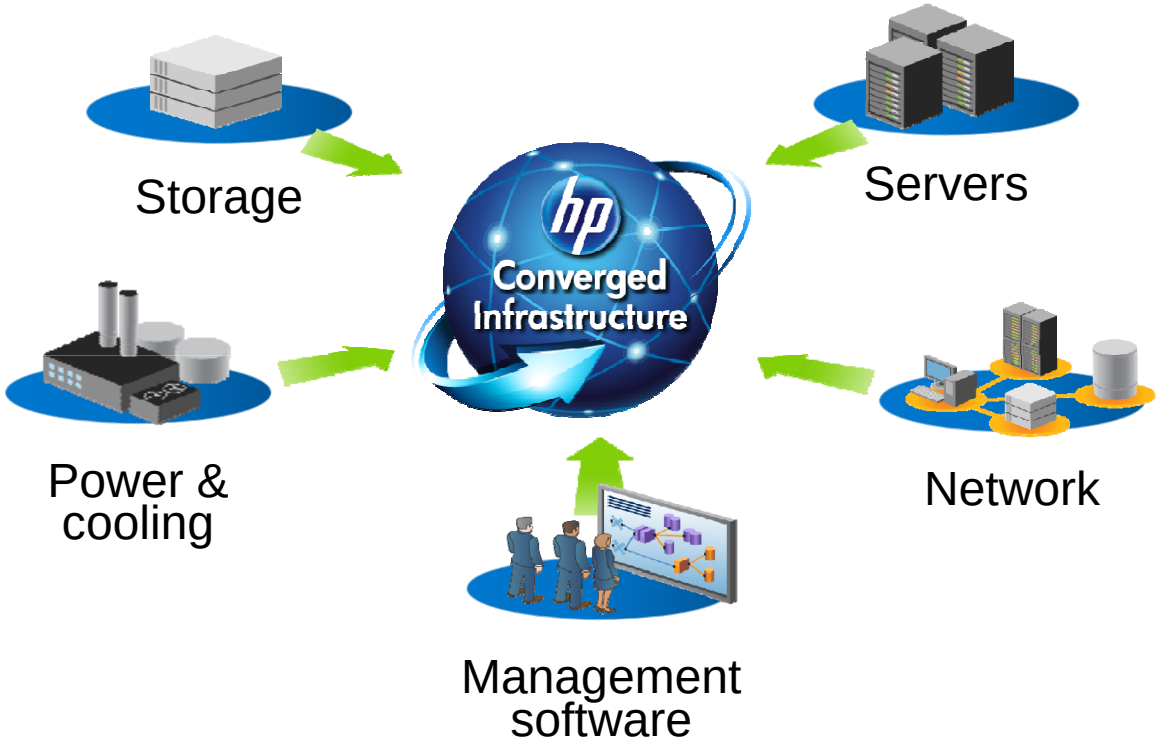
Converged Infrastructure

Transforming the Data Center with HP BladeSystem

Erich Stadler , Technical Consultant Presales

Tomorrow's business will be built on a converged infrastructure



Virtualized • Resilient • Orchestrated • Optimized • Modular

The converged infrastructure architecture defined

Infrastructure operating environment

Enables shared-service management

FlexFabric

Wire-once, dynamic assembly, always predictable

Virtual resource pools

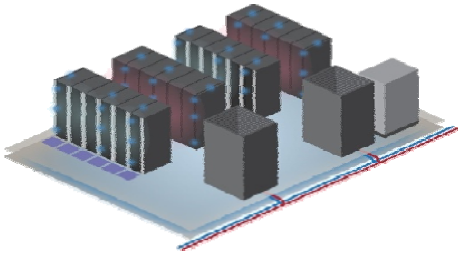
Adaptive compute, memory, storage & network resources

Data center smart grid

Intelligent energy management across systems and facilities

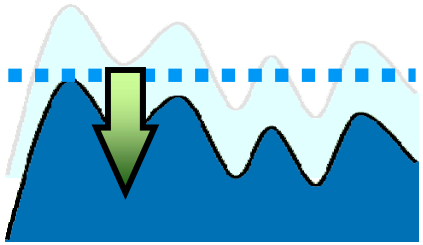
Delivering the converged infrastructure today

Embedded ‘sea of sensors’



Accurate power and cooling measurement of systems & facilities

Intelligent, energy-aware control



Triple the capacity of your data center

Facility-level visualization and control

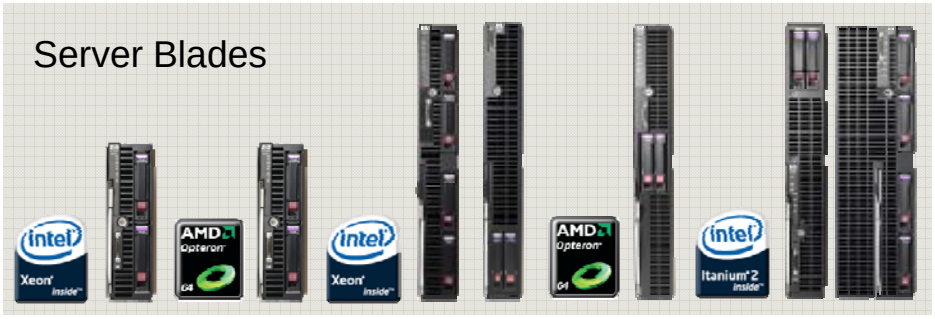
30% increase in cooling capacity

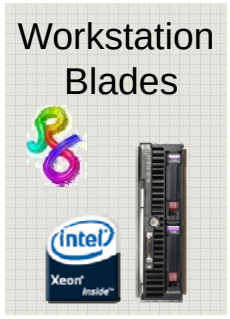
HP BladeSystem and the Converged Infrastructure

