Overview
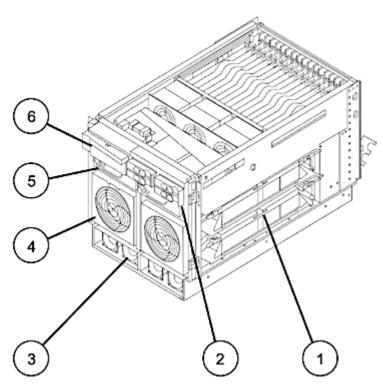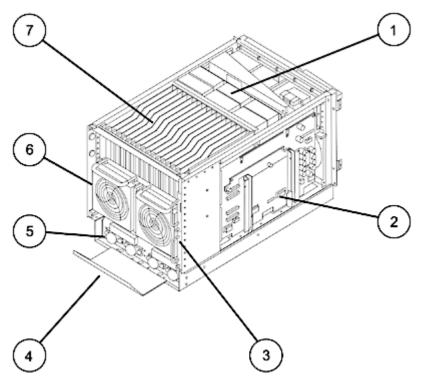

1. Cell Boards (2)
2. Hot-plug disks (4)
3. 2N redundant hot-swap system power (2)

4. N+1 redundant hot-swap fans (2)
5. 2 Independent PCI power supplies
6. Removable DVD or DAT

Overview

1. N+1 PCI cooling fans
2. System backplane (right side)
3. Core I/O
4. Power cord retention bracket

5. Dual-grid 2N redundant power inputs
6. Hot-swap redundant fans
7. 15 Hot-plug PCI-X slots

At A Glance

HP Integrity rx7640 Server Product Number (base system)
AB312A

Standard System Features

- HP-UX 11i v2 and HP-UX 11i v3 operating system
- Microsoft Windows Server 2003 Enterprise and Datacenter Editions
- Linux RHEL AS 5 and AS 4 and SLES 10 SP 1. Mad9M rx7640 configuration not supported.
- OpenVMS V8.3-1H1 or higher (for Montvale). Mad9M rx7640 configurations not supported.
- One External Ultra320 LVD SCSI channel (a second Ultra320 SCSI port is available if a Smart Array card is used to access internal disk drives)
- Four internal SCSI controllers
- Two GbE LAN ports (with auto speed sensing)
- Management Processor technology with Integrated LAN console
- 100Base-T Management LAN for LAN console
- Rack mountable into HP 19 inch cabinets (factory or field integration)
- Rack mountable into some third party cabinets
- One or Two hardware partitions (nPartitions)
- Factory integration of CPUs, memory, disk drives, removable media drives, and I/O cards
- HP site planning and installation
- One-year warranty with next business day on site service response
- Owner's Guide and General Usage media set

HP Integrity rx7640 Server Flexible Advantage Starter (FAST) Configurable Bundles

HP Integrity rx7640 Server Flexible Advantage Starter (FAST) Configurable Bundles

The Flexible Advantage STarter base systems for the HP Integrity rx7640 Server allow for faster configurations due to the semi configured system bundles. Configurations built from FAST base systems will have substantially lower prices than systems built from the parts.

HP Integrity rx7640 Server FAST Configurable Bundles

Product Number*	Number of dual core Itanium processors	Number of Cell Boards in bundle	Number of Core I/O Cards in bundle
AB447A	2 (2P/4C)	1	1
AB448A	4 (4P/8C)	1	1
AB449A	6 (6P/12C)	2	2
AB450A	8 (8P/16C)	2	2
*NOTE:Includes base chassis and power supplies.			

QuickSpecs

Standard Features

Minimum System	● One active core in a Dual core Itanium processor (1P/2C) ● One processor per cell board (Dual-core Itanium2 only requires one active core per cell board) ● One cell board ● 2-GB memory (1 pair of 1-GB DIMMs) ● One core I/O (included; not configurable) ● One internal DVD drive for OpenVMS and Windows ● Two power cords ● Seven hot plug 33-/66-/133-/266-MHz 64-bit PCI-X slots slots or seven mix of hot plug 64 bit PCI X and PCIe x8 IO slots with adaptive signaling technology
Maximum Server Capacities	● Eight Dual core Itanium processors (8P/16C) ● Four processors per cell board ● Two cell boards ● 256 GB memory (16 pairs of 8 GB DIMMs) ● Two core I/O ● Four power cords, providing 2N power and dual grid support ● Four internal hot-plug LVD SCSI disks ● One half-height removable media bay. Configure with one DVD+RW or (1) DAT (or optionally, two slimline DVD devices) ● 15 hot plug 33 /66 /133 /266 MHz 64 bit PCI X slots or 15 mix of hot plug 64 bit PCI X and PCIe x8 IO slots with adaptive signaling technology)
Standard System Features	● HP-UX 11i v2 and HP-UX 11i v3 operating system ● Microsoft Windows Server 2003 Enterprise and Datacenter Editions ● Linux RHEL AS 5 and AS 4 and SLES 10 SP 1. Mad9M rx7640 configuration not supported. ● OpenVMS V8.3-1H1 or higher (for Montvale). Mad9M rx7640 configurations not supported. ● One External Ultra320 LVD SCSI channel (a second Ultra320 SCSI port is available if a Smart Array card is used to access internal disk drives) ● Four internal SCSI controllers ● Two GbE LAN ports (with auto speed sensing) ● Management Processor technology with Integrated LAN console ● 100Base-T Management LAN for LAN console ● Rack mountable into HP 19 inch cabinets (factory or field integration) ● Rack mountable into some third party cabinets ● One or Two hardware partitions (nPartitions) ● Factory integration of CPUs, memory, disk drives, removable media drives, and I/O cards ● HP site planning and installation ● One year warranty with next business day on site service response ● Owner's Guide and General Usage media set

Standard Features

High Availability	- N+1 Hot-swap cooling - Redundant and hot-swap power supplies - Cell Hot-plug (implemented as dynamic nPars in HP-UX 11i v3) - Hot-plug disks 2N power inputs (redundant line cords/dual power grid support) - On-line memory page deallocation - ECC protected SyncDRAM memory - Full parity protection of data and address buses - On-chip CPU cache with ECC protection - Double Chip Spare - Dynamic Processor resilience and deallocation (CPU deallocation on failure) - On-line addition and replacement of PCI I/O cards - UPS power management - Three independent Ultra320 buses to internal disks for mirroring across disks and controllers - Journal file system (HP-UX) - Auto reboot - On line diagnostics and system health monitor - Microsoft Cluster Services for Microsoft Windows Server 2003 Enterprise and Datacenter Editions - HP StorageWorks Software for HP Integrity Servers running Windows Server 2003 Enterprise and Datacenter Editions. Includes Cluster Extension XP and EVA, Continuous Access, Business Copy and SQL Server Fast Recovery - HP OpenVMS Cluster Software
Security	- Separate console LAN port for system management - Password protection on console port - Disablement of remote console ports
Internet Server Functions	- Internet server (inetd) - Domain name server - Routing (OSPF, BIND, RIP, EGP, HELLO, gateD) - Network Time Protocol
Client Configuration Services	Automatic configuration for printers, PCs, workstations, and X terminals (DHCP, Bootp, tftp, rbootp)
Optional Web Services	- Netscape Communication Server - Netscape Navigator
Email	- Mail, MailX, ELM - Sendmail, MIME, SMTP, ESMTP
Remote Access Services	Telnet, ftp, anonymous ftp server

Configuration

The HP Integrity rx7640 Server is a symmetrical multiprocessing (SMP) server supporting up to eight high performance 64 bit Intel dual core Itanium processors (1.6 GHz 24 MB cache, 1.6 GHz 18 MB cache and 1.4 GHz 12 MB cache).

It also supports the new and improved sx2000 chip set. The rx7640 can be configured as a single SMP server or divided into two smaller, hardware-partitioned (nPars), logical servers.

Cell Boards	A minimum of one and a maximum of two cells can be ordered in an HP Integrity rx7640 Server. Each cell can be purchased with up to four active Intel Itanium dual core processors (Montecito or Montvale) or Intel single core Itanium single core processors, or in combination with Instant Capacity processors (future for dual core processors).

The HP Integrity rx7640 and HP Integrity rx8640 servers share the same cell board.
The rp7410/rp7420/rx7620 cell boards cannot be carried forward to the rx7640 server.

