HP-UX: Making Your Move to Itanium

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HP's Seamless Path to Itanium®

- Time and pace of evolution set by you
- Knowledge gained from previous technology evolutions applied
- 1x1 approach to build custom evolution plans to transition from HP 9000 to HP Integrity servers
- ISV program ensures your full ecosystem is available on Integrity as well as on HP 9000 through the transition
- Predictable and consistent product roadmaps to facilitate reliable transition planning
- Complimentary and fee-based services to meet your needs

EPIC Performance

Integrity Servers From HP for Superior Application Performance

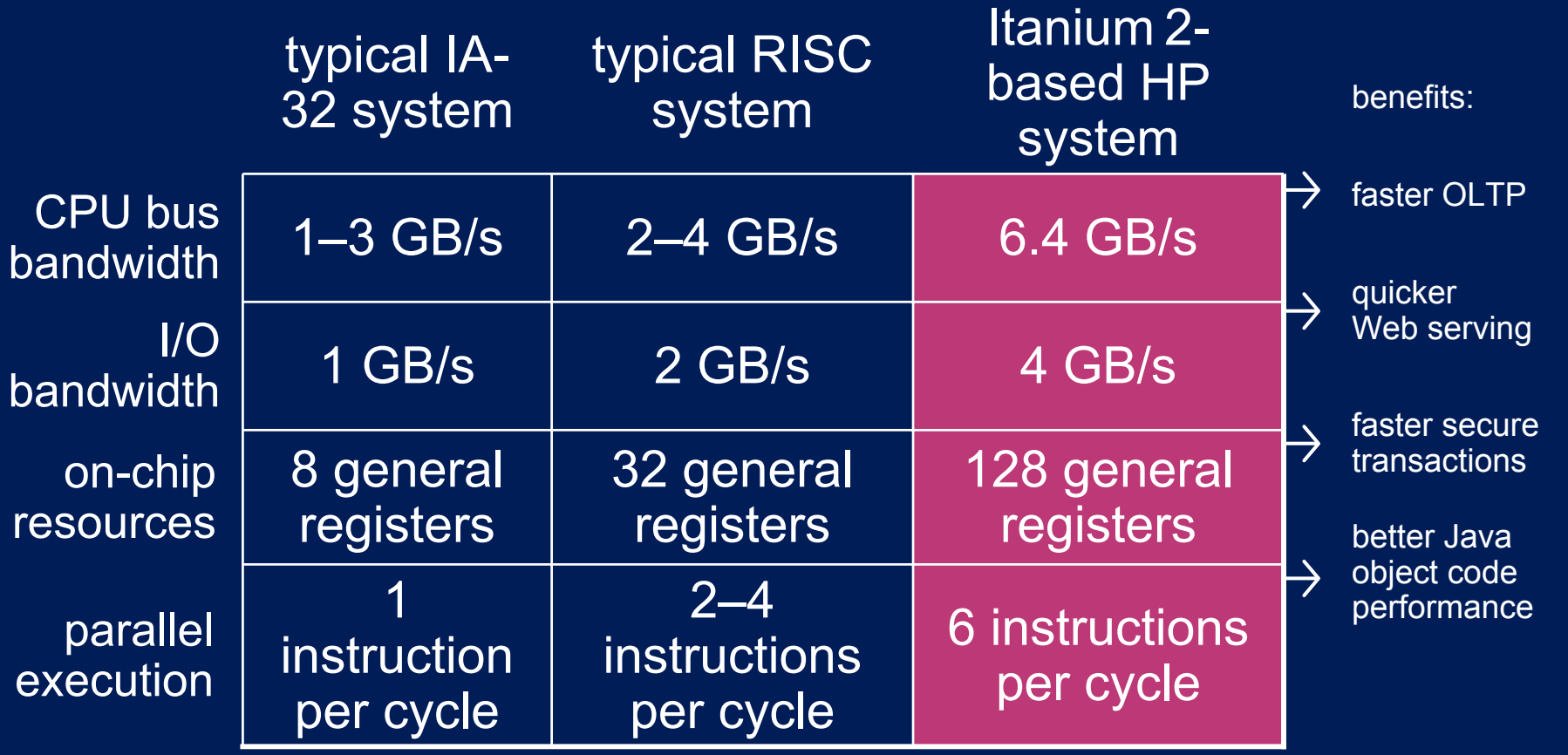
"The Intel Itanium architecture is built on the Explicit Parallel Instruction set Computing (EPIC) specifications that … incorporate both hardware and software advances focused on enabling, enhancing, expressing, and exploiting **parallelism** by both the hardware and the software compiler."

