Enterprise Technology at Work: Applying the Power and Range of the HP Portfolio

John Loether

Senior Technology Consultant
HP

Session #2645 Room B207

HP WORLD 2003
Solutions and Technology Conference & Expo

The world's #1 technology company

- Portfolio leadership
  - Palmtop to NonStop
- Segment leadership
  - Consumer to SMB to enterprise
- Customer focused
  - 15K pre-sales and sales
  - 65K service professionals
  - 100K+ partners of choice

- eCommerce leadership
  - $12 billion/quarter in e-commerce transactions (includes internet, EDI, web-enabled revenue)
  - B2B capabilities in 185 countries, 43 currencies, 15 languages
- R&D leadership
  - >17,000 patents spanning print technology to molecular computing
  - 3 new patents every working day
  - $4 billion annual R&D investment
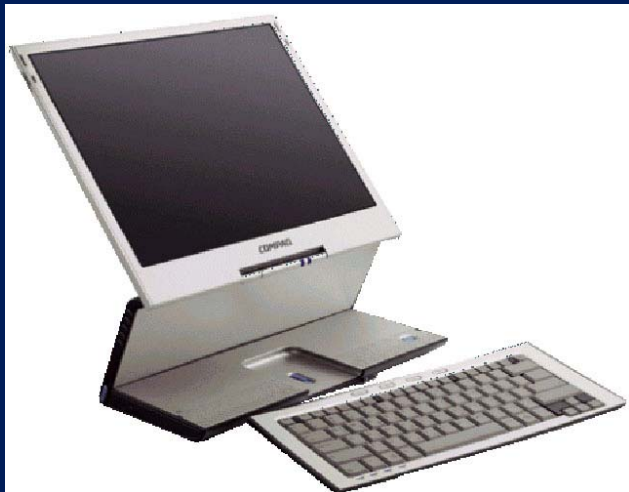- Financial strength
  - $11.8 billion in cash

A new world of IT is emerging

- Dynamic digital content…
- Delivered anywhere, anytime…
- Across the internet…
- Requiring continuous update and support…
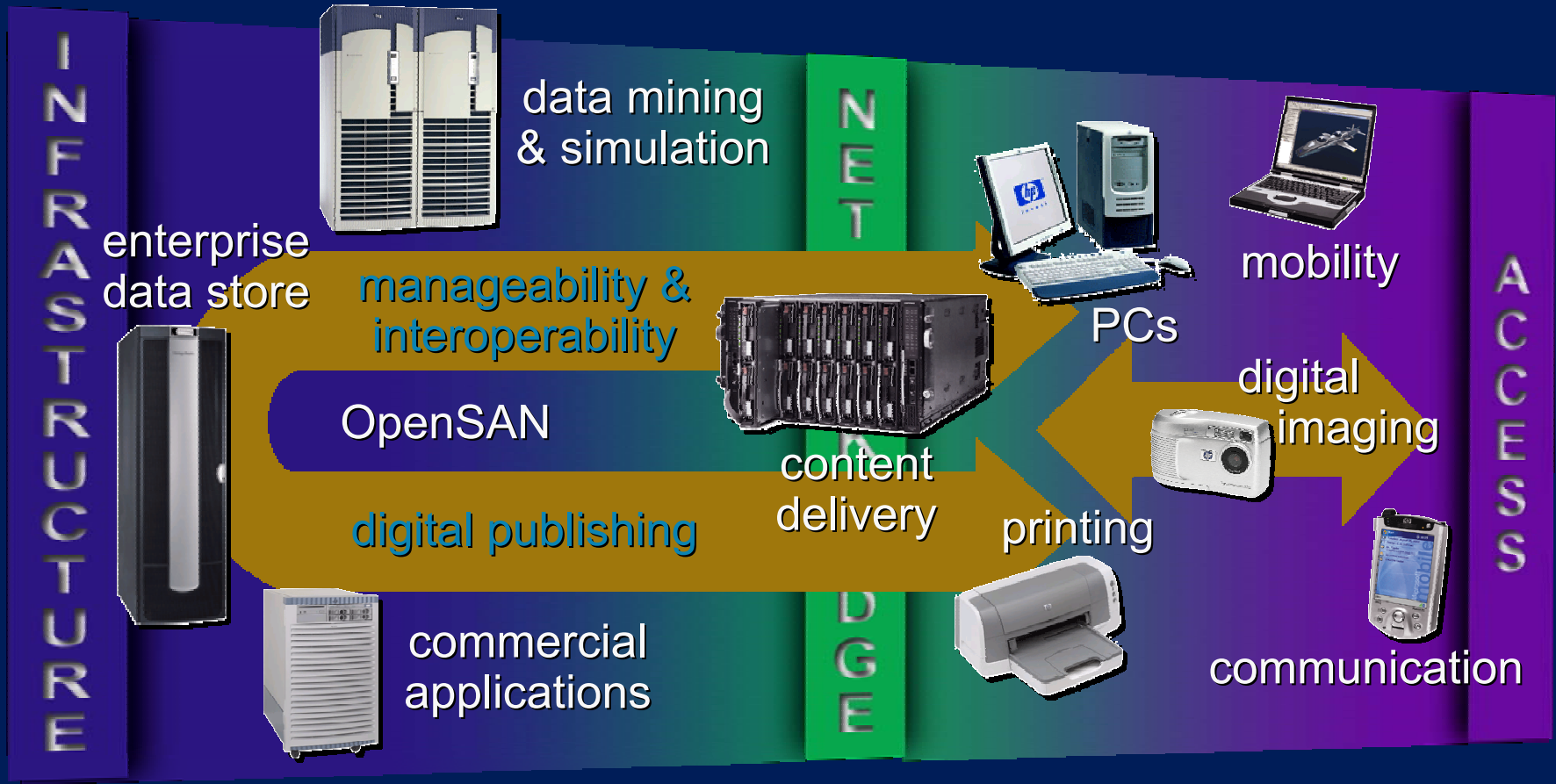- Built on open, industry-standard architectures

The innovation company

The new technology landscape

HP WORLD 2003
Solutions and Technology Conference & Expo

delivered with premier partnerships

INFRASTRUCTURE

NETWORK EDGE

ACCESS

data mining & simulation

enterprise data store

manageability & interoperability

OpenSAN

digital publishing

content delivery

mobility

PCs

digital imaging

printing

commercial applications

communication

adaptive infrastructure integrated with services

Top IT issues

- Managing transaction volumes
- Bulletproofing the infrastructure
- Security and manageability
- Integrating web-based processes
- Real-time access to customer data
- Standardization leading to lower costs

What it means

- Leadership in data center and supercomputing
- Leadership in adaptive infrastructure
- Leadership in mission-critical services
- Leadership in commercial personal computing
- #1 consumer technology company*

*internal study

Strong record of scalable HPTC solutions

Pacific Northwest National Laboratory

largest Linux supercomputer win
8 TFLOPS Itanium™

geneProt™

1.9 TFLOPS AlphaServer protein factory

DAIMLERCHRYSLER

1.9 TFLOPS
Superdome and N-Class

Pittsburgh Supercomputing Center

6 TFLOPS AlphaServer SC

" Los Alamos is very excited about the new Q machine. ASCI Q will increase our capability to maintain and assess the safety and performance of the nuclear weapons stockpile while moving us toward new scientific frontiers in the simulation of complex systems. "

Dr. John Browne - Director

Los Alamos National Laboratory

ASCI
Accelerated Strategic Computing Initiative

ASCI Q at Los Alamos has now been measured with 13.88 TF/s and is the second system to exceed the 10 TF/s mark.

