HP ProLiant G6

Technologies for better business outcomes

HP ProLiant
RUN WITH CONFIDENCE

Franz Weberberger
Product Manager ISS
April 2009

HP ProLiant
Industry Standard Server

ESS – Enterprise Server & Storage

HP ProLiant

HP Integrity/Integrity NonStop

HP BladeSystem

HP StorageWorks

Infrastructure Software

The best high-volume AND high-value solutions

HP ProLiant Server Familie

700

DL785

500

DL580

DL585

300

DL380

DL385

ML370

DL365

DL360

DL320

ML350

100

DL165, DL185

ML150

ML110, ML115

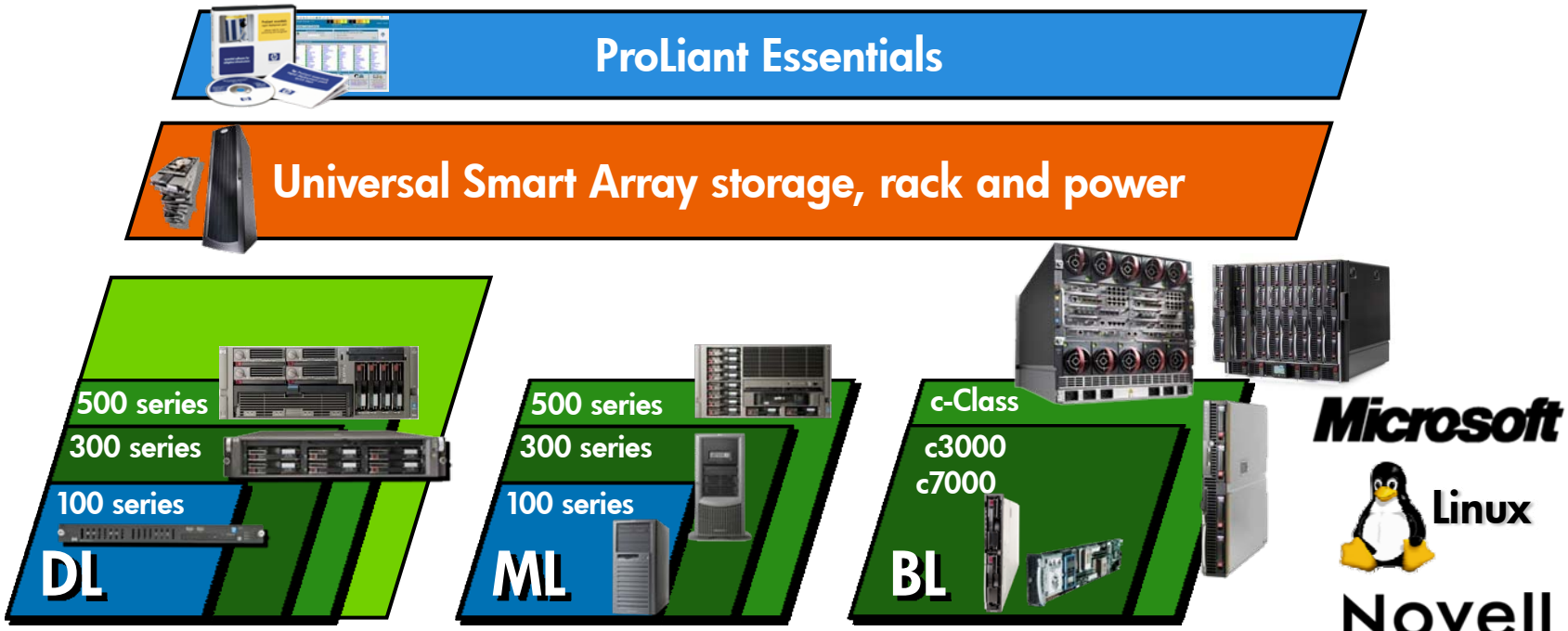
DL120, DL160, DL180

ML310

HP BladeSystem

HP ProLiant Server Linien

Industry Standard tools for an Adaptive Enterprise

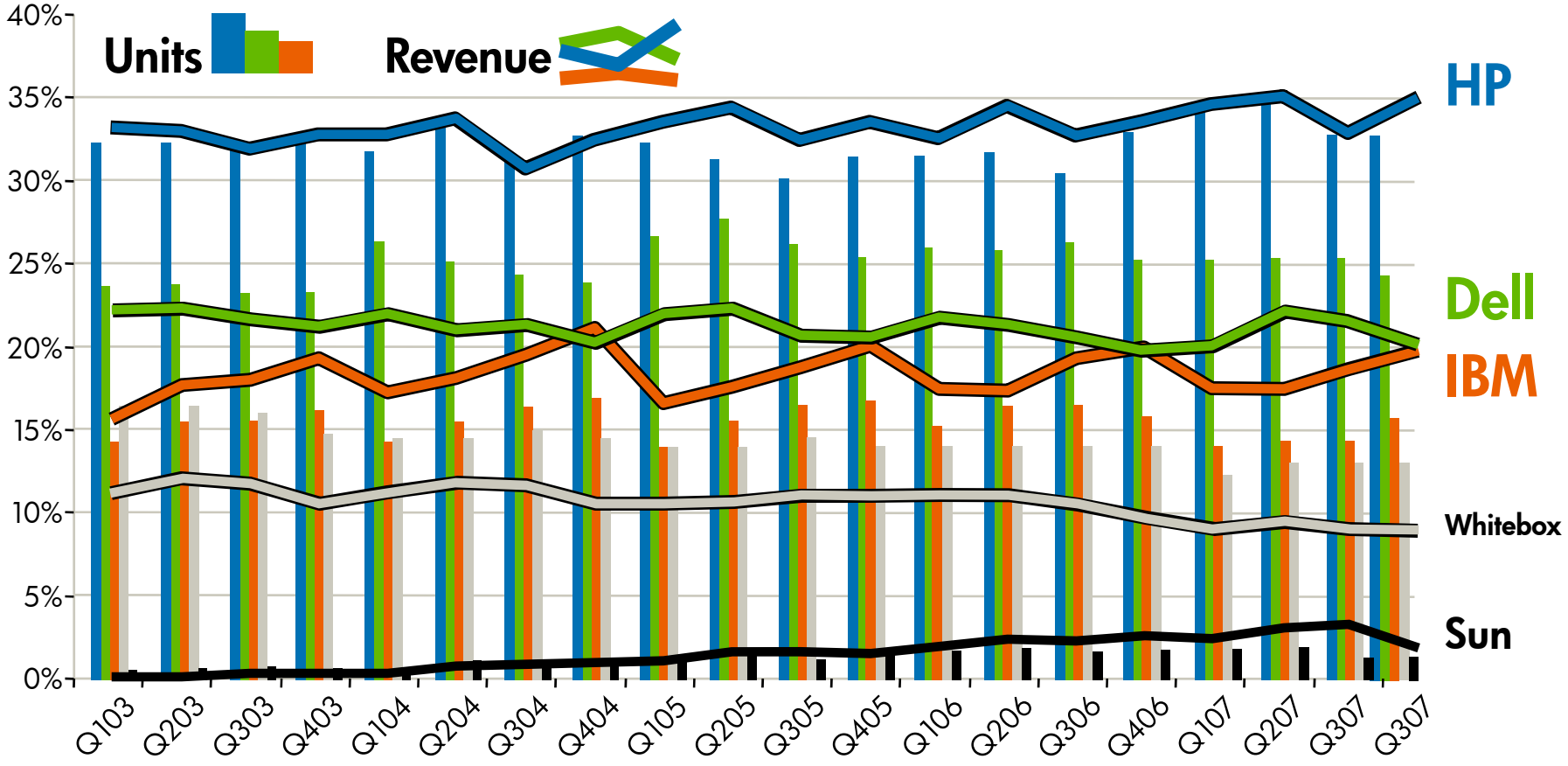


HP ProLiant DL
Density-optimized for rack mount environments

HP ProLiant ML
Maximum expansion for rack and tower

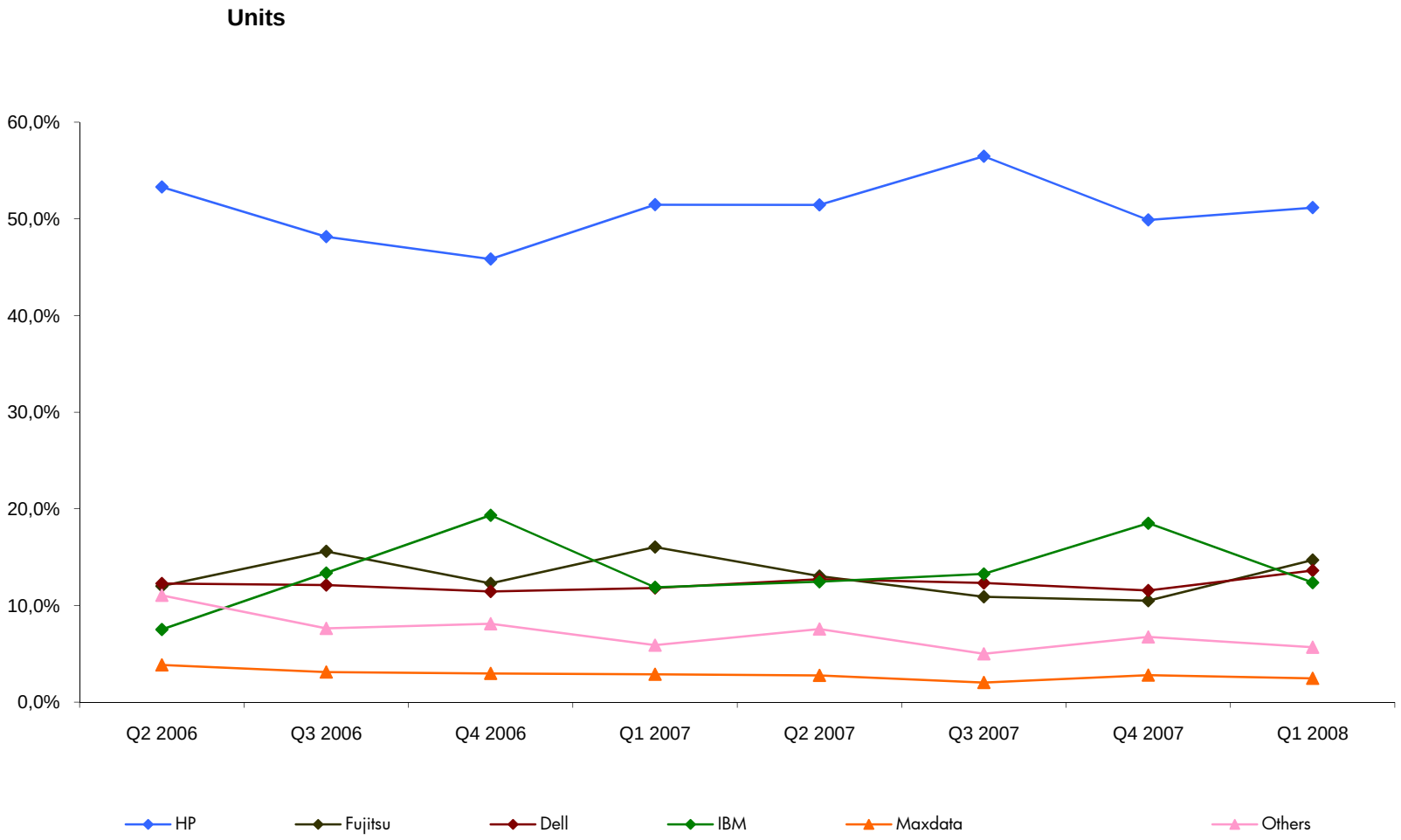
HP ProLiant BL
Maximum flexibility and control

