Datasheet

Fujitsu Software BS2000 VM2000 V12.0

FUJITSU

Virtual Machine System

Virtual machine system for BS2000 SE Servers

A virtual infrastructure like Fujitsu Software BS2000 VM2000 reduces IT costs by increasing efficiency, flexibility and response capability. It provides IT resource allocation on-the-fly in response to new business requirements and service requests. Extremely high levels of server utilization are a byproduct.

VM2000 supports the simultaneous operation of different, totally segregated system environments on one server. The operating resources (CPU power and main memory) of one real server can be distributed across up to 32 BS2000 guest systems. This distribution can be modified dynamically. The configuration of peripherals, including their connections (channels), and other devices can be modified or extended during live operation.
The advantage of using VM2000 as compared with the use of multiple servers is the possibility of consolidation with the aim of providing more efficient use of hardware resources, human resources and infrastructure.

Green IT

Features and benefits

Main features	Benefits
• Concurrent operation of up to 32 BS2000 systems on one Server Unit x86 and up to 15 BS2000 systems on one Server Unit /390	• Enables consolidation with the aim of providing more efficient use of hardware resources, human resources and infrastructure
• Totally segregated system environments	• Production, development, testing or sensitive applications can be insulated from one another
• Workload balancing between the systems	• Computing power not required from one system can be used by another system
• Server CPU capacity quota can be allocated to the guest systems	• The computing capacity assignment to the systems can be ensured corresponding to the business priority
• uninterruptable relocation of a running BS2000 guest system	• Reduce planned downtimes

Topics

Functional description

In order to optimize the handling of diverse IT tasks, there is a growing requirement for the BS2000 operating system to support different system environments concurrently. VM2000 supports concurrent operation of different system environments on one server, each totally insulated from the others. This allows the deployment options outlined below.

Concurrent operation of several production systems

Sometimes it is not possible to run all production applications of an enterprise on the same system because different system environments are required. It can be necessary to separate sensitive applications (e.g. payroll accounting) from other production applications. The applications have to be run in different systems. VM2000 enables setting up this scenario on one physical server.

Concurrent production, development and testing

Test systems always harbour an inherent risk of generating errors. For this reason it is not practice to perform tests in parallel with live operation on production systems. VM2000 allows this. Test and production systems can run on the same installation because system errors in one system have no impact on the other concurrently active systems. With VM2000, the individual production applications can be tested in a second guest system until all errors have been eliminated. Only then are the applications deployed in the production system.

Differentiated systems for e.g. service providers

Data centers that provide different customers with computing services (for production or backup) must have a number of computers available to support the different system environments necessary for this. VM2000 gives data center operators the option of installing a single high-performance computer, thus saving on floor space as well as on administrative overhead. VM2000 offers a powerful service level management that enables to guarantee a fixed server CPU quota to every customer.

Balancing of load peaks, use for backup concepts

VM2000 also includes a function enabling the main memory of a VM to be increased or reduced in size dynamically, allowing further optimization of deployment scenarios. With this feature, there is greater scope for balancing out load peaks on guest systems; temporary virtual machines can be set up “on the fly” and backup guest systems can be provided with minimal use of resources – all without the need to terminate live guest systems.

VM definition

Each BS2000 VM on a Server Unit of a SE server owns a configuration description , the VM definition. A VM definition is identified by the VM name and contains the provided or currently assigned attributes, resources and devices designated for the VM and also the state of VM. A persistent VM definition is created for VMs with the attribute PERSISTENT and is also available after a restart of a Server Unit. A persistent VM is automatically set up again and can be restarted according to the specifications.

Support of Live Migration (LM) in VM2000

Live Migration provides an uninterruptable relocation of a running BS2000 guest system from one Server Unit to another. This enables a simple relocation of the guest systems with running applications to another server, for example prior to planned maintenance work respectively updates for hardware or firmware, including the reverse relocation of the systems or changing the load distribution between two servers. Those take place without affecting the users.