United States Postal Service

Announced at the 2003 Americas Field Conference

- PC contract for thousands of units

- Hundreds of AlphaServers

- Running OpenVMS

UNITED STATES POSTAL SERVICE.

" It lets us grab information at our fingertips that used to be stored on paper. Now any district in the city can go online and search for any incident. "

Lieutenant Detective Bill McCarthy
Boston Police Department

State-of-the-art systems make life tougher for criminals

AlphaServer

Tru64 UNIX

SANs

BostonPolice
DEPARTMENT

RELIABILITY…
taking online to the extreme

" Our reliance on technology is 100 percent. As an electronic marketplace, it is critical that we have absolute reliability. We cannot tolerate any system downtime. **"**

John Hickey
Executive VP of Technology Services
NASDAQ

Through seven generationsof Tandem NonStop™ servers handling more than 2,000 transactions per second

NASDAQ

Pushing SQL Healthcare

"

The Johns Hopkins Sloan Digital Sky Survey has been expanding its catalog size to about 300 million celestial objects that are stored in a Microsoft SQL Server 2000 database. The project manages computations for calculating the distances between all pairs of objects within the catalog. The positive effects of large memory were seen very clearly in the first generation 64-bit Itanium-based server. With HP's 64-bit Intel Itanium-based platform configured with 28 GB of memory we were able to do the job in 10 days, where it would have taken half a year previously.

"