Weltweiter x86 Market share



Source: IDC Worldwide Quarterly Server Tracker: 4Q07, February 26, 2008

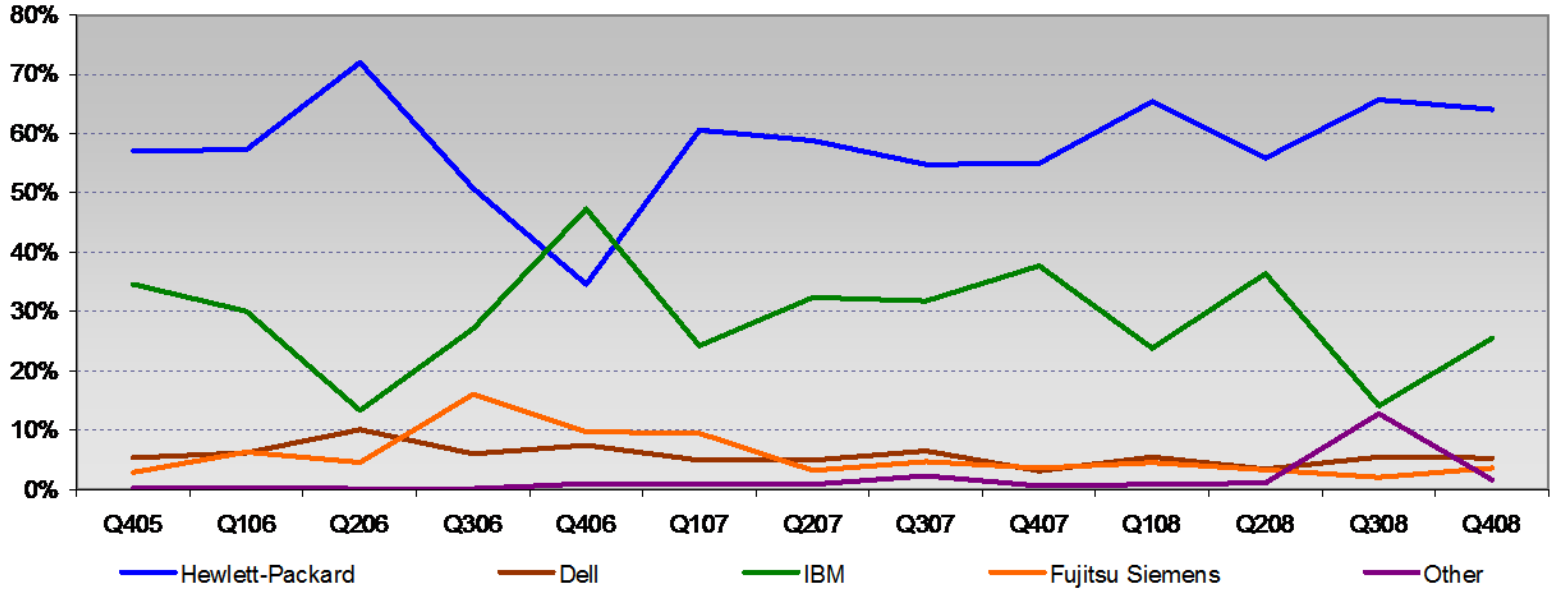
Österreich x86 Market Share



x86 Mkt Share Evolution – Blades Units

Austria

Source:
IDC_Qshare_Q408_EMEA_HP.xls



Mkt Share	Q405	Q106	Q206	Q306	Q406	Q107	Q207	Q307	Q407	Q108	Q208	Q308	Q408
Hewlett-Packard	57%	57%	72%	51%	35%	61%	59%	55%	55%	65%	56%	66%	64%
Dell	5%	6%	10%	6%	7%	5%	5%	7%	3%	5%	3%	5%	5%
IBM	35%	30%	13%	27%	47%	24%	32%	32%	38%	24%	36%	14%	25%
Fujitsu Siemens	3%	6%	5%	16%	10%	9%	3%	5%	4%	4%	3%	2%	4%
Other	0%	0%	0%	0%	1%	1%	1%	2%	1%	1%	1%	13%	2%

Units	Q405	Q106	Q206	Q306	Q406	Q107	Q207	Q307	Q407	Q108	Q208	Q308	Q408
Hewlett-Packard	620	481	585	472	391	690	647	598	1,081	1,003	1,106	1,140	1,199
Dell	58	52	82	56	84	56	54	71	61	84	68	95	99
IBM	376	252	108	252	534	276	356	347	742	365	721	244	477
Fujitsu Siemens	31	53	37	149	110	108	35	51	71	69	65	35	67
Other	2	2	1	1	11	9	9	25	12	13	21	222	30
Total Units	1,087	840	813	930	1,130	1,139	1,101	1,092	1,967	1,534	1,981	1,736	1,872

ProLiant enterprise server line-up

Intel Xeon-based systems

ML350	DL360	ML370	DL380	DL580
Best Selling Tower Server	Best Selling 1U Server	Best Performing 2P x86	#1 Server World Wide	#1 4-socket server
Branch Office & Enterprise Minded SMBs	Concentrated Compute Power	Performance & Virtualization	Versatile, Dependable Workhorse	The High Availability 4-way

The HP BladeSystem Enclosure portfolio

Time-Smart, Energy-Efficient, Cost-savvy

2006

c7000

Datacenter optimized

Holds 16 c-Class server blades

September 2007

Remote sites and midmarket

c3000

Rack-able or set on a table

C3000 Tower

Place on a floor using the Tower version

Holds 8 c-Class server blades

Blades benötigen **weniger Energie** als normale Server!

Customers win with HP Thermal Logic

30% less power per sever

47% less CFM

38% quieter

8 x1U severs

482 VA per server

(Intel 5140 dual-core)

Power:
3856 VA
@100% CPU Util.

Cooling:
323 CFM

Acoustics:
8.1 bels

8 HP c-Class servers

340 VA per server

HP BL460c
(Intel 5140 dual-core)

Power:
2720 VA
@100% CPU Util.

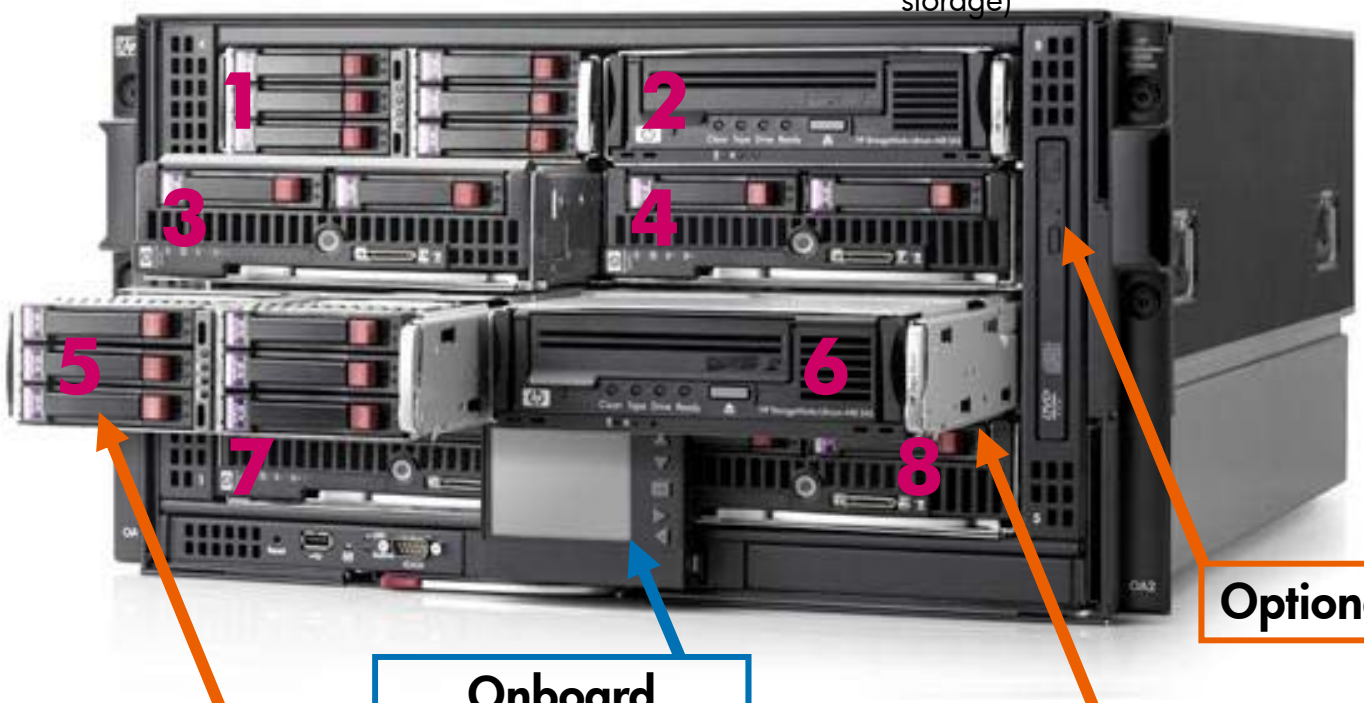
Cooling:
172 CFM

Acoustics:
7.4 bels

Assumptions:
- Same load/same configuration (2 x 5140 CPU w/ 8 DIMMs each running Prime95 @100%)
- CFM (Cubic feet per minute) of air (costs to run datacenter equipment for cooling are significant)

c3000 Front View

- **8 Device bays**
- **Accepts c-Class Blades** (servers & storage)



