



3331 Quantifying the value proposition of blade systems

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Common questions



What are the benefits of blades?

What is the value proposition?

Why do customers buy blades?

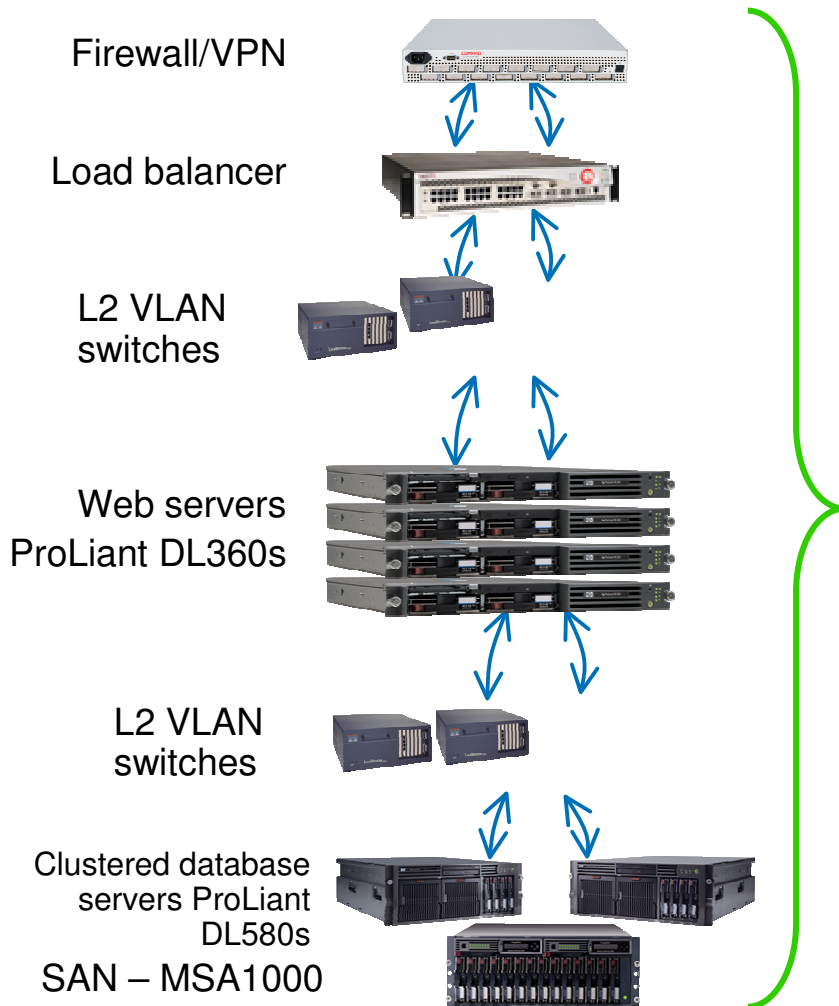
Blades vs. standard rack-mounted servers? When should I buy one vs. the other?



Agenda

- What are blade systems?
- Why are they being adopted?
- Comparing blades to rack-mounted servers
 - Space, power, cabling, management, acquisition, etc.
- Sample comparisons – blade systems vs. rack-mounted server systems
 - Acquisition costs
 - TCO and ROI: using a customer tailorable model
- Summary

Blade systems: integration of servers, network, and storage



Rack-mounted server
architecture



ProLiant BL10e

L2 VLAN switch

ProLiant BL20p

ProLiant BL40p

L2 VLAN switch

BL p-Class power

Management
servers

SAN – MSA1000

Blade system
architecture



HP Blades Built On Trusted ProLiant Engineering



HP Red Hat SBF
(Standard Build Framework)



ML Maximize Line



DL Density Line



Automatic Provisioning

- Blade PXE Boot:
- What Is My Personal ID?
- Pre-assigned RDP Slot
- Red Hat Personality
- Build Commences
- 30 Minutes



