



HP-UX 11i on HP Integrity entry-class servers

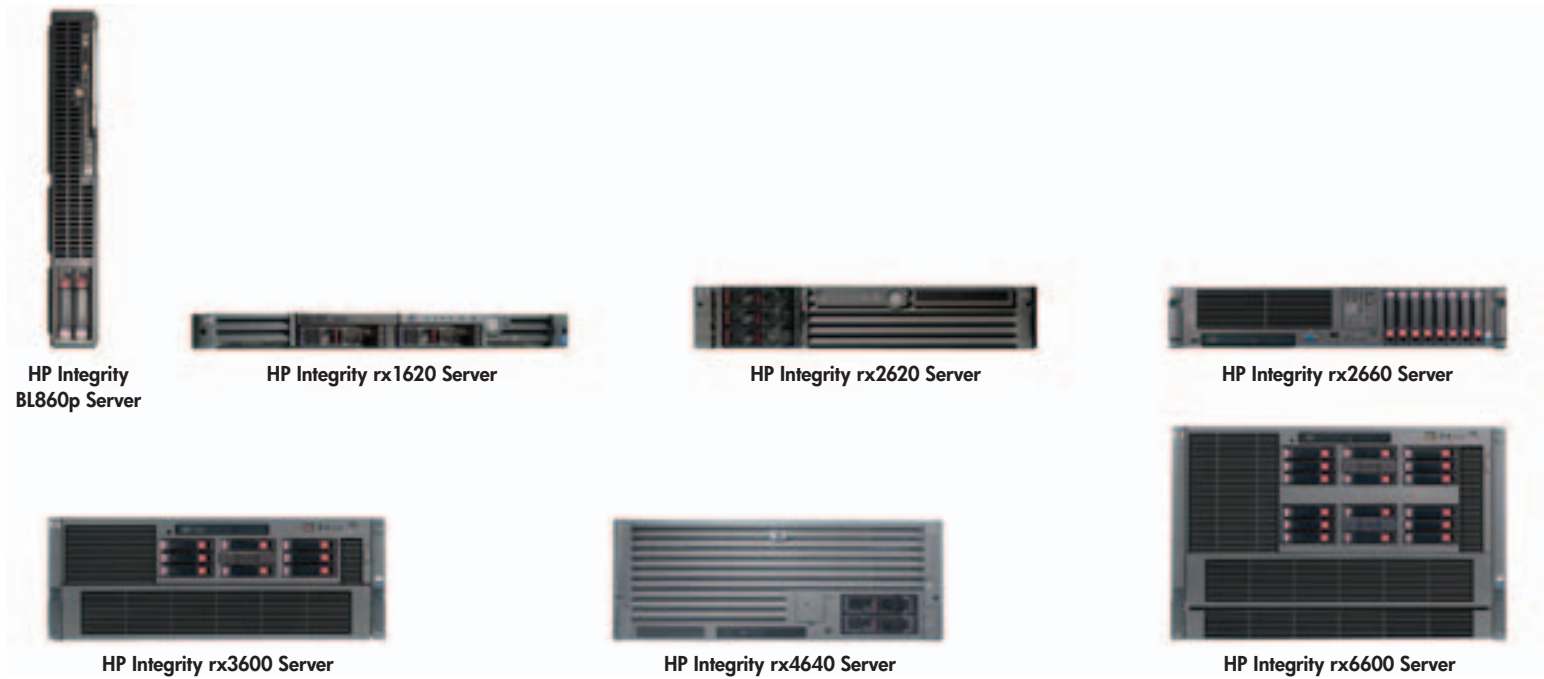
Moving business value to your bottom line



Table of contents

Making the right choice	2
Business growth	2
Hardware flexibility and operating system choice	2
Virtualization enables an adaptive infrastructure	3
Maximizing ROI	3
Driving down TCO	4
Standardization, consolidation, and management	4
Unified infrastructure management	4
Remote management	5
Continuous and secure operations	5
HP Serviceguard high-availability solution	6
Layered security and built-in protection	6
Increased performance	7
HP-UX 11i – performance and versatility	7
Customer satisfaction	8

From the space-saving BL860c blade server to the powerful Integrity rx6600 Server with a maximum of eight cores, HP Integrity servers deliver performance, flexible capacity, secured availability, and simplified management.