Integrity Servers From HP for Superior Application Performance

"Some performance-enhancing aspects of the design philosophy include:

- Predication
- Speculation
- Software pipelining
- Rotating registers and other processing efficiencies
- Hardware enhancements, such as larger integer and floating point units."

Integrity Servers From HP for Superior Application Performance



. . . to run applications faster than IA-32 and more cost-effectively than RISC

Integrity Servers From HP for Superior Application Performance

HP compilers have been highly tuned to take advantage of these hardware features,

– meaning your developers do not need to worry about how all this works!

HP-UX Software Roadmap

HP-UX 11i Major Release History

HP- UX 10.20

File System and File Size Scalability

- HA Features – Disk Mirroring and HA Clustering
- 32 Bit Kernel
- 16 Processor Support
- Process Resource Management

HP- UX 11.0

Scalability with 64 bit on PA-RISC

- HA features – Dynamic Processor and Memory Resilience
- 64 Bit Kernel
- 32 Processor Support
- Binary and Data Compatible with Previous Versions

HP- UX 11i

Manageability, Ease of Use for PA-RISC

- vPars
- WLM with Service Level Agreement (SLA)
- Performance Improvements
- Binary Compatible w/ 11.0
- Introduction of OEs
- Performance Leadership
- Open Source Application Bundle
- Security Enhancements

Ongoing Delivery of HP-UX 11i Enhancements

HP- UX 11i v1.5

First to Market for Itanium®-Based Servers

- 1st in the Industry in Commercial OSs
- HP-UX for Itanium®

HP - UX 11i v1.6

ISV Momentum Building for Itanium®-Based Servers

- ISV Momentum
  - Oracle
  - BEA
- Binary Compatible w/ 11i v1.5
- HP-UX for Itanium 2®

HP- UX 11i v2

Enterprise Release for HP Integrity® Servers

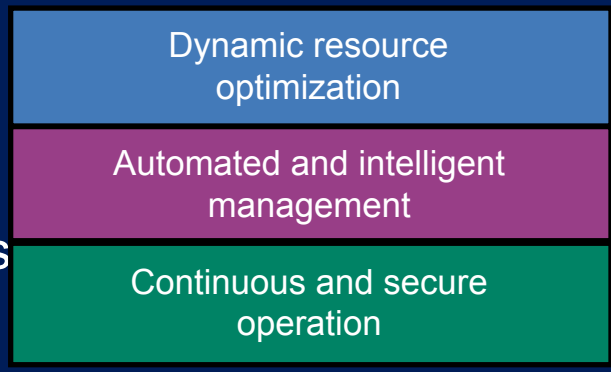
- Full Enterprise Release
- Functional Parity with 11i
  - All OEs
  - 64-Way Scaling
  - nPars
  - Bastille and Install Time Security
- Cell Local Memory
- Binary Compatibility w/ 11i v1.6
- HP-UX for Itanium 2® and Beyond

HP-UX 11i v2 for Itanium®-based Systems

Ideal environment for new projects

Enterprise release

- Functional parity with HP-UX 11i on PA-RISC
  - vPars planned for follow-on release
- Full operating environment support
  - Foundation, enterprise, and mission-critical OEs
- Full line of training and support products
- Continued quality improvement



Seamless path forward

- Binary compatibility with HP-UX 11i v1.5 and v1.6 on Itanium®-based systems
- Source compatible with HP-UX 11.0 and 11i v1 on PA-RISC
  - Application build environment moves across architectures intact

HP-UX 11i v2 Highlights

Application compatibility
- PA binary compatibility via Aries
- PA=>IA cross compiler
- Java 1.4.1 32 & 64 bit support

High availability
- Hardware partitions
- Reduce system reboots 50% via dynamic kernel tunables
- Online add/replace PCI and PCIx I/O
- Instant capacity on demand
- Pay per use

Scalability
- Up to 64 CPUs
- 512 GB memory, 4 TB FS size
- Cell local memory

Internet & Web services
- HP-UX Web Server Suite
- Internet Express
- Mobile IPv6

Security
- Install time security
- Bastille
- Intrusion detection system

Linux Affinity
- Linux source compatibility
- Linux binary compatibility (April)

