

Hardware Product

RM600 CS45-Single / CS45-Dual

Reliant Cluster Server II Model

RM600 CS45 - Enterprise Server for unbeatable performance

The RM600 CS45 server generation has been developed to meet the very highest requirements in the UNIX enterprise server class. It is based on the tried-and-tested RM600 E systems, which offer a hardware platform ideally suited for server consolidation. In design, technology and performance, they set standards in keeping with the overriding importance of your information technology infrastructure to the competitiveness of your company.

In day-to-day corporate life, RM servers prove their worth not only by virtue of their technical superiority, but also because of their cost-effectiveness in operation. This covers long-term considerations of the total cost of ownership (TCO) just as much as the reliability of a long-term development strategy that is based on continuity. Make sure you get the picture - and let yourself be convinced of the performance muscle of a server family that is making its mark in the UNIX market.

The CS45 Enterprise Server provides you with one system in addition 36 PCI slots in an I/O chassis or two independent systems in one cabinet, which can be expanded to form a cluster with two nodes. (Cluster in a Box).

This design allows you to utilize both the cabinet and the footprint to the full.

Based on the innovative system architecture of the RM600 E systems, the entire performance spectrum of the Reliant UNIX servers is available in the RM600 CS45 system, with up to 24 processors and 24 gigabytes in a single cabinet (2 nodes).

The following components are supplied ready configured with the cabinet:

RM600 CS45 (2 nodes)

- 1 Ethernet port for console connection and for LAN applications.
- Failover Edition with live monitoring via Ethernet

The combination of these elements in a single cabinet provides a wide range of options to set up powerful cluster configurations.

The external dimensions of the cabinet have been carefully chosen to ensure that the cabinet will fit through any standard doorway, both height-wise and width-wise, complete with its packaging.

This configuration enables rapid deployment at the required location in your data center. The RM600 CS45 is designed to meet your requirements, delivering ready-to-run high-availability solutions direct from the factory.



Space-saving design concept

The cabinet comes with all the components required, including those for cluster installation, such as remote communication adapter and Ethernet hub, permanently preinstalled. Therefore all you need for both systems is a single LAN access facility. By interconnecting a number of cabinets, either stringing them closely together or with greater distances between them, it is thus possible to implement large configurations as compact functional units or as disaster recovery solutions.

Investment protection

Thousands of RM server systems prove themselves day in, day out, in organizations of all sizes, across all sectors of trade and industry. The benefit for you is system stability, based on tried-and-tested technology. By engaging in close dialogue with our customers we also receive constant suggestions and ideas arising out of real-world use of the systems, and all this practical experience is fed into further developments at the same time as we integrate innovative technologies. In this process we are constantly guided by the principle of binary compatibility based on the standardized Reliant UNIX operating system. For you as the customer, this consistency pays off in the long term, as your RM server upgrades are also guaranteed in the future. Another bonus is the stability of Siemens and Fujitsu, two of the leading IT suppliers operating in the international markets.

Cost-effectiveness

If you compare our performance offering on the basis of cost, we will gladly direct your attention to the outstanding scalability of the RM600 CS45. This model represents a tailor-made configuration incorporating precisely those performance features that your company needs today.

If your requirements change, we can respond quickly and upgrade your RM600 CS45 to match the growth in need, simply by adding further components. There are

virtually no limits to your flexibility, or ours. In any node, for example, main memory can be expanded to a maximum of 12 GB and the number of processors can be increased to 12 with an almost linear rise in performance.

High availability

You can rely on the high availability (HA) of the RM600 CS45, anytime and anywhere. Many companies base their decision to opt for our RM servers on this consideration, which is of considerable relevance in view of the importance of trouble-free IT operation.

The RM600 CS45 server satisfies customer requirements in all areas of commercial data processing. The many installations handling online transaction processing (OLTP), data warehousing (DWH) and mission-critical applications (R/3, BAAN) are impressive confirmation of this.

Technology

The impressive system performance, exceptional scalability and high availability of the RM600 CS45 are based on its advanced symmetrical multiprocessor (SMP) architecture. This supports dynamic load balancing and parallel processing of applications on multiple processors. It enables up to 12 processors to be interconnected in one node to match individual performance requirements. Up to 24 processors are available in a "Cluster in a Box". Further nodes are added if performance requirements exceed these levels. In the RM600 CS45, optimally tuned system configurations, state-of-the-art processor boards and bus systems translate the high processor performance into top-class data throughput rates. The evidence is clear: the RM600 CS45 offers the flexibility to cope effortlessly with increasing performance requirements.

Technical openness

Integration into existing data center installations is made easy thanks to the availability of all today's most common drivers and interfaces. Connection of RAID,

FC600 E (Fibre Channel disk subsystem), tape libraries, robot systems and other storage subsystems is possible via Fibre Channel or SCSI with load balancing. Today more than ever, heterogeneous installations including NT servers are deployed in many data centers with RM servers.

