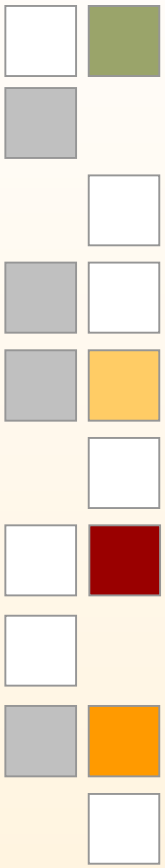
IBM @server OpenPower

POWER5 systems tuned for Linux

Bala Ekambaram, WW Offering Manager
January, 2005

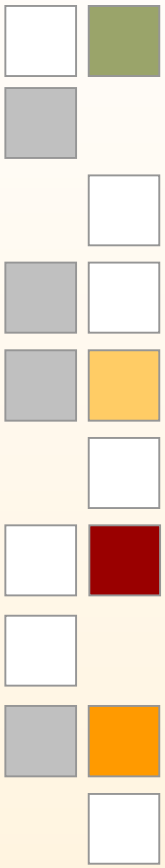
ON DEMAND BUSINESS™

Session objectives



- **Enable sales teams and business partners to**
  - Understand Linux capabilities and selling points of OpenPower™
  - Position OpenPower within the IBM @server® offerings
  - Understand resources available to assist in selling of OpenPower
- **To assist sales teams and business partners make 2005 OpenPower objectives**

Topics for discussion



- **Linux, POWER™, and the combination**
- **OpenPower offerings – systems, options, virtualization**
- **Linux on OpenPower eco system, applications, solutions**
- **Selling OpenPower**
  - Typical customer scenarios
  - Key target opportunities for 2005
  - Fulfillment and ordering
- **Resources available**

ROI and IT simplification objectives drive specific requirements for the next-generation Linux server

Key adoption drivers

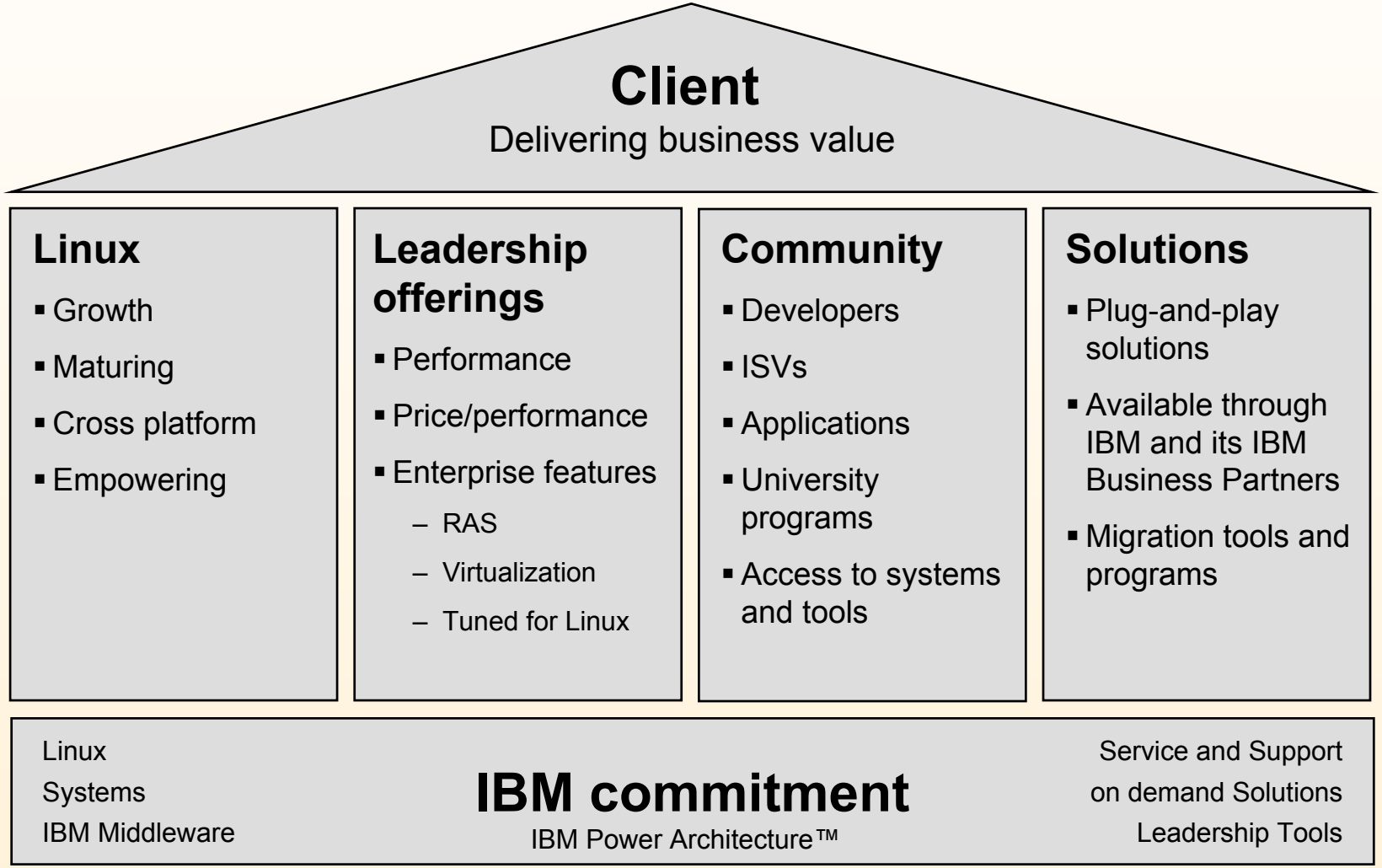
- Rapid adoption and maturing of Linux OS
- 32- to 64-bit transition
- Increasing popularity of scale-out deployment
- Consolidation of infrastructure, application workloads
- Adoption of commercial clusters
- Price-focused purchases of “good enough” entry servers (2-way and 4-way)

Linux server selection criteria

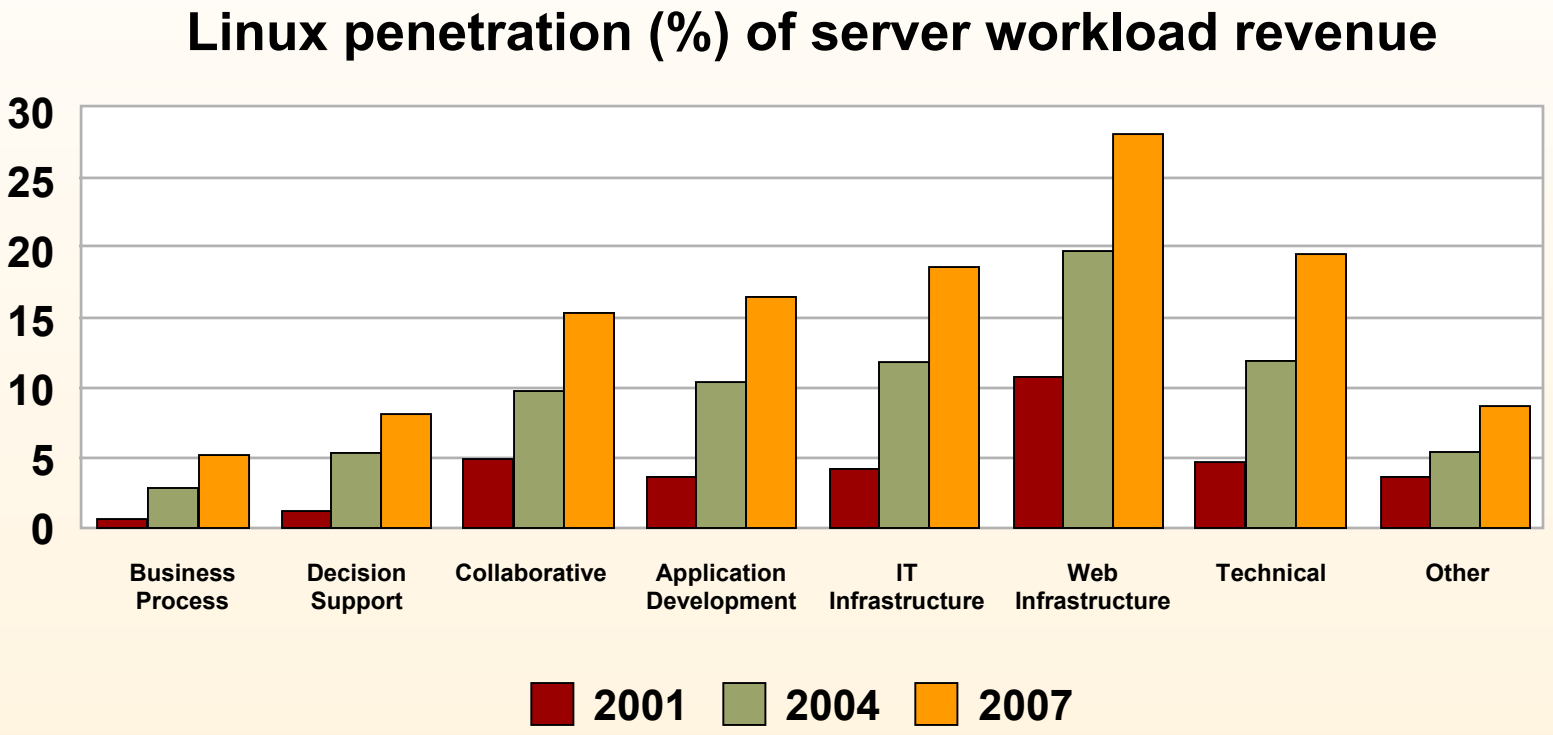
- A low cost, reliable, secure way to simplify IT infrastructure, and run business-critical applications
- A solution designed and tuned for Linux OS that fits easily into existing environments
- A balance of performance / reliability and Linux OS freedom / low cost
- Strong and vibrant ecosystem
- A committed partner to provide the support and “a security blanket”

Source: ZMET customer research, March 2004

With IBM commitment and industry momentum for Linux, OpenPower will deliver exceptional business value

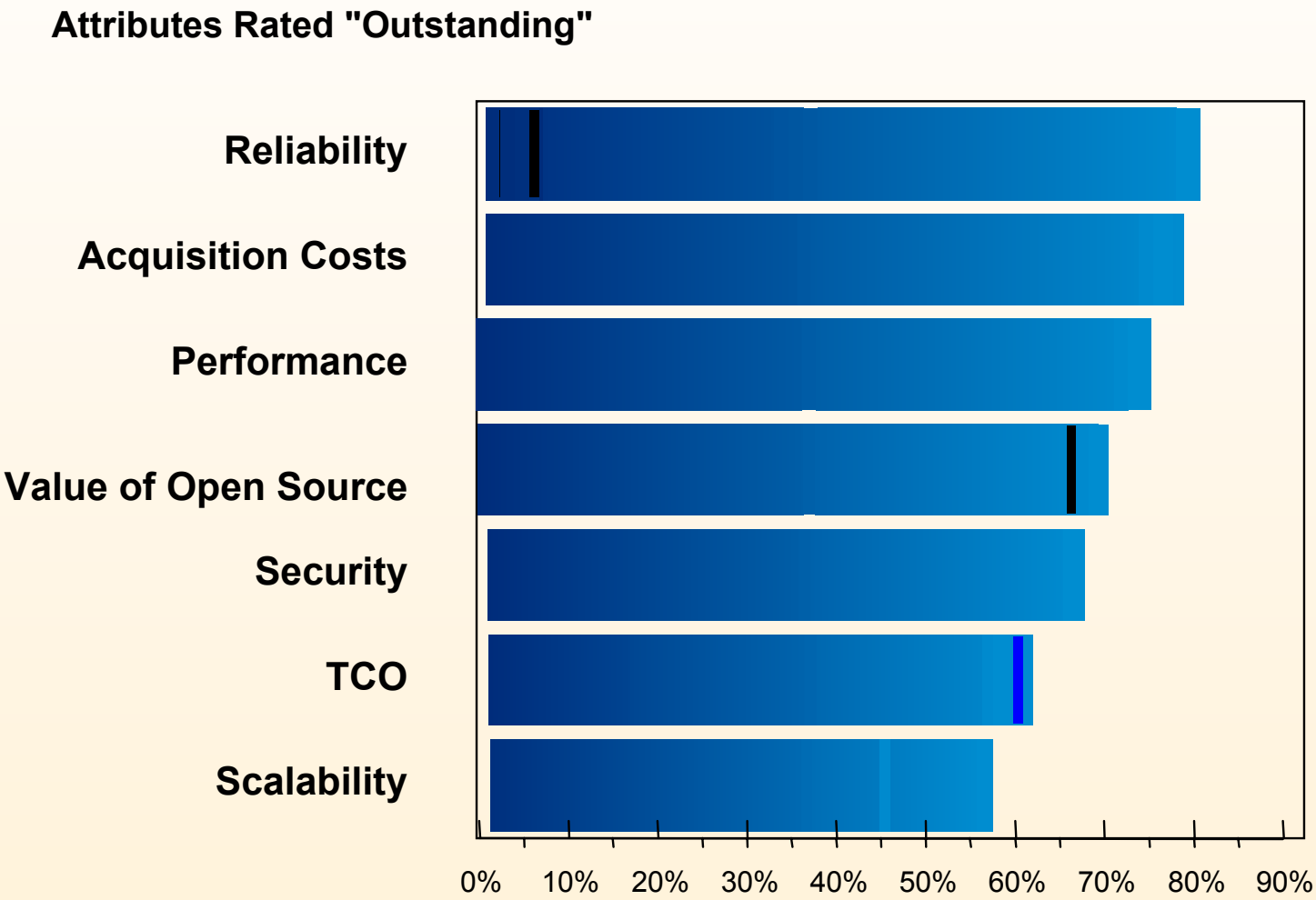


Clients expanding Linux to new workloads



Source: IDC Workload Study 2004

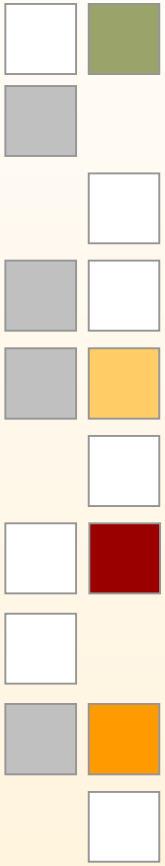
Reliability and costs are major attributes to clients acquiring Linux