Alex Szalay
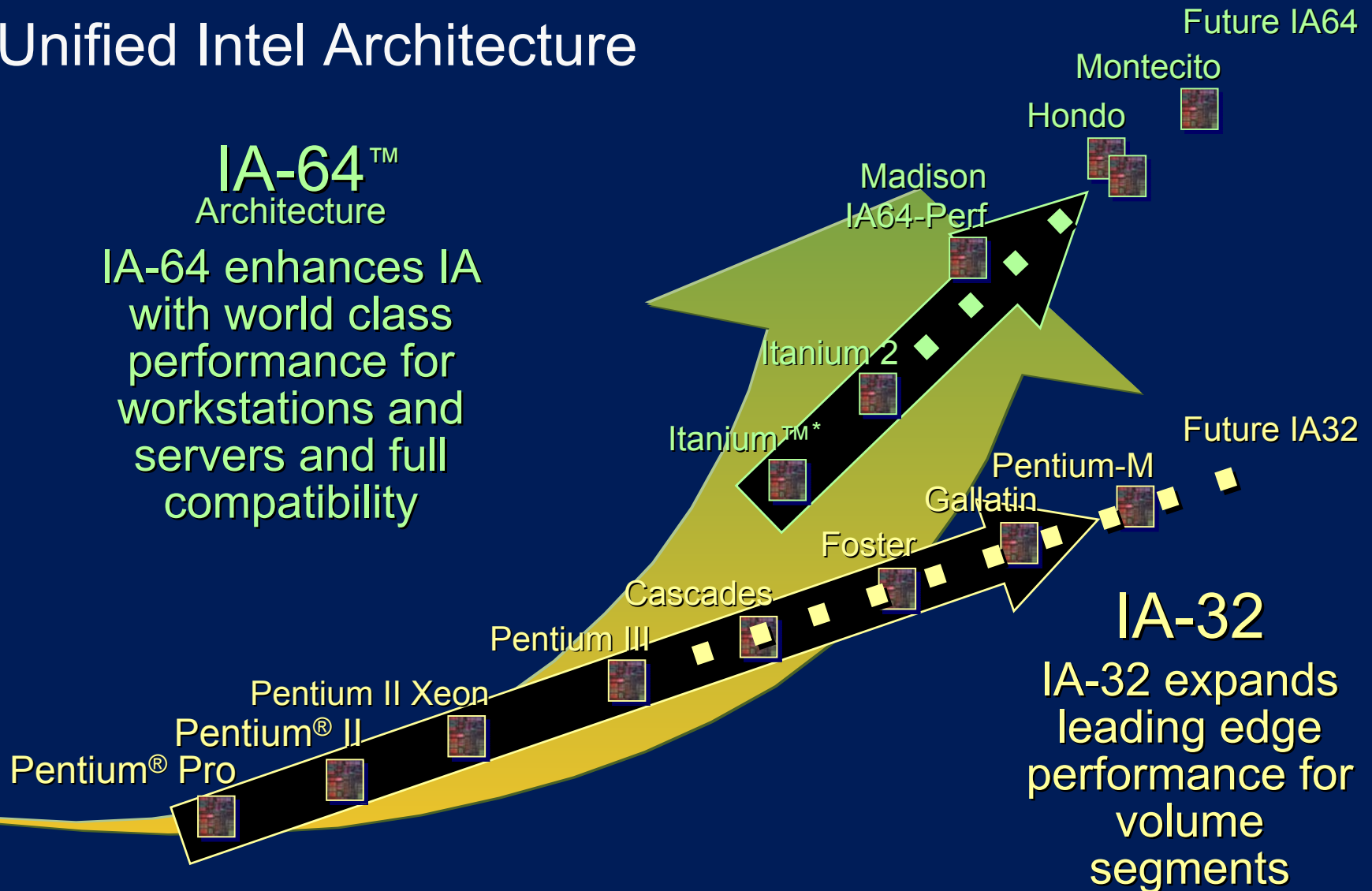Johns Hopkins University

Next Generation Microsoft Databases

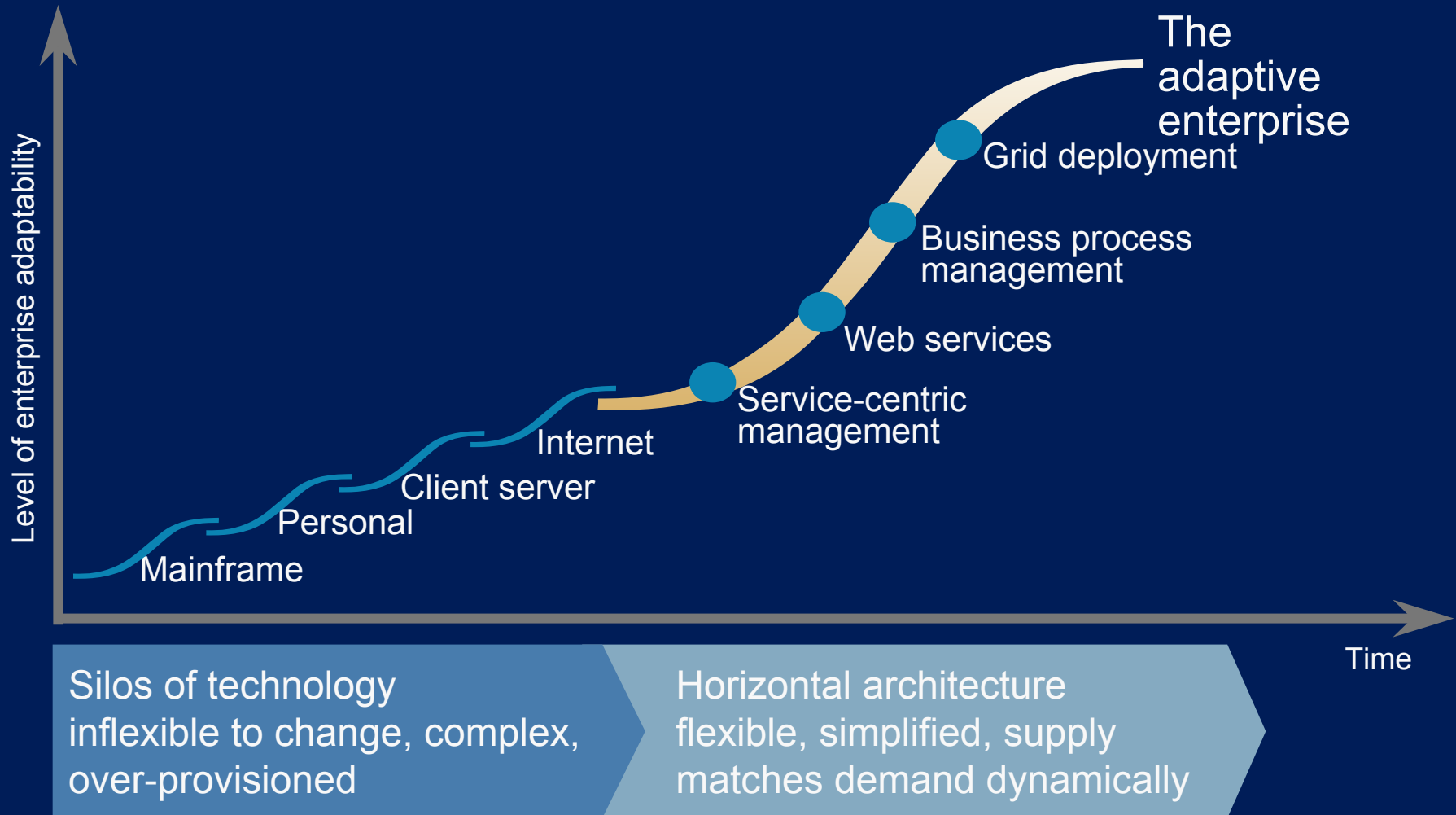JOHNS HOPKINS
U N I V E R S I T Y

Intel architecture roadmap

Unified Intel Architecture

IA-64™
Architecture

IA-64 enhances IA with world class performance for workstations and servers and full compatibility

Future IA64

Montecito

Hondo

Madison
IA64-Perf

Itanium 2

Itanium™*

Pentium-M

Gallatin

Foster

Future IA32

IA-32

IA-32 expands leading edge performance for volume segments

Cascades

Pentium III

Pentium II Xeon

Pentium® II

Pentium® Pro

A new model of computing: business and IT are perfectly synchronized

The adaptive enterprise

Grid deployment

Business process management

Web services

Service-centric management

Internet

Client server

Personal

Mainframe

Level of enterprise adaptability

Time

Silos of technology inflexible to change, complex, over-provisioned

Horizontal architecture flexible, simplified, supply matches demand dynamically

Technical leadership across the adaptive enterprise IT environment

Management & control

Business processes

Services

Resources

Real-time business agility

Utility Data Center

Virtualization

Capacity on Demand

Disaster Tolerance

Grid computing

Business efficiency

.Net *and* J2EE support

Multi-OS strategy

Advanced blades architecture & offerings

Virtual Server Environment

Server clustering

Networked storage

Printer management

Busi

HP-UX

OpenV

PA-RI

Serve

Built-i

Best h

Discrete partitioned

Integrated clustered

Virtualized federated

Utilization

Clustering - An Overview

Clustering is combining multiple servers to provide reliable, available and scalable services to clients

A cluster generally comprises of:
- Multiple Servers
- One or more interconnects
- Shared storage (often with RAID)

The total configuration delivers availability & scalability for…..

….clients and applications
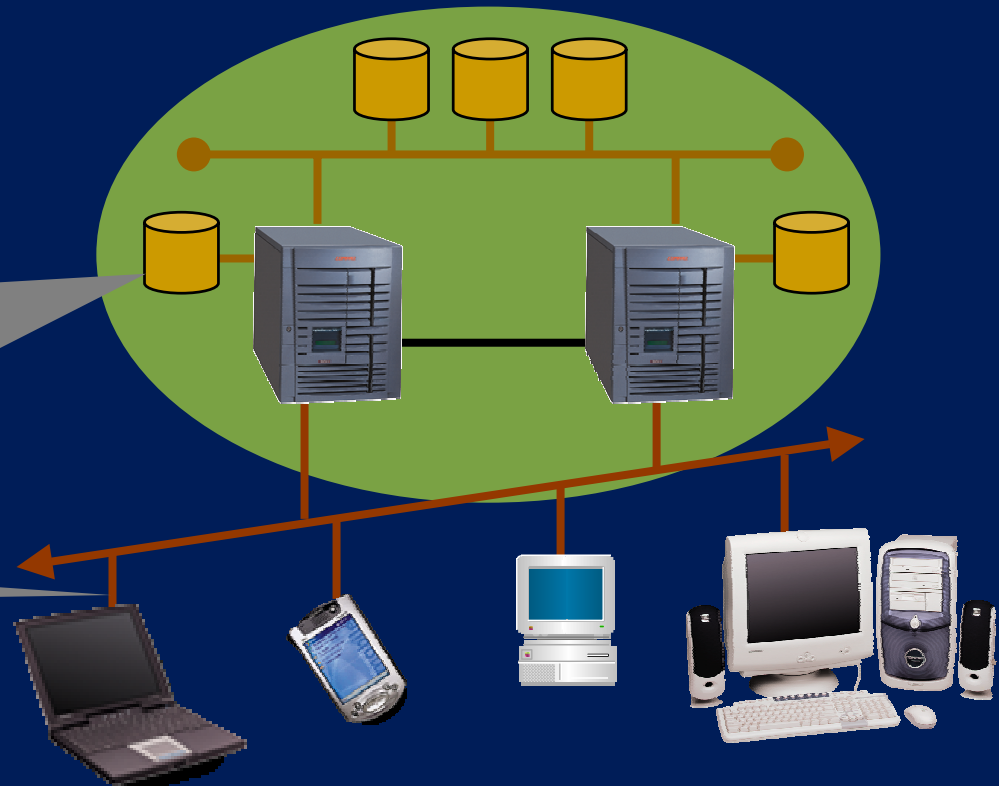
Clustering - An Overview

The style of clustering deployed will depend on specific availability and scalability requirements

- There are three main clustering styles:
  - Hot Standby
  - Shared Nothing
  - Computational & Shared Everything

This is the style of clustering that many vendors have, because it's easy

This is the most advanced style of clustering today

This is the style of clustering provided by Microsoft

"Shared Everything" Clusters

Deliver true scalability by sharing hardware and enabling all systems to access the same disks *at the same time*

All systems can access the same disk at the same time, so there's no need to split the data

In some cases, it is not necessary to modify applications to run them on multiple nodes simultaneously

Payroll

Payroll
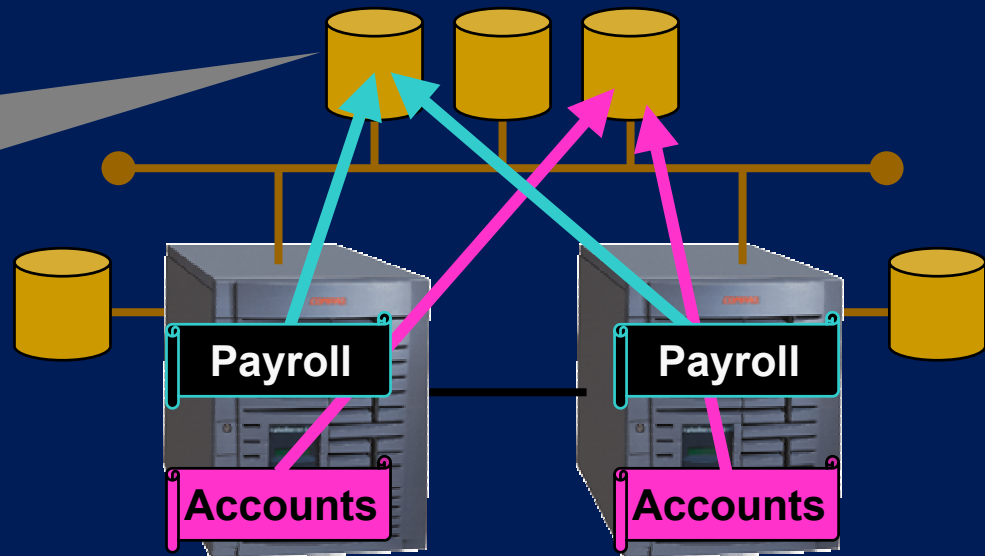
Accounts

Accounts

Shared Clusters should:

