

SUPERMAX

ENTERPRISE SERVERS

TECHNICAL OVERVIEW



Supermax Enterprise Servers

Supermax Enterprise Servers are a series of UNIX® servers and mid-range computers developed and manufactured by DDE. The product line is characterized by open systems conformance combined with industry-leading multiprocessor technology providing wider-ranging scalability and higher performance. These two features enable the Supermax Enterprise Servers to support from 1 to more than

1000 truly concurrent users and to offer 'right-sized' configurations across this entire span. Typical applications of Supermax Enterprise Servers are:

- High power database servers
- Enterprise departmental servers
- Multi-purpose superservers for PC-clients
- Alternative mainframes.

Depth and Width

The above mentioned fields of application require both depth and width in the services provided, and database server qualities are in focus. Hence, a complete set of features such as scalability, high availability, security and high performance is provided which combined makes the Supermax Enterprise Server the ultimate database server.

Furthermore, a wide range of useful server features are offered: file serving, printer serving, boot serving, mail serving, communications serving, name serving, database serving, applications serving, etc.

By supporting these general purpose services as well as the exceptionally strong database services, all integrated on one powerful server platform, the Supermax Enterprise Server enables the user to operate, manage, maintain and upgrade a complete server system in a very cost effective, reliable and secure manner.

SVR4.2 MP Operating System

The operating system implemented on Supermax Enterprise Servers is the System V Release 4.2 MP (SVR4.2 MP) from SCO/Novell/AT&T. This new, high performance and fully multi-threaded operating system complies with the XPG4 standard from X/Open. Being based on multiple

R4400 RISC processors from Mips Technologies Inc. the Supermax Enterprise Server was the first server with Mips processors to implement SVR4.2 MP.

Multiprocessing Architecture

The very sophisticated SMP (Symmetric Multi-Processing) architecture combined with extremely fast bus technology provides out-standing scalability by enabling the best single-processor performance available to be multiplied into the mainframe and supercomputer range of performance while still maintaining the cost effectiveness of standard processor technology.

The Supermax Enterprise Server architecture is prepared to allow for an elegant combination of SMP and SMC (Shared Memory Clustering) architectures to provide an as yet unseen degree of scalability and anticipation of future technological evolution. When performance increases are required, the user may upscale either through SMP or - if any new SMP bottlenecks are encountered - by expanding through SMC.

Unlike MPP (Massive Parallel Processing) architectures, which lack shared memory features, the unique Supermax architecture ensures close interprocessor coupling by providing the processors with both shared and local memory.



Scalability

The unique two-level modularity provides fine-granular and extremely wide-ranging scalability, so far unmatched. Each Supermax configuration consists of a number of identical CPU module boards, memory module boards and I/O module boards. All of these three types of module boards are modular in themselves and consist of a number of submodules.

This hardware modularity provides, together with the multiprocessing operating system, a configuration span from a few to more than a thousand truly concurrent users. The configurations are expandable in convenient steps and flexible for exact dimensioning for each specific application. Binary compatibility (software portability) exists across the entire configuration span.

In addition to scalability, the comprehensive modularity provides a very attractive means of upgrading systems - module by module - as technology evolves over time and new generations of modules are released.

High Availability

Supermax Enterprise Servers are designed as 'nearly non-stop' systems but, unlike real non-stop systems, they are based on cost effective open

systems technology. High availability features include:

- Robust design and component selection.
- Mirrored and hot swap hard disks with automatic updating from mirror upon swap.
- Plus-1-redundant and hot swap power supplies.
- Fail-over clustering using dual hosted disk-array technology.
- Fast reboot through journalizing file system.
- Online disk and file system management.
- Hardened UNIX kernel.

New advanced RAID Disk System

The Veritas disk system is scalable to a very high level of performance, security and capacity. In-cabinet RAID 0 through 5 is supported as well as online file system resizing, online backup, performance monitor / analysis, and online disk management with fully graphical management tools.

Open Systems Conformance

Portability standards supported include: System V Release 4.2 MP (SVR4.2 MP), X/Open XPG4, Unified UNIX (Spec 1170), POSIX and MIPS ABI. The last mentioned standard ensures binary compatibility with MIPS ABI compliant UNIX computers from Concurrent Computer Corp., Control Data,

NEC, Pyramid Technology, Silicon Graphics, Siemens Nixdorf, Sony and Tandem. As a result, shrink-wrapped standard software and other software generated for the MIPS ABI can be run straight away. Interoperability standards supported include: TCP/IP, OSI and SNA.

