

WHITE PAPER

HP-UX 11i: A Foundation for Enterprise Computing That Delivers Business Agility Through Integrated Virtualization, Workload Management, and Enhanced Security

Sponsored by: HP

Jean S. Bozman

Al Gillen

May 2005

EXECUTIVE SUMMARY

Unix servers, including those from Hewlett-Packard (HP), support mission-critical workloads, such as transaction processing, enterprise applications, and large corporate databases. Today's enterprise customers want their IT environments to support higher levels of business agility and deliver more business value. Therefore, advanced virtualization as well as support for high availability, provisioning, and workload management in Unix operating systems are key factors in winning new business in the modern enterprise datacenter, as a small set of top vendors provides systems in the highly competitive worldwide Unix server market. The latest release of HP's Unix operating system, HP-UX 11i v2, bolsters the company's flagship line of systems with enhanced virtualization, workload management, high availability, and security features. Taken together, the new features provide highly granular control for customers' applications and workloads that are running on HP's Unix servers. This fits into HP's overall goal to deliver systems that help customers become more agile as business requirements increasingly demand faster deployments and responses to meet opportunities when and where they arise.

INTRODUCTION

The Role of Unix Systems in the Enterprise

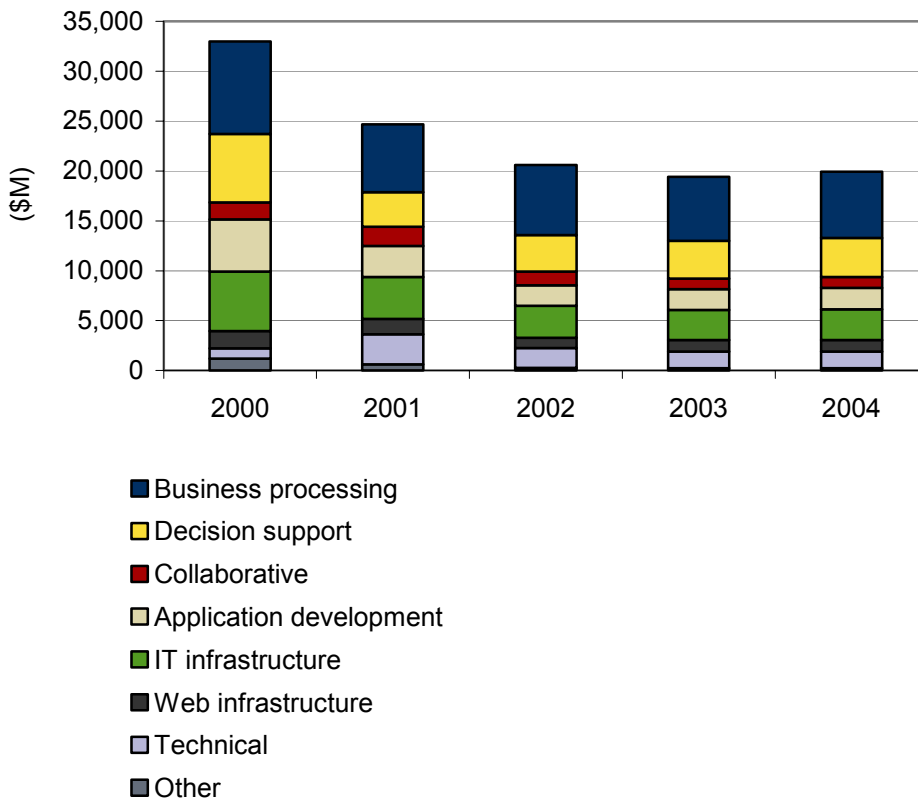
The maturity of the Unix operating system has given major Unix products a well-deserved reputation for stability and resilience that serve the operating system well in high-transaction, mission-critical computing workloads. These qualities help Unix play a keystone role in server categories: volume servers (servers priced at less than \$25,000), midrange enterprise servers (servers priced from \$25,000 to \$499,999), and high-end enterprise servers (servers priced at \$500,000 or more).