Making the right choice

To help run their operations, HP customers around the world have chosen HP Integrity entry-class servers and the HP-UX 11i operating system.

Though varied and diverse in geography and industry, these customers share IT goals similar to yours, including:

- Enabling and managing business growth
- Maximizing ROI
- Achieving standardization, consolidation, and simplified management
- Maintaining continuous and secure operations
- Increasing performance
- Boosting customer satisfaction

They appreciate the fact that HP offers leadership price/performance. But that's just the beginning. This white paper explores the additional value for you of HP Integrity entry-class servers and the HP-UX 11i operating system in terms of flexible capacity, secured availability, and simplified management.

Table 1 (see page 3) provides a technical overview of the HP Integrity entry-class server family.

Business growth

Enabling and managing growth is a challenge. You want to synchronize business and IT to capitalize on change.

Hardware flexibility and operating system choice

HP Integrity entry-class servers deliver processor, memory, and storage scalability—flexible capacity for real-world workloads.

All Integrity entry-class servers offer built-in investment protection by enabling in-box upgrades to future Intel® Itanium® 2 processors.

A choice of operating systems brings superior flexibility for deployment and redeployment in an adaptive enterprise. For even more flexibility, you can choose among these other operating environments in addition to HP-UX 11i:

- Windows® Server 2003, Enterprise Edition for Itanium-based systems
- Linux (Red Hat ES, Red Hat AS, and Novell SUSE Linux Enterprise Server)
- HP OpenVMS 8.3

Table 1. HP Integrity entry-class servers

Integrity server	Processors supported (frequency/cache)	Number of processors	Number of cores	Memory
BL860c	Intel Itanium 2 processor 1.6 GHz/6 MB 1.6 GHz/18 MB dual-core 1.4 GHz/12 MB dual-core	1–2	2–4	48 GB
rx1620	Intel Itanium 2 processor 1.6 GHz/3 MB	1–2	1–2	16 GB
rx2620	Intel Itanium 2 processor 1.6 GHz /3 MB 1.4 GHz/12 MB dual-core 1.6 GHz/18 MB dual-core	1–2	1–4	32 GB
rx2660	Intel Itanium 2 processor 1.6 GHz/18 MB 1.4 GHz/12 MB 1.6 GHz/6 MB	1–2	2–4	36 GB
rx3600	Intel Itanium 2 processor 1.4 GHz/12 MB dual-core 1.6 GHz/18 MB dual-core	1–2	2–4	96 GB
rx4640	Intel Itanium 2 processor 1.6 GHz/18 MB dual-core 1.6 GHz/24 MB dual-core	1–4	2–8	128 GB
rx6600	Intel Itanium 2 processor 1.4 GHz/12 MB dual-core 1.6 GHz/18 MB dual-core 1.6 GHz/24 MB dual-core	1–4	2–8	192 GB

Virtualization enables an adaptive infrastructure

HP understands that an ongoing issue is how to maintain high service levels as an environment grows and demand changes. The answer is with the flexible capacity of HP-UX 11i on Integrity servers.

One of the ways HP provides flexible capacity is through the HP Virtual Server Environment (VSE). The VSE doubles server utilization and balances IT supply with business demand. By creating virtual servers that automatically grow and shrink based on business priorities, the VSE delivers additional resources to critical applications during peak times.

The VSE also integrates intelligent control with partitioning, high availability, and utility pricing, so you can maintain continuous service levels in the event of downtime and pay for spare capacity on an as-needed basis.

