTE: Each of these support levels include hardware and software reactive support, as applicable, and are available with DMR (defective media retention). Support

How to Order

services are available in 3, 4 or 5 year durations. Support durations should match the support duration of the Linux subscription.

Site Planning for MC990 X Server

System Unit	**Dimensions**	Height	5U 8.75 inches (22.2 cm) base and 5U expansion chassis
		Width	17.5 inches (44.5 cm)
		Depth	31.8 inches (80.8 cm)-without bezel 38.1 inches (96.8 cm)-with bezel
	Weight	Maximum	4 socket chassis: 146lbs (62.kg) (fully populated
	Power Specifications	Voltage Range	200 - 240 VAC
		Maximum Current	10 Amps @ 200VAC per power Supply
		Frequency Range	50 - 60 Hz
	BTU Rating	Maximum	17.74 kBTU//hr (1.48. Tons) , 5.33kW. Average 4 socket chassis configuration ~2.4kW
	Power Supply Output	Maximum	Four 12-Volt, 1600 Watt (Platinum) [200-240 VAC] **C13/C14**
	System Inlet Temperature	Temperature tolerance (operating)	+5 °C (41 °F) to +35 °C (95 °F) (up to 1500 m / 5000 ft.) .) for configurations that require GPU support, 25 °C is maximum recommendation +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)
	Humidity (noncondensing)	Relative humidity	20% to 80% operating (no condensation) 8% to 80% non-operating (no condensation)

Technical Specifications

Altitude	Operating Non-operating	10,000 ft. (3,049 m) 40,000 ft. (12,195 m) non-operating
Airflow	Intake (front) Exhaust (rear)	650 CFM Max (1104 m3/hr) 475 CFM typical (407 m3/hr)
Acoustics (sound power)	Rack Mount	Approximately 77 dBA (at rear of rack)

Integrity MC990 X system rack physical specifications

Feature			
	1075mm rack	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)
	1200mm rack	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)

Rack Management Controller (RMC) Specifications	**42U Rack Access Requirements**	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	100-120V (90-132 VAC min/max)
		Voltage:	50-60 Hz (47-63 Hz min/max)
		Frequency:	(50W) per supply
			200-240V (180-264 VAC min/max)
		Power:	20 ms
		Hold-up time:	NEMA 5-15R (x2) N. America/Japan
		RMC power: single-phase	IEC320-C13 (x2) N. America/Japan & Int'l
		100-120 VAC RMC power: single-phase 200-240 VAC	
		Air flow (front to back)	Maximum = 35 CFM (60 m3) per hour
		Acoustical noise	Approximately 68 dBA

Regulatory Compliance	**Regulatory Model Number (MC990 X)**	RSVLA-RE01: HPE Integrity MC990 X Server
	Regulatory Model Number (RMC)	RSVLA-RE02: Rack Management Controller (RMC)

Technical Specifications

Electromagnetic interference	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.
Safety	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
06-Nov-2017	From Version 5 to 6	Changed	Changes made to the entire document
11-Jul-2017	From Version 4 to 5	Changed	Changes made to the Standard Features and How to Order Sections
05-Jun-2017	From Version 3 to 4	Changed	Changes made to the entire document
27-Mar-2017	From Version 2 to 3	Changed	All SKUs updated for 4-Socket Scalable configurations
28-Nov-2016	From Version 1 to 2	Changed	Changes made to the entire document
15-Aug-2016	Version 1	Created	Document Created

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