HP Virtual Server Environment

Optimize server resources in real time

Business Critical Systems
Hewlett-Packard GmbH

"Use of virtualization technologies in server will dramatically improve server utilization rates, increase server flexibility and reduce the overall spending required for servers."

Source: T. Bittman, Gartner, November 2003

72 % of customers use server virtualization today or plan to evaluate it in the next 3 years*

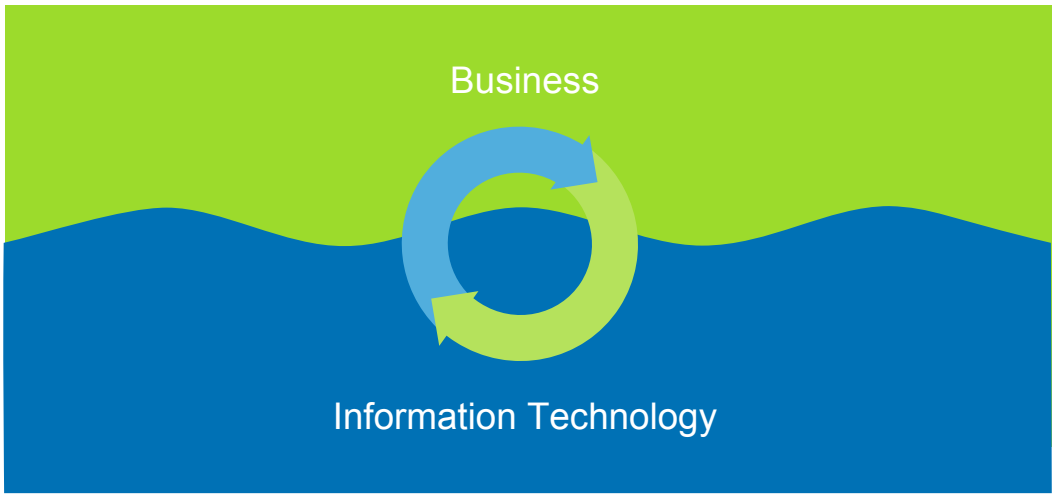
Source: Summit, August 2004





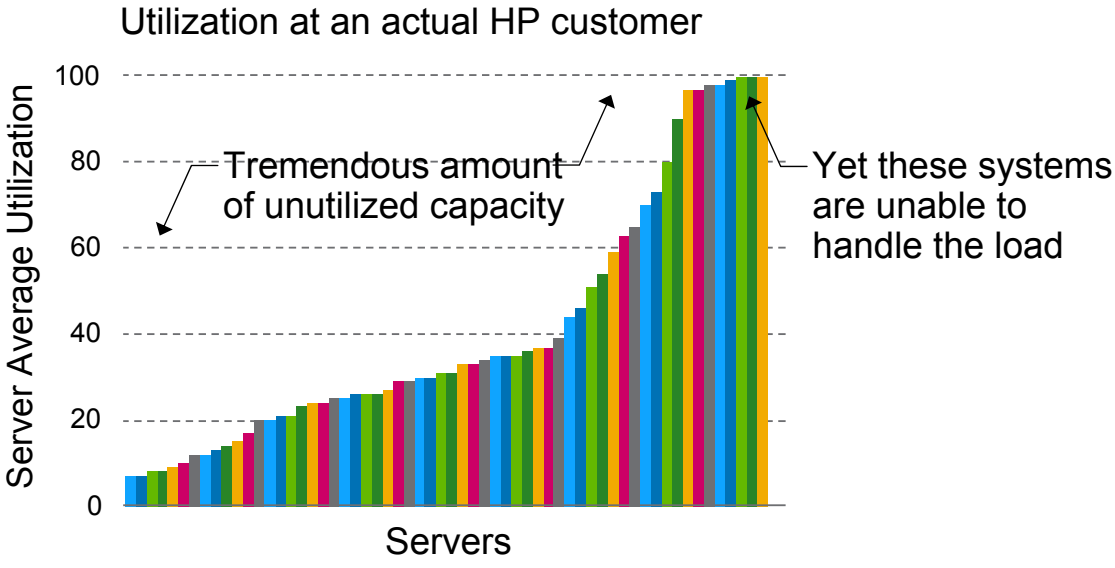
The Role of Virtualization in the Adaptive Enterprise

Business and IT synchronized to capitalize on change



Virtualization: an approach to IT that pools and shares resources so utilization is optimized and supply automatically meets demand

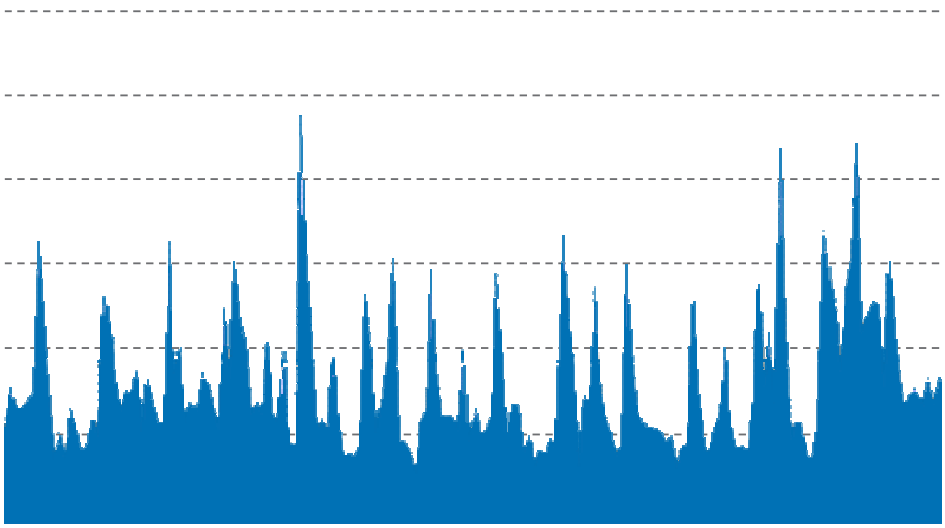
Challenge – enterprises have unused server capacity yet still can't meet demand