In addition, you can use the subprocessor partitioning granularity of Integrity Virtual Machines to achieve even greater consolidation by concurrently handling multiple workloads, each executing in its own isolated operating environment instance for stability, security, and quality of service.

A common perception is that virtualization makes management complex. HP simplifies the management of your virtualized environment with HP Systems Insight Manager. This tool, described in more detail below, provides core services such as discovery, identification, security, fault management, and event management for HP servers and storage.

Maximizing ROI

After years of asking IT to do more with less, businesses need to strongly consider investing in an agile IT architecture that will require less long-term support, reduce development time, and promote partnership between technology, lines of business, and overall strategic business planning. In short, they need to maximize their ROI. And key to that is driving down TCO while increasing the value IT contributes.

Table 2. Price/performance comparison

IBM p5 570 TPC-C executive summary	HP Integrity rx4640 Server TPC-C executive summary
2 chips/4 cores	2 chips/4 cores
203,440 tpmC ¹	200,829 tpmC ²
\$3.93/tpmC	\$2.75/tpmC
Total system cost = \$799,990	Total system cost = \$551,406

The Integrity rx6600 Server delivers 33% better price/performance compared to IBM

IBM POWER5 Oracle® list pricing	Intel Itanium processor Oracle list pricing
0.75 x cores = .75 x 4 cores = 3 x \$20,000 = \$60,000 (list)	0.5 x cores = .5 x 4 cores = 2 x \$20,000 = \$40,000 (list)

With 4 cores you save \$20,000 on Oracle DB list with an HP Integrity server

¹ www.tpc.org/results/individual_results/IBM/IBM_570_4_200510_es.pdf

² www.tpc.org/results/individual_results/HP/hp_tpcc_rx4640_es.pdf

Driving down TCO

Many companies think of IT costs as simply the purchase of hardware and software, any support contracts, and perhaps IT training. But as with an iceberg, these are only the *visible* costs of ownership. IT ownership also has hidden, ongoing costs that inflate the total cost of ownership significantly. These include inefficiencies resulting from under-utilization, administration, and personnel downtime.

HP Integrity entry-class servers can drive down cost of ownership from the very beginning. For example, Table 2 compares the HP Integrity rx6600 Server with the IBM p570 in an Oracle® environment and clearly shows the HP price/performance advantage.

HP-UX 11i software contributes TCO savings through virtually eliminating downtime; virtualization that doubles typical system utilization; simplified management, reducing maintenance costs; and security methods that simplify compliance and related reporting, for example with Sarbanes-Oxley regulations.

Standardization, consolidation, and management

If you are like many of our customers, you seek to increase agility, free up resources, and focus on innovation by moving to a standards-based IT foundation and unified business practices—achieving scalability based on standards.

The range of HP Integrity entry-class servers has the power and capacity to allow even two-processor systems to serve as consolidation servers today. HP-UX 11i enables you to align resources to jobs by business priority, and to secure applications in compartments for access and execution control. Consolidate with HP-UX 11i for the resulting cost-savings, and without compromising control.

Unified infrastructure management

HP Systems Insight Manager (SIM) simplifies IT management for HP-UX 11i systems, as well as Integrity and ProLiant servers running any of HP's operating systems. Able to automate low-level administrative tasks and become the basis of a unified infrastructure management environment, HP SIM reduces the time and cost of ongoing administration and maintenance. It provides a single view into the provisioning and management of an IT infrastructure—while integrating HP Enterprise Management solutions and applications into the business-process management environment.

In addition, the HP System Management Homepage (SMH) allows more efficient and easier management of HP-UX 11i servers, providing a full range of systems administration tools through a rich Web-based graphical interface. HP SMH also reduces the time required to troubleshoot problems by providing at-a-glance monitoring of system component health and consolidated log viewing. Plug-ins such as Integrity Essentials and Storage Essentials extend the base platform with tools to manage the specifics of each platform, such as partition setup, processes, and management.

