

QuickSpecs for HP-UX 11i v2 describes the features and functionality delivered by the HP-UX 11i v2 operating system and related software, plus considerations for a successful, optimized HP-UX 11i v2 deployment.

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Note:

QuickSpecs are also available for [HP Integrity servers](#), [HP 9000 systems](#), [HP-UX 11i layered software](#), [HP storage products](#) and more at www.hp.com/go/quickspecs.

Overview

Description

HP-UX 11i is HP's enterprise UNIX operating environment. HP-UX 11i v2 supports HP 9000 and HP Integrity servers, providing binary compatibility for applications moving from HP 9000 to HP Integrity servers. HP-UX 11i v2 delivers secured availability, simplified management and flexible capacity, ultimately ensuring the highest business value and lowest cost of ownership among enterprise UNIX offerings today. With over two decades of investment in functionality optimized for customers' most critical computing needs, HP delivers proven UNIX quality and performance in HP-UX 11i with established leadership in high availability and flexible workload management, formerly the domain of only mainframe class systems. Available on the range of servers from entry class to Superdome systems and with thousands of applications available, HP-UX 11i ensures enterprise IT success for businesses across all industries and of all sizes.

HP-UX 11i v2 supports processors of different 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.

OPERATING ENVIRONMENTS

HP-UX 11i simplifies software procurement, installation and management with integrated, pre-tested Operating Environments (OEs). The Foundation, Enterprise and Mission Critical OEs provide the most popular software products in packages that are simple to order, use and maintain.

Foundation OE

The HP-UX 11i Foundation OE is a fully-featured operating environment. In addition to the base HP-UX kernel, commands and management utilities, the HP-UX 11i Foundation OE provides numerous other Internet-focused capabilities, including the Apache Webserver, Java Runtime and Java Development Environment. The HP-UX 11i Foundation Operating Environment includes a number of features for industrial-strength system management, industry-leading scalability, multi-system interoperability, and the world's most advanced security. Some of the products included in the Foundation OE are:

Network Drivers	System Inventory Manager
HP Apache Web Server	HP-UX 11i Kernel Configuration
Ignite-UX	Software Distributor-UX
Real-time host intrusion detection	Netscape LDAP directory server
Java™ RTE, JDK, and JPI	EMS Framework
CIFS Client	Base File System for HP-UX 11i (JFS)
CIFS Server	Base Volume Manager for HP-UX 11i
Perl	Systems Insight Manager
Mozilla Web Browser	On-Line Diagnostics
HP-UX Web Server Suite	gWLM agent
Servicecontrol Manager	Systems Insight Manager

Enterprise OE

The HP-UX 11i Enterprise Operating Environment provides all the capabilities of the HP-UX 11i Foundation OE plus certain critical add-on products for additional single system availability and performance management. The HP-UX Enterprise Operating Environment is focused on midrange application servers that must be optimized for single-system (non-clustered) high availability and maximum performance.

The HP-UX 11i Enterprise OE adds OnlineJFS, MirrorDisk/UX, and Event Monitoring System (EMS) High Availability Monitors for additional single-system availability. The HP-UX 11i Enterprise OE also adds Process Resource Manager to manage application performance and response times and GlancePlus Pack to be monitor and optimize system performance.

Mission Critical OE

The HP-UX 11i Mission Operating Environment provides all the capabilities of the HP-UX 11i Foundation and Enterprise Operating Environments plus certain critical add-on products for additional multiple system availability and performance management. The HP-UX 11i Mission Critical Operating Environment is focused on the highest-end, corporate-critical database servers that must measure system downtime in no more than a few minutes per year.

The HP-UX 11i Mission Critical Operating Environment adds the Serviceguard high-availability clustering software. The HP-UX 11i Mission Critical OE also includes Workload Manager, a completely unique tool for HP-UX that provides goal-based system resource management to maximize application response times.

MANAGEABILITY/VIRTUALIZATION

HP-UX 11i provides a rich set of tools to support management in the Adaptive Enterprise. Designed based on direct customer input, the latest generation of HP-UX 11i system management tools reflects the real needs of today's IT administrators, who must manage a dynamic, highly virtualized environment with smaller staffs and reduced budgets.

With HP-UX 11i system management tools, administrators gain the performance, accessibility, and efficiency they need to succeed. HP-UX software deployment and configuration management capabilities automate routine administration and simplify many complex tasks, while providing deep-level system control where needed. The choice of an enhanced CLI, menu-driven TUI, and web-based GUI ensure that both experienced and junior administrators alike can be productive quickly when working with HP-UX 11i. In addition, these single-system tools also work seamlessly with higher level multi-system and enterprise management environments, including HP Systems Insight Manager and HP OpenView. As a result, administrators gain more visual abstracted views of their heterogeneous IT assets, while also having the ability to automatically launch HP-UX 11i management tools from within Systems Insight Manager or OpenView when system-level precision tuning is required.

Installation

HP-UX can be installed from either a DVD or an Ignite-UX Install Server. Administrators have a choice of full, update, and cloned installations. Installation Services are available for those customers who would like an experienced HP Software Specialist to install the software.

Software deployment

Ignite-UX addresses the needs of HP-UX 11i system administrators who perform fast deployment for one or many servers. It provides the means for creating and reusing standard system configurations, enables replication of

systems, permits post-installation customization, and is capable of operating in both interactive and unattended modes.

Software Distributor-UX (SD-UX) is the HP-UX 11i administration toolset used to deliver and maintain the HP-UX 11i operating system and layered software applications. Delivered as part of HP-UX 11i, SD-UX can help manage the HP-UX 11i operating system, patches, and application software on HP Integrity servers.

Update-UX is a tool for customizing the behavior and automating the process for HP-UX 11i operating environment updates.

Software Package Builder is an intuitive, graphical user interface (GUI)-based tool for packaging software into SD-UX packages so that they can be installed and managed in the same way as HP's system software

Central Point of Configuration – SIM

HP Systems Insight Manager (SIM) is the central point of administration for management applications that address the management requirements of HP-UX 11i customers. HP SIM delivers powerful monitoring and control, notifying the administrator of potential hardware or software problems before they occur. It also provides inventory-reporting capabilities that dramatically reduce the time and effort required to track server assets. HP SIM provides secure communications as well as role-based security to make certain that its powerful capabilities are kept secure from unauthorized users. And HP SIM is an effective tool for managing HP storage, power, client, and printer products.

The central administration, software deployment, and configuration management tools are offered at no additional charge with the HP-UX 11i Foundation Operating Environment (OE). HP Integrity Essentials for HP-UX 11i are advanced plug-ins to HP SIM that provides modular, integrated system management software for complete HP Integrity server management.

Security Patch Check

Security Patch Check is a tool that analyzes the currency of a system with respect to security bulletins. It recommends actions for security vulnerabilities that have not been fixed by previously performed patches, updates, removals, or, where logged by the user, manual actions. The actions may include updates, software removals, or manual actions. Use of the Security Patch Check software tool can help efficiently improve system security, but does not guarantee system security.

Web-Based Enterprise Management (WBEM)

WBEM (Web-Based Enterprise Management) is a DMTF (Distributed Management Task Force) standard based on the CIM (Common Information Management) model.

WBEM allows customers to manage their systems consistently across multiple platforms and operating systems, providing integrated solutions that optimize their infrastructure for greater operational efficiency.

WBEM enables management applications to retrieve system information and request system operations wherever and whenever required.

Event Monitoring Services (EMS)

HP's Event Monitoring Service (EMS) is a system monitoring application designed to facilitate real-time monitoring and error detection for HP products in the enterprise environment. This framework provides centralized

management of hardware devices and system resources and provides immediate notification of hardware failures and system status.

HP EMS reports information that helps to detect loss of redundant resources, thus exposing single points of failure and eliminating the threat to data and application availability. HP EMS capabilities cover the entire system: system components, storage, and network interfaces.

System Administration Manager (SAM)

System Administration Manager (SAM) is an HP-UX tool that helps a system administrator to manage user and group accounts, auditing and security policies, disks and file systems, peripheral devices, printers and plotters; configure kernel, etc.

Partition Manager

Partition Manager (parmgr) allows system administrators to configure Superdome and other systems that support hardware partitions through an easy to use, familiar graphical user interface. Partition Manager is available as a free web download.

HP-UX Virtual Partitions

vPars Overview

The vPars (Virtual Partitions) product allows you to run multiple instances of HP-UX simultaneously on one server or nPartition by dividing a server or nPartition into virtual partitions. Each virtual partition is assigned its own subset of hardware, runs a separate instance of HP-UX, and hosts its own set of applications. vPars provides application and OS (operating system) fault isolation.

What's new in the latest Version of vPars (A.04.02)

This version includes:

- Support for the sx2000 chipset on Integrity servers and the CPUs supported on that chipset

Note that upgrading may change the hardware path. For more information, see the hardware path changes documented in Chapter 4 of Installing and Managing HP-UX Virtual Partitions.

- Flexible administrative capability. You can now specify vPars administration capabilities for zero, one, or more designated virtual partitions. Only super users within designated virtual partitions can perform the vPars administration commands that affect other virtual partitions.

Product Numbers

vPars A.04.01 and later have different product numbers than vPars A.03.xx and earlier:

T1335BC vPars A.04.xx for HP-UX 11i v2

T1335AC vPars A.03.xx for HP-UX 11i v1

Software Depot

You can order this release of vPars from the HP Software Depot at:

<http://www.hp.com/go/softwaredepot>

HP Integrity Virtual Machines

HP Integrity Virtual Machines (VMs) is a robust soft partitioning and virtualization technology that provides operating systems isolation, shared CPU (with sub-CPU granularity), and shared I/O, and automatic, dynamic resource allocation that is built in.

A single HP Integrity server, or nPartition, running HP Integrity Virtual Machines can create multiple virtual servers or machines, with their own separate “guest” operating system instances with different: operating system versions, applications and users. The physical resources of the HP Integrity server are shared amongst any of the virtual machines it hosts, based on demand and entitlement. Each virtual machine hosts its own applications in a fully isolated environment. HP offers [Virtualization Licensing](#) for the HP-UX 11i software running in the guests. For software licensing purposes, HP Integrity Virtual Machines are capped at the number of CPUs assigned to the guest.