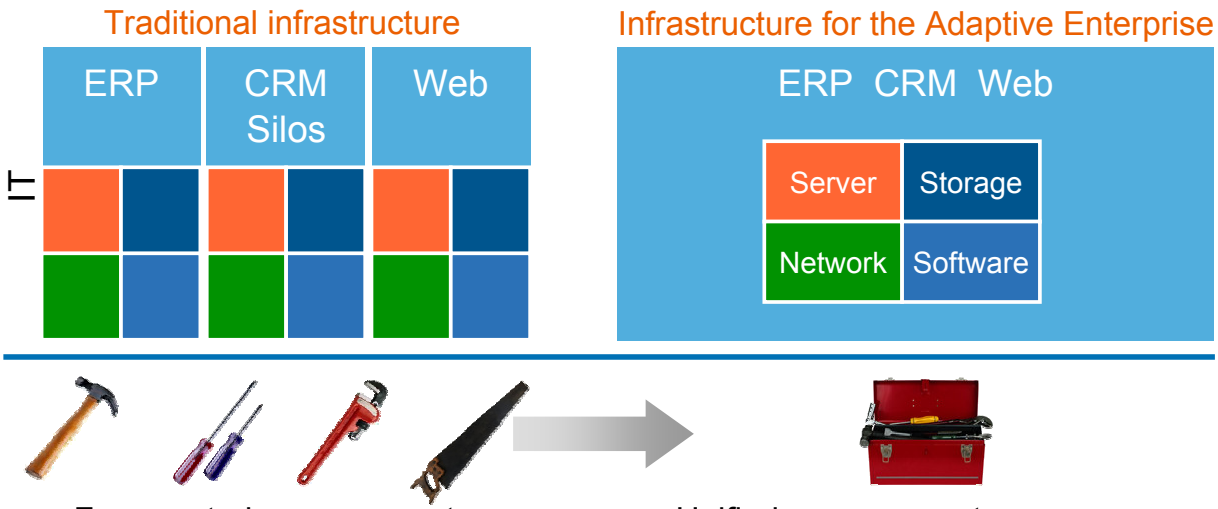
Most reports put average utilization at approximately 30%

Utilization is so low because…

- Each system is an isolated island of resources
- Systems have load peaks that need to be met



From fragmentation and silos to an infrastructure for the Adaptive Enterprise

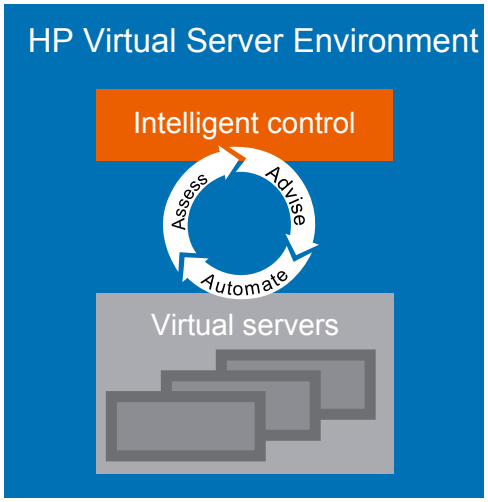


- Fragmented management
- Distributed architecture
- Silos of IT
- Manual changes

- Unified management
- Consolidated architecture
- Virtual pools of IT
- Automated changes to meet service levels

Optimum server utilization in real time

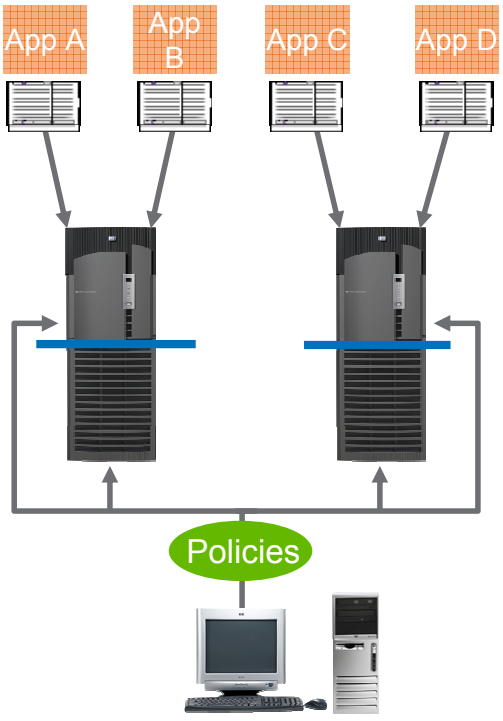
HP Virtual Server Environment for HP Integrity Servers



- Double your resource utilization
  - Dynamic resource allocation in a multi-OS environment
- Maintain continuous service levels
  - Simple policy management and highly available
- Pay only for what you use
  - Utility pricing

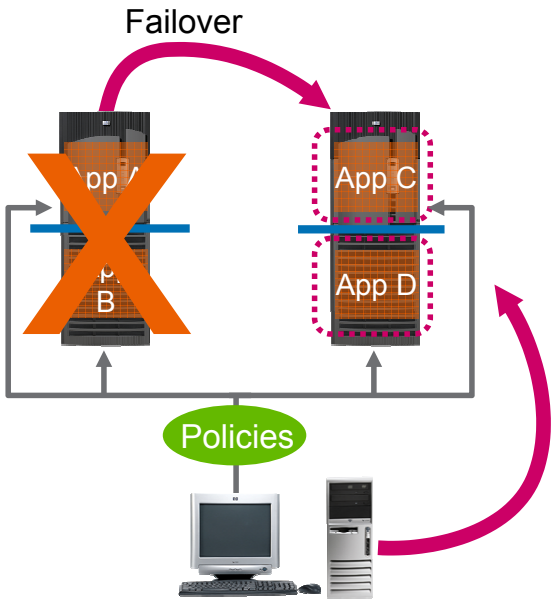
Consolidate, virtualize, automate server resources for optimum utilization in real time

HP Virtual Server Environment in action…



- Double your resource utilization…
  - Strategic consolidation
  - Partitioning continuum for optimal flexibility & isolation
  - Workload management for real-time allocation of resources based on business priorities

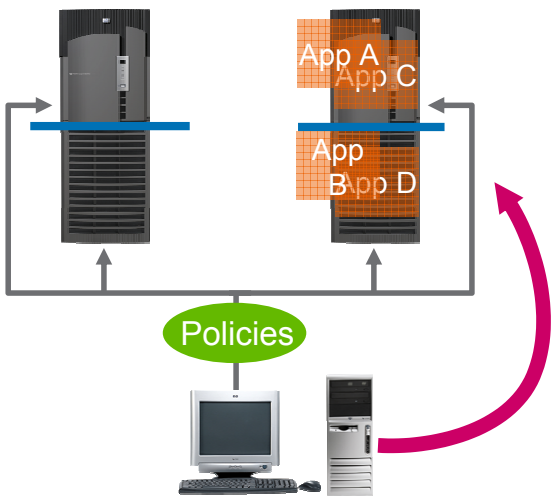
HP Virtual Server Environment in action…



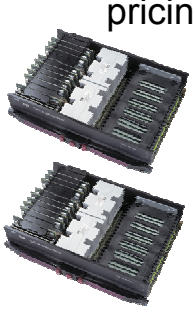
- Maintain continuous service levels…
  - Tight integration of workload management with clustering solutions (within a data center and across data centers)

