QuickSpecs
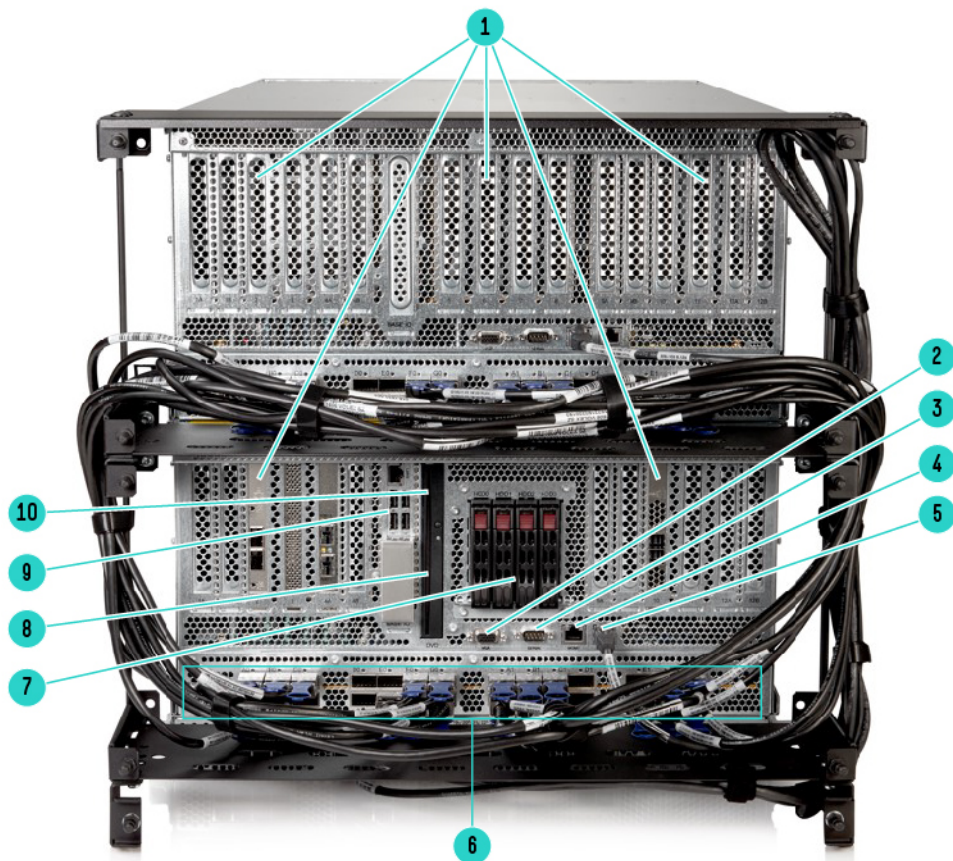
Overview

HPE Integrity MC990 X Server

The HPE Integrity MC990 X Server delivers in-memory computing performance and capacity for the Linux-based applications at unparalleled scale with mission-critical reliability and modular flexibility.

An advanced symmetric multiprocessing (SMP) system designed for data-intensive workloads, the HPE MC990 X Server features enterprise-class Intel® Xeon® E7‑8800/4800 v4 processors and robust reliability, availability, and serviceability. The 5U modular chassis contains 4 sockets with up to 192 threads. By adding chassis and leveraging high bandwidth, low latency NUMAlink technology, the HPE MC990 X Server can scale as a single system from 4 to 32 sockets and from 256GB to 48 TB of cache‑coherent shared memory. With a maximum of 768 cores of powerful Xeon compute, the MC990 X is ideal to deploy your large Linux applications, 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 large, memory intense, workloads on the MC990 X Server.

MC990 X Expansion Chassis (without bezel)

1. PCIe 3.0 slots
2. VGA port
3. Serial port
4. Management connector
5. RMC connector
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

Hewlett Packard Enterprise

Overview

HPE Integrity MC990 X Server (8-socket)

1. HPE Integrity Rack Management Controller (RMC)
2. MC990 X Base Chassis (4-socket)
3. MC990 X Expansion Chassis (4-socket)

Standard Features

Models   The HPE Integrity MC990 X Server is available in seven (7) base configurations:
- HPE MC990 4S E7-8867 v4 Server
- HPE MC990 4S E7-8880 v4 Server
- HPE MC990 4S E7-8890 v4 Server
- HPE MC990 4S E7-8891 v4 Server
- HPE MC990 4S E7-8893 v4 Server
- HPE MC990 4S E7-4830 v4 Server
- HPE MC990 4S E7-4850 v4 Server