Integrity Virtual Machines 1.0 will support HP-UX 11i v2 guests. Support of Windows, Linux and HP OpenVMS guests are planned for the future. Download the new Integrity VM Manager GUI for free, now at our [Integrity Essentials download page](#).

HP-UX Webmin-based Admin

Using Webmin's graphical user interface administrators can create separate user accounts for restricted access to configuring HP-UX Apache-based Web Server. Enhanced with the HP look-and-feel, easy access to documentation, and support for more Apache modules. Browser-based, it can be accessed from anywhere in the world via a network connection. Configuration with Webmin does not preclude configuration via other tools, or via the command line. An excellent tool for both novice and experienced system administrators. Integration with [OpenView](#) through a smart plug in module (SPI) allows event monitoring, process monitoring, and application tools.

HP Serviceguard Manager

Serviceguard Manager provides a configuration, monitoring, and administration tool to display and manage Serviceguard, Serviceguard Extension for RAC, Serviceguard Extension for SAP, Metrocluster and Continentalclusters, maintaining high availability.

Using Serviceguard Manager, administrators and operators see color-coded, graphically intuitive icons to get the big-picture view of multiple clusters so that they can proactively manage the clusters, nodes, and applications.

Process Resource Management

HP Process Resource Manager (HP PRM) is a resource management tool used to control the amount of resources that processes use during peak system load.

HP PRM can manage allocation of the following resources:

CPU: Ensures a minimum allocation, but (optionally) no more than its capped amount of CPU.

Memory: Ensures a minimum allocation, and (optionally) a soft upper bound can be defined of real memory.

Disk bandwidth: Ensures a minimum allocation of disk bandwidth.

HP-UX Workload Manager/ HP Global Workload Manager

HP-UX Workload Manager (HP-UX WLM) is a resource management tool that provides automatic CPU resource allocation and application performance management based on prioritized service-level objectives (SLOs). In addition, real memory and disk bandwidth allocations can be set to fixed levels in the configuration.

HP Global Workload Manager (gWLM) is an intelligent policy engine for HP VSE that automatically allocates resources among multiple workloads to increase server utilization while meeting service levels for high-priority applications. Designed to work across multiple HP-UX 11i and Linux systems, gWLM is ideal for large, centralized IT environments that host applications for many departments.

Secure Resource Partitions

Secure Resource Partitions (SRPs) control the resources that processes use during peak system load. SRPs allow administrators to run multiple mission-critical applications on a single system, improve response time for critical users and applications, allocate resources on shared servers based on departmental budget contributions, provide applications with total resource isolation, and dynamically change configuration at any time—even under load. For example, Process Resource Manager (PRM) can manage the allocation of CPU, memory, and disk bandwidth.

When the security containment functionality that ships with the HP-UX 11i Foundation OE is in use, the processes running in each SRP cannot communicate with processes in the other partitions. This enables multiple application instances to run securely in a consolidated environment, providing the benefits of consolidation while preserving the security of a scale-out environment. PRM is included with HP-UX 11i Enterprise Operating Environment.

HP Total Print Management

With three elemental components, HP Total Print Management (TPM) makes it easier to control the printing and imaging environment, maximize productivity, optimize performance, and lower costs.

HP TPM print infrastructure and network products simplify the environment and minimize downtime through an intelligent mix of Print Server Appliances, Jetdirect connectivity, and intelligent print devices. That means fewer bottlenecks and more efficient servers, printers, and employees.

Improve the print environment's efficiency and control with HP printing and imaging network management. HP Total Print Management (TPM) offers a set of [scalable management tools and services](#) that ensure proactive management, effective device deployment and efficient asset utilization.

HP TPM is about delivering a complete solution to meet a customer's individual needs. HP's TPM portfolio allows customers to assess, design, deploy, and manage their printing and imaging environment to maximize efficiency and productivity while driving down costs. To get a custom, in-depth assessment for increased efficiency and effectiveness, please contact HP.

GlancePlus Pak

HP OpenView GlancePlus Pak provides a single product for managing a system's availability and performance. It is an integrated product that includes:

- HP OpenView GlancePlus - GlancePlus provides immediate performance information about a system. It lets a customer easily examine system activities, identify and resolve performance bottlenecks, and tune the system for more efficient operation.

- HP OpenView Performance Agent - The HP OpenView Performance Agent is the logging, alarming, and collection component of HP OpenView GlancePlus Pak. It keeps a history of the system's performance and sends alarms of impending performance problems.

As an integrated product, the GlancePlus Pak includes the real-time diagnostic capabilities of GlancePlus and the historical data collection capabilities of the Performance Agent. The performance agent is used with other availability and performance management products, thus providing an integrated real-time and historical performance management solution.

With GlancePlus Pak, a wide range of system performance and availability problems can be handled to get the best from the system and the applications running on it.

HP OpenView Storage Data Protector

The HP OpenView Storage Data Protector software is enterprise data protection and disaster recovery, ensuring recovery from any disruption. Data Protector integrates a variety of techniques to eliminate backup and recovery windows. The capabilities to eliminate planned downtime range from online backup and backup of open files to zero-downtime, zero-impact backup. The software provides industry-leading instant recovery as well as several disaster recovery alternatives to eliminate unplanned downtime, allowing recovery of entire data centers in minutes.

Instant Capacity On Demand for HP 9000 and HP Integrity Servers

Standard iCAP

With the iCAP program, a server fully loaded with CPUs, can be deployed, yet pay for only the processors planned for use on day one, with the exception of a nominal up fee or "deposit". When needs change and more processing power is required, then the needed processors can be instantly activated with a simple UNIX® command. Systems can be more highly available with automatic activation of iCAP processors when processor failure is detected.

Temporary iCAP (TiCAP)

The Temporary iCAP Capacity activates capacity in a temporary "calling card fashion" in 30-processor-day increments. A processor day equals 24 hours for one processor. With this option, processors may be activated and deactivated. One TiCAP license is applied to a system so any number of iCAP processors on the system can be turned on and off. With iCAP on the system, any number of iCAP processors can be activated as long as the license has a positive balance. The 30-processor day license can be used for three years. Information about your iCAP balance can be accessed through a secure web portal.

Cell board iCAP

Cell board iCAP extends iCAP beyond processors to the cell level. Under cell board iCAP, a customer pays only for the cells that will be used on day one. Additional cells, their memory, and the iCAP processors contained on them, remain dormant until needed. These cells can be assigned to any partition and can be moved from partition to partition in a dormant state. When the cell is needed, the cell and all of its memory are activated along with any number of iCAP processors that are also needed.

Global iCAP (GiCAP)

GiCAP allows users to swiftly transfer iCAP usage rights from one system to another, whether that system is across the street or across the continent.

Platform availability

HP-UX 11i iCAP is available on:

- Superdome
- Rp8420/rp7420

- Rx8620/rx7620
- Rx8640/rx7640

Pricing

There is no premium pricing for iCAP. It is the same as a regular active processor or memory for the ultimate in flexibility.

Easy to implement, activate, and afford, iCAP supports both current and future customers, can be installed on existing servers, and will be available on all future Integrity platforms. It can be ordered pre-installed on new servers and thus can be delivered “ready to go.” There is only a nominal right-to-access fee to cover the cost of administering inactive iCAP processors and cell boards, regardless of whether they are pre-installed or installed as upgrades.

The iCAP program is extremely flexible. A customer does not need to order a full complement of processors and cells, and can order any combination of traditional and iCAP components up to the full capacity of the system. This flexibility is vital for those who may be limited by environmental considerations such as power and cooling.

Upgrading existing HP servers to iCAP models

The iCAP solutions are available for all current or new HP customers who intend to install servers based on PA-8500, PA-8600, PA-8700 and PA-8700+ CPUs, as well as future PA-RISC and Itanium® processors.

DATA MANAGEMENT

Mirrordisk/UX

Mirrordisk/UX software (product number B2491BA) prevents data loss due to disk failures by maintaining up to three copies of data on separate disks. Applications can continue to access data even after a single disk failure. In addition, on-line backups can be performed to avoid user and application disruption.

To prevent the failure of a single I/O interface from causing a system failure, HP recommends that mirrored disks be connected to separate interface cards.

Features and Benefits

- No single point of failure - separate controllers/power supplies
- Up to 3-way disk mirroring
- On-line backup while maintaining mirroring
- Application transparency
- Dynamic mirror configuration
- Selective mirror of data
- Fast data synchronization
- Menu-driven administration tools

Volume Manager (VxVM), Base VxVM

The Volume Manager for HP-UX is an alternative to the HP Logical Volume Manager and HP Mirrordisk/UX products.

Base VxVM 4.1 (included in HP-UX 11i Foundation OE at no additional cost) provides many volume manager features and benefits such as:

- Root disk mirroring
- Rootability support for improved manageability of the root disk
- Dynamic LUN expansion for improved manageability and minimize downtime
- Split brain avoidance for high availability
- Java-based administrative GUI
- Heterogeneous platform support

In addition to the above features offered in Base VxVM 4.1, the full VxVM 4.1 product (product number B9116BA) can be purchased separately to obtain many more features and benefits including:

- Full mirroring capability (RAID1) up to 32 copies
- Striping (RAID 0) to distribute data across storage devices for improved performance
- Striped mirrors (RAID 0+1) and Mirrored stripes (RAID 1+0) for improved performance and availability
- Active load balancing or Dynamic Multi Pathing
- Online relayout provides uninterrupted data access during maintenance
- Online volume reconfiguration balances performance and minimize downtime
- Hot relocation restores data after disk failure

JFS and Online JFS

HP sells Symantec VERITAS file system VxFS under the name of HP OnlineJFS. HP invests in integration, testing and quality assurance of OnlineJFS with the HP-UX 11i operating environment.

Designed to extend the functionality of Base VxFS, HP OnlineJFS is a set of features that adds higher levels of data management capability and substantially increases the availability by enabling online data management without interrupting user and application access to the data.

