

IBM z/VSE



z/VSE Release Guide

Version 3 Release 1

IBM z/VSE



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Version 3 Release 1

Note!

Before using this information and the product it supports, be sure to read the general information under "Notices" on page v.

First Edition (March 2005)

This edition applies to Version 3 Release 1 of IBM z/Virtual Storage Extended (z/VSE), Program Number 5609-ZVS, and to all subsequent releases and modifications until otherwise indicated in new editions.

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About This Book

z/VSE is the successor to IBM's VSE/ESA product. Many products and functions supported on z/VSE may continue to use VSE/ESA in their names.

z/VSE can execute in 31-bit mode only. It does not implement z/Architecture, and specifically does not implement 64-bit mode capabilities.

z/VSE is designed to exploit select features of IBM eServer zSeries hardware.

This manual provides details of the enhancements and changes implemented with IBM z/VSE Version 3, Release 1 (z/VSE 3.1).

Who Should Use This Book

This manual is intended for those z/VSE users who need to be aware of important information provided with z/VSE Version 3 Release 1.

How to Use This Book

The book contains one chapter:

- "What is New With z/VSE 3.1?" on page 1

Where to Find More Information

Whenever appropriate, the book refers to other z/VSE manuals that provide further details on a specific topic.

The z/VSE home page provides additional z/VSE information:

z/VSE Home Page

z/VSE has a home page on the World Wide Web, which offers up-to-date information about VSE-related products and services, new z/VSE functions, and other items of interest to VSE users.

You can find the z/VSE home page at:

<http://www.ibm.com/servers/eserver/zseries/zvse/>

What is New With z/VSE 3.1?

z/VSE is the successor to IBM's VSE/ESA product. Many products and functions supported on z/VSE may continue to use VSE/ESA in their names.

z/VSE can execute in 31-bit mode only. It does not implement z/Architecture, and specifically does not implement 64-bit mode capabilities.

z/VSE is designed to exploit select features of IBM eServer zSeries hardware.

z/VSE Version 3 Release 1 (z/VSE 3.1) is designed to support the latest IBM eServer zSeries products and features. Innovative IBM eServer zSeries technology offers significant value to VSE customers. This chapter provides a brief description of the main items and changes introduced with z/VSE 3.1, in these sections:

- "Support for IBM eServer zSeries Processors" on page 2
- "Exploitation of IBM TotalStorage Disk Technology" on page 5
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Support for IBM eServer zSeries Processors

Please note that z/VSE can execute in 31-bit mode only. It does not implement z/Architecture, and specifically does not implement 64-bit mode capabilities.

z/VSE 3.1 is designed to exploit select features of IBM eServer zSeries processors, which are described in this section.

Note: For further details about the features described in this section, refer to the manual *z/VSE Planning*, SC33-8221.

Up to 30 LPARs in Which z/VSE Can Run

This support is available exclusively on IBM eServer zSeries 890 and 990 processors. A larger number of LPARs provides additional configuration flexibility.

Support for up to 30 LPARs is available with VSE/ESA Version 2 Release 6 and later.

Up to four Logical Channel Subsystems (LCSS)

With multiple LCSSs, z890 and z990 processors can attach up to 1024 channels. However, any single instance of z/VSE remains limited to 256 channels. Additional LCSSs are available exclusively on IBM eServer zSeries 890 and 990 processors. The z890 supports up to 2 LCSS, and the z990 supports up to 4 LCSSs.

Support for up to 4 LCSSs is available with VSE/ESA Version 2 Release 6 and later.

HiperSockets, including HiperSockets Spanned Channels

Using HiperSockets, TCP/IP traffic travels between LPARs and virtual servers at near-memory speed, rather than network speed. Spanned Channels allow z/VSE to use HiperSockets that link LPARs or virtual servers using different Logical Channel Subsystems (LCSSs).

Support for HiperSockets, including HiperSockets Spanned Channels is available with VSE/ESA Version 2 Release 7 and later.

Spanned External Channels

Spanned external channels can be shared among LPARs across multiple Logical Channel Subsystems (LCSS). A z/VSE image in a single LPAR can use FICON Express2, FICON Express, OSA-Express2, and OSA-Express adapters defined across multiple LCSSs.