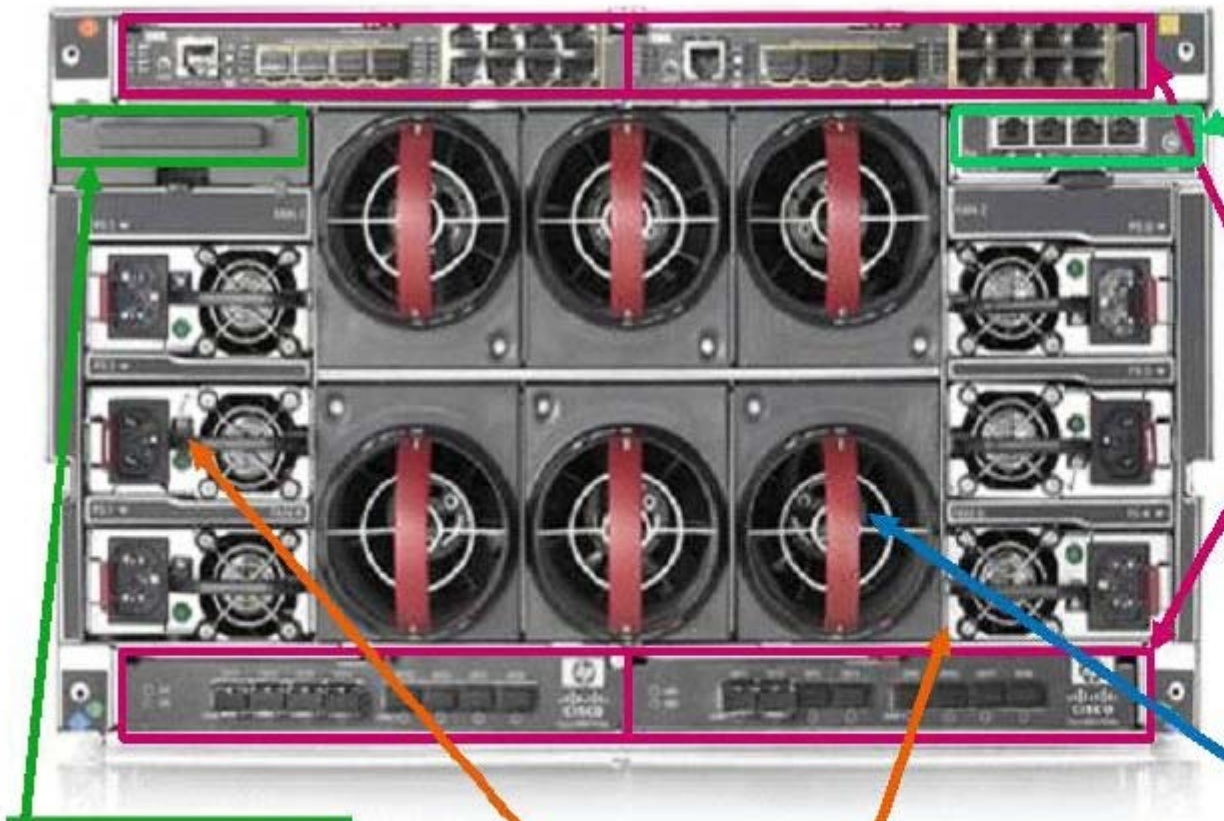
Optional DVD drive

Onboard Administrator & Insight Display

Direct attached/ Shared Storage

Tape Back Up Blade

c3000 Rear View



Onboard Administrator & iLO links

4 Interconnect bays (Accepts c-Class interconnect modules)

Optional KVM module bay

2 to 6 power supplies
Single-phase AC PS or DC (-48V)

4 to 6 Active Cool fans

HP BladeSystem c-Class Portfolio

A Full Range of 2P and 4P Blades

Server Blades

Workstation Blades

Storage Blades

Interconnect choices for LAN, SAN, and Scale-Out Clusters

Virtual Connect

LAN

Ethernet NICs

SAN

Fibre Channel

InfiniBand 4X DDR

Unified Management

Choice of Power

Complete Services

Assessment
Implementation
Support

HP ProLiant G6

Leading Efficiency

Increased Power Efficiency over G5

- Energy Star rated
- All power supplies are up to 92% efficient
- SpecPower Leadership

Ultimate power management

- Control your power budget
- Dynamic power capping
- Conserve energy

Right-sized Power Supplies

- Only pay for the power you need
- Fuller load resulting in greater efficiency
- Choose from 460W, 750W or 1200W power supplies

Continued Leadership in Energy Efficiency

Power/Cooling efficiency

- Dynamic Power Capping
- Intelligent Power & Cooling Savers
  - Sea of Sensors
  - Power Down Mode Support on DDR-3
  - Dynamic Power Management of unused i/o ports.
  - Individual Fan Management for Dynamic cooling and power management.
- Intel Nehalem performance with lower power envelopes.

Power delivery

- HP Common Power Slot- one power source fits many platforms - reduced spares
- Higher Efficiency Power Supplies, up to 92% to meet Energy Star and Climate Savers Gold requirements.
- Right-Sizing for the perfect power fit improved capacity
- High Efficiency and Load Balancing Modes for Redundant Power Supplies. NEW

G6 Common Slot Power Strategy

Alternative Thinking Designs ….One Size – Many Options

Commonality across ProLiant, Integrity, StorageWorks, ProCurve

Common Slot

460W AC up to 92% efficiency

750W AC up to 92% efficiency

1200W AC up to 90% efficiency

48Vdc 1200W up to 90% efficiency

Alternative AC and DC Solutions

High Voltage AC/DC options

Military Solutions

- Right-Sized to reclaim wasted/lost power in the rack. Reclaim power with just the size power supply you need.
- Improved power efficiencies up to 90% and 92%, which are targets for Energy Star
- Meets requirements for SpecPower leadership, Climate Savers and Energy Star for Servers Gold
- Flexibility to fit data center infrastructure needs 100-240Vac, -48Vdc, 400Hz Military, High Line AC, etc.
- Simplified serviceability – reduces data center spares

Extreme Flexibility

Flexible storage

- More servers with choice of LFF or SFF drives
- Choice of SSD support

Common power slot

- Reduces # of spares needed
- Simplifies Ordering

Flexible Smart Array Portfolio

- Mix and match cache with batteries for performance and availability

Flexible I/O

- More Slots / More I/O choice (PCI-E x8,x16 and PCI-X)
- More 10GbE options

ProLiant G6:Technology
Prozessor

Nehalem Processor

Higher performance, better power efficiency, more adaptable

QuickPath Architecture

Delivers additional performance, bandwidth, and reliability

Integrated Memory Controller

Each processor now has a dedicated memory controller

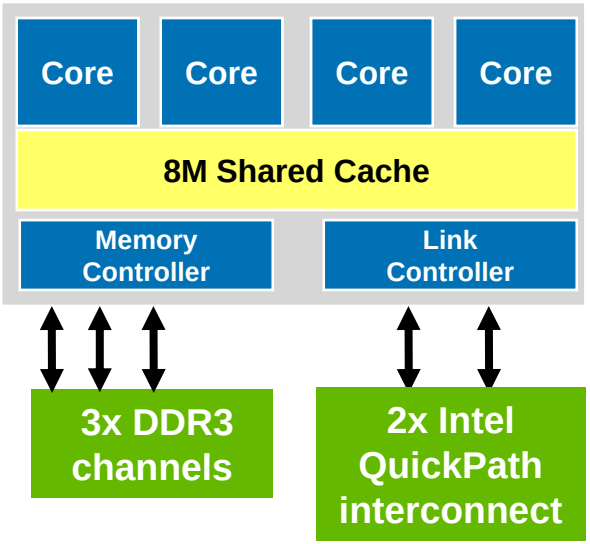
Turbo Mode

Additional processing boost during peak demand periods

Dynamic Power Management

Hyper-Threading Technology

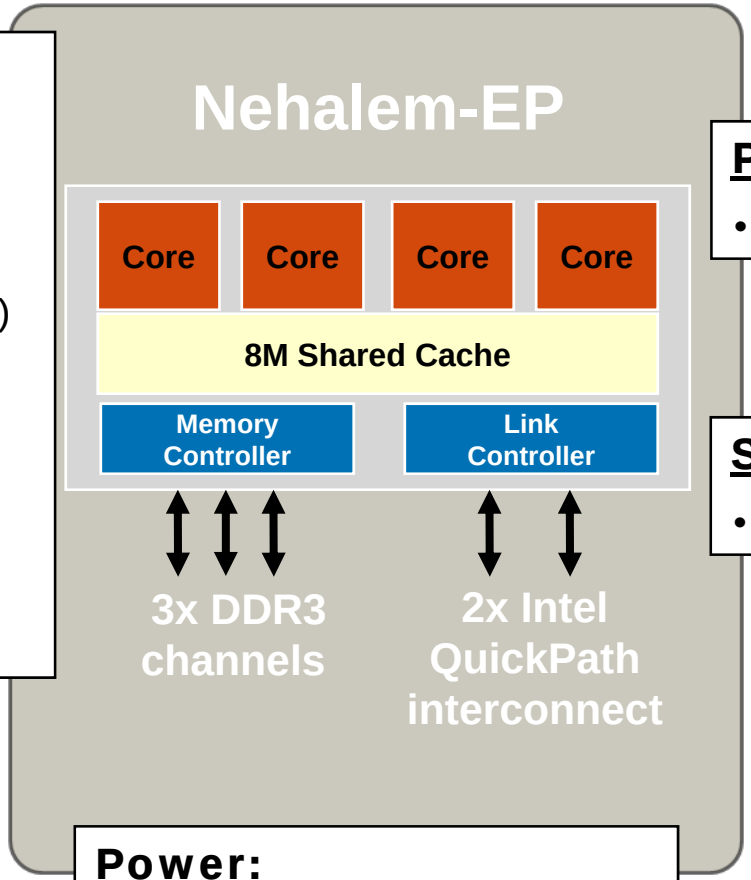
Enhances performance and energy efficiency