Security

The Supermax Enterprise Server conforms to various very strict security levels as defined by the US Department of Defense (Orange Book) and EU (ITSEC). The actual security level applied is optional according to site-specific security policies and external requirements such as public filing legislations.

Compound Database Server Features

The unique mix of parallel multiprocessing,

scalability, high availability and high security positions the Supermax Enterprise Servers as very powerful database servers. Additionally, a dedicated effort has been made to tune operating system implementation and database ports to each other. Even the adding of special functionality to both operating system and databases has been involved to obtain an extremely fast database server which performs remarkably well - not just running benchmarks - but also running real *live* applications.

Green Computer

Throughout the design and production process of the Supermax Enterprise Servers full environmental caution is exercised. No assembling glues, liquid paint or varnish are used. Furthermore all cabinet and printed circuit board materials are fully recyclable.

Product Overview

Multiprocessor Architecture

- 1 to 56 CPUs.

- Binary compatibility across the entire range of Supermax Enterprise Servers.

Quadruple CPU Subsystem R4400

- Based on the standard R4400MC processors designed by Mips Technologies.
- Symmetric Multiprocessing (SMP) support.
- Modular design with 4 CPU submodules mountable per main CPU subsystem.
- RISC (Reduced Instruction Set Computing) architecture.
- 200 MHz or 150 MHz internal clock frequency
- Hardware-supported cache coherence.

- 32 KB internal primary cache with 1600 MB/sec transfer rate and copyback type operation.
- 4 MB or 1 MB on-board secondary cache with 400 MB/sec transfer rate and copyback type operation.
- 64 bit processor implementation.
- 8-stage superpipeline.
- On-chip Floating Point Unit implementing the IEEE standard 754-1985.
- 534 MB/sec (B = bytes) burst transfer rate from memory systems to cache memories.

Memory Subsystem Module.

- Contains mounting bases for 2+2 memory submodules.
- Supports error detection and error correction codes.
- Interleaved operation.

Memory Submodules.

- Available with 32 MB, 64 MB or 256 MB. The maximum size of memory on one memory motherboard module is 512 MB, i.e. two submodules of 256 MB each.
 - Supports block mode transfers.
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I/O Subsystem

- Handles I/O to hard disks, diskettes, tapes and other mass storage devices
- Connects peripheral devices such as asynchronous terminals, PCs, printers and modems to the Supermax Enterprise Server
- Connects communications networks (LANs and WANs) to the Supermax Enterprise Server
- Intelligent module with Mips R3052E RISC processor
- Modular design with a base unit to which one, two or three submodules are attached. The base unit itself provides:
 - Two independent Fast and Wide SCSI-2 host interfaces for connection to peripheral units.
 - The SCSI-2 interfaces conform to ANSI X3.131

- Each SCSI-2 interface supports up to 7 devices.
- Concurrent operation of the two SCSI-2 interfaces supports mirrored disk systems and dual-hosted disk systems.
- One Ethernet interface supporting RJ45, BNC or AUI.
- Two asynchronous channels for serial RS232 console connection etc.

Ethernet Submodule

- Provides two connections to Ethernet LANs via RJ45 and/or BNC.

HDLC Submodule

- Equipped with two V.36/X.21 ports and two V.24/X.21bis ports.

Internal Service Computer

- Internal Service Computer for monitoring and supervision of the Supermax.
- Front panel LCD display.
- Battery-backed-up realtime clock.

- Temperature monitoring and fan control logic.
- Power supply voltage monitoring and adjustments during diagnostics.
- Up-time statistics and extended error logging.

4.8 GB Hard Disk

- High-quality disk.
- Formatted capacity: 4095 MB.
- Half-height 3½" form-fit mounting.
- Average seek time: 8 msec.
- Rotation speed: 7200 RPM.
- MTBF: 1,000,000 hours.

2.4 GB Hard Disk

- High-quality disk.
- Formatted capacity: 2047 MB.
- Half-height 3½" form-fit mounting.
- Average seek time: 8 msec.
- Rotation speed: 7200 RPM.
- MTBF: 1,000,000 hours.

