product

HEWLETT® PACKARD
Expanding Possibilities

HP | Data Center Solutions | V-Class Enterprise Server

HP 9000 V-Class Data Center Solutions

The HP 9000 V-Class Enterprise Server family has established itself as the business-critical–proven, high-performance data center computing platform that leading corporations depend on for their computing needs.

Now, the new HP 9000 V2500 Enterprise Server raises the performance bar once again by delivering the highest-performing, most robust application platform available on the market today.

So whatever your business problem requires—a powerful OLTP server, a high CPU count decision-support, sophisticated E-commerce platform, technical computing infrastructure, or a large server upon which to consolidate multiple applications—the HP 9000 V-Class provides the availability and scalability needed to meet your enterprise and technical data center needs.

You can choose an entry-level V-Class configuration to optimize your IT investment, knowing that the system will scale as your needs demand.

Combined with HP's unmatched experience in delivering large scale mission-critical solutions for the data center, and more than 15,000 ISV applications for HP-UX 11 and HP's partners, the HP V-Class provides the comprehensive UNIX® platform your enterprise can count on.

Mission-Critical Computing with the Industry's Most Powerful System

- Industry-leading 440-MHz PA-8500, 200-MHz and 240-MHz PA-8200 processors
- HP's Scalable Computing Architecture (SCA) for breakthrough performance
- Attractive entry-level price and a wide performance range
- Up to 128 CPUs*
- Up to 128 GB of memory*
- Up to 112 2X PCI slots*
- System-wide throughput of up to 61.66 GB/s* with HP's HyperPlane crossbar technology
- Up to 7.6-GB/s I/O throughput*
- N+1 redundant components for increased reliability

* With SCA

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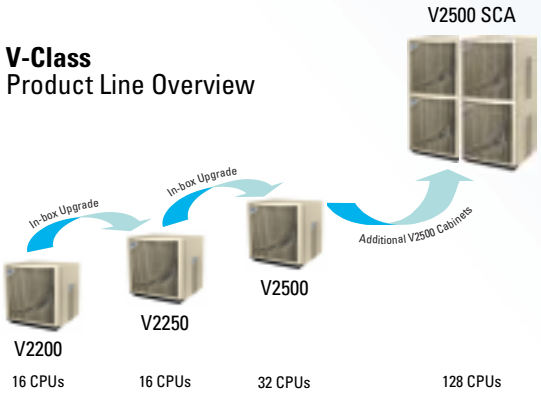
The Ultimate Data Center Platform

In an increasingly competitive environment, companies must be able to rely on their IT infrastructure to provide business-critical applications. To ensure business success, requirements call for virtually risk-free solutions *and* cost efficiency, as total cost of ownership (TCO) is a critical criterion when selecting the optimal platform.

Ready to meet these challenges by setting new standards for enterprise computing, the HP 9000 V-Class Enterprise Server is the platform of choice for leading companies worldwide to run their mission-critical and most demanding commercial and technical applications.

Unmatched performance at both the component and application level allows the HP 9000 V-Class to address a wide range of real-life workloads—from batch and transaction processing to Java-based applications and technical computing.

With excellent scalability, additional resources can be added as needed to address even the most demanding requirements or to consolidate multiple applications on a single system. Based on the HP 9000 V-Class's proven reliability and serviceability, HP provides the complementary solutions and services that will enable 24x365 availability for your applications in a real-life environment.



For high-end computing, HP offers three models of V-Class servers. The V2200 is a 200-MHz PA-8200–based 16-way V-Class system. The V2250 is a 240-MHz PA-8200–based 16-way system. Both the V2200 and the V2250 can be upgraded to the 440-MHz PA-8500–based 32-way V2500. Based on HP's unique Scalable Computing Architecture (SCA), the V2500 allows you to scale up to 128 CPUs and 128 GB of memory.

HP 9000 V-Class: Designed for Performance

HP has designed powerful systems in which all components integrate together to deliver maximum performance. When upgrading from a V2250 to a V2500, the combined system performance of all key components—processor, I/O subsystem, memory subsystem—is doubled. HP-UX 11 provides scalability up to 128 processors, and leading ISVs have fine-tuned their applications to ensure maximum performance.

Powered by PA-RISC

The V2500 is powered by the lightning-fast 440-MHz 4-way superscalar PA-8500 processor. This new generation PA-RISC CPU provides unmatched performance and functionality. With the world's largest on-chip L1 cache, the V2500 provides significantly faster access to data. Prior to the V2500, both the V2200 and the V2250 set industry records for OLTP performance and price/performance. The V2500 will continue this tradition. All V-Class applications are binary compatible, therefore offering maximum investment protection.