Base VxFS is the base file system included the base HP-UX 11i operating system. OnlineJFS is available as a stand-alone add-on HP-UX 11i software product, included in the Enterprise and Mission Critical Operating Environments, and as a product in the Serviceguard Storage Management Suites for HP-UX 11i.

HP OnlineJFS provides the online management of the journaled file system.

VxFS3.5 supports file system size up to 32TB and file sizes to 2TB. VxFS 4.1 supports up to 256TB file system. Larger file sizes will be supported with 11i v3.

Licenses for both versions of OnlineJFS (3.5 and 4.1) are included in the purchase of the Enterprise and Mission Critical OE. At installation time, the user has the option to install either version.

Some of the features in VxFS 4.1 include:

Multi-volume file system (MVS)

MVS allows a file system to exist in multiple volumes. It provides flexibility to the customer to customize the mapping between their data requirements and the most appropriate choice of performance, availability, and cost available from their storage configurations.

Dynamic Storage Tiers, Quality of Storage Service (QoSS)

With MVS you can control where storage is allocated for a given file, directory, or checkpoint. However, the value of that data can change over time. With Dynamic Storage Tiers and QoSS built on top of MVS, you can further configure relocation policies to ensure these files are stored on the storage most appropriate to matching their characteristics at a given time, thus reducing storage costs.

Cross-platform Data Sharing (CDS)

CDS provides a means for the serial sharing of a VxFS file system across heterogeneous platforms that have direct access to the physical devices that contain the data. This may be useful for migrating from one platform to another (e.g., Solaris or AIX to HP-UX) or for the serial processing of data across multiple platforms (e.g., HP-UX and Linux).

Disk Layout

VxFS4.1 supports disk layouts 4, 5, and 6 (new and default). Disk layout 3 is no longer supported. Many of the new VxFS4.1 features and future scalability beyond a 32TB file system size require disk layout 6. With disk layout 6, any application that uses the statvfsdev(3C) family of interfaces (statvfsdev, fstatvfsdev, statvfsdev64, fstatvfsdev64, statfsdev, fstatfsdev) must relink with these routines.

Cluster File System

Through use of the cluster file system, you can concurrently share file systems and files between nodes in the cluster. CFS is only available as part of Serviceguard Storage Management Suite with CFS.

The HP CIFS Product Suite

Hewlett Packard's HP CIFS Suite consists of HP CIFS Server and HP CIFS Client.

HP CIFS for HP-UX 11.x unites UNIX with Microsoft Windows environments by providing remote file sharing, printer access and authentication services between HP-UX and Windows systems. HP CIFS includes both client and server functionality for HP-UX. The HP CIFS Client allows HP-UX systems to mount file systems on Windows NT, Windows 2000, HP CIFS and ASU/9000 servers and access them locally, in a manner similar to NFS, but with greater security. The HP CIFS Server allows Windows and HP CIFS clients to access the HP-UX file system; Windows clients can also access the HP CIFS Server's printers.

The HP CIFS products include CIFS UNIX Extensions, which allow connections between HP CIFS Clients and Servers to utilize UNIX file system attributes within the CIFS protocol. The HP CIFS Client also includes a Pluggable Authentication Module (PAM) which allows HP-UX logins to be authenticated by Windows NT domain controllers.

The HP CIFS products use Microsoft's Common Internet File System protocol (CIFS), the standard networking protocol in Microsoft Windows operating systems.

HP CIFS Server features and benefits:

- Based on the open source server software Samba (version 2.2.9)
- Support for CIFS Unix Extensions
- Support for administration of HP-UX POSIX Access Control Lists (ACL) from Windows clients
- Integrated with core HP-UX directory and file access control subsystems; thus, compatible with standard HP-UX file backup tools such as OmniBack and Legato. (All data and security information resides in the HP-UX file system.)
- Web-based configuration and management using the Samba Web Administration Tool (SWAT)
- High Availability (HA) CIFS server solutions available when used with HP-UX Serviceguard. Templates and documentation are included to assist in the configuration of Serviceguard packages.
- Industry-leading HP service and support

Availability:

HP CIFS product suite is provided free with HP-UX 11i v2 Application Releases. It is automatically ignited with HP-UX 11i v2, and is a standard component of HP-UX 11i v2 Operating Environments. Both CIFS Server and CIFS Client products are included.

Network File System

The Network File System (NFS) allows a client node to perform transparent file access over the network. By using NFS, a client node operates on files residing on a variety of servers and server architectures, and across a variety of operating systems. File access calls on the client (such as read requests) are converted to NFS protocol requests and sent to the server system over the network. The server receives the request, performs the actual file system operation, and sends a response back to the client.

NFS operates in a stateless manner using remote procedure calls (RPC) built on top of an external data representation (XDR) protocol. The RPC protocol enables version and authentication parameters to be exchanged for security over the network. Customers can feel safe when sharing files over UNIX networks, whether across the room or across the building.

INTERNET AND NETWORKING

IPv6

HP's newest release of Internet Protocol version 6 is HP-UX 11i IPv6. This fully supported version is downloadable at no extra charge. HP-UX 11i IPv6 supports dual stacks to facilitate IPv6 deployment. This allows existing applications to coexist on both IPv4 and IPv6 networks. Application modification is required only when the application needs to take advantage of the new IPv6 features. HP-UX 11i IPv6 supports Ethernet links on HP-UX 11i.

Plug-and-Play address auto-configuration is implemented by automatically configuring a "link local" IP address to allow immediate communication with directly connected hosts, printers, or other devices.

IPv6 has built-in IP security extensions for authentication, data integrity, and data confidentiality — ensured by a standard header extension, for end-to-end encryption at the network layer.

IPv6 also incorporates built in controls that allow network traffic to be prioritized and reserved.

Autoconfiguration, routing headers, destination options, anycast address, encapsulation, security, and flow label management all contribute to IPv6's natural mobility support.

Features included in HP-UX 11i IPv6 --
IPv6 Protocol Stack:

- RFC 1981 - IPv6 PMTU Discovery
- RFC 2373 - IPv6 Addressing Support
- RFC 2374 - IPv6 Aggregatable Global Unicast Address Format
- RFC 2375 - IPv6 Multicast Address
- RFC 2452 - IPv6 MIB for TCP
- RFC 2460 - IPv6 Specification
- RFC 2461 - IPv6 Neighbor discovery
- RFC 2462 - Stateless Autoconfiguration
- RFC 2463 - ICMPv6 Specification
- RFC 2464 - Transmission of IPv6 packets over Ethernet Networks
- RFC 2465 - MIB for IPv6: Textual Conventions
- RFC 2466 - MIB for IPv6 ICMPv6 Group
- RFC 2473 - Generic Packet Tunneling in IPv6
- RFC 2893 - Transitions Mechanisms for IPv6 Hosts (Automatic and Configured Tunnels)

- RFC 3056 - Connection of IPv6 Domains via IPv4 Clouds
- IPv4/IPv6 Dual Stack
- Socket APIs
- RFC 2553bis - Basic IPv6 Socket APIs
- RFC 2292bis - Advanced Socket APIs
- Network configuration & testing utilities
- ifconfig, netstat, nslookup, ping, route, nettl, ndd, ndp

New IPv6 features available with Transport Optional Upgrade Release (TOUR)

Multicast Listener Discovery (MLD): MLD (specified in [RFC 2710](#)) is a sub-protocol of ICMPv6. MLD is automatically enabled when an IPv6 interface is initialized. This RFC specifies a protocol that an IPv6 router uses to detect multicast listeners (nodes interested in receiving multicast packets) on its directly attached links. The Management Information Base (MIB) for MLD (defined in [RFC 3019](#)) is also supported.

IP Security (IPsec)

HP-UX IPsec (J4256AA) provides an infrastructure to allow secure communications (authentication, integrity, confidentiality) over IP-based networks between systems and devices that implement the IPsec family of protocol standards.

Some of the benefits of HP-UX IPsec are:

- Adheres to all relevant IPsec standards, including IKE (Internet Key Exchange) for automated key generation
- Easily adopted and transparent to existing applications; Protects the customer's investment
- Available on all hardware platforms supporting HP-UX 11.0 and beyond (except HP-UX 11.20 and HP-UX 11i version 1.6); Also supported on VVOS 11.04 (Virtual Vault)
- Demonstrated multi-vendor interoperability
- Host-based authentication:
 - Preshared keys
 - Digital certificates (Baltimore and VeriSign PKIs)
 - Auto-enrollment of VeriSign certificates
- Command-line interface (CLI) for policy configuration:
 - Profile file to provide default parameter values that can be modified by the user
 - Flexible rule-based security attribute and access control policy configurations -- allows combinations of IP addresses, prefix lengths, ports, and protocols in specifying security attributes configuration and packet filtering
- Batch mode for bulk configuration
- GUI for security certificate configuration.
- Diagnostic and monitoring tools; Logging and audit trail for accountability and intrusion alerts
- Focused on end-system IPsec. HP-UX IPsec can communicate with other end-systems (transport mode) or VPN gateways (tunnel mode).
- Industry-leading performance (crypto performance is optimized for PA-RISC and IA-64 architectures)

TOUR Components

The following components are included in TOUR 2.2 and 2.0:

- HP-UX Transport Enhancements
- HP-UX Point-to-Point Protocol (PPP) enhancements (PPPoE and PPPv6)
- HP-UX Mobile IPv6 A.01.00

Features and Benefits

In addition to the functional enhancements listed below, the key benefit of TOUR is that new transport and networking functionality can be obtained without waiting for the next major HP-UX release.

New Feature in TOUR 2.2: The IPv6 product (IPv6AA) can be deselected during the interactive swinstall procedure.