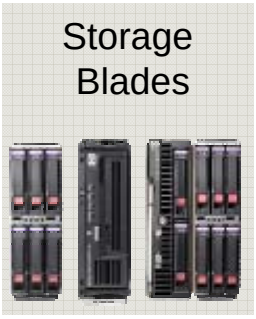
HP BladeSystem c-Class
The most complete Portfolio

Enclosures

A Full Range of 2p and 4p Blades

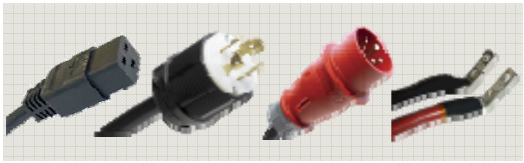






Unified Management

Choice of Power



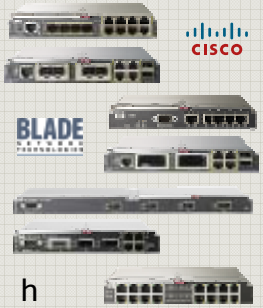
Services

Assessment
Implementation
Support

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

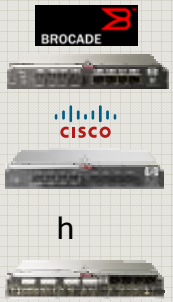
Virtual Connect

LAN



Ethernet NICs

SAN



Fibre Channel

InfiniBand 4X DDR

HP BladeSystem: The ideal foundation for converged infrastructure

Client Virtualization	Small & Remote site	Enterprise Data Center	Massive Scale Out & HPC	Mission Critical	Shared Services
Virtual Desktop, Workstation Blades	c3000, Storage Blades	c7000, Virtualization, Telco	2-in-1 Compute Blades, StorageWorks X9000	Integrity, Integrity Nonstop	BladeSystem Matrix
					
1st system under $1000 per seat	1st SMB blade, Optimized for the “undatacenter”	#1 in blades 12 consecutive quarters	#1 platform on Top500 list	1st NonStop 24x7 service levels on blades	1st converged infrastructure for shared services

BladeSystem delivers real business value…

Rack infrastructure

HP BladeSystem with Virtual Connect Flex-10

34% less power
58% less rack space
97% fewer cables
52% lower interconnect cost
29% less total solution cost

$211,116 **$70k reduction** **$149,376**

Comparison of 16 Dell PowerEdge P610 rack servers versus HP BL460c G6 servers. Includes associated fabric and power infrastructure.

Converged Infrastructure with HP BladeSystem Matrix

Get the benefits of shared services today

Instantly adjust to dynamic business demands

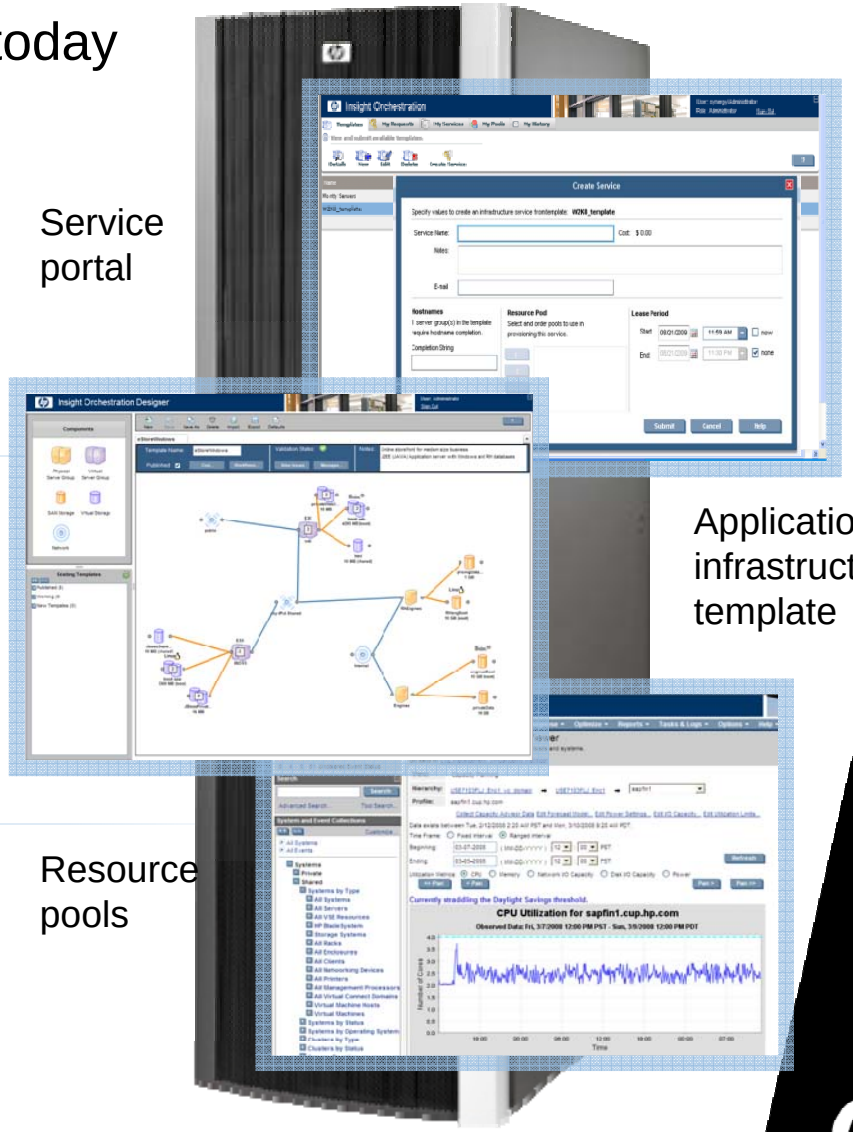
Provision and modify complex infrastructure in minutes, not months