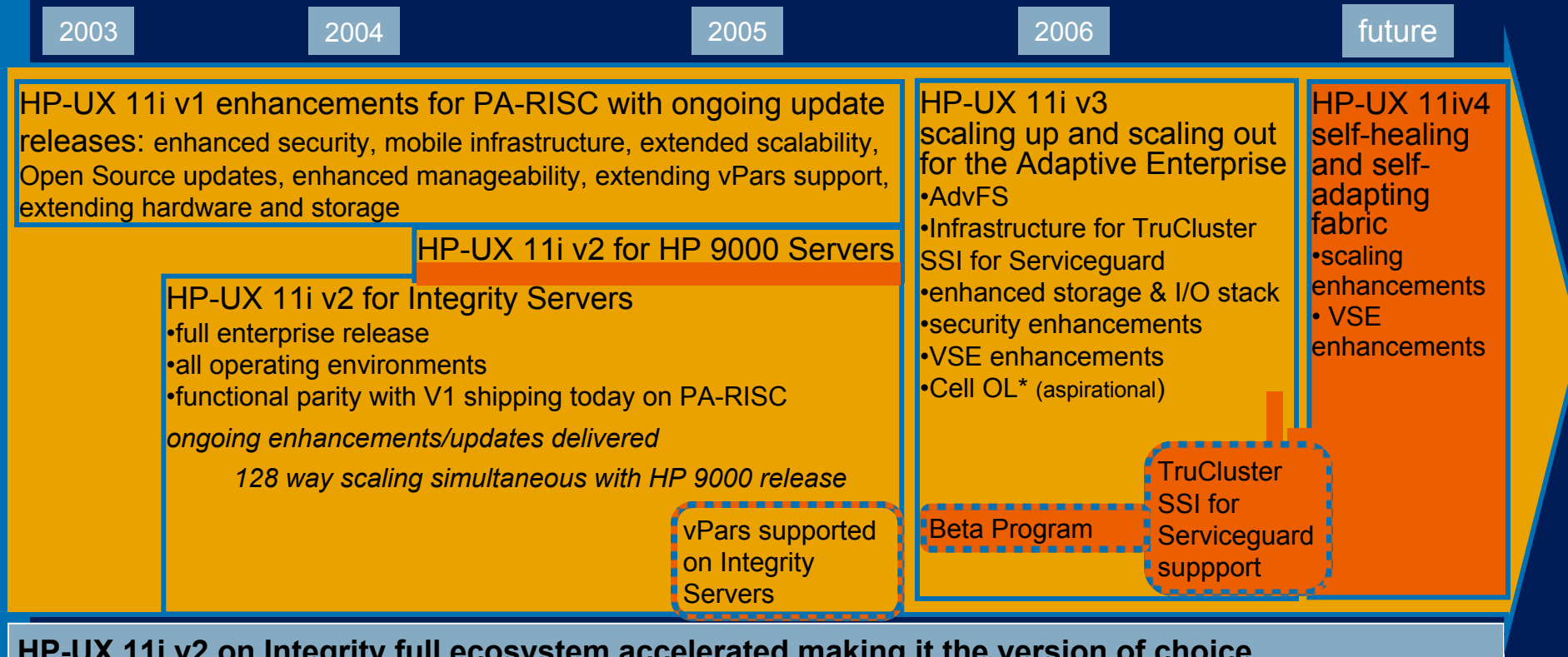
Manageability
- Servicecontrol Manager 3.0
- HP-UX Inventory Manager
- Process Resource Manager
- Workload Manager

HP-UX 11i Schedule Accelerated for HP Integrity Server Capabilities

HP has listened and responded to customer requests, to better meet business needs:

- ✓ Availability of vPars on Integrity servers accelerated by 8 months
- ✓ Availability of a common release for both HP 9000 and Integrity servers accelerated by 15 months
  - HP-UX 11i v2 available this year on HP 9000 (PA-RISC) systems
- ✓ HP-UX 11i v3 functionality remains unchanged
  - HP-UX 11i v3 planned delivery includes security enhancements, AdvFS, storage and I/O Stack enhancements, and the infrastructure for TruCluster Single System Image (SSI) for Serviceguard
  - HP-UX 11i v3 Beta Program will be introduced for early adopters

HP-UX 11i Roadmap



HP-UX 11i v2 on Integrity full ecosystem accelerated making it the version of choice
- **full parity with HP-UX 11i v1 on PA-based HP 9000 servers**
- **preserves and builds on HP-UX 11i v2 ISV momentum**
- **accelerated vPars availability**
- **accelerated common release for PA-RISC based HP 9000 and Itanium®-2 based Integrity servers**

HP-UX 11i v3 will advance leadership in scale-up and scale-out
- **HP remaining committed to Tru64 UNIX customers bringing best technology from Tru64 UNIX into HP-UX & Serviceguard (AdvFS and TruCluster Single System Image)**

