z/VM and TCP/IP for z/VM Overview

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Introduction

- Jim Elliott, VM, VSE and Linux Product Manager, IBM Enterprise Server Sales, IBM Americas Group

Z/VM Platform Status

- George Madl, z/VM Product and Platform Manager, IBM Enterprise Server Development, IBM Server Group

Z/VM Version 3 Release 1 Product Overview

- Romney White, Senior Developer, IBM Enterprise Server Development, IBM Server Group
Announcements on October 3, 2000

IBM @server zSeries

Hardware

• IBM @server zSeries 900

VM-related Software Products

• z/VM Version 3 Release 1
• VMPRF Version 1 Release 2.2
• RTM Version 1 Release 5.3

New Software Pricing

• Workload License Charges for z/VM with z/OS
IBM's investment plan for VM focuses on three key areas:

- New hardware
  - Processor and I/O architecture
  - Storage Systems
  - Networking
- Utility support
  - Exploit VM's unique and powerful virtual server capabilities
  - Increase VM's value for enterprise server solutions
- Connectivity support
  - Focus on TCP/IP protocols and applications
  - Improve server and client access to, or from, VM systems

z/VM offers key technologies for IBM @server zSeries 900 customers looking to maximize their e-business success
z/VM Version 3 Release 1
Product Overview

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Topics

IBM  zSeries

VM Release Status

z/VM Version 3 Release 1 Overview

Related Products for z/VM
VM Product Evolution

VM/ESA Version 1

VM/ESA Version 2

VM/ESA Version 3

VM/XA SP

VM/SP HPO

VM/SP

R1.0 ESA

12/93

12/93

R1.1

12/94

12/91

R2.0

3/95

12/92

R2.1

7/93

5/94

R2.2

V2 R1

10/95

V2 R2

12/96

V2 R3

3/98

V2 R4

10/99

V3 R1

10/99

1/01

3/98

7/99

2/2001

z/VM

R1.0 370 Feature

12/94

12/94

12/93

VM/ESA Version 1

VM/ESA Version 2

VM/ESA Version 3

Currently marketed

No longer serviced

Withdrawn from marketing

Release GA date

End of service date

IBM eServer zSeries

IBM eServer. For the next generation of e-business.
z/VM Version 3 Release 1

IBM @server zSeries

Generally available February 23, 2001

Supported processors

- IBM @server zSeries 900 (64-bit and 31-bit mode)
- 31-bit mode only:
  - S/390 Parallel Enterprise G3, G4, G5, G6 Servers
  - Multiprise 3000 and Multiprise 2000
  - S/390 Parallel Enterprise R2 and R3 Servers
  - P/390 and R/390
  - S/390 Integrated Server
z/VM V3R1 New Function

IBM @server zSeries

Cost of Computing and Classic Strengths

- z/Architecture support
  - 64-bit real and virtual addressing
  - Improved guest Parallel Sysplex support
  - Guest pages and minidisk cache above the 2GB line
  - VM Dump Tool

- Device Support Improvements
  - Native Shark FlashCopy support
  - FICON Tape Subsystem attachment support
  - Guest support for VTS import/export

Application Support

- Binder/Loader
- CMS NFS Client
- Converged sockets APIs

Connectivity Enhancements

- Native TCP/IP exploitation of QDIO (OSA Direct Express GigaBit Ethernet)
- SSL Server for TCP/IP stack
- IP Multicast
- OSPF
- FTP enhancements

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IBM @server® zSeries 900

IBM @server® zSeries

26 Models (1-16 way)
64-bit Architecture
  • Up to 64 GB of central processor storage
Up to 15 LPARs
  • Maximum 64 GB of storage per LPAR
Enhanced I/O subsystem supports greater bandwidth
  • Up to 256 ESCON, 88 Parallel channels
  • Up to 96 FICON Channels
Multiple clustered LPARs
  • CPU management
  • Channel subsystem priority queuing
  • Dynamic channel management

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Exploit central storage above 2 GB for guest pages and minidisk cache
- Constraint relief for both ESA/390 and z/Architecture mode guests
- CP nucleus and V=R/V=F guests must be below 2 GB

Run 64-bit-capable guests with greater than 2 GB of virtual storage (OS/390 R10, z/OS, Linux for zSeries, z/VM)
- Requires 64-bit-capable processor

Significant changes to CP
- CP nucleus module only - no IPLable nucleus
- Control block fields have moved, changed size
VM Support for Parallel Sysplex Technology

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VM provides a Parallel Sysplex environment for OS/390 or z/OS