Transform the economics of your data center

Double admin productivity with payback in less than a year

Integrated by design

Built on the industry's leading blade architecture, pre-configured and installed by HP experts



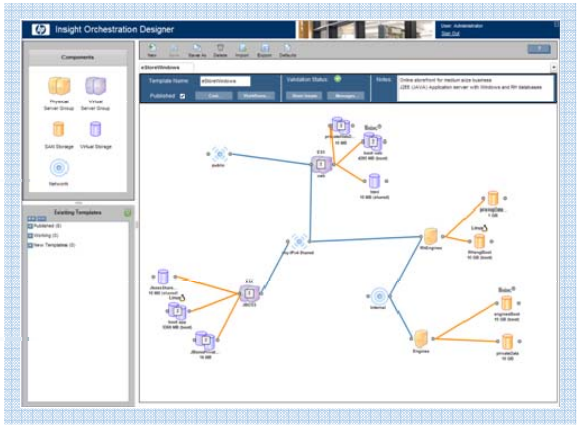
Instantly adjust to dynamic business demands

Provision and modify complex infrastructure in minutes, not months

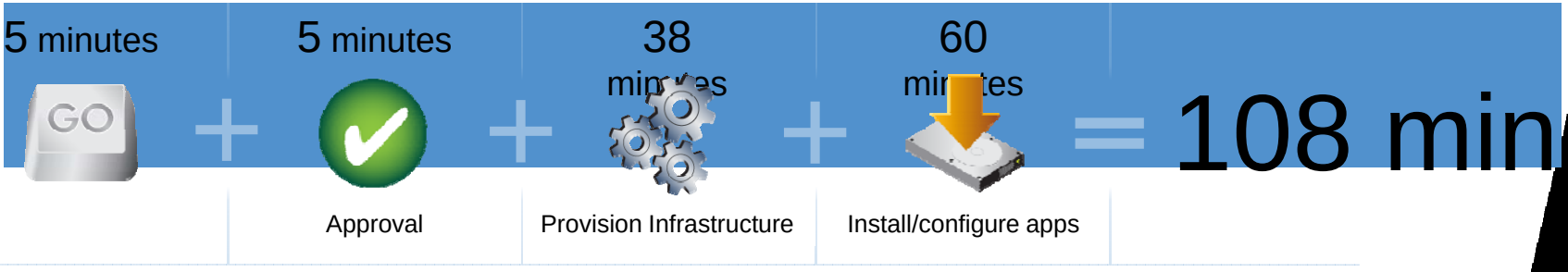
Provision infrastructure in minutes with automated activation of servers, storage and networking.

Optimize infrastructure confidently with built-in capacity planning and rebalancing tools.

Protect continuity of services with automated, cost-effective failover.