Cell Details	4 processor slots (supporting up to eight processor cores) - HP sx2000 cell controller 16 DDR-2 Memory DIMM slots - DC-DC Power converters - Manageability and Processor Dependent Hardware Circuitry

Cell Board Configuration Rules	- Cell boards are ordered individually - Minimum: 1 cell board - Maximum: 2 cell boards - Cell slot 1 must be loaded first

Intel Dual and Single core Itanium Details

Intel Dual-core Itanium 2 Details		
1.6-GHz - Level 3 cache: 24 MB - Level 2 cache: 1 MB instr + 256 KB data - Level 3 cache: 16 KB instr + 16 KB data - Single-bit cache error correction 44-bit physical addressing 64-bit virtual addressing 4-GB maximum page size	1.6 GHz - Level 3 cache: 18 MB - Level 2 cache: 1 MB instr + 256 KB data - Level 3 cache: 16 KB instr + 16 KB data - Single bit cache error correction 44 bit physical addressing 64 bit virtual addressing 4 GB maximum page size	1.4 GHz - Level 3 cache: 12 MB - Level 2 cache: 1 MB instr + 256 KB data - Level 3 cache: 16 KB instr + 16 KB data - Single bit cache error correction 44 bit physical addressing 64 bit virtual addressing 4 GB maximum page size

Configuration

Processor Configuration Rules

- The Intel Dual core Itanium processor consists of two processor cores. You may order and upgrade a Dual core Itanium processor in increments of one core (the second core in a processor being iCAP).
- The Intel Itanium 1.6 GHz processor consists of one processor core and can only be ordered or upgraded in pairs (two processors). This has been obsoleted and is only available for field upgrades.
- There must be at least two processor cores (single core Itanium processors) active (non iCAP) on each cell board.
- There must be at least one processor core active (the other core being iCAP) on each cell board.
- On each cell board, processors must be installed in the following sequence 0, 2, 1, 3
- HP Integrity rx7620 1.6 GHz 6 MB level 3 cache processors may be carried forward to rx7640 servers.
- Intel Single core Itanium processors and Intel Dual core Itanium processors can be mixed in the same chassis as long as they are in separate hard partitions (they require the same chipset, sx1000, or sx2000).

Memory Configuration

The memory DIMMs used in the HP Integrity rx7640 Server are sold in pairs and are custom designed by HP. Each DIMM contains DDR II chips with full ECC protection. DIMM sizes of 1 GB, 2 GB, 4 GB and 8-GB are supported (1-GB DIMMs will be obsoleted in Feb 2008). Each HP Integrity rx7640 Server cell board supports up to 16 DIMMs with 16 GB/s of peak memory bandwidth. HP 9000 rp7410/rp7420/rx7620 memory modules cannot be carried forward to the rx7640 server. The HP Integrity rx7640 and HP Integrity rx8640 servers share the same 2 GB, 4 GB, 8 GB and 16-GB memory products.

HP Integrity rx7640 Server Memory DIMMs

Pair Size (Product)	rx7640 Product Numbers	HP Integrity rx7640 Server Maximum Capacity Using 1 DIMM Size	DIMM Size
2 GB	AB453A	32 GB	1024 MB
4 GB	AB454A	64 GB	2048 MB
8 GB	AB455A	128 GB	4096 MB
16 GB	AB456A	256 GB	8192 MB

Memory Loading Rules

- Memory must be installed in pairs (2 DIMMs of equal size)
- Memory is available in four densities: 2 GB (2×1024MB), 4 GB (2×2048MB), 8 GB (2×4096MB) and 16 GB (2×8192MB).
- Minimum memory is 2 GB per cell
- Larger DIMMs must be loaded first across a cell, followed by progressively smaller DIMM sizes.
- Maximum memory per system is 256 GB-using sixteen 8 GB DIMM pairs per system.
- On each cell board, Memory Pairs must be installed in the following order:
  (0A, 0B), (1A, 1B), (2A, 2B), (3A, 3B), (4A, 4B), (5A, 5B), (6A, 6B),(7A, 7B)
- DIMM mixing other than recommended configurations is supported as long as the memory loading rules are followed.

rx7640 Recommended Memory Configurations

Configuration

Memory per Cell (GBs)	Number of DIMMs			Quad Echelon							
	1 GB	2 GB	4 GB	2	1	3	0	2	1	3	0
				OA, OB	1A, 1B	2A, 2B	3A, 3B	4A, 4B	5A, 5B	6A, 6B	7A, 7B
2	2			1 GB							
4	4			1 GB	1 GB						
8	6			1 GB	1 GB	1 GB	1 GB				
16	16			1 GB	1 GB	1 GB	1 GB	1 GB	1 GB	1 GB	1 GB
24	8	8		2 GB	2 GB	2 GB	2 GB	1 GB	1 GB	1 GB	1 GB
32		16		2 GB	2 GB	2 GB	2 GB	2 GB	2 GB	2 GB	2 GB
48			8	4 GB	4 GB	4 GB	4 GB	2 GB	2 GB	2 GB	2 GB
64			16	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB

Performance Tuning Guidelines

- For best performance, a cell should be configured with a multiple of eight DIMMs or four pairs (although the server will execute properly with an odd number of pairs). It takes eight DIMMs to populate both memory buses. Populating only one of the two memory buses on a cell board will deliver only half the peak memory bandwidth.
- Load memory equally across the available cell boards.

Memory Latencies

There are two types of memory latencies within the HP Integrity rx7640 Server:
1. Memory latency **within** the cell refers to the case where an application either runs on a partition that consists of a single cell or uses cell local memory.
2. Memory latency **between** cells refers to the case where the partition consists of two cells and cell interleaved memory is used. In this case 50% of the addresses are to memory on the same cell as the requesting processor, and the other 50% of the addresses are to memory of the other cell.

The HP Integrity rx7640 Server average memory latency depends on the number of CPUs in the partition. Assuming that memory accesses are equally distributed across all cell boards and memory controllers within the partition, the average idle memory latency (load to use) is as show below:

Number of processors Per Partition	Average Memory Latency
4- processor (single cell)	~185 ns
8- processor (two cell)	~249 ns

Configuration

I/O Architecture	Components within the I/O subsystem are the I/O controllers, internal peripheral bay, and multifunction Core I/O. The figure below shows the basic block diagram of the I/O subsystem. The HP Integrity rx7640 Server I/O architecture utilizes industry standard PCI X buses in a unique design for maximum performance, scalability, and reliability.

TThe HP Integrity rx7640 Server contains two master I/O controller chips located on the PCI X backplane. Each I/O controller contains 16 high performance, 12 bit wide links; these links connect to 18 slave I/O controller chips supporting the PCI card slots and core I/O. In the HP Integrity rx7640 Server, two links, one from each master controller, are routed through the system backplane and are dedicated to core I/O. The remaining 30 links are divided among the sixteen (133 MHz; 64 bit and 266 MHz; 64 bit) PCI X card slots, with each slot on a PCI bus by itself. This one card per bus architecture leads to greater I/O performance, better error containment, and higher availability.

Each controller chip is also directly linked to a host cell board. This means that both cell boards must be purchased in order to access all 15 available I/O card slots. (With only one cell board, access to seven slots is enabled.)

The HP Integrity rx7640 Server can be purchased with either one or two core I/O board sets. Each Core I/O product contains two boards, a MP/SCSI, and a LAN/SCSI card. The core I/O boards provide console, Ultra320 SCSI, Gigabit LAN, and management processor functionality. If you opt for the second core I/O board set, it can be used to enable dual hard partitioning (nPars) in the HP Integrity rx7640 Server and to provide access to a second set of disk drives. Two cell boards and access to all I/O slots are available to the server with one core I/O board set.

The LAN/SCSI card provided with each Core I/O product occupies one of the sixteen PCI slots. Since there must always be at least one Core I/O board set, the HP Integrity rx7640 Server has fifteen available PCI X slots for expansion cards. If the second Core I/O product (board set) is purchased, there are fourteen remaining slots available for cards.

The internal peripheral bay supports up to four low profile disks and one removable media device (one removable media device can be configured with one DVD+RW or one DAT (or optionally, two slimline DVD modules). The internal disks are electrically divided into two pairs. SCSI controller chips located on each core I/O board set supports each pair of internal disks. This means that you must have both core I/O board sets in order to access both halves of the peripheral bay.

PCI Backplane	Eight of sixteen I/O card slots are supported by dual high performance fat links. Each link is capable of ~2 GB/s of bandwidth. Six of the sixteen I/O card slots are supported by dual high-performance links. Each link is capable of providing 1060 of bandwidth. This means that half of HP Integrity rx7640 Server I/O slots are capable of sustained 2.12 GB/s. Aggregate I/O slot bandwidth is ~23 GB/s. In addition, because each I/O slot has a dedicated bus, any slot can be "hot-plugged" or serviced without affecting other slots. The hot plug operation is very easy, and can be done with minimal training and effort.