TOUR 3.0 provides:

- Considerable improvement in scalability and performance for multiport APA and high-bandwidth interfaces
- Enables near-link speed for high bandwidth links and provides you with the scalability and performance needed to support emerging multimedia and VoIP applications
- Transport and STREAMS functionality are available without requiring to wait for the next major HP-UX release

Features Available since TOUR 2.0 /TOUR 3.1

- IPv6 Transition Mechanism (Tunneling) Enhancements
 - Host and router support for configured tunnels and "6to4"
 - Support for Tunnel Types: IP-in-IP6, IP6-in-IP6
- IP over InfiniBand (IPoIB) Link Support (HP-UX 11i v2 only).
- TCP Segmentation Offload (TSO) transport support for TSO-enhanced cards and drivers. For more information on TSO-enhanced cards and drivers, refer to "GigEtherEnh-01: Enhancement Software for GigEther-01" by searching the keyword "GigEtherEnh" at <http://www.software.hp.com>.
- IPv6 Link Support: Ethernet, FDDI and PPP links.
- Serviceguard Enablement for IPv6 support.
- IPv6 Transition Mechanisms - Dual Stack, IP6-in-IP tunneling.
- IPv6 Stateless Address Autoconfiguration.
- IPv6 Neighbor Discovery.
- TCP/UDP over IPv6, PMTUv6, ICMPv6, IPv6 MIBs and Socket APIs.
- Network Configuration and Troubleshooting Utilities for IPv4 and IPv6: ifconfig, netstat, ping, route, ndd, ndp (neighbor-discovery utility for IPv6 only), traceroute, netll and netfmt.
- Router Advertisement: Router functionality, implemented with a new daemon, rtradvd, and an accompanying configuration file, /etc/rtradvd.conf.
- Host (listener) Multicast Listener Discovery (MLD) support. The Management Information Base for MLD is also supported.
- Limited Transmit: a TCP loss recovery enhancement.

For a list of IPv6 -related RFCs supported in TOUR, refer to the [Transport Optional Upgrade Release \(TOUR\) 2.0 Release Notes](#).

Transport Optional Upgrade Release (TOUR) 3.1 delivers Transport and STREAMS functionality on the web and independently from major HP-UX releases. TOUR 3.1 is a Transport Web upgrade supported on the HP-UX 11i v1 and HP-UX 11i v2 September 2004 operating systems.

CRITICAL: Defect fixes for ARPA Transport and STREAMS are included in TOUR releases. Once TOUR is installed, it is CRITICAL that NO ARPA Transport or STREAMS patches are installed on the system. Otherwise, defect solutions and subsystem dependencies could be lost. Defect fixes and new functionality for ARPA Transport and STREAMS MUST ONLY BE APPLIED via future TOUR releases.

Benefits

- Considerable improvement in scalability and performance for multiport APA and high-bandwidth interfaces
- Enables near-link speed for high bandwidth links and provides you with the scalability and performance needed to support emerging multimedia and VoIP applications
- Transport and STREAMS functionality are available without requiring waiting for the next major HP-UX 11i release.

HP-UX 11i Point-to-Point Protocol (PPP) enhancements (PPPoE and PPPv6):

PPPoE: The key features of PPPoE are as follows:

- Supported over a cost-effective LAN technology, such as Ethernet.
- Conforms to RFC 2516, "A Method for Transmitting PPP Over Ethernet (PPPoE)."

PPPv6: The key features of PPPv6 are that PPPv6 conforms to RFC 2472, "IP Version 6 over PPP", which defines how to transmit IPv6 packets over PPP links. It also describes how to form IPv6 link-local addresses for PPP links and to negotiate the type of compression protocol to be used for compressing or decompressing IPv6 headers transmitted over serial lines.

HP-UX Mobile IPv6 A.01.00

IPv6 addresses are topologically correct, meaning IPv6 nodes attached to the same physical network or LAN segment must have the same IPv6 network address prefix. Mobile IPv6 allows Mobile Nodes, such as laptops and PDAs, to change network attachment points, remaining reachable at all times and with no disruption in network connectivity using a single, fixed IPv6 address for extended periods of time. Without Mobile IPv6, Mobile Nodes cannot use a single, fixed IPv6 address while they roam. Instead, each time a Mobile Node moves and changes network attachment points, it must manually re-configure a new IP address and default router based on its current location—temporarily losing its network connections and ability to communicate in the process. The first release of the HP-UX Mobile IPv6 software was delivered in TOUR 2.0.

Dynamic Host Configuration Protocol (DHCP)

HP-UX 11i DHCP Server contains all the benefits inherent in DHCP, plus a number of advantages that are unique to HP's version. DHCP is available for IPv4 and IPv6 networks. The most recent versions of DHCP, DHCPv6, are available on www.software.hp.com. This version is for IPv6 networks and can coexist with DHCPv4 on the same host.

HP-UX Quality of Service

With the rapid growth in networking traffic and the utilization of server resources near their capacity, Enterprise IT departments and ISPs are confronted with a dilemma in providing applications and users the guaranteed bandwidth to meet the service levels that they have signed up for. To address this business need, HP-UX IPQoS provides IETF DiffServ-compliant network quality of service controls for IP-based network communications.

Multimedia Protocols

HP-UX provides a multimedia infrastructure to be used for multimedia applications. The following lists the protocols that Multimedia Streaming Protocols (MSP) includes.

RTP

Real Time Transfer Protocol (RTP) is a transport protocol that provides end-to-end network transport functions for applications transmitting data with real-time properties, such as interactive audio and video. RTP consists of Real-Time Control Protocol (RTCP), a closely linked protocol, which provides a mechanism for reporting feedback on the transmitted real-time data.

RTSP

Real Time Streaming Protocol (RTSP) controls the transfer of real-time media data and serves as a network-remote-control for multimedia sessions.

SDP

Session Description Protocol (SDP) describes the general real-time multimedia sessions

IP Multicast

HP-UX supports the Level 2 end-system IP Multicast functionality, specified in RFC 1112, on Ethernet and FDDI. The implementation provides integrated multicast address management for multi-protocol environments.

Name Services

The Domain Name System (DNS) provides the naming structure for the Internet, translating host names such as www.hp.com into numerical IP addresses. The Berkley Internet Name Domain (BIND) is the most common implementation of DNS for UNIX based systems and HP ships BIND with all of its HP-UX 11i versions.

Versions:

BIND 9.2 for HP-UX 11i

BIND version 4.9.6 is shipped default on HP-UX 10.20 and HP-UX 11.0.

BIND 8.1.2 is also available for HP-UX 11.0.

Network Time Protocol (NTP)

HP-UX provides the Network Time Protocol to synchronize and distribute the time for all machines in a network environment.

Sockets

BSD Sockets is a set of programming development tools for inter-process communication. HP's implementation of BSD Sockets is a full set of sockets from the networking services originally developed by the University of California at Berkeley (UCB).

STREAMS

STREAMS/UX for the HP 9000 is Hewlett Packard's implementation of the AT&T de facto standard environment for communications protocols.

STREAMS/UX consists of the STREAMS environment, Transport Layer Interface (TLI), and XTI. TLI is an industry de facto standard application program interface for implementing transport-level communications by means of STREAMS-based network protocol stacks. HP also provides a Data Link Provider Interface (DLPI) adapter with the core operating system. DLPI is one industry standard definition for message communications to STREAMS-based network interface drivers.

HP-UX Web Server Suite

HP-UX 11i provides the industry leading, Apache Web Server as a total solution for web server deployment. The version of Apache featured on HP-UX 11i is based on the Open Source Apache Web Server 2.0 software developed by the Apache Software Foundation (Apache HTTP Server Project described at <http://httpd.apache.org>).

Apache 2.0 is a significant enhancement over the Apache 1.3.x line from the Apache Server Foundation with many architectural improvements that increase Apache's power and flexibility while retaining its legendary stability as the world's most popular web server. In addition to the base HTTP server, HP has combined numerous popular modules from other Open Source projects as well as provided HP value-added features just for the HP-UX platform.

Internet Express

HP-UX 11i Internet Express is a collection of the most popular and up-to-date set of Internet and security services and tools, combined with a graphical administration utility for ease of management and easy installation of services and configuration. Included with every HP-UX 11i OE Media Kit, the Open Source software is fully tested and qualified for HP-UX 11i supported HP 9000 and HP Integrity systems.

The HP-UX 11i Internet Express software package consists of the most recognized security products, mail servers, news and chat servers, and a variety of tools for providing dynamic Web content. In addition, the industry-leading HP-UX 11i Web Server Suite is also provided.

All the Open Source Internet components and administration software included with the product are configured and available for use when the installation is complete. HP-UX 11i Internet Express can be installed using a command-line script or using a graphical user interface. The HP-UX 11i Internet Express Open source components are configured through the HP-UX 11i Webmin-based administration utility. These components are grouped as HP-UX 11i OE components and non-OE components. The OE components are part of every HP-UX 11i OE media and are fully supported under HP-UX 11i support contracts. The non-OE components, on the HP-UX 11i Internet Express media, are part of every OE media kit and are open source community supported products.

HP-UX 11i Internet Express is available on both HP 9000 and HP Integrity platforms.

HP-UX supports Fast Ethernet (IEEE 802.3 100Base-TX) in full and half duplex.

Gigabit Ethernet

HP-UX supports Gigabit Ethernet IEEE 802.3z Gigabit Ethernet Standard, IEEE 802.3x Pause Frame Flow control (X-on/X-off), both symmetric and asymmetric, and is Jumbo frame capable.

HP Auto-Port Aggregation (HP APA)

HP APA, HP's link aggregation or trunking product, provides the ability to logically group two or more physical network ports into single "Fat Pipes", often called "trunks". Network traffic is load balanced across all of the links in the aggregation, which allows a customer to build large bandwidth logical links into the server that are highly available and completely transparent to the client and server applications. HP APA is available for HP-UX 11i v2.

The LAN Monitor mode of HP APA provides a failover group capability with Serviceguard-like configuration tools. LAN Monitor does not support Serviceguard. In the event of link failure, LAN Monitor will automatically migrate the data flow from the primary link to one of the standby links in the failover group.