- Allow different size nodes to be interconnected and shared
- Allow for rolling upgrades
- Support a wide span of 'node' counts
- Have Multi Paths to Storage with NSPOF
- Support Site Tolerant clusters over long distances
- Do 'shadowing' and data replication
- Support a cluster-wide file system – (make changes once)
- Support common cluster address – cluster is viewed as a single system
- Activate complete dynamic load balancing
- Allow nodes/storeage to be added and subtracted from the cluster without shutting the cluster down

Quickblade modular strategy
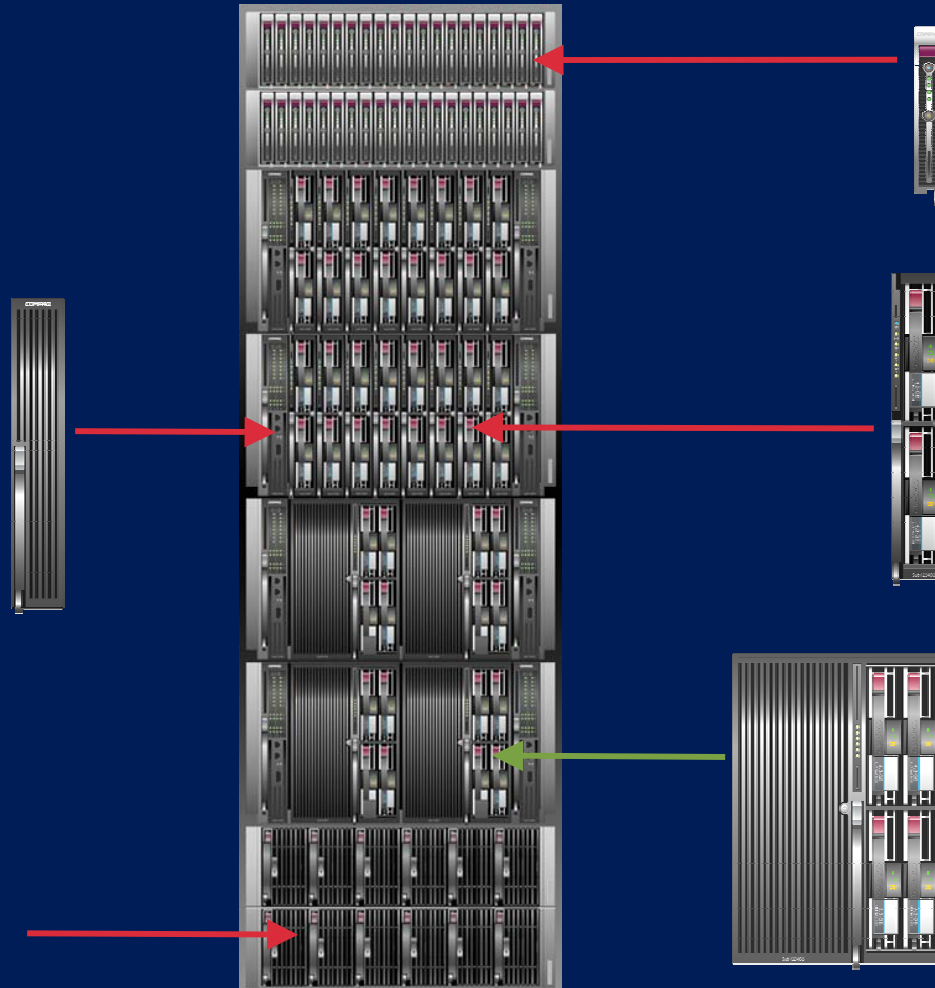
3U and 6U enclosures w/ pluggable backplane

Low-Power Front-End Server Blade

Patch Panel or Port Aggregator Modules

Mid-Tier Server Blade

Back-End Server Blade

Redundant, Hot Plug Power Supplies

HP business critical servers

Simply the best enterprise offering

THE STANDISH GROUP

Lowest TCO in the industry

Continuous availability

Scales to 4080 processors

Zero Latency Enterprise
NonStop
S76000
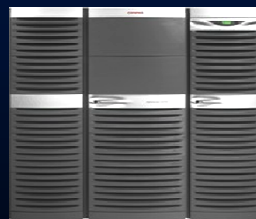S86000
S76 series

TOP500 SUPERCOMPUTER SITES

HP retains #1 position

4 in top 10

ASCI Q, most powerful in US

Superdome first in enterprise category

AlphaServer
SC series
GS series (8,16,32)
DS and ES series

Superdome

IDC

#1 in UNIX

#1 ww server revenue

#1 ww high-end and mid-range revenue

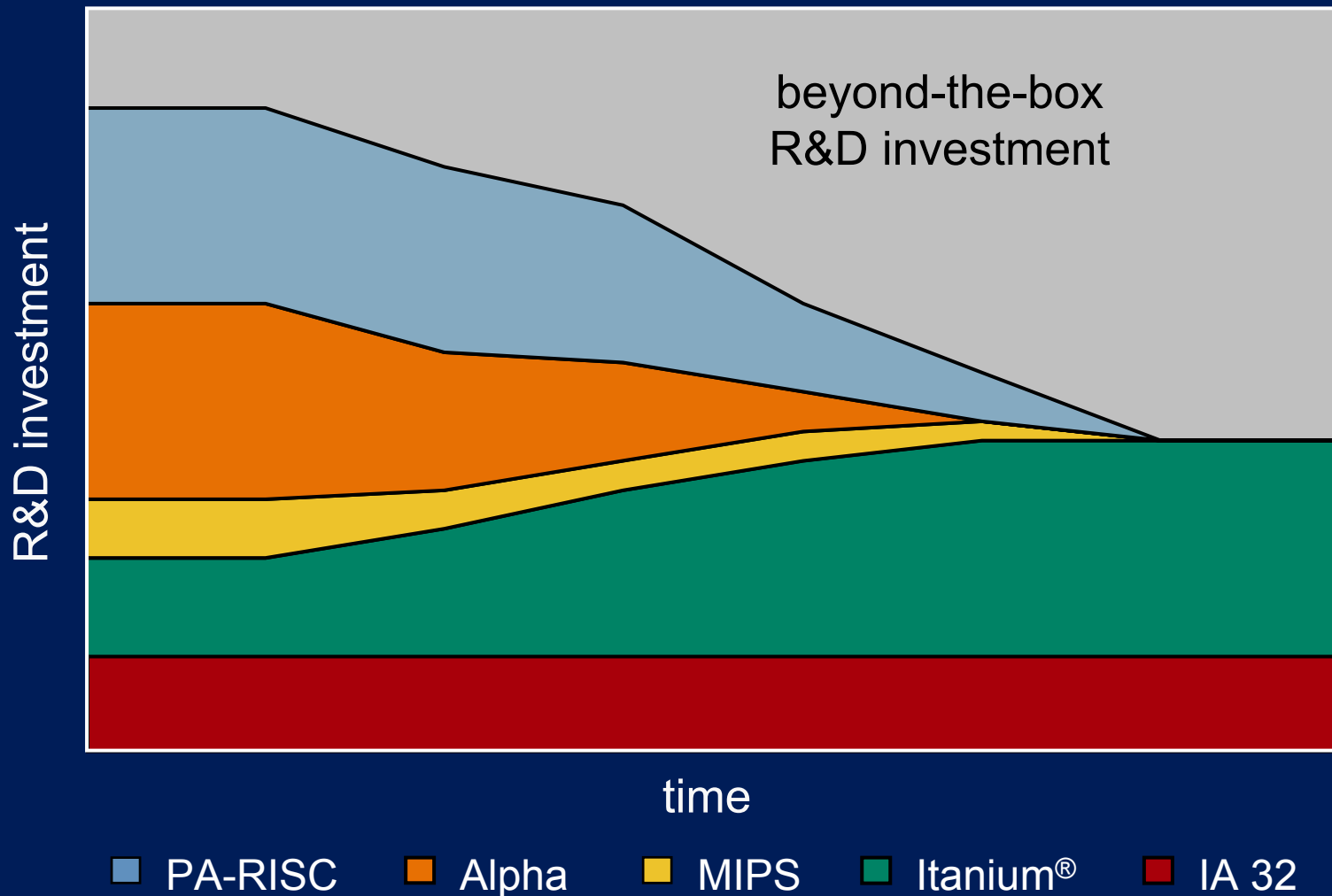#1 ww units and revenue in combined UNIX, Windows and Linux market