This unified infrastructure management solution enables administrators to monitor the health of servers and proactively troubleshoot complex problems that span servers and storage. Ultimately, with a unified infrastructure management environment, your IT organization can focus less on daily maintenance and more on meeting future business needs.

Remote management

Whether in front of the system or thousands of miles away, system administrators using HP Integrity Integrated Lights-Out (iLO) can perform any administration task as if they were physically at the server—regardless of the server's operating condition. Essential iLO capabilities are built into every entry-class HP Integrity server. The next-generation product, Integrity iLO 2, comes standard with selected Integrity entry-class servers—expanding remote management capabilities with powerful new tools for a virtualized console experience.

HP Integrity Integrated Lights-Out 2 (iLO 2)—which includes new features such as Integrated Remote Console and Virtual Media—provides a convenient, easy-to-use first access point to help you remotely configure hardware, load software, manage IT access, and even troubleshoot selected entry-class HP Integrity servers.

Continuous and secure operations

There is a good chance that you will need 24x7 global operations to remain competitive. This means maintaining the availability of core global applications and financial transactions through the failover of business-critical data and operations. You must avoid the disruption and financial loss of unplanned downtime while reducing risk by implementing robust, high-availability IT systems that support numerous users. What's more, you must do all this while maintaining the highest levels of security—and often needing to demonstrate compliance as well.

HP Integrity entry-class servers offer built-in integrated availability for the support of continuous business operations and the reduction of planned and unplanned downtime:

- Single-system high availability built into the server
- Hot-swap disk drives, fans, and power supplies as well as PCI OLR
- Dynamic processor and memory resilience
- Error checking and correction on every data path
- Double chip sparing (on zx2-based systems)
- Data protection and redundancy built into every server
- Virtualization with built-in high availability
- Integrated SAS RAID controllers (on zx2-based systems)
- Dual (backup) ROM for “uninterrupted” firmware updates
- Certification with HP StorageWorks devices

To the hardware reliability features, HP-UX 11i software adds software reliability, availability, and security features for mainframe-class availability and security, priced for entry-class servers.

“With HP, we have enterprise-class availability combined with a clustered architecture providing high redundancy. In conjunction with HP Mission Critical Support, this provides us with excellent support for our 24x7 operation.”

Walter Stadelmann,
Head of IT,
Emmi Schweiz

HP Serviceguard high-availability solution

HP-UX delivers mainframe-class UNIX® system availability and disaster tolerance with operating-system features and a family of HP Serviceguard cluster-based software. The latest version, HP-UX 11i v3, for example, delivers features such as hot-swap processors and memory, eliminating the need to take any part of the system offline when changes are required to those components.

HP Serviceguard builds on the concept of virtualization by grouping multiple servers into a cluster to provide highly available application services that enhance data integrity. Within the cluster, HP Serviceguard monitors the health and status of software and hardware components and uses cluster management tools to efficiently manage multiple systems. If a threshold is exceeded or a failure occurs, HP Serviceguard provides automatic failover of the mission-critical applications (from the failed server to alternate active servers).

While HP Serviceguard is effective in handling unplanned events, it can also be used for planned maintenance of clustered environments. Applications can be moved among servers so that services remain available to the end user while software or hardware upgrades are being implemented.

Through integration of Serviceguard with the Virtual Server Environment and key applications, you can deploy automated disaster-tolerant capabilities that maintain service-level objectives during planned and unplanned downtime between virtual machines, partitions, systems, and multiple data centers—even across continents. Support of HP Integrity Virtual Machine guests as members of a Serviceguard package environment takes advantage of flexibility and consolidation capabilities as part of the HP Virtual Server Environment.