IDC's workloads research shows that Unix servers support a wide range of workloads, ranging from tier 1 Web serving and networking support to tier 2 application serving and tier 3 database serving and support for online transaction processing, enterprise applications, and business intelligence. Figure 1 illustrates the range of workloads supported — and the depth of support for business processing workloads — from 2000 to 2004. IDC's demand-side, customer-based workloads research defines a number of broad-based workload categories. Each category contains a number of specific

workloads, including IT infrastructure (e.g., file/print, networking support); Web infrastructure (e.g., Web serving, proxy, cache); collaborative (e.g., email and groupware); application development (e.g., programming); technical (e.g., scientific and technical workloads) and business processing (e.g., OLTP, business intelligence, and enterprise applications), and decision support.

FIGURE 1

Worldwide Unix Server Revenue by Workload Category, 2000–2004



Source: IDC's Workloads Study, 2004

Accordingly, Unix servers play at all levels of customers' IT infrastructures: platforms are used for front-tier Web serving, middle-tier application serving, and back-end database serving and OLTP support. Unix's strong Internet role is partly due to its role as a key operating environment on which the Internet was built. Unix provides excellent support for networking standards, including networking protocols and Internet protocols such as HTTP and TCP/IP.

Unix servers are deployed across all major vertical market segments, including the aerospace, automotive, chemical, oil/gas, and pharmaceutical industries, and in universities and national research laboratories. They are widely used in telecommunications, financial services, manufacturing, and government sites. Unix servers continue to play an important role in high-performance computing (HPC), either singly or in clusters — supporting both scale-up and scale-out computing styles. Finally, Unix servers are highly scalable, ranging in size from small rack-optimized servers to servers that support thousands of end users and databases containing vital customer profile and inventory information for traditional business, ecommerce, and Web services.

Today the industry is consolidating on a limited number of Unix distributions that offer best-of-breed capabilities, scalability, and the broadest application portfolios. Within that select group, HP-UX 11i v2 is well positioned through its inclusion of features and benefits that customers can exploit to build solutions that deliver high levels of availability and scalability yet retain the flexibility that allows the IT resources to respond to changing business needs.

HP-UX 11i v2 is well positioned through its inclusion of features and benefits that customers can exploit.

Evolution of HP-UX 11i and Its Important Role in the Adaptive Enterprise

HP has a vision for the next generation of enterprise IT operations, called the Adaptive Enterprise, and a crucial element of that vision is the ability to respond to changing business operational requirements.

Simply put, the Adaptive Enterprise links business processes with the IT technology that enables flexible business operations. Adaptive Enterprise initiatives are designed to break down the barriers between the "islands of automation" that have developed between a variety of different server systems that have been deployed to support specific workloads within a given enterprise. In the process, an Adaptive Enterprise addresses a key IT issue: the complex IT infrastructure that has been based on a series of past decisions — and inherited by today's IT managers.

From a customer's perspective, when an IT manager wants to deploy end-to-end applications — reaching from a company's headquarters datacenter to its business units and, ultimately, to its end customers — the organization can face significant technology barriers between a variety of potentially incompatible systems and software packages.

HP's Adaptive Enterprise is a vision for computing that delivers simplicity, agility, and value to customers through a process of IT standardization based on modular technology building blocks. When applied, these modular components result in a simplified IT infrastructure that can adapt to ever-changing business processes on a near-real-time basis. Realizing the vision of the Adaptive Enterprise within an enterprise is a process that progressively builds improved flexibility and adaptability over time.

HP focuses on three key initiatives to collectively enable an enterprise to progressively become more agile:

- ☒ IT standardization that reduces complexity through the use of fewer hardware and software components
- ☒ Virtualization that allows workloads to move to available compute resources
- ☒ Management that allows IT to align compute resources with ever-changing business requirements

HP's Integrity server line is one of the pillars of its server portfolio that supports workload consolidation from older servers and, therefore, the process of IT simplification in sites that have multiple server platforms installed. Based on Intel Itanium microprocessors, the Integrity server line offers IT managers' choice and flexibility through its ability to run multiple operating environments and multiple workloads.