- No connections are provided to any facility outside a single VM image

Real Coupling Facility not required or supported

Synchronizes virtual TOD clocks

Supported on IBM @server zSeries 900, S/390 9672 G3, G4, G5, G6, S/390 Multiprise 2000 and 3000 servers

TPF can also exploit virtual coupling facility

Cost-effective Support for Parallel Sysplex Technology

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z/VM provides support for guest use of new Coupling Facility Control Code on new servers

- Will load either 31-bit or 64-bit versions of CFCC

Larger HSA bit-vector simulation area

- Local-Cache Vector: 557,056 bits (was 65,536)
- List-Notification Vector: 557,056 bits (was 4,096)

QUERY VTOD command

- Display current value of VTOD clock
- List other users using the same VTOD valu
Native Shark (ESS) FlashCopy Support

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Function
- Instant copy of a volume or range of cylinders
- Copy immediately available after command issued
- Similar to SnapShot on the IBM RVA

Benefits
- Asynchronous backup
- Test environments
- Checkpoints
- Business Intelligence applications

Invocation
- CP FLASHCOPY command

1. FLASHCOPY 201 202
2. Backup 202 to tape
Tape Support Enhancements

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Guest Virtual Tape Server (VTS) Enhancements
- Import/Export capabilities available on 3494 models B16 and B18
- Allows physical tapes to be inserted/removed from logical tape library
- Improved error recovery and new error messages

Guest Support for 3494 Peer-to-Peer VTS
- Second VTS maintains duplexed copy of the first
- Improved error recovery and new error messages

Guest support for 3590 A60 tape controller including FICON attachment
VM Dump Tool

Evolved from CP Dump Tool
- Supplied as sample in previous releases
- New macros and subcommands
- Responses from macros and subcommands have changed

VM Dump Tool is the only supported tool for CP dumps
- Supports z/VM control block and logic changes

Dump Viewing Facility (DVF) still used for non-CP dumps
Application Support

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OS/390 Binder/Loader

CMS NFS Client

Converged Sockets API

VMLINK Rewrite
  • Improved serviceability and documentation
  • Minor functional changes
OS/390 Binder/Loader Support

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DFSMS/MVS Program Management Binder runs under CMS

- Native implementation of corresponding program object loader functions

Allows ready transportability of executable files between z/VM and OS/390 or z/OS

- Enhances CMS-OS/390 (and CMS-z/OS) application affinity

Positions CMS to exploit new programming language technologies (e.g. C++ compiler)
CMS NFS Client

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Allows CMS users remote access to data residing on any system with an NFS server

- OS/390, Windows, UNIX, Linux, z/VM, others

Supports NFS V2 or V3 (RFCs 1094 and 1813)

Remote data is mounted in the Byte File System

Data can be accessed with:

- POSIX APIs
- OpenExtensions Shell and Utilities
- OPENVM commands
- XEDIT
- CMS Pipelines

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TCP/IP Feature (Level 3A0) Enhancements

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FTP enhancements

IP Multicasting

OSPF Routing

QDIO (Queued Direct I/O) exploitation

Secure Socket Layer (SSL) server
FTP Enhancements

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Improved operation with web browser clients
FTP server can supply ...
- UNIX long-list format file lists
- VM-format file lists
- Defaults for server and individual users

Clients can change list format for a given session
FTP server will automatically change directory when processing file commands that contain directory information
FTP server will automatically translate files based on file type
- Specified in TCPDATA file

FTP server will supply file size in bytes in response to an FTP SIZE command
IP Multicasting

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Defined in RFC 1112

Enables an IP datagram to be sent to a group of hosts

TCP/IP supports both sending and receiving of multicast datagrams

Implementation of Internet Group Management Protocol (IGMP) version 1

- Allows hosts to communicate their multicast group membership information to multicast routers

RouteD also updated to exploit multicasting
OSPF Routing

Open Shortest Path First

Defined in RFC 1583

Routers exchange link state information instead of distance vectors

Addresses some shortcomings of RIP

- Faster convergence
- No network size limit
- Supports subnetworks
- Enables load balancing
- Less routing protocol network traffic
QDIO Exploitation

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QDIO is a new data transfer architecture available on G5/G6 and IBM @server zSeries 900 servers

- Direct exchange of data between program and Ethernet Adapter Card through memory queues
- Dramatically reduces system overhead and improves throughput

z/VM's TCP/IP will support the following protocols:

- Fast Ethernet
- GigaBit Ethernet (GbE)
- ATM (Ethernet LAN emulation)
Secure Socket Layer (SSL) Server

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Provides privacy between TCP/IP client and server
- Defined by RFC 2246 (Transport Layer Security)
- Can be used for all TCP/IP servers (e.g., Telnet, FTP, HTTP)

Implemented in a server virtual machine
- Stack notifies server when a connection is received for a secure port
- Server handles the handshake with client to establish cryptographic parameters
- Server encrypts and decrypts data to and from the client
- 128-bit encryption provided

CMS-based administration

No server code changes required!