NOTE: Servers can be configured up to 32-sockets; use 4-socket Expansion servers when scaling beyond 4-sockets

Processors   Four (4)Intel® Xeon® E7-8800 v4 or E7-4800 processors are configured in each Base server or Expansion chassis:
- Intel Xeon Processor E7-8867 v4 18-core/2.4GHz/165W/45M
- 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 E7-8893 v4 4-core/3.2GHz/140W/60MB
- 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 32-sockets; use 4-socket Expansion servers when scaling beyond 4-sockets

Memory Modules   DDR4 Registered (R) DIMMs in 8GB, 16GB, 32GB and 64GB capacities. Memory kits sold in quantities of 32DIMMs.
- 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 Base IO: Zero (0) or 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: 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
- 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   The HPE MC990 6Gb 4p Internal SAS Controller is required when ordering 2.5" internal drives
Controller
- Support for four (4) internal Hard Disk Drive (HDDs) or Solid State Drives (SSDs)
- Supports RAID 0, 1, 10

Standard Features

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

Optical Media Drive	One (1) HPE DVD-RW or DVD-R 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(32S)supports up to ninety two (92)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
- Expansion chassis with disk riser: eight (8) PCIe Gen3 slots; four (4) 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

NOTE: All Optical network adapters include transceivers unless otherwise stated.

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: 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 8p Ext SAS Controller
- HPE MC990 12Gb 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)

Standard Features

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 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 8 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 11 SP3 and 12
- Red Hat® Enterprise Linux 6.6 and above, and 7.1 and above
- Oracle® Linux 7 with Unbreakable Enterprise Kernel;
- Oracle VM 3.4
- VMware vSphere6.5 (up to 8 sockets)

NOTE: 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: **http://www.hpe.com/info/ossupport**
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

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 E7-8800/4800 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 2040/2050 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 Pointnext

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.

Services and Support

HPE Proactive Care Advanced – 3,4,5 Year

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 - 3,4,5 Year

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 – 3,4,5 Year

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

Services and Support

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.

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.

HPE Factory Express for Servers and Storage

HPE Factory Express offers configuration, customization, integration and deployment services for HPE servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HPE products supported through Factory Express include a wide array of servers and storage: HPE Integrity, HPE ProLiant, HPE Apollo, HPE ProLiant Server Blades, HPE BladeSystem, HPE 9000 servers as well as the MSA, 3PAR suite, XP, rackable tape libraries and configurable network switches.

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

Ordering and Configuration

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 600mmx1075mm G2 Kitted Advanced Shock Rack with Side Panels and Baying	P9K04A
HPE 36U 600mmx1075mm G2 Kitted Advanced Shock Rack with Side Panels and Baying	P9K06A
HPE 42U 600mmx1200mm G2 Kitted Advanced Shock Rack with Side Panels and Baying	P9K10A
HPE 42U 600mmx1075mm G2 Kitted Advanced Shock Rack with Side Panels and Baying	P9K08A
HPE 42U 800mmx1075mm G2 Kitted Advanced Shock Rack with Side Panels and Baying	P9K12A
HPE 42U 800mmx1200mm G2 Kitted Advanced Shock Rack with Side Panels and Baying	P9K16A
HPE 42U 600mmx1075mm G2 Enterprise Shock Rack	P9K38A
HPE 42U 600mmx1200mm G2 Enterprise Shock Rack	P9K40A
HPE 42U 800mmx1075mm G2 Enterprise Shock Rack	P9K42A
HPE 42U 800mmx1200mm G2 Enterprise Shock Rack	P9K46A
HPE 48U 600mmx1075mm G2 Enterprise Shock Rack	P9K50A
HPE 48U 600mmx1200mm G2 Enterprise Shock Rack	P9K52A
HPE 48U 800mmx1075mm G2 Enterprise Shock Rack	P9K54A
HPE 48U 800mmx1200mm G2 Enterprise Shock Rack	P9K58A
HPE 42U 610mm x 1156mm Destination Rack	H7C27A
HPE 42U 610mm x 1156mm Extension Destination Rack	Q2T97A