Step 2: Buy Red Hat SB and create server image

All 300 Series Offer

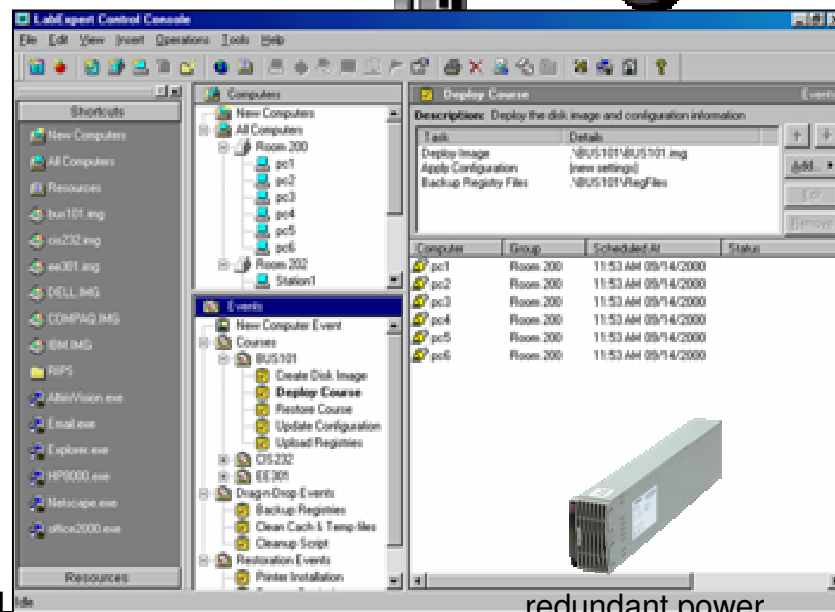
- Intel's Latest Dual Core
- Universal SCSI Drives
- 5i Array Controller
- Integrated NICs
- Integrated Lights Out



Step 3: Log-On to RDP Server And Designate Target Slot

- Any Device
- Anywhere

Integrated Switch or patch panel



BL

redundant power

HP WORLD 2004
power enclosure
N+N pooled power

Customer needs drive a new server architecture



Rapid serviceability and continuous uptime

- Rapid deployment and redeployment tools
- Hardware and software

Centralized management

- Servers, networking, storage, and applications
- Centrally manage your data center: 1 blade or 1000s ... anywhere ... anytime

Improve efficiency in data center management

- Move to '000s of devices managed by each administrator
- Improve server utilization

Flexibility and adaptability

- Dynamic resource allocation



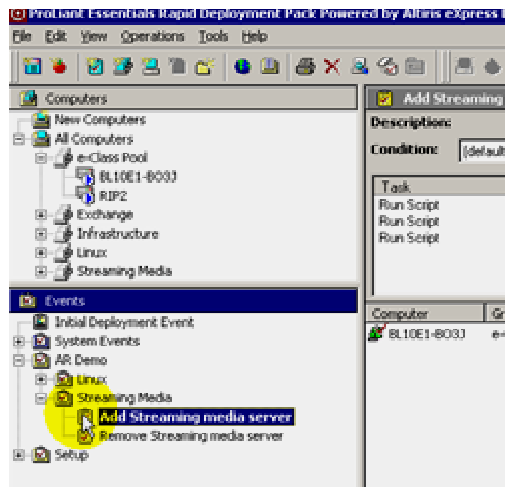
HP Blades Optimized for Installation & Change