HP has tested switches from the following vendors to work with HP APA:

- 3Com
- Cisco
- HP
- Foundry
- Alteon
- Nortel
- Extreme

HP Frame Relay for HP 9000 Servers

HP Frame Relay software provides TCP/IP Transport Layer access for communication from HP 9000 systems to any other system through a Frame Relay network. The Frame Relay software has been designed to offer high performance, especially when used with high speed communication interface cards.

The Frame Relay software has been designed to broaden the HP native links offering. It relies on the same hardware adapters as HP X.25 products, allowing Frame Relay and X.25 software to coexist alternatively in the same hardware system configuration. The product number for HP Frame Relay is J3529A.

Network Time Protocol (NTP)

HP-UX provides the Network Time Protocol to synchronize and distribute the time for all machines in a network environment.

SECURITY

HP-UX 11i is a highly secure commercial UNIX operating system that provides layered security and in-depth protection that helps your e-business prevail against hacking and cyber attacks. Designed to enable this new era of Internet-based technologies and e-security, HP-UX 11i can meet security requirements in the areas of policy management, authorization and access control, real-time threat management, audit and alarms, privacy and integrity, and identity management. HP-UX 11i v2 running on HP 9000 or HP Integrity platforms has been successfully evaluated against the requirements for the EAL4 Common Criteria (ISO 15408) Assurance Level, augmented by ALC_FLR.3 (flaw remediation), using the Controlled Access (CAPP) and Role-Based Access Control (RBAC) Protection Profiles. EAL4+ is sometimes used as the abbreviated form for this Assurance Level. Details of the evaluation and evaluated configuration are available at

<http://www.commoncriteriaportal.org/public/files/epfiles/CRP225.pdf>

Host Intrusion Detection System (HIDS)

Host Intrusion Detection System (HIDS) is a standard feature of HP-UX 11i security capabilities, making HP the only systems vendor to offer its own host intrusion detection product integrated with the operating environment at no additional charge. HIDS enhances host-level security with near real-time automatic monitoring of each configured host for signs of potentially damaging intrusions and takes action to both prevent and repair damage.

HP-UX 11i Secure Shell

Secure Shell Software — The HP-UX 11i [Secure Shell software implementation](#) provides the following features and benefits:

- Encrypts all traffic (including passwords) to effectively eliminate eavesdropping, connection hijacking, and other network-level attacks
- Provides a myriad of secure tunneling capabilities
- Protects a variety of authentication methods
- Secure remote logins
- Secure file transfer
- Secure remote commands execution

HP-UX Bastille

HP-UX Bastille is a security hardening/lockdown tool that enhances the security of an HP-UX 11i UNIX host. It accommodates the various degrees of hardening required of servers used for webs, applications and databases. By answering a series of security and usability questions, the server is tightened appropriately for its use. It configures daemons, system settings, and firewalls to be more secure. It turns off unneeded services such as `pwgrd` and `printing`, and it configures client software such as `rcp` and `rlogin` to be more secure. It also helps create "chroot jails" that help limit the vulnerability of common Internet services such as Web servers and DNS.

Stack Buffer Overflow Protection

Stack buffer overflow protection uses a combination of highly efficient software and existing memory management hardware to protect against both known and unknown stack buffer overflow attacks. Eliminates need to modify a program's code to get stack buffer overflow protection, unlike other products that require time-consuming program modifications, recompilation or re-linking.

Install-time Security (ITS)

Install-time Security (ITS) is available to HP-UX 11i version 2 customers as an install option to lockdown systems during installation. ITS makes HP-UX 11i more secure out-of-the-box when customers select higher security levels. There are four choices, including a maximum compatibility level which provides security tools, but doesn't apply a security level, because they represent tradeoffs between security, functionality, productivity, and usability.

HP-UX 11i Strong Random Number Generator

The Strong Random Number Generator provides a secure, non-reproducible source of true random numbers for applications with strong security requirements, such as for generating encryption keys. Generating encryption keys from a non-random source constitutes a security risk that can be removed with this product.

The `/dev/random` and `/dev/urandom` special files are created during product installation. If configured to use these special files, applications such as SSH will have a more secure environment for cryptographic computations.

Security containment

HP-UX 11i security containment introduces three core technologies: compartments, fine-grained privileges, and role-based access control. Together, these three components provide a highly secure operating environment without requiring applications to be modified. In addition, HP-UX 11i security containment makes several trusted mode security features available on standard mode HP-UX 11i systems. These features are called the HP-UX Standard Mode Security Extensions. Security containment provides compartment isolation providing protections should one compartment be compromised other compartments are sealed against the threat. Inter-compartment process is available with rules providing the access among compartments.

With HP-UX 11i security containment, the HP-UX 11i v2 operating system provides a highly secure, easy to maintain, and backwards compatible environment to deploy business applications.

Role Based Access Control (RBAC)

HP-UX 11i v2 provides a mechanism to allow non-root users to perform administrative tasks, effectively splitting the power of root into a manageable set of roles. It is implemented with the existing (uid based) HP-UX privilege model, and it is designed to integrate shortly with a kernel enforced fine-grained privilege model. The idea of splitting the root account into a set of administrative roles is referred to as role-based access control or RBAC

HP-UX 11i MD5 Secure Checksum

The HP-UX 11i MD5sum feature of HP-UX 11i provides the `md5sum` command, a more secure alternative to the `cksum` command as it is based on the standard MD5 algorithm providing 128-bit long fingerprints. This new command (`md5sum`) enables one to verify with a high degree of certainty the integrity of a downloaded package using ftp or http type of electronic downloads. The command can be used to compare files as well.

The feature consists of the following two components that can be installed independently:

- HP-UX 11i MD5sum (`md5sum` checksum command)
- HP-UX 11i LibCryptX (`libcryptx` libraries providing MD5 APIs)

Access Control List (ACL)

- Stores a series of entries that identify specific users or groups and their access privileges for a directory or file
Specifies detailed access permissions for multiple users and groups
- Supports Journaled File System (JFS 3.3)

Generic Security Services Application Programming Interface (GSS API)

- Contains all the GSS APIs in RFC 2743 and is implemented as C programming language interfaces
- Provides security services for client/server applications independent of various underlying security mechanisms and communication protocols, including authentication, integrity and confidentiality services
- Enables application developers writing secure applications to write code only once, eliminating need to change it whenever the underlying security mechanism changes.

Sendmail-8.9.3

Sendmail uses the first sendmail release to include anti-spam rule sets that give mail administrators significantly more power to reduce spam.

Cryptographic algorithms

HP implementation of RSA cryptographic algorithms for DES and Triple-DES uses advanced features in the enhanced assembly language for PA-RISC 2.0 that takes advantage of 64-bit registers and achieves almost twice the encryption speed of other leading software implementations

HP demonstrates its commitment to network security with HP-UX 11i's rich set of standards-based and directory-enabled network security features that enable you to build your e-business without compromising corporate security.

HP-UX 11i Kerberos server

The HP-UX 11i kerberos server provides key distribution facilities to implement the Kerberos authentication protocol in network-distributed enterprises. It operates with an LDAP directory for integrated authentication and access control.

HP-UX 11i IPSec

HP-UX 11i IPSec provides secure and private communication over the Internet and within the enterprise without modifying existing applications. This software incorporates Internet Key Exchange (IKE) as an automated protocol for dynamically negotiating the IPSec parameters. IKE provides dynamic secret key generation and exchange for IPSec and allows for scalability.

HP-UX 11i IPSec interoperates with over 25 other IPSec implementations, including those of Cisco Systems and Microsoft®.

HP-UX 11i IPFilter

HP-UX 11i IPFilter is a stateful inspection host-based firewall system that provides filtering of selected IP traffic and streaming UDP protocols into or out of the system.

HP-UX 11i AAA server

HP-UX 11i AAA server provides authentication, authorization and accounting services using the RADIUS protocol. It enables service providers or enterprises to authenticate users and then account for time and billing use of network services and supports EAP (Extensible Authentication Protocol) for Wireless LAN Security.

HP-UX 11i mobile AAA server

HP-UX 11i mobile AAA server is a wireless data authenticator based on the emerging Diameter protocol. This advanced implementation provides authentication, authorization, and accounting (AAA) functions in 3GPP2 wireless data networks. It is the first Diameter implementation available, and is designed for next generation mobile operators and OEMs for use in 3G wireless test labs.

Pluggable Authentication Modules (PAM)

Pluggable Authentication Modules (PAM) is an industry-standard authentication framework that gives system administrators the flexibility to choose any authentication service available on the system. It allows new authentication service modules to be plugged in and made available without modifying the applications.

BIND9.2.0

BIND9.2.0 provides data integrity and authentication to applications using cryptographic digital signature and prevents non-authorized access to DNS and prevents name-to-address mapping tampering over the wire. This restricts DHCP updates to those authorized to perform them and guarantees the integrity of zone data using digital signatures.

DIRECTORY-ENABLED COMPUTING

HP provides added security protection through directory-enabled computing. HP includes Netscape Directory Server for HP-UX 11i with the HP-UX 11i operating environment.

In addition, LDAP Services are integrated through LDAP UX integration. LDAP is integrated with:

- Local OS login authorization as pam_authz
- Cluster management
- With sendmail
- With BIND 9.2.0
- With NIS
- With Network Quality of Service (QoS) management
- With Virtual Private Network (VPN) management
- AAA (RADIUS) Server

NIS+ Server is available as a directory server.

Netscape Directory Server V6.2 for HP-UX 11i

Netscape Directory Server for HP-UX 11i is an LDAP server that centralizes application settings, user profiles, group data, policies, and access control information into a network-based registry. Directory Server simplifies user management by eliminating data redundancy and automating data maintenance. It also improves security enabling administrators to store policies and access control information in the directory for a single authentication source across enterprise or extranet applications. The server is available on HP-UX 11i v2 and operates on both HP9000 and Integrity hardware platforms.

Novell eDirectory for HP-UX 11i

Novell® eDirectory™ is the foundation for the world's largest identity management deployments-allowing businesses to manage identities and control access for employees, customers and partners. With Novell eDirectory, the industry's first and most advanced full-service directory, businesses lay the groundwork for complete secure identity management solutions and multi-platform network services. Now HP-UX 11i customers can implement this popular

directory on systems running the HP-UX 11i operating system.