Source: IBM Market Research 2004

IBM's long-term investment in POWER delivers today

An innovative architecture that simplifies your environment and maximizes business flexibility



Collaborative Power Architecture

- Allows device designers, chip manufacturers and other members of the community to work together on new and innovative applications

Technology leadership

- IBM Virtualization Engine systems technologies
- Mainframe-inspired enterprise-class reliability, availability, scalability (RAS)

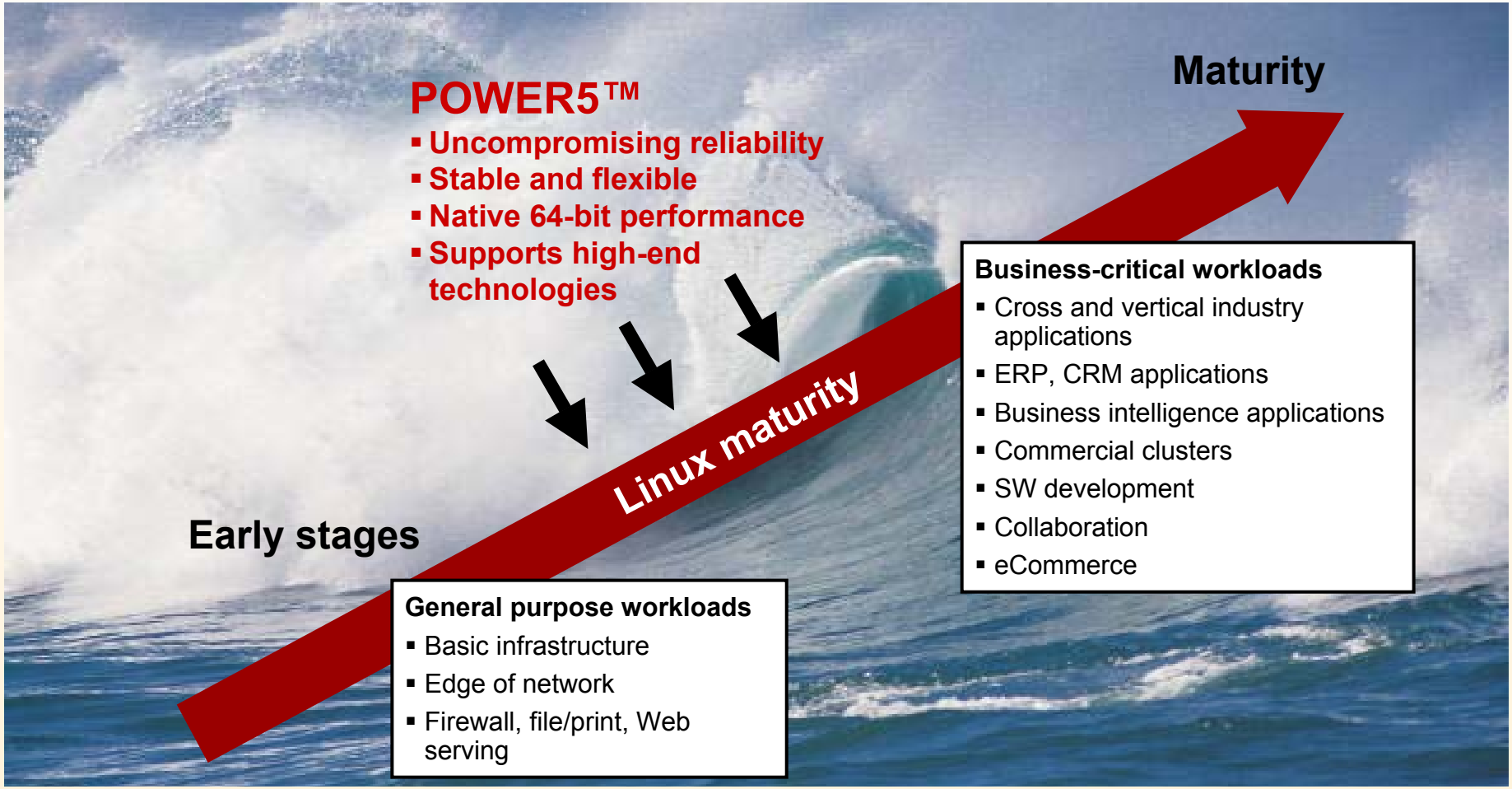
Over a decade of experience

- Evolutionary approach with a roadmap to the future
- 5th generation
- Systems architecture expertise

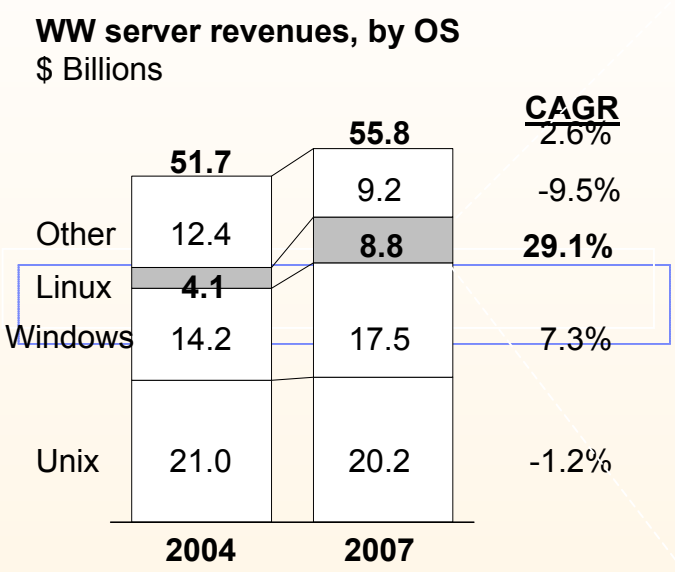
64-bit performance (runs 32 bit apps as well)

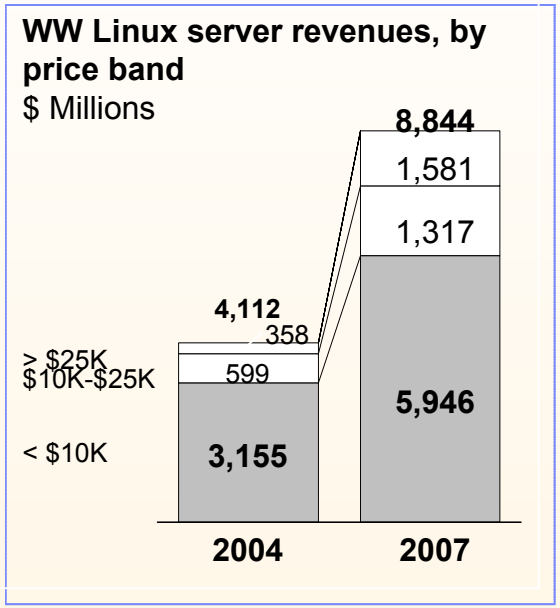
- Allows enterprise-class applications to be run on Linux OS systems
- Runs 32 bit apps without performance penalty

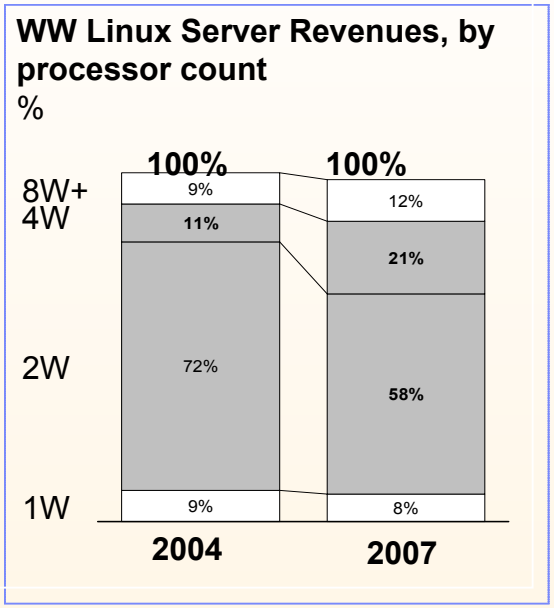
POWER5 technology is accelerating Linux acceptance for business-critical workloads



OpenPower is set to capture growing Linux opportunity







Linux on POWER is strategic to IBM

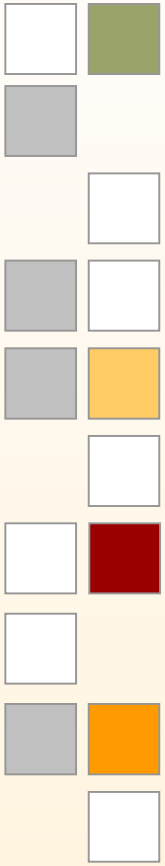
- Capitalize on Linux market growth
- Strengthen low-end position
- Driver of new footprints (e.g. Blades)
- Provide clients platform choice
- Stimulate the ecosystem around POWER

IBM is investing for success

- High investment level within STG
- New group formed
- Dedicated Geo teams
- One IBM support

Source: 1H04 IBM GMV, based on industry data

Topics for discussion



- **Linux, POWER™, and the combination**
- **OpenPower offerings – systems, options, virtualization**
- **Linux on OpenPower eco system, applications, solutions**
- **Selling OpenPower**
  - Typical customer scenarios
  - Key target opportunities for 2005
  - Fulfillment and ordering
- **Resources available**

Introducing the IBM @server OpenPower

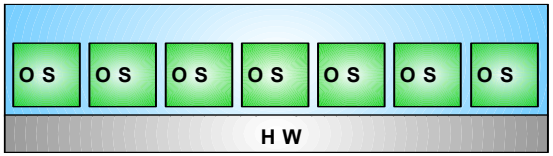
Family of entry IBM POWER5 systems tuned for the Linux OS

- **Tuned for Linux**
- **Virtualization designed to lower operational costs**
- **Enterprise-class RAS**
- **Leading-edge performance**

An integrated set of OpenPower offerings delivers the passion of Linux enriched by the power of IBM

OpenPower 720 (4U 4W)
OpenPower 710 (2U 2W)*

Advanced OpenPower Virtualization*



Workload/industry solutions

Linux OS on OpenPower

suse

redhat

OpenPower Support/Installation Services

* To be announced on January 25, 2005
**Availability varies by geo and channel (HVEC vs. AAS)

@server OpenPower Roadmap

Planned (subject to change)

	2004	2005
4W/8W — 4U	**OpenPower 720** POWER5 1.5 GHz, 1.65 GHz DCM 4U 4W 9/04 	**Technology refresh, speed bumps, additional offerings**
2W/4W — 2U	 **OpenPower 710** POWER5 1.65 GHz DCM 2U 2W 1Q05	
2W/4W — 1U		

IBM @server OpenPower delivers the passion of Linux enriched by the power of IBM

OpenPower 720

Specifications:

- 4U up to 4-way, rack or tower
- Two processor speeds (1.65 GHz and 1.5 GHz)
- Maximum memory 64 GB
- 8 bays for Ultra320 SCSI drives
- 5 PCI-X slots
- Optional onboard RAID
- 3 year parts and labor NBD warranty and support
- Software support
  - SLES 9 from Novell SUSE LINUX
  - RHEL AS 3 from Red Hat
- OpenPower virtualization option

OpenPower systems keep business-critical applications up and running

OpenPower provides improved performance, reliability and stability

Tuned for Linux means improved performance

- Linux supports and takes advantage of unique POWER5 features (simultaneous multi-threading, First Failure Data Capture, HW based virtualization)
- New features introduced in POWER5 to run better on Linux (instruction/data cache coherency, faster data lock acquisitions)

POWER5 platform provides flexibility and stability

- Evolutionary roadmap
- Decade of experience
- Runs 32-bit and 64-bit applications

Robust reliability, availability and serviceability (RAS) unique to Linux on POWER5

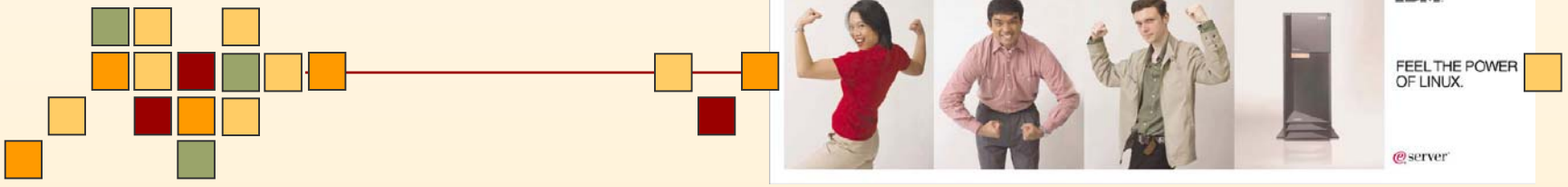
System reliability

- First Failure Data Capture
- Service processor
- Hot-plug PCI slots, fans, power
- Internal Light Path Diagnostics
- Hot-swappable disk bays

Memory and CPU reliability

- DDR and IBM Chipkill™ memory
- ECC, redundant bit steering memory
- Persistent memory de-allocation
- Dynamic Processor Deallocation[1]

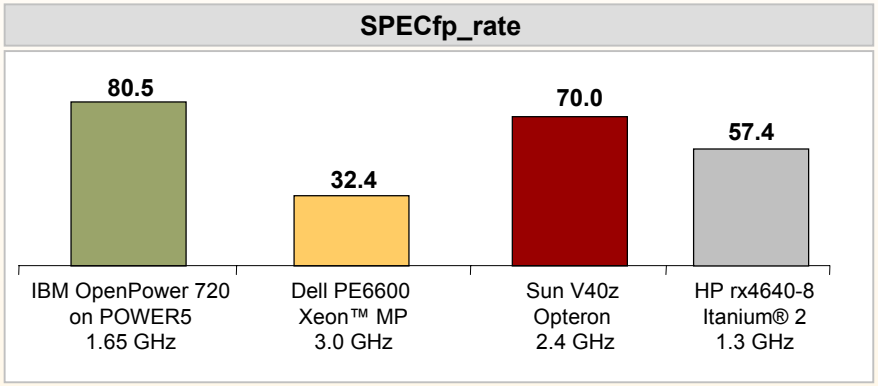
1 OpenPower with SUSE LINUX Enterprise Server (SLES 9).