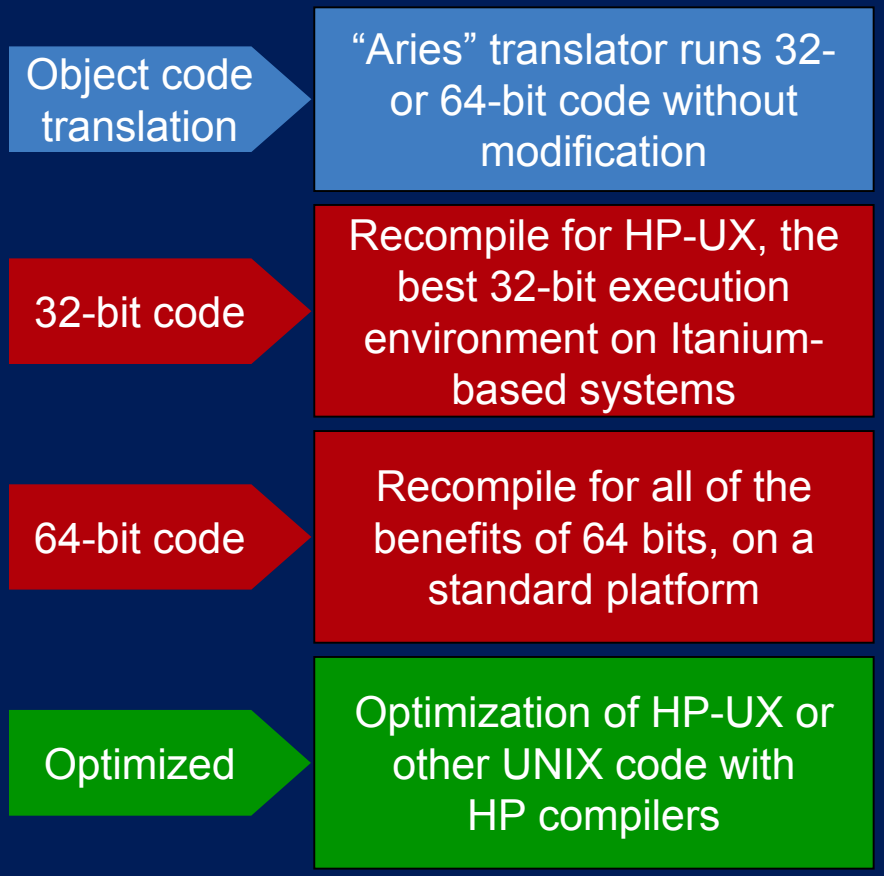
Technical Considerations in Your Transition

Tools: HP-UX Compatibility

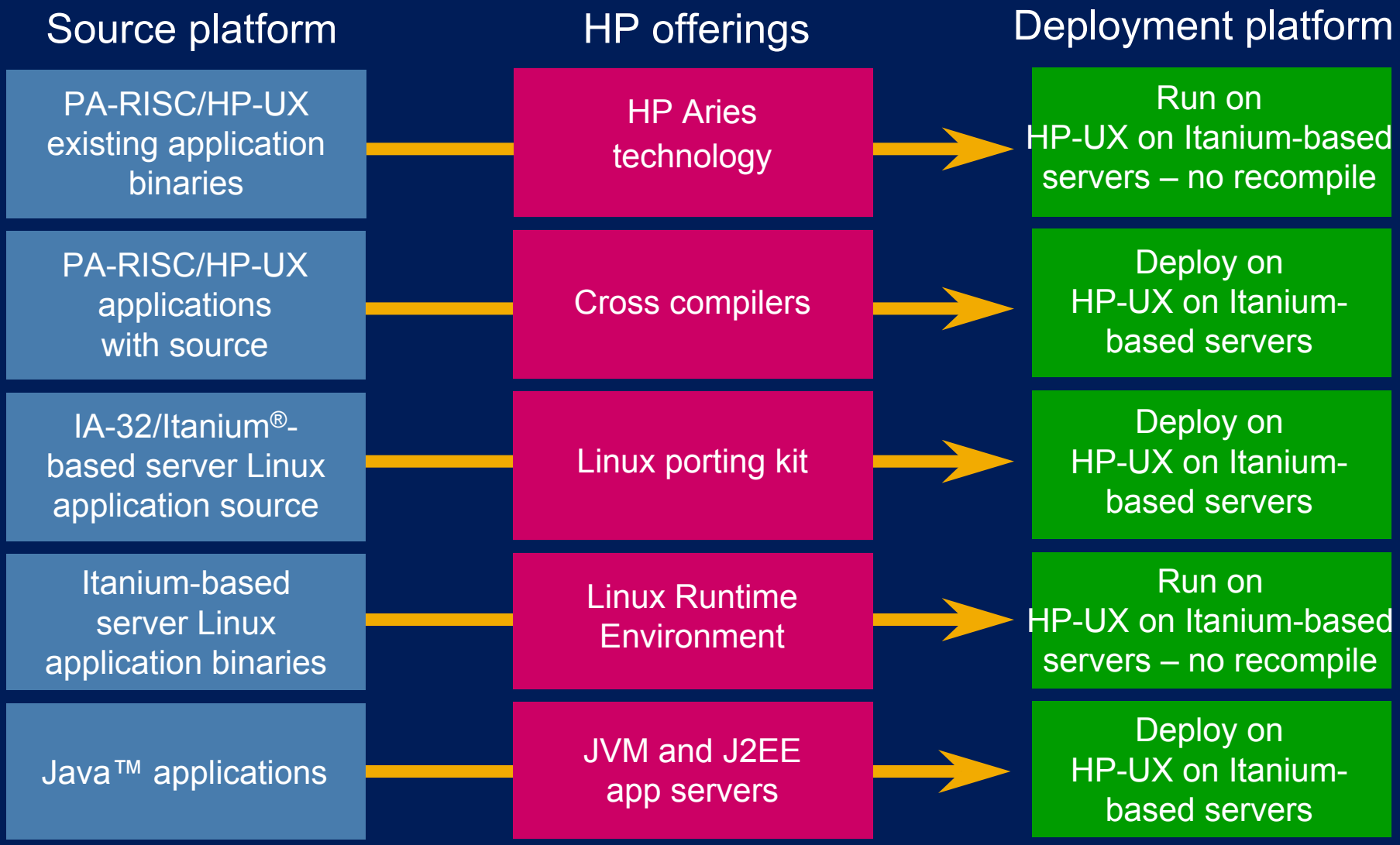
HP-UX 11i
A seamless transition to Itanium®