The key benefits of HP Serviceguard include:

- Increased application availability and reduced operator error with rapid automatic detection and recovery times
- A superior level of protection with the ability to survive multiple node failures

- Shortened startup time for applications in the primary active node with fast failback
- Sustained application availability during hardware and software maintenance with rolling upgrades
- Enhanced systems consolidation with virtual and hard-partitioning support
- Simplified deployment and integration of complex mission-critical Oracle, Oracle Real Application Clusters, and SAP mission-critical environments
- Mixed Serviceguard cluster support of HP 9000 and HP Integrity servers
- Support for multiple operating systems (HP-UX and Linux)

In addition, you can achieve failover times that are as much as three times faster than those in Serviceguard-only environments with Serviceguard Extension for Faster Failover. And the integration of high availability and virtualization technologies with storage solutions—such as the HP StorageWorks XP Disk Array or Enterprise Virtual Array (EVA) families—delivers a complete data protection and business continuity solution to keep businesses running.

HP Serviceguard software virtually eliminates unplanned downtime and lets you take control of planned downtime while providing enhanced disaster tolerance and manageability. Workloads that matter to your bottom line deserve the mission-critical availability provided by HP Serviceguard software.

Layered security and built-in protection

HP-UX 11i delivers advanced, integrated security solutions that seamlessly protect applications without modification to the applications. HP-UX 11i provides 26 points of security protection to reduce risk and increase adherence to compliance requirements. Continuing our investment in these critical areas, HP recently announced the first UNIX Encrypted Volume and File System.

“We’ve been extremely satisfied with HP-UX, both in the way that it supports SAP and in the way that it supports a wide variety of applications. Our core application is SAP, but our company runs on HP-UX.”

Vandy Johnson,
Director of
Operations,
General Mills

Table 3. Leadership benchmarked performance of HP Integrity entry-class servers

Workload	Benchmark	HP performance	IBM performance
Java™	32 core SPECjAppServer2004	4,915.49 JOPS ¹	2,921.48 JOPS ²
	8 core SPECjbb2005	138,382 BOPS, 69,191 BOPS/JVM ³	127,851 BOPS, 15,981 BOPS /JVM ⁴
Transactional	4 core TPC-C	230,569 tpmC ⁵	203,440 tpmC ⁶
		\$2.63 USD/tpmC	\$3.93 USD/tpmC

¹ HP Integrity rx6600 Server, 1.6 GHz 24M Itanium 2, 16 chips/32 cores/2 core per chip, 4 nodes

² IBM p5 550, 1.9 GHz POWER5+, 16 chips/32 cores/2 cores per chip, 8 nodes

³ HP Integrity rx6600 Server, 1.6 GHz 24M Itanium 2, 4 chips/8 cores/ 2 cores per chip, no HW threading

⁴ IBM p5 550Q, 1.65 GHz POWER5+, 4 chips/8 cores/ 2 cores per chip, HW threading enabled

⁵ HP Integrity rx6600 Server, 1.6 GHz 24M Itanium 2, 2 processors/4 cores/8 threads

⁶ IBM p5 570, 1.9 GHz POWER5, 2 processors/4 cores/8 threads

All results as of October 18, 2006

See www.spec.org for details

With HP, you benefit from features such as:

- Security designed into HP hardware and software
- Reduced downtime through secure isolation between resources and processes
- Near real-time monitoring of potential intrusions
- Effective administration with single access controls
- Dynamic processor and memory resilience
- HP-UX 11i real-time host intrusion detection and protection
- HP-UX 11i Identity Management integration with HP OpenView Select Access, HP-UX enforcement, and LDAP directory
- HP-UX Bastille—security hardening/lockdown tool for enhancing security
- Trusted Platform Module (TPM) solution on zx2 platforms for key encryption and added security

For a complete description of HP-UX 11i security, please visit: www.hp.com/go/hpux11isecurity

Increased performance

Many companies and organizations need to boost competitiveness by streamlining operations and increasing performance. If yours is one of them, you probably want to improve application response times or ensure fast, effective order processing, or meet stringent service level agreements. Timing is a big

issue as you strive to provide up-to-date supply chain information or reduce inventory through real-time sales information. You need to cut operational overhead as you accelerate daily transaction processing or improve the performance of data integration applications.