Intel Nehalem Processor Details

Features:

- 2 or 4 cores
- 8M on-chip Shared Cache
- Simultaneous Multi-Threading capability (SMT)
- Intel® QuickPath Interconnect up to 6.4 GT/s, each direct. per link
- Integrated Memory Controller (DDR3)
- New instructions



Process:

- 45nm CPU

Socket:

- New LGA 1366 Socket

Power:

- 95W, 80W, 60W[1]

Nehalem Turbo Mode

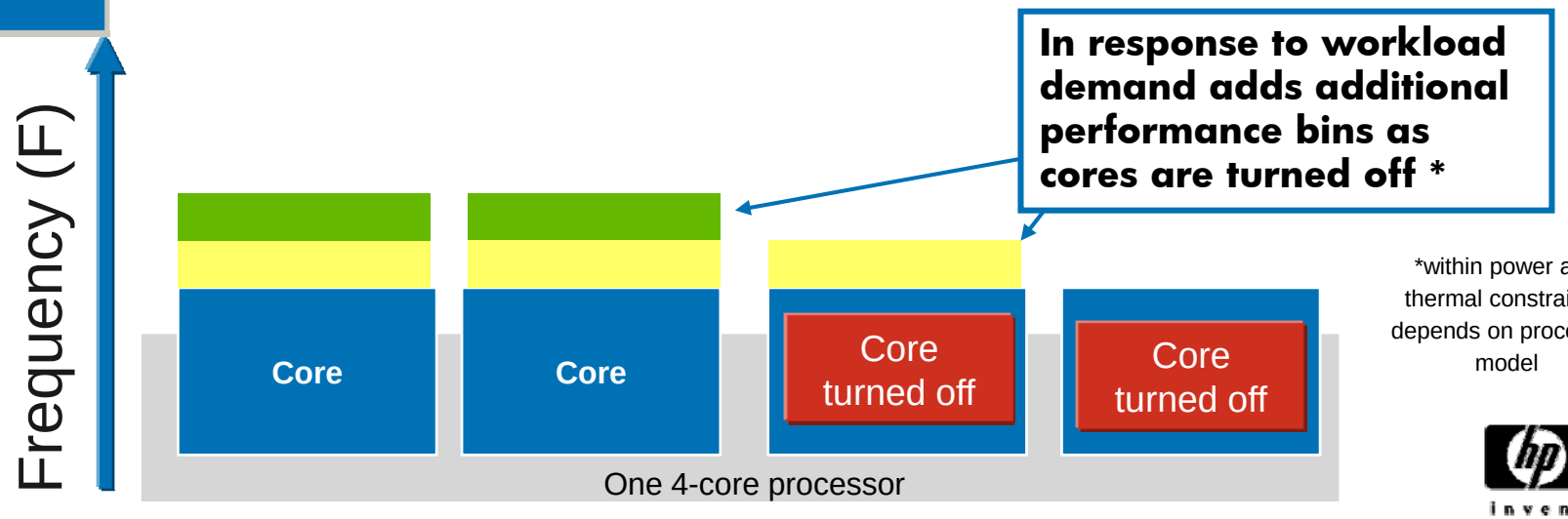
Description

CPU operates at higher-than-stated frequency when operating below power and thermal design points

3 Methods of Control

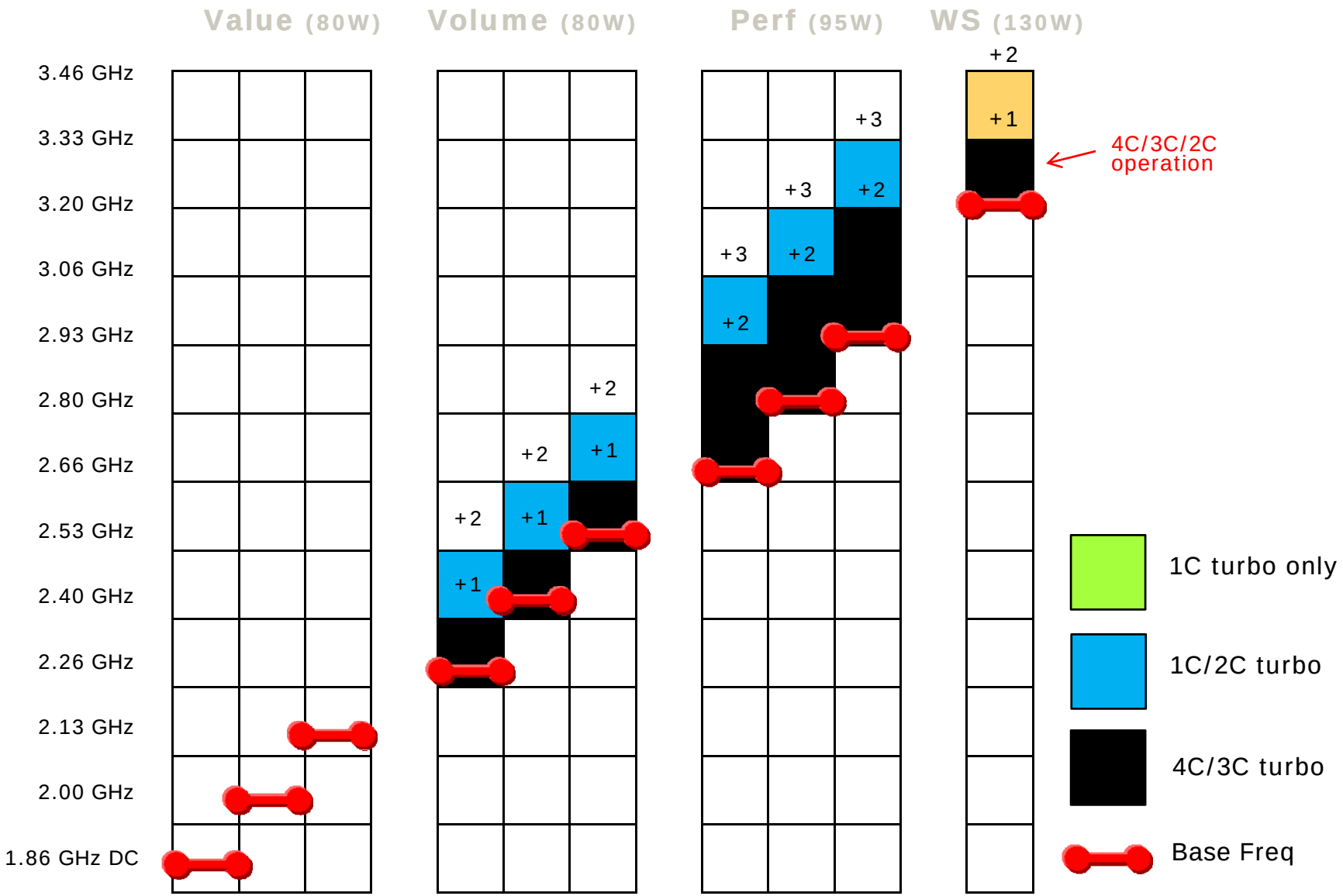
1. **Off:** CPU operates only at rated frequency
2. **Automatic:** OS requests higher perf state, CPU determines turbo frequency (recommended)
3. **Manual:**
   - User can manually disable cores (reboot required) via BIOS
   - Less cores means more likely turbo will happen

Example

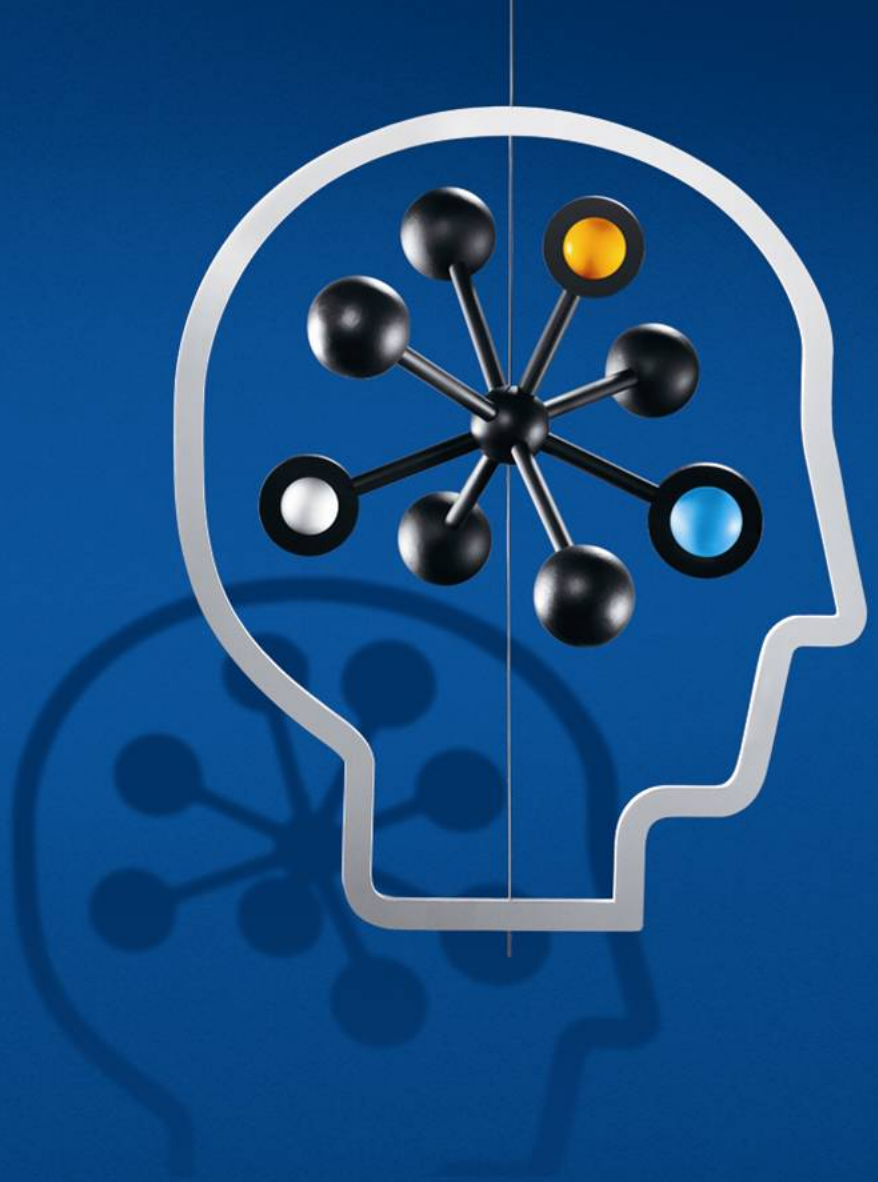


*within power and thermal constraints, depends on processor model

Nehalem-EP Turbo Mode Frequencies



ProLiant G6:Technology Memory



New DDR-3 Memory Benefits

Bandwidth doubles

- DDR-2; 667MHz 4 channels
- DDR-3; 1333MHz 6 channels

25% power savings over DDR2

- Voltage reduced from 1.8V to 1.5V
- Thermal temperature sensors allow power down when idle