HP's HyperPlane

At the core of the V-Class is HP's HyperPlane crossbar technology which provides high bandwidth and low latency access from CPU and I/O to local memory. It enables linear scaling without bus contention throughout the entire system and as resources are added. This non-blocking 8x8 crossbar provides 15.36-GB/s memory bandwidth with bi-directional 960 MB/s per port.

High-Speed Memory Subsystem

Featuring up to 256-way interleaving, a single V2500 cabinet supports from one to 32 GBs of SDRAM physically distributed on two to eight memory boards. Separate read and write busses mirror the HyperPlane architecture, allowing for double the memory bandwidth. The V2250 supports up to 16 GBs of memory with up to 32-way interleaving.

PCI I/O Subsystem

Each V2500 cabinet supports up to 28 240-MB/s 64-bit PCI interfaces. In addition, each of the bi-directional 240-MB/s I/O ports is capable of direct memory access (DMA). This design eliminates CPU involvement during data transfers, reserving the CPUs for user work. It also streamlines data transfer for large disk blocks and high-speed network connections.

As a result, the V-Class provides industry-leading performance in almost any benchmarking discipline.

HP 9000 V-Class Data Center Solutions

High Availability for Mission-Critical Environments

As more applications become mission-critical, maximum availability is an absolute requirement. HP addresses these requirements at various levels with consulting, services, and products such as MC/ServiceGuard. At the system level, reliability and serviceability features are integrated into the V-Class.

Reliability—The inherent reliability of the V-Class has been improved even further with the V2500 due to a design consisting of fewer system parts. The V-Class provides numerous reliability and redundancy features that can minimize the impact of any failure, such as system-wide ECC protection, which ensures memory integrity and increases reliability.

In the event of a memory module failure, Dynamic Memory Resilience will block the affected memory range and allow the system to keep running. And should an I/O problem occur, alternate pathing (AP) allows for redundant I/O and network controllers to take over the job and to keep the system running.

The distributed N+1 power system allows for automatic de-configuration and online replacement, and N+1 cooling fans can also be replaced online. When configured with redundant components, the automatic reboot feature allows the system to recover from hardware failures. External disk arrays provide additional redundancy and hot-swap capabilities.

Service Support Processor

For ongoing local or remote system monitoring and management, a dedicated service support processor is provided. This service support processor ensures system health through environmental sensing and preventive maintenance, and allows for very fast system re-boot and eventually deconfiguration of components to ensure availability—even in the case of a failure.

HP's Scalable Computing Architecture

For multi-terabyte data warehouse implementations, complex technical computing, or other demanding applications, scaling beyond a 32-way HP 9000 V2500 server—the most powerful SMP system on the market today—may be necessary. While cluster configurations are a good solution for certain applications, the increased management and application development complexity associated with the typical cluster may not be a good fit for others. This is particularly true if a standard application must continue to run and scale well.

HP's Scalable Computing Architecture (SCA) has proven its functionality and ability to scale for years, and now is uniquely positioned to provide the resources needed to meet the demands of these applications without a disruptive and expensive box swap.

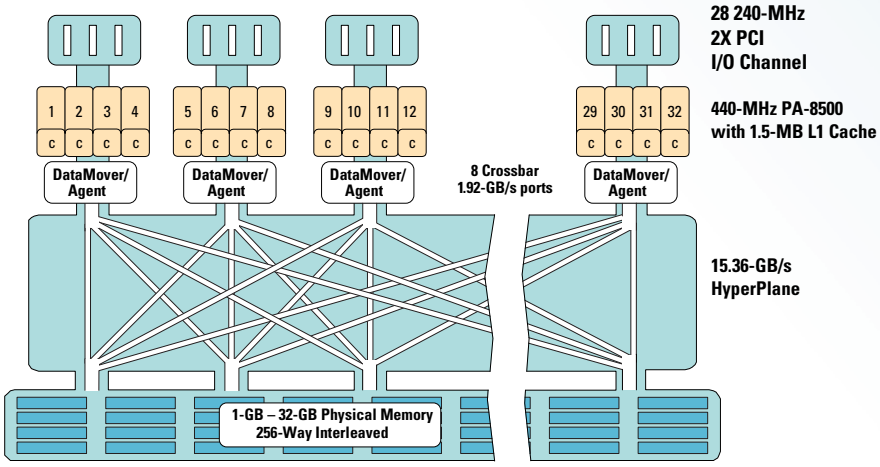
Used as a basic building block combined with a high-bandwidth SCA Hyperlink, the V2500 makes it possible to configure a system with incredible performance and scalability.

Configuration Flexibility

SCA configurations can scale up to 128 PA-8500 CPUs, 128 GB of memory and 112 2X PCI slots. Whatever the configuration, a single copy of standard HP-UX 11 allows you to run unmodified any of the more than 15,000 applications available.