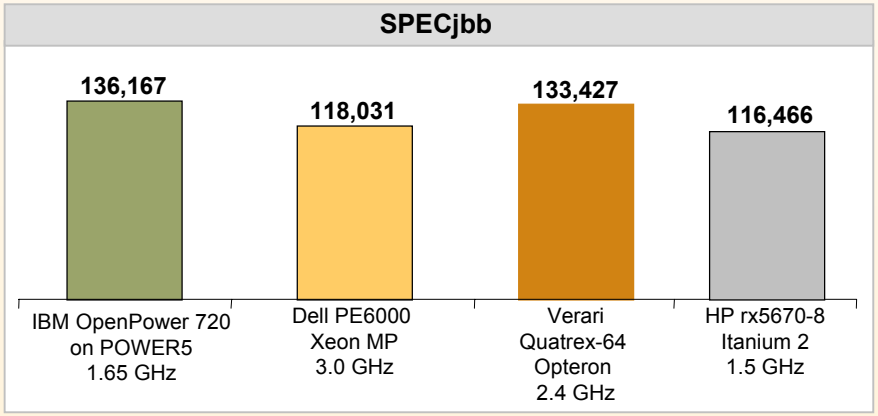


OpenPower 720 delivers leadership performance at breakthrough prices

Leadership performance…

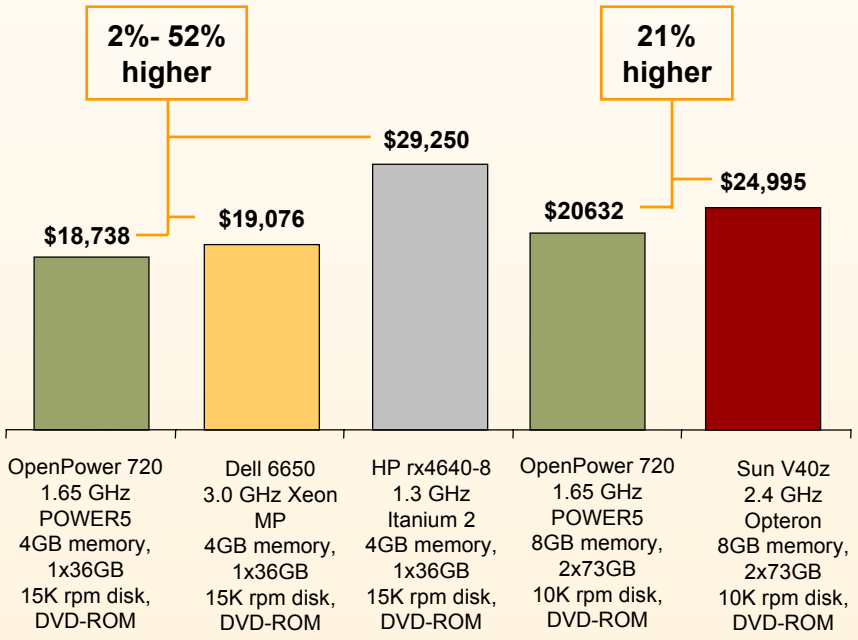
Performance of 4-way systems*





…at superior prices

US list prices of competitive offerings and OpenPower 720 – 4 processor models, US$**



* SPECfp_rate and SPECjbb results of IBM, Dell, Sun, HP, Verari servers and AMD Opteron™ processors are published in http://www.spec.org

** Prices of Sun, Dell, and HP products from http://www.dell.com, http://www.sun.com, http://www.hp.com as of December 8, 2004. Reseller prices may vary

OpenPower 720 is advantaged compared to Dell 6650

	OpenPower 720	Dell 6650
Configuration/Size	Rack Mount, 4U/Deskside	Rack Mount, 4U
Processor	IBM Dual Core P5 GR 1.65 /1.5 GHz	Up to 3.0 GHz Intel® Xeon Processor MP
Processor L2 Cache	1.9 MB L2	1 MB L2
Max. # Processors	4	4
Memory Type	DDR1 266 MHz	PC1600 ECC DDR SDRAM
Maximum RAM	64 GB	32 GB
Memory Protection	Chipkill & Online Spare	ECC
DASD Controller	Dual Ultra320 SCSI (8 Bays)	Ultra 160 SCSI
RAID Support	Integrated RAID 5	None
Media Bays	8 (2x4 packs)	5 Bays
Storage Capacity	1.17 TB	730 GB
Slots (hot-plug)	5x64bit/133MHz PCI-X	8
Remote I/O	12 drawers	None
Active PCI-X slots	5	7x64-bit/100 MHz PCI-X 1-32 bit/33MHz
Networking	Integrated Dual Gigabit	Dual Gigabit
HS redundant power	Optional	Standard
Systems Mgt.	FSP	Dell OpenManage
Systems Mgt. Proc.	Yes	Embedded Server Mgt. III (Must add Remote Access Card Option)
Virtualization option	Yes	VMWare
Limited Warranty*	3 years parts and labor NBD	3 years on site, NBD

*See Legal Notes page for additional Limited Warranty information
Source: Dell website www.dell.com

OpenPower 720 is advantaged compared to Sun v40Z

FEATURE	OpenPower 720	Sun V40z
Configuration/Size	Rack Mount, 4U/Deskside	Rack Mount, 3U
Processor	IBM Dual Core P5 GR 1.65 /1.5GHz	AMD Opteron 2.4 GHz
Processor L2 Cache	1.9 MB L2	1 MB L2
# Processors	2/4	2/4
Memory Type	DDR1 266 MHz	DDR 333 MHz
Maximum RAM	64 GB	32 GB
Memory Protection	Chipkill & Online Spare	ECC
DASD Controller	Dual Ultra320 SCSI (8 Bays)	Ultra 320
RAID Support	Integrated RAID 5	Integrated RAID 1 (Mirror)
Media Bays	8 (2x4 packs)	5+1 FDD, CD-ROM
Storage Capacity	1.17 TB	587 GB
Slots	5x64bit/133MHz PCI-X	2x64-bit/133, 6x64-bit/100Mhz
Remote I/O	12 drawers	None
Active PCI-X slots	5	None
Networking	Integrated Dual Gigabit	Dual Gigabit
HS redundant power	Optional	Standard
Systems Mgt.	FSP	BMC
Systems Mgt. Proc.	Yes	No
Virtualization option	Yes	VMWare in 32-bit mode
Limited Warranty*	3 years parts and labor NBD	3 years parts exchange

*See Legal Notes page for additional Limited Warranty information
Source: Sun website www.sun.com

What OpenPower 720 is not…

What OpenPower 720 is not…

- No **1p** 1.65 GHz model offered
- No 3 processor model offered
- Not 1 year base warranty
- Does not support Linux versions other than SLES 9 and RHEL AS 3 (for example, does not support SLES 8)
- No net price MES del offered for additional processors i.e. to upgrade from 1W to 2W/4W, customers have to buy additional processor cards, and discard the 1p card (no credit offered)
- 1p and 2p models can run on either 110V or 220V power outlet; 4p models need 220 V power outlet. The power supply in the server is auto-ranging, hence runs on 110 or 220V.
- DASDs requires cages. 1st cage holds 4 DASDs – and is in base box. 5 or more DASD require purchase of 2nd cage
- Only pSeries racks available for AAS orders, xSeries racks for HVEC orders
- Keyboard and mouse are optional in both tower and rack models
- Only IBM service for all current OpenPower 9124 systems

Description of OpenPower 710

PLANNED FOR 1/25 ANNOUNCE

OpenPower 710

Specifications:

- 2U up to 2-way, rack
- 1.65 GHz processor frequency, 2 models
  - 1.65 GHz 1W DCM
  - 1.65 GHz 2W DCM
- Maximum memory 32 GB
- 4 bays for Ultra320 SCSI drives
- 3 PCI-X slots
- DVDROM base
- 3 year parts and labor NBD warranty and support
- Software support
  - SLES 9 SP1 from Novell SUSE LINUX*
  - RHEL AS 3 Update 4 from Red Hat*
- OpenPower virtualization option

* May change depending on Linux distro plans

PLANNED FOR 1/25 ANNOUNCE

OpenPower 710 – Positioning and differentiation

Positioning

- **Highly available** 2U, 2-way POWER5 server for application serving in data center environments
  - Redundant (optional) power
  - Redundant cooling
  - Hot swap disk drives with easy front access

- **Rack-dense** computing power with **expandability** and **scalability** for constrained data centers and ASPs
  - Rack-dense 2U form factor provides high performance density
  - Expandability – 4 drives for internal storage, 3 PCI slots for adapters, dual GigE ports, external SCSI storage option
  - Scalability – Modular 2W system make it easy to add systems as business needs increase

Competitive Advantage

- Robust RAS capability
- Advanced virtualization technology
- Decade experience in 64 bit technology

OpenPower 710 Customer Profile

PLANNED FOR 1/25 ANNOUNCE

Primary Market	Key User Requirement	User Characteristics	Solution Environment	Applications/ Usage
Medium to Large Enterprise - Constrained Data Center Environments – Financial Services – Retail – Government – Manufacturing – Telecom	• Growth Flexibility • Rack optimized designs • Ease of use • Latest technology • Cable Management • Cost sensitive	• Flexibility to grow rack environment or system with business needs • Price/Performance Computing • Highly Segmented Networks with Multiple Locations	• Internet/Intranet Front End • Network Infrastructure • Workgroup applications • Performance clustering	• Dynamic Web Serving • Encryption and security • Caching • Email apps • IIS / Websphere • RAS solutions • Computational Node
Internet Service Providers	• Rack optimized designs • Time to Revenue • Ease of Service / Installation • Cable Management	• Seeking cost effectiveness • Need Quick installation for rapid growth • MGT nodes/ Linux Clustering	• Network Infrastructure • Web Content Serving • Application Hosting services	• Caching • Load Balancing • Gateways • Firewall • Content Serving • Groupware Access • Streaming Media

OpenPower 710 is advantaged compared to HP DL 380

PLANNED FOR 1/25 ANNOUNCE

FEATURE	OpenPower 710	ProLiant DL 380 G4
Configuration/Size	Rack Mount, 2U	Rack Mount, 2U
Processor	IBM Dual Core P5 GR 1.65 GHz 3 Models	Up to 3.6 GHz Intel Xeon 800MHz FSB
Processor L2 Cache	1.9 MB L2	1 MB
# Processors	1/2	2
Memory Type	DDR 266 MHz	PC2 3200 ECC DDR, 2-way interleaving
Maximum RAM	32 GB	12 GB (6 DIMM slots)
Memory Protection	Chipkill & Online Spare	Advanced ECC,Online Spare
DASD Controller	Dual Ultra320 SCSI (4 Bays)	Ultra 320 SCSI
RAID Support	Optional Onboard RAID	Smart Array 6i Plus Controller
Media	DVD Rom Base	CD Standard & Floppy Optional ($49)
Storage Capacity	1.17 TB	6 SCSI drives (1.8TB)
Hot-swap PCI		Yes
Remote I/O	No	No
Active PCI-X slots	3 PCI-X 64bit/133 MHz	1 PCI-X 64-bit/133 MHz 2 PCI-X 64-bit/100
Networking	Integrated Dual Gigabit	Dual Gigabit Ethernet
HS redundant power	Optional	Optional
Systems Mgt.	FSP	Insight Manager
Systems Mgt. Proc.	Yes	Integrated Lights-Out Mgmt iLO
Virtualization option	Optional Virtualization Engine	VMWare
Limited Warranty*	3 years parts and labor NBD	3 years on site, NBD

*See Legal Notes page for additional Limited Warranty information.

Source:http://h18004.www1.hp.com/products/servers/platforms/index.html as of 12/8/04

OpenPower 710 is advantaged to Dell 2850

PLANNED FOR 1/25 ANNOUNCE

	OpenPower 710	Dell PowerEdge 2850
Configuration/Size	Rack Mount, 2U	Rack Mount, 2U
Processor	IBM Dual Core P5 GR1.65 GHz	Up to 3.6 GHz Intel Xeon 800 MHz FSB
Processor L2 Cache	1.9 MB L2	1 MB L2
Max. # Processors	1, 2	1, 2
Memory Type	DDR 266 MHz	PC2-3200 ECC DDR-II 400
Maximum RAM	32 GB	12 GB (6 slots)
Memory Protection	Chipkill & Online Spare	Advanced ECC, Online spare, memory mirroring
DASD Controller	Dual Ultra320 SCSI (4 Bays)	Ultra320 SCSI
RAID Support	Optional Onboard RAID	Optional
Media	DVD ROM Base	
Storage Capacity	1.17 TB	1.8 TB SCSI (6x300GB)
Slots (hot-plug)	Yes	Yes
Remote I/O	No	No
Active PCI-X slots	3 PCI-X 64bit/133 MHz	3 PCI-X 64-bit/100MHz
Networking	Integrated Dual Gigabit Ethernet	Dual Gigabit Ethernet
HS redundant power	Yes/Optional	Yes/Optional
Systems Mgt.	FSP	Dell OpenManage
Systems Mgt. Proc.	Yes	BMC standard Optional DRAC 4/1 (slot free)
Virtualization option	Yes	VMWare
Limited Warranty*	3 years parts and labor NBD	3 years on site, NBD

*See Legal Notes page for additional Limited Warranty information
Source:http://www.dell.com/downloads/global/products/pedge/en/66x0_specs.pdf as of 12/8/04.