HP Integrity entry-class servers based on the Intel Itanium 2 processor and running the HP-UX 11i operating system fill the bill. As Table 3 illustrates, HP Integrity entry-class servers deliver leadership benchmarked performance in several key areas.

HP-UX 11i—performance and versatility

HP-UX 11i is HP's enterprise UNIX operating environment supporting HP 9000 and HP Integrity servers, providing binary compatibility for applications moving from HP 9000 to HP Integrity servers. With HP-UX 11i on HP Integrity entry-class servers, you leverage performance and versatility, ultimately experiencing the highest business value and lowest cost of ownership among enterprise UNIX offerings today.*

With over two decades of investment in functionality optimized for your most critical computing needs, HP delivers proven UNIX quality and performance in HP-UX 11i—offering established leadership in high availability and flexible workload management, formerly the exclusive domain of mainframe-class systems.

* Please see supporting analyst documents at: www.hp.com/go/hpux11iroi

“As an independent profit center, we compete with other IT providers by delivering superior services in the most efficient way. With our HP Integrity environment, we are able to respond flexibly to the changing demands of our clients and offer high levels of availability, performance and efficiency.”

Wolfgang Wassmer,
HBM IT manager,
Burda Digital data
center

HP-UX 11i supports processors of various performance levels; high levels of multiprocessing; a large range of memory sizes, from megabytes to hundreds of gigabytes; and file system sizes up to 256 terabytes to achieve superior levels of performance scalability.

Available on a range of servers—from entry-class to Superdome systems—and with thousands of available applications, HP-UX 11i brings enterprise IT success to businesses across all industries and of all sizes.

Customer satisfaction

You don't make IT investments just to make life easier for your IT department. You invest to make life easier for your end users and customers. You want to meet service-level objectives, react faster to changing customer preferences, offer superior service, or give customers a single point of contact.

As this white paper has shown—with real-life examples in our customers' own words—HP Integrity entry-class servers running HP-UX 11i offer multidimensional solutions to major customer problems. But HP delivers more than just hardware and software. HP Services offerings range far beyond standard product support to include:

- **Deployment services** for risk-reducing installation and startup, implementation, and integration
- **Availability services** to help proactively reduce downtime and meet service-level commitments in mission-critical environments
- **Performance services** that provide objective technical assistance to help make the most of IT investments

- **Innovative support management services** such as HP Integrated Support to complement internal capabilities with proven multivendor expertise
- **Software services** to support functionality from the basic to the business critical, from the desktop to the global enterprise
- **HP Financial Services** to put the power of the HP portfolio to work quickly and cost-effectively

Whichever entry-class server or combination of servers running HP-UX 11i you choose, you will benefit from flexible capacity, secured availability, and simplified management. But more than that, you will be able to lower the total cost of ownership and maximize the return on your investment as you synchronize business and IT to capitalize on change.

The business value of HP-UX 11i mounts most rapidly when you take full advantage of the HP entry-class, mission-critical virtualized environment. HP-UX 11i, used in combination with the HP Integrity Virtual Machines and HP Serviceguard software, allows you to rapidly execute new IT initiatives with an adaptive infrastructure designed for speed and agility while reducing unplanned and planned downtime. In short, HP-UX 11i software—coupled with entry-class servers—delivers what you need when your bottom line depends on application security, availability, and agility.

Work smarter and sleep better with the proven value of entry-class servers with HP-UX 11i—affordable, no-compromise, adaptive infrastructure solutions for businesses of all sizes.

For more information

To learn more about HP-UX 11i on HP Integrity entry-class servers, visit: www.hp.com/go/integritynow

To learn more, visit www.hp.com

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