In deployments that are aimed at IT simplification, HP Integrity servers improve interoperability between systems through the use of Internet protocols and widely adopted middleware software products and software interfaces. The Integrity servers, running the HP-UX 11i v2 Unix operating system, support highly granular hardware-defined partition (nPAR) and software-defined virtual partition (vPAR) capabilities through their support for HP-UX 11i-enabled integrated virtualization software. HP's integration of high availability, security, workload management, and utility pricing assists in allowing customers to deploy highly dependable virtualized environments.

HP-UX 11i Unix is one of the top Unix operating systems worldwide, according to IDC's worldwide server operating environment research. It includes support for the two most widely used programming models on two of the industry's most important operating systems: Unix and Windows. These programming models — Java and .NET — enable the construction of end-to-end applications that link multiple servers over the network.

HP-UX 11i Unix is one of the top Unix operating systems worldwide.

In addition, HP's broad set of management tools works with HP-UX 11i to provide comprehensive views of the entire IT environment. Tools such as HP Process Resource Manager (HP PRM) and HP-UX Workload Manager (HP-UX WLM) enable HP to offer granular control of system resources, operations, and configuration. This granularity of management control, which took many years to develop, supports business flexibility by allowing workloads to move to available compute resources and provides IT with the ability to support virtualized workloads across Integrity systems managed by the HP-UX 11i operating system. It is through the use of all these advanced features that HP-UX 11i is positioned as HP's proven foundation for an Adaptive Enterprise.

Business Benefits of HP-UX 11i

As one of the industry's leading Unix system providers, HP offers a strong value proposition to current and prospective customers. HP-UX 11i, which has been supported on PA-RISC processors for many years, is gaining in its adoption on HP's Integrity Itanium-based servers. This is occurring as the percentage of HP's Business Critical Servers that are based on Itanium technology grows.

IDC's worldwide server data shows that in 4Q04, about 20% of HP's Business Critical Server shipments were Itanium-based, a number that HP plans to increase throughout 2005. At the same time, HP has said that it will end new shipments of AlphaServers in 2006 so that longtime HP customers using Tru64 UNIX will increasingly consider Integrity servers running HP-UX 11i as the next server platform for their Unix workloads.

To meet the requirements of these customer sets, HP must continue to integrate next-generation functionality that supports the HP Adaptive Enterprise initiative while also offering functionality that is competitive with that offered by other major Unix system OEMs. To meet all these goals, HP has been accelerating its movement down its HP-UX 11i technology road map through the continued evolution of its flagship Unix server operating environment.

HP-UX 11i as a Foundation Technology for an Adaptive Enterprise

HP-UX 11i has a special role as a foundation technology for HP's Adaptive Enterprise vision and strategy. HP focuses on three key initiatives to collectively enable an enterprise to progressively become more agile: standardization, virtualization, and management. As a longtime platform for enterprise computing, HP-UX 11i brings with it an innate support for high levels of reliability, availability, and manageability that meet, and often exceed, traditional Unix standards.

HP-UX 11i provides a foundation for business agility, IT simplicity, and business value through HP Virtual Server Environment (VSE) for HP-UX 11i. This foundation integrates virtualization, high availability, management, utility pricing, and security features into a single server operating environment that dynamically adjusts to a business' immediate requirements. This operating environment can be leveraged to help customers optimize the business value that can be realized from their IT investments.

HP-UX 11i provides a foundation for business agility, IT simplicity, and business value through HP Virtual Server Environment for HP-UX 11i.

HP-UX 11i integrates with HP software for resource management, system management, and network management. It supports virtualization of scale-out servers and scale-up servers — allowing customers to use their servers more efficiently and supporting server and workload consolidation. In a scalable HP Superdome server, HP-UX 11i supports multiple levels of virtualization within the same computer frame, ranging from hardware-defined partitions (nPARs) to software-defined virtual partitions (vPARs) and including multiple resource partitions running within a single instance of the operating system.