LDAP-UX integration

LDAP-UX Integration for HP-UX is a free downloadable bundle consisting of two products, which provide access to the directory services of an LDAP directory server.

The NIS/LDAP Gateway acts as an NIS server storing data in an LDAP directory server rather than in NIS maps. The NIS/LDAP Gateway provides Simple Access to LDAP Directory Server allowing current NIS clients to use the LDAP directory server with few or no changes. In addition, the gateway server converts NIS rpc requests into LDAP operations, and then converts answers back into NIS replies.

The LDAP-UX Client Services provides tools for managing the data in the LDAP directory server and a second set of tools that provide native access to the directory server, bypassing NIS.

HP-UX Identity Management Integration

Hewlett Packard provides the first identity management and single sign-on capability from a single vendor that utilizes the HP-UX 11i operating system to enforce critical system access and authorizations. In addition to integrated enforcement, customers benefit from single vendor support for this mission critical capability.

The Identity Management Integration feature of HP-UX 11i provides authentication and enforcement of user rights within the operating system. By using the Red Hat Directory Server for HP-UX, with HP OpenView Select Access Identity Management System features are seamlessly managed. The HP-UX AAA Radius Server can be added to enforce network access, authentication and accounting useful to many service providers

HIGH AVAILABILITY

HP Serviceguard

HP Serviceguard builds upon the concept of virtualization by grouping multiple servers or partitions into a cluster to provide highly available application services that ensure data integrity. Within the cluster, HP Serviceguard monitors the health and status of software and hardware components and uses enhanced cluster management tools to efficiently manage multiple systems. If a threshold is exceeded or a failure occurs, HP Serviceguard provides automatic failover and fast failback of the mission-critical applications.

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

HP Serviceguard is available as a stand-alone product, as part of the HP-UX 11i Mission Critical Operating Environment, and in the Serviceguard Storage Management Suites.

HP Serviceguard is available for environments with HP-UX 11i or Linux, enabling a consistent cluster strategy for

both operating systems.

HP Serviceguard Extension for RAC

HP Serviceguard Extension for RAC allows multiple servers to be configured as a highly available enterprise cluster that supports Oracle 9i and 10g Real Application Clusters.

These two products work together to provide the best aspects of HP's enterprise clusters and the Real Application Clusters: high availability, data integrity, scalability, and reduced database administration costs.

Please note: Serviceguard and Serviceguard Extension for RAC are required components for Oracle9i Real Application Clusters on HP-UX servers.

HP Serviceguard Extension for SAP

HP Serviceguard Extension for SAP expands Serviceguard's powerful failover capabilities to SAP environments. It continuously monitors the health of each SAP node and automatically responds to failures or threshold violations. As an added bonus, it can minimize planned downtime when performing SAP upgrades.

HP Serviceguard Extension for Faster Failover

HP Serviceguard Extension for Faster Failover decreases recovery time to provide even greater levels of protection for mission-critical needs. The application is designed to significantly reduce failover time of Serviceguard and Serviceguard Extension for RAC environments while continuing to support all of their functionalities and components without compromise.

HP Serviceguard Storage Management Suite

The HP Serviceguard Storage Management Suite is the latest addition to the HP-UX 11i high availability portfolio. This suite of products combines the power of HP Serviceguard with the VERITAS Storage Foundation offerings by Symantec to produce a comprehensive solution that offers proven availability, performance and manageability.

Seven product bundles are included in the Serviceguard Storage Management Suite - each to address different customer mission critical requirements. Some products are specific for Oracle database environments and others provide cluster file system manageability.

Additionally, the VERITAS File System and Volume Manager 4.1 capabilities described in the Data Management section of this QuickSpec are also included in Serviceguard Storage Management Suite. Value-added utilities such as the Oracle Disk Manager provide improved performance within file-system based environments; and for better availability, the Dynamic Multi-pathing capability reduces downtime by enabling automatic I/O path failover.

The value of HP-UX 11i extends beyond the benefits gained through the Serviceguard Storage Management Suite. Customers will be able to take advantage of these high availability-based solutions integrated with the HP Virtual Server Environment to maximize resource utilization and improve ROI. Also, pre-integration with the HP-UX 11i Mission Critical Operating Environment provides a quick-to-deploy solution.

For additional information regarding the HP Serviceguard Storage Management Suite, go to www.hp.com/go/sms.

DISASTER-TOLERANT SOLUTIONS

Continentalclusters

Continentalclusters are the most flexible of HP-UX suite of geographically dispersed clusters that also includes Extended Campus Cluster and Metrocluster.

Key Features:

- Local and remote failover capability
- Support up to 32 HP 9000 servers per Continentalcluster
- Allow any data replication. HP offers integrated solutions with leading data replications such as HP Continuous Access, EMC SRDF, and Oracle Standby Database
- Optimized resource utilization and performance with HP Workload Manager and On-Demand Solutions

Continentalclusters is most appropriate when

- Data centers are located at 100s or 1000s of kilometers/miles from each other
- Full control of the failover (operator initiated) is required in case of a major outage
- Multiple clusters need to be managed and protected

Metrocluster with Continuous Access XP

Metroclusters offer the most robust of HP-UX suite of geographically dispersed clusters that also includes Continentalcluster and Extended Campus Cluster.

Key features

- Automatic and bi-directional failover of mission critical data and applications so both data centers can be active, protected and capable of handling package failover to each other
- Cluster stretched up to 100km, support up to 16 HP 9000 servers
- Robust, reliable fast fail-over and fail-back based on array-based data replication
- Optimized resource utilization and performance with Workload Manager and On-Demand Solutions

Metrocluster with continuous access XP is most appropriate when

- HP Stagerworks XP disk arrays are used to store and manage large volumes of data, and Continuous Access XP is used to mirror data between sites
- Application performance is of critical importance
- Fast fail-over and fail-back are required
- Business is at risk from major outages impacting the whole data center

Metrocluster with EMC SRDF

Key features

- Automatic and bi-directional failover of mission critical data and applications so both data centers can be active, protected and capable of handling package failover to each other
- Cluster stretched up to 100km, support up to 16 HP 9000 servers
- Robust, reliable fast fail-over and fail-back based on array-based data replication

- Optimized resource utilization and performance with Workload Manager and On-Demand Solutions

Metrocluster with EMC SRDF is most appropriate when

- EMC Symmetrix disk arrays are used to store and manage large volumes of data, and EMC SRDF is used to mirror data between sites
- Application performance is of critical importance
- Fast fail-over and fail-back are required
- Business is at risk from major outages impacting the whole data center Extended Distance (Campus) Cluster

Extended Distance (Campus) Cluster

Key features

- This configuration implements a single Serviceguard cluster across two data centers, and uses either MirrorDisk/UX or VxVM mirroring for data replication. No (cluster) license beyond Serviceguard is required for this solution, making it the least expensive to implement.
- Customers may choose any storage supported by Serviceguard, and the storage can be a mix of any Serviceguard-supported storage.
- Writes are synchronous unless the link or disk is down, so data remains current between the primary disk and its replica.

Extended Distance Cluster is most appropriate when

- Distance is less than 100km. Extended Campus Cluster does not support asynchronous data replication. While data currency is maintained between the two data in normal operations, longer distances between the data centers increases the likelihood of performance impact.
- Data is less critical. Extended Campus Cluster provides no built-in mechanism for Serviceguard to determine the state of the data before starting up the application. Unlike Metrocluster or Continentalclusters, An application package will start successfully if volume group activation is successful. For example, nothing prevents an application from starting if the Logical Volume Manager (LVM) mirrors are split. This scenario will increase the exposure to loss in the event of a site disaster.

Only a carefully designed architecture coupled with proper implementation (e.g. adding additional intelligence to package control scripts, selecting appropriate volume group activation options, incorporating monitoring tools like Event Monitoring Services, etc.) can help to avoid undesirable behavior or consequences

STANDARDS

The Single UNIX Specification is an industry standard promulgated by the Open Group¹. The Open Group has released three versions of this specification starting with UNIX 95 in 1994. The UNIX 98 version was released in the first half of 1998. The UNIX 2003 version was released in 2002.

Since 1996, HP-UX has been branded with the UNIX 95 profile. The HP-UX 10.10, 10.20, 11.0 and 11i releases of HP-UX are all branded to this specification.

¹ www.opengroup.org

POSIX.1 and FIPS 151-2

HP-UX 11i conforms to the IEEE Standard 1003.1- 1990, POSIX Part 1: System Application Program Interface (API) [C Language] also referred to internationally as ISO/IEC 9945-1:1990, and to the Federal Information Processing Standard, FIPS 151-2.

IEEE Standard 1003.1-1996

Information Technology-Portable Operating System Interface (POSIX®)-Part 1: System Application: Program Interface (API) [C Language] This edition incorporates extensions for realtime applications (1003.1b-1993, 1003.1i-1995) and threads (1003.1c-1995).

POSIX_ASYNCHRONOUS_IO	POSIX_SYNCHRONIZED_IO
POSIX_CHOWN_RESTRICTED	POSIX_SYNC_IO
POSIX_FSYNC	POSIX_THREADS
POSIX_JOB_CONTROL	POSIX_THREAD_ATTR_STACKADDR
POSIX_MEMLOCK	POSIX_THREAD_ATTR_STACKSIZE
POSIX_MEMLOCK_RANGE	
POSIX_THREAD_PRIORITY_SCHEDULING	
POSIX_MESSAGE_PASSING	POSIX_THREAD_PRIO_INHERIT
POSIX_NO_TRUNC	POSIX_THREAD_PRIO_PROTECT
POSIX_PRIORITY_SCHEDULING	POSIX_THREAD_PROCESS_SHARED
POSIX_REALTIME_SIGNALS	POSIX_THREAD_SAFE_FUNCTIONS
POSIX_SAVED_IDS	POSIX_TIMERS
POSIX_SEMAPHORES	POSIX_VDISABLE
POSIX_SHARED_MEMORY_OBJECTS	

Open Group Standard XNS 5.2 Networking Standard (Sockets)

HP-UX 11i includes support for the Open Group Std XNS 5.2 Networking Standard (Sockets).