Support for Spanned External Channels is available with VSE/ESA Version 2 Release 7 and later.

Adapter Interruptions

Adapter interruptions are exclusive to z890 and z990 processors. High performance adapter interrupt handling, that was first introduced with HiperSockets, is also available for OSA-Express2 and OSA-Express in QDIO mode (CHPID type OSD), as well as FICON Express2 and FICON Express (CHPID type FCP). This zSeries advanced function provides a more efficient technique for handling I/O interrupts, and is designed to reduce path lengths and overhead in both the operating system and the adapter.

Adapter interruptions for CHPID=FCP are supported in z/VSE Version 3 Release 1.

Adapter interruptions for CHPID=OSD are supported with VSE/ESA Version 2 Release 7 and later.

PCI Cryptographic Accelerator (PCICA)

PCICA cards are designed to provide a RSA assist for Secure Sockets Layer (SSL) acceleration/clear key operations. z/VSE 3.1 tests for the PCICA feature at IPL time. The support for TCP/IP for VSE/ESA SSL transparently uses the PCICA card, if available.

Support for the PCICA feature is available with VSE/ESA Version 2 Release 7 and later.

Crypto Express2

Crypto Express2 is available as an optional feature exclusively on z890 and z990 processors. It is designed to offer the functions of both PCICA (supported by VSE/ESA Version 2 Release 7 and later) and PCIXCC (not supported by any VSE, including z/VSE) cards. When functioning as a PCICA card, the Crypto Express2 feature provides compute-intensive RSA cryptographic operations, which reduces CP usage and increases SSL throughput.

z/VSE 3.1 supports the Crypto Express2 feature as a PCICA card. z/VSE supports 512 and 1024 keys. The exploitation of Crypto Express2 is transparent to the application. z/VSE 3.1 tests for the Crypto Express2 feature at IPL time. TCP/IP for VSE/ESA SSL support transparently uses the Crypt Express2 feature if available.

Support for Crypto Express2 is available with VSE/ESA Version 2 Release 7 and later.

CP Assist for Cryptographic Function (CPACF)

CPACF is available exclusively on each and every central processor (CP) within a z890 or z990 complex. It provides an “on processor” function that is designed to accelerate symmetric cryptographic operations. The function is delivered through a new set of zSeries architecture instructions. CPACF is a no-charge hardware feature.

The support for TCP/IP for VSE/ESA SSL transparently uses the CPACF feature, if available.

Open Systems Adapter-Express2 10 Gigabit Ethernet

Open Systems Adapter-Express2 (OSA-Express2) represents a new generation of zSeries LAN adapters. It is available as an optional feature exclusively on z890 and z990 processors. OSA-Express2 can help satisfy the network bandwidth requirements of your applications demand.

Like the OSA-Express2 and OSA-Express features, the Open Systems Adapter-Express2 10 Gigabit Ethernet (abbreviated to *OSA-Express2 10 GbE* feature) only supports QDIO mode (CHPID type OSD) with full duplex operations, using one port to carry TCP/IP traffic.

Note that the OSA-Express2 10 GbE feature does not support auto-negotiation to any other speed. The OSA-Express2 10 GbE feature supports 64B/66B coding, whereas the OSA-Express GbE feature supports 8B/10B coding.

For z/VSE 3.1 and TCP/IP for VSE/ESA, the feature is compatible with OSA-Express2 GbE and OSA-Express. You can therefore use this feature without any change to your z/VSE or TCP/IP configurations.

Support for OSA-Express2 10GbE is available with VSE/ESA Version 2 Release 6 and later.

Open Systems Adapter-Express2 Gigabit Ethernet (GbE)

OSA-Express2 is available as an optional feature exclusively on z890 and z990 processors. The Open Systems Adapter-Express2 Gigabit Ethernet (abbreviated to the *OSA-Express2 GbE*) feature supports QDIO mode (CHPID type OSD), using two ports to transmit TCP/IP traffic, and with full duplex operations only. For z/VSE 3.1 and TCP/IP for VSE/ESA, the feature is compatible with OSA-Express. You can therefore use this feature without any change to your z/VSE or TCP/IP configurations.

z/VSE 3.1 supports the capability of up to 640 TCP/IP stacks/connections per dedicated CHPID, or 640 total stacks across multiple LPARs using a shared or spanned CHPID on a single OSA-Express2 feature on the z890/z990.