What OpenPower 710 is not…

PLANNED FOR 1/25 ANNOUNCE

What OpenPower 710 is not

- Not 1 year base warranty
- No net price MES del offered for additional processors i.e. customers have to buy additional processor cards, and discard the 1p card (no credit offered)
- Keyboard and mice are optional (for charge)
- Only pSeries racks available for AAS orders, xSeries racks for HVEC orders
- HMC is a firm pre-requisite for virtualization
- Does not support previous versions of SUSE and Red Hat
- IBM does not support other Linux distros such as Debian, Mandrake, Red Flag, TurboLinux, etc. Regional business partners may offer such support

Target opportunities for OpenPower 710

PLANNED FOR 1/25 ANNOUNCE

IDC estimates that 31% of Linux server revenue will be sourced through migrations from other OS's (mainly Unix and Windows)

Unix migrators will generate $950M for Linux

Unix migrators	'05
Bus Processing	30%
Decision Supt	20%
Collaborative	7%
App Developm't	10%
IT Infrastructure	17%
Web Infrastructure	5%
Technical	10%
Other	1%
Unix to Linux	$950M

OP 720

- **OP 710**
- **OP 720 with virtualization**

Windows migrators will generate $802M for Linux

Windows migrators	'05
Bus Processing	9%
Decision Supt	10%
Collaborative	21%
App Developm't	8%
IT Infrastructure	39%
Web Infrastructure	10%
Technical	3%
Other	1%
Windows to Linux	$802M

Source: 2004 IDC Server Migration Study; IBM internal analysis

OpenPower 710 VS. 720– competitive play

PLANNED FOR 1/25 ANNOUNCE

Sun Unix Accounts

HP Unix Accounts

Windows NT Accounts

IBM AIX accounts

WIN

RETAIN

- **Business processing**
- **Decision support**
- **Server consolidation**

- **Infrastructure**
- **Web serving**
- **HPC**
- **Server consolidation**

OpenPower 720

4U rack/tower

1, 2, 4-way

OpenPower 710

2U rack

1, 2-way

OpenPower 710 Linux Ready I/O Options

PLANNED FOR 1/25 ANNOUNCE

Option	OpenPower 720	OpenPower 710
Processor cards	▪ 1.5 GHz 1W SCM ▪ 1.5 GHz 2W DCM ▪ 1.65 GHz 2W DCM	▪ 1.65 GHz 1W DCM ▪ 1.65 GHz 2W DCM
Memory DIMMs - ECC DDR1 SDRAM	▪ 256 MB, 512 MB, 1 GB, 2 GB, 4 GB DIMMs ▪ Available in pairs	▪ 512 MB, 1 GB, 2 GB, 4 GB DIMMs; available in pairs
Drives	▪ 36.4GB 10K (expected withdrawal in 1Q05) ▪ 73.4GB 10K ▪ 146.8GB 10K ▪ 36.4GB 15K ▪ 73.4GB 15K	Same
Storage controllers	▪ Dual Channel Ultra320 SCSI PCI Adapters (with or without RAID 5) ▪ 2 Gigabit Fibre Channel PCI Adapter	Same
Optical storage	▪ IBM IDE Slimline DVD-ROM Drive (standard with base offering) ▪ IBM IDE Slimline DVD-RAM Drive	
I/O slots	▪ PCI-X adapters	Same
Interconnects	▪ IBM Gigabit Ethernet PCI Adapter	Same
External storage	▪ Variety of IBM storage offerings (see Appendix)	Same
Other options	▪ Onboard RAID, internal tape, RIO port, External RIO drawer	Not supported

Proliferation of Underutilized Assets

9 x 1-way Servers with 10% Utilization

Each server is dedicated to a single OS and workload

Poor Return On Investment (ROI)

- **Potential Issues Include:**
  - **Significant waste of resources, such as processors, memory, LAN, etc.**
  - **Increased systems management complexity**
  - **Substantial costs in physical asset tracking, floor space and power requirements**
  - **Duplication of software expenses, including OS, middleware and management**

Why Advanced OpenPower Virtualization?

9 x 1-way Servers with 10% Utilization

Each logical partition contains its own independent OS, and is designed to be isolated, protected and secure from the other partitions

Amount of resources, such as processors, memory, etc. dedicated to a specific partition can vary

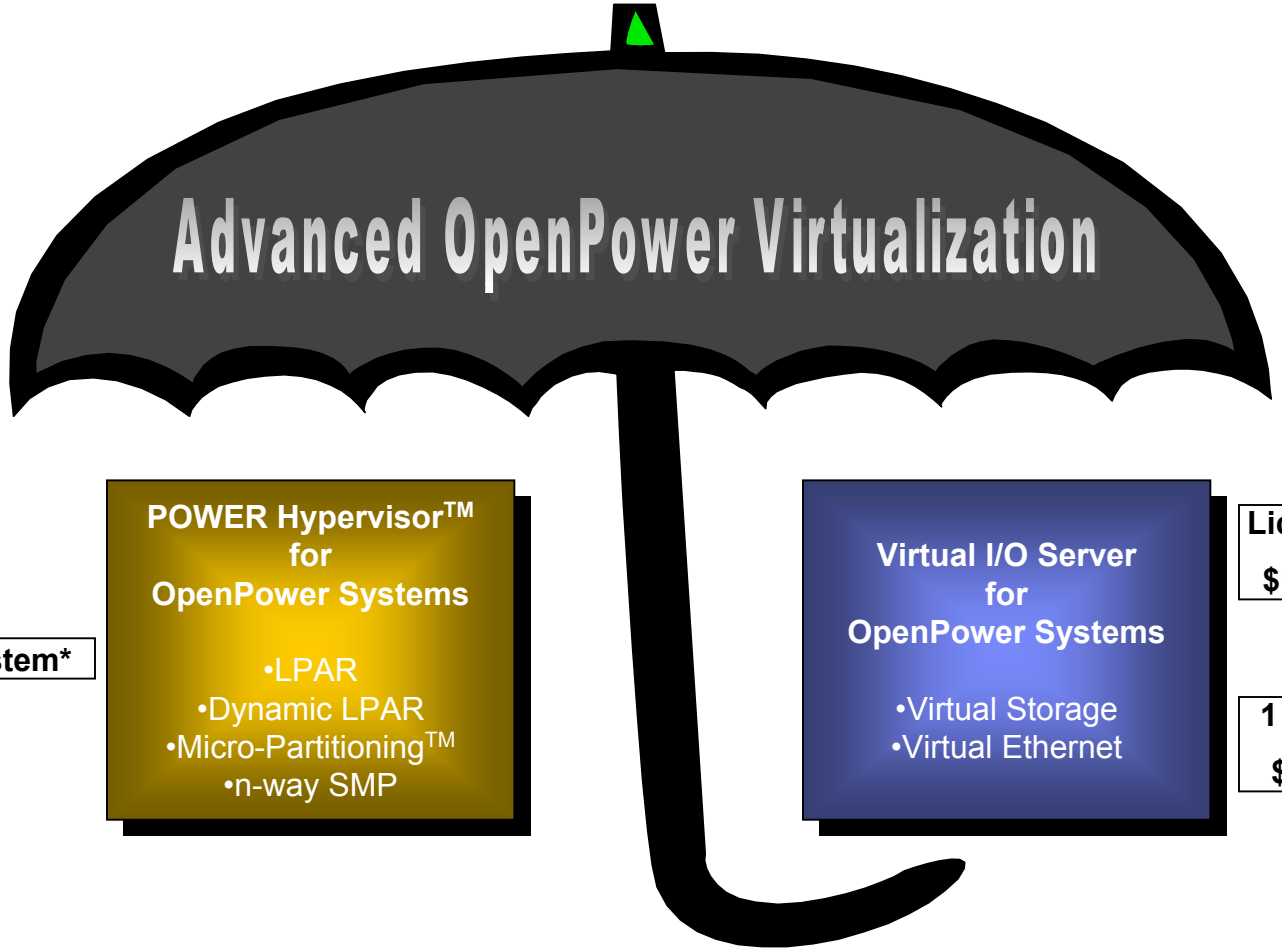
1 x 1-way Server with 90+% Utilization[1]

Potential Benefits Include:

- **Reduced power, floor space and asset management costs**
- **Reduced HW acquisition costs**
- **Reduced SW and OS licensing costs**
- **Increased administrator productivity**

1. This is a conceptual example only to illustrate consolidation. Actual utilization rates will vary.

Advanced OpenPower Virtualization Components



POWER Hypervisor™ for OpenPower Systems

- LPAR
- Dynamic LPAR
- Micro-Partitioning™
- n-way SMP

$1,000 per system*

Virtual I/O Server for OpenPower Systems

- Virtual Storage
- Virtual Ethernet

License + 1 Yr. SWMA

$186 per processor*

1 Yr SWMA Renewal

$31 per processor*

Optional FW Upgrade to the OpenPower 720

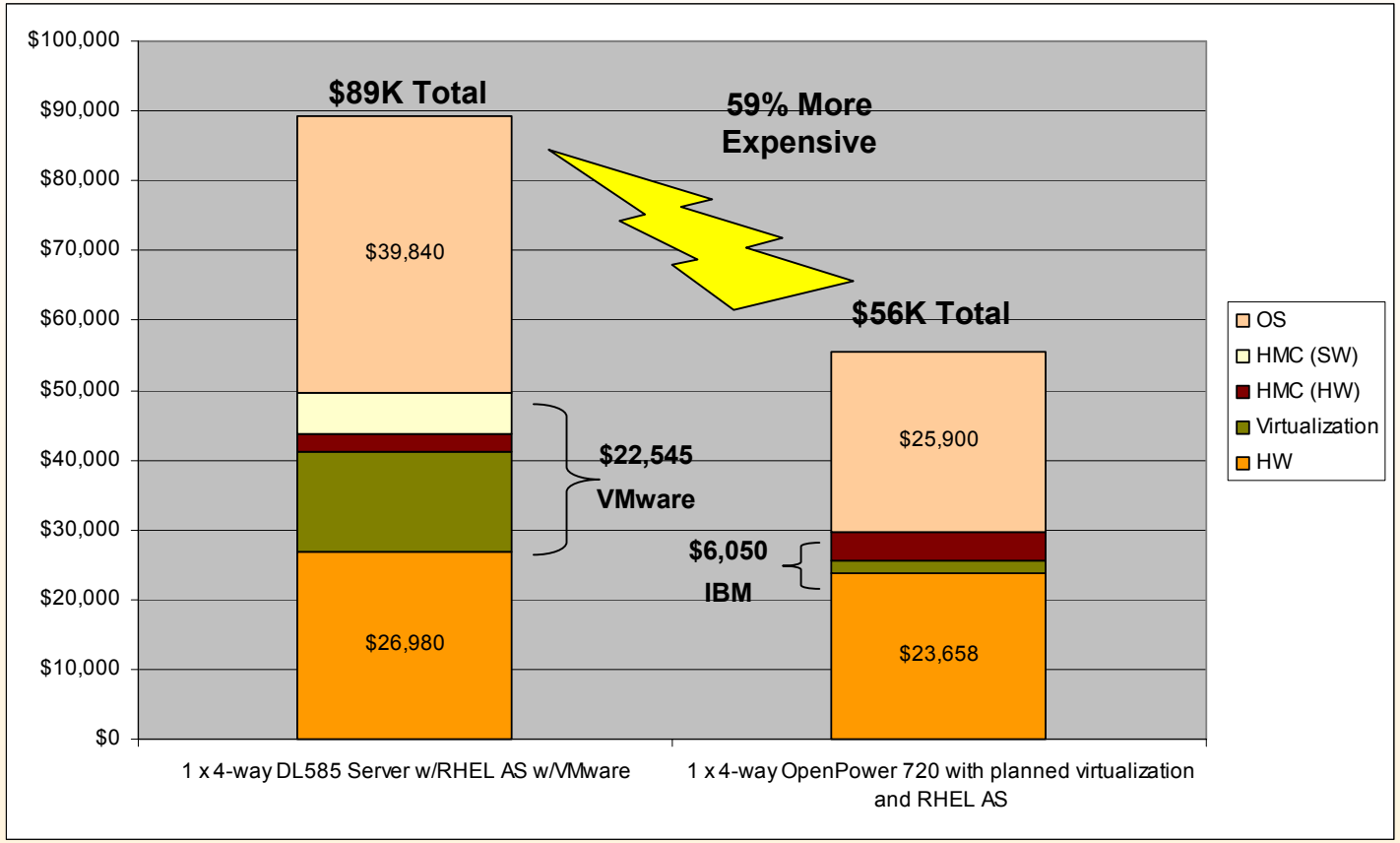
SW Option for the OpenPower 720

Announce = 10/19 GA = 10/29

* US List Prices as of 10/29/04. Reseller prices may vary

Advanced OpenPower Virtualization options help significantly reduce acquisition costs

Versus other partitioning solutions



The solutions represented by the bar graphs assume a customer is replacing twenty 1-way servers that have 15% utilization by either one 4-way HP DL585 with VMware or one 4-way OpenPower 720 with the Advanced OpenPower Virtualization options. It is for illustrative purposes only, and actual solutions for the same or similar replacements will vary. The sample HP solution in the graph includes HP DL140 for the HP HMC hardware and VirtualCenter for the HMC software. Other options or variations are available. Prices for the DL585 hardware, the DL140, and the VMware for Virtual Infrastructure Node (for 4 processors) are U.S. prices as listed at www.hp.com on 8/30/04. As of 10/14/04, VMware's web site indicates DL585 is supported in 32-bit mode only (see www.vmware.com). The price for VirtualCenter is the U.S. list price from www.ibm.com as of 8-30-04. Prices for the OpenPower solution are IBM U.S. list prices as of 10/19/04. Reseller prices may vary. Linux OS prices for the OpenPower solution are applicable only when licensed through IBM. Prices rounded to the dollar.