Re-allocate resources based on business goals and priorities

HP Virtual Server Environment in action…



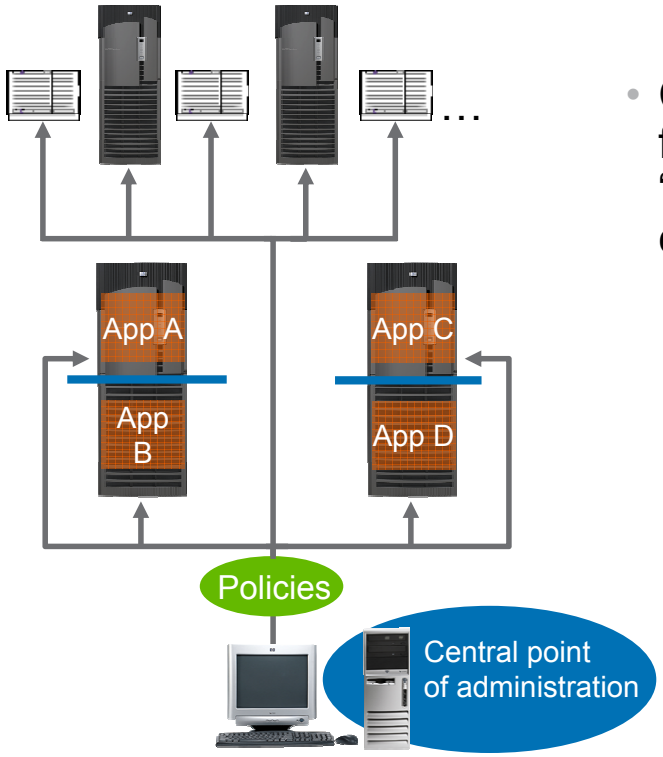
- Pay only for what you use…
  - Tight integration with utility pricing solutions



…even turning on instant capacity CPUs only if needed

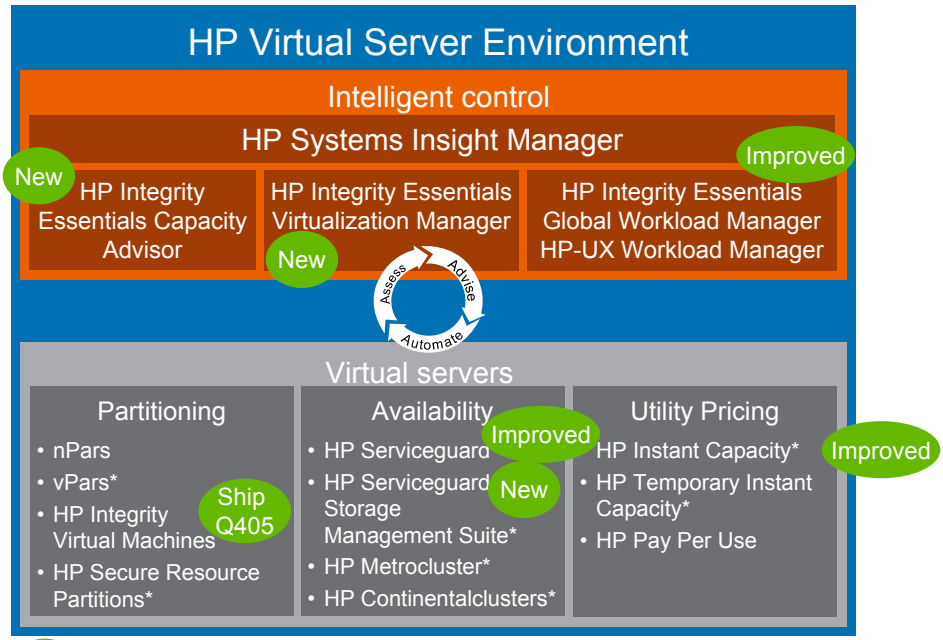
Re-allocate resources based on business goals and priorities

HP Virtual Server Environment in action…



- Centralized control for “scale-up” or “scale-out” environments…
  - Goal-based policy engine for managing workloads across multiple systems simultaneously
  - Central point of administration with unified infrastructure management

HP Virtual Server Environment for HP Integrity and HP 9000 servers



New Virtualization Licensing for HP-UX 11i

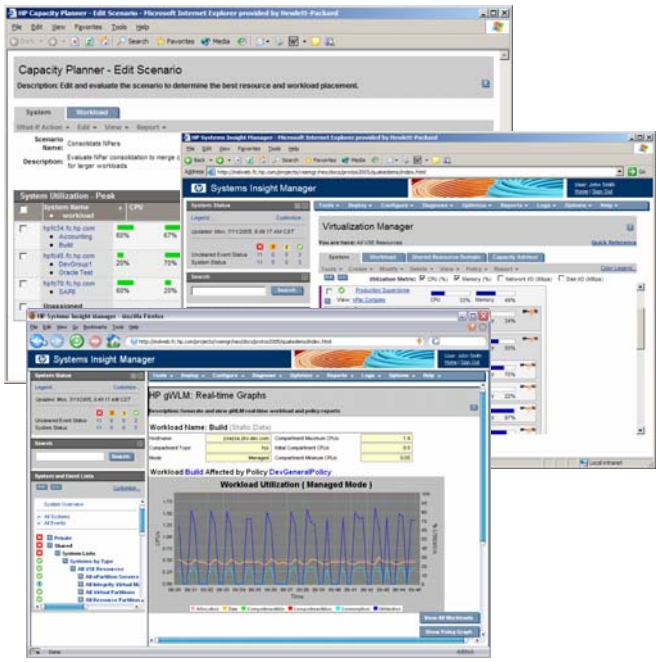
New HP Virtual Server Environment Suite for HP-UX 11i

*HP-UX only

Integrated multi-OS software for planning, managing, and automating virtual servers

New HP Integrity Essentials software

Available Dec 2005

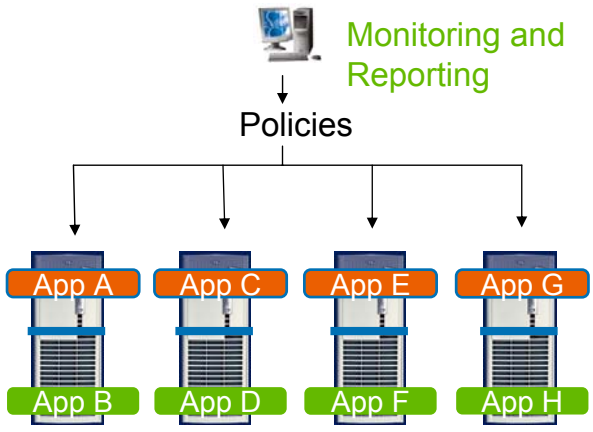


- **Planning** — New
  HP Integrity Essentials Capacity Advisor
  Industry's first intuitive, integrated tool for ongoing capacity planning simulating placement of application workloads
- **Configuration** — New
  HP Integrity Essentials Virtualization Manager
  Reducing complexity with comprehensive, integrated configuration and management of all VSE elements
- **Automation** — Improved
  HP Integrity Essentials Global Workload Manager
  Automatically aligning server resources with business needs