Every V2500 cabinet can be configured to become part of an SCA configuration at a later point in time, providing unprecedented headroom. Up to four cabinets can be combined. And when requirements change, an SCA configuration can be re-deployed as individual systems.

The use of MC/ServiceGuard allows you to combine two SCA configurations for even higher levels of availability through automatic failover.



HP 9000 V-Class Data Center Solutions

Architecture and Technology
HP's Scalable Computing Architecture is based on a globally shared memory access known as cache-coherent non-uniform memory access (ccNUMA). SCA uniquely combines the most powerful SMP system with more than 3.84-GB/s interconnect bandwidth. A fully configured four-cabinet SCA configuration provides 61.44-GB/s memory bandwidth and 7.6-GB/s I/O throughput.

All resources, including I/O, are transparently accessible and local cabinets keep a large amount of coherent cache, which allows for local memory access most of the time. The 8-way interleaved interconnect supports up to 256 outstanding memory requests, significantly reducing the average memory latency for remote cabinet access.

HP-UX 11 provides sophisticated capabilities to balance the workload across multiple cabinets and to optimize local versus remote cabinet memory access. The result is extraordinary performance and high scalability for a wide variety of business requirements.

Reducing TCO through Application Consolidation

Traditional client/server implementations used multiple systems for multiple applications, increasing overall management complexity as well as total cost of ownership (TCO). Now, the power of the HP 9000 V-Class servers, in combination with HP's Process Resource Manager (PRM), allows you to consolidate multiple applications on a single system. System resources such as processors, memory, and I/O cards can be assigned to dedicated applications, enabling service-level agreements (SLAs), workload management, and simplified capacity planning.

Existing 32-bit HP-UX applications, as well as 64-bit HP-UX applications, can equally benefit from the large memory of the V-Class.

The truly dynamic nature of this solution allows the system to make unused resources available to other applications. This allows better utilization of available resources and a potential reduction in TCO, particularly if the different applications require peak performance at different times of the day. Management complexity of a more distributed configuration in one or multiple chassis can also be significantly reduced. And, for true high-availability requirements, a second system can be stacked without requiring additional floor space.

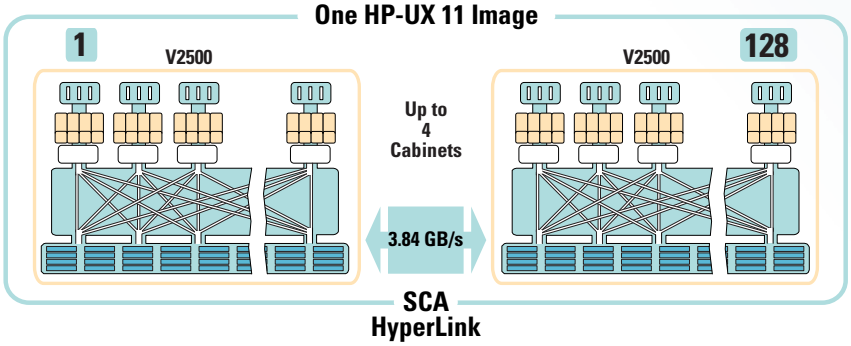
Delivering the Complete Platform Solution

Industry-Leading HP-UX 11—HP's highly scalable, mainframe-class 64-bit operating system enjoys the highest level of ISV enthusiasm and allows you to choose from more than 15,000 applications. All major databases and leading ERP applications are available as native 64-bit versions. Complete binary compatibility significantly lowers the risk, effort, and cost of migrating to IA-64–based systems in the future. HP-UX 11 also turns the V-Class into an ideal Java™ platform and provides sophisticated Windows NT® integration.

High Availability for Mission-Critical Applications—HP's vision for the platform, operating system, and applications—articulated as 5nines:5minutes—will provide mainframe availability for UNIX systems. As a stepping stone towards delivering on this vision, today HP offers Mission Critical Server Suites that guarantee 99.95% uptime for selected V-Class configurations. And with HP Campus, Metro, and Continental Clusters, HP provides the widest and most robust range of disaster recovery solutions to ensure the highest levels of availability—beyond what a mainframe can provide.

Mass Storage Choices to Meet Your Connectivity, Capacity, and Performance Needs—HP's V-Class supports a wide range of HP's industry-leading mass storage components. Combined with our partnership and close integration with EMC Symmetrix, HP storage solutions deliver the highest levels of performance, connectivity, and capacity to your mission-critical data center.

World-Class Consulting, Service, and Support—Consistently rated at the top for excellence in customer support, HP Consulting has extensive experience in defining, sizing, and implementing projects such as large-scale mainframe-alternative and ERP projects. The goal of our consulting, service, and support offerings is to work with you to establish an IT infrastructure that will help ensure your business success.