IEEE Standard 1003.2-1992

HP-UX 11i conforms to the IEEE Std 1003.2 1992 - Shell and Utilities, referred to internationally as ISO/IEC 9945-2, and provides the following implementation options:

- [POSIX2_C_BIND]
- [POSIX2_C_DEV]
- [POSIX2_CHAR_TERM]
- [POSIX2_LOCALEDEF]
- [POSIX2_SW_DEV]
- [POSIX2_UPE]

SVID

HP-UX 11i is based on the UNIX System V Release 3.2 operating system and includes important features from the Fourth Berkeley Software Distribution.

Real-Time

HP-UX 11i provides a realtime user and programming environment that complies with the POSIX 1003.1-1996 standard. Support is provided for:

- Real-time clocks and timers
- Real-time queued signals
- Fixed-priority scheduling policies
- Real-time scheduler priorities
- Counting semaphores
- Shared memory
- Process memory locking
- Asynchronous I/O
- Synchronized I/O
- Process communications facilities
- Thread-safe implementation of real-time libraries

HP Message Passing Interface (MPI)

HP MPI is an implementation of the MPI standard for HP systems. Engineers from the High Performance Technical Computing Lab of Hewlett-Packard have developed a high-performance, robust, high-quality, native implementation of MPI for HP servers and workstations.

HP MPI uses OS-specific enhancements to provide low latency and high bandwidth point-to-point and collective communication routines. It supports multi-protocol execution of MPI applications on clusters of shared-memory servers. HP MPI supports 32- and 64-bit applications, single- and multi-threaded, and provides tools to debug and instrument MPI execution.

Symmetric Multiprocessing (SMP)

HP-UX 11i supports symmetric multiprocessing (SMP), which enables systems with two or more processors to execute the same copy of the operating system, access common memory, and execute instructions simultaneously. SMP functionality fully exploits the additional compute capabilities of multiple processors.

Threads

HP-UX 11i provides software developers the ability to write multithreaded programs that take full advantage of SMP using POSIX Threads. POSIX Threads provide a pthreads interface that complies with the POSIX 1003.1c semantics. The POSIX Threads implementation provides user space threads that are supported by and cooperate with the threaded kernel of HP-UX 11i in a comprehensive two-level scheduling model that transparently maintains full concurrency when a thread blocks. In addition, for building libraries whose routines can be called in either a single-threaded or multi-threaded context, POSIX Threads provide a thread-independent services (TIS) interface.

Shared Libraries

HP-UX 11i provides a full complement of dynamic shared libraries based on System V semantics, which increase system performance, reduce minimum hardware requirements, and ease system management. HP-UX 11i also provides static versions of most of these libraries.

DEVELOPER'S ECOSYSTEM

HP Fortran

HP Fortran is a modern, powerful mathematical and scientific language that supports array-handling, data abstraction, and data hiding. HP Fortran is available on both HP 9000 and Integrity servers, and includes the following features:

- Full Fortran 95 compiler, based on International ANSI/ISO standards
- Full OpenMP v2.0
- Object-oriented Fortran feature optimizations
- Math intrinsic inlining support
- Standard Fortran library
- Native and cross compilers for HP 9000 and Integrity systems
- HP WDB debugger support
- HP Caliper

HP Fortran products are increasingly the language of choice for software engineers writing scientific applications and who demand superior run-time performance, code portability, and programmer productivity.

HP aC++

The HP aC++ compiler is HP's implementation of the ISO/IEC 14882 Standard for the C++ Programming Language (the international standard for C++) and largely conforms to this standard.

Major features and benefits include:

- Precompiled Header Files — quicker compiles
- Standard Template Library — off-the-shelf software reduces the amount of code to be written
- Faster Template Instantiation — promotes software reuse
- Optimized Exception Handling — convenient mechanism for handling error conditions

HP C/ANSI C Developer's Bundle

HP C/ANSI C Developer's Bundle is HP's well-rounded compiler toolkit for HP-UX 11.0, 11.i, 11i version 1.5, and 11i version 1.6, based on the ANSI/ISO Standard. The bundle supports code generation for both PA-RISC and Itanium®-based processors.

The HP C Developer's Bundle includes:

- Standard C library

- C developer's tools
- C analysis tools
- Support of N-Class and V2600 servers
- Y2K compliance for HP-UX 10.20 and HP-UX 11.x

HP C is one of the most commonly used products by software engineers writing commercial or technical applications.

HP Code Advisor

HP is happy to announce the availability of HP Code Advisor (cadvice) version C.01.00. This new tool is a static analysis tool. It finds coding errors in C and C++ programs. Beyond finding coding errors, this tool also enables programmers to identify porting issues, and security vulnerabilities.

HP WDB Debugger

The HP WDB debugger is an HP-supported implementation of the GDB debugger. It supports source-level debugging of object files written in HP C, HP aC++, Fortran 90, and FORTRAN77 on HP-UX Release 11.0 and later.

HPWDB 4.5 is the recommended debugger for Integrity systems running HP-UX 11i v2. Other debuggers, such as xdb and HP DDE, are no longer supported.

PERL

PERL has been updated to include hash code re-factored for source code duplication reduction, to add hv_clear_placeholders as part of the PERL API. .

Java™ 2 platform Standard Edition™ (J2SE) for HP-UX 11i

The HP-UX SDK, for the Java platform (product T1456AA) provides the Java 2 programming tools and runtime environment which allows a customer to deploy version 1.4 technology with the best performance on HP-UX 11i for HP Integrity and HP 9000 systems.

The redistributable version of the 1.4 runtime environment is HP-UX Runtime Environment for the Java platform (product T1457AA).

The J2SE features include:

- 64-bit interpreter and compiler
- Standard Java™ 2 SDK tools
- Core API support
- Hotspot 1.4 VM
- HP enhancements to enable great performance
- HP-UX 11i HP 9000 and HP Integrity support

In addition, additional downloadable tools are available for use with J2SE:

HPjtune is a Java Garbage Collection (GC) visualization tool for analyzing garbage collection activity in a Java program. The analysis is carried out off-line or on-line, based on the output of the JVM via the -Xloggc or -Xverbosegc output file.

HPjmeter is the 100% Pure Java tool for analyzing profiling information generated by the Java Virtual Machine in Java 2 (1.2, 1.3 and 1.4). Measure, view, and improve Java™ application performance with HPjmeter.

HPjconfig is a Java configuration tool for tuning HP-UX 11i HP Integrity and HP 9000 system kernel parameters to match the characteristics of the application. HPjconfig provides kernel parameter recommendations tailored to a customer's Java enterprise services (Web server, Application Server, etc.) and HP-UX hardware platform. It offers save and restore functions for easy distribution of tailored recommendations across multiple users.

Java Out-of-Box is a stand-alone bundle that upon installation will install startup (RC) scripts, modify kernel parameters, rebuild the kernel, and reboot the system. During startup the startup scripts will modify system tunables, thus providing better "out of the box" behavior for Java.

Aries Technology for HP 9000 to HP Integrity transition

ARIES is a binary translator that automatically executes PA-RISC applications on Integrity servers running HP-UX 11i. The ARIES technology does not require recompilation of the code. To learn more about it, read the following white papers:

[Transparent execution, no recompilation](#) (PDF, 140 KB)

[Compatibility mode on Itanium-based HP-UX](#)

Note:

On Integrity servers, HP 9000 and Integrity applications and libraries cannot be mixed. To port or simply qualify an application on Integrity servers, make sure that the libraries for this platform are available.

HP 9000 and Integrity binaries cannot be mixed in any one executable.

Visual Threads

Visual Threads is the diagnostic tool needed to analyze and refine multithreaded applications. It can be used to debug potential thread-related logic problems, even those hard-to-find problems that only occur due to slight timing differences. Visual Threads can also be used to pinpoint bottlenecks and performance problems by using its rule-based analysis and statistics capabilities and visualization techniques.

Visual Threads can be used with any application that uses a POSIX threads library (including Java applications).

Parallelized Scientific Subroutine Lib (MLIB)

HP MLIB is a package of high-performance mathematical software in the form of subroutine libraries. The MLIB product is designed for use by software engineers who develop, port, or optimize engineering or scientific programs. These programs rely heavily on computational kernels such as the Basic Linear Algebra Subprograms, linear algebra computations (solving linear equations or eigenvalue problems), discrete Fourier transforms, or convolutions. Using MLIB will save you the effort of developing, testing, or optimizing these algorithms.

Included in this bundle are subprogram libraries containing software for:

- dense vector operations, including the Basic Linear Algebra Subprograms (BLAS)
- sparse vector and matrix operations, including the Sparse BLAS
- matrix operations, including the Level 2 and Level 3 BLAS
- linear equation solution, including LAPACK
- eigensystem solution, including LAPACK
- parallel linear equation solution using MPI, including ScaLAPACK

- parallel eigensystem solution using MPI, including ScaLAPACK
- parallel sparse nonsymmetric linear systems solution using MPI, including SuperLU_DIST
- sparse symmetric and structurally-symmetric linear equation solutions
- full METIS functionality
- sparse symmetric ordinary and generalized eigensystem solutions
- discrete Fourier transforms
- convolution and correlation
- miscellaneous tasks, such as sorting and generating random numbers

HP STK for platform transitions

The HP Software Transition Kit contains tools and documentation to help transition applications from older to newer versions of HP-UX, from Tru64 Unix to HP-UX and from Linux to HP-UX. More specifically HP-UX STK supports application transition from older version to newer versions of HP-UX. STK supports application transition from Tru64 UNIX to HP-UX transition. STK supports Linux to HP-UX application transition. The HP STK assists with topics such as:

New features in the latest HP-UX release and how to take advantage of them:

- Deciding on 32-bit or 64-bit version of applications.
- Qualifying software (for example, run a 10.x executable on HP-UX 11.x) versus porting (create a new HP-UX executable on the destination platform).
- Transitioning software to Integrity processors.