Support for OSA-Express2 GbE is available with VSE/ESA Version 2 Release 6 and later.

OSA-Express Integrated Console Controller (OSA-ICC)

The OSA-Express Integrated Console Controller (OSA-ICC, CHPID type OSC) is available exclusively on z890 and z990 processors. It is designed to eliminate the need for a non-SNA 3174 controller, and may replace existing 3174 or 2074 controllers. 3270 emulation for console session connections is integrated into one of the ports of an optional OSA-Express 1000BASE-T feature. It supports TN3270E and Non-SNA DFT 3270. OSA-ICC support may help reduce Total Cost of Ownership (TCO) and aid infrastructure simplification.

Support for OSA-ICC is available with VSE/ESA Version 2 Release 6 and later.

FICON Express2 and FICON Express

FICON channels allow higher I/O bandwidth compared to ESCON channels.

FICON Express2 is a technology refresh that offers 4 ports per feature and the potential for increased performance. FICON Express2 is exclusive to z890 and z990 processors.

z/VSE 3.1 supports CHPID type FC, FCV, and FCP. VSE/ESA Version 2 Release 6 and later support CHPID type FC and FCV only.

Exploitation of IBM TotalStorage Disk Technology

Note: For further details about the features described in this section, refer to the manual *z/VSE Planning*, SC33-8221.

FCP-Attached SCSI Disks

The objective of z/VSE Small Computer System Interface (SCSI) disk support is to offer clients more storage choices as well as help lower Total Cost of Ownership (TCO). Therefore z/VSE 3.1 has been developed to enable selected SCSI disks to be attached, in addition to Extended Count-Key-Data (ECKD) and Fixed Block Architecture (FBA) disks. Only SCSI disks that are contained within the IBM TotalStorage Enterprise Storage Server Model F20, 800, and 800 Turbo are qualified for z/VSE 3.1. FCP channels consist of FICON Express or FICON Express2 cards that have been personalized with the FCP feature.

The IBM eServer zSeries Fibre Channel Protocol (FCP) channels are designed to allow customers to attach industry-standard SCSI disk devices. A typical topology might consist of one or more FCP channels, a switch (such as the IBM 2109), and a controller that contains one or more ports and one or more SCSI devices.

The z/VSE SCSI-FCP support is designed to be transparent to z/VSE components and subsystems, vendor interfaces, and user-written programs. This support includes both operating system components and files containing user data.

Using the appropriate features and service applied to the IBM eServer zSeries server, it is possible to IPL z/VSE from a SCSI disk. Therefore, it is possible to build a “SCSI-only” z/VSE system. However, there are some limitations that apply to a SCSI-only system. For example:

- A standalone dump cannot be created on a SCSI disk.
- Dump information cannot be written to SCSI disks.

z/VSE SCSI-FCP support includes *multipathing*. This is a method of increasing the availability of the device. A lock file can be assigned to a SCSI-FCP disk using z/VSE DASD sharing.

z/VSE 3.1 does **not** support FlashCopy for SCSI-FCP disks.

IBM TotalStorage ESS

The IBM TotalStorage Enterprise Storage Servers (ESS) are designed to offer scalability, performance, accessibility, security and reliability to support 24X7 operations. In particular, the ESS Model 750 is designed to meet midrange price, capacity, and performance needs. ESS offers FlashCopy, FlashCopy Version 2, Peer-to-Peer Remote Copy (PPRC), and PPRC Version 2 copy services.

The IBM TotalStorage ESS offers 3380 and 3390 (including 3390 “Large Volumes” with up to 32K cylinders) ECKD format. The ESS is designed to support a broad range of operating environments including IBM eServer zSeries, pSeries, iSeries, and xSeries as well as several non-IBM systems. zSeries attachment is via ESCON, FICON, or FCP channels. S/390 attachment is via ESCON or FICON channels.

z/VSE 3.1 also supports FCP-attachment and SCSI-disk format. Please note that the ESS 750 does **not** offer FCP-attached SCSI disks.