A catalyst to enabling an Adaptive Enterprise



Save people time in installation, upgrades, and maintenance

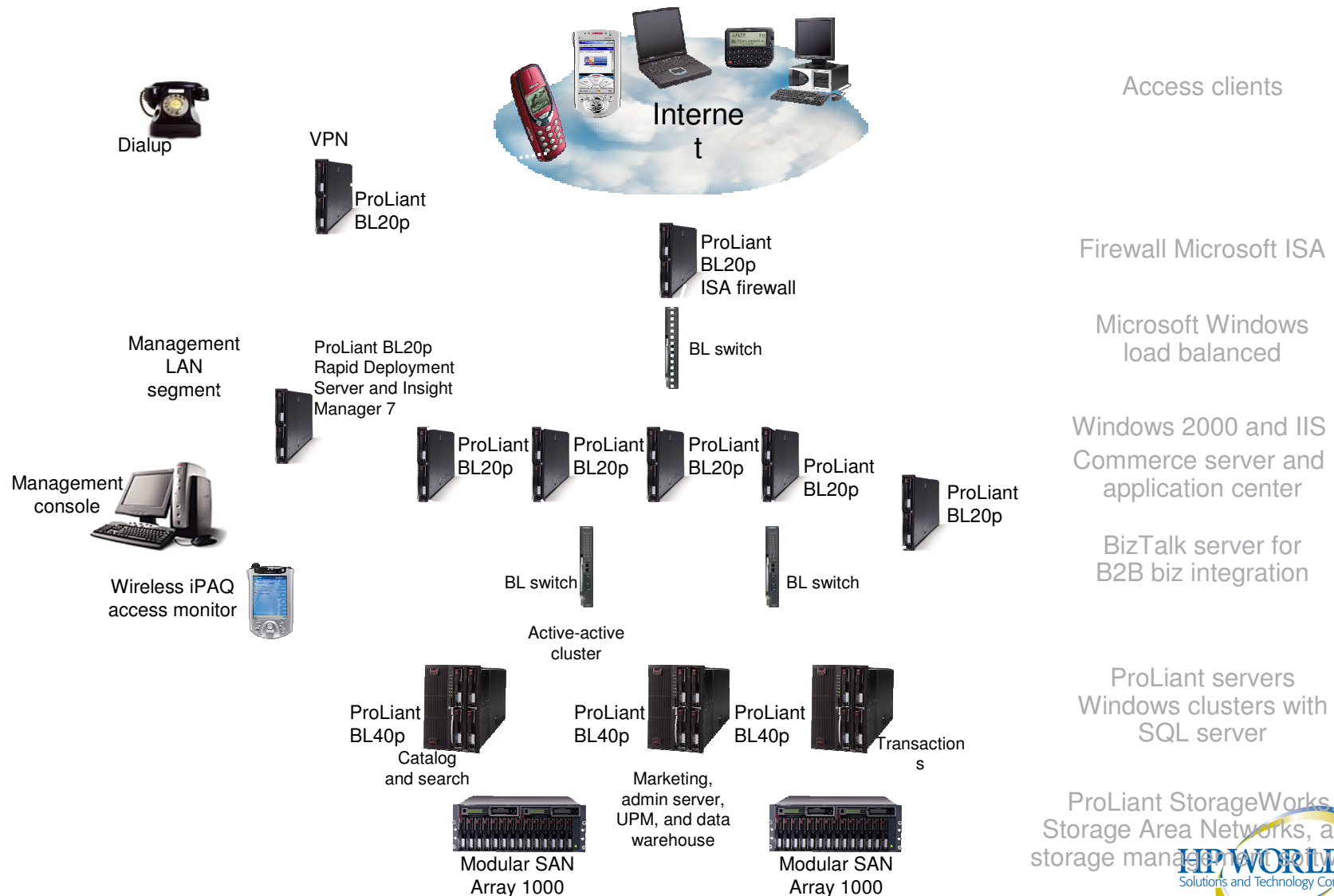
- Rack & wire once
- Configure and re-configure with software tools
- Move from days to minutes to add and re-configure servers, network ports, cables, and disk capacity
- Virtual presence to manage any blade, from anywhere
- Automatic failover to spare servers



**Simple, structured, modular,
automated and low touch.**



e-Commerce storefront example application of ProLiant BL servers



What are the benefits?