Key benefits

- Binary compatibility through Aries dynamic code translation technology—no recompilation
- Source code compatibility from PA-RISC to Intel® Itanium® Processor Family—single source code stream
- Data compatibility between PA-RISC and Itanium Processor Family—no data conversions



Evolving Your Code



Software Transition and Programmers Kits

Collection of web based tools and documentation that help developers to port/transition their software (C/C++, Fortran, Cobol, Scripts, and Makefiles)

Software Transition Kits

- HP-UX to a later version
- Linux to HP-UX
- Tru64 UNIX® to HP-UX

Programmers Kits

- Linux Programmers Tool Kit

http://www.hp.com/go/STK

STK flavors and supported platforms

	Impact database		
Supported platform	HP-UX to HP-UX Any 11.23	Linux to HP-UX	Tru64 UNIX® to HP-UX
HP-UX – PA (HP-UX 10.20)			
HP-UX – PA (HP-UX 11.x)	STK 1.9	STKL 1.2	STKT
HP-UX – (PA & IA) 11.22		STKL 1.2	
HP-UX – (PA & IA) 11.23	STK 1.9		STKT
Debian Linux (PA)		STKL 1.2	
Red Hat Linux (IPF)		STKL 1.2	
Tru64 UNIX ®			STKT

Impact Database means transition is supported between these platforms and Supported Platform means that STK can be installed on these platforms.

How to Prepare Source Code for HP-UX on Integrity

- Scan files with STK tools
- Resolve IPF transition issues
- Use kernel threads instead of DCE threads
- Use shared libraries
- Use *pstat(2)* to read system files
- Make 64-bit applications 64-bit clean
- Compile with HP-UX 11i on PA-RISC

HP-UX Compilers for Integrity

- HP offers C, ANSI C++, HP Fortran, and Java compilers for HP-UX on Integrity.
- C, ANSI C++, and Fortran compilers generate both 32- and 64-bit code, with 32-bit code the default, as with PA-RISC compilers.
- Cfront C++, Fortran77, and Pascal compilers have been obsoleted for Integrity.
- Some third-party compilers are also available.

HP Debugger for Integrity

- HP WDB 4.2.01 debugger is an HP-supported implementation of the GDB version 5.0 debugger.
- Supports source-level debugging of object files written in HP C, HP aC++, and Fortran 90 on HP-UX release 11.23 (11i v2).
- Same debugger (version 3.3) runs on PA-RISC systems running HP-UX release 11.11 (11i v1).

Moving Your Data

- The key to transitioning data in third-party databases is to bring the PA-RISC system up to the DB version supported on Integrity.
- At that point the disks containing the data can actually be moved to the new Integrity server, or you can copy the databases to new disks.
- There are no data conversion issues when moving data from PA-RISC to Integrity.
- There may be some data conversions when moving applications from 32-bit to 64-bit.

ISV Feedback: Extremely Positive!

Ports to Itanium® architecture from PA-RISC take less time and fewer resources than anticipated.

- Java applications are running native in one day.
- Compiled applications can be transitioned and certified within two weeks with no source code or script file changes.
- Application build environment compatibility works (source code, script files, data).