Technical Specifications

	V2250	V2500 (1 Cabinet)	V2500 (4 Cabinets) SCA configuration
System Processing Unit			
Central processor	64-bit PA-RISC PA-8200	64-bit PA-RISC PA-8500	64-bit PA-RISC PA-8500
Clock frequency	240 MHz	440 MHz	440 MHz
Number of processors	1–16	2–32	2–128
Cache size (per processor)	Direct map 2-MB L2 Data Cache 2-MB L2 Instruction Cache	Four-way set-associative 1-MB L1 Data Cache (on-chip) 0.5-MB L1 Instruction Cache (on-chip)	Four-way set-associative 1-MB L1 Data Cache (on-chip) 0.5-MB L1 Instruction Cache (on-chip)
Operating environment	HP-UX 11	HP-UX 11	HP-UX 11*
HyperPlane Crossbar, Memory Subsystem (SMP, SCA)			
Memory architecture	Crossbar-based symmetric multiprocessor (SMP)	Crossbar-based symmetric multiprocessor (SMP)	Crossbar-based symmetric multiprocessor (local cabinet) Cache-coherent, non-uniform memory access (remote cabinet)
Type	8 × 8 non-blocking multiported crossbar	8 × 8 non-blocking multiported crossbar	8 × 8 non-blocking multiported crossbar (local cabinet) 8-way interleaved, split-transaction SCA HyperLinks (remote cabinet)
Bandwidth (peak)	15.36 GB/s	15.36 GB/s	61.44 GB/s (aggregate peak)
Memory capacity	1 GB to 16 GB ECC protected	1 GB to 32 GB ECC protected	4 GB to 128 GB ECC protected
Memory interleaving	Up to 32-way	Up to 256-way	Up to 256-way per cabinet
I/O Subsystem			
Number of channels	8 × 32-bit PCI	8 × 64-bit PCI	32 × 64-bit PCI
Channel bandwidth	240 MB/s (bidirectional)	240 MB/s(bidirectional)	240 MB/s (bidirectional)
Peak aggregate I/O channel bandwidth	1.9 GB/s	1.9 GB/s	7.6 GB/s
Number of PCI I/O cards	1–24	1–28	4–112
I/O controllers supported	FWD SCSI-2, ATM, Fibre Channel, Token Ring 10/100Base-T, 1000Base-SX, FDDI, HyperFabric, X.25	FWD SCSI-2, Ultra2 SCSI, ATM, Fibre Channel, Token Ring 10/100Base-T, 100 Base-Fx, 1000 BaseSX GB, FDDI, HyperFabric, X.25	FWD SCSI-2, Ultra2 SCSI, ATM, Fibre Channel, Token Ring 10/100Base-T, 100 Base-Fx, 1000 BaseSX GB, FDDI, HyperFabric, X.25
User accessible media drives	650-MB 12X CD-ROM drive 12-GB DDS-3 DAT drive	DVD drive 12-GB DDS-3 DAT drive	DVD drive 12-GB DDS-3 DAT drive
Internal Storage (not supported for HA configurations)			
Number of drives	16	16	64
Capacity (max)	288 GB	288 GB	1.1 TB
External storage	Supported in 19" RETMA standard Rack Up to 40 TB of Fibre Channel information storage	Supported in 19" RETMA standard Rack Up to 50 TB of Fibre Channel information storage	Supported in 19" RETMA standard Rack Up to 200 TB of Fibre Channel information storage
Physical Specifications			
Cabinet dimensions	39" (99.06 cm) + 31.5" (80.01) + 37" (93.98 cm) per cabinet	39" (99.06 cm) + 31.5" (80.01) + 37" (93.98 cm) per cabinet	39" (99.06 cm) + 31.5" (80.01) + 37" (93.98 cm) per cabinet
Maximum cabinet weight	490 lb. (222.73 kg)	490 lb. (222.73 kg)	490 lb. (222.73 kg)
Environmental Specifications			
Operating temperature	60–80°F (15.6–26.7°C)	60–80°F (15.6–26.7°C)	60–80°F (15.6–26.7°C)
Humidity	40–60%	40–60%	40–60%
Thermal dissipation	5500 W (4351 kcal/h) maximum	7500 W (5934 kcal/h) maximum	7500 W (5934 kcal/h) maximum
Power requirements	208/220 VAC single-phase (U.S.) 200 VAC single-phase (Far East) 230 VAC single-phase (Europe)	208/220 VAC single-phase (U.S.) 200 VAC single-phase (Far East) 230 VAC single-phase (Europe)	208/220 VAC single-phase (U.S.) 200 VAC single-phase (Far East) 230 VAC single-phase (Europe)

* SCA available in 2QCY99.

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