- Saving data center space and power
- Lower connectivity costs and simplified cabling
- Fewer spare parts
- Save time in installation, upgrades, and maintenance
- Higher system availability
- Improve data center efficiency
 - Remote access for centralized management
 - Automated deployment and provisioning
- Equal or lower acquisition costs

Blade System TCO Calculator

(the spreadsheet model is available from your HP sales representative)



3 Year TCO Calculation

Summary

Number of Servers Compared	8
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Scenario	BL20P G2	1U Server	BL20p G2 Savings
TCO / NPV	\$ 44,661	\$ (115,473)	\$ 160,133
3 year TCO per server	\$ 5,583	\$ (14,434)	\$ 20,017
Acquisition Cost	\$ (79,926)	\$ (97,212)	\$ 17,286
Installation Cost	\$ (2,333)	\$ (8,653)	\$ 6,320
Yearly Operational Value	\$ 53,176	\$ (4,000)	\$ 57,176

Details

1U Server Scenario

Acquisition Costs

Server Acquisition cost

\$ 44,528

=from Step 4 includes FC HBA cost

Infrastructure Acquisition Costs from Step #4

\$ 52,684

Installation Costs

Racking costs

\$ 5,600

=rackable items x time to rack one x labor rate

Additional Power related installation

\$ 2,000

=from Step #1 input value

Cabling Costs

\$ 1,053

=number of cables x time to install one x labor rate

Maintenance/Upgrade Costs

= # of servers x # of events per year x time to remove and install x labor rate

\$ 4,000 \$ 4,000 \$ 4,000



Blade TCO tool

- The BL20p TCO tool is a spreadsheet-based model that creates a 3-year TCO (based on an NPV) for 2P blade servers and a comparative value for 1U rack mounted servers (example: DL360).
- The tool uses customer-specific data (labor rates, pricing, power costs, etc.) combined with rack configuration rules to create a specific answer for each customer.
- A key benefit of the tool is its ability to create “what if” scenarios to aid in the decision making process.
- The tool is revised monthly as variables change and as additional functionality is added.
- *The tool is available from your HP sales representative.*

Space

Saving data center space 14% to 24%

- Cost per square foot of data center space is \$1000 - \$5000+ per year
- Practical number of servers per rack:

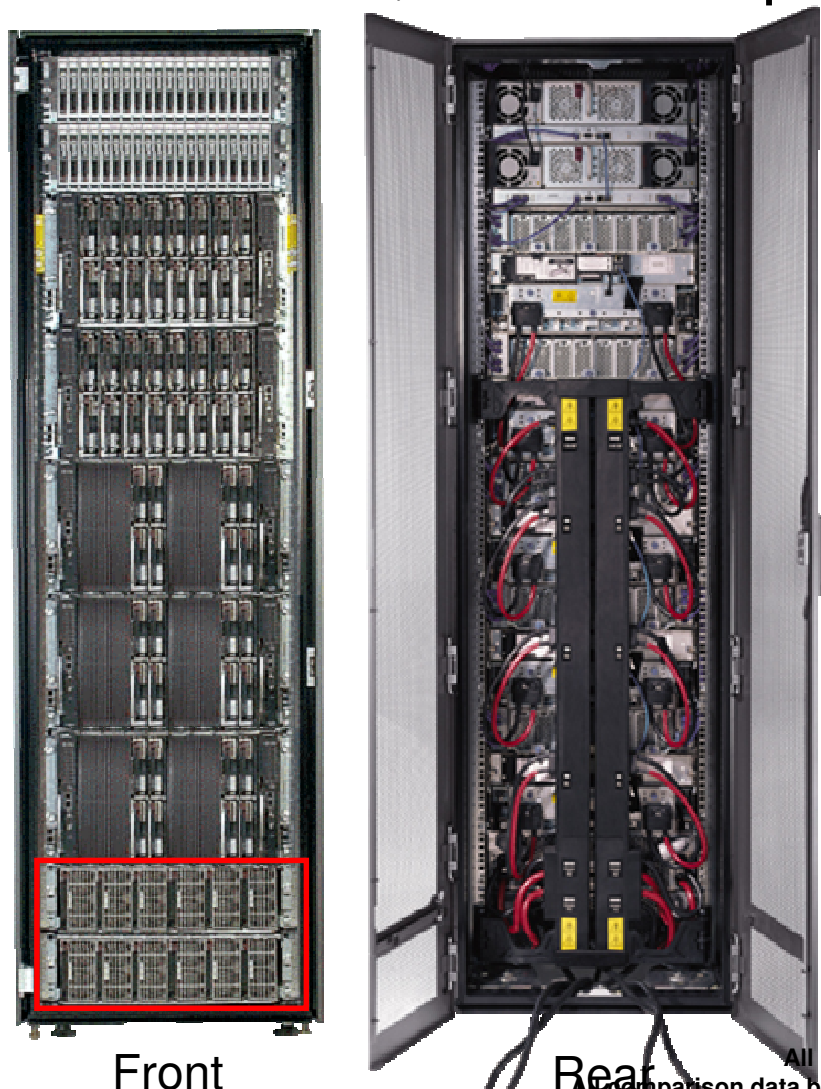
Blades	48 (moving to 96)
R-M servers	Less than 30