In addition, HP is expected to introduce HP Integrity Virtual Machines in the second half of 2005. HP Integrity Virtual Machines allow customers to allocate processor resources and I/O resources to an application at a high degree of granularity. The Integrity Virtual Machine technology keeps applications separate from one another within a single instance of the HP-UX 11i operating system. This allocation model increases server utilization by supporting multiple application workloads within a single operating system instance. It also isolates application faults and maintains security isolation so that interruption to one workload will not affect the other workloads running within the same operating system instance. The physical resources of the hardware — processor, memory, and I/O — are virtualized for the

Virtual Machines (VMs). Processor and I/O resources can be shared across virtual machines (reducing cost and increasing utilization). Or, for purposes of workload isolation, I/O can be dedicated to a single virtual machine. Integrity Virtual Machines will support all HP Integrity servers running HP-UX 11i v2 update 2.

Finally, HP-UX 11i's resource management capabilities fit well with HP OpenView's enterprisewide system management and network management capabilities, making the operating system a cornerstone in empowering HP's Adaptive Enterprise deployments within large organizations.

HP-UX 11i's Evolution to Itanium-Based Integrity Server Systems

For the past several years, HP has been on a planned upgrade pattern that is moving its key operating system technologies from PA-RISC processors to Intel Itanium processors. After a series of staggered releases that brought versions of HP-UX aboard PA-RISC and Itanium processors closer together, HP-UX 11i v2 provides a unified release of the operating system that includes complete functional parity aboard the two architectures.

Functional parity makes it easier for customers to move from HP's traditional RISC hardware platforms to the Itanium-based Integrity platform for new deployments. In addition, HP has successfully made application compatibility — when moving applications from HP-UX 11i on PA-RISC platforms to HP-UX 11i v2 aboard Integrity platforms — a top priority. Today, applications can move from HP-UX 11i aboard PA-RISC to HP-UX 11i v2 aboard Integrity with no change or can be recompiled to optimize performance. HP has paid particular attention to this application support issue, recognizing that forcing an application migration on customers serves as a significant adoption blocker that impedes the success of any new platform.

Today, applications can move from HP-UX 11i aboard PA-RISC to HP-UX 11i v2 aboard Integrity with no change.

Going one step further, HP also offers broad support for Linux applications aboard HP-UX 11i v2 on Integrity servers through a Linux Runtime Environment, which further expands the range of options customers will have when making new deployments.

Accelerated Delivery of Advanced Virtualization and Security Features

Multiple communities of customers will evaluate HP-UX 11i v2 as a possible replacement for their existing Unix server systems, including longtime users of HP's PA-RISC HP9000 servers and HP AlphaServers running Tru64 UNIX. For these users, the acceleration of additional virtualization and security features into HP-UX 11i v2 adds business value that is intended to encourage a move to new Integrity server systems in 2005 and 2006. The support for integrated virtualization, advanced workload management capabilities, and support for workload consolidation on standardized hardware platforms have the potential to reduce operational costs. Taken together, they may speed return on investment for customers who install new systems running HP-UX 11i v2.

The acceleration of additional virtualization and security features adds business value that is intended to encourage a move to new Integrity server systems in 2005 and 2006.

Calculating the Five-Year ROI for New Technology

IDC notes that Alinean, an Orlando, Florida-based ROI analysis firm that partners with IDC, has developed an online software tool for HP that enables HP business value consultants, in collaboration with enterprise IT managers, to evaluate the costs and benefits of implementing virtualization on the HP-UX 11i platform. The Alinean tool serves IT managers in three ways:

- ☒ Enables the understanding of the five-year total costs of a customer's current server environment
- ☒ Quantifies the five-year total costs of implementing the HP-UX 11i platform
- ☒ Quantifies the cost savings and business benefits generated by virtualization (Benefits include reduced hardware and software costs, more efficient management, and higher availability.)

The result is a document supporting total costs and ROI analysis to help enterprises understand the financial benefits of virtualization.