Strengthening multi-OS server virtualization for Integrity servers

HP Integrity Essentials Global Workload Manager Manage and automate large, multi-system VSEs

- Goal-based policy engine
  - for managing workloads across multiple systems simultaneously
- Easy to use management
  - integrated with HP Systems Insight Manager and other VSE management tools
- Enables central IT to deliver an IT utility
  - supporting multiple LOBs Resources can be assigned to LOB based on:
    - Own/borrow/lend model
    - Fixed entitlement model
    - CPU utilization model
    - Service Level Objectives



New functionality with gWLM 2.0

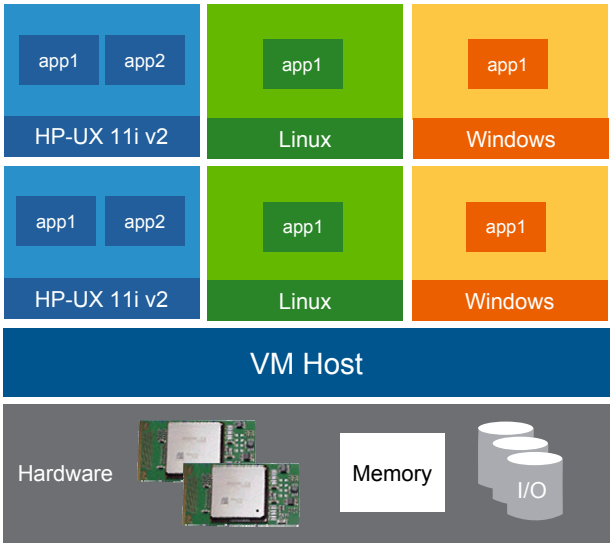
- Support for HP Integrity Virtual Machines and Temporary Instant Capacity
- Support for OpenVMS

Available Dec 2005

Support for HP-UX 11i, Linux, and OpenVMS on HP Integrity, and HP-UX 11i on HP 9000

HP Integrity Virtual Machines (VM)

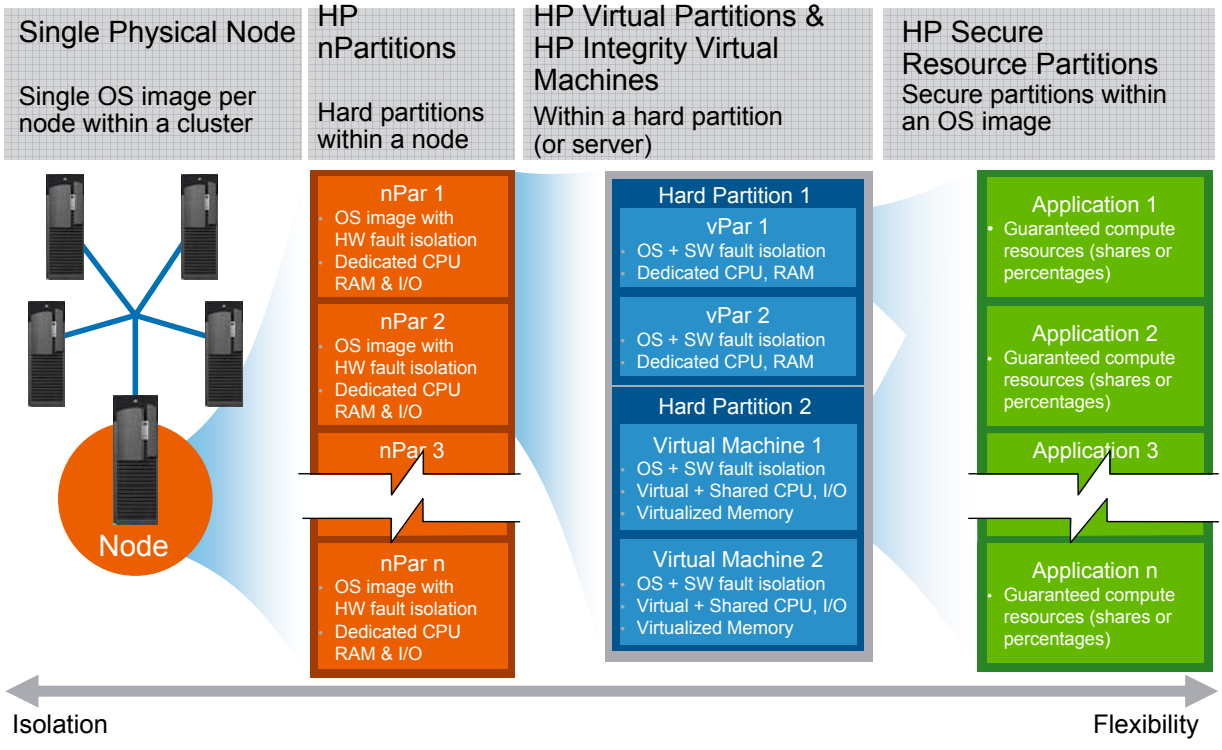
Optimum utilization across multiple OS



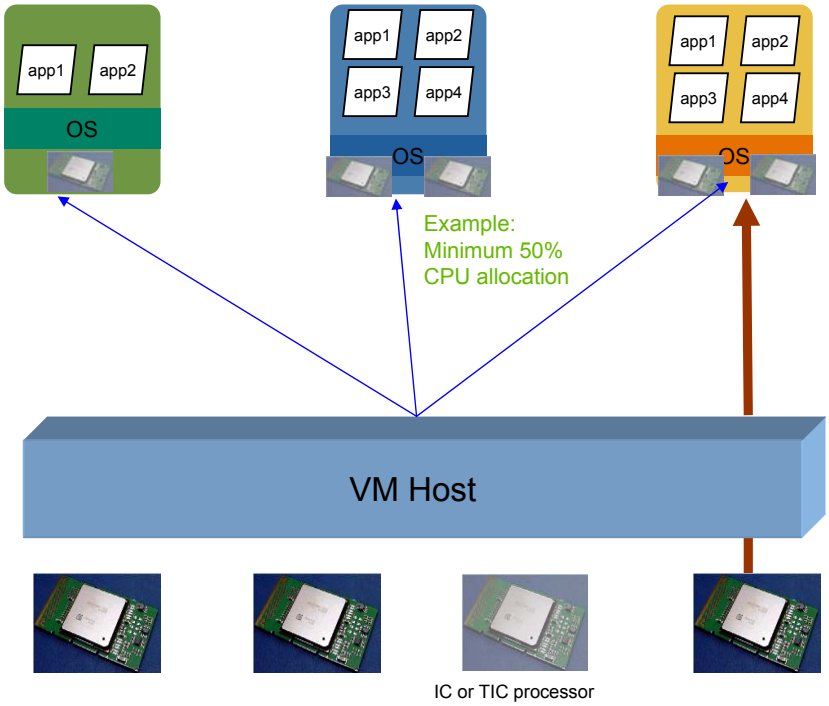
HP-UX 11i software can be licensed by virtual machine!