- Range of data center costs:

NYC	\$5000 per sq. ft.
Houston	\$1000 per sq. ft.

Pooled Power for HP Blades

Centralized, redundant power sub-system



Front

Rear

- 3U power enclosure, up to 6 hot plug power supplies for N+N redundancy
- Fully redundant power to the server enclosures using bus bars
- High voltage (208-250VAC) @ 30A inputs or facility DC input, Single- and three-phase
- Power & Cooling calculator for planning

No. of Servers	Better Power Efficiency		
	BL20p	DL360 G3	Savings
8	2,494	3,328	25%
16	4,987	6,656	25%
24	7,896	9,072	13%
32	9,691	13,312	27%
40	12,114	16,640	27%
48	14,536	18,144	20%

All power consumption shown in Watts
 All comparison data based on ProLiant Power Calculators
 2P 3Ghz/512mb, 1Gb Mem, 2x18Gb Hdd, Dual Fiber per server

Power

- Centralized Power subsystem provides better power efficiency
- Blade systems eliminate the need for PDUs in the rack (up to \$4000 per rack)
- Reduced cabling & power centralization lowers BTUs and improves heat dissipation
- ProLiant power calculators
 - Calculates wattage and BTUs for various ProLiant servers
 - <http://h18001.www1.hp.com/partners/microsoft/utilities/power.html>

Example:

- 8 DL360
- 8 BL20p G2

8 DL360s	326w per server
8 BL20p G2s and enclosure	307w per blade

Cabling and network connectivity costs

- Lower connectivity costs and simplified cabling
 - Significantly fewer cables!
 - Up to 25% of system admin's time is spent in cable management, and cable failures are a prime cause of downtime – Giga Group
- Network connectivity costs:

Fewer cables

10-100 ports

Gigabit ports

8 R-M servers	8 ProLiant BL blades
16-32 downlink cables	2-4 uplink cables
\$40-\$150 copper \$65-\$385 fibre per port	\$54 per switch port (copper or fibre)
\$180-\$1060 per switch port	\$92 per switch port

Fewer parts & simpler maintenance



Fewer spare parts; simpler daily management

- Blades have fewer options – memory and disks
- Blade architectures are designed for shared storage ... all user changeable data should be on NAS and SANs
- Blade servers run OS and applications only ... facilitates standard server builds/images
- Back-ups are needed for NAS and SANs; not every server.
- Blade disks are managed by software deployment tools, such as RDP ... benefits: fewer errors in OS, patch, and application maintenance

Installation and changes

Save time in installation, upgrades, and maintenance

- Rack and wire once! ... re-configure with software tools
- Move from days to minutes to add and re-configure servers, network ports, cables, and disk capacity
- Blade systems are a catalyst to improving data center ratios (devices managed per administrator)

Availability

- Higher system availability; no need to plan for availability
- Blades are fully redundant
 - Dual VLAN switches per blade enclosure
 - Redundant and shared power systems across all blades in a rack
 - Redundant backplane data paths (Ethernet and FC SAN)
 - Redundant local disks (RAID 1)
 - Redundant fans
 - Rip and replace server maintenance (via enclosure slot, and via software deployment tools like RDP)

Data center efficiency

Blade systems are a catalyst to improving data center ratios (devices managed per administrator)

- Reduce the need to touch every device in the data center
- Adopt new management tools (configuration, software deployment, automated provisioning, etc.)
- Centralize the management of multiple data centers
- Merge separate management domains (servers, network, storage)

Today 900 devices	15 to 1	\$6M per year
Tomorrow	30+ to 1 100 to 1* <i>* some ISPs are at this ratio</i>	\$3M per year

Acquisition Costs – what is compared?