Flexibility

- Unbuffered DIMMs
- Registered DIMMs

Lower latency

- 24GB/sec with DDR-2
- 64GB/sec with DDR-3

Larger memory footprints

- Increased slot counts with G6
- Max Memory up to 24GB with U-DIMMs
- Max Memory up to 144GB with R-DIMMs

Customer choice with DDR-3

Memory Technology Comparison		
	RDIMMs *Greater capacity, ECC w/advanced memory protection*	**UDIMMs** *Smaller capacity, lower price points, ECC*
Capacities at launch	2GB, 4GB, 8GB	1GB, 2GB
Max. DIMMs/Channel	3 Dual Rank	2 Dual Rank
Advanced Memory Protection	✓	
ECC support	✓	✓
Lower Cost		✓
Ranks/DIMM support	1, 2, 4	1, 2
DRAM support	x4, x8	x8
Maximum capacity	144GB max capacity (18 slots, dual rank)	24GB max capacity (12 slots)

Note: No Mixing of RDIMM and UDIMM

DDR3 memory capacities

- RDIMM maximum capacity 144GB (8GB 2Rank)
- UDIMM maximum capacity 24GB (2GB 2Rank)

DIMM Type ->	RDIMM	RDIMM	RDIMM	RDIMM	RDIMM	RDIMM	RDIMM	RDIMM	RDIMM	UDIMM	UDIMM	UDIMM	UDIMM	UDIMM	UDIMM
DIMM Rank ->	1R	1R	1R	2R	2R	2R	4R	4R	4R	1R	1R	2R	2R	4R	4R
DIMM Capacity ->	2GB	4GB	8GB	2GB	4GB	8GB	2GB	4GB	8GB	1GB	2GB	1GB	2GB	1GB	2GB
SLOTS THAT CAN BE POPULATED															
9 slot servers	n/a	n/a	n/a	9	9	9	n/a	6	6	6	n/a	n/a	6	n/a	n/a
12 slot servers	n/a	n/a	n/a	12	12	12	n/a	12	12	12	n/a	n/a	12	n/a	n/a
16 slot servers	n/a	n/a	n/a	16	16	16	n/a	12	12	12	n/a	n/a	12	n/a	n/a
18 slot servers	n/a	n/a	n/a	18	18	18	n/a	12	12	12	n/a	n/a	12	n/a	n/a
MAXIMUM CAPACITY															
9 slot servers	n/a	n/a	n/a	18	36	72	n/a	24	48	6	n/a	n/a	12	n/a	n/a
12 slot servers	n/a	n/a	n/a	24	48	96	n/a	48	96	12	n/a	n/a	24	n/a	n/a
16 slot servers	n/a	n/a	n/a	32	64	128	n/a	48	96	12	n/a	n/a	24	n/a	n/a
18 slot servers	n/a	n/a	n/a	36	72	144	n/a	48	96	12	n/a	n/a	24	n/a	n/a
POPULATED DIMM SPEED (MHz)															
1 DIMM Per Channel	n/a	n/a	n/a	1333	1333	1067	n/a	1067	1067	1333	n/a	n/a	1333	n/a	n/a
2 DIMM Per Channel	n/a	n/a	n/a	1067	1067	1067	n/a	800	800	1067	n/a	n/a	1067	n/a	n/a
3 DIMM Per Channel	n/a	n/a	n/a	800	800	800	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

95 Watt processors needed to run 1333MHz.
See population rules for additional guidelines.

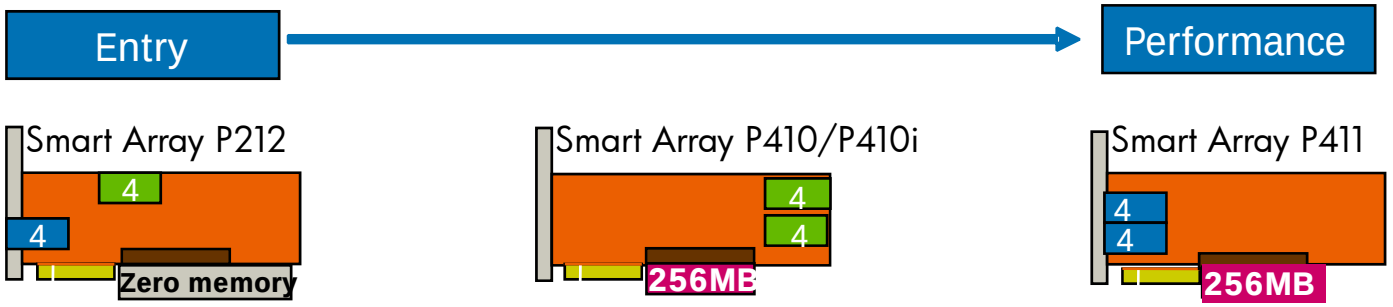
ProLiant G6:Technology
Smart Array & Hard Drives

New Modular Smart Array Controller Configurations

New Modular solutions

Common form factor, hardware, and firmware

Seamless upgradeability from zero memory to 512 BBWC



Features

HP SAS Expander Card

Ports Available

- Support 24 drive bays plus external
- Internal/External Split
  - 8 internal ports used for Smart Array connection
    - One Mini SAS 8i internal connector
  - 24 internal ports used for HDD/tape connection
    - Three Mini-SAS 8i internal connectors
  - 4 external ports for tape
    - One Mini-SAS 4x external connector

Support

- 3.0 Gbps SAS and 1.5 Gbps SATA
  - FW upgrade to 6 Gbps SAS and 3 Gbps SATA in Summer 09
- PCIe full-height card just using PCIe power

Support Continued

- Internal and External Devices
  - SAS/SATA HDD (internal only)
  - Tape Drives (internal and external)
    - DAT 160 SAS
    - LTO448
    - LTO920
    - LTO1840
- Servers
  - ML350 G6
  - ML370 G6
  - DL380 G6
  - DL385 G5p
  - DL385 G6
  - DL580 G5
  - DL785 G5
  - DL785 G5p
- Controllers
  - P410 with cache
  - P410i with cache

Smart Array Advanced Pack (SAAP) – January 2009

What is SAAP?

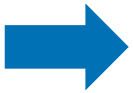
SAAP is a paradigm shift in how features are received and utilized by the introduction of "silver bullet" features to continue driving SAS, Smart Array value and differentiation .

Customer Values

Control over environment

Tunable stacks/Flexibility

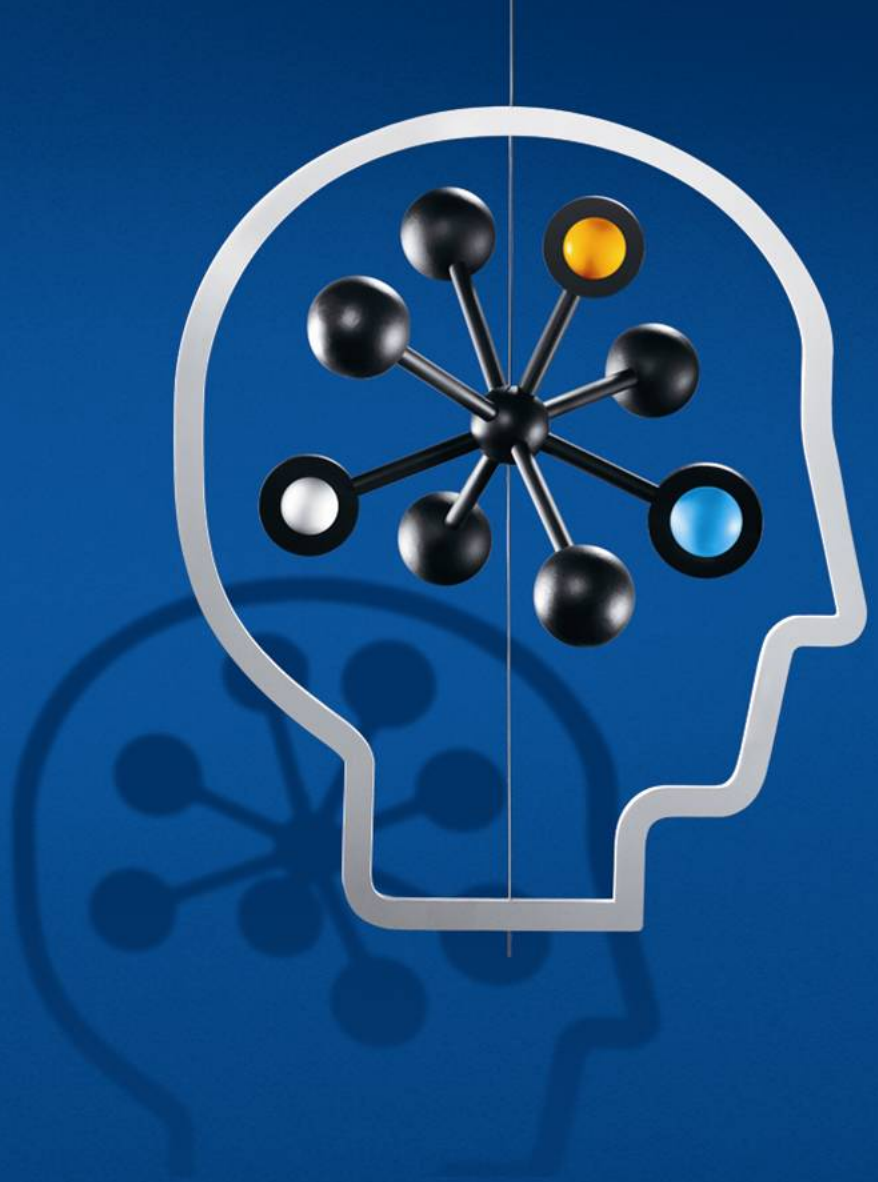
Deployment methodology



SAAP Release 1 Features - ILP$329

- RAID 6 (ADG)
- RAID 60
- Advanced Capacity Expansion (ACE)
- Split Mirrors and Recombining of them in offline mode
- Secure Drive Erase
- Performance Optimization – Degraded Reads and Read Coalescing (VOD)