Supported I/O Cards for HP-UX, Windows, Linux, and OpenVMS

Supported HP-UX I/O Cards					
I/O Card	Product Number	First HP-UX Release / Boot Support	Connector Type(s)	Hot Plug / Factory Integration	Maximum Cards/Ports
Mass Storage Host Bus Adapters					

Configuration

PCI 1 port 2x Fibre Channel	A5158A	11.00/No	Duplex SC	Yes/No	15/15
PCI 2 GB Fibre Channel	A6795A	11.00/Yes	LC	Yes / Yes	15/15
PCI 1 port 4 Gb Fibre Channel	AB378B	11i/Yes	LC	Yes / Yes	15/15
PCI 1 port 4 Gb Fibre Channel	AB378A	11i/Yes	LC	Yes / Yes	15/15
PCI 2 port 4 Gb Fibre Channel	AB379B	11i/Yes	LC	Yes/No	15/15
PCI 2 port 4 Gb Fibre Channel	AB379A	11i/Yes	LC	Yes/No	15/15
PCI 1 channel Ultra160 SCSI	A6828A	11.00/Yes	VHDCI	Yes/No	15/15
PCI 2 channel Ultra160 SCSI	A6829A	11.00/Yes	VHDCI	Yes/No	15/30
Dual Channel Ultra320 SCSI Adapter	A7173A	11i/Yes	VHDCI	Yes / Yes	15/30
PCI X 2 channel 2 Gb/s Fibre Channel	A6826A	11i/Yes	LC (SFF)	Yes / Yes	15/30
PCI-X 2-channel Smart Array 6402	A9890A	11i/Yes	VHDCI	Yes / Yes	8/16
PCI-X 4 channel Smart Array 6404/256-MB	A9891A	11i/Yes	VHDCI	Yes / Yes	8/32
Local Area Network Interface Cards					
PCI-X 1-port 10-Gb Ethernet Fiber Adapter	AB287A	11iv2 / Yes	Duplex LC	Yes / Yes	2/2
PCI-X 4-port 1000Base-T Gigabit Adapter	AB545A	11iv2 / Yes	RJ-45	Yes / No	15/60
PCI-X 1-port 1000Base-SX	AD332A	11i/Yes	Duplex SC	Yes / Yes	15/15
PCI-X 1-port 1000Base-T	AD331A	11i/Yes	Duplex SC	Yes / Yes	15/15
PCI 1-port 1000Base-SX	A4926A	11.00 / No	Duplex SC	Yes / Yes	15/15
PCI 1-port10/100Base-T	A5230A	11.00 / No	RJ-45	Yes / Yes	15/15
PCI 1-port1000Base-T	A4929A	11.i / No	RJ-45	Yes / Yes	15/15
PCI 4-port 10/100Base-T	A5506B	11.00 / No	RJ-45	Yes / Yes	15/60
PCI Dual port 1000BaseSX	A7011A	11iv2/Yes	Duplex SC	Yes / Yes	15/30
PCI Dual port 1000Base-T	A7012A	11iv2/Yes	RJ-45	Yes / Yes	15/30
PCI-X 2-port 4X Fabric HCA (HPC)	AB286A	11iv2 / No	4x Infiniband Copper	Yes / No	2/4
PCI-X 2-port 4X Fabric HCA (HPC)	AB286B	11iv2/No	4x Infiniband Copper	Yes/No	2/4
PCI-X 2-port 4X Fabric (HPC and DB) Adapter	AB286C	11iv2/No	4x Infiniband Copper	Yes / Yes	15/30
Multi-Function Cards (Mass Storage / LAN)					
PCI 2 port 100Base T / 2 port Ultra2 SCSI	A5838A	11.00 / No	VHDCI/RJ-45	Yes / No	15/60
PCI X 2 Gb Fibre Channel/1000Base SX	A9782A	11i / Yes	LC (SFF) / LC GigE	Yes / Yes	15/30
PCI-X 2-Gb Fibre Channel, 1000Base-T	A9784A	11i / Yes	1LC / 1 RJ-45	Yes / Yes	15/30
PCI-X 2-port 2Gb FC/ 2-port 1Gb Ethernet	AB465A	11iv2 / Yes	2 LC/2 RJ-45	Yes / Yes	15/60
PCI-X 2-port 1000BT/2-port U320 SCSI	AB290A	11i / Yes	2 LC GigE/2 RJ-45	Yes / Yes	15/60
Wide Area Network Interface Cards					
2-port Programmable Serial Interface (PSI) X.25/Frame Relay/SDLC	J3525A	11.00 / No	RS-530, RS-232, V.35, RS-449 or X.21	Yes / Yes	15/30
Additional Interface Cards					
PCI 8-port Terminal Multiplexer	A6748A	11.00 / No	RS-232	Yes / No	15/120

Configuration

PCI 64-port Terminal Multiplexer	A6749A	11.00 / No	RS-232 or RS-422	Yes / No	15/960
Hyperfabric2 Fiber Adapter	A6386A	11.00 / No	LC Duplex	Yes / Yes	4/4
PCI Obsidian 2 USB Adapter	A6869B	11iv2/Yes		Yes / Yes	15/15

Supported Windows I/O cards					
I/O Card	Product Number	Special Notes	Connector Types(s)	Hot Plug / Factory Integration	Maximum Cards/Ports
Mass Storage Host Bus Adapters					
PCI Windows and Linux Ultra160 SCSI	A7059A[1]		VHDCI	Yes / Yes	6/6
PCI Windows and Linux 2 channel Ultra160 SCSI	A7060A[1]		VHDCI	Yes / Yes	6/12
PCI 2 Channel Ultra 320 SCSI Adapter	A7173A		VHDCI	Yes / Yes	6/12
PCI-X Smart Array P600 Serial Attached SCSI (SAS) Controller	337972-B21	External Storage Only RAID 0, 1, 1+0, 5 & 6(ADG)	SFF8470	Yes/Yes	8/32[2]
PCI-X SmartArray 6402/128 MB	A9890A[1]	Internal Storage: RAID 0, 1 & 1+0 External Storage: RAID 0, 1, 1+0, 5 & 6(ADG)	VHDCI	Yes / Yes	8/16
PCI-X SmartArray 6404/256 MB	A9891A	Internal Storage: RAID 0, 1 & 1+0 External Storage: RAID 0, 1, 1+0, 5 & 6(ADG)	VHDCI	Yes / Yes	8/32
PCI X Smart Array 6402 128MB - factory integrated for a RAID 1 array	AB362A	Must order 2 identical HDDs in the hard partition	VHDCI	Yes / Yes	8/16
PCI-X Smart Array 6404 256-MB	AB363A	Must order 2 identical HDD's in the hard partition	VHDCI	Yes / Yes	8/32
Emulex 4Gb PCI-X Fibre Channel HBA	AD167A		LC	Yes / Yes	8/8
Emulex 4Gb PCI-X Fibre Channel, Dual Channel HBA	AD168A		LC	Yes / Yes	6/12
PCI X 2 GB /s FCA2404 Fibre Channel	AB232A[1]		LC	Yes / Yes	12/12
PCI-X 2 channel 2-GB / s Fibre Channel	AB466A		LC	Yes / Yes	8/16
PCI-C 1 channel 2-GB /s Fibre Channel	AB467A		LC	Yes / Yes	12/12

Configuration

PCI-X 266-MHz 1-channel 4-Gb/s Fibre Channel	AB429A		LC	Yes/Yes	8/8
PCI-X 266-MHz 2-channel 4-Gb/s Fibre Channel	AB379A		LC	Yes/Yes	6/12
PCI-X 266-MHz 2-channel 4-Gb/s Fibre Channel	AB379B		LC	Yes/Yes	6/12
Local Area Network Interface Cards					
PCI 2-port Windows / Linux 1000Base-TX	A9900A		RJ-45	Yes / Yes	8/16
PCI 2-port Windows / Linux 1000Base-SX	A9899A		LC	Yes / Yes	8/16
PCI 1-port 1000Base-T	A7061A		RJ-45	Yes / Yes	12/12
PCI 1-port 1000Base-SX	A7073A		Duplex SC	Yes / Yes	12/12
PCI-X 1-port 10 GbE	AD144A		Duplex LC	Yes/Yes	4/4
Additional Interface Cards					
Graphics/USB Card – Optional; Max 1 per partition	A6869B	Max 1 per Partition		No / Yes	2 / 2

[1] I/O card supported, but not orderable with system
[2] For Windows, each 337972-B21 external port supports a maximum of two (2) MSA 50s, attached in series.