RX5670
RX2600

RP8400
RP74xx
RP54xx
RP24xx

Investing beyond the box
Focused innovation

beyond-the-box R&D investment

R&D investment

time

PA-RISC | Alpha | MIPS | Itanium® | IA 32

HP enterprise server Itanium strategy

Why Itanium®

- Open industry standard platform
  - Common platform for standard OS strategy
  - Lowers HP R&D and support costs, rides industry standard ROI curve
  - Ensures ISV adoption
- Reduces complexity
  - Provides legacy continuity
  - Common management reduces IT TCO
  - Common architecture provides flexibility for dynamic utility computing reconfigurations
- Architectural superiority
  - Investments in design teams
  - Increases in process technology
  - Planned increases in compiler performance

Itanium future

HP servers

HP-UX
Linux
Windows
OpenVMS

NonStop

capability & affordability
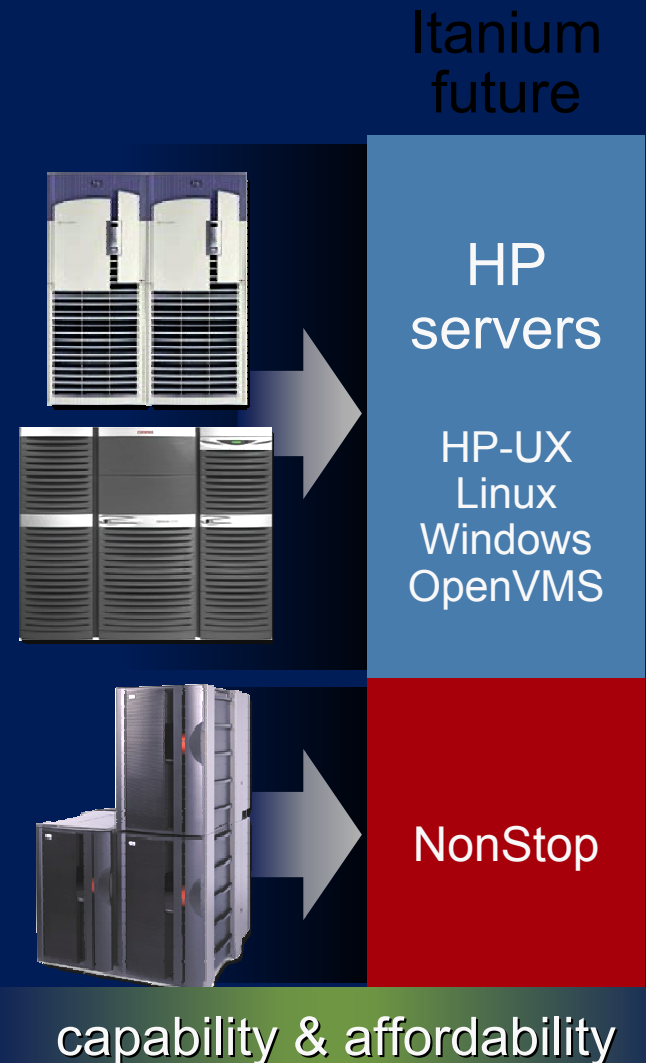
HP Partitioning Continuum Products

	clusters	hard partitions	virtual partitions	resource management
Windows		future systems	VMWare Server	hp ProLiant Essentials Workload Management Pack (RPM)
Linux		future systems	VMWare Server	PRM for Linux
OpenVMS		AlphaServer hard partitions	OpenVMS Galaxy	None
Tru64 UNIX		AlphaServer hard partitions	None	ARMTech psets Class Scheduler
HP-UX		nPartitions	vPars	PRM pSets
		HP-UX Workload Manager		

Broadest partitioning capabilities

hard partitions with multiple nodes	**hard partitions** within a node	**virtual partitions** within a hard partition	**PRM with psets** resource partitions in a single OS image
hp hyperplex	nPartitions	virtual partitions	PRM (process resource manager)
– complete hardware and software isolation – node granularity – multiple OS images	– hardware isolation per cell – complete software isolation – cell granularity – multiple OS images	– complete software isolation – CPU granularity – dynamic CPU migration – multiple OS images	– dynamic resource allocation – share (%) granularity – 1 OS image

hp-ux wlm (workload manager)
–automatic goal-based resource allocation via set SLOs

isolation   flexibility

for maximum flexibility and consolidation

Making multi-operating systems work

We lead with

HP-UX   incorporate the best of Tru64 UNIX® functionality into HP-UX

Linux®   contribute IP to Linux® community

Windows®   lead the migration to .NET®

Multi-OS capabilities

IT virtualization technologies

Security

– single sign-on

High-availability

Common management

– one system management environment

HP-UX 11i

HP servers today – market share leader
1 in 3 of world's servers shipped is HP!

market share #1 hp

source: IDC

- UNIX systems
- Windows systems
- industry standard (IA-32) servers
- Linux systems
- fault tolerant systems
- high performance technical computing

- Manufacturing – 9 out of top 10 automotive companies
- Transportation – 4 out of world's 5 largest airlines
- Financial – 95% world's securities transactions
- Telecom – 80% Europe's, and ~100% Japan's mobile services
- Utilities – 65% world's energy infrastructure

- DH Brown – 2002 UNIX function review: best operating system – HP-UX
- Gartner Group – server evaluation model: best high-end UNIX server – HP Superdome
- Gartner Group – server evaluation model: great reliability..solid choice as a database engine – HP NonStop server
- LinuxWorld '02 – Best system integration solution: rapid Linux deployment with ProLiant blades

Offering CHOICE

each for a reason

access services
- application
- customization
- flexibility
- price
- rackability
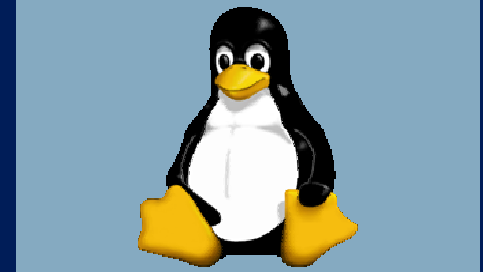- new application trends

foundation/ application services
- application
- scalability (<8-way)
- price/performance
- middleware integration
- new application trends

data services
- application
- scalability (>8-way)
- large data sets
- price/performance
- mission critical
- middleware integration
- new application trends