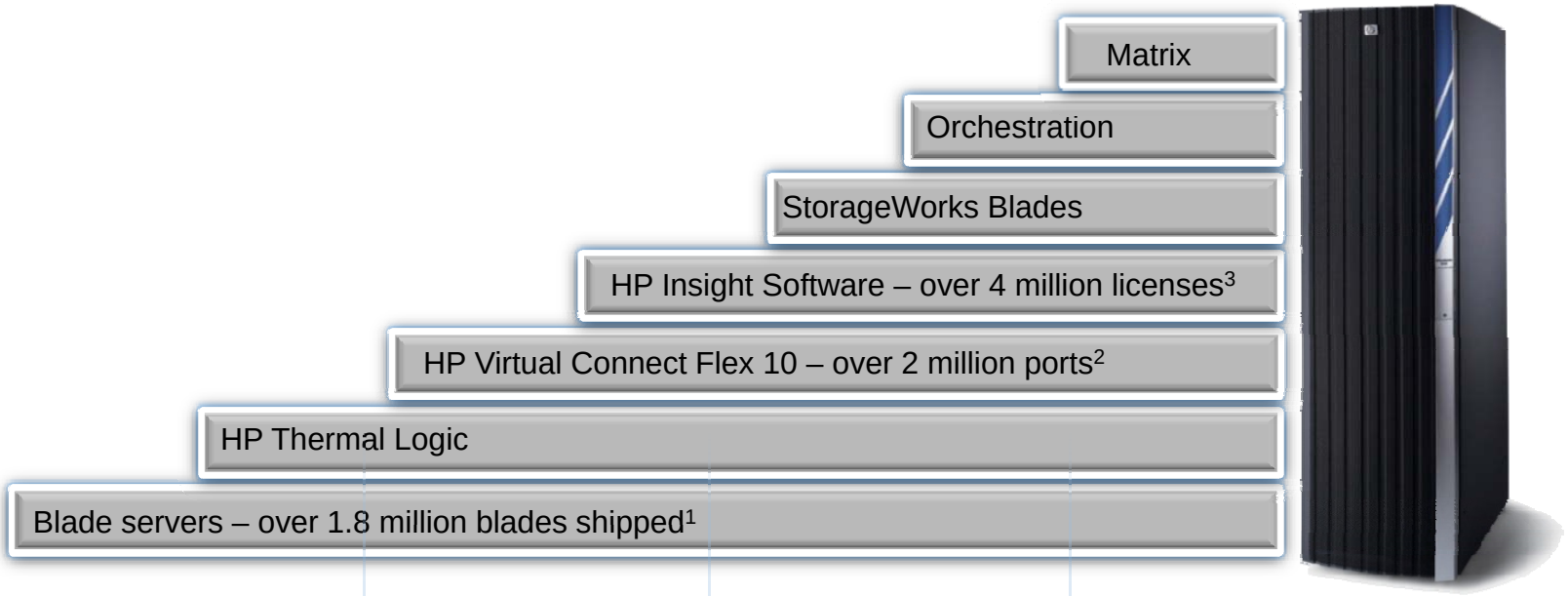


Sample “e-shopping” application infrastructure template



HP BladeSystem: Proven, Integrated

Built step by step over a decade of innovation



29% less total solution cost over rack-mount

97% fewer cables 52% lower interconnect cost

Reduce unplanned downtime by 77%

Double admin productivity with payback in less than a year

1. IDC Quarterly Worldwide Server Tracker Q3CY2009, published December 2009, 2002-2009 data covering HP & Compaq shipments
2. HP internal analysis
3. HP internal analysis

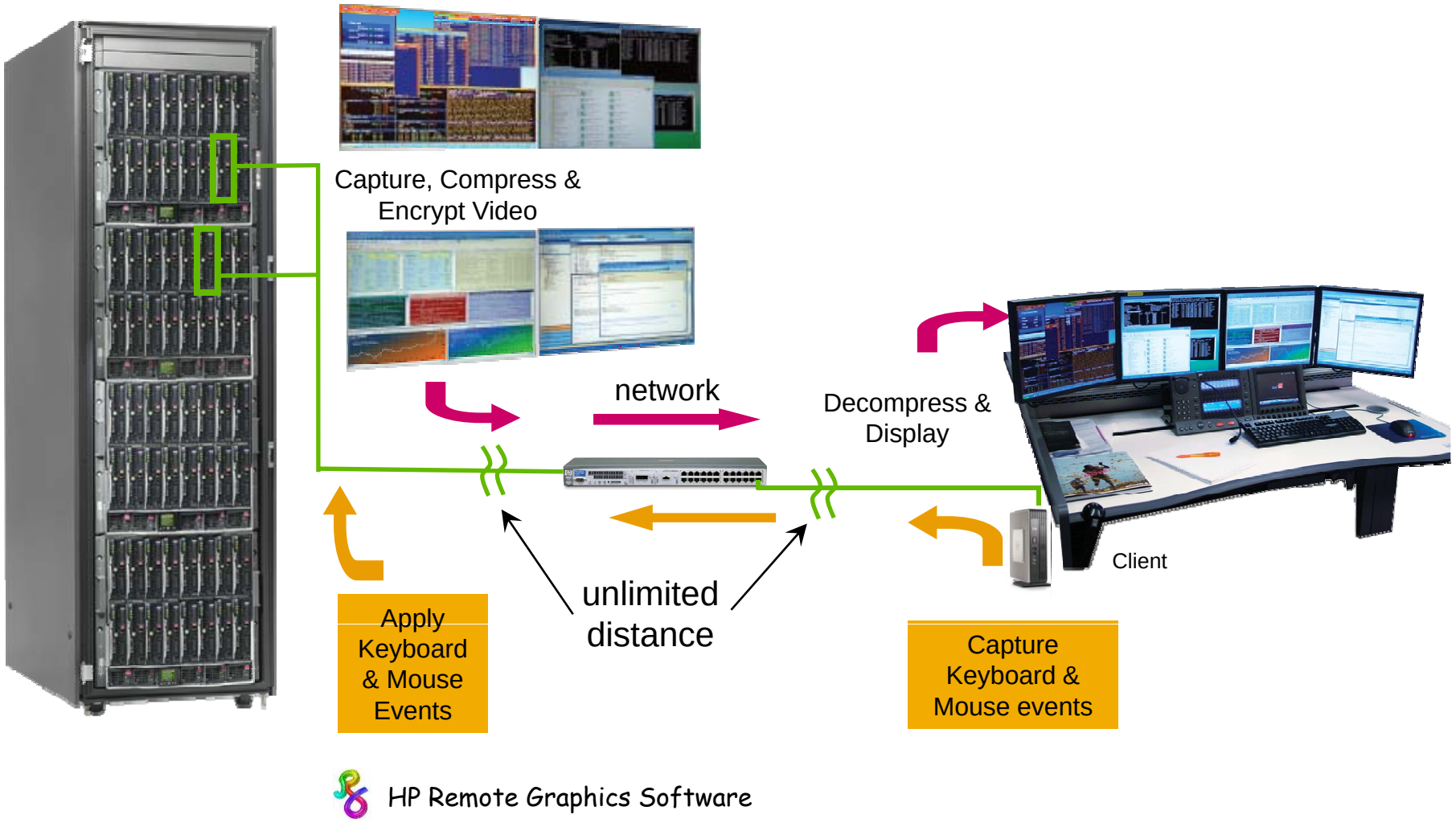
The Bladed Workstation.