Accelerating the HP-UX 11i Road Map

HP has continued to drive new functionality into its products, sometimes with its own innovation and at other times by partnering with best-of-breed vendors. Building on a strong foundation of capabilities in HP-UX 11i, HP has added feature and functions through the acceleration of its own internal development efforts and by working with partner firms to license and integrate complementary technology.

Examples include HP's discontinuance of its own Web application server platform after it partnered with BEA Systems for its WebLogic technology and HP's announcement that it had extended its partnership with VERITAS Software to leverage a select set of VERITAS' file and volume management capabilities, including its Cluster File System (CFS) software. The fall 2004 HP-VERITAS announcement is a continuation of a long-standing relationship between the two companies that brought VERITAS Online JFS (journaling file system), VERITAS Volume Manager (VxVM), and Cluster Volume Manager (CVM) to HP Unix server customers in recent years.

Existing Key Features in HP-UX 11i v2

HP has incorporated the following areas of functionality into HP-UX 11i v2:

- ☒ Inclusion of multiple levels of virtual partitioning capabilities, allowing a single physical server or hardware-defined partition to support multiple virtual environments — each with a standalone instance of the HP-UX 11i v2 operating system. This capability is in addition to the existing support for nPARs, offering increased flexibility and granularity and complete feature parity between PA-RISC and Integrity-based versions of HP-UX 11i. HP-UX Workload Manager (WLM) is used to move resources between partitions automatically, based on policies and real-time resource demand.

- ☒ Extension of virtualization capabilities using HP Process Resource Manager (PRM) software for reallocating system resources within a single operating-system image, including the additional isolation of Secure Resource Partitions. HP's PRM and WLM modules, with their advanced functionality, work together to enable granular deployment and management of workloads and the resources those workloads consume.
- ☒ The integration of HP Serviceguard high-availability software for clustered servers and HP's WLM software for allocating compute resources ensures that resources are highly utilized, but are still guaranteed to be available for mission-critical workloads whenever that is required.
- ☒ Support for system scalability up to 64 Itanium processors, given its support for 64 sockets, which will support up to 128 cores when the dual-core "Montecito" generation Itanium processors are shipped.
- ☒ Support for networking and storage solutions for Itanium-based systems, including dynamic expansion of storage components and extended support for Gigabit Ethernet and Gigabit Fibre Channel interconnects.
- ☒ Enhanced security features tightly coupled with system virtualization capabilities.

Highlights of New Features in HP-UX 11i v2

HP has continued to pour development resources into extending HP-UX 11i v2 rather than bringing forward the next full release under a strategy to minimize disruption in datacenter operation, since major product revisions tend to mandate a cycle of pilot evaluations and regression testing for enterprise customers. One case in point is the company's integration of VERITAS technologies with its Serviceguard cluster software offering. This integrated software includes HP Serviceguard high-availability software, VERITAS Storage Foundation Cluster File System, and VERITAS Storage Foundation for Oracle9i Real Application Clusters (RAC). (See *HP and VERITAS Extend Their Alliance*, IDC #32594, December 2004.)

HP has continued to pour development resources into extending HP-UX 11i v2.

At the core of this expanded alliance is joint development to integrate the VERITAS Storage Foundation Cluster File System and other Storage Foundation technology components with HP Serviceguard, a clustering and availability software (CLAS) offering that is a key component of HP Virtual Server Environment (VSE). HP plans to enhance HP VSE using HP management products to provide IT customers with a single virtual view for simplified management and control. This approach provides common management and optimization of all virtualized server and storage resources within a single server and across clusters, including clusters based on Serviceguard integrated with VERITAS Cluster File System technology. This will promote enhanced interoperability in sites where HP Unix servers and other types of servers are co-installed in datacenters that leverage VERITAS software.

The partnership with VERITAS is important to longtime customers who have AlphaServers running Tru64 UNIX because it replaces HP's previous plans to bring TruCluster technology and Advanced File System to a future release of HP-UX 11i. The adoption of VERITAS technology accelerates the delivery of similar functionality, arriving at least one year earlier than originally expected.