Supported Linux cards

I/O Card	Product Number	Special Notes	Connector Type(s)	Hot Plug/ Factory Integration	Maximum Cards/Ports
Mass Storage Host Bus Adapters					
PCI-X 2-port 4Gb Fiber Channel Adapter	AB379A		LC	No/Yes	8/16
PCI-X 4-Gb Fiber Channel Adapter	AD167A		LC	No/Yes	8/8
PCI-X Dual channel 4 Gb Fiber channel Adapter	AD168A		LC	No/Yes	8/16
PCI-X 4-Gb Fiber channel Adapter	AB429A		LC	No/Yes	8/8
PCI-X Smart Array P600 Serial Attached SCSI (SAS) Controller[1]	337972-B21	External Storage Only	SFF8470	No/Yes	8/8
PCI-X 2 channel Smart Array 6402 128 MB	A9890A		VHDCI	No/Yes	8/16
PCI-X Dual-channel Ultra320 SCSI Adapter	A7173A		VHDCI	No/Yes	8/16
Local Area Network Interface Cards					
PCI 1-port 1000Base T	A7061A		RJ 45	No/Yes	8/8
PCI 1-port 1000Base SX	A7073A		Duplex SC	No/Yes	8/8
PCI Windows/Linux 2-port 1000Base-SX	A9899A		Duplex SC	No/Yes	8/16
PCI Windows/Linux 2-port 1000Base-T	A9900A		RJ-45	No/Yes	8/16

Configuration

PCI Windows/Linux 10-GbE SR (133 MHz)	AD144A		Duplex SC	No/Yes	2/2
Combination Adapters (Mass Storage\LAN)					
PCI-X 2-port U320 SCSI/ 2-port 100 base-T	AB290A			No/Yes	8/32

Supported OpenVMS Cards

I/O Card	Product Number	Special Notes	Connector Type(s)	Hot Plug/ Factory Integration	Maximum Cards/Ports Per Partition
Mass Storage Host Bus Adapters					
PCI X 2 channel 2 Gb/s Fibre Channel	A6826A	Bootable	LC (SFF)	No/Yes	8/16
PCI 2 channel Ultra320 SCSI Adapter	A7173A	Bootable	VHDCI	No/Yes	2/4
PCI 1 port 4 Gb Fibre Channel	AB378A	Bootable	LC	No/Yes	8/8
PCI 1 port 4 Gb Fibre Channel	AB378B	Bootable	LC	No/Yes	8/8
PCI 2 port 4 Gb Fibre Channel	AB379A	Bootable	LC	No/Yes	8/16
PCI 2 port 4 Gb Fibre Channel	AB379B	Bootable	LC	No/No	8/8
PCI X 2 channel Smart Array 6402	A9890A	Bootable	VHDCI	No/Yes	2/4
PCI X 4 channel Smart Array 6404 256 MB	A9891A	Bootable	VHDCI	No/Yes	1/4
Multi function Cards (Mass Storage/LAN)					
PCI X 2 port 2 Gb FC/2 port 1 Gb Ethernet	AB465A	FC Bootable	2 LC/2 RJ-45	No/Yes	2/8
PCI X 2 port 1000Base T/2 port Ultra320 SCSI	AB290A	SCSI Bootable	2 LC GigE/2 RJ-45	No/Yes	2/8
PCI X 2 Gb Fibre Channel, 1000Base SX	A9782A	FC bootable	LC (SFF)/LC GigE	No/Yes	4/8
PCI X 2 Gb Fibre Channel, 1000Base T	A9784A	FC bootable	1LC/1 RJ-45	No/Yes	4/8
PCI-X 1-port 4-GB FC/1-port 1000Base-T	AD193A	FC bootable	1 LC/1 RJ-45	No/Yes	2/2
PCI-X 2-port 4-GB FC/2-port 2-Gb 1000Base-T	AD194A	FC bootable	2 LC/2 RJ-45	No/Yes	2/4
Local Area Network Interface Cards					
PCI X 1 port 10 Gb Ethernet Fiber Adapter	AB287A		Duplex SC	No/Yes	2/2
PCI X 4 port 1000Base T Gigabit Adapter	AB545A		RJ-45	No/Yes	3/12
PCI-X 1-port 1000Base-T	AD331A		Duplex SC	No/Yes	8/8
PCI-X 1-port 1000Base-SX	AD332A		Duplex SC	No/Yes	8/8
PCI X 2 port 1000Base SX	A7011A		Duplex LC	No/Yes	8/16
PCI X 2 port 1000Base T	A7012A		RJ-45	No/Yes	8/16

Configuration

Additional Interface Cards					
Graphics/USB Card	A6869B	USB Support only, DVD bootale	USB	No/No	1/2

Integrity Integrated Lights Out (iLO-2) Management Processor Functionality for sx2000-based servers	*Lights-Out remote management port with both HP9000 command line interface and new iLO-2 web GUI interface.* iLO-2 standard features are part of the iLO-2 management processor. iLO-2 Advanced Features are added with optional PCI card per managed partition (option AD307A)

Standard Features:

- DB 25 serial port-multiplexed (using W cable) into three RS 232 ports: local ASCII console, remote/modem console, and general purpose
- Password protected console ports
- Console mirroring between all local, modem, LAN, and web consoles
- Remote power up and power down control, per OS partition
- Configurable remote access control
- Interface to system monitoring and diagnostic hardware via an internal IC bus
- System Event logs and event notification to system console-Provides connectivity, information, and support for HP UX tools (such as STM and EMS) to notify by email, pager and/or HP response centers.
- Integration with HP management tools such as Systems Insight Manager
- Secure Sockets Layer security on web console
  (LDAP is not yet available for this product)

Advanced Features, available through Integrity Lights Out Advanced / KVM card (option AD307A):	- Physical VGA/USB 2.0 - Integrated Remote Console (virtual Keyboard Video Mouse) - Virtual Media USB 1.1 Card provides one physical VGA port and two physical USB ports, should be used instead of graphics/USB option A6869A. One card should be installed in each nPar where additional management features are required. Card cannot be used in systems without iLO-2 management processor firmware installed.

AD307A card Integrated Remote Console (virtual Keyboard Video Mouse) and virtual Media (read-only CD/DVD/ISO file) support per OS:

Operating System	Integrated Remote Console (vKVM)	Virtual Media
HP UX	not supported	supported
Windows	supported	supported
Linux	not supported	not supported
OpenVMS	not supported	supported
VGA port is supplied by an ATI ES1000 controller. Supported resolutions and refresh rates include:		
Operating System	Refresh Rate	Maximum Resolution
Windows	75 Hz	640x480
Windows	75 Hz	800x600
Windows	75 Hz	1024x768
Windows	75 Hz	1280x1024
Windows	60 Hz	1600x1200

Configuration

External Server Storage Connectivity

HP has the broadest, most robust server and storage line-up in the industry, providing exactly the right fit for every need. Refer to the Storage-Server matrix to see a matrix that highlights which storage device, server and operating system is interoperable.

Integrated Multifunction Core I/O

The HP Integrity rx7640 Server chassis supports up to two core I/O board sets. Each board set contains two cards (MP/SCSI and LAN/SCSI), which are installed in different locations. MP/SCSI cards are installed along the right rear vertical edge of the chassis. The LAN/SCSI cards are installed in the PCI card bay. The first core I/O board set will support up to two cell boards in the server and all I/O slots. For support of two hard partitions or for support of the third and fourth integrated disk drive, a second core I/O board set is required in the host system.

HP Integrity rp7410/rp7420/rx7620 Core I/O cards cannot be carried forward to the HP Integrity rx7640 server.

Both Core I/O board sets are identical. The "primary" and "secondary" Core I/O LAN/SCSI board is supported by a 530 MB/s link. In addition, in the "primary" core I/O, a SCSI controller from both the LAN/SCSI board and MP/SCSI board each support a single internal disk drive.