HP Blade Workstation Solution

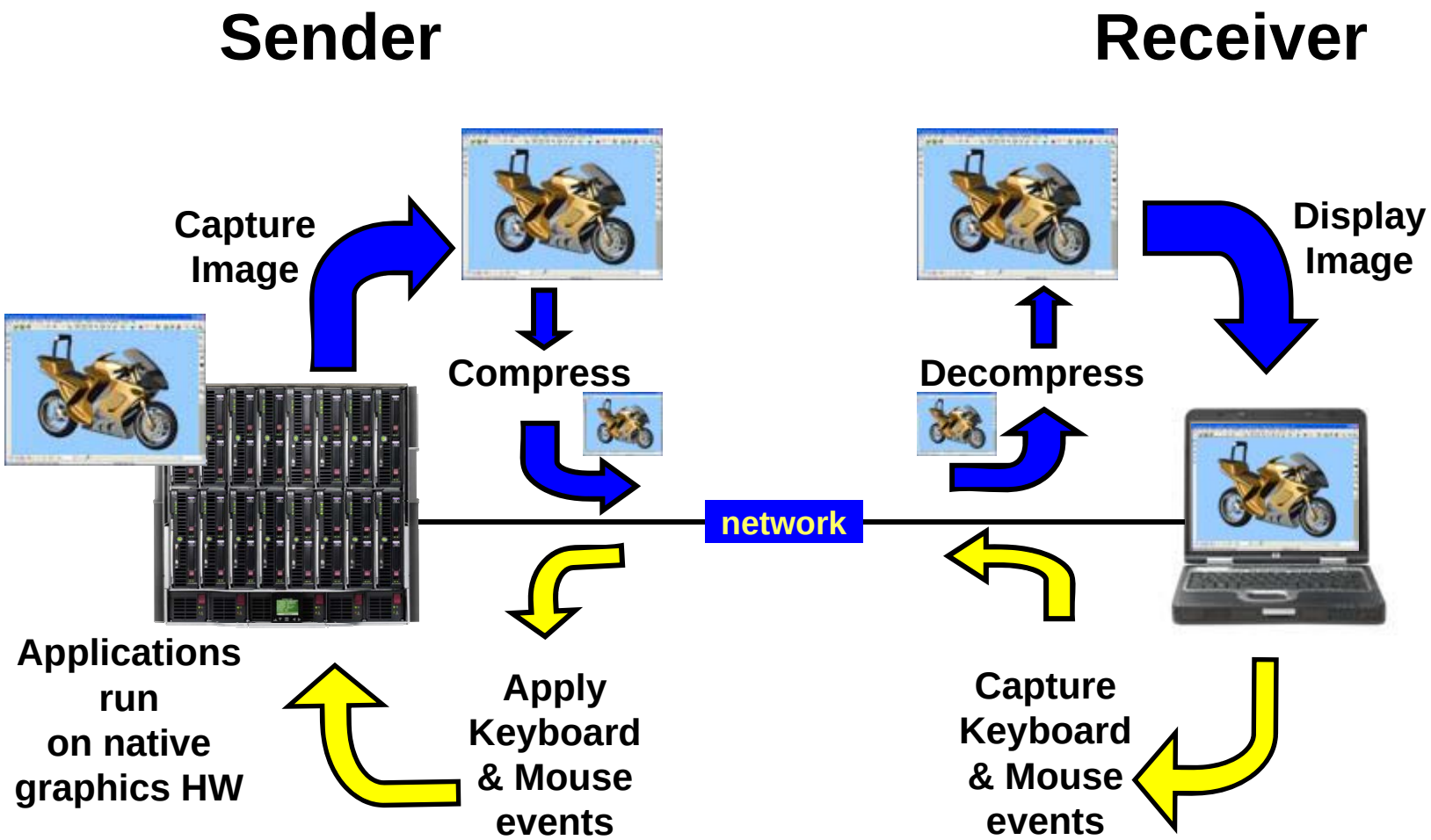
- Data center security and control
- Workstation-class experience
- Multi-location flexibility