ISVs Are Finding Transition Effort Moves Quickly

"After *initial ports* proved the feasibility of *rapid product availability*, we decided to accelerate our support of the i2 SCM suite on the Itanium® 2-based platform. We are committed to offering customers the best possible value when it comes to deploying our solutions and the price/performance of Itanium 2-based HP systems can help meet that criterion. HP Integrity Superdome servers running Windows and HP-UX 11i v2 can provide our customers with increased flexibility, reduced cost of ownership, and a straightforward path to the future."

– Pallab Chatterjee
President, Solutions Operations
i2 Technologies

"HP-UX 11i and the Itanium Processor Family architecture are important to HP and TIBCO customers requiring messaging software that delivers true real-time publish/subscribe and request/reply messaging. We *ported* our TIBCO Rendezvous messaging software from HP-UX on PA-RISC to HP-UX 11i v2 on the Itanium architecture *quickly*."

–Gautham Viswanatha
VP Product Marketing
TIBCO Software, Inc.

"724 Solutions is able to *easily transition* our X-treme Mobility Gateway (XMG) software to HP Itanium 2-based systems running HP-UX 11i v2. With the EPIC architecture and exceptional power of the Itanium 2 processor, our XMG software will be able to take advantage of wider system bandwidth design and better parallel processing capability."

–Marc Printz
XMG Product Manager

Consolidation Opportunities and Methods

What Can Be Consolidated?

Services / Applications	Business services and applications with similar or related context
Systems	Reduce number of systems using application stacking, partitioning
Operating Systems	Reduce number of operating system types, images and versions
Management	Streamline systems management processes and tools
Physical / floor space	Floor space - rack n' stack
Storage	Common storage services, SAN's Std media and archive strategies.
Backup	Use larger, but fewer, backup devices. Server license costs reduced.
Configuration	Standardize on client/desktop or server configurations, patches, setups
Network	Reduce complexity, # of links, improve bandwidth
Development & Test	Common development, cert, test practices, porting environments, tools
Consoles	Use ISV pkgs for remote, secure access. Keep log files of console activity
Help Desk	Central db provides single data source for logging, monitoring, reporting
Data center	Merge multiple data centers into fewer
Support	Centralized contract, support management
Disaster recovery	Common recovery sites and platforms
Processes	Reduce number of different but redundant processes
Printers	Install larger, more centralized printers. Staff handles admin tasks easier.

Server Consolidation

- Hardware Platforms
  - Mid-range
  - Enterprise
- Server Sizing
- RASS
  (Reliability, Availability, Scalability, Security)
- Clustering and Partitioning
- Workload Management
- Console Management

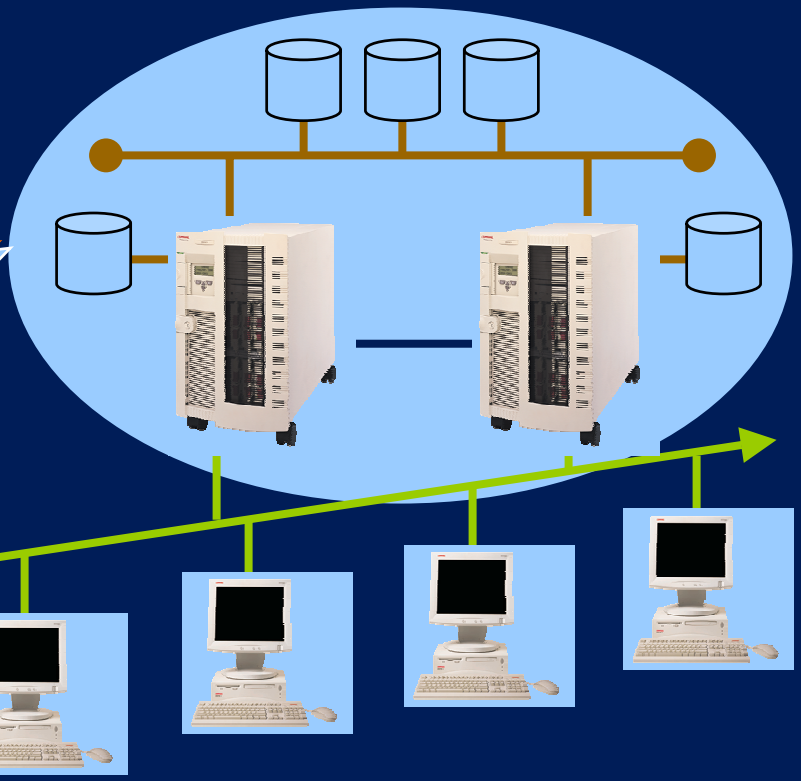
OS Consolidation

- User Account and Data Migrations
- Software Licenses
- Dynamic Resource Sharing
- Clustering and Partitioning
- Load Balancing
- Networking
- Workload and Resource Management
- Security

Server and OS Consolidation
What Is "Clustering"?