Each HP Integrity rx7640 Server core I/O board set provides the following features:

- Management Processor: The management processor (MP), located on each MP/SCSI card, is a dedicated processor that simplifies and extends system management, and also enhances serviceability. The MP minimizes or eliminates the need for the system administrator to be physically at the system to perform tasks such as diagnostics, system management, or even hard resets. Here are some of the features enabled by the HP Integrity rx7640 Server management processor:
  - System management over the Internet or Intranet (telnet or web)
  - System console redirection
  - Console mirroring
  - System configuration for automatic restart
  - Viewing history log of system events
  - Viewing history log of console activity
  - Setting MP inactivity timeout thresholds
  - Remote system control
  - Remote power cycle (except for MP housekeeping power)
  - Viewing system status
  - Event notification to system console, e mail, pager, and/or HP Response Centers
  - Automatic hardware protection of critical environmental problems
  - Access to management interface and console(s) on LAN failure (modem required)
  - Remote resetting of hardware partitions
  - Forward progress indicator (Virtual front panel)
  - Out of band Manageability and PDC firmware update
  - Configure manageability and console security
  - SSL
- External Management LAN port: 10/100Base T LAN port using an RJ 45 connector.
- One External SCSI ports: Ultra320 LVD SCSI port for connections to mass storage or media. (A second U320 external port only available when internal drive off of LAN/SCSI is connected to Smart Array).
- Two External 1GbE LAN ports.
- Access to internal peripheral bay: The HP Integrity rx7640 Server internal peripheral bay is located at the top front of the system chassis. The peripheral bay holds up to four low profile hot plug

Configuration

disks and one half height removable media device (One half height bay supports two devices in the case of optional slim line DVD's). Each HP Integrity rx7640 Server core I/O board set contains dual channel Ultra320 SCSI controller chips that support the SCSI devices in the internal peripheral bay. Each core I/O board set supports two internal disks. It is important to note that separate controllers and SCSI busses manage the two disks supported by the primary and secondary core I/O set (This is a change from the previous architecture in sx1000 based servers). If use of more than two internal disks is needed, the HP Integrity rx7640 Server will require both core I/O sets.

Core I/O Loading Rules

- Minimum of one Core I/O board set (primary) must be purchased with each HP Integrity rx7640 Server
- Load the Primary (1) MP/SCSI board into slot 1 and the LAN SCSI board into I/O cabinet 1 (slot 8).
- MP/SCSI slot 0 and I/O cabinet 0 corresponds to Cell Board slot 0. MP/SCSI slot 1 and I/O cabinet 1 corresponds to Cell Board slot 1.
- A cell board must be installed in slot 0 to enable use of Core I/O 0. Likewise, a cell board must be installed in slot 1 to enable use of Core I/O 1.
- Access to two internal disk drives and one half height removable media bay is enabled with the installation of the first Core I/O board set (Primary).
- The optional second Core I/O board set (secondary) must be ordered to enable hardware partitioning
- The optional second Core I/O board set (secondary) must be ordered to enable access to the third/fourth internal disks
- The optional second core I/O board set (secondary) must be ordered to enable using the optional slim line DVD's.

Internal Disk Drives   HP Integrity rx7640 Server supports up to four internal low profile hot plug disk drives.

Internal Disk Drive Specifications

Product Number	Disk Capacity	Rotational speed	Average seek time (read/write)	Sustained Bandwidth
AD146A	36 GB	15,000 RPM	3.6 msec (read); 3.9 msec (write)	75 MB/s
AD147A	73 GB	15,000 RPM	3.6 msec (read); 3.9 msec (write)	75 MB/s
AD148A	146 GB	10,000 RPM	4.7 msec (read); 5.2 msec (write)	69 MB/s
AD149A	300 GB	10,000 RPM	4.7 msec (read); 5.2 msec (write)	69 MB/s
AD210A	146 GB	15000 RPM	3.6 msec (read); 3.9 msec (write)	75 MB/s
AD265A	300 GB	15000 RPM	3.6 msec (read); 3.9 msec (write)	75 MB/s

HP Integrity rp7410/rp7420/rx7620 disk drives can be carried forward to the HP Integrity rx7640 server.

Configuration

For HP UX:

- Supported by MirrorDisk/UX across disk drives, controllers, and core I/O boards
- Must order the second Core I/O board set to support more than two internal disk drives

For Windows:

- An rx7640 customer need only order AB362A 0D1 in order to receive an SA6402 Smart Array card cabled and configured for RAID 1 mirroring in the factory. The AB362A product includes both the SA6402 Smart Array Card (A9890A) and the internal RAID cables (AB338A).
- An rx7640 customer need only order AB363A 0D1 in order to receive an SA6404 Smart Array card cabled and configured for RAID 1 mirroring in the factory. The AB363A product includes both the SA6404 Smart Array Card (A9891A) and the internal RAID cables (AB338A).
- The customer is limited to maximum of one AB362A or AB363A per partition.
- The customer may order additional Smart Array controllers as add in cards for connection to external storage devices. When these products are ordered with option 0D1 they will be installed, but will not be connected to the internal HDDs. The supported Smart Array products (for external storage) on rx7640 are:
  - A9890A - SA6402
  - A9891A - SA6404
  - 337972-B21 - SA P600

Internal Removable Media

- HP Integrity rx7640 Server contains one half-height removable media bay, which will support either a DVD+RW or DAT 72 drive or two slimline DVD+RW drives. Removable media drives are not hot plug capable.
- DVD+RW drive provides enhanced features while preserving backward read compatibility with CD ROM. Data transfer rates of up to 6.75 MB/s are achieved with the DVD format; 4.8 MB/s can be achieved with the CD format.
- A DVD drive is required for all OpenVMS and Windows configurations.
- DAT drive has a maximum storage capacity of 72 GB with a peak transfer rate of 21.6 GB/hour compressed.
- HP Integrity rp7410/rp7420/rx7620 removable media drives can be carried forward to the HP Integrity rx7640 servers

Internal Removable Media Specifications

Product Number	Device	Capacity	Data transfer rate
AB351B[1]	DVD+RW		
AB400A	DAT	72 GB	
AD013A[2]	Two slimline DVD+RW		
[1]Third party software (not included with AB351B) is required to support DVD write capability with Windows.			
[2]The slimline DVD's require the second core I/O set.			

I/O Configuration Rules The following table summarizes previously mentioned configuration rules pertaining to usage of I/O slots and internal peripherals.

Configuration

	Minimum Requirement	
Configuration	Minimum Number of Cells	Minimum Number of Core I/Os
>7 I/O card slots or access to both I/O card bays	2	1
>2 internal disks or access to both pairs of disks	2	2
1 Internal half height Removable Media	1	1
2 Hard Partitions	2	2
2 Internal slim line DVD's	2	2

External Storage

HP has the broadest, most robust server and storage line up in the industry, providing exactly the right fit for every need. Refer to the Storage-Server matrix to see a matrix that highlights which storage device, server and operating system is interoperable.

AC/DC Power

DC Power Supplies

The HP Integrity rx7640 Server comes with two power supplies that provided dual grid (2N) protection. The hot swap design allows for the replacement of a failed power supply without interrupting server operation. All four power cords must be utilized to fully enable power supply hot swap. HP Integrity rp7410/rp7420/rx7620 DC power supplies can be carried forward to the HP Integrity rx7640 server

PCI Power Supplies

PCI power supply is now a redundant N+1 design. One PCI power supply failure will not affect the I/O bay since the remaining PCI power supply will power both I/O bays (this is an upgrade from the sx1000 based systems). PCI power supplies are hot swap capable (this is an upgrade from the sx1000 based systems). HP Integrity rp7410/rp7420/rx7620 PCI Power Supplies cannot be carried forward to the HP Integrity rx7640 server.

AC Power

The HP Integrity rx7640 Server contains four C20 power receptacle ports located at the bottom rear bulkhead. A minimum of two power cords must be used to maintain normal operation of the HP Integrity rx7640 Server. A second set of two cords can be added to improve system availability by protecting, for example, against power grid failures, accidentally tripped circuit breakers, or a failed power supply. The HP Integrity rx7640 Server hardware is capable of receiving AC input from two different AC power sources. The objective is to maintain full equipment functionality when operating from power source A and power source B or A alone or B alone. This capability is called "fault tolerant power compliance".

Although many HP Integrity rx7640 Server configurations can be sufficiently powered from a single 16 /20 amp branch circuit, the optimum configuration is to use one 16 amp (minimum) branch circuit per power cord. Due to the variety of 16/20 plugs used throughout the world, the HP Integrity rx7640 Server Ordering Guide offers a choice of plug options.

AC Power Consumption

The HP Integrity rx7640 Server power consumption will vary greatly depending on the hardware configuration and the input line voltages supplied at customer sites. Because of the disparity of line voltages throughout the world it's best to represent power consumption in VA (Volt Amperes). With power consumption being of high concern throughout the world, it's necessary to specify consumption in a couple of different ways.

Maximum Theoretical Power: or "Maximum Configuration" (Input power at the ac input expressed as Volt-Amps to take into account Power factor correction.)
The calculated sum of the maximum worst case power consumption for every subsystem in the server. This number will NEVER be exceeded by a functioning server for any combination of hardware and

Configuration

software under any conditions.

Marked Electrical Power: (Input power at the ac input expressed as Volt-Amps.)
The server Marked Electrical Power is the rating given on the chassis label and represents the input power required for facility ac power planning and wiring requirements. This number represents the expected maximum power consumption for the server based on the power rating of the bulk power supplies. This number can safely be used to size ac circuits and breakers for the system under all conditions.