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 Modular 14.4kVA/60309 63A 3-wire 48A/230V Outlets (6) C19/1U Horizontal INTL PDU	P9Q51A
HPE G2 Basic Modular 3Ph 17.3kVA/60309 60A 4-wire 48A/208V Outlets (6) C19/1U Horizontal NA/JP PDU	P9Q60A
HPE G2 Basic Modular 3Ph 22kVA/60309 5-wire 32A/230V Outlets (6) C19/1U Horizontal INTL PDU	P9Q63A
HPE G2 Basic Modular 4.9kVA/L6-30P 24A/208V Outlets (6) IEC C19/1U Horizontal NA/JP PDU	P9Q39A
HPE G2 Basic 7.3kVA/60309 3-wire 32A/230V Outlets (12) C13/1U Horizontal INTL PDU	P9Q44A
HPE G2 IEC C20 Input/(8) C13 Expansion Outlets/PDU Extension Bar Kit	P9Q66A
HPE Destination Rack 21 x Outlets 3-phase 240V NA/JP PDU	H7C28A
HPE Destination Rack 21 x Outlets 3-phase 400V INTL PDU	H7C29A
HPE Destination Rack 8 x Outlets Single-phase 240V NA PDU	H7C30A
HPE Destination Rack 8 x Outlets Single-phase 240V INTL PDU	H7C31A
HPE Destination Rack 8 x Outlets Single-phase 240V AU PDU	H7C32A
HPE G2 Basic 4.9kVA/L6-30P 24A/208V Outlets (20) C13/Vertical NA/JP PDU	P9Q41A
HPE G2 Basic 7.3kVA/60309 3-wire 32A/230V Outlets (20) C13/Vertical INTL PDU	P9Q45A

Ordering and Configuration

HPE G2 Basic 11kVA/60309 63A 3-wire 48A/230V Outlets (30) C13 (6) C19/Vertical INTL PDU	P9Q50A
HPE G2 Basic 3Ph 17.3kVA/60309 60A 4-wire 48A/208V Outlets (18) C13 (6) C19/Vertical NA/JP PDU	P9Q61A
HPE G2 Basic 3Ph 17.3kVA/60309 60A 4-wire 48A/208V Outlets (36) C13 (12) C19/Vertical NA/JP PDU	P9Q62A
HPE G2 Basic 3Ph 22kVA/60309 5-wire 32A/230V Outlets (18) C13 (6) C19/Vertical INTL PDU	P9Q64A
HPE G2 Basic 3Ph 22kVA/60309 5-wire 32A/230V Outlets (36) C13 (12) C19/Vertical INTL PDU	P9Q65A

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

NOTE: When configuring MC990 X with 12-sockets or greater, use HPE MC990 42U 610mm x 1156mm D-Rack (H7C27A)

Integrity MC990 X Servers	HPE Integrity MC990 4-socket E7-8880 v4 Base Server	H7B99A
	HPE Integrity MC990 4-socket E7-8890 v4 Base Server	H7C00A
	HPE Integrity MC990 4-socket E7-8893 v4 Base Server	H7C17A
	HPE Integrity MC990 4-socket E7-8891 v4 Base Server	H7C18A
	HPE Integrity MC990 4-socket E7-8867 v4 Base Server	H7C19A
	HPE Integrity MC990 4-socket E7-4830 v4 Base Server	Q2T76A
	HPE Integrity MC990 4-socket E7-4850 v4 Base Server	Q2T78A
	HPE Integrity MC990 4-socket E7-8880 v4 Expansion Server	H7C01A
	HPE Integrity MC990 4-socket E7-8890 v4 Expansion Server	H7C02A
	HPE Integrity MC990 4-socket E7-8893 v4 Expansion Server	H7C20A
	HPE Integrity MC990 4-socket E7-8891 v4 Expansion Server	H7C21A
	HPE Integrity MC990 4-socket E7-8867 v4 Expansion Server	H7C22A
	HPE Integrity MC990 4-socket E7-4830 v4 Expansion Server	Q2T77A
	HPE Integrity MC990 4-socket E7-4850 v4 Expansion Server	Q2T79A

NOTE: Max 3x MC990 X 8-socket servers per 42U rack; each MC990 X 8S server = 10U

Ordering and Configuration

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: Max 32-socket MC990 X system with single RMC per 42U rack