HP positions this announcement as an expansion of the Alpha RetainTrust program for Tru64 UNIX customers. The program will now provide technical assistance to help customers with planning and implementation of HP Serviceguard with VERITAS software. HP believes this will accelerate and simplify customers' transitions to HP-UX 11i v2 on HP Integrity and HP 9000 servers. The announcement also helps strengthen HP's presence in discussions of virtualization capabilities, particularly when viewed with respect to HP announcements regarding support for virtualization and server management for bladed servers, as well as HP's transition from the Utility Data Center (UDC) product set to a set of software products that provides utility computing capabilities.

New Security and Reliability Features in HP-UX 11i v2

Other new features in HP-UX 11i v2 include technical improvements specifically focused on security and reliability. In 2005, HP has accelerated another round of features previously slated for release in 2006 into the existing release of the operating system. As a result, new features will be delivered with an update to the v2 release of HP-UX 11i, including the following:

HP has accelerated another round of features previously slated for release in 2006 into the existing release of the operating system.

- ☒ **Security Containment.** This technology gives applications and the data owned by those applications an additional level of insulation from other applications and users on the system. Within the Security Containment environment are individual application environments called "security compartments," which are protected from and insulated from one another. Integrated with HP-UX 11i's virtualization capabilities, HP's Security Containment fully secures and locks down workloads, partitions, and servers. Security compartments can be configured to communicate to other compartments. This interprocess communication is further protected by rules. Given the correct rule privilege, interprocess communication between compartments takes place; however, without the rule privilege, it cannot take place. One compartment may be outside, or open to a network connection, while another compartment is inside, or isolated from outside networking. This level of application isolation further secures a virtualized environment, providing peace of mind when multiple applications are deployed in a single operating system instance. A given system can support many security compartments.

- ☒ **Identity management.** Integral to the Security Containment technology is the inclusion of new identity management technology, which allows for authentication and authorization needed to access a security compartment and to centralize access privileges associated with systems and security compartments. The identity management software is a direct response to the additional levels of user and application identity required to make security containment possible. This new identity management technology also ensures that a single identity can be eradicated from a system in a single operation, eliminating the need to track down multiple identities belonging to a user, system, or other resource. This capability reduces management costs and lowers potential security risks.

- ☒ **Secure Resource Partitions.** This technology allows the allocation of system resources across resource compartments. HP has built the Security Containment features on top of the Resource Partitions to provide greater granularity of control with respect to the software-enforced isolation of data and applications. The Resource Partitions (PRM) technology enables the dynamic provisioning required to ensure response time, quality-of-service (QoS) levels, or other attributes of applications and infrastructure software that is running within a security compartment. Secure Resource Partitions therefore provide secure application stacking within a single operating system instance. The inclusion of Secure Resource Partitions completes the security story by giving systems administrators either manual or automated control over how resources are allocated to security compartments.

- ☒ **New security installation tools.** These installation tools enhance and simplify the securing of HP-UX 11i v2 servers by facilitating the creation of security compartments that isolate workloads — and prevent them from interfering with each other — promoting balanced and reliable overall system performance.

FUTURE OUTLOOK

Benefits of HP-UX 11i v2

HP-UX 11i v2 enhancements build on an already robust server operating environment foundation, providing new features that support a number of important business benefits that ensure continued operations, high availability, and high levels of controllability and manageability for enterprise applications and data. These features further ensure against IT outages that would result in interruptions to ongoing business processes. They also support the ability to expand operations and to adapt to changing business conditions, without the need to "rip and replace" existing IT infrastructure.

These features further ensure against IT outages that would result in interruptions to ongoing business processes.

Specific business benefits include the following:

- ☒ Customer control over the virtualized computing environment. HP-UX 11i's integrated virtualization features link resource management to virtualization capabilities. Therefore, workloads that are reallocated within a server, or between servers in a cluster, will be able to access all the data and files that they need to ensure efficient data processing.