ProLiant G6:Technology Nics



New Embedded NICs on ProLiant G6 Servers

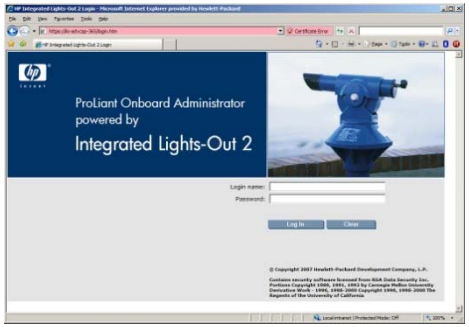
G6 Platform	Networking Controller	HP Model	What's New
DL160 DL180	Intel 82576	HP NC362i	Dual port, high-performance gigabit connectivity designed for a multi-core and virtualized platform
DL360 DL380	Broadcom 5709	HP NC382i	Latest multifunction NIC supporting TCP/IP offload and iSCSI iSCSI IS NOW INCLUDED FREE – NO LICENSE REQUIRED Four ports on DL380 G6
DL/ML370	NetXen 3031	HP NC375i	Four 1GbE ports TWO EMBEDDED NIC PORTS CAN BE UPGRADED TO 10GbE
DL320 ML330 ML350	Broadcom 5715	HP NC326i	Dual port performance designed to support reliability, flexibility, and expandability
ML150	Broadcom 5723	HP NC107i	Single port Gigabit performance for cost-effective, entry-level platforms

ProLiant G6:Technology
Onboard Administrator powered by iLo2

ProLiant Onboard Administrator

The core of ProLiant manageability

Enable hands off deployment for one server or hundreds



Save hundreds or thousands in travel cost and downtime

Investigate server health in any situation from any location

ProLiant Onboard Administrator

- Simplified Server Setup
- Extended Embedded Health
- Power & Thermal Control
- iLO Remote Admin.

HP Integrated Lights-Out iLO 2

- iLO 2 help you manage your ProLiant G6 agentlessly
  - Status, presence, redundancy
  - Fan, temperature, power supplies, VRM
  - Hard Drive presence
  - Server status
  - ProLiant F6 Fan Control and DIMM Temperature metrics
- iLO 2 can help you manage your ProLiant G6 server power consumption
  - Receive data from ProLiant G6 servers to calculate the hottest core temperature
  - Gain access to server registers
  - Decrease system power consumption when a temperature threshold is breached
- And much more!
  - Logging memory issues, power throttling, etc…

Simply migrate your existing server to G6

No need for from-the-ground-up deployment

Available late April 2009

Server Migration Pack Universal Edition

Automated migration process takes care of driver compatibility
Drop or resize partitions during migration

Confidently upgrade, Accelerate deployment
Minimize cost of transition

HP ProLiant Easy Set-up CDs - New Features for 100 series G6 servers

Deployment & Update CD - 1 per model

Ships with 100 series ML servers

Deployment

Assisted Installation – Single server

Manual Installation – Single server

Supported March 2008:

- On ML110 G5 & ML115 G5 servers

G5 ISO Image Web download

Update (online flash)

Supported in 2009: ML100 G6 servers as they announce:

- Assisted and Manual Installation
- Deployment updates.

Ships with G6 100 series DL servers

Deployment Deployment Update

Assisted Installation – Single server

Manual Installation – Single server

HP Smart Update Manager – Single & Multi-server for Assisted Installation

New w/ G6

Smart Component Smart Component Update

New w/ G6

Supported in 2009:

- All of the above on DL1xx G6 servers as servers announce.

G6 ISO Image Web download

SmartStart Scripting Toolkit for 100 series DL servers – Multi-server

New w/ G6

ProLiant 100 series G6 servers get this capability as each server announces. Ships as part of server BOM.

Blue = new w/ProLiant 100 series G6

ProLiant 300 series G6 Product Details

HP ProLiant DL360

	DL360 G5	DL360 G6
Processor	Intel Xeon 5000 Sequence	**Intel Nehalem - EP**
Memory	8 Sockets, DDR2 667MHz 64GB max.	**18** Sockets, DDR3 800Mhz to 1333MHz **144GB** max.
Drive Bays	6 SFF SAS/SATA	**8** SFF SAS/SATA
Storage Controller	P400i/E200i	**P410i**
Slots	2 Available Slots -1full length x16 PCI-e /-1 low profile PCI-e x8 -1 optional PCI-x 133 replace full length PCI-	2 Available Slots -1full length x16 PCI-e **Gen2/**-1 low profile x8 PCI-e **Gen2** -1 optional PCI-x 133 replace full length PCI-e
Networking	2 NIC ports [NC373i Multifunction (Broadcom)	**2 NIC ports, NC382i**
Ports	Front: USB (1), video Rear: USB (2), Video, NIC / Internal: USB (1)	Front: USB (1), video Rear: USB (2), Video, NIC / Internal: USB (1)/ **SD slot (1)**
Management	ILO 2	**Onboard Administrator w/ ILO 2**
Security		**TPM option**
Redundancy	Fan: N+1 Power:1	Fan: N+1 Power:1

HP ProLiant DL380

	DL380 G5	DL380 G6
Processor	Intel Xeon 5000 Sequence	**Intel Nehalem - EP**
Memory	8 Sockets, DDR2 667MHz 64GB max.	**18** Sockets, DDR3 800Mhz to 1333MHz **144GB** max.
Drive Bays	8 SFF SAS/SATA	**Up to 16 SFF** SAS/SATA or **6 LFF** SAS/SATA (Different drive cages for SFF and LFF)
Storage Controller	P400/E200	**P410i**
Slots	PCI-E Gen 1: Embedded: 2X4 PCI-E Standard Riser: 1X4 and 2 X8 PCI-E Optional Riser: PCI-X/PCI-E (2 PCI-X, 1X8 PCI-E) (Max. PCI-E slots: 4)	PCI-E **Gen 2:** Standard Riser: 1X8 and 2 X4 PCI-E Optional Risers: X16 PCI-E; PCI-X/PCI-E (2 PCI-X/133, 1X8, 1 X4 PCI-E (Max. PCI-E slots: 6)
Networking	2 NIC ports,NC373i	**4 NIC ports, NC382i**
Ports	Front: USB (2), video Rear: USB (2), Video, NIC Internal: USB (1)	Front: USB (2), video Rear: USB (2), Video, NIC Internal: USB (1)/ **SD slot (1)**
Management	ILO 2	**Onboard Administrator w/ ILO 2**
Security		**TPM option**
Redundancy	Fans: Hot plug with optional redundancy Power: 1	Fans: Hot plug with optional redundancy Power: 1

HP ProLiant ML350

	ML350 G5	ML350 G6
Processor	Intel Xeon 5000 Sequence	**Intel Nehalem - EP**
Memory	8 Sockets, DDR2 667MHz 32GB max.	**18** Sockets, DDR3 800Mhz to 1333MHz **144GB** max.
Drive Bays	8 SFF or 6 LFF SAS/SATA	**Up to 16 SFF** SAS/SATA or **8 LFF** SAS/SATA (Different drive cages for SFF and LFF) 5 removable half height media bay
Storage Controller	P400/E200	**P410i**
Slots	PCI-E 5 Available slots 3 full-length PCIe x8 (x4 speed) Gen1 1 64bit PCI-X (1-133MHz, 2-100MHz) Option for 2 PCI-X slots replacing a PCIe slot	PCI-E **Gen 2** **8 Available slots** 1 full-length PCIe x16 (x8 speed) Gen2 1 full-length PCIe x8 Gen2 4 full-length PCIe x8 (x4 speed) Gen2 1 full-length PCIe x8 (x4 speed) Gen1 Option for 2 PCI-X slots replacing a PCIe slot (similar to G5)
Networking	1 NIC port, NC373i	**2 NIC ports, NC326i**
Ports	Front: USB (2) Rear: USB (2), Video, NIC Internal: USB (1)	Front: USB (2) Rear: USB (2), Video, NIC (2) Internal: USB (2), **SD slot (1)**
Management	ILO 2	**Onboard Administrator w/ ILO 2**
Security		**TPM option**

HP ProLiant DL370 and ML370

	ML370 G5	DL370 and ML370 G6
Processor	Intel Xeon 5000 Sequence	**Intel Nehalem - EP**
Memory	16Sockets; DDR2 667MHz 64GB	**18** Sockets, DDR3 800Mhz to 1333MHz **144GB** max.
Drive Bays	8 SFF hot plug SAS or SATA standard 16 SFF Hot plug SAS or SATA optional 2 Media Bays (2 half height) standard	**Up to 24 SFF** hot plug SAS or SATA standard; **or 14 LFF** 3 Media Bays (2 half height, 1 slim line) standard
Storage Controller	P400/E200	**P410i**
Slots	PCI-e Gen 1 9 slots 8 available: (6) PCI-E x4 (2) PCI-X 64-Bit/133MHz	PCI-e **Gen 2** **9** slots (2x16, 2x8, 5x4) Accelerators 300 watt in x16 slots 2 PCI-x slots optional (replacing PCI-e slots)
Networking	2 NIC ports, NC373i	**4 NIC ports, NetXen (w/10G optional upgrade card)**
Ports	Front: USB (2), video / Rear: USN (2), Video, NIC Internal: USB (2)	Front: USB (2), video / Rear: USN (2), Video, NIC Internal: USB (2)/ **SD slot (1)**
Management	ILO 2	**Onboard Administrator w/ ILO 2**
Security		**TPM option**
Redundancy	Fan: RPS:	Fan: RPS:
Form Factor	5U	**4U**