Linux on POWER Distributions

Content

- **Equivalent to Distributors' Intel Versions with POWER specific support and Service Toolkit improvements**
- **Open Source Tools & Applications available with Distributor's code and from OSS**
  - Apache
  - SAMBA
  - MySQL
  - Sendmail
  - Development Tools

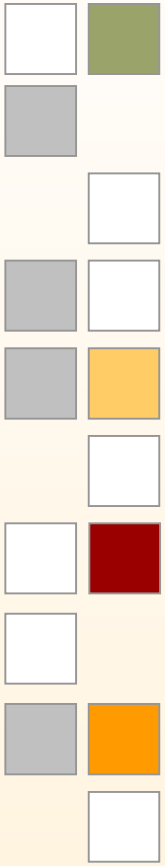
Support

- **IBM Global Services Support Line Offerings**
  - Choice - with subscription/no support, with standard support, with pr
  - Lower price – 20-30% lower than distribution prices
- **Distributor Offerings**
- **IBM Business Partners**

Ordering Linux

- **Linux provided by Distributor as CD or download**
- **Linux can be ordered and delivered through IBM as CD**

Topics for discussion



- **Linux, POWER™, and the combination**
- **OpenPower offerings – systems, options, virtualization**
- **Linux on OpenPower eco system, applications, solutions**
- **Selling OpenPower**
  - Typical customer scenarios
  - Key target opportunities for 2005
  - Fulfillment and ordering
- **Resources available**

IBM makes it easy to simplify and expedite the porting of applications

ISV and developer portals
- Comprehensive Web site for access to HW, technical support, education, toolkits and unique marketing on demand programs

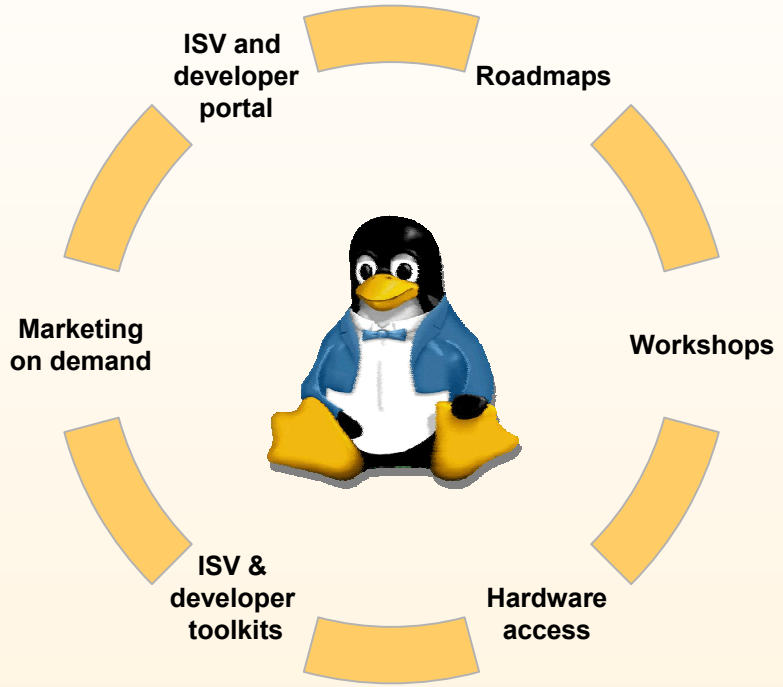
Porting white papers
- Microsoft® Windows® to Linux
- IBM POWER4™ to POWER5
- How to achieve compatibility between distributions
- Java™ on Intel® to Java on POWER

Workshops
- Access to 100s of free seminars and workshops (hands-on labs, technical white papers, how to guides)

Hardware access (free, on demand access)
- Access to 25 WW Innovation Centers
- Virtual Loaner Program to handle 1000s of ISV
- Remote test drive for ISVs to test applications
- Remote access for developers through U of Portland
- Developer access to 100s of technical support personnel

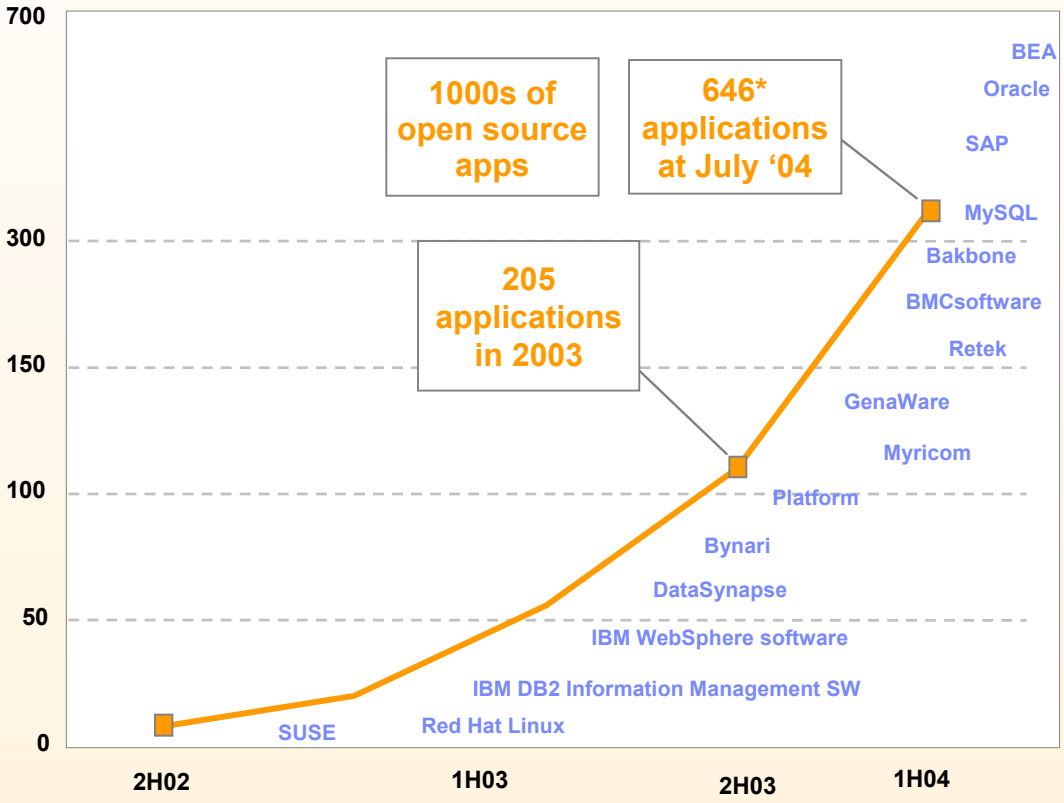
ISV and developer toolkits
- IBM and open source toolkits for ISVs and developers

Marketing on demand
- Global Solutions Directory and @server Solution Connection @server Proven
- Online sizing tools, templates for sales collateral and GTM



http://www.ibm.com/developerworks/linux/power

Tripling in the last year, a wide portfolio of infrastructure and industry applications is now available



http://www-1.ibm.com/servers/eserver/linux/power/apps/all.html

IBM Middleware applications
- Full complement of core software from IBM WebSphere®, IBM DB2®, Tivoli®, IBM Informix®
- IBM Compilers, Cluster Management

ISV infrastructure and tools
- BEA Weblogic Server, MySQL DB, Bakbone, NetVault, BMC Patrol Agent & KMs, Novell, Accucorp, Myricom, Storix, Platform Computing & others

Open source infrastructure and tools
- Apache, SAMBA, Sendmail, others
- Distributed with Red Hat & Novell SuSE

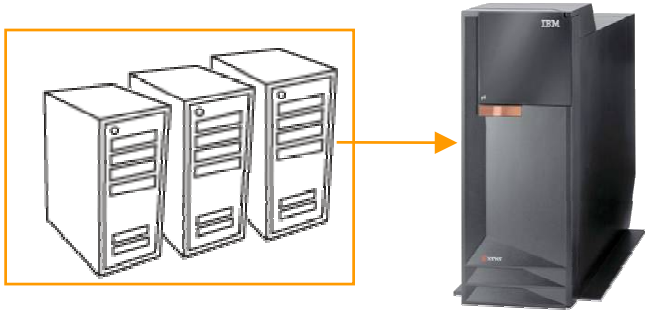
Workload applications
- Deep computing – growing portfolio of Life Sciences, Petroleum & open source Apps
- SAP committed support in 2004

Industry and regional applications
- Temenos, Fair Isaac, Genaware, Hansa, Tecsys, Evant, eOne, Triversity & others

*Number of applications depends on distribution level.

costs
and improve the efficiency of your IT assets

IT Infrastructure Solution Portfolio



Solution	Application
File and print	- Samba 3
Static Web serving	- Apache
Security*	- ClamAV, Pattern Authority, SpamAssassin
IT Consolidation	- OpenPower Consolidation solution
Database/DB2	- DB2 8.2 and DB2 Express
Database/Sybase*	- Sybase
Application serving	- WebSphere and WAS Express

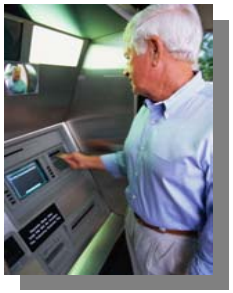
Others in future...

* Planned availabity in Q104

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

OpenPower industry solutions help meet unique IT challenges

Industry Solution Portfolio

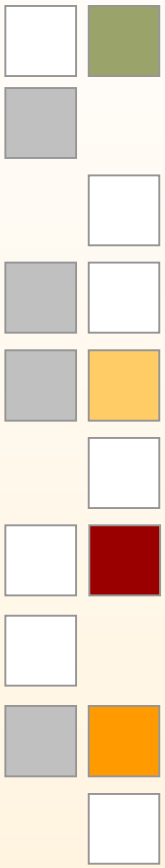


Solution	Application
Bioinformatics	- HMMER, Blast, etc.
Proteomics*	- Waters / Micromass
Computational Chemistry*	- GAMESS, CPMD, Amber
ERP**	- SAP
Banking Payments*	- eFunds IST/Switch

Others in future...

* Planned availabity in Q104
** Application server now

Topics for discussion



- **Linux, POWER™, and the combination**
- **OpenPower offerings – systems, options, virtualization**
- **Linux on OpenPower eco system, applications, solutions**
- **Selling OpenPower**
  - Typical customer scenarios
  - Key target opportunities for 2005
  - Fulfillment and ordering
- **Resources available**

Client Selling

1. People are choosing Linux in your accounts!!

2. Default is Intel processor-based systems unless you promote:
   - Performance of POWER
   - Virtualization for higher utilization
   - RAS of POWER
   - Growth/Scaling/Future of POWER
   - @server OpenPower for 1-4 way Linux solutions

Clients have made the move to Linux on POWER technology

ADP

Cambridge University

CNIO: Centro Nacional de Investigaciones Oncológicas

DGDDI: Direction Générale des Douanes et Droits Indirects

Effisis

ICMCB: Institut de Chimie de la Matière Condensée de Bordeaux

Intermountain Health Care

LexCom GmbH

Medical College of Wisconsin

Ministry of Railway Peoples Republic of China

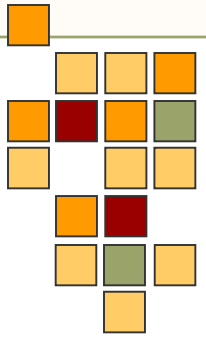
National Semiconductor

Russian Joint Supercomputer Center

Tata Consultancy Services

University of Oregon

University of Washington



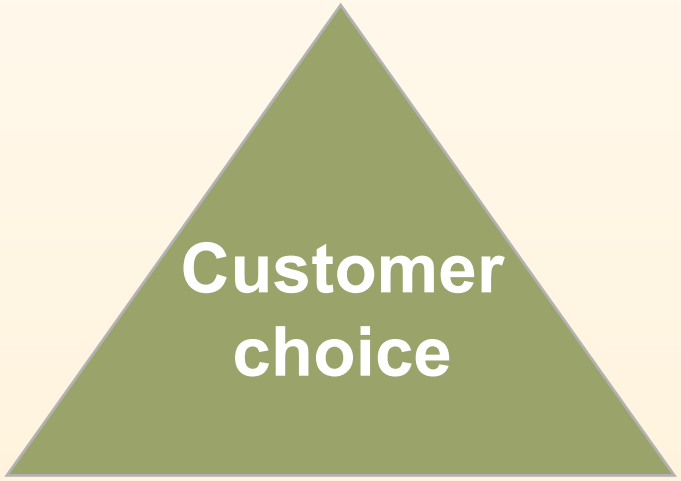
IBM @server Linux OS Product Positioning

OpenPower

For clients making long-term commitments to Linux OS and those desiring leadership price/performance with enterprise-class reliability and virtualization characteristics

xSeries

For clients seeking enterprise-class reliability and scalability from an x86 Windows or Linux OS server