Rack Management Controller (RMC)	HPE Integrity Rack Management Controller	H7B94B
	NOTE: One (1) RMC must be ordered per MC990 X Server regardless of socket count;	
	NOTE: RMC = 1U	
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
	HPE MC990 24-socket Interconnect and Scale Activation Kit	H7C14A
	HPE MC990 28-socket Interconnect and Scale Activation Kit	H7C15A
	HPE MC990 32-socket Interconnect and Scale Activation Kit	H7C16A
	NOTE: When configuring MC990 X 4S servers as 4-socket to 32-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	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 each 4-socket chassis ; 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 section.	
	HPE MC990 400GB Base SATA (1.8in) Solid State Drive	H7B55C
	HPE MC990 800GB Base SATA (1.8in) Solid State Drive	H7B56C
	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	
Network Adapters	HPE MC990 10GbE Fiber 2-port Adapter	H7B72A
	HPE MC990 10BASE-T 2-port Adapter	H7B74A
	HPE MC990 1000BASE-T 4-port 5719 Adapter	H7B75A
	HPE MC990 1000BASE-T 4-port Adapter	H7B76A

Ordering and Configuration

HPE MC990 10GbE 2-port Copper I71 Adapter	Q2T98A
HPE MC990 10GbE 4-port Copper X710 Adapter	Q2T99A
HPE MC990 10GbE 2-port Copper X710 Adapter	Q2U00A
HPE MC990 10GbE 2-port SFP+ I71 Adapter	Q2U01A
HPE MC990 10GbE 4-port SFP+ I71 Adapter	Q2U02A
HPE MC990 1GbE 2-port Copper I35 Adapter	Q2U03A
HPE MC990 1GbE 2-port SFP+ I35 Adapter	Q2U04A
HPE MC990 40GbE 1-port Copper I71 Adapter	Q2U05A
HPE MC990 40GbE 2-port Copper I71 Adapter	Q2U06A
HPE MC990 40GbE 1-port SFP+ I71 Adapter	Q2U07A
HPE MC990 40GbE 2-port SFP+ I71 Adapter	Q2U08A

Fibre Channel Host Bus Adapters	HPE MC990 SN1100E 16Gb 2-port Fibre Channel Host Bus Adapter	H7B97A
	NOTE: The H7B97A is the same card as LPe16002B FC HBA - C8R39A	

Host Channel Adapters	HPE MC990 InfiniBand FDR/Ethernet 40Gb 2-port QSFP Adapter	H7B79A
	HPE MC990 InfiniBand EDR/Ethernet 100Gb 1-port QSFP Adapter	Q2U09A
	HPE MC990 InfiniBand EDR/Ethernet 100Gb 2-port QSFP Adapter	Q2U10A
	HPE MC990 1-port Omni-Path Architecture Adapter	Q6L32A

IO Accelerators	HPE MC990 1.6TB NVMe PCIe Accelerator	Q2U11A
	HPE MC990 3.2TB NVMe PCIe Accelerator	Q2U12A

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 8p Ext SAS Controller	Q6L30A
	HPE MC990 16-port External 12G SAS Controller	Q2U42A
	HPE MC990 12Gb 8-port External SAS Controller	H7B70A
	HPE MC990 4-port Internal 9361 SAS/RAID Controller	Q2U17A
	NOTE: The Q2U17Ainternal SAS controller is required when internal 2.5" drives are ordered. Occupies 2 PCIe slots	

Internal 2.5" Hard Disk Drives	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

Ordering and Configuration

(HDDs)	HPE MC990 1TB 12G SAS 7.2K rpm SFF (2.5in) Midline 512n Hard Drive	Q2T62A
	HPE MC990 2TB 12G SAS 7.2K rpm SFF (2.5in) Midline 512n Hard Drive	Q2T63A
	HPE MC990 1.2TB 12G SAS 10K rpm SFF (2.5in) Midline 512n Hard Drive	Q2T61A
	HPE MC990 2TB 6G SATA 7.2K rpm SFF (2.5in) Midline 512n Hard 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 ordered. Occupies 2 PCIe slots
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 SFF (2.5in) MLC Solid State Drive	Q2U13A
	HPE MC990 1.9TB 6G SATA SFF (2.5in) MLC Solid State Drive	Q2U14A
	HPE MC990 3.8TB 6G SATA SFF (2.5in) MLC 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

| **Internal Optical Drives** | HPE MC990 DVD-Read-Write Drive | H7B66A |
| | HPE MC990 DVD-Read Drive | H7B67A |