ProLiant 100 series G6 Product Details

HP ProLiant 100 series

DL160

Performance…

DL180

Density…

G6

Expansion…

ML150

Cost…

DL120

HP ProLiant DL160

High performance, highly efficient compute for scale-out environments

	DL160 G5	DL160 G6
Processor	(2) Xeon (Harpertown/Wolfdale)	(2) Xeon **(Nehalem EP)**
Memory	8 Sockets, DDR2 667-800MHz FBD	**18** Sockets, DDR3 1067/1333
Drive Bays	4 LFF SATA/SAS NHP/HP	Up to 4 LFF or 8 SFF SATA/SAS NHP/HP
Storage Controller	SW RAID embedded with NHP models; SAS HBA with HP models; Smart Array optional	HP SW RAID embedded with NHP skus; Smart Array P212 with HP skus; Smart Array P4xx, P8xx optional
Slots	2 Available slots 1 full-length PCI-E gen 2 x16 gen 2 1 half length low-profile PCI-E gen 2 x16 2 optional PCI-X 133 replaces full-length PCI-E and 1 PCI-X 133 low profile	2 Available slots 1 full-height/full length PCI-E x16 Gen2 OR 1 internal only LP card with PCI-E x8 Gen2 and 1HL/FH PCI-E x16 Gen2 2 optional PCI-X 133 replaces full-length PCI-E and 1 PCI-X 133 low profile
Networking	Dual-port gigabit NIC (2 NC7782)	2 Gigabit NICs
Ports	USB: 2 front, 1 internal, 2 rear Video, Serial, PS/2	USB: 2 front, 1 internal, 2 rear Video, Serial, PS/2
Security		**TPM** option
Management	LO100i	LO100i; **System setup and update, SNMP health agents, SIM support** (Polaris & Lighthouse)

HP ProLiant DL180

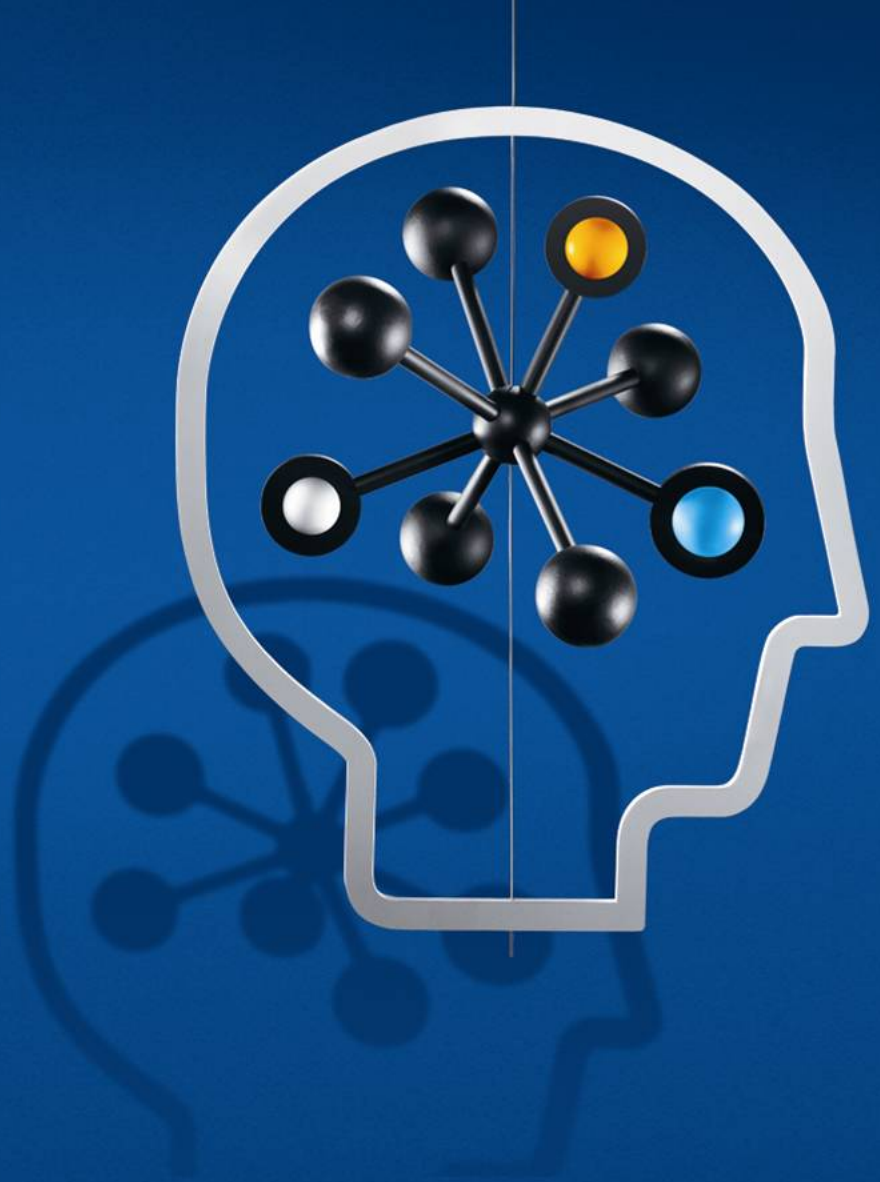
High capacity, highly efficient compute for scale-out environments

	DL180 G5	DL180 G6
Processor	Xeon Quad/Dual Core	2P Xeon **(Nehalem EP)**
Memory	6 Sockets, DDR2 667 FBD	**12** Sockets , DDR3 1067/1333
Drive Bays	4/8/12 LFF SATA/SAS	4/8/12/**14** LFF SATA/SAS (4/8/12 standard +2 rear upgrade) **8/25 SFF**
Storage Controller	SATA RAID embedded with entry models; SA E200 or P400 on other models;	HP SATA RAID with entry models (ICH-9); P212 and P410 on other models
Slots	3 Available slots 2 full-length PCI-e x4 1 low-profile PCI-e x8 2 optional PCI-X 133 replaces full-length PCI-E slots	3 Available slots 2 full-length PCI-E x8 Gen 2 1 low-profile PCI-E **x16** Gen 2 2 optional PCI-X 133 replaces full-length PCI-E **OR** 1 optional PCI-E x16 Gen 2
Networking	1 Gigabit NIC	**2** Gigabit NICs
Ports	USB: 2 front, 1 internal, 2 rear Video, Serial, PS/2	USB: 2 front, 1 internal, 2 rear Video, Serial, PS/2
Management	LO100	LO100; System setup and update, health agents, SIM support (Polaris & Lighthouse)
Security		TPM option
Redundancy	HP RPS	HP RPS

HP ProLiant ML150

	ML150 G5	ML150 G6
Processor	Intel Xeon 5000 Sequence	Intel Nehalem - EP
Memory	6 Sockets, [RB] 16GB max.	**12** Sockets, DDR3 **48 GB max (24GB at launch)**
Drive Bays	[4] [LFF] SAS/SATA+ optional 2nd cage for 4 additional drives	[4] [LFF] SAS/SATA+ optional 2nd cage for 4 additional drives
Storage Controller	Embedded SATA RAID 0/1 Optional SC40Ge/SC44Ge/8 Port SAS HBA	**Embedded SATA RAID 0/1** **Optional SA controllers**
Slots	6 Available Slots 5 PCI-e Gen 1 1 PCI 33/32 3.3V	5 Available Slots 1 PCIe x8 Gen1 2 PCIe x8 Gen2 1 PCIe x16 Gen2 1 32b/33MHz PCI 3.3V
Networking	Broadcom 5722	Broadcom 5723
Ports	Front: USB (2), Rear: USB (4), Internal: USB (1); 1 Serial, 1 VGA, 1 LAN	Front: USB (2), Rear: USB (4), keyboard, mouse,Video, 1 Serial, 1 Dedicated Management port, 1 GbE Port Internal: USB (2), tape, drive
Management	LO100c	LO100c
Security		TPM option

HP ProLiant G6 Blade Systems



ProLiant Generation Features

G5	G6
Intel: Front Side Bus architecture; Fully-Buffered (FB) DDR2 DIMMs AMD: NUMA; RDDR-2 DIMMs	Intel : Nahalem processors; NUMA; DDR3 memory AMD: Shanghai, Istanbul processors
Low Power DIMM options	Low Power DIMM options
Interceptor-based Smart Array controllers	PMC-based Smart Array controllers; SA Advanced Pack
2.5″ SAS, SATA HDDs	2.5″ SAS, SATA, SSD HDDs
Integrated 1Gb Ethernet	Integrated 10Gb Ethernet; Flex-10 in some cases
PCI Express 1.0	PCI Express 2.0
Internal USB ports	Internal USB ports & SD card slots
iLO-2	iLO-2
	TPM; Rack: Common power supplies