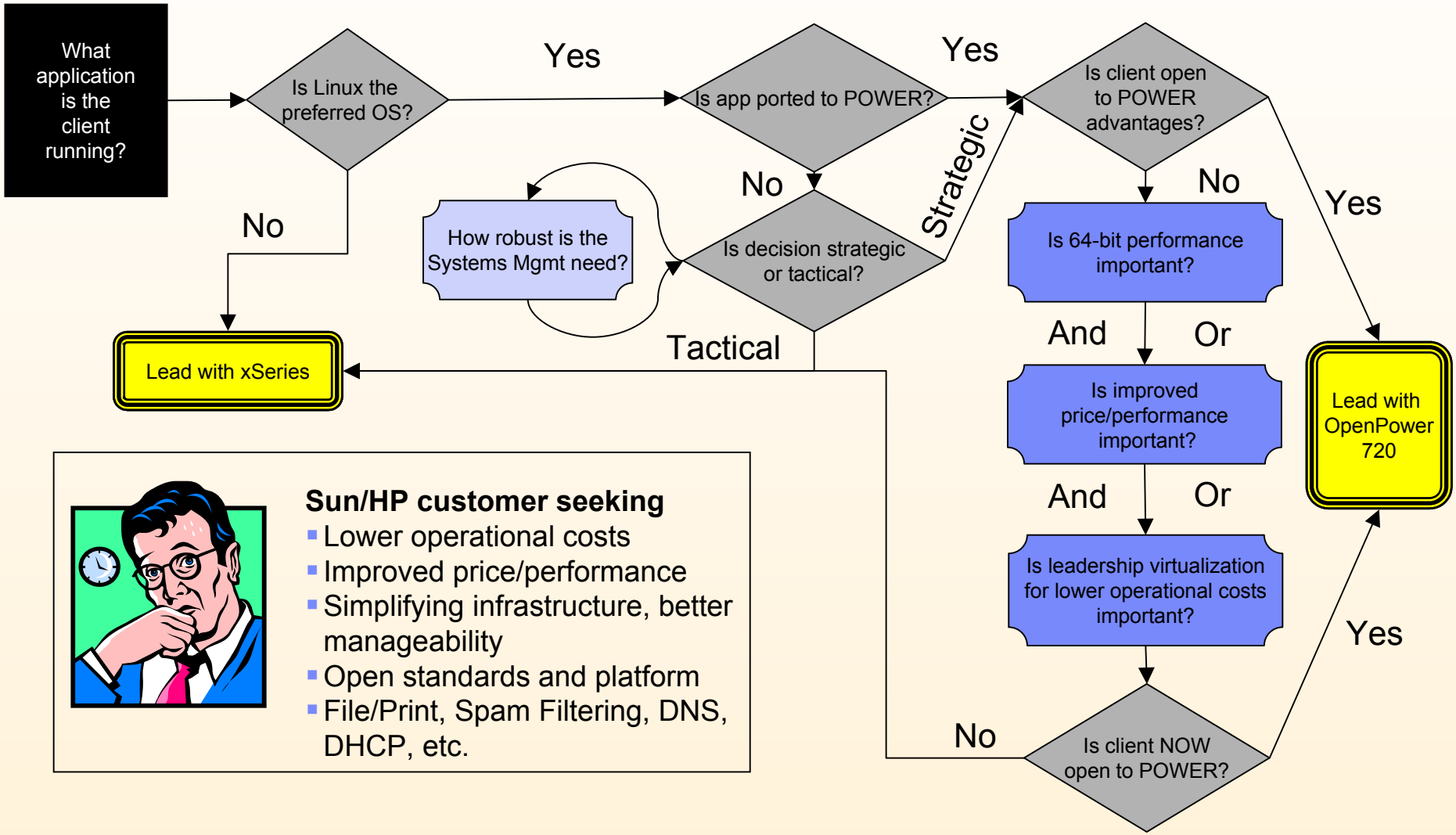
pSeries

For enterprise-class UNIX OS clients and those seeking the most scalable and reliable Linux and AIX 5L OS servers

Client Input Key to Choosing a Lead

- **Gathering Background Information is Important**
  - What application is the client trying to run?
    - Is it 32- or 64-bit? When do they see going to 64-bit?
    - Does it benefit from the VMX component of the PowerPC® 970 processor?
      - See Appendix for details
    - Is it ported to OpenPower (Linux on POWER\™)?
      - See Appendix for details on finding the latest list of currently ported applications
  - What OS are they using?
    - If not Linux, reps should prompt them with …. Have you looked at the advantages of the Linux environment?
  - Do they have a processor architecture preference or available capacity on an existing server?
    - Note: If Linux is the OS, you could ask …. Are you aware of the advantages of our Linux on POWER offerings?
  - How important is price, performance, RAS, systems management and virtualization?
    - Which benchmarks?

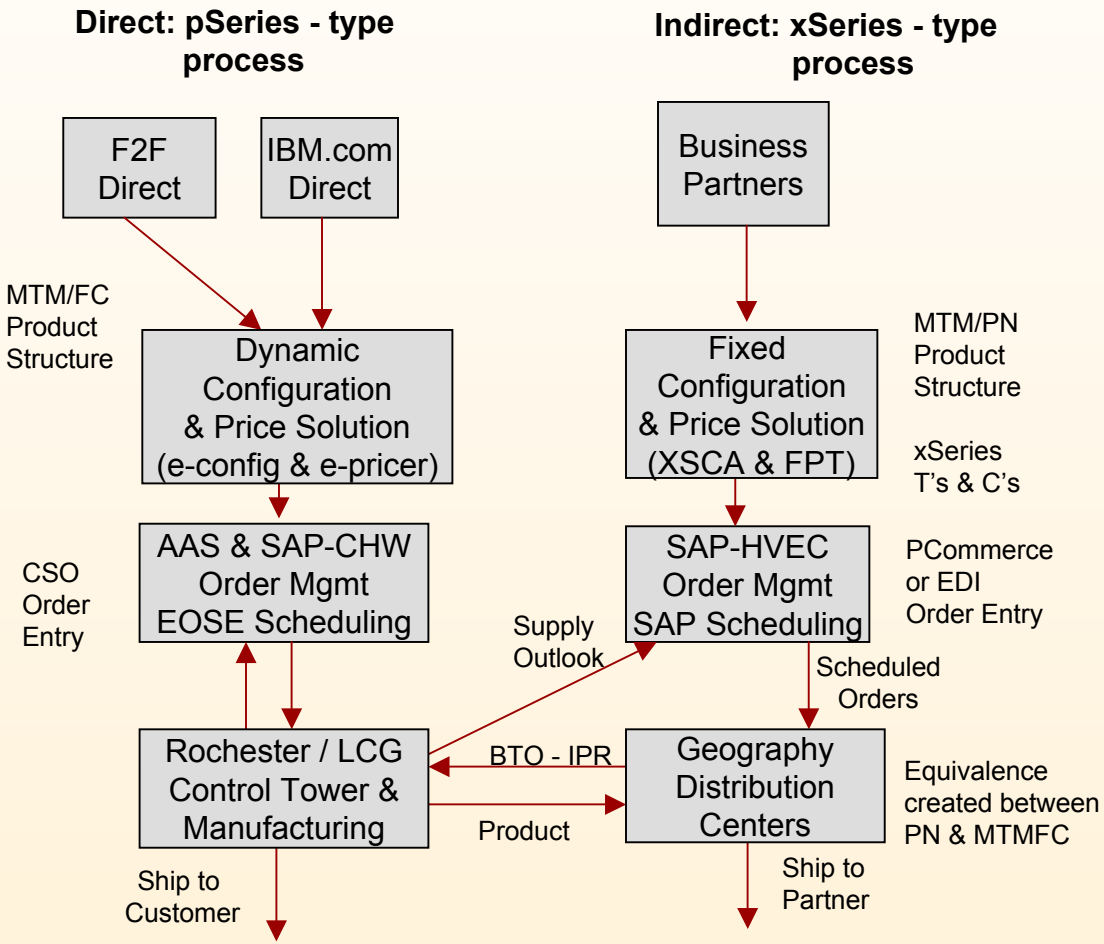
Is OpenPower 720 an Advantage for Infrastructure Upgrades?



Sun/HP customer seeking

- Lower operational costs
- Improved price/performance
- Simplifying infrastructure, better manageability
- Open standards and platform
- File/Print, Spam Filtering, DNS, DHCP, etc.

OpenPower fulfillment path and ordering methods



Important Notes:

1. One route should be chosen for all OpenPower sales activities for a client, otherwise a translation of the product structure will be necessary. A cross reference document will be provided to the Technical Sales teams to facilitate this translation, but the pricing may need to be redone.
2. For EMEA and AP regions, the line cords for the tower versions of the products will be sold separately. The US version of the line cord is included in every machine, For rack machines, variation is not needed unless called for by the rack.
3. Business partners will acquire, stock and resell the OpenPower machines and options as separate line items, and integrate them as a customer service. No custom machines can be ordered from IBM by business partners.

Communication to Business Partners

Communication to BPs

- To build custom config for customer, BP can buy parts separately and build from fixed configs. InfoCenter has necessary installation instructions

- Special configs
  - Above fixed configs should be delivered to BPs within standard lead time
  - For special customer configs, special bid process has to be used, and will have longer lead times
  - If a BP needs a special config for inventory, it will require a new PN, and take 3 months for delivery (need RFA)

- All fixed configs come with RH or SuSE CDs:
  - No license for support or service or subscription included. BPs do not pay extra for the “linux-readiness”. They can opt to discard the CDs
  - BPs should decide to buy Linux from IBM at time of purchase. Subscription license will be sent separately, and will have instructions/key Linux contained will be the then version of Linux

OpenPower 710 fixed configs for Business Partner deployment

PLANNED FOR 1/25 ANNOUNCE

WW ID	WW ID	Description
9123 1A1 9123 1A2	Red Hat SUSE	1 POWER5 1.65 GHz DCM processor, DVD-ROM, 1 GB memory (with 2 x 512 MB DIMMs), one 73 GB 10K drive
9123 1A3 9123 1A4	Red Hat SUSE	1 POWER5 1.65 GHz DCM processor, DVD-ROM, 2 GB memory (with 2 x 1 GB DIMMs), one 73 GB 10K drive
9123 1A5 9123 1A6	Red Hat SUSE	1 POWER5 1.65 GHz DCM processor, DVD-ROM, 4 GB memory (with 2 x 2 GB DIMMs), one 73 GB 15K drive
9123 1A7 9123 1A8	Red Hat SUSE	1 POWER5 1.65 GHz DCM processor, DVD-ROM, 2 GB memory (with 2 x 1 GB DIMMs), one 146 GB 10K drive
9123 1B1 9123 1B2	Red Hat SUSE	2 POWER5 1.65 GHz DCM processor, DVD-ROM, 2 GB memory (with 2 x 1 GB DIMMs), one 73 GB 10K drive
9123 1B3 9123 1B4	Red Hat SUSE	2 POWER5 1.65 GHz DCM processor, DVD-ROM, 4 GB memory (with 2 x 2 GB DIMMs), one 73 GB 10K drive
9123 1B5 9123 1B6	Red Hat SUSE	2 POWER5 1.65 GHz DCM processor, DVD-ROM, 4 GB memory (with 2 x 2 GB DIMMs), one 73 GB 15K drive
9123 1C1 9123 1C2	Red Hat SUSE	2 POWER5 1.65 GHz DCM processor, DVD-ROM, 2 GB memory (with 2 x 1 GB DIMMs), one 36 GB 15K drive
9123 1C3 9123 1C4	Red Hat SUSE	2 POWER5 1.65 GHz DCM processor, DVD-ROM, 2 GB memory (with 2 x 1 GB DIMMs), one 146 GB 10K drive
9123 1C5 9123 1C6	Red Hat SUSE	2 POWER5 1.65 GHz DCM processor, DVD-ROM, 4 GB memory (with 2 x 2 GB DIMMs), one 146 GB 10K drive

Notes:

- **Do not include FC 3752 in above fixed configs**

Key selling materials

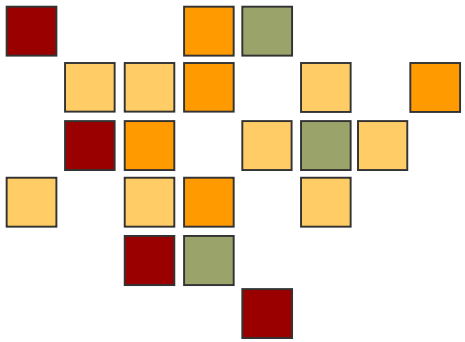
- **Brochure & Datasheets**
  - Linux on POWER family brochure, Linux distribution on POWER datasheet, OpenPower datasheet
- **Presentations**
  - OpenPower Overview presentation, Product Excellence presentation, 64-bit alternatives quick reference guide,
- **Analyst White Papers**
  - IDC: OpenPower overview, HRG: Assessment on IBM best of breed 64-bit Linux server, Sageza: Power Consolidation report
- **OpenPower flash demo**
- **OpenPower poster**
- **Solution briefs (over 10)**
- **Many more….**

Find them in the OpenPower sales kit (will be live on 9/14):

IBM: http://w3.ibm.com/sales/systems

Business partners : http://www.ibm.com/partnerworld/sales/systems

Make the move to OpenPower!