Clusters Roadmap
for Oracle9*i* RAC

SuSE Linux
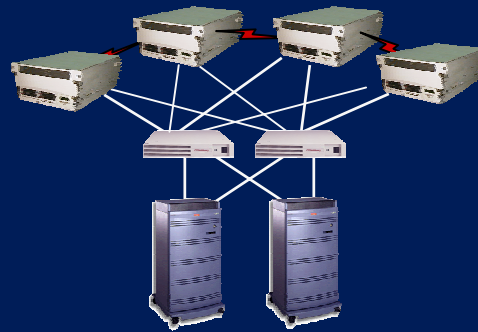
ProLiant DL580

Windows 2000

Select ProLiant Servers with RA4x00 or RA8000 Storage

HP-UX or TruCluster Server

Higher Levels of Availability, Scalability & Management

Full Range of Certified Configurations for **Customer Choice**

All systems are **pre-configured, pre-tested and certified**

Offering a **range of availability, scalability and management**

A day in the life with Superdome

6:30 — Wake up, turn off alarm-clock: **Sony**

6:45 — Go for a run: **Reebok**

7:15 — Have breakfast: **Nestle, General Mills, Kellogg's**

8:00 — Get Dressed: **Liz Claiborne**

8:30 — Check email: **AOL, Cisco**

8:35 — Have gift sent to Mom: **Amazon**

8:40 — Make long distance call to wish Mom a Happy Birthday : **Nextel**

8:50 — Drive to work**: Porsche, Goodyear, Oakley Sunglasses**

8:55 — Use cellphone in car to check voicemail: **Cingular Wireless**

9:10 — Arrive at the office: **Kone elevators**

9:30 — Conf call with Europe: **Deutsche Telekom, Vodafone, Talk America**

10:00 – Reserve flights, hotel for next week's trip : **Continental Airlines, Best Western**

12:00 – Pick up a snowboard for weekend ski trip: **Burton Snowboards**

1:30 — Update Health Insurance policy: **Blue Cross/Blue Shield**

3:00 — Send package to Vienna office: **Pitney-Bowes, Austrian Postal Service**

5:00 — Stop by pharmacy on the way home: **Glaxo-SmithKline, Shoppers Drug Mart**

U.S. Air Force

Joint STARS - new era in airborne surveillance

" By using commercially available computer systems, we are able to provide the customer with increased reliability, advanced technologies and increased processing power, all while achieving the original goal of the program - to provide lower cost per aircraft. "

NORTHROP GRUMMAN

Frank Moore
Vice President
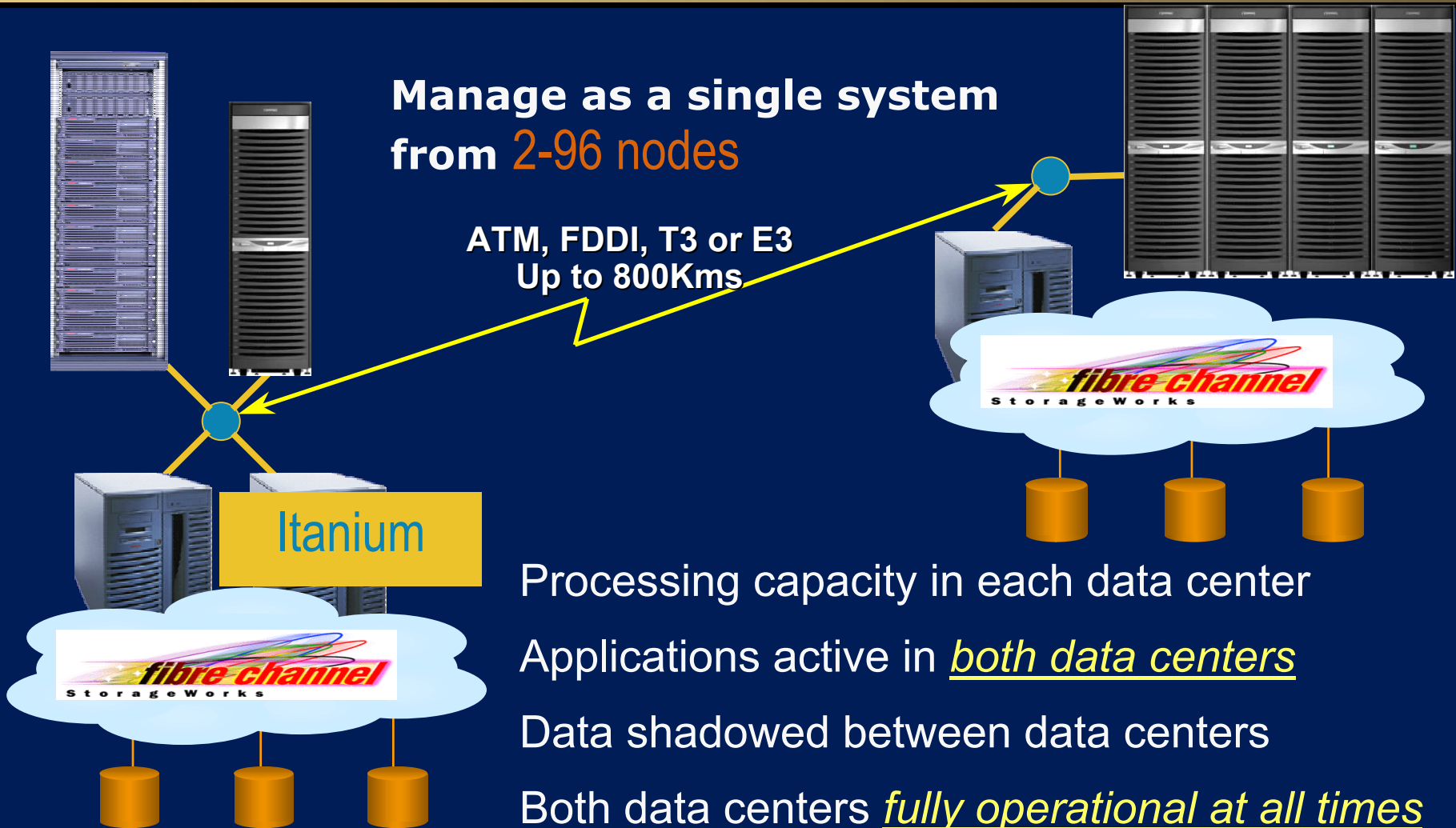Northrup Grumman

20 OpenVMS AlphaServer ES40CV systems per aircraft, plus ground support, world's most advanced airborne surveillance and target acquisition system

DISASTER TOLERANCE…
multiple sites — long distances

**Manage as a single system
from** 2-96 nodes

**ATM, FDDI, T3 or E3
Up to 800Kms**

Itanium

Processing capacity in each data center

Applications active in *both data centers*

Data shadowed between data centers

Both data centers *fully operational at all times*

Minimal effect on performance

Open… delivering market data with Intel and Red Hat

" Working with these industry leaders will ensure that RMDS on Linux provides the stability, performance, and integrity that our customers have come to expect from us. "

Mike Sayers
Chief Technology Officer
Reuters

reducing cost while improving flexibility and performance

REUTERS

redhat. **intel.**

DreamWorks and HP have formed a unique technology partnership with one simple goal: to explore new creative frontiers. DreamWorks animators use HP workstations and servers running Linux to increase collaboration and reduce rendering times and overall costs, freeing them to invent brave new animated worlds of ogres and the princesses who love them.

www.hp.com/plus_dreamworks

Scalability...
Telecom

"

We are looking at Itanium and the Itanium based architecture as the hardware platform
for the server nodes in the future tele- and datacomm networks. Since we believe that
IA-64 architecture will end up being as ubiquitous as the IA-32 bit is today choosing Itanium was quite natural for us. TelORB includes an high performance in-memory database that will especially benefit from the large addressing space provided by the Itanium machines. "

Alexander Larruy, M.S.C.
Ericsson Utvecklings AB
Network Core Products

In Memory
Data Bases

ERICSSON

IA-64 Flying High
Aerospace

"

We were very impressed by the stability of HP-UX on the new architecture, and by the ability to run Linux, Windows NT and HP-UX on the same platform. The compiler, though very complex, worked correctly.