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VMPRF Version 1 Release 2.2

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Supports new and changed monitor records in z/VM
  • ESA/390 and z/Architecture
Tolerates new and changed monitor records in VM/ESA not already included with VMPRF 1.2.0
Reports storage sizes in:
  • Kilobytes (K)
  • Megabytes (M)
  • Gigabytes (G)
  • Terabytes (T)
  • Petabytes (P)
  • Exabytes (E)
Installation and service via VMSES/E
Supports both z/VM and VM/ESA
RTM Version 1 Release 5.3

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Performance monitoring for z/VM only
- ESA/390 or z/Architecture mode
- Reports storage sizes in K, M, G, T, P, and E

Internal trace table improvements

Improved initialization with an external configuration file

Elimination of 370 Accommodation requirement

New Queries
- Service level of executable parts
- System Configuration
- Internal table locations

Improved use of VMSES/E

RTM Version 1 Release 5.3 will only run on z/VM
RTM Version 1 Release 5.2 will *not* run on z/VM
z/VM Product Packaging

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TCP/IP
- Priced optional feature (Level 3A0) of z/VM; pre-installed on base DDRs
- Kerberos Data Encryption Standard (DES) feature is integrated in base

TCP/IP NFS
- Priced optional feature of z/VM; pre-installed on base DDRs
- NFS Client integrated into TCP/IP Feature and CMS

OpenEdition Shell and Utilities
- Integrated into CMS (no charge)
- Renamed to OpenExtensions Shell and Utilities

RSCS
- Priced product; pre-installed on base DDRs

Tivoli Storage Manager (TSM) for VM, Version 4.1
- Priced optional feature of z/VM; pre-installed on base DDRs
- Functionally equivalent to Tivoli ADSM for VM/ESA, Version 3.1
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Lan File Services/ESA (LFS/ESA) Feature
- Withdrawn from marketing and is not available with z/VM

VM Graphical User Interface Clients
- Available from the VM Download library

Publications
- All basic publications available in hardcopy and supplied with order
- All updated publications are available in PDF format from the IBM Publication Ordering System (fee), VM Web site, or VM Collection CD-ROM
- Publications available in BookManager format are available from VM Collection CD-ROM or VM Web site
- Publications are not orderable from IBM distribution centers
Summary

IBM eServer zSeries

z/VM is the next step in VM's evolution

We are investing in key areas

- Architecture
- Device support
- Application support
- Connectivity

VM and VM technology continue to be important
Polling Questions

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A. Please describe your level of satisfaction with today's program:
   1. Very satisfied
   2. Satisfied
   3. Not satisfied

B. What is the highest level of VM you are currently using:
   1. VM/ESA 2.1.0 or earlier (including previous versions)
   2. VM/ESA 2.2.0
   3. VM/ESA 2.3.0
   4. VM/ESA 2.4.0
   5. Other
   6. Not using VM today
Polling Questions ...

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C. What is the highest level of processor you are running VM on:
   1. 9672 G5 or G6
   2. Multiprise 3000
   3. 9672 G2 (models Rn2 or Rn3), 9672 G3-G4, Multiprise 2000, P/390, R/390 or Integrated Server
   4. 9672 G1 (models Rn1, En1 or Pn1), 9221, 9121 or 9021
   5. 43xx, 308x or 3090
   6. Non-IBM processor

D. Would you like to receive additional information on z/VM and related products?
   1. Yes, please send me additional materials
   2. No thanks, I'll check the website for additional information

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- May 7-10, 2001 in Jacksonville, Florida will be the z/VM, VSE, and Linux for zSeries conference.
- May 28-June 1 in Berlin, Germany will be the z/VM and VSE conference, in conjunction with z/OS and Storage Systems.

Visit the VM events calendar at [ibm.com/s390/vm/events/](http://ibm.com/s390/vm/events/) for conferences and other z/VM-related educational opportunities in 2001 and beyond.
The S/390 VM and VSE Solutions Journal contains articles on real customer solutions to business problems using S/390 Servers and software.

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