Tape Drives

- 5 GB, 8 mm Video Streamer, 500 KB/sec.
- 2.3 GB, 8 mm Video Streamer, 250 KB/sec.
- 4 GB, 4 mm DAT Tape Unit, 510 KB/sec.
- 2.4 GB, ¼" Cartridge Streamer, 300 KB/sec.
- 525 MB, ¼" Cartridge Streamer, 220 KB/sec.

Floppy Disk Drive

- 3½" Floppy Disk Drive supporting formats with capacities of 720 KB and 1.44 MB.

CD ROM

- 600 MB Quadra Spin.
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Supermax Enterprise Servers Cabinets

	Supermax 16	Supermax 8	Supermax 5	Supermax 3	Supermax Disk Cabinet
Configuration range					
CPU's	1 - 56	1 - 24	1 - 12	1 - 2	
Memory modules	1 - 14	1 - 6	1 - 3	1	
Max. no. of modules	16	8	5	3	
SCSI-2 channels	2 - 16	2 - 8	2 - 6	2	
Network interfaces	1 - 178	1 - 70	1 - 35	1 - 9	
Mass storage					
Hard disks	1 - 30	1 - 18	1 - 12	1 - 6	1 - 18
Front-mounted units	1 - 10	1 - 6	1 - 4	1 - 4	1 - 6
Power requirements					
Voltage A	400/3N±15%	400/2N±15%	230 ±15%	230 ±15%	230 ±15%
Current A	18	12	6	4	3
Frequency Hz	47 - 63	47 - 63	47 - 63	47 - 63	47 - 63
Environmental requirements					
Temperature	10 - 35°C	10 - 35°C	10 - 35°C	10 - 35°C	10 - 35°C
Humidity, non-cond.	20 - 80%	20 - 80%	20 - 80%	20 - 80%	20 - 80%
Physical dimensions					
Height	1000 mm	1000 mm	1000 mm	1000 mm	1000 mm
Width	680 mm	470 mm	370 mm	370 mm	470 mm
Depth.	1020 mm	1020 mm	1020 mm	1020 mm	1020 mm
Electro magnetic compatibility (EMC)	Supermax Enterprise Servers complies with the requirements specified in EN 55022 B and FCC part 15, subpart J, class B.				
Safety	Supermax Enterprise Servers complies with the requirements specified in IEC 950, EN 60950 and UL 1950.				

All Supermax Enterprise Server cabinets feature:

- In-cabinet RAID.
- Hot-plug hard disks.
- Hot-plug power supplies



Operating System

- System V Release 4.2 MP.
- Complies with XPG4 from X/Open.
- Complies with POSIX from ISO.
- Complies with System V Interface Definition (SVID) from SCO/Novell/AT&T.
- Committed X/Open Unified UNIX (Spec 1170) compliance.
- Complies with MIPS ABI.
- Features the Veritas Advanced File System, Volume Manager and Visual Administrator.
- Realtime UNIX implementation with fully preemptive kernel, realtime scheduler and supporting POSIX Realtime Extensions.
- Supports shutdown control from UPS.
- Supports 8 bit ISO 8859-1 character set.

Database and 4GL Support

- INFORMIX.
- ORACLE.
- PROGRESS.

Programming Languages

- C - ANSI X3J11, ISO/IEC 9899-1990.
- C++.
- Fortran - Enhanced Fortran 77/ANSI.
- Pascal - Enhanced ANSI/IEEE.
- COBOL-85 incl. Panels/Companion.

Other Development Tools

- Motif.
- X Window System.
- USoft.
- C-ISAM.
- and other tools.

Networking protocols and networking applications

	OSI protocols	TCP/IP protocols	SNA protocols
Terminal and printer access	X.3 PAD X.29 Remote Login DDE-Term	Telnet TN3270 DDE-Term	3270/SNA
Electronic mail	X.400 (88)	Sendmail SMTP/UUCP POP/IMAP2	SNADSmial (LU6.2)
File transfer		FTP UUCP	3770/SNA RJE 3270/SNA File Transfer
Distributed File Systems and Databases	MS Advanced Server for UNIX (LAN Manager)	MS Advanced Server for UNIX (LAN Manager) NFS	
Program-to-Program Communication	TLI MS Advanced Server for UNIX (LAN Manager)	TLI, Sockets, RPCs TCP NetBIOS MS Advanced Server for UNIX (LAN Manager)	3270/SNA API
Directory Service	X.500	DNS	
Network Management		SNMP Open/View	
Internet connectivity		World Wide Web/HTTP News/NNTP	

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