Blade System	1U Rack-mounted servers
<ul style="list-style-type: none">• BL20p Blade servers (2P Xeon 3.06 GHz)• 1 GB memory• 2 internal disks• FC Interconnect module• Blade enclosures and power subsystem• Blade Interconnect L2 VLAN switches - GbE• Cables, racks• FC switch - external	<ul style="list-style-type: none">• DL360 servers (2P Xeon 3.06 GHz)• 1GB memory• 2 internal disks• KVM switches and cables• PDUs in the rack• External L2 VLAN switches – GbE• Cables, racks• FC switch - external

Acquisition Cost Summary (8 servers)



	<u>SAN connected</u>	<u>No SAN connectivity</u>
<u>10/100 Network</u>	Blade systems are ~7% less costly	Blade systems are ~1% more costly
<u>GbE Network</u>	Blade systems are ~19% less costly	Blade systems are ~17% less costly

Note: The above summary ignores blade system savings from datacenter space, power & cooling, installation & operational efficiencies.

Acquisition Cost Comparison

(8 servers, Gigabit Network, SAN attached)



HP ProLiant BL20p G2 versus 1U Servers

Revised 4/23/2004

Step #4 - Acquisition Cost

BL20P Scenario		Total Cost	\$	90,302	1U Server	Total Cost	\$	104,388
	Servers		\$	45,944	Servers		\$	51,704
	Servers		\$	37,952	Servers		\$	33,312
	Total FC Ports		\$	7,992	Total FC Ports		\$	18,392
	Infrastructure		\$	44,358	Infrastructure		\$	52,684
	Total Racks		\$	2,718	Total Racks		\$	2,718
	Blade Enclosures		\$	2,932				
	Power Enclosures		\$	4,252				
	Bus Power Box		\$	341				
	Mini-Bus Bar		\$	-				
	Scalable Bus Bar		\$	-				
	PDU's		\$	-	PDU's		\$	872
Switching	C-Gbe Switch Pair		\$	-	Network Switches		\$	13,440
	Network Patch Panel Pair		\$	-	KVM switches		\$	6,350
	C-Gbe Switch/FC Patch Panel Pair		\$	6,098	KVM Cables		\$	1,215
	FC Patch Panel Pair		\$	-				
	FC Switches		\$	28,000	FC Switches		\$	28,000
	Cat5 Cables		\$	17	Cat5 Cables		\$	89

Summary

- Blades are often less expensive than rack-mounted servers! (acquisition costs)
- In comparison to rack-mounted servers, blade systems are easily justified by space, power, and operational efficiencies!
- Use blade systems as a catalyst to an adaptable & flexible datacenter infrastructure!

So, Why Not Blades?



HP Blades Reduce Hard Costs

	Traditional 1U Servers	ProLiant p-class blades
Acquisition Costs (based on 8 servers)	ProLiant DL360G3 w/ Ethernet and SAN	up to 19% savings
Cabling Connectivity (based on 40 servers)	40x3 network + 40x2 power = 200 cables	5x2 network + 4 power = 14 cables 93% reduction
Data Center space (density per 42U rack)	36 servers + Ethernet switches	48 - 96 servers + Ethernet switches 25 - 60% reduction
Power and Cooling (based on 40 servers)	16.6kW*	12.1kW 27% savings
Installation, provisioning, & re-purposing	8 hrs. per server	10 - 30 min. per blade 94% - 98% reduction
Productivity of datacenter management (ratio of devices managed by each admin.)	15 to 1	At least 30 to 1 >100% improvement



Questions?