- ☒ Greater levels of service availability and operational security stemming from the combination of Serviceguard technology with the VERITAS Storage Foundation Cluster File System and Storage Foundation suite and HP-UX 11i's new security features. These benefits apply both from an uptime perspective and from a quality-of-service perspective.

- ☒ An integrated, unified view of all managed data within a cluster. The addition of a global, clustered file system will enable a single virtual view of the Serviceguard Cluster — and it will provide this capability nearly a year sooner than HP had originally planned.

- ☒ Flexible computing for highly available data and applications. HP has enhanced and integrated Serviceguard within HP-UX 11i v2 to provide a unified management engine that allows workloads to "fail over" within partitions of a single Integrity server frame or between clustered HP-UX 11i v2 servers.
- ☒ Support for compliance with government regulations worldwide and greater security for virtualized environments. Security Containment, delivered via security compartments in HP-UX 11i v2, supports business initiatives aimed at improving the integrity and secure handling of data, even in cases where workloads are coresident within the same Integrity server. This can help customers comply with government regulations such as Sarbanes-Oxley in the United States and would be applicable to other sets of governmental regulations in Europe.
- ☒ Moving to next-generation functionality more quickly. HP has accelerated its delivery of HP-UX 11i capabilities by moving up delivery of features/functions that had originally been expected in 2006. HP believes customers will be able to deploy the new functionality in HP-UX 11i v2 without waiting to recertify applications one year from now with the next release of HP-UX 11i.

CHALLENGES/OPPORTUNITIES

Although HP's innovation and product enhancements have boosted the functionality and competitive positioning of HP-UX 11i in the Unix market, the company still faces stiff competition in the industry. HP's HP-UX 11i servers are one of the top 3 brands of Unix servers sold worldwide. The top competitors for HP's Unix servers are Sun servers running the Solaris operating system and IBM servers running the AIX 5L operating system. These three server vendors account for more than 70% of all Unix server revenue worldwide — and a large gap in revenue-based market share exists between the top 3 vendors and all other Unix server vendors.

HP's main challenges are as follows:

- ☒ **Competing with other Unix server vendors.** The Unix server market is one in which the top vendors compete heavily on the basis of price and performance, as well as customer relationship and account influence. Given the powerful competitors in this market, price compression often results from the competitive environment. Although this price compression often benefits IT customers from a cost perspective and gives them a choice of competing server platforms, over time this competition will take its toll on vendors as they look for ways to become more competitive.
- ☒ **Competing with other types of server operating environments** for some workloads. Unix, as an operating system, has more than three decades of deployments in the server marketplace, following its initial introduction in the telecommunications industry in the 1970s. However, two operating systems, Microsoft Windows and Linux, both show widespread adoption in customer sites, even though that adoption results in heterogeneous, mixed-vendor deployments in large enterprises. Unix's maturity has given it a stability and resilience that serve it well in high-transaction, mission-critical computing workloads and across server categories (volume, midrange enterprise, and high-end enterprise).

However, for many computing environments, Windows and Linux provide support for a wide range of functionality and applications — and IDC notes that these two operating environments are growing at double-digit rates year over year. IDC notes that HP has found a way for Linux, Windows, and Unix to coexist on Integrity systems. This approach supports customers' needs to consolidate workloads on scalable server frames, with a unified management framework that benefits all three operating environments.

HP has found a way for Linux, Windows, and Unix to coexist on Integrity systems.

- ☒ **Server consolidation**, which gathers up workloads to be run more efficiently on enterprise servers, could also reduce Unix server footprints in large datacenters — a factor that would affect all Unix server vendors. Unix is an extremely effective platform for scale-up computing — and it provides highly granular controllability for system resources. However, these very capabilities could result in consolidation onto large scalable servers of many workloads that today are running on smaller Unix servers. Even so, unit shipments of Unix servers are still increasing year over year, showing delivery of Unix in new server form factors for scale-out deployments as well as for scale-up SMP deployments.