An STK consists of:

- a set of file scanning tools with associated database and information, which checks source files, makefiles, and scripts for identifiers which may indicate transition problems
- a library of useful documents
- A search engine which searches the man pages, impacts and documents
- HTML formatted man pages or links to HTML formatted man pages on docs.hp.com

Cell Local Memory Support

Memory can be configured into "interleaved" and "cell local" memory. Interleaved memory is a hardware-provided feature that mixes memory from different cells with a very fine granularity. This has the effect of spreading out memory accesses and eliminating "hot spots." Cell local memory provides faster access to processes running on the same cell as the memory, but slower access to processes running on any other cell.

The system administrator has the ability to configure how much memory will be interleaved and how much will be cell local via the command line (parcreate or parmodify) or Partition Manager GUI (parmgr).

Applications can control which locality they execute in using the locality binding and launch policy features.

Shells

HP-UX systems support the Bourne Shell, the C Shell, the POSIX Shell, and the Korn Shell command interpreters.

Dynamic Loader

HP-UX 11i uses an SVR4-compatible loader to dynamically load shared libraries. This loader provides SVR4 symbol resolution semantics, including symbol preemption.

The COFF object file format is supported for all forms of object files.

Data Link Provider Interface (DLPI)

HP-UX 11i provides a Data Link Provider Interface to allow applications to directly use the data link layer services in order to interact directly with the network device drivers.

Dynamically Loadable Kernel Modules

Dynamically Loadable Kernel Module (DLKM) provides the means to add a device driver to a running UNIX system without rebooting the system or rebuilding the kernel. This feature also makes it possible to dynamically remove a device driver from the UNIX system when the driver is no longer needed, thereby freeing system resources for other use.

The DLKM feature not only provides the infrastructure to load drivers into a running kernel, but it also allows a driver to be statically linked into the kernel—the way all drivers were included in the kernel prior to HP-UX 11.0. Simply setting a flag in one of the driver's configuration files determines whether a driver is to be configured as dynamically loadable or statically linked.

INTERNATIONALIZATION

The HP-UX 11i internationalization environment, tools, and localization features enable the development and execution of internationalized software without re-engineering the user application. Supported character sets, Unicode support, Euro support, a complete listing of I18N features, as well as memory and disk space requirements by language variant, can be found at the following URL:

<http://docs.hp.com/en/5991-1194/index.html>

Unicode Support

HP-UX 11i v2 includes Unicode 3.0 support, which is an extension to the previously supported Unicode 2.1 standard. Unicode 3.0 is aligned with the revised ISO 10646-1:2000 standard and includes an additional 10,194 characters from the previous version of the standard. Most notable of these additional characters are 6,582 new CJK characters (Han Extension A) for use in various Asian countries.

Euro Currency Support

HP-UX 11i supports the processing of the new euro currency symbol through the use of the ISO 8859-15 character set, and Unicode V3.0. ISO 8859-15 is a newly ratified character set that differs from ISO 8859-1 by supporting eight new characters. Specific enhancements are provided to allow Euro display, input, and processing capabilities.

Chinese Character Set Standard GB18030

HP-UX 11i conforms to the People's Republic of China National Standard GB18030-2000. This is a mandatory standard and supports the Chinese Character Set Standard for Information Interchange.

HARDWARE REQUIREMENTS

QuickSpecs for [HP Integrity servers](#) and for [HP 9000 systems](#) describe how to configure and order the systems that run HP-UX 11i.

The HP-UX 11i Operating System can execute on supported HP 9000 and HP Integrity systems and must include the following minimum system configuration:

- Minimum main memory - 512 MB.
- Minimum swap space on disk - 1 GB
- The minimum disk space requirement for installing the HP-UX 11i Operating System is 1 GB to accommodate the EFI Boot Disk and the HP Service Partition.

File Partition Disk Space Allocation by Operating Environment

Foundation OE	Enterprise OE	Mission-Critical OE
208 MB (78% used)	208 MB (81% used)	208 MB (81% used)
304 MB (21% used)	304 MB (21% used)	304 MB (21% used)
4.5 GB (2% used)	4.5 GB (2% used)	4.5 GB (2% used)
2.6 GB (76% used)	2.7 GB (75% used)	2.7 GB (75% used)
208 MB (4% used)	208 MB (4% used)	208 MB (4% used)
3.6 GB (52% used)	3.7 GB (53% used)	3.7 GB (53% used)
32 MB (26% used)	32 MB (26% used)	32 MB (26% used)
11.6 GB (37% used)	11.7 GB (37% used)	11.8 GB (36% used)

1. The results are from using the bdf (1M) command; the results may vary if the du (1) command is used.
2. Totals are not exact due to rounding.
3. Totals do not include disk space required for the EFI Boot Partition, HP Service Partition, or /swap.

Hardware Partitioning

Hewlett-Packard's nPartition system capabilities enable a customer to configure a single server complex as one large system or as multiple smaller systems. These hard partitions are designed to provide for complete electrical and software isolation. For organization where high availability is critical, this ensures that any fault within one partition cannot impact any other partition. Applications running within hard partitions are not subject to hardware or software events in other partitions.

Each nPartition has one or more cells (containing processors and memory) that are assigned to the partition for its exclusive use. Any I/O chassis that is attached to a cell belonging to a partition also is assigned to the partition. (Each chassis has PCI card slots plus any I/O cards and attached devices, and may also have core I/O.) Since each nPartition has its own CPU, memory and I/O resources consisting of the resources of the cells allocated to the nPartition, resources may be removed from one nPartition and added to another without having to physically remove and add hardware. Additionally, dynamic creation and modification of nPartitions is supported.

These partitions operate in such a manner that they can be totally isolated from other hard partitions. Each nPartition executes a single OS image, thus providing software isolation. Alternate nPartitions may, therefore, be executing different versions of the OS. With the addition of IA-64 processors, HP-UX 11i, Linux, and Microsoft Windows will be supported simultaneously in different nPartitions within a single Superdome, making the Superdome the only high-end server in the industry that includes both full IA-64 compatibility and binary application support.

SUPPORTED HARDWARE

Combinations of hardware options are subject to limitations, such as bandwidth, physical configuration constraints, and electrical load and power supply.

HP reserves the right to change the number and type of devices supported by HP-UX 11i. The minimum hardware requirements for future versions and updates of HP-UX 11i may be different from current requirements. Please check the platform specific requirements:

For HP Integrity server options: <http://h20341.www2.hp.com/integrity/cache/342360-0-0-0-121.html>

For HP 9000 server options: http://www.hp.com/products1/servers/HP9000_family_overview.html

Supported HP 9000 Server Models

Superdome

rp8420

rp7420

rp4440

rp3440

Note: HP 9000 Workstations are no longer supported.

Supported HP Integrity Server Models

The current Integrity server family models supported by HP-UX 11i are listed below. Additional Integrity server models will be added to the supported models list as they are introduced.

HP Integrity Superdome

rx8620/ rx8640

rx7620/ rx7640

rx4640

rx2620

rx1620

Supported HP Integrity Workstation Models

zx2000 (Itanium2)*

zx6000 (Itanium2)*

* supported on HP-UX 11i 0505 and earlier.

RETIRED HARDWARE

The following hardware platforms are no longer supported:

HP 9000 Server platforms:

All 32-bit servers (incl. 32-bit A-class servers -- A180, A180C)
All D-class servers
All R-class servers
All E-class servers
All K-class servers
All T-class servers
All V-class servers
No HSC, EISA, HPPB

HP 9000 workstations are no longer supported.

HP Integrity Server platforms:

Itanium-1 based servers (Merced):
Rx4610, rx9610
No HSC, EISA, HPPB

HP Integrity Workstation platforms:

Itanium-1 based WS (Merced):
I2000
No HSC, EISA, HPPB

Optional Device Support

The HP-UX 11i Version 2 Release Notes (available at <http://docs.hp.com/hpux/os/11iv2/index.html>) provides a complete list of supported network and mass storage drivers, and SCSI devices.

GROWTH CONSIDERATIONS

The minimum hardware and software requirements for any future version of this product may be different from the requirements for the current version. Specific information about HP-UX 11i, HP 9000 systems and HP Integrity systems can be viewed at:

<http://www.hp.com/go/hpux11i>

DISTRIBUTION MEDIA

HP-UX 11i is distributed on DVD and is ISO 9660 Level 1 compliant.

ORDERING INFORMATION

HP-UX 11i Software Media Kit

HP-UX 11i OE DVD Media for Itanium2 Servers: B9106AA

HP-UX 11i Enterprise OE Server Media: B7993AA

HP-UX 11i Mission Critical OE Media: B7994AA

HP-UX 11i Documentation

HP Instant Information CD-ROM

HP Instant Information is HP's new generation of electronic documentation. The name "HP Instant Information" refers to both the content and the industry standard DynaText browser, which delivers a new interface, powerful search functionality, and enhanced print-on-demand capabilities. HP Instant Information replaces HP LaserROM as the technology used to deliver documentation on CD-ROM.

Features and Benefits:

- The HP Instant Information CD offers the following features and benefits.
- A comprehensive collection of online documentation.
- Documentation grouped into categories or collections.
- Ability to view Table of Contents and document text at the same time.
- Advanced printing functionality, including PostScript-quality printing of proportional fonts, graphics, and tables.
- Full text search integrated into browse window.

Customers can purchase a single HP Instant Information CD for a particular HP-UX release. Also available is a convenient update service to make sure that customers always have the latest HP-UX documentation.

Product #: B3921EA

Users can also view the HP-UX 11i documentation at: <http://docs.hp.com/>

SOFTWARE LICENSING

The licenses for the HP-UX 11i Operating Environments provide the right to use the software as described in these QuickSpecs. Customers can update from previous versions of HP-UX 11i if they are on a software update contract. Customers with no support contract are required to purchase the license to update to later versions.

SOFTWARE PRODUCT SERVICES

A variety of service options are available from HP. For more information, please see the [HP-UX 11i services page on hp.com](#) or contact your local HP office.

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