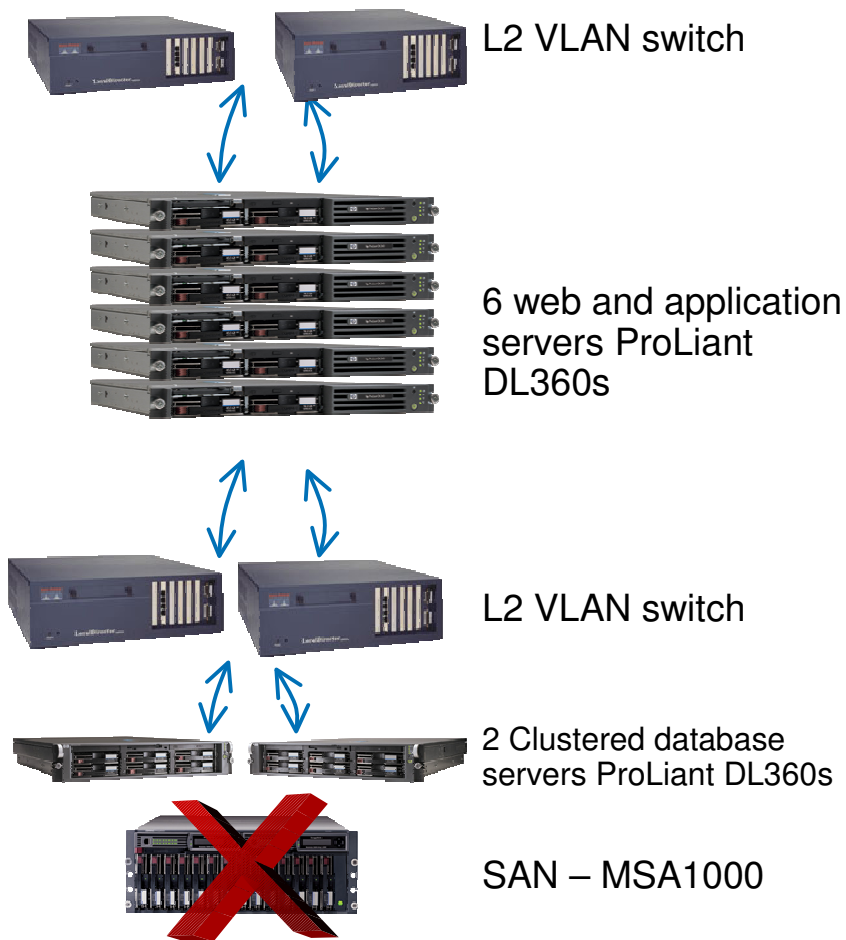


Back-up slides

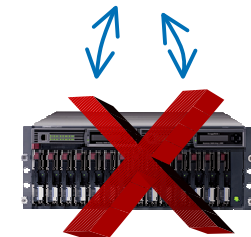


Acquisition Cost Comparison

(8 servers, 2 switches, and SAN connectivity)



Rack-mounted server architecture



Blade system architecture



Acquisition Cost Comparison

(8 servers, 10/100 Network, no SAN)

HP ProLiant BL20p G2 versus 1U Servers

Revised 6/12/2004

Step #4 - Acquisition Cost

BL20P Scenario		Total Cost	\$	46,734	1U Server		Total Cost	\$	46,317
	Servers		\$	37,952		Servers		\$	33,312
	Servers		\$	37,952		Servers		\$	33,312
	Total FC Ports		\$	-		Total FC Ports		\$	-
	Infrastructure		\$	8,782		Infrastructure		\$	13,005
	Total Racks		\$	1,359		Total Racks		\$	1,359
	Blade Enclosures		\$	2,039					
	Power Enclosures		\$	2,619					
	Bus Power Box		\$	149					
	Mini-Bus Bar		\$	-					
	Scalable Bus Bar		\$	-					
	PDU's		\$	-		PDU's		\$	872
Switching	C-Gbe Switch Pair		\$	2,599		Network Switches		\$	3,120
	Network Patch Panel Pair		\$	-		KVM switches		\$	6,350
	C-Gbe Switch/FC Patch Panel Pair		\$	-		KVM Cables		\$	1,215
	FC Patch Panel Pair		\$	-					
	FC Switches		\$	-		FC Switches		\$	-
	Cat5 Cables		\$	17		Cat5 Cables		\$	89