Data center workstation computing without boundaries

HP Blade Workstation Solution



How HP Remote Graphics Software works



Low-res, JPG

Specialty Thin Clients: High Performance
HP gt7725

gt7725

High performance for the superb graphics and video

Key Features and Benefits

Superior performance with a 2.3GHz dual-core processor

- Garner the horsepower of workstation client performance in a compact footprint
- Configured with dual channel memory, data throughput is further optimized, bringing new levels of system performance in thin clients

Excellent rich multimedia experience

- Preinstalled with HP Remote Graphics Solution (RGS) software for superb performance of rich 2D/3D graphics, full motion video, Rich Internet Applications, and enhanced browsing
- First HP thin client preinstalled with RGS

Optimized for streaming media VDI implementations

- Supports impressive delivery of streaming media and USB redirection over remote connections with the powerful combination of a high performance thin client + HP RGS
- Ideal for VDI and blade environments

Multi-Display for maximum productivity

- Multi-view, up to four monitors to maximize desktop real estate
- Multi-display rotation for portrait and landscape orientations

Excellent resolution

- Supports 24" & 30" displays
- Dual head: 2560x1600 per display w/two monitors
- Quad head (via expansion module on gt7725): 1920 x 1200 per display w/four monitors

True PC performance but with Thin Client benefits

- More secure, reliable, easier to manage, better TCO

Specialty Thin Clients: Performance
HP gt7725

gt7725

High performance for the superb graphics and video

Key Features and Benefits

OPERATING SYSTEM:	HP ThinPro GT (Linux)
PROTOCOLS:	ICA 10 and RDesktop 1.6
SUPPORTED BROKERS:	HP Session Allocation Manager (SAM), Citrix XenDesktop DDC VMware VDM, Leostream, Provision (Quest)
REMOTE TECHNOLOGY:	HP Remote Graphics Software (RGS receiver)
MANAGEMENT:	ThinState, HP Device Manager, Altiris Deployment Solution, HPCA
SECURITY:	Administrator and user passwords Remote BIOS configurability to disable ports Smart card support, HP Kensington lock (sold separately)
PREINSTALLS	Web browser (Firefox), TeemTalk 5, ICA 10 and RDesktop 1.5, Session Allocation Manager (SAM), ePDFView (PDF viewer), ThinPrint .print TCP client, Debian Package Manager, Synaptic Installer

PROCESSOR:	SYSTEM MEM:	FLASH MEM:	GRAPHICS: (Native Dual Monitor Support, Quad monitor capable)
AMD Turion Dual Core 2.3GHz	2GB DDR2 dual channel	1GB	• ATI Radeon HD 3200 Graphics *(native);* chipset: *RS780G, SB700 Max Resolution 2560 x 1600 at 32 bit per display* • ATI FireMV 2250 Graphics *(for quad head via expansion module) Max Resolution 1920 x 1200 per display*
PORTS: 8 USB 2.0 ports, 1 serial, 2 PS/2, 1 RJ45, 1 DVI-D, 1 DVI-1, (add'l 2 x DVI-I via expansion mod) 1 headphone, 1 mic			
NETWORK: 10/100/1000 Ethernet, PPP, PPPoE, PPTP, L2TP, SNTP, SNMP, TCP/IP with DNS and DHCP, Wake on LAN, PXE			
WEIGHT: Starting at ~1.29kg (2.83lbs)	COOLING: active	DIMENSIONS: 0.99in (at front) x 11.1in x 8.44in 25.2m (at front) x 282.3mm x 214.3mm	

HP BladeSystem enclosures

Blade System c3000 Rack and Tower Versions

BladeSystem c7000

WS460c G6 Workstation Blade

HP ProLiant WS460c G6 Workstation Blade

	WS460c G6
Processor	• Intel Xeon 5500 series Quad-Core processors • Single or Dual processors • Shared 8MB L3 cache
Memory	• Registered or Unbuffered DDR3 • 12 DIMM Sockets • 96 GB max
HDD & Controller	• SFF SAS HDDs (10K & 15K) • SmartArray P410i controller with RAID 0/1; optional cache and BBWC upgrades
Networking	• 2 integrated Multifunction 10Gbe ports (NC532i Dual Port 10GbE Multifunction, Broadcom 57711) • 10/100 dedicated to iLO
Graphics	• NVIDIA Quadro FX 3600M 512MB • NVIDIA Quadro FX 770M 512MB • NVIDIA Quadro FX 770M 256MB (Single or Dual cards)
Management	Intelligent Administrator / iLO2 Advanced
Chipset	Intel 5500
OS	Support for: • Microsoft Windows XP, x64, Vista Business Blade edition • Red Hat Enterprise Linux (v.4.8 & v.5.3)