Typical Maximum Power: or User Expected Maximum Power, "Typical Configuration" (Expressed as Volt-Amps.)
The measured maximum worst case power consumption. This number represents the larges power consumption that HP engineers were able to produce for the server with any combination of hardware under laboratory conditions using aggressive software applications designed specifically to work the system at maximum load. This number can safely be used to compute thermal loads and power consumption for the system under all conditions.
For further power consumption details, see the HP Integrity rx7640 Installation manual.

Configuration

HP Integrity rx7640 Server Fully Loaded Configuration

- 8 Intel Dual core Itanium processors or 1.6 GHz Single core Itanium processors
- 64 GB of memory
- 14 PCI cards
- 2 cell boards
- 4 internal hard drives
- 1 DVD drive
- 2 core I/O board sets
- 2 bulk power supplies.
- Typical maximum power: 2171 VA (2128 W) (10.9 A @ 200 VAC across two cords)
- Marked Electrical for the server: 2640 VA (12A @ 220 VAC across two cords)
- Marked Electrical per line cord: 1320VA (6A @ 220 VAC across each cord)
- Maximum Theoretical Power: 3231 VA (3166 W)

HP Integrity rx7640 Server Average Configuration

- 4 Intel Dual core 1.6-GHz Itanium processors or four 1.6 GHz Intel Single core Itanium processors
- 10 GB of memory
- 5 PCI cards
- 2 cell boards
- 2 internal hard drives
- 1 DVD drive
- 1 core I/O board set
- 2 bulk power supplies
- Typical power consumption: 1100 VA (5.5 A @ 200 VAC across two cords)

Configuration

Power Distribution Units　　**60-amp Power Distribution Unit-**

- AF916A (NA/JPN) and AF917A (International) - supported in 10KG2 rack
- E7683A (US) and E7684A (International) - supported in Rack System E

Customers who prefer the fewest higher amperage connections from their ac line current source to the HP Integrity rx7640 Server can use the 60 amp power distribution unit (PDU). The AF916A & AF917A PDU's contain 12 C19 outlets. The E7683A & E7684A PDU's contain 8 C19 outlets. For more details on PDU's, please see PDU sales collateral. This PDU is sold separately and can be ordered with any HP server solution.

The maximum amperage is 60 amps through the entire PDU and 20 amps per breaker. Both limits must be met. If each 60 amp PDU can support up to four HP Integrity rx7640 servers if the PDU is not mounted in the same rack. Up to three HP Integrity rx7640 servers can be supported if the PDU is mounted within the same rack.

For redundant power inputs, the second set of cords is added. If the second PDU is plugged into a second grid this configuration provides protection against:

- Losing power from a single power grid
- Accidental tripping of one or two circuit breakers
- Accidental disconnect of a single PDU power cord
- Accidental disconnect of up to four (two from each system) system power cords

30 amp Power Distribution Unit-

- 252663-D74 (NA/JPN) and 252663-B33 (International)- supported for 10K G2 rack
- E7681A (North America/JPN) and E7682A (International)- supported with Rack System E

A 30 amp Power Distribution Unit (PDU) is also supported with HP Integrity rx7640 Server. Rack configurations consisting of peripherals and only one HP Integrity rx7640 Server will likely be best supported with the 30 amp PDU. This PDU is sold separately and can be ordered with any HP server solution.

Unlike the 60 amp PDU, each 30 amp PDU can only support one HP Integrity rx7640 Server. The following configuration guidelines apply when using the 30 amp PDU:

- A0 and A1 or B0 and B1 cords should never be plugged into the same PDU
- Use two 30 amp PDUs to achieve input power redundancy (plugging A0/A1 and B0/B1 into separate PDUs).
- Ordering tools will not force the purchase of a second PDU for input power redundancy. A second PDU must be manually selected if redundant input power is desired.

Configuration

Partitioning

A hardware partition corresponds roughly to a single, standalone system. Each HP Integrity rx7640 Server can be subdivided into two partitions, each containing one cell that has minimal shared resources with the other cell (partition). Special programmable hardware in the cells defines the boundaries of a partition in such a way that the isolation is enforced from the actions of other partitions. Each partition runs its own independent instance of the operating system (HP UX 11i v2/v3, Windows, Linux, or OpenVMS). Applications cannot span partitions since each partition runs its own instance of the OS, essentially functioning as a stand alone server. However, different partitions may be executing the same or different revisions of an operating system, or they may be executing different operating systems altogether (such as HP UX, Windows, Linux, or OpenVMS), with OS availability.

Each partition has its own independent CPUs, memory and I/O resources consisting of the resources of the cells that make up the partition. Resources may be removed from one partition and added to another without having to physically manipulate the hardware just by using commands that are part of the System Management interface. With a future release of HP UX, using the related capabilities of dynamic reconfiguration (e.g. on line addition, on line removal), new resources may be added to a partition and failed modules may be removed and replaced while the partition continues in operation.

Partitioning the resources of the complex in this way makes it easy to run multiple application environments on the same physical system; you can allocate physical resources and tune the operating system running on each partition depending on the needs of the application (or the most important application) you intend to run on it. Alternatively, you can configure the HP Integrity rx7640 Server as a single partition, allowing all the resources to be focused on a single set of tasks, for example a large online transaction processing application.

You can increase or reduce the processing power of a partition by adding or deleting cells (at this release, you must shut down the operating system running on the affected partition(s) before moving cells, and before configuration changes will take effect). Though the OS might include commands for some configuration tasks, HP recommends you use the Partition Manager (parmgr) to configure partitions.

The current release of HP Integrity rx7640 Server/HP UX 11i v2 supports hardware partitioning. Hardware based partition configuration changes may require a reboot of the partition depending upon the configuration change. The reboot of the partition only affects the partition that is being reconfigured. The other partition defined in the chassis is not affected and will continue to execute without interruption. In a future HP UX release, dynamic hard partitions will be supported. Dynamic partitions imply that partition configuration changes do not require a reboot of the partition.

The HP Integrity rx7640 Server can be divided into two independent hardware partitions. In a partitioned configuration, system resources such as cell boards, I/O slots, core I/O, and disks, are evenly split between the two partitions (the removable media device is dedicated to partition 1). There is no flexibility to otherwise divide these components. For example, it is not possible to include 12 I/O slots in partition 0 and 4 I/O slots in partition 1; the split must be even.

The table below summarizes the resource split between hardware partitions.

	Cells (required)	I/O slots	Core I/O (required)	Disk/Media Bays
Partition 0	Cell 0	7	1	2/0
Partition 1	Cell 1	7	1	2/1

Configuration

Software Partitioning

HP Integrity rx7640 servers support virtual partitioning (vPars) to the single processor level similar to support on HP 9000 servers with HP UX 11i v1. With vPars, a user will be able to support up to four separate virtual partitions each with an instance of HP UX within each hard partition. VPars will provide many of the features of nPars but without the electrical isolation and support for hardware failures that nPars provides.

HP Virtual machines is supported on the rx7640 server. HP Virtual Machines:

- increases server utilization
- enables server consolidation
- provides rapid deployment of new environments (a requirement for test and development environments)
- enhances the HP Virtual Server Environment by providing soft partitioning with shared I/O, sub-CPU granularity, and built-in dynamic resourcing for all Integrity servers

HP System Insight Manager

HP Systems Insight Manager (SIM) is the central point of administration for management applications that address the Integrity rx7640 and rx8640 servers management requirements. HP SIM delivers powerful monitoring and control, notifying the administrator of potential hardware or software problems before they occur. It also provides inventory-reporting capabilities that dramatically reduce the time and effort required to track server assets. HP SIM provides secure communications as well as role-based security to make certain that its powerful capabilities are kept secure from unauthorized users.

HP-UX

- HP Integrity Essentials for HP-UX 11i are advanced plug-ins to HP SIM that provide modular, integrated system management software for complete HP Integrity server management. It integrates with many other HP-UX-specific system management tools, including the following tools available on Integrity servers
- Ignite-UX addresses the need for HP-UX system administrators to perform fast deployment for one or many servers. It provides the means for creating and reusing standard system configurations, enables replication of systems, permits post-installation customizations, and is capable of both interactive and unattended operating modes.
- Software Distributor-UX (SD-UX) is the HP-UX administration toolset used to deliver and maintain HP-UX operating systems and layered software applications. Delivered as part of HP-UX, SD-UX can help you manage your HP-UX operating system, patches, and application software on HP Integrity servers.
- System Management Homepage (SMH) is used to manage accounts for users and groups, perform auditing and security operations, and handle disk and file system management and peripheral device management. HP Systems Insight Manager allows these tasks to be distributed to multiple systems and delegated using role-based security.
- HP-UX Kernel Configuration is used for self-optimizing kernel changes. The new HP-UX Kernel Configuration tool allows users to tune both dynamic and static kernel parameters quickly and easily from a Web-based GUI to optimize system performance. This tool also sets kernel parameter alarms that notify you when system usage levels exceed thresholds.
- Partition Manager creates and manages nPars for high-end servers. After the partitions are created, the systems running on those partitions can be managed consistently with all the other tools integrated into SIM.
- HP-UX 11i Webmin-based Admin is a Web-based system management framework that allows a wide variety of open source Webmin system management modules to be plugged in. HP supports

Configuration

this tool for the configuration of the HP-UX 11i Apache-based Web Server and the HP-UX 11i Tomcat-based Servlet Engine.