- Sub CPU virtual machines with shared I/O
- Runs on a server or within an nPar
- Dynamic resource allocation built in
- Resource guarantees as low as 5% CPU granularity
- OS fault and security isolation
- Supports all (current and future) HP Integrity servers
- Designed for multi OS
  - HP-UX 11i v2 guests for Q405
  - Windows guest support for 2H06
  - Linux guest support for 2H06
  - OpenVMS guests in future
- Integrated with VSE

HP strengthens its broad partitioning continuum by adding HP Integrity Virtual Machines (VM)



Dynamic CPU Allocation … sub-CPU granularity



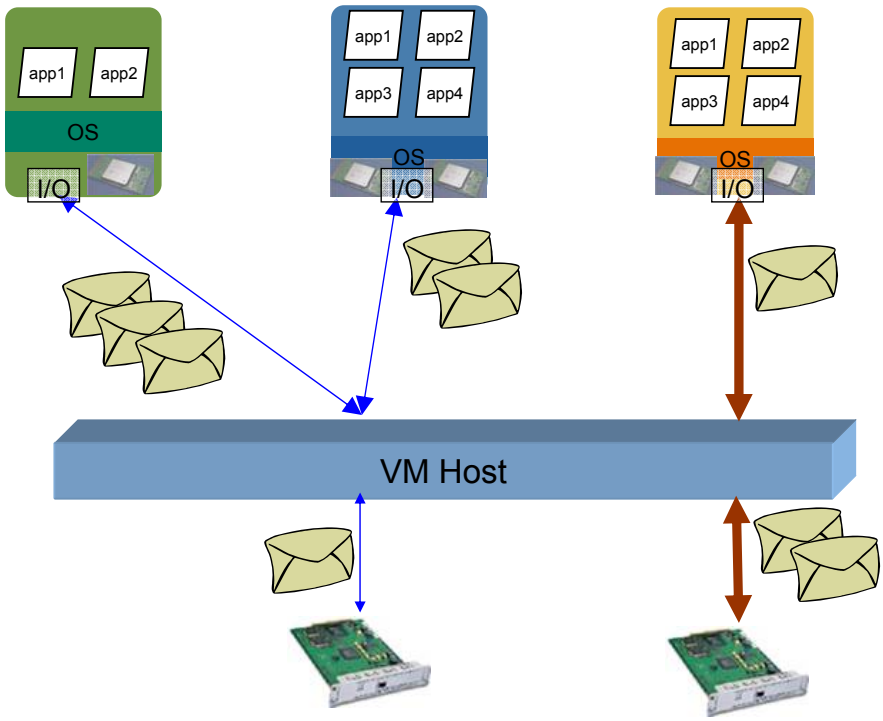
CPU shares dynamically allocated to the virtual machines as needed

When oversubscribed (more demand than physical resources), fair share allocation to active virtual machines

PRM resource guarantees

CPU can be dedicated to a virtual machine for performance isolation

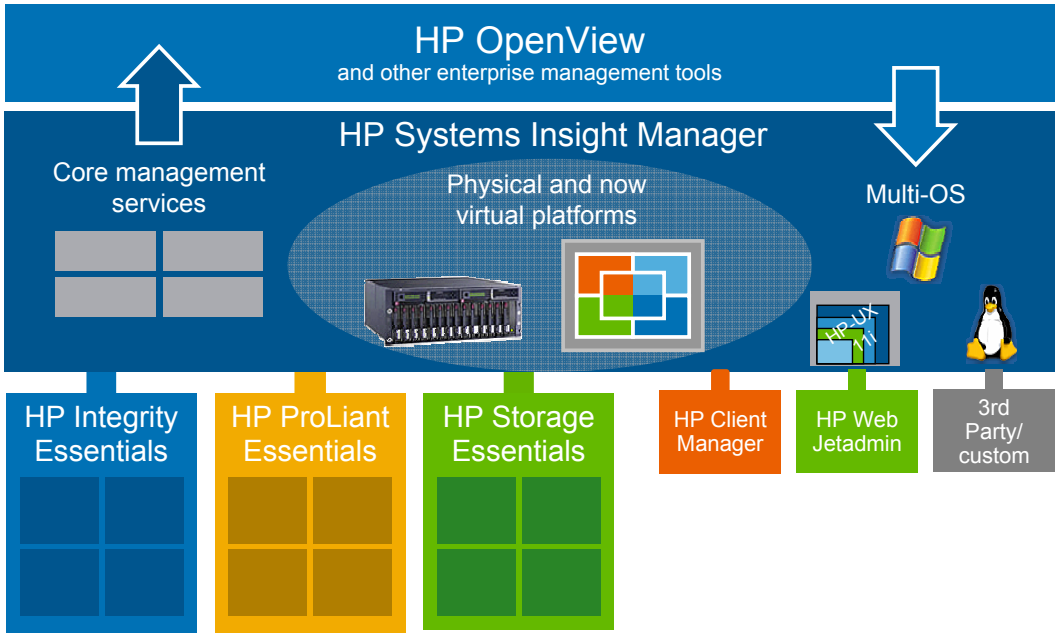
Dynamic I/O Sharing



I/O packets directed to I/O cards by the Platform Manager

I/O card can be dedicated to a virtual machine for performance isolation

Extending HP unified infrastructure management to the virtual world



HP Systems Insight Manager – one platform unifies it all

Reduce costs with new flexible licensing

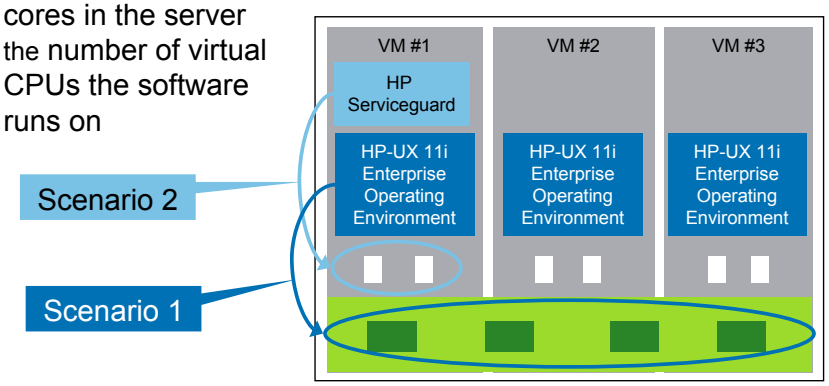
New HP-UX 11i Virtualization Licensing Program

New

HP-UX 11i software licensing now based on the lesser of:

- the number of physical cores in the server
- the number of virtual CPUs the software runs on