HP xw series Blade WS portfolio

HP ProLiant Blade Workstation – Datacenter workstations

Extreme density | High Performance | Extreme 3D graphics

Expandability

Graphics performance

xw2x220c

- 128 users per 42U rack density
- 2-socket, Intel Xeon per node
- MXM mezzanine graphics
- Dual-display
- Mid-range 3D graphics
- 32GB memory capacity per node
- One SATA HDD per node
- Best per seat cost

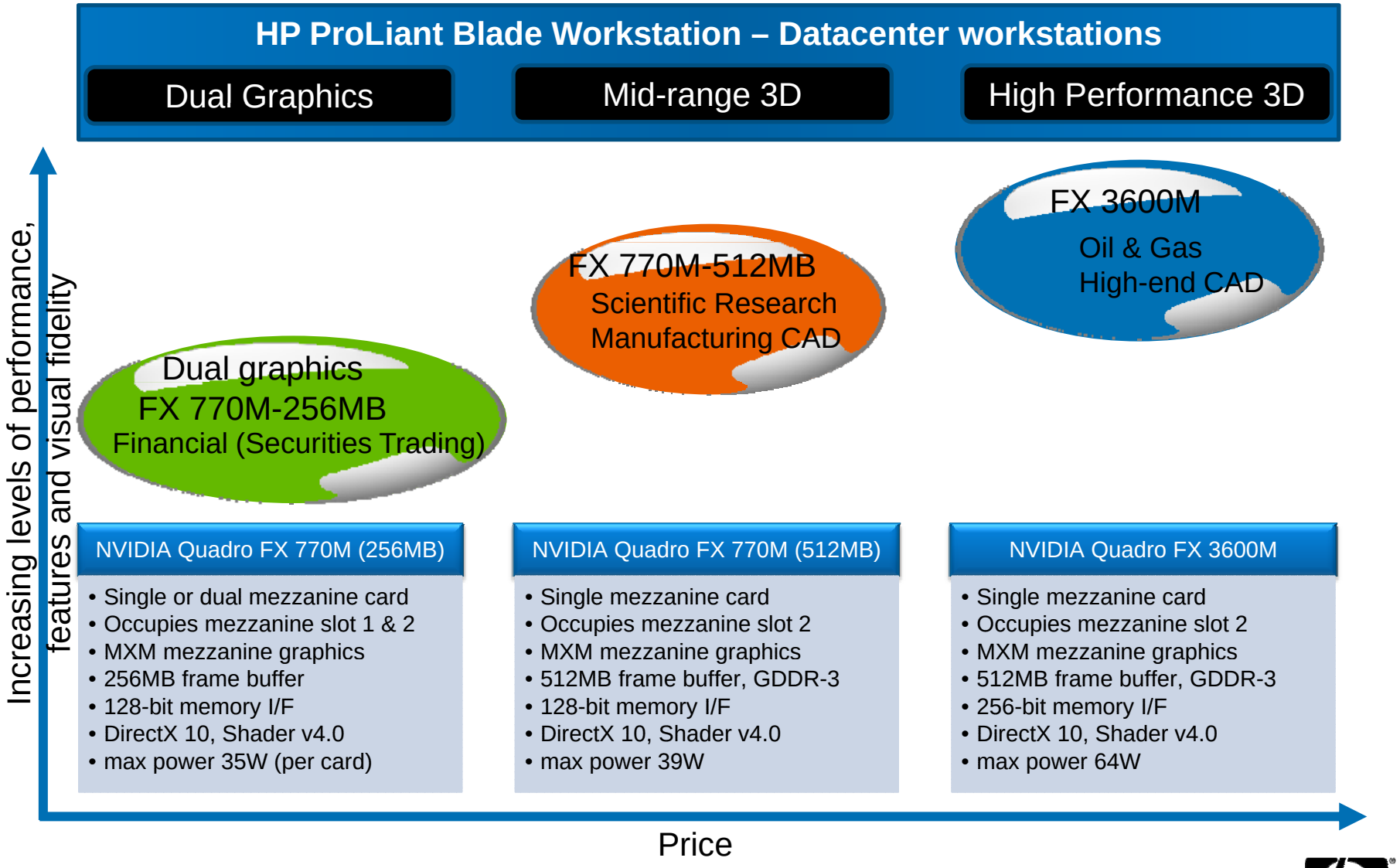
xw460c

- 64 users per 42U rack density
- High-performance system
- MXM mezzanine graphics
- Quad-display (Dual-graphics)
- High-end 3D graphics
- Mezzanine I/O (SAN, Network)
- 64GB memory capacity
- Two SAS, hot-pluggable HDD with RAID

xw460c with expansion

- 32 user per 42U rack density
- High-performance system
- Desktop standard PCIe graphics
- Extreme 3D graphics
  - NVIDIA Quadro FX 5800 (4GB)
  - NVIDIA Quadro FX 4800 (1.5GB)
- 64GB memory capacity
- Two SAS, hot-pluggable HDD with RAID