- HP-UX Bastille is a security hardening/lockdown tool that enhances the security of an HP-UX 11i UNIX® host. It accommodates the various degrees of hardening required of servers used for webs, applications, and databases.
- Security Patch Check efficiently improves systems security by performing analysis of file sets and patches installed on an HP-UX 11i system and generating a report of recommended security patches.
- System Inventory Manager is for change and asset management. It enables you to easily collect, store, and manage inventory and configuration information for HP-UX-based servers. It provides an easy-to-use, web-based interface, superior performance, and comprehensive reporting capabilities.
- Event Monitoring Service (EMS) keeps the administrator of multiple systems aware of system operation throughout the cluster, and it notifies the administrator of potential hardware or software problems before they occur. HP Systems Insight Manager can launch the EMS interface and configure EMS monitors for any node or node group that belongs to the cluster, resulting in increased reliability and reduced downtime.
- HP Process Resource Manager (PRM) controls the resources that processes use during peak system load. PRM can manage the allocation of processor, memory resources, and disk bandwidth. It allows administrators to run multiple mission-critical applications on a single system, improve response time for critical users and applications, allocate resources on shared servers based on departmental budget contributions, provide applications with total resource isolation, and dynamically change configuration at any time-even under load.
- HP-UX Workload Manager (WLM) provides automatic processor resource allocation and application performance management based on prioritized service level objectives (SLOs). In addition, WLM allows administrators to set real memory and disk bandwidth entitlements (guaranteed minimums) to fixed levels in the configuration. The use of workload groups and SLOs improves response time for critical users, allows system consolidation, and helps manage user expectations for performance.
- HP OpenView Operations Agent provides a fully integrated, single-pane-of-glass management solution for systems, networks, applications, and databases. A powerful ability to monitor, filter, correlate, and respond to events enables IT organizations to establish central management control over their managed environments and improve overall availability and reliability.
- HP OpenView Performance Agent monitors and analyzes the performance of systems and applications to compare SLOs with actual application performance, and it enables real-time performance monitoring as well as action on alarm.
- HP OpenView Glanceplus is a powerful system monitoring and diagnostic tool that provides online performance information, examination of system activities, identification and resolution of performance bottlenecks, and system fine-tuning.
- HP OpenView Data Protector (Omniback II) provides reliable, high-performance data protection for enterprise-wide heterogeneous environments without impacting system or application performance. It centralizes and automates backup and recovery operations and tracks file versions and media to enable swift recovery of information.
- HP OpenView Network Node Manager (NNM) management station runs on Itanium based HP UX servers. NNM provides a powerful network management solution that includes concise, in depth views of network devices and their status in an intuitive graphical format. NNM helps network managers evaluate network performance, pinpoint problem sources, and proactively manage their networks and network availability.

All other HP OpenView management tools, such as HP OpenView Operations, Service Desk, and Service Reporter, will be able to collect and process information from the agents running on Integrity servers with HP-UX.

Configuration

Windows

The HP Integrity Essentials Foundation Pack for Windows is a complete toolset for installing, configuring, and managing HP Integrity rx7640 and rx8640 Servers running Windows. The following tools are included in the package:

- Smart Setup CD includes an EFI-based setup utility designed for easy server and array controller configuration. The CD also includes all the latest tested and compatible drivers, HP firmware, HP utilities, and HP management agents that assist in the server deployment process (by preparing the server for installation of a standard Windows operating system) and in the ongoing management of the server.
- System Management Homepage for HP Integrity servers with Windows helps system administrators rapidly respond to potential and actual system failures, increases system stability, and reduces troubleshooting complexity. It provides consolidated information about system health and configuration through a simple, web-based user interface. All system faults and major subsystem status are reported within the System Management Homepage. The System Management Homepage is accessible directly through a browser or through a management application such as System Insight Manager or an enterprise management application.
- Microsoft Windows System Resource Manager (WSRM) provides resource management and enables the allocation of resources, including processor and memory resources, among multiple applications based on business priorities. An administrator sets targets for the amount of hardware resources that users or running applications are allowed to consume. This means resources can be allocated among multiple applications on a server according to business priorities.
- HP OpenView management tools, such as HP OpenView Operations and Network Node Manager, will be able to collect and process information from the SNMP agents and WMI running on Itanium based Windows servers, proactively monitoring and measuring the availability and performance of heterogeneous servers and applications from a services perspective and a Windows management platform. In the future, OpenView agents will be able to directly collect and correlate event, storage, and performance data from Itanium based Windows servers, enhancing the information HP OpenView management tools will process and present.

Linux

- The HP Integrity Essentials Foundation Pack for Linux is a set of 3 CDs that includes tools for server install, configure and manage the Integrity rx7640 and rx8640 servers as a part of an adaptive infrastructure.
- The Smart Setup CD contains the latest documentation, firmware, and tools that assist in the server deployment process by preparing the server for installation of the Linux operating systems. This EFI-based setup utility application assists with tasks such as configuring storage adapters, upgrading firmware, preparing a system hardware inventory, and installing diagnostics tools.
- HP Integrity Essentials Foundation Pack for Linux also includes two management CDs to assist in the on-going server management tasks. These CDs contain the complimentary HP value-added software that aid in remotely diagnosing and monitoring system resources, and storage attached to the system. This software includes:
    - HP Insight Management Agents,
    - WBEM providers
    - System Management Homepage
    - HP System Insight Manager
- System Management Homepage provides a consolidated view of system hardware health, configuration, performance and status information for individual HP servers. Included with the HP Integrity Essentials Foundation Pack for Linux, the System Management Homepage is a secure web-based application that helps systems administrators respond rapidly and proactively to

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potential and actual system failures, increasing system stability and reducing troubleshooting complexity. It provides a consolidated view of all system health, in-depth instrumentation and configuration data, and simplifies access to HP web-enabled management tools that include the Insight Management Agents, Software Version Control Agents and the Array Configuration Utility.

- The HP Systems Insight Manager is a core management element of the Integrity Essentials Foundation Pack that is also included on one of the two Management CDs. This application gathers and organizes raw system management agent information that enables operators to more effectively monitor system usage and troubleshoot system problems. Customer benefits include greater system uptime, quicker problem resolution and lower cost of ownership for your Integrity and Proliant servers.
- Serviceguard Manager can monitor and manage Serviceguard on Linux and HP-UX 11i clusters from a single point. It provides a GUI to administer HP Serviceguard, Serviceguard Extension for RAC, Metrocluster, and Continentalclusters and to display their status.

OpenVMS

- Factory installed software
- Partition Manager creates and manages nPartitions-hard partitions for high end servers. Once the partitions are created, the systems running on those partitions can be managed consistently with all the other tools integrated into HP Systems Insight Manager. See "Partitioning" for more information.
- OpenVMS Management Station to manage user accounts, printers, and disks
- Availability Manager for real time performance monitoring
- Global Workload Manager (gWLM)-Global Workload Manager provides automatic CPU resource allocation and application performance management based on prioritized service level objectives (SLOs).
- Class Scheduler for resource management
- HP Systems Insight Manager (see above) in conjunction with (Web) Management Agents
- Central Management Server - CMS - Management agent for gWLM
- OpenView Operations Agent-collects and correlates OS and application events (fee based)
- OpenView Performance Agent-determines OS and application performance trends (fee based)
- OpenView Data Protector (Omniback II)-backs up and recovers data (fee based)

Instant Capacity (iCAP-For HP UX and OpenVMS only (Windows and Linux are currently not supported)

Configuration

Racking

The HP Integrity rx7640 Server was designed to provide industry leading performance density and availability when ordered in a racked configuration. At 10 EIA units (17.5 inches), four HP Integrity rx7640 servers can be mounted into a single HP two meter cabinet (HP 10K G2 Universal rack).