Available Q4 2005



Scenario 1: use as many as you want

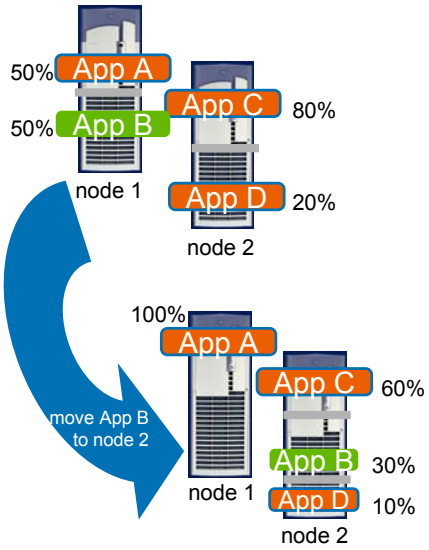
- Run as many instances of HP-UX 11i Enterprise Operating Environment as you want
- Never pay for more than the physical cores in the server
- In this scenario, pay for 4 HP-UX 11i Enterprise OE licenses

Scenario 2: pay for as few as you need

- Run HP Serviceguard on only a portion of the server
- Pay only for the licenses you need
- In this scenario, pay for 2 HP Serviceguard licenses

Serviceguard – strengthening the unique integration of virtualization and high availability

VSE uniquely integrated with HA today

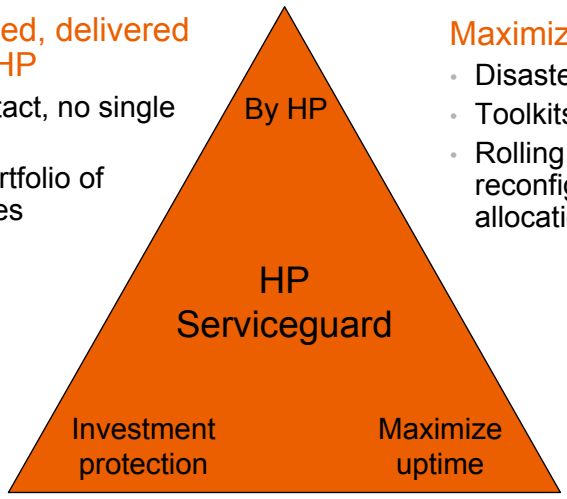


- Maintain continuous service levels
  - Simple policy management and high availablity

HP Serviceguard benefits

Designed, developed, delivered and supported by HP

- Single point of contact, no single point of failure
- Comprehensive portfolio of support and services



Maximize uptime

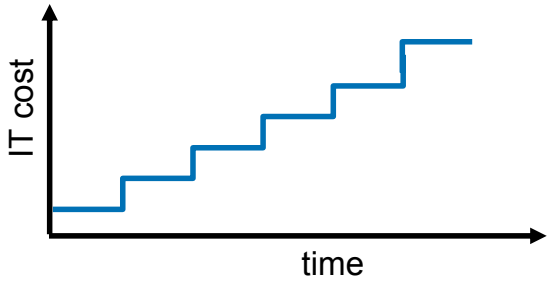
- Disaster tolerant configurations
- Toolkits for leading applications
- Rolling upgrade, online reconfiguration, workload allocation

Investment protection

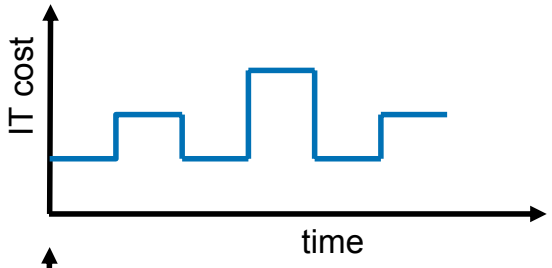
- With over 150,000 licenses shipped, HP's continued commitment is clear
- Easily integrate Linux clustering solutions or multi-OS environments and quickly build Linux capabilities and expertise for mission critical applications
- Smooth IA32 to Integrity Linux and PA-RISC to Integrity HP-UX HA transition

Different Solutions for Different Capacity Needs

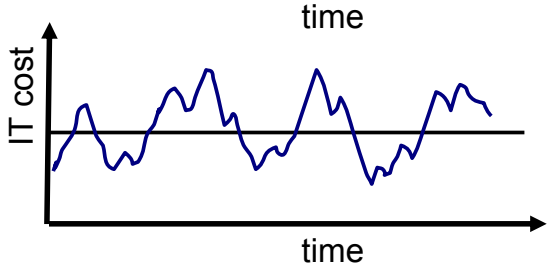
Instant Capacity



Temporary Instant Capacity



Pay Per Use



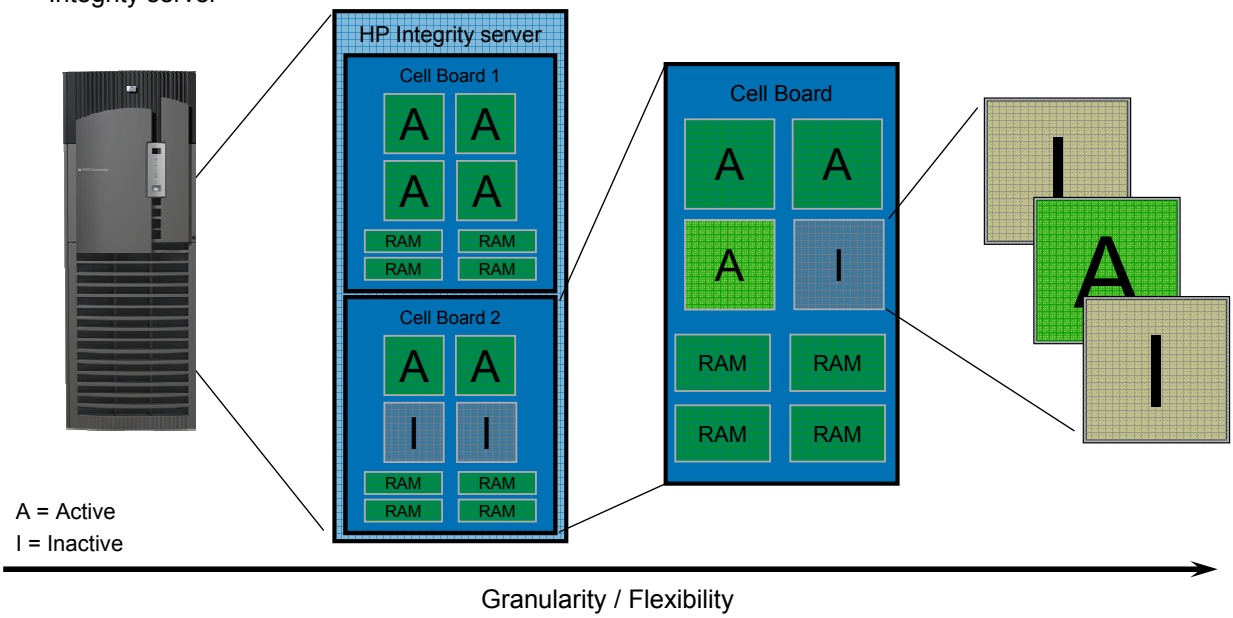
HP Instant Capacity (iCap)