Reliant UNIX

According to the requirements of the market, Fujitsu Siemens has developed Reliant UNIX into a 64 bit operating system which satisfies the growing demands of the customers for performance and scalability.

With the introduction of 64-bit technology in Reliant UNIX, Fujitsu Siemens has set a new milestone in the evolution of this operating system. The 64-bit operating system version is fully backward-compatible to the 32-bit world, permitting all 32-bit applications to continue to work without any restrictions, and in parallel to 64-bit applications. Numerous enterprise applications, such as high-end transaction processing, data warehousing, but also applications from the areas internet, audio and video, gain performance benefits from the use of 64-bit technology.

The current release of Reliant UNIX 5.45 for RM systems is optimized for supporting cluster configurations. If customers talk about clusters they typically administer clusters; high availability clusters or scalability clusters have less importance. In order to fulfil these requirements Reliant UNIX 5.45 offers a new web-based administration concept WebSysAdmin with its components Visual Config and VDisk Lite which provide easy administration, easy configuration and improved maintenance of systems in the network.

Reliant UNIX 5.45 contains many other functional extensions, representing a genuine plus over "straight" SVR4.

High availability

With the RM600 CS45, the requisite level of availability can be provided through the installation and combination of different standard components according to your requirements:

- Battery backup unit (BBU), and/or uninterruptible power supply (UPS). The signaling links to the system ensure data consistency and fast database restart following a protracted power failure.
- Redundancy and online replacement (OLR) for fans, system power supply (optional) and mirrored hard disks.

New performance features

Fibre Channel

Fibre Channel is a technology that grew out of concerns about high availability. Basic fault detection mechanisms are an integral part of the specification. To ensure operation can continue even if a connection goes down, Fibre Channel uses redundancy and multipath technology. The user data is stored in FC600 E cabinets or in RAID systems connected to the server via redundant Fibre Channel connections .

Cluster technology

With the Reliant Cluster Server II (RCS), Siemens provides the basis of cluster technology for failover clusters and for database clusters with ORACLE or INFORMIX. Ethernet, Fast Ethernet or Gigabit Ethernet are the preferred communication protocols for Cluster Interconnect links for failover and for covering great distances.

PCI 64-bit subsystem

Using this new technology it is possible to achieve a high I/O capacity with a 64-bit bus width and a high I/O performance based on a 64-bit EHIOS PCI subsystem. In addition to the new 64-bit FC and Gigabit Ethernet controllers, all 32-bit PCI controllers of the RM600 E series can also be used, such as the new WAN and ISDN communication controllers.

System architecture

The RM600 CS45 UNIX SMP server consists of standardized functional units. The 128-bit Synchronous Pipelined Bus (SPbus), which is clocked at 55 MHz, forms the backbone of the central unit. The processor boards with their local main memory are directly connected to the SPbus, as also are the enhanced high-performance I/O boards (EHIOS) with the PCI subsystems for connecting the I/O controllers. The PCI I/O controllers are used to connect mass storage devices, communications facilities and LAN.

Processor board

Depending on the base configuration of each model the processor boards can accommodate 2 or 4 Risc processors MIPS R12000/360 MHz and up to 4GB of main memory. Each processor has access to an onboard. The SLC uses copy-back memory technology and has error correction code (ECC) protection. Processor boards with either 2 or 4 processors and main memory in steps of 256MB can be upgraded in the field

ccNUMA architecture

In choosing the ccNUMA architecture (cache-coherent Non-Uniform Memory Access) we are helping to give a major boost to memory access speeds and at the same time significantly increase the data throughput of the overall system - Performance to delight not just IT specialists but also cost-conscious customers.

CS45-Single I/O chassis

Up to 36 PCI slots in the I/O chassis can be accommodated among the upper node in the same rack.

I/O cabinet

RM600 CS I/O (24" rack)

Up to 72 (36/node) further PCI slots can be accommodated in an add-on cabinet, thereby offering a large number of additional I/O connection options.