General guidance only; some features may not be available in some products

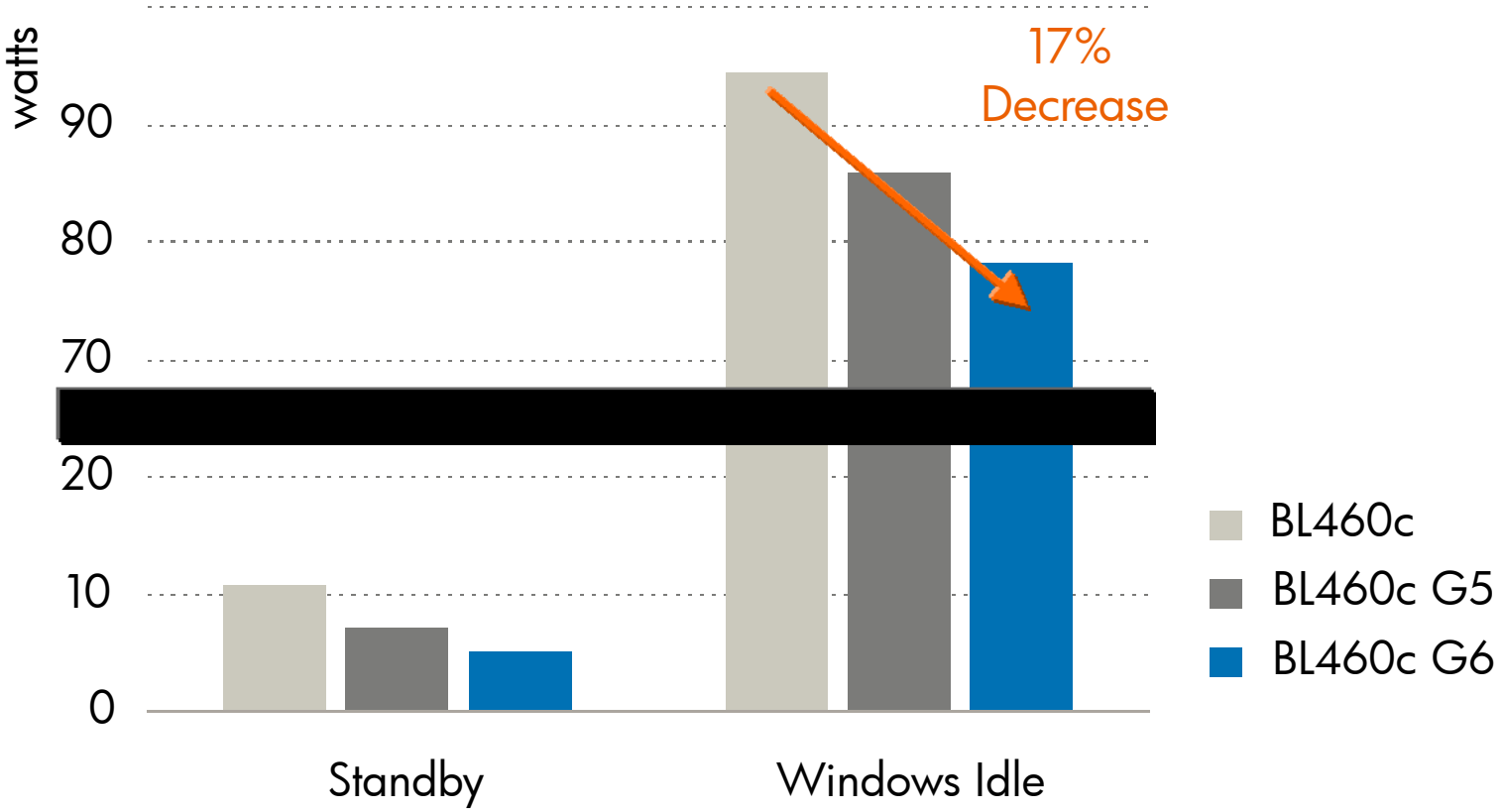
HP ProLiant BL460c G6

	BL460c G6
Processor	• Up to two Dual- or Quad-Core Intel® Xeon® processor 5500 series (Nehalem-EP)
Memory	• 12 DIMM Sockets • Registered or Unbuffered DDR3 DIMMs, up to DDR3-1333 • 96 GB max
Internal Storage	• 2 SFF hot-plug drive bays for SAS or SATA HDDs • Smart Array P410i RAID controller with optional cache & BBWC; RAID 0/1 support • Direct-Attached and Shared Storage connect options
Networking	• Embedded dual-port Flex-10 10GbE Multifunction server adapter

Mezzanine Slots	• 2 mezzanine slots
	  • x8 PCIe Type-1 Mezzanine expansion slot
	  • x8 PCIe Type-2 Mezzanine expansion slot

Additional Features	• Internal USB 2.0 connector • Internal SD Card slot • TPM support
Management	• Integrated Lights Out 2 Standard Blade Edition • Power Meter, Power Regulator, Power Capping
Density	• 16 server blades in 10U enclosure • 8 server blades in 6U enclosure

BL460c Improved Power Efficiency



BL460c and BL460c G5: 1P Xeon E5450 (3.0GHz, 80W), 2 x 1GB FBDIMM, 1 x 72GB SAS
BL460c G6: 1P Nahalem (2.8GHz, 95W), 2 x 1GB DDR3-1333 UDIMMs, 1 x 72GB SAS

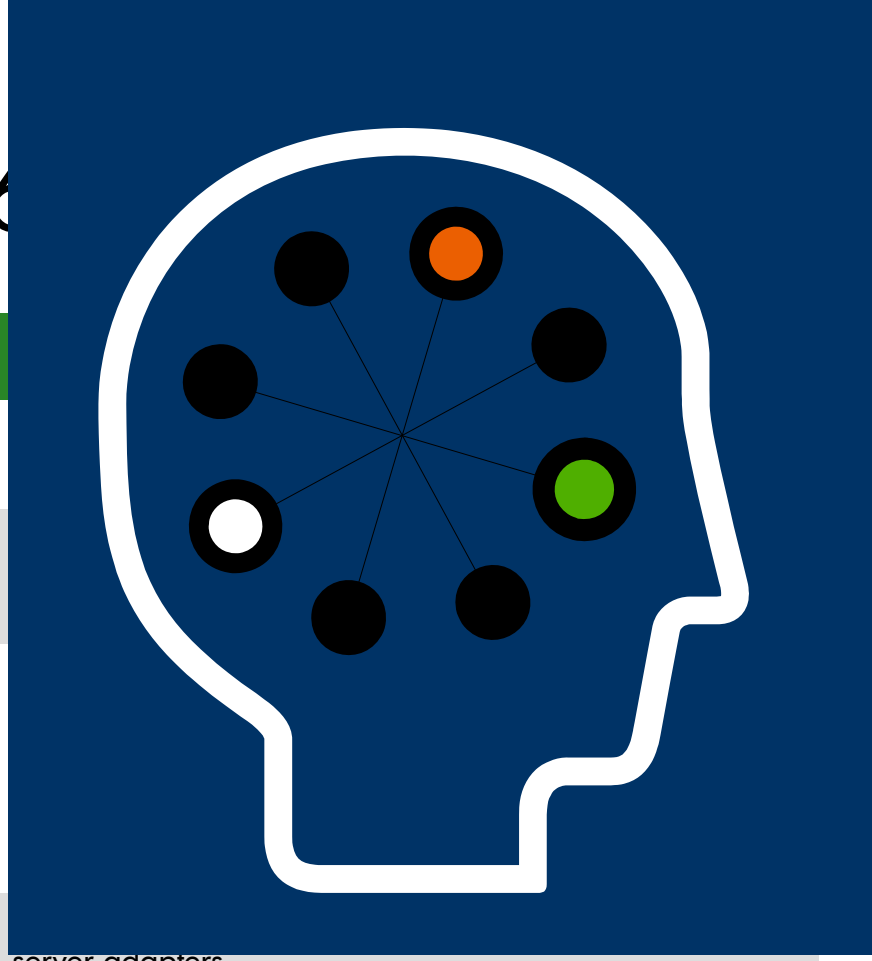
HP ProLiant BL490c G6

BL490c G6	
Processor	• Up to two Quad-Core Intel® Xeon® processor 5500 series (Nehalem-EP)
Memory	• 18 DIMM Sockets • DDR3 Registered or Unbuffered DDR3 DIMMs, up to DDR3-1333 • 144 GB max
Internal Storage	• 2 SFF non hot-plug drive bays (SSD only) • HP Embedded SATA Controller • Direct-Attached and Shared Storage connect options
Networking	• Embedded dual-port Flex-10 10GbE Multifunction server adapter

Mezzanine Slots	• 2 mezzanine slots
	  • x8 PCIe Type-1 Mezzanine expansion slot
	  • x8 PCIe Type-2 Mezzanine expansion slot

Additional Features	• Internal USB 2.0 connector • Internal SD Card slot • TPM support
Management	• iLO-2 Standard Blade Edition • Power Meter, Power Regulator, Power Capping
Density	• 16 server blades in 10U enclosure • 8 server blades in 6U enclosure

HP ProLiant BL685c G6



Processor	
Memory	
Internal Storage	
Networking	server adapters
Mezzanine Slots	3 PCIe x8 mezzanine expansion slots
Additional Features	• Internal USB 2.0 connector • Internal SD Card slot • TPM support
Management	• iLO-2 Standard Blade Edition • Power Meter, Power Regulator, Power Capping
Density	• 8 server blades in 10U enclosure • 4 server blades in 6U enclosure

Transition
G5 -> G6

Transition Roadmap

BESCHREIBUNG	LAUNCH	INTRO	EOL	DISC	2. FQ '09		3. FQ '09			4. FQ '09			1. FQ '10	
					Mär. '09	Apr. '09	Mai '09	Jun. '09	Jul. '09	Aug. '09	Sep. '09	Okt. '09	Nov. '09	Dez. '09
BL460c Server														
HP BL460c G1			1. Aug. '09	31. Okt. '09										
HP BL460c G5			1. Aug. '09	31. Okt. '09										
HP BL460c G6	30. Mär. '09	1. Mai '09												>>>
BL480c Server														
HP BL480c G1			1. Apr. '09	30. Jun. '09										
BL490c Server														
HP BL490c G6	30. Mär. '09	1. Mai '09												>>>
DL160 Server														
HP DL160 G5			1. Jul. '09	30. Sep. '09										
HP DL160 G6	30. Mär. '09	1. Mai '09												>>>
DL180 Server														
HP DL180 G5			1. Jul. '09	30. Sep. '09										
HP DL180 G6	30. Mär. '09	1. Mai '09												>>>
DL360 Server														
HP DL360 G5			1. Sep. '09	30. Nov. '09										
HP DL360 G6	30. Mär. '09	1. Mai '09												>>>
DL380 Server														
HP DL380 G5			1. Sep. '09	30. Nov. '09										
HP DL380 G6	30. Mär. '09	1. Mai '09												>>>
ML150 Server														
HP ML150 G5			1. Mai. '09	31. Jul. '09										
HP ML150 G6	30. Mär. '09	1. Mai '09												>>>
ML350 Server														
HP ML350 G5			1. Aug. '09	31. Okt. '09										
HP ML350 G6	30. Mär. '09	1. Mai '09												>>>
ML370 Server														
HP ML370 G5			1. Sep. '09	30. Nov. '09										
HP ML370 G6	30. Mär. '09	1. Mai '09												>>>
HP DL370 G6	30. Mär. '09	1. Mai '09												>>>