A virtual machine (BS2000-VM) can be relocated from the local Server Unit to another Server Unit of the same SU cluster in a running guest system operation while maintaining the operating resources.
The Live Migration of a BS2000-VM between two Server Units /390 in SE network is fully executed by VM2000. The LM functionality of Xen/X2000 in SU x86 is encased by VM2000 commands and messages.
In addition to the Live Migration of BS2000-VM VM2000 V11.5 supports also the migration of a VM definition between two Server Units of a SU cluster.

Program description

Hypervisor

The Hypervisor controls the execution of the guest systems in the virtual machines (VMs). Especially it realizes the virtualization of the global resources CPU and main memory and activates the ready-to-run guest systems on the real CPUs (scheduling).
The Hypervisor runs on a Server Unit /390 in a separate, specially privileged functional status, which permits firmware settings that isolate VM resources. On a Server Unit x86 the Xen hypervisor takes over this role, whereat some of the hypervisor tasks for the BS2000 guest system are done by X2000 (carrier system based on Linux).

Monitor

The monitor realizes the interfaces from VM2000 to other system components and to the outside world. The administration of the VM2000 system is done within the monitor system. Two roles with different privileges exist: The administration of the overall VM2000 system and the administration of a single VM. In this respect, standardized BS2000 user interfaces are provided.
The following functions are implemented in the monitor:

- Command server for the VM2000 commands
- Message output
- VM2000 accounting
- Management of the administration dialogs and operation of virtual consoles
- VM2000 hardware error logging
- Administration of VM definition (SU /390 only)

VM1 – VMn

The individual virtual machines encapsulate the virtualized hardware environment for the monitor system (VM1) and for the guest systems (VM2 - VMn). Each VM can be administrated discretely.

Guest systems

The (BS2000) systems running in the VMs are known as (BS2000) guest systems. Guest systems essentially use the hardware resources assigned to their VM (CPU, main memory, devices) directly, i.e. without the Hypervisor as intermediary. The instruction set, the possibility of communication in computer networks as well as the testing and diagnostic aids of all guest systems running under VM2000 correspond to the native mode. The operating of the individual guest systems occurs via a console window on the SE manager.
With a HNC network connections to monitor system and all other guest systems can be built on Server Unit /390. The data transfer between the different BS2000 guest systems can be done internally in the HNC, without burdening the network.
On Server Units x86, the VMs share the integrated LAN controllers of the Server Unit. In addition, firmware-based inter-VM communication (VMnet) is offered.
The number of guest systems is dependent on the architecture of the Server Unit. On Server Unit x86 up to 32 BS2000 VMs are release, on the SU /390 up to 15.

Linux and Windows guest systems on Server Unit x86

Besides VMs with BS2000 guest systems on Server Unit x86 VMs with Linux and Windows guest systems can be set up, the so-called XenVMs.
XenVMS are only managed via the SE manager. They are not known in VM2000. Only in the display of global resources they are listed under the keyword FOREIGN.

Multiprocessor level of a VM

The maximum multiprocessor level (number of virtual CPUs) of a VM on one Server Unit x86 is 32; on one Server Units /390 the maximum multiprocessor level has been increased from 8 to 16.
At the same time, the maximum multiprocessor degree of a VM is limited by the number of physical CPUs, which are released for the BS2000 operating on the Server Unit.

Technical details

Requirements	
Technical requirements Hardware	Fujitsu Server BS2000 SE Serie, from SE-SW V6.4
Technical requirements Software	Monitor system: OS DX V1.0 Guest systems: OS DX V1.0 or OSD/XC V11.0B optionally: - OMNIS is needed for guest systems operating via virtual consoles or VM administration via application $VMCONS.
Requirements for the user	Knowledge of BS2000
Installation and operation	
Operating mode	Dialog and batch operation
Implementation language	SPL, Assembler
User interface	Commands in English, Message texts in German/English (optional)
Installation	By the customer according to the user guide
Documentation and training	
Documentation	The Manual and Release Notice for VM2000 are available on the manual server.
Training	See course offer (German)
Reference and delivery	
Conditions	This software product can be leased by the customer in accordance with the conditions for the use of software products.
Ordering and delivery information	The software product can be obtained from your local Fujitsu regional office.

Contact

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