Although we knew hp had been working very hard on Itanium with Intel, we didn't expect so much progress to have been made so quickly.

"

Olivier Oudin,
Laboratory Manager, Airbus
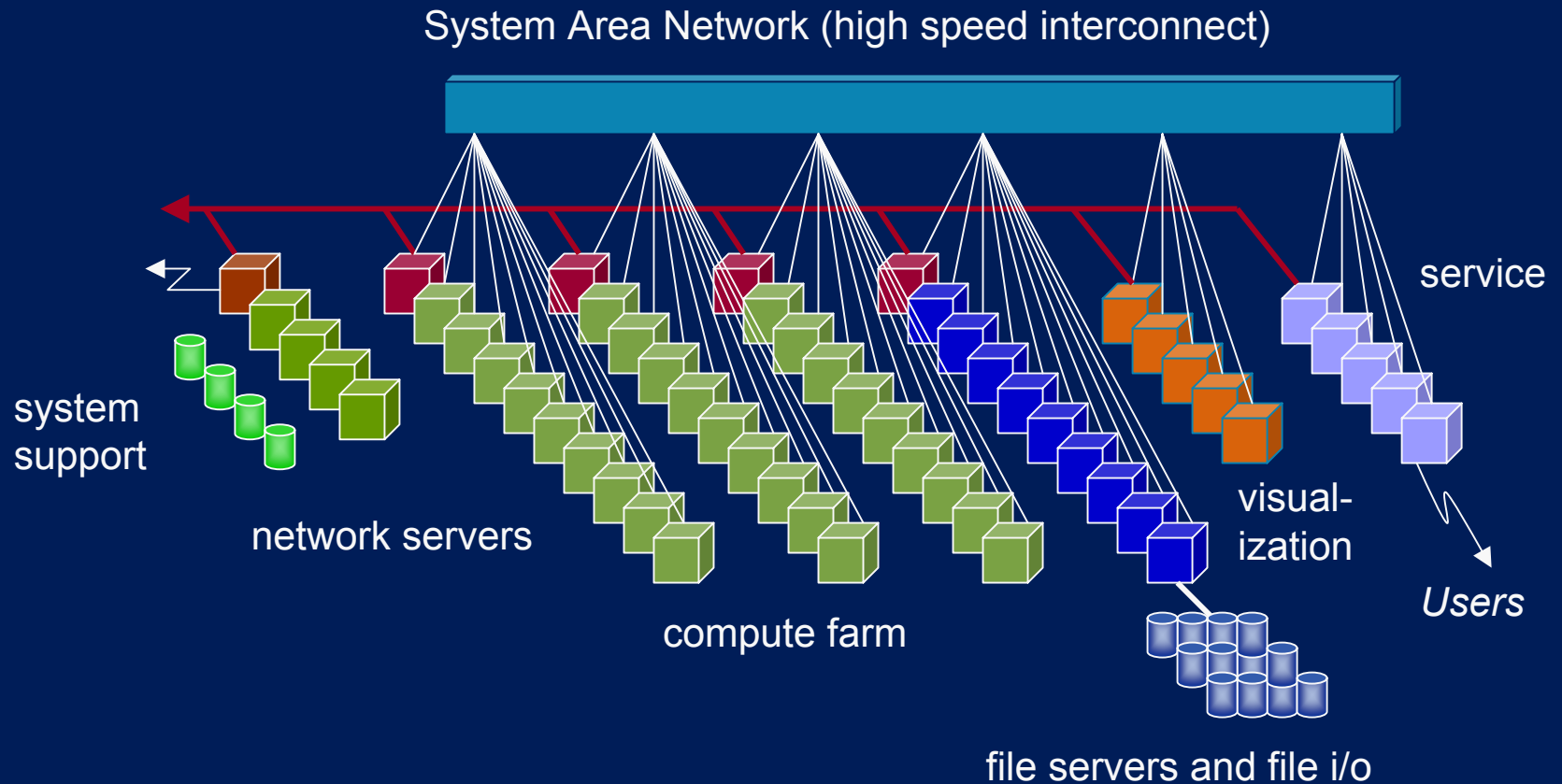
Investment Protection with O/S

AIRBUS

What is a Linux (Beowulf) Cluster

A collection of low cost industry standard distributed servers that looks and behaves like a single virtual server. It is managed from a single point and runs a

single Linux image.

The logical system

System Area Network (high speed interconnect)

service

system
support

network servers

visual-
ization

Users

compute farm

file servers and file i/o

System Interconnects Comparison

	100baseT Ethernet	Gigabit Ethernet	Myricom Myrinet 2000	QSW Quadrics
Measured Bandwidth (MB/s)	8.58	85	164	280/305/220
MPI* Latency (ms)	114.69 (100-400)	85.3 (80-400)	13.4	<5/4.91
Deterministic Transfers	No	No	Yes	Yes
Barrier/Collective Support	SW/HW	SW/HW	SW	HW/SW
System Management	Scyld/Scali	Scyld/Scali	Scyld/Scali	Open Source
Maximum # nodes	4 and 8	16 - 128	16 - 128	Custom
Network Topology	Star/Layered	Star/Layered/Torus	Fat-Tree	Fat-Tree
MPI support	TCP/IP implementations	TCP/IP implementations	Myricom And Others	Quadrics/HP
Approximate List Price/node (2 to 128 nodes)	~$250	~$1000 - ~$1500	~$2000	~$3000
	ClusterBlocks Interconnect Options			Custom Option

# HP lc series compute cluster suite

- The lc series is a suite of computational clusters based on the HP ProLiant DL360 G3 family of servers.

- Designed to be fully integrated and tested at a hp factory or by resellers meeting hp manufacturing certification specifications.

- Supports a limited range of options for memory, disk, interconnect and systems software.

- Shipped fully integrated with minimal local set up required.