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 Instructions	Q2T94A
	HPE MC990 8-socket Interconnect and Scale Activation Kit	H7C10A
	(utilized when growing for a 4 socket to 8 socket system i.e. adding one chassis	
	HPE MC990 4-socket Upgrade Scale Activation Kit	Q2U16A
	(utilized when expanding beyond 8 sockets, Quantity 1 required for each 4 socket chassis added to system)	
	HPE MC990 0.75m NUMAlink 7 Copper Cable	Q2T85A
	HPE MC990 1.5m NUMAlink 7 Copper Cable	Q2T86A
	HPE MC990 1m NUMAlink 7 Copper Cable	Q2T87A
	HPE MC990 2m NUMAlink 7 Copper Cable	Q2T88A
	HPE MC990 3m NUMAlink 7 Copper 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

Ordering and Configuration

Integrity MC990 X for SAP HANA TDI	The HPE Integrity MC990 X for SAP HANA TDI Scale-up Solution is certified as a compute block for SAP HANA TDI from 4 socket to 20 socket (20TB). For configuration and ordering details, please see the HPE Solutions for SAP HANA Tailored Data Center Integration (TDI) QuickSpecs: **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c05209803**

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 Software 2 for Red Hat Enterprise Linux Media License RTU	Q7N11A
HPE Foundation Software 2 for SUSE Linux Enterprise Server Media License RTU	Q7N12A
HPE Foundation Software 2 for Oracle License 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 Software 2 for Red Hat Enterprise Linux Media	Q7Y82A
HPE Foundation Software 2 for SUSE Linux Enterprise Server Media	Q7Y83A
HPE Foundation Software 2 for Oracle Linux 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 Systems

SUSE Linux Enterprise Server see:
https://www.hpe.com/h20195/v2/GetPDF.aspx/c04154457.pdf

RHEL Enterprise Linux see:
https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04123419

VMware vSphere Standard 1 Processor 3yr Software	BD711A
VMware vSphere Standard 1 Processor 5yr Software	BD512A
VMware vSphere Enterprise Plus 1 Processor 3yr Software	BD715A
VMware vSphere Enterprise Plus 1 Processor 5yr Software	BD514A

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)

Technical Specifications

Site Planning for MC990 X Server

System Unit	Dimensions	Height	4S chassis: 5U 8.75 inches (22.2 cm)
		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	4S: 146lbs (66.2 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 (non-condensing)	Relative humidity	20% to 80% operating (no condensation) 8% to 80% non-operating (no condensation)
	Altitude	Operating	10,000 ft. (3,049 m)
		Non-operating	40,000 ft. (12,195 m) non-operating
	Airflow	Intake (front)	650 CFM Max (1104 m3/hr)
		Exhaust (rear)	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)