Single Physical Node
e.g. single 8-CPU HP Integrity server

Cell Board IC
Inactive cell board containing four dormant CPUs

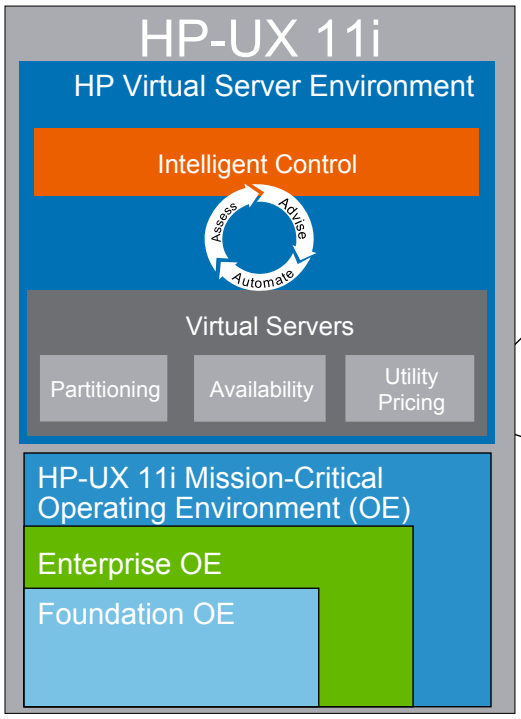
Instant Capacity
One or more inactive CPUs per cell board

Temporary IC
Temporary use (30 days/ 720 hours) of IC CPUs



Easier access to HP Instant Capacity

New utility pricing features for HP-UX 11i



New

- 5 CPU-days of Instant Access Capacity provided *at no charge* with every HP Instant Capacity (iCAP) CPU so customers can
  - Get instant access to iCAP CPUs
  - Temporarily activate iCAP CPUs for performance evaluation
  - Test iCAP functionality

New

- No Email Requirement
  - Eliminates security issues associated with connecting mission critical systems to an external network

Available now for Integrity; Q4 for HP 9000

Two models for Pay per use - Active and Percent summary

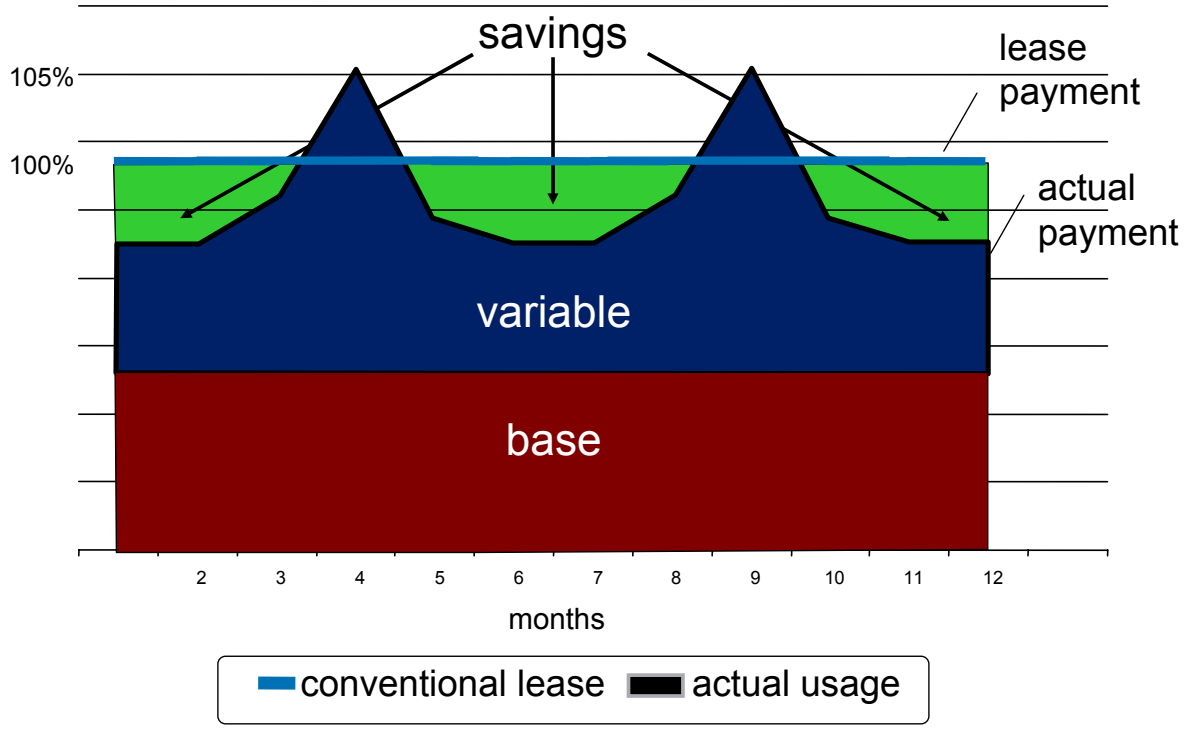
Active pay per use

- Available on PA and Integrity
- "Active" CPU is available for tasks by O/S
- You "light up" or "shut down" capacity
- Utility meter is a ProLiant server and software agent and this resides at customer site
- Supports vPars (on PA)
- HP web portal provides detailed usage reports
- Average of 25% of total CPUs are included in the fixed payment (base usage)
- Billing based on the monthly average of daily average of Active CPUs

Percent pay per use

- Available on PA and IPF
- Measures the "Percent" used of each CPU used within a system
- Utility meter is a ProLiant server and software agent and this resides at customer site
- Meter reads all CPUs every 5 minutes and averages it
- Supports vPars (on PA)
- 0% utilization is included in fixed payment (base usage)
- Billing based on monthly average of daily average above base usage

Capitalizing on fluctuating demand

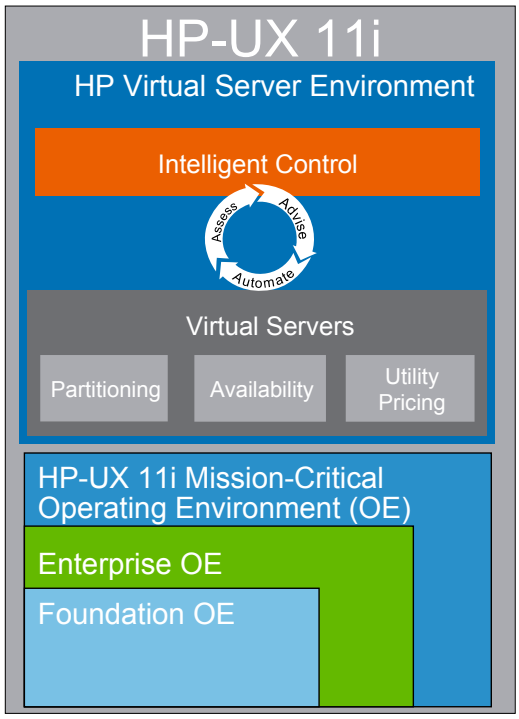


Agenda

- Virtualization: Delivering on the HP Adaptive Enterprise vision
- HP Virtual Server Environment (VSE): Optimum server utilization in real time
- HP VSE… more detail:
  - Intelligent Control
  - Partitioning Continuum
  - Availability
  - Utility Pricing