For more information about OpenPower, visit:
ibm.com/eserver/openpower

For more information about Power Architecture, visit:
ibm.com/power

Worldwide OpenPower Contacts

Sales:	Christopher Johnson/Cranford/IBM
Marketing:	Susan L Green/Boulder/IBM
Marketing:	Irene N Wong/Raleigh/IBM
BP Marketing:	Debra A Schultz/Raleigh/IBM
Channels:	Elaine Lack/Raleigh/IBM
ibm.com:	James Tracy/Atlanta/IBM

Geography Team Leads – Sales

AG:	Christopher Hicks/Cincinnati/IBM
AG:	Steve Michael/Mount Laurel/IBM
EMEA:	Rohan Fernando/UK/IBM
EMEA:	Ray Belcher/UK/IBM
AP:	Jeffrey Lee Dunn/Singapore/IBM
AP:	Andrew H Rouch/Singapore/IBM

Appendix

OpenPower 720 is advantaged compared to HP DL 580

FEATURE	OpenPower 720	ProLiant DL 580 G2
Configuration/Size	Rack Mount, 4U/Deskside	Rack Mount, 4U
Processor	IBM Dual Core P5 GR 1.65 /1.5 GHz	Up to 2. 8 GHz Intel Xeon Processor MP
Processor L2 Cache	1.9 MB L2	1 MB
# Processors	2/4	4
Memory Type	DDR 266 MHz	PC 1600 DDR 200 MHz ECC
Maximum RAM	64 GB	32 GB
Memory Protection	Chipkill & Online Spare	Advanced ECC
DASD Controller	Dual Ultra320 SCSI (8 Bays)	Ultra 320 Ready
RAID Support	Integrated RAID 5	Smart Array 5i Plus Controller
Media Bays	8 (2x4 packs)	4 1.0” Drive Bays
Storage Capacity	1.17 TB	587 GB (Using 146 GB drives)
Slots (hot-plug)	5x64bit/133MHz PCI-X	4
Remote I/O	12 drawers	No
Active PCI-X slots	5	6 available (64-bit/100 MHz PCI-X)
Networking	Integrated Dual Gigabit	Single Port 10/100/1000 (in a Slot)
HS redundant power	Optional	Yes
Systems Mgt.	FSP	Insight Manager
Systems Mgt. Proc.	Yes	Integrated Lights-Out Mgmt iLO
Virtualization option	Yes (Planned 4Q04 GA)	VMWare
Limited Warranty*	3 years parts and labor NBD	3 years on site, NBD

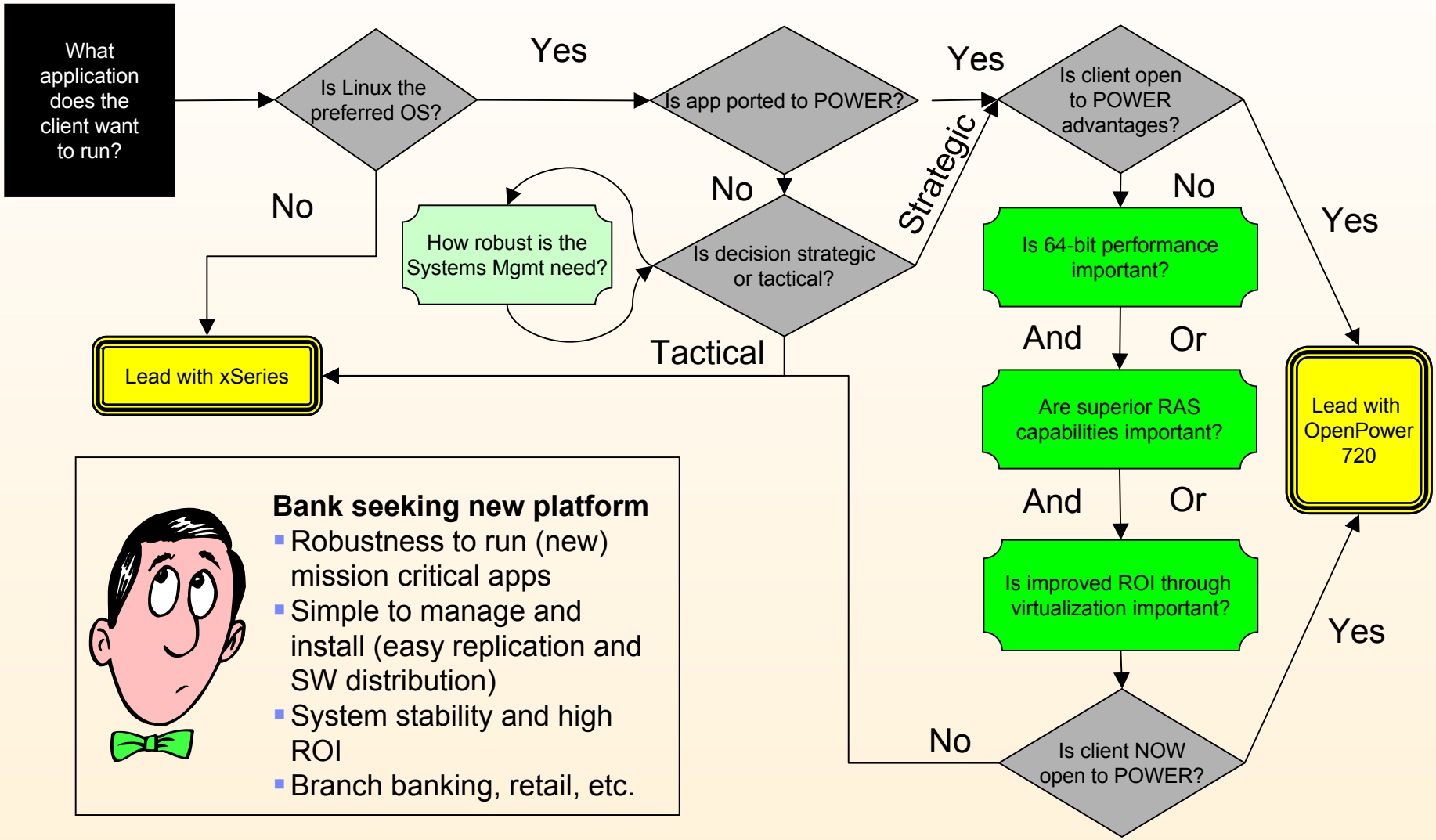
***See Legal Notes page for additional Limited Warranty information.**

OpenPower 720 is advantaged compared to HP DL585 on Opteron

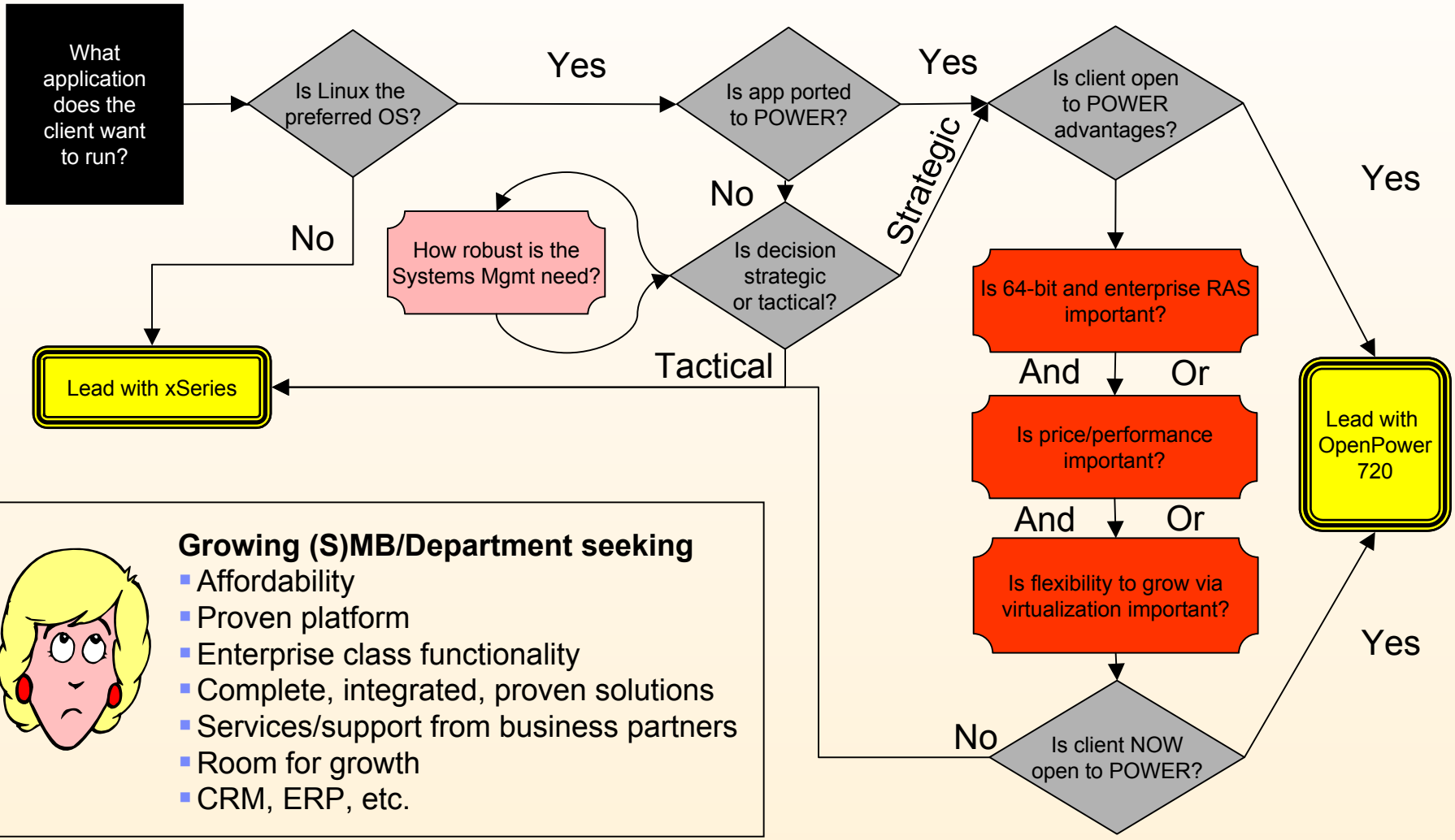
FEATURE	OpenPower 720	ProLiant DL585
Configuration/Size	Rack Mount, 4U/Deskside	Rack Mount, 4U
Processor	IBM Dual Core P5 GR 1.65 /1.5 GHz	Up to 2.4 GHz AMD Opteron 850
Processor L2 Cache	1.9 MB L2	1 MB L2
# Processors	2/4	4
Memory Type	DDR 266 MHz	266 MHz PC 2100 DDR
Maximum RAM	64 GB	64 GB
Memory Protection	Chipkill & Online Spare	ECC/No
DASD Controller	Dual Ultra320 SCSI (8 Bays)	Dual Channel Ultra 160 SCSI (std.) Dual Channel Ultra 320 SCSI (Optional)
RAID Support	Integrated RAID 5	Smart Array 5i
Media Bays	8 (2x4 packs)	4 Bays”
Storage Capacity	1.17 TB	587GB
Slots	5x64bit/133 MHz PCI-X	2x64-bit/133, 6x64-bit/100 MHz
Remote I/O	12 drawers	None
Active PCI-X slots	5	4
Networking	Integrated Dual Gigabit	Dual Gigabit
HS redundant power	Optional	Yes
Systems Mgt.	FSP	Insight Manager
Systems Mgt. Proc.	Yes	Integrated Lights-Out Mgmt iLO
Virtualization option	Yes (Planned 4Q04 GA)	VMWare in 32 bit mode
Limited Warranty*	3 years parts and labor NBD	3 years on site, NBD

*See Legal Notes page for additional Limited Warranty information.

Is OpenPower 720 an Advantage for Distributed Enterprise Solutions?



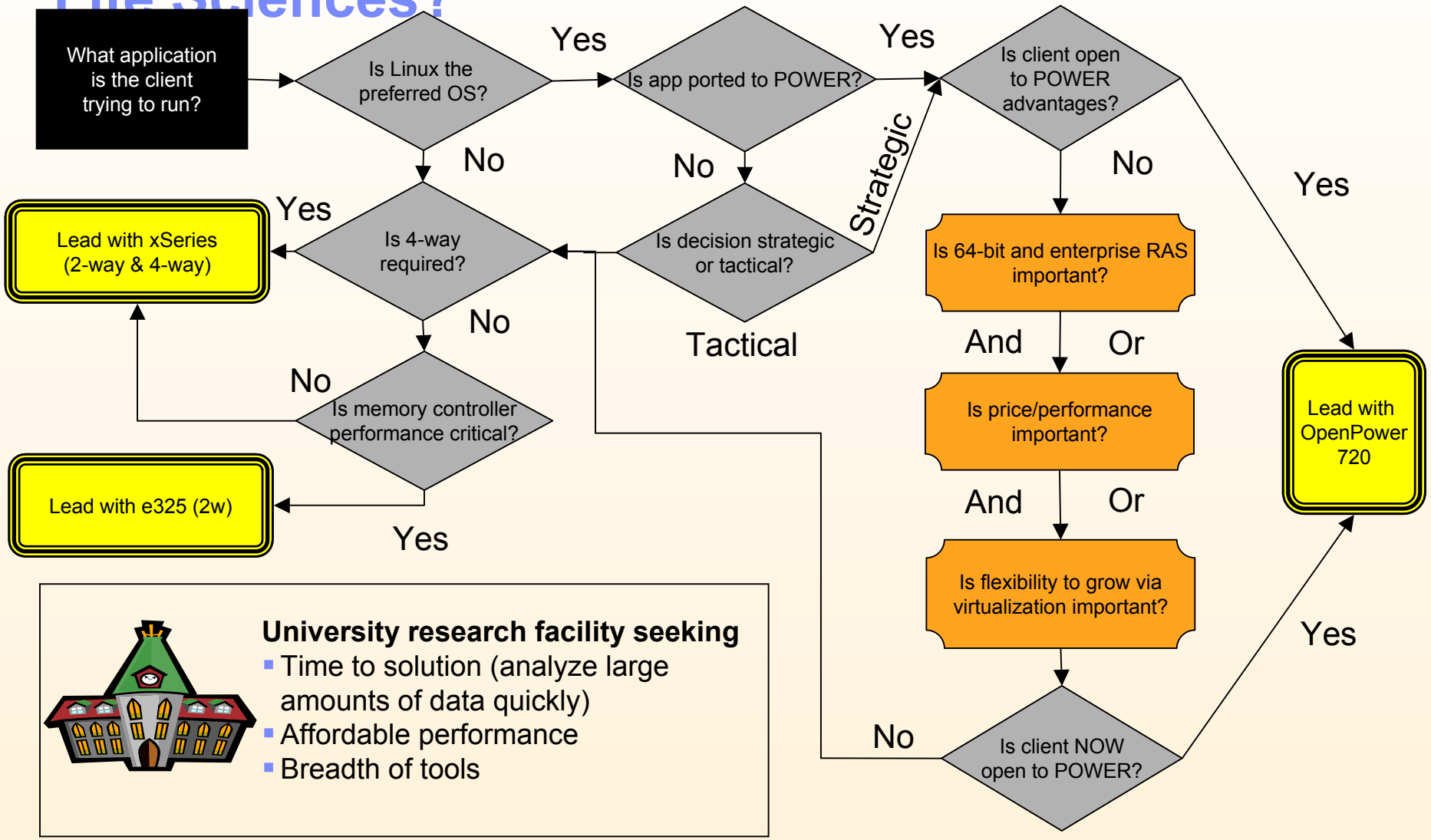
Is OpenPower 720 an Advantage for Bus. Process Transformation?