Meeting the Challenges

- ☒ HP-UX 11i is a competitive and robust product for the Unix marketplace. HP-UX 11i v2 will have the features and functions that enable it to compete effectively with other Unix operating environments. Its support for highly granular levels of virtualization, along with its enhanced Security Containment features and its reliability, availability, and serviceability features, will allow it to take on demanding workloads that require the highest levels of uptime for applications and data being accessed by hundreds or thousands of end users. Its support for security compartments will ensure isolation of applications, thus minimizing the possibility that failure of any hardware or software components will threaten to take a partition or even the entire system offline.
- ☒ HP has a multiple operating system strategy that will allow customers to combine Unix on the same system that runs Microsoft Windows and Linux in separate, hardware-defined partitions. IDC believes that most large enterprises will continue to deploy and to support multiple operating environments, with each server operating platform supporting a range of workloads. User preference, IT skill sets, and performance considerations are factors that will determine which operating system will be deployed for a particular workload — and which mix of operating systems will work best for a given organization.
- ☒ Unix systems, including HP-UX 11i, provide business advantages in terms of reliability, availability, and security — all of which will favor Unix deployments for the most demanding, mission-critical applications and databases.
- ☒ Unix systems running HP-UX 11i v2 will be able to run workloads that formerly ran on mainframes, making them vital platforms for the enterprise datacenter that is replacing aging mainframe systems. This release of HP-UX 11i continues HP's tradition of supplying a "mainframe alternative" platform based on its Unix servers.

CONCLUSION

The acceleration of HP's delivery on the HP-UX product road map brings benefits to customers through the delivery of new functionality earlier than had been expected. This early delivery has enabled HP to maintain its position in the industry as one of the major providers of operating systems in the Unix world. The capability to support multiple instances of HP-UX 11i and other guest operating systems through vPAR and nPAR technologies is appreciated by customers who are moving down a path of consolidation.

In addition, HP's delivery of new features will increase the ability of HP-UX 11i to compete in the emerging dynamic IT environment identified and described by IDC in a May 2004 study (see *Hinge Technologies for the Dynamic Enterprise*, IDC #31371). IDC's dynamic IT environment analysis addresses vendor strategies, such as HP's Adaptive Enterprise, that allow IT infrastructure to respond to changing business needs. It is this kind of flexible IT environment that is needed to avoid "islands of automation" that prevent a flexible response to changing business requirements over time.

HP's product set is in step with this approach to dynamic IT. First, the Adaptive Enterprise addresses the overarching idea of linking business goals with IT infrastructure capabilities. The integration of HP-UX 11i virtualization techniques (partitioning, clustering, and utility pricing) with the advanced, automated, and goal-based workload management exemplifies this approach to IT technology. Importantly, HP Virtual Server Environment for HP-UX 11i, with its support for multiple operating systems running on Integrity systems and advanced system management capabilities, reduces the administrative burden of managing resources to support changing business objectives through the level of automation and integration that it provides. HP's ability to support multiple operating environments aboard its Integrity line of servers, including Unix, Windows, and Linux, expands the attractiveness of the Integrity platform, particularly for customers who are motivated to manage a mixed operating system computing environment more effectively. Although it is likely that many Unix servers will continue to be surrounded by volume servers running Linux and Windows, the ability to interoperate with those environments in grids and networked arrays of servers running several types of operating systems will become increasingly valuable to customers, for business reasons.

HP's product set is in step with this approach to dynamic IT.

Ultimately, time to market is driving the acceleration of HP's movement down its technology road map. That much is clear from HP's decision to speed the delivery of new features to its large installed base of HP-UX 11i customer sites — and also to prospective customers of its Unix server platform. Although competitive pressure is a factor in this change in plans, the resulting technology delivery translates into very real business benefits for IT organizations and modern enterprises.

Copyright Notice

External Publication of IDC Information and Data — Any IDC information that is to be used in advertising, press releases, or promotional materials requires prior written approval from the appropriate IDC Vice President or Country Manager. A draft of the proposed document should accompany any such request. IDC reserves the right to deny approval of external usage for any reason.

Copyright 2005 IDC. Reproduction without written permission is completely forbidden.