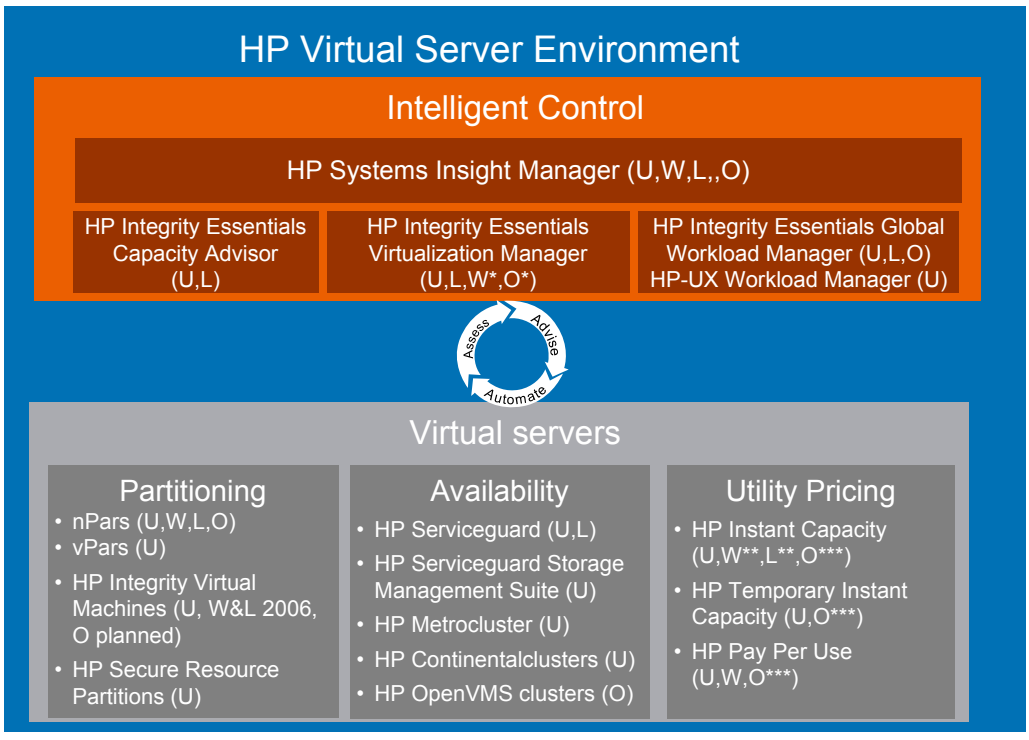
☞VSE: Unique differentiation

Industry's best platform for mission-critical virtualization: HP-UX 11i



- HP-UX 11i Momentum
  - HP-UX 11i revenue grew 8% year-over-year (Q3'05)
  - 6th consecutive quarter of YOY growth
- Most HP-UX 11i customers buy mission-critical virtualization software
  - Well over 50% of mid-range and high end servers ship with either Mission Critical OE or Enterprise OE (Q2'05)
  - ~50% of HP-UX 11i servers ship with HP Serviceguard (Q2 05)
  - HP-UX Workload Manager shipments grew 50% year/year (Q2 05)
- Continued investment in virtualization for HP-UX 11i
  - Development platform for Integrity server virtualization
  - Integrity virtualization functionality delivered first on HP-UX 11i

Operating System support for elements of the HP Virtual Server Environment for HP Integrity and HP 9000 servers



Legend
U – HP-UX 11i
L – Linux
W – Windows
O - OpenVMS

*nPar only

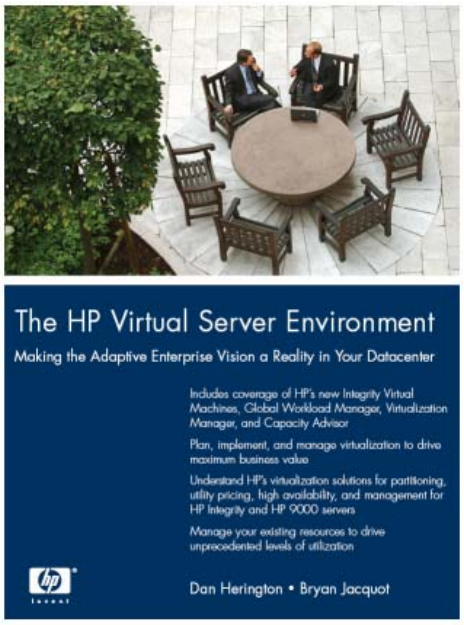
** with Integrity Virtual Machines 2006

*** planned with OpenVMS 8.3

New Book: The HP Virtual Server Environment

New book available Sep 2005

The guide for maximizing the business value of virtualization



- Architect flexible, dynamic configurations that adapt instantly to business requirements
- Choose the right solutions from HP's partitioning continuum
- Use utility pricing solutions in a variety of capacities
- Improve utilization and control in your virtual environment
- Integrate VSE technologies into heterogeneous HP-UX 11i, Window, Linux and OpenVMS environments on HP Integrity and HP 9000 Servers

Customers can go to www.informit.com and enter promotion code B85522 for a 40% discount, compliments of HP (valid 8/14/2005 – 12/31/2005)

University of Magdeburg

Education, Europe

Increased agility, reduced costs with HP virtualization for SAP

Challenge	Solution	Results
• The University of Magdeburg operates an SAP University Competence Center (HCC) based on the Application Service Provider model. • Large number of users – some 40,000 students – results in a high IT load. • Fluctuations in demand result in huge peak loads for the IT infrastructure.	• HP Virtualized Infrastructure Solutions for mySAP™ Business Suite • Virtualization and consolidation of HP and SAP system landscape. • Control of load distribution for SAP applications by SAP Adaptive Computing Controller integrated into HP solution • HP Integrity Superdome servers running HP-UX 11i v2	• Effective peak load management by distributing SAP applications to various servers. • Virtualization ensures optimal usage of hardware, which enables consolidation of existing hardware. • Consolidations helps reduce IT operating costs by some 30 to 40 percent. • The HCC can continue to provide a professional, educational service at a more cost effective price and with greater agility to meet future demand.

“With the HP Virtualized Infrastructure Solutions for mySAP™ Business Suite we have achieved flexibility in our IT load handling and business agility. It has also cut Total Cost of Ownership: Infrastructure and marginal costs have gone down, which will result in savings of 30 to 40 percent of operating costs.”

Prof. Claus Rautenstrauch
Faculty for Informatics
Director of the Magdeburg HCC