Growing (S)MB/Department seeking

- Affordability
- Proven platform
- Enterprise class functionality
- Complete, integrated, proven solutions
- Services/support from business partners
- Room for growth
- CRM, ERP, etc.

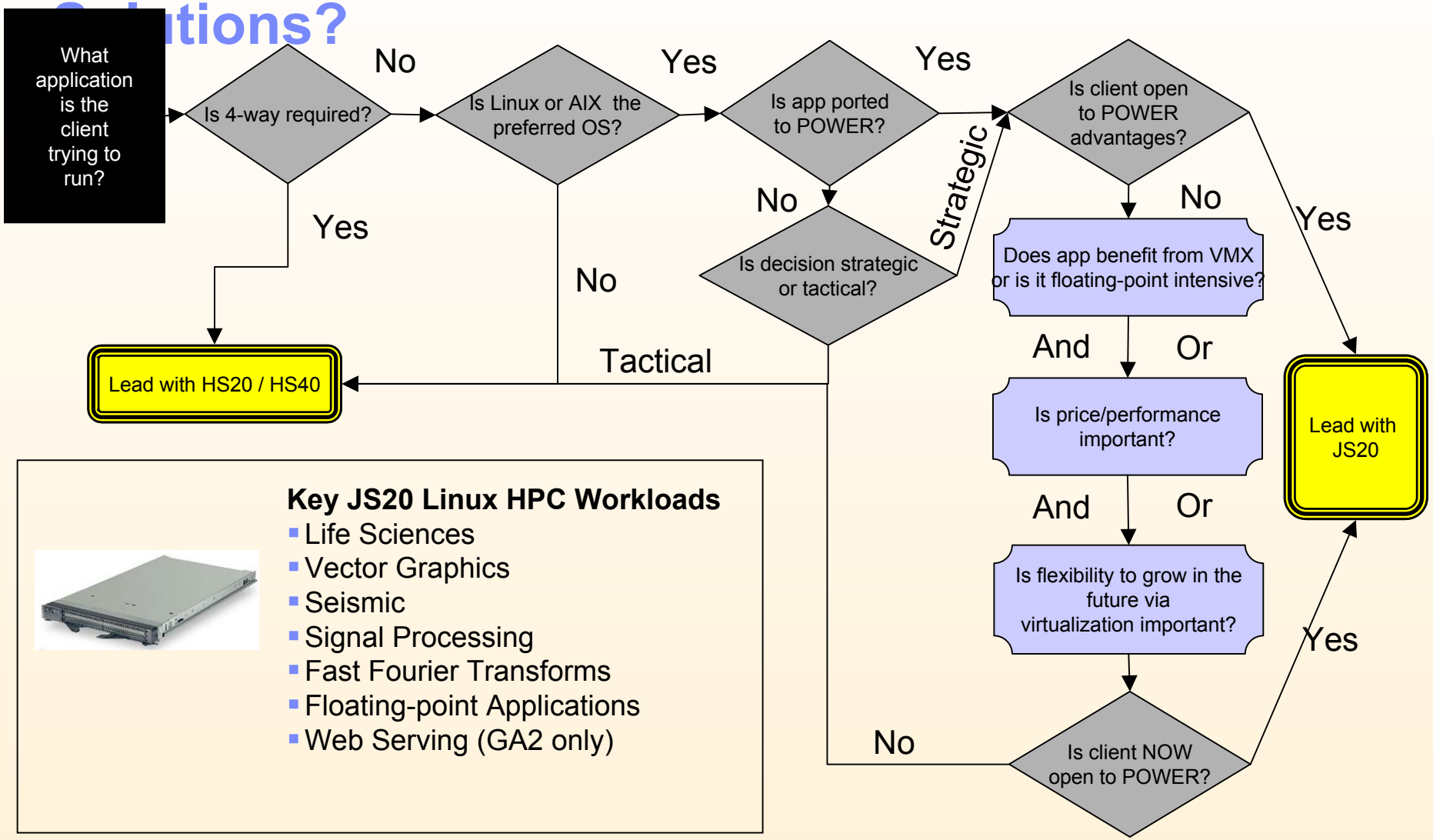
Is OpenPower 720 an Advantage for HPC and Life Sciences?



University research facility seeking

- Time to solution (analyze large amounts of data quickly)
- Affordable performance
- Breadth of tools

Is JS20 an Advantage for BladeCenter™ Solutions?



Key JS20 Linux HPC Workloads

- Life Sciences
- Vector Graphics
- Seismic
- Signal Processing
- Fast Fourier Transforms
- Floating-point Applications
- Web Serving (GA2 only)

Special Notices

This document was developed for IBM offerings in the United States as of the date of publication. IBM may not make these offerings available in other countries, and the information is subject to change without notice. Consult your local IBM business contact for information on the IBM offerings available in your area.

Information in this document concerning non-IBM products was obtained from the suppliers of these products or other public sources. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. Send license inquires, in writing, to IBM Director of Licensing, IBM Corporation, New Castle Drive, Armonk, NY 10504-1785 USA.

All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

The information contained in this document has not been submitted to any formal IBM test and is provided "AS IS" with no warranties or guarantees either expressed or implied.

All examples cited or described in this document are presented as illustrations of the manner in which some IBM products can be used and the results that may be achieved. Actual environmental costs and performance characteristics will vary depending on individual client configurations and conditions.

IBM Global Financing offerings are provided through IBM Credit Corporation in the United States and other IBM subsidiaries and divisions worldwide to qualified commercial and government clients. Rates are based on a client's credit rating, financing terms, offering type, equipment type and options, and may vary by country. Other restrictions may apply. Rates and offerings are subject to change, extension or withdrawal without notice.

IBM is not responsible for printing errors in this document that result in pricing or information inaccuracies.

All prices shown are IBM's United States suggested list prices and are subject to change without notice; reseller prices may vary.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

Many of the pSeries features described in this document are operating system dependent and may not be available on Linux. For more information, please check: http://www.ibm.com/servers/eserver/pseries/linux/whitepapers/linux_pseries.html

Any performance data contained in this document was determined in a controlled environment. Actual results may vary significantly and are dependent on many factors including system hardware configuration and software design and configuration. Some measurements quoted in this document may have been made on development-level systems. There is no guarantee these measurements will be the same on generally-available systems. Some measurements quoted in this document may have been estimated through extrapolation. Users of this document should verify the applicable data for their specific environment.

Revised February 6, 2004

Special Notices (Cont.)

The following terms are registered trademarks of International Business Machines Corporation in the United States and/or other countries: AIX, AIX/L, AIX/L(logo), alphaWorks, AS/400, Blue Gene, Blue Lightning, C Set++, CICS, CICS/6000, CT/2, DataHub, DataJoiner, DB2, DEEP BLUE, developerWorks, DFDSM, DirectTalk, DYNIX, DYNIX/ptx, e business(logo), e(logo)business, e(logo)server, Enterprise Storage Server, ESCON, FlashCopy, GDDM, IBM, IBM(logo), ibm.com, IBM TotalStorage Proven, IntelliStation, IQ-Link, LANStreamer, LoadLeveler, Lotus, Lotus Notes, Lotusphere, Magstar, MediaStreamer, Micro Channel, MQSeries, Net.Data, Netfinity, NetView, Network Station, Notes, NUMA-Q, Operating System/2, Operating System/400, OS/2, OS/390, OS/400, Parallel Sysplex, PartnerLink, PartnerWorld, POWERparallel, PowerPC, PowerPC(logo), Predictive Failure Analysis, pSeries, PTX, ptx/ADMIN, RISC System/6000, RS/6000, S/390, Scalable POWERparallel Systems, SecureWay, Sequent, ServerProven, SP1, SP2, SpaceBall, System/390, The Engines of e-business, THINK, ThinkPad, Tivoli, Tivoli(logo), Tivoli Management Environment, Tivoli Ready(logo), TME, TotalStorage, TURBOWAYS, VisualAge, WebSphere, xSeries, z/OS, zSeries.

The following terms are trademarks of International Business Machines Corporation in the United States and/or other countries: Advanced Micro-Partitioning, AIX/L(logo), AIX 5L, AIX PVMe, AS/400e, BladeCenter, Chipkill, Cloudscape, DB2 OLAP Server, DB2 Universal Database, DFDSM, DFSORT, Domino, e-business(logo), e-business on demand, eServer, GigaProcessor, HACMP, HACMP/6000, Hypervisor, i5/OS, IBMLink, IBM Virtualization Engine, IMS, Intelligent Miner, Micro-Partitioning, iSeries, NUMACenter, OpenPower, POWER, Power Architecture, Power Everywhere, PowerPC Architecture, PowerPC 603, PowerPC 603e, PowerPC 604, PowerPC 750, POWER2, POWER2 Architecture, POWER3, POWER4, POWER4+, POWER5, POWER5+, POWER6, Redbooks, Sequent (logo), SequentLINK, Server Advantage, ServeRAID, Service Director, SmoothStart, SP, S/390 Parallel Enterprise Server, ThinkVision, Tivoli Enterprise, TME 10, TotalStorage Proven, Ultramedia, VideoCharger, Visualization Data Explorer, X-Architecture, z/Architecture.

A full list of U.S. trademarks owned by IBM may be found at: http://www.**ibm.com**/legal/copytrade.shtml.

UNIX is a registered trademark in the United States, other countries or both.

Linux is a registered trademark of Linus Torvalds in the United States, other countries or both.

Microsoft, Windows, Windows NT and the Windows logo are registered trademarks of Microsoft Corporation in the United States and/or other countries.

Intel, Itanium and Pentium are registered trademarks and Intel Xeon and MMX are trademarks of Intel Corporation in the United States and/or other countries

AMD Opteron is a trademark of Advanced Micro Devices, Inc.

Java and all Java-based trademarks and logos are trademarks of Sun Microsystems, Inc. in the United States and/or other countries.

TPC-C and TPC-H are trademarks of the Transaction Performance Processing Council (TPPC).

SPECint, SPECfp, SPECjbb, SPECweb, SPECjAppServer, SPEC OMP, SPECviewperf, SPECapc, SPEChpc, SPECjvm, SPECmail, SPECimap and SPECsfs are trademarks of the Standard Performance Evaluation Corp (SPEC).

NetBench is a registered trademark of Ziff Davis Media in the United States, other countries or both.

Other company, product and service names may be trademarks or service marks of others.

Revised August 23, 2004

Notes on Benchmarks and Values

The IBM benchmarks results shown herein were derived using particular, well configured, development-level and generally-available computer systems. Buyers should consult other sources of information to evaluate the performance of systems they are considering buying and should consider conducting application oriented testing. For additional information about the benchmarks, values and systems tested, contact your local IBM office or IBM authorized reseller or access the website of the benchmark consortium or benchmark vendor.

IBM benchmark results can be found in the IBM eServer p5, pSeries and IBM RS/6000 Performance Report at http://www-1.ibm.com/servers/eserver/pseries/hardware/system_perf.html

Unless otherwise indicated for a system, the performance benchmarks were conducted using AIX V4.3 or AIX 5L. IBM C Set++ for AIX and IBM XL FORTRAN for AIX with optimization were the compilers used in the benchmark tests. The preprocessors used in some benchmark tests include KAP 3.2 for FORTRAN and KAP/C 1.4.2 from Kuck & Associates and VAST-2 v4.01X8 from Pacific-Sierra Research. The preprocessors were purchased separately from these vendors. Other software packages like IBM ESSL for AIX and MASS for AIX were also used in some benchmarks.

For a definition and explanation of each benchmark and the full list of detailed results, visit the web site of the benchmark consortium or benchmark vendor.

TPC	http://www.tpc.org
SPEC	http://www.spec.org
Linpack	http://www.netlib.org/benchmark/performance.pdf
Pro/E	http://www.proe.com
GPC	http://www.spec.org/gpc
NotesBench	http://www.notesbench.org
VolanoMark	http://www.volano.com
STREAM	http://www.cs.virginia.edu/stream/
SAP	http://www.sap.com/benchmark/
Oracle Applications	http://www.oracle.com/apps_benchmark/
PeopleSoft - To get information on PeopleSoft benchmarks, contact PeopleSoft directly	
Siebel	http://www.siebel.com/crm/performance_benchmark/index.shtm
Baan	http://www.ssaglobal.com
Microsoft Exchange	http://www.microsoft.com/exchange/evaluation/performance/default.asp
Veritest	http://www.veritest.com/clients/reports
Fluent	http://www.fluent.com/software/fluent/fl5bench/fullres.htm
TOP500 Supercomputers	http://www.top500.org/
Ideas International	http://www.microsoft.com/exchange/evaluation/performance/default.asp
Storage Performance Council	http://www.storageperformance.org/results

Revised August 26, 2003