Graphics Mezzanine portfolio



HP WS460c G6 Graphics Expansion Blade

Shown with NVIDIA Quadro FX card installed

Released March 2010

HP WS460c G6 Graphics Expansion Blade	
Chassis	• HP BladeSystem c-Class, half-height blade module • Powered independently from backplane • Physically attached to host WS460c workstation blade • Connects via mezzanine slot 1 & 2 on WS460c
Slot 1 & 2	• Two, standard full-length, PCI Express slots • PCIe x8 Gen2
Graphics support	• NVIDIA Quadro FX 5800 (4.0GB) PCIe NVIDIA Quadro FX 4800 (1.5GB) PCIe • NVIDIA Quadro FX 3800 (1.0GB) PCIe

FX 5800

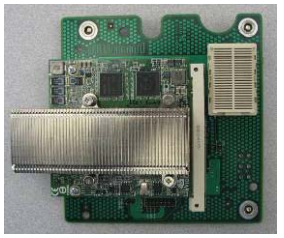
FX 4800

FX 3800

Windows XP | Windows Vista | Red Hat Linux | Windows 7

Flex-10

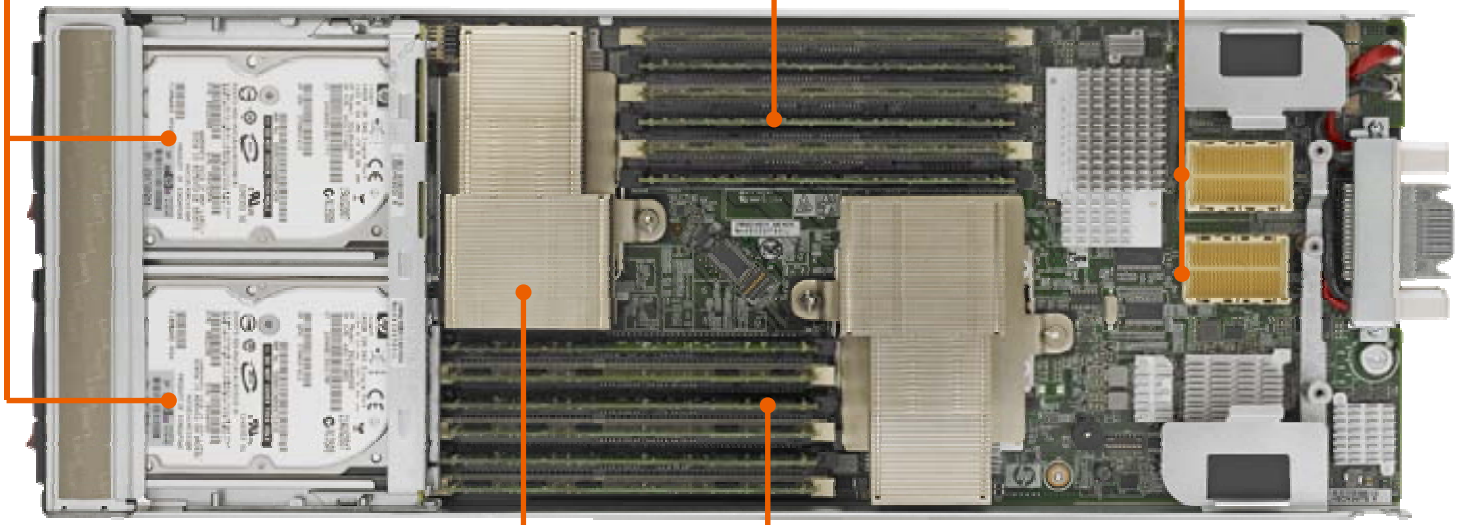
WS460c G6 Internal View



Mezzanine Slots:
• MXM Graphics mezzanine
• NVIDIA Quadro FX770M or FX6600M

Two hot-plug SAS drive bays

6 memory slots for processor 2



Processor 1

6 memory slots for processor 1
Registered DIMM or Unbuffered DIMM

New G6 Solid State Midline Drives

- Drop in hard drive replacement
- Extreme Ruggedness
- High Read Performance
- Improved Write performance
- Increased Reliability
- ~2W vs. ~9W SFF SAS and 4W SFF SATA
- Thermal, Size and Acoustic Advantages

Available Mid 2009

	G6 Solid State Drives Specifications*
Form Factor	• SFF Hot Plug and Non-Hot Plug
Capacity	• 60GB and 120GB
Interface	1.5Gb/s SATA
Power Consumption	• ~2W
Performance	• Up to 25x 15K SAS SFF random read performance • Up to 3x 15K SAS SFF random write performance • NCQ • Smart Array support
Target Platforms	ProLiant portfolio G6 platforms, including WS460c G6/ BL460c G6

* Subject to change

HP logo blue on white

Technology for better business outcomes