Expandability of an RM600 CS45

Components		
System cabinet, each node expandable with:	CS45-Single	CS45-Dual
Processor board With 2 or 4 processors	1 - 3	bis 2 x (1 – 3)
Number of processors	4 - 12	bis 2 x (2-12)
Main memory: per processor board per system	2 GB - 4 GB 2 GB - 12 GB	1 GB - 4 GB 2 x (1 GB - 12 GB)
1st local PCI subsystem with EHIOS board (basic) with submodule PCI subsystem local SCI adapter , optional	2 x V.24 (console, Teleservice) Submodules: 1x8SE, 2x16SE 2 PCI buses each 3x32-bit, 3x64-bit data width 0 – 1 x SCI ring adapter	
EHIOS-SCI , optional	Interface for 2 SCI rings for external PCI subsystems	
2nd local PCI subsystem SCI adapter , optional	2 PCI buses each 3x32-bit, 3x64-bit and 0 – 1 x SCI ring adapter	
SCSI strings in the system cabinet: 8-bit SE 16-bit SE	1 x for removable media drives 2 x for system disks	
Drive bays for removable media 3½-inch 8-bit SE 5¼-inch 8-bit SE	3 2	2 x 3 2 x 2
I/O area	0 – 3 PCI subsystem	
Remote communication adapter	TCP/IP Ethernet, 10BaseT / RJ45 connection	
8 Port HUB (Class II Repeater)	every 10/100Mbps (RJ45)	
Drive bays for hard disks	10	2 x 10
Maximum values are in part mutually exclusive		
Expansion cabinet, expandable with:	0 - 4	0 - 8
Hard disk bays	36	
PCI subsystem, external (per 12 PCI slots)	0 - 1	
24" I/O cabinet, expandable with:	-	0 - 1
2*PCI subsystem, external (per 12 PCI slot)	-	2 - 3
FC600 E cabinet	0 - 4	
expandable up to 48 HD drives with:	1-4 disk chassis per 12 drives	
BBU cabinet, expandable with:	0 - 2	0 - 4
Max. disk capacity in TB with 36-GB drives and max. no. of cabinets	12 TB formatted	17,2 TB formatted
Terminal / printer connection	via commercially available terminal servers	
PCI controllers (per PCI subsystem) WAN X.21/V.24/V.35 ISDN S ₀ ISDN S _{2M} Fibre Channel 100 MB/s Fast-Ethernet 100 Mbit/s Gigabit Ethernet FDDI (SAS/DAS) Token Ring ATM 155 Mbit SCSI Ultra, 16-bit ESCON Adapter	0 – 12 0 – 12 0 – 8 0 – 8 0 – 8 0 – 4 0 – 2 0 – 2 0 – 4 0 – 12 0 – 2	
Teleservice	Modem and Tele-X software	
Redundant power supply	Optional	
Console	Connection via LAN	

Technical Data

RM600 CS45 node

MIPS R12000 processor

Clock speed (MHz)	360
0.35 μ technology	
6,100,000 transistors	
Processing width (bits)	64
Floating-point unit (FPU)	on chip
Memory management unit (MMU):	on chip
Primary cache	
- instruction cache (KB)	32
- data cache (KB)	32
Second-level cache controller	on chip
Second-level cache (MB)	8
Cache management	2-way associative
Processor performance (estimated)	
RM600 CS45 with SLC 8 MB :	
- for one CPU (SPECint95)	20
Throughput :	
- for 12 CPUs (SPECint_rate95)	4369

(Note: 1 MB = 2²⁰ bytes, 1KB = 2¹⁰ bytes)

Processorboard

Number of processors	2 or 4
RAM on board	max. 4 GB
RAM upgrade increments	256 MB

Number of processor boards

RM600 model CS45 / node:	max. 3
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Main memory configuration

SDRAM 256 MB in 64-Mbit technology, multibit error detection and 1-bit error correction (ECC).
 Maximum onboard main memory capacity over multiple processor boards with:

RM600 model CS45 / node:	12 GB
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Hard disks

3½" hard disk drives (16-bit, Fast SCSI-2) in rackmount chassis for direct plugging into system and expansion cabinets:

Hard disk drive ³⁾	9 GB	18 GB	36 GB
Capacity, formatted (GB)	9,1	18	36
Speed (rpm)	10.000	10.000	10.000
Average latency time (ms)	2,99	2,99	2,99
Avg. positioning time (ms)	5,4/6,0 ²⁾	5,4/6,0 ²⁾	5,4/6,2 ²⁾
Data transfer rate (MB/s)	20	20	20

¹⁾ with data compression

²⁾ read/write

³⁾ 1 MB = 10⁶ bytes, 1 GB = 10⁹ bytes

MTC drives

MTC drive 8mm	7/14¹⁾ GB
- Form factor	5¼" HH
- Storage capacity, formatted (GB)	7/14 ¹⁾
- Average data transfer rate (MB/s)	0.5/1
MTC drive 8mm	20/40¹⁾ GB
- Form factor	5¼" HH
- Storage capacity, formatted (GB)	20/40 ¹⁾
- Average data transfer rate (MB/s)	3/6 ¹⁾
MTC drive 1/4-inch	4/8 MB
- Form factor	5¼" HH
- Storage capacity, formatted (MB)	4/8 ¹⁾
- Average recording speed (KB/s)	387
MTC drive 4mm (DAT)	12/24¹⁾ GB
- Form factor	3½"(1.6 inch)
- Storage capacity, formatted (GB)	12/24 ¹⁾
- Average data transfer rate (KB/s)	1000

CD-ROM drive (32-speed with caddy)

- Form factor	5¼" HH
- CD-ROM media	650 MB
- Data transfer rate (MB/s)	2-4.8 MB/s

or

DVD-drive

- Form factor	5¼" HH
- Storage capacity (CD-ROM Media)	≤ 650 MB
- Storage capacity (DVD-ROM Media)	≤ 4,3 GB
- Data transfer rate (MB/s)	5 MB/s

Floppy disk drive

- Form factor	3.5"
- Storage capacity, formatted (MB)	1.44
- Data transfer rate (Kbit/s)	500

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