- Clustering is combining multiple servers to provide available, scalable and manageable services to clients.
- Depending on the OS, typical server numbers supported in a cluster range from 2-96.

A cluster generally comprises:
•Multiple Servers in 1 or more cabinets
•One or more interconnects
•Shared storage (often with RAID)
The total configuration delivers availability & scalability for…..



….clients and applications

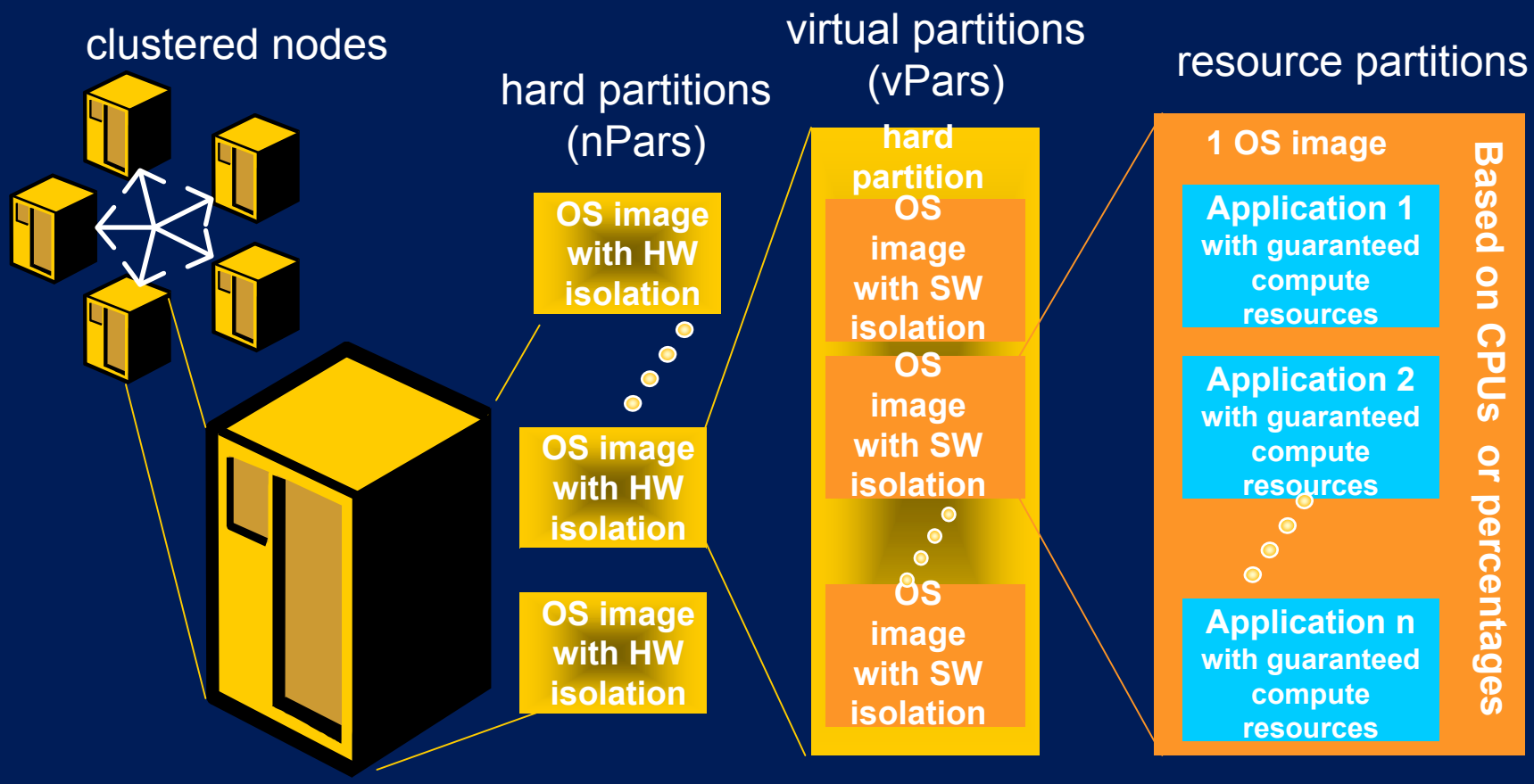
Server and OS Consolidation
What Is "Partitioning"?

- Partitions are physical or logical mechanisms for isolating operational environments within single or multiple servers.
- Partitions offer the flexibility of dynamic resizing, while ensuring that applications can enjoy protection from unrelated events that could otherwise cause disruption, interruption, or performance degradation.
- Think "multiply" for clustering, "divide" for partitioning.