The HP Integrity rx7640 Server industrial design and packaging was designed to allow easy and quick access to all of the system's components. The most frequently handled devices, removable media and disks, are directly accessible at the system's front. By removing the front bezel, hot swap fans, hot swap power supplies, and PCI power supplies can be completely serviced. At the rear, core I/O and more hot swap fans are directly accessible. For access to all other components, the rack mounted HP Integrity rx7640 Server comes with rack sliders.

These rack sliders enables the HP Integrity rx7640 Server to be slid forward out of the HP cabinet for servicing of internal components such as fans, cell boards, and I/O cards, while the system is still running. The sliders also allows for servicing or replacement of any FRU (field replaceable unit) without removing the chassis from the cabinet. The HP Integrity rx7640 Server industrial design and slider strategy enables access and removal of any FRU within 15 minutes or less. This design feature minimizes the downtime associated with system upgrades in the rare event of a component failure. Also included with ever rack mounted HP Integrity rx7640 Server is a cable management arm (CMA) The CMA neatly secures data cables and prevents cables from becoming entangled while servicing of the system.

UPS

Management of local UPSs for the rx7640 and rx8640 is now through a LAN port on the core I/O card. Management of UPSs by the predecessor, rx7620 and rx8620 servers was through a serial port on the core I/O. The serial port is not available on the rx7640 and rx8640 servers. Therefore, when upgrading or adding rx7640 and rx8640 servers to your environment and using local UPSs (as opposed to datacenter wide UPSs), make sure there is a LAN management card available on the local UPS.

HP 10000 and 9000 Racks (These racks are the pre-merger Compaq racks)

The HP 9000 and HP Integrity servers are supported for field installs into these racks. Factory integration is not yet supported for HP 10000 and HP 9000 racks. Differing depth requirements of the HP 9000/HP Integrity racking kits preclude racking HP 9000/HP Integrity servers and HP ProLiant servers in the same racks.

Third-Party Racking

HP Servers are designed to maximize performance density when installed into HP Rack Systems. HP system Rack Systems maintain the high level of safety and reliability of HP Server solutions that customers have come to expect. Although HP strongly recommends racking servers in HP Rack Systems, it is recognizes that some customer circumstances may prohibit this. For those customers, HP has developed a set of guidelines that when followed, enables server installations into third-party cabinets. It is extremely important that the guidelines be followed due to the wide variety of cabinets in the market place.

Upgrades

The rx7640 server is capable of in-box upgrades from rx76xx/rp74xx servers.

You can also accomplish an upgrade by combining the purchase of a new server with Trade-Up credits on the older server. Box swap upgrades may have the advantage of less upgrade down time.

In-box upgrades and box swap upgrades may have similar prices depending on the amount of memory and number of cell boards and processors that have to be upgraded.

Included in the in-box Upgrade Kit (AD057A):

- System Backplane-The rx7640 System backplane is a new design with the following feature modifications:
    - New high speed differential links
    - Redesign of the crossbar ASIC
    - Additional switch fabric on the backplane
    - Redesign of the backplane power subsystem
    - Redesign of the system clock infrastructure
    - New high speed, impedance controlled, board to board connectors will be used
- Mass Storage Backplane PCA- The mass storage subsystem upgrades from SCSI SE interconnect to U320.

Other Miscellaneous

- Nameplates and labels
- "Read Me" documents, Upgrade Guide, CD ROM
- Miscellaneous cables

Must Order Separately for an in-box upgrade:

- Processor -(Unless already have supported processor)
- Cell boards- New Cell board design to support new chipset and future Itanium CPU
- I/O Backplane-The I/O backplane must be ordered
- Memory DIMMs-The memory system uses Double Data Rate DRAMs (DDR II)
- Core I/O - U320 support
- Installation services

Material to be Reused in an in-box upgrade:

- Chassis
- System fans
- 1.6-GHz, 6MB cache single core Itanium processor modules (Madison9M)
- AC power distribution PCA
- DC power distribution PCA
- OL* PCA (I/O cards)
- Bulk power supplies
- Hard disk drives
- Removable media drives
- Supported I/O Cards (please refer to supported I/O card list)

Technical Specifications

Server Model Number	rx7640	
	Number of 1.6GHz/24MB Dual core Itanium Processors	1-8
	Number of 1.6GHz/18MB Dual core Itanium Processors	1-8
	Number of 1.4GHz/12MB Dual core Itanium Processors	1-8
	Chipset	HP sx2000
	Server Product Number (Base system)	AB312A

Fast Bundles (all include base chassis and power supplies)

Product Number	Number of Processor cores	Number of Cell Boards in bundle	Number of core I/O Cards in bundle
AB447A	4	1	1
AB448A	8	1	1
AB449A	12	2	2
AB450A	16	2	2
Dual-core Itanium 1.6GHz/24MB is only available in a			

Hardware Warranty	1 year next day on site	

Supported Processors	1.6 GHz Dual core Itanium processors	
	L3 Cache	18 MB
	Floating Point Coprocessor	Yes
	1.6 GHz Dual core Itanium processors	
	L3 cache	18 MB
	Floating Point Coprocessor	Yes
	1.4 GHz Dual core Itanium processors	
	L3 cache	12 MB
	Floating point Coprocessor	Yes

Memory	Memory slots	32 (16 per cell board)
	Minimum memory (pair: 2 DIMMs)	2 GB
	Maximum memory capacity	128 GB (64 GB per cell board)

Technical Specifications

Internal Disks	Maximum disk mechanisms	4
	Maximum disk capacity	1.2 TB
	Internal Removable Media (1 half height)	1 slot
	DVD+RW(1 half height device or 2 slimline devices)	
	DDS 72 DAT	72 GB

Core I/O (Items per core I/O set)	Ultra320 SCSI	2
	NOTE: Second SCSI port only available if Smart Array controller is used for internal disks.	
	1 GbE (RJ-45 connector)	2
	10/100Base-T port (LAN console connection)	1
	RS-232 Management Console port	1

I/O Buses and Slots	**Total hot plug PCI-X Slots** (266 MHz; 64 bits)	15
	8 Dual channel slots (2128 MB/s each)	
	6 Dual channel slots (1060 MB/s each)	
	2 Single channel (530 MB/s each)	

Maximum I/O Cards (See supported I/O table for specific products)	Mass Storage	15
	LAN	2-15
	WAN	15
	Multi-Function (Mass Storage / LAN)	15
	Additional Interface Cards	4-15

Electrical Characteristics	AC Input power	200-240V 50/60 Hz
	Hot swap Power supplies	2 total, included with base
	Redundant AC power inputs	2 required, 4 cords for 2N
	Typical maximum power dissipation for maximum CPU, memory, disk, I/O configurations	2171 VA (2128 W) 10.9A @200VAC
	Marked Electrical for server	2640 VA (12A @220VAC)
	Marked Electrical per line cord	1320 VA (6A @220VAC)
	Power factor at full load	0.98 (approximately)

Technical Specifications

Site Preparation		
	kW rating for UPS loading*	3.0
	Site planning and installation included	Yes
	Depth (in/mm)	30 in (762 mm)
	Width (in/mm)	19 in (482 mm)
	Height (in/mm/EIA) Racked	17.5 in (445 mm)/10 units
	Weight (lb/kg)	101.6 kg (224 lbs)

*NOTE: Represents theoretical maximum power/heat dissipation under worst case conditions, may increase with future upgrades

Environmental Characteristics		
	Regulatory Model	RSVLA-0102
	Acoustics (sound power)at 25° C	7.4 Bels LwA
	Acoustics (sound power)at 30° C	7.4 Bels LwA
	Acoustics (operator/bystander) at 24° C	58.4 dB LpA
	Operating Temperature (up to 5000 ft)*	5° to 32° C (41° to 89° F)
	Non-operating Temperature	-40° to 158° F (-40° to 70° C)
	Maximum rate of temperature change	68° F (20° C)/hour
	Operating relative humidity	15% to 80%, non-condensing, max. web bulb = 78.8° F (26° C)
	Non-operating relative humidity	5% to 80%, non-condensing
	Operating altitude above sea level	To 10,000 feet (3.0 km)
	Non-operating altitude above sea level	To 15,000 feet (4.5 km)

*NOTE:Maximum operating temperature range up to 5000 ft. For higher altitudes derate the max temperature by 1°C/1000 ft above 5000 ft.

Regulatory Compliance		
	Regulatory Model Number	RSVLA-0102
	Electromagnetic Interference	Complies with FCC Rules and Regulations, Part 15, as a Class A digital device. Manufacturer's Declaration to EN55022 Level A, VCCI Registered, Class 1, Korea RLL.
	Safety	CSAus Certified, compliant with EN 60950