The lc is the value solution for the HPTC division line of
high performance Linux computing solutions
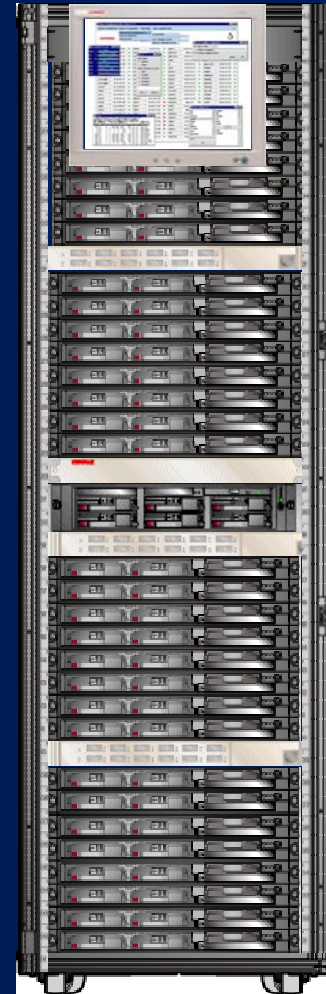
Zero Latency Enterprise (ZLE) Extreme CRM Solution
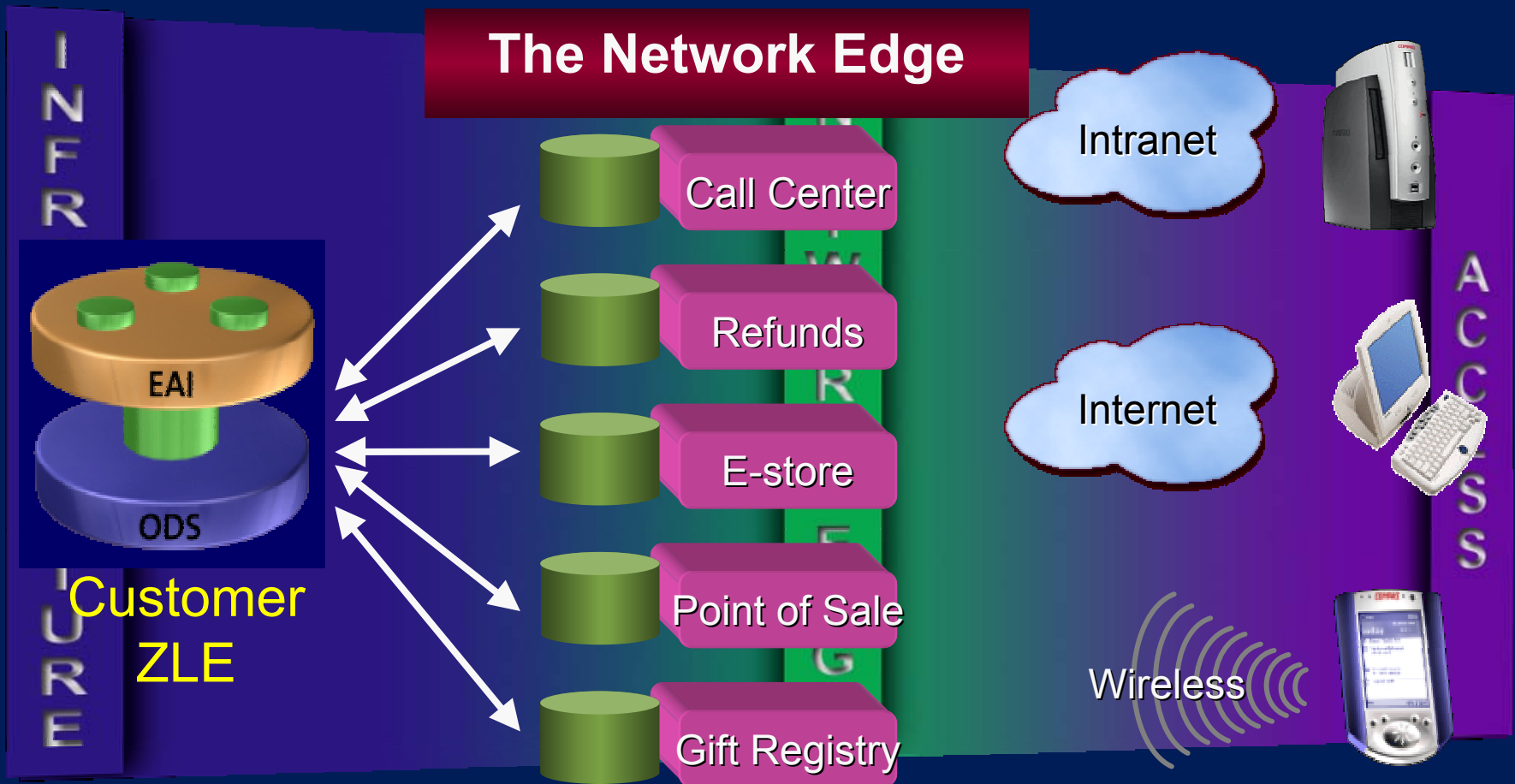
ZLE ... servicing guests at the speed of now

O TARGET

" What caught our attention with this technology is its ability to support a mixed workload that includes both real-time transactions and analytical processing. This is a competitive advantage for our organization. "

Paul Singer
CIO Target Corporation

1,306 Stores
in 45 States

NonStop™

ODS

Advanced technology – today

World's fastest servers with HP Integrity Servers
- World record benchmark on Superdome

Blade leadership
- 1st to market with industry-leading performance, density and function
- Greater market share than nearest 3 competitors combined

Functional leadership in partitioning and clustering
- #1 clustering solutions partner per DH Brown
- Leadership in Unix, Windows and Linux

#1 position in network storage
- 100+ virtualization patents
- SAN technology and market share leadership

Technology of the future. Applied today.
- An industry first: HP Utility Data Center
- # 1 supplier to the top 500 supercomputer sites

The path to an adaptive enterprise

It's the ultimate state of fitness in a world where every business decision triggers an IT event

1. Measure, assess and maintain a dynamic link between business and IT

2. Architect and integrate heterogeneous IT environments

3. Manage and control business processes, applications and the IT environment

4. Extend and link business processes and applications horizontally – from suppliers through to customers

5. Delivers business and technology innovation for today and tomorrow

Business

Information Technology
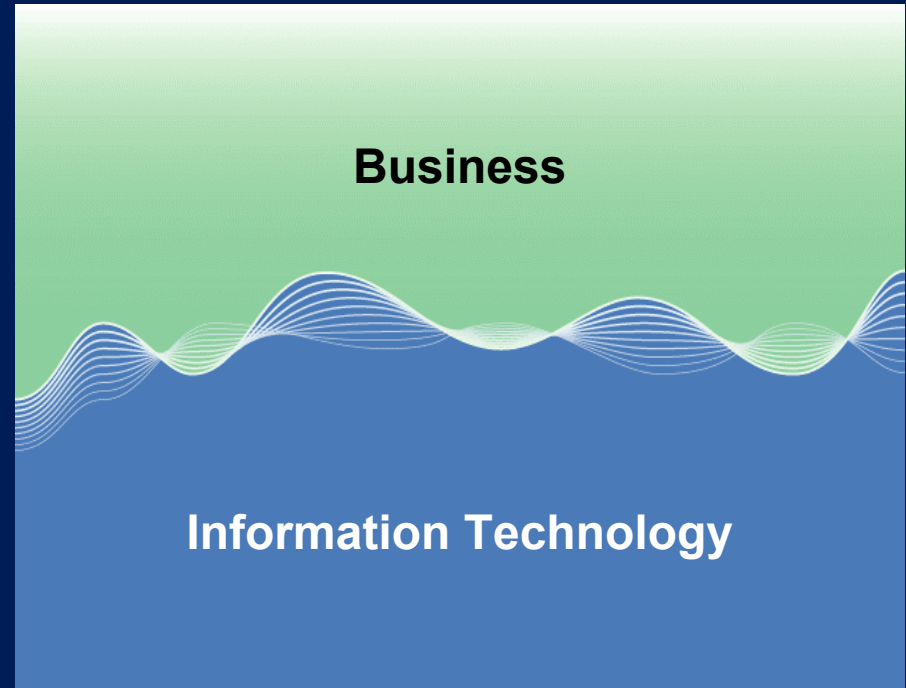
Why HP?

- Passion for customers
- Trust and respect
- The broadest range of IT products
- Built on best-of-breed components
- Integrated into solutions
- Complemented with best-in-class services
- Delivered globally