Acquisition Cost Comparison (8 servers, Gigabit Network, no SAN)



HP ProLiant BL20p G2 versus 1U Servers

Revised 6/12/2004

Step #4 - Acquisition Cost

BL20P Scenario		Total Cost	\$	48,534	1U Server		Total Cost	\$	56,637
	Servers		\$	37,952		Servers		\$	33,312
	Servers		\$	37,952		Servers		\$	33,312
	Total FC Ports		\$	-		Total FC Ports		\$	-
	Infrastructure		\$	10,582		Infrastructure		\$	23,325
	Total Racks		\$	1,359		Total Racks		\$	1,359
	Blade Enclosures		\$	2,039					
	Power Enclosures		\$	2,619					
	Bus Power Box		\$	149					
	Mini-Bus Bar		\$	-					
	Scalable Bus Bar		\$	-					
	PDU's		\$	-		PDU's		\$	872
Switching	C-Gbe Switch Pair		\$	-		Network Switches		\$	13,440
	Network Patch Panel Pair		\$	-		KVM switches		\$	6,350
	C-Gbe Switch/FC Patch Panel Pair		\$	4,399		KVM Cables		\$	1,215
	FC Patch Panel Pair		\$	-					
	FC Switches		\$	-		FC Switches		\$	-
	Cat5 Cables		\$	17		Cat5 Cables		\$	89

Acquisition Cost Comparison

(8 servers, 10/100 Network, SAN attached)



HP ProLiant BL20p G2 versus 1U Servers

Revised 6/12/2004

Step #4 - Acquisition Cost

BL20P Scenario		Total Cost	\$	87,584	1U Server		Total Cost	\$	94,068
Servers			\$	45,944	Servers			\$	51,704
	Servers		\$	37,952		Servers		\$	33,312
	Total FC Ports		\$	7,992		Total FC Ports		\$	18,392
Infrastructure			\$	41,640	Infrastructure			\$	42,364
	Total Racks		\$	2,718		Total Racks		\$	2,718
	Blade Enclosures		\$	2,039					
	Power Enclosures		\$	2,619					
	Bus Power Box		\$	149					
	Mini-Bus Bar		\$	-					
	Scalable Bus Bar		\$	-					
	PDU's		\$	-		PDU's		\$	872
Switching	C-Gbe Switch Pair		\$	-		Network Switches		\$	3,120
	Network Patch Panel Pair		\$	-		KVM switches		\$	6,350
	C-Gbe Switch/FC Patch Panel Pair		\$	6,098		KVM Cables		\$	1,215
	FC Patch Panel Pair		\$	-					
	FC Switches		\$	28,000		FC Switches		\$	28,000
	Cat5 Cables		\$	17		Cat5 Cables		\$	89

Acquisition Cost Comparison

(8 servers, Gigabit Network, SAN attached)



HP ProLiant BL20p G2 versus 1U Servers

Revised 6/12/2004

Step #4 - Acquisition Cost

BL20P Scenario		Total Cost	\$	87,584	1U Server		Total Cost	\$	104,388
	Servers		\$	45,944		Servers		\$	51,704
	Servers		\$	37,952		Servers		\$	33,312
	Total FC Ports		\$	7,992		Total FC Ports		\$	18,392
	Infrastructure		\$	41,640		Infrastructure		\$	52,684
	Total Racks		\$	2,718		Total Racks		\$	2,718
	Blade Enclosures		\$	2,039					
	Power Enclosures		\$	2,619					
	Bus Power Box		\$	149					
	Mini-Bus Bar		\$	-					
	Scalable Bus Bar		\$	-					
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	Switching	C-Gbe Switch Pair	\$	-		Network Switches		\$	13,440
		Network Patch Panel Pair	\$	-		KVM switches		\$	6,350
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		FC Patch Panel Pair	\$	-					
		FC Switches	\$	28,000		FC Switches		\$	28,000
		Cat5 Cables	\$	17		Cat5 Cables		\$	89



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