Partitioning and Virtualization

- **Hard Partitioning** (nPars) – Multiple instances of an operating system running on physically separate hardware resources that are part of a single server.
- **Logical or Soft Partitioning** (vPars) – Multiple instances of an operating system running independently on the same physical hardware resources.
- **Resource Partitioning** – a segment of a server's total processor and memory resources that is reserved for specific processes.
- **Dynamic Allocation** – Physical resources are automatically shifted into and out of Resource and OS Partitions.

Partitioning and Virtualization



Workload Management

Isolation
highest degree of separation

Flexibility
highest degree of dynamic capabilities

HP Partitioning Continuum
Service Level and Cost Control

Dynamic resource optimization

Automated and intelligent management

Hard partitions with multiple nodes	Hard partitions within a node	Virtual partitions within a hard partition	PRM with psets resource partitions w/in a single OS image
Clusters	**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

highest degree of separation

Flexibility

highest degree of dynamic capabilities

** Future deliverable on Itanium® based platforms*

How and Where to Get Help

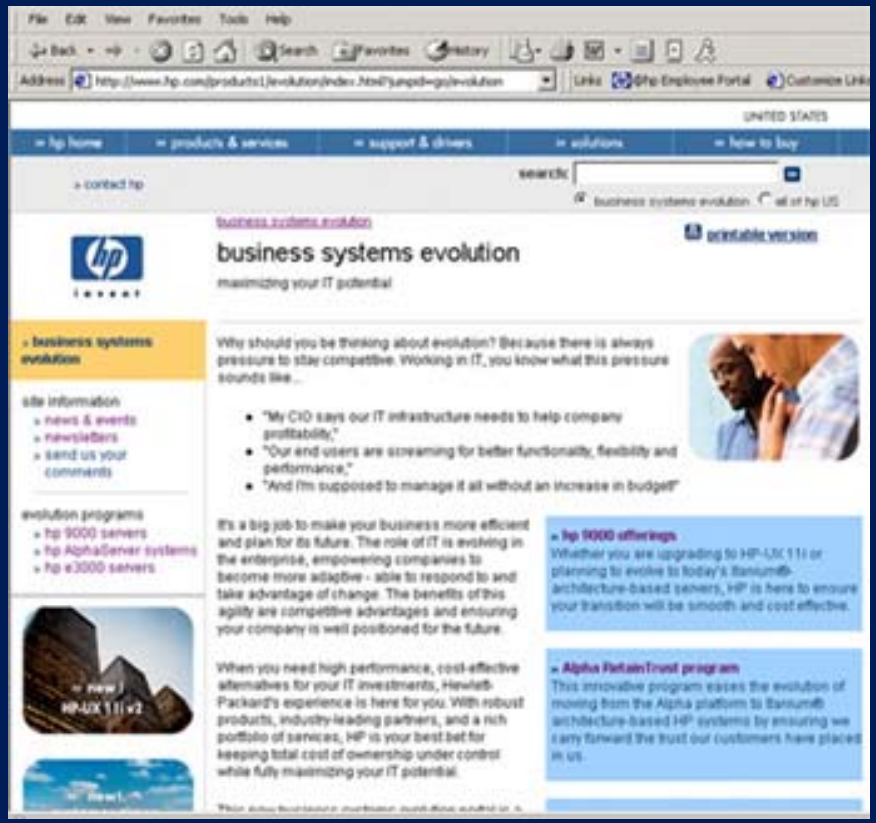
Services and Tools: Help As You Need It

HP Business Systems Evolution Web Information

- Visit the website: http://www.hp.com/go/evolve

- Centralized resource for:
  - programs
  - white papers
  - tools
  - web-based training

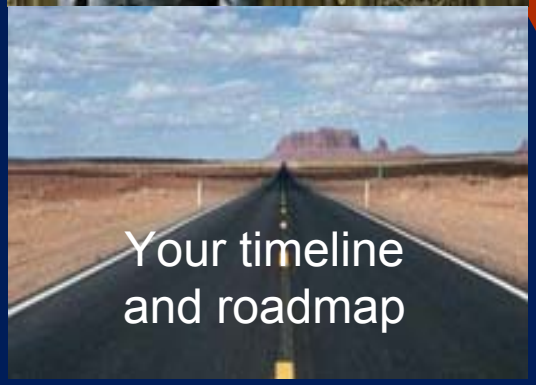
- Select your present platform
  - HP 9000
  - AlphaServer
  - HP e3000



It's Your Roadmap

External drivers

- Business changes
- Technology changes



Internal drivers

- User requirements:
  - Business and IT
- Operational needs:
  - TCO savings
- Financial considerations

HP

...delivering choices


invent