Technical Specifications

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

Regulatory	**Regulatory Model**	RSVLA-RE01: HPE Integrity MC990 X Server

Technical Specifications

Compliance	Number (MC990 X)	
	Regulatory Model Number (RMC)	RSVLA-RE02: Rack Management Controller (RMC)
	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
05-Feb-2017	From Version 11 to 12	Changed	Service and Support and Ordering and Configuration sections were updated.
		Removed	SKUs deleted in Ordering and Configuration section: H7B80A, H7B81A.
08-Jan-2018	From Version 10 to 11	Removed	SKU was deleted from Ordering and Configuration section: H7B86A
06-Nov-2017	From Version 9 to 10	Changed	Standard Features, Service and Support, Ordering and Configuration, and Technical Specifications sections were updated.
		Added	SKUs added in Ordering and Configuration section: P9K04A, P9K06A, P9K10A, P9K08A, P9K12A, P9K16A, P9K38A, P9K40A, P9K42A, P9K46A, P9K50A, P9K52A, P9K54A, P9K58A, H7C27A, Q2T97A, P9Q51A, P9Q60A, P9Q63A, P9Q39A, P9Q44A, P9Q66A, H7C28A, H7C29A, H7C30A, H7C31A, H7C32A, P9Q41A, P9Q45A, P9Q50A, P9Q61A, P9Q62A, P9Q64A, P9Q65A, Q7N11A, Q7N12A, Q7N16A, Q7N13A, Q7N14A, Q7N15A, Q7Y82A, Q7Y83A, Q7Y84A, BD711A, BD512A, BD713A, BD513A, BD715A, BD514A.
		Removed	SKUs were deleted from Ordering and Configuration section: H7B86A, H7B84A, H7B85A, H7C27A, H7B88A, H7B96A, H7B89A, H7B90A, H7C28A, H7C29A, H7C30A, H7C31A, H7C32A, H7B91A, H7B84A, BD713A, BD513A.
11-Jul-2017	From Version 8 to 9	Changed	Overview, Standard Features, and Ordering and Configuration sections were updated.
		Added	SKUs added in Ordering and Configuration section: H7B86A, H7B84A, H7B85A, H7C27A, H7B88A, H7B96A, H7B89A, H7B90A, H7C28A, H7C29A, H7C30A, H7C31A, H7C32A, H7B91A, Q2T94A, H7C10A, Q2U16A, Q2T85A, Q2T86A, Q2T87A, Q2T88A, Q2T89A.
05-Jun-2017	From Version 7 to 8	Changed	Overview, Standard Features, Service and Support, Ordering and Configuration, and Technical Specifications sections were updated.
		Added	SKUs added in Ordering and Configuration section: Q2T67A, H7B86A, Q2T76A, Q2T78A, Q2T77A, Q2T79A, Q2T98A, Q2T99A, Q2U00A, Q2U01A, Q2U02A, Q2U03A, Q2U04A, Q2U05A, Q2U06A, Q2U07A, Q2U08A, Q2U09A, Q2U10A, Q6L32A, Q2U11A, Q2U12A, Q2T80A, Q2T81A, Q2T82A, Q2T83A, Q2T91A, Q2T92A, Q6L30A, Q2U42A, Q2U17A, Q2T62A, Q2T63A, Q2T61A, Q2T60A, Q2U13A, Q2U14A, Q2U15A.
		Removed	SKUs removed in Ordering and Configuration section per old 8 socket system: H7B50B, H7B51B, H7B52B, H7B53B, H7B54B, H7B63A, H7B64A, H7B65A, H7B95A, H7B94A, H7B55B, H7B56B.
13-Feb-2017	From Version 6 to 7	Changed	Overview and Standard Features sections were updated.
		Added	SKUs added in Ordering and Configuration section: H7C27A, H7C28A, H7C29A, H7C30A, H7C31A, H7C32A, H7C17A, H7C18A, H7C19A, H7C20A, H7C21A, H7C22A, H7C10A, H7C11A, H7C12A, H7C13A, H7C14A, H7C15A, H7C16A, H7C23A, H7C24A, H7C25A.
28-Nov-2016	From Version 5 to 6	Changed	Overview, Standard Features, Ordering and Confguration, and Technical Specifications
		Added	SKUs added in Overview section: H7B99A H7C00A H7C01A, , H7C02A, H7C06A. H7C07A, H7C08A, H7C09A. H7B55B.,H7B56B.,H7B98A, ., H7B57B7B58B.
		Removed	Obsolete SKUS were deleted: Obsolete SKUS ere deleted: H7B50A, H7B51A, H7B52A, H7B53A,.H7B54A,. H7B55A, H7B56A,

Summary of Changes

			H7B57A, H7B58A.
05-Aug-2016	From Version 4 to 5	Changed	Overview, Ordering and Configuration, and Technical Specifications sections were updated.
		Removed	SKUs were deleted in Ordering and Configuration section: H7B87A, H7B68A, H7B52B, H7B51B, H7B94A, H7B63A, H7B64A, H7B65A, H7B95A, H7B67A, H7B55A, H7B97A, H7B78A, NOU73A, NOU75A, P9U94A.
06-Jun-2016	From Version 3 to 4	Changed	Overview, Standard Features, Services and Support, and Ordering and Configuration sections were updated.
		Added	SKUs added in Ordering and Configuration section: H7B96A, H7B50B, H7B51B, H7B52B, H7B53B, H7B54B, H7B94A, H7B95A, H7B97A, N0U73A, N0U75A.
		Removed	Obsolete SKU was deleted: **G6F48A,** H7B52A,
08-Abr-2016	From Version 2 to 3	Changed	Standard Features, Services and Support, Ordering and Configuration sections were updated.
		Added	SKUs added in Ordering and Configuration section: H7B52A, H7B63A, H7B64A, H7B65A, H7B67A, H7B55A, H7B68A, H7B78A, P9U94A, G6F48A.
		Removed	SKUs were deleted: H7B92A, H7B93A.
11-Mar-2016	From Version 1 to 2	Changed	Standard Features, Ordering and Configuration, and Technical Specifications sections were updated.
		Removed	SKUs were deleted: H7B73A, H7B77A.
16-Feb-2016	Version 1	Created	New QuickSpecs

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