FlashCopy Version 2 Support for IBM TotalStorage ESS

FlashCopy Version 2 (“FlashCopy 2”) includes the features of FlashCopy (including NOCOPY) *plus* extensions designed to improve capacity management and disk utilization. z/VSE 3.1 supports the following selected FlashCopy Version 2 functions:

- *Dataset Copy*, which reduces background completion times because FlashCopy no longer needs to be performed at the volume level when only a dataset copy is required. Dataset Copy allows the source and target volumes to be different sizes, and the copied data to reside at a different location in the source and target volumes.
- *Elimination of the LSS Constraint* can help simplify administration and capacity planning for FlashCopy. Source and target volumes can now span logical subsystems within a storage server.
- *Multiple Relationship FlashCopy* offers new flexibility. It allows up to 12 target volumes to be created from one source volume in a single FlashCopy operation.
- *Performance improvements* in FlashCopy 2 are designed to reduce the time required to complete a FlashCopy establish command.

z/VSE 3.1 does **not** support these FlashCopy functions:

- Incremental FlashCopy.
- Consistency Group commands over a Remote Mirror link.
- Inband Commands over a Remote Mirror link.

Improved FlashCopy Support for IBM TotalStorage ESS

IBM TotalStorage FlashCopy technology is a *point-in-time* copy capability that can be used to help reduce planned application outages caused by backups and other data copy activities.

z/VSE 3.1 provides support for the NOCOPY option, which can be used to copy most, or all, of the data directly from the source to tape *without* the need to first copy all of the physical data to an intermediate backup copy.

Peer-to-Peer Remote Copy Version 2 Support for IBM TotalStorage ESS

IBM TotalStorage Peer-to-Peer Remote Copy (PPRC) technology allows businesses to automatically replicate data at a remote site using ESS PPRC and PPRC Version 2 functions. PPRC Version 2 offers functions that provide the ability to keep local and remote copies of “in synch” and ready for a quick switch-over, should a disaster occur.

VSE/ESA Version 2 Release 7 and later support PPRC and PPRC Version 2 through the ICKDSF component.

Remote Mirroring for IBM TotalStorage DS8000 and DS6000 Series

The IBM TotalStorage DS family introduces new terminology. The ESS PPRC V2 capabilities are included in a new Remote Mirror and Copy Feature (RMC) for DS8000 series and DS6000 series storage servers.

VSE/ESA Version 2 Release 7 and later support RMC Metro Mirror, Global Copy, and Global Mirror modes through the ICKDSF component.

FlashCopy Support for IBM TotalStorage DS8000 and DS6000 Series

IBM TotalStorage DS8000 series and DS6000 series make no distinction between FlashCopy and FlashCopy Version 2 (“FlashCopy 2”). The features of FlashCopy 2 are included in a single FlashCopy Feature (PTC - Point in Time Copy) for DS8000 series and DS6000 series storage servers.

z/VSE 3.1 supports NOCOPY and the FlashCopy 2 functions, whereas VSE/ESA Version 2 Release 7 and later support FlashCopy only.

Exploitation of IBM TotalStorage Tape Technology

Note: For further details about the features described in this section, refer to the manual *z/VSE Planning*, SC33-8221.

IBM TotalStorage 3592 Enterprise Tape Drive

The IBM TotalStorage 3592 Enterprise Tape Drive J1A (3592) is designed to address the needs of applications for high capacity, fast access to data, and/or long-term data retention.

The 3592 offers both 300 GB (up to 900 GB with 3:1 compression) and 60 GB cartridges. Either cartridge type is available in rewritable or WORM (Write Once Read Many) formats.

VSE/ESA Version 2 Release 6 and later support the 3592 as a channel-attached tape drive, or as a tape component of a 3494 Tape Library.

IBM TotalStorage 3494 Tape Library

The IBM TotalStorage 3494 Tape Library System (3494 Tape Library) is designed to address data retention and business continuity requirements.

The 3494 Tape Library supports 3490E, 3590 and 3592 tape drives with high capacity or short-length rewritable media, as well as 3592 WORM media. A single 3494 Tape Library can be shared across multiple platforms, including IBM eServer zSeries, pSeries, iSeries, and xSeries, as well as various non-IBM platforms.

New native support in z/VSE 3.1 allows the 3494 Tape Library to be supported through the S/390 channel command interface, mainly Perform Subsystem Function (PSF) and Perform Library Function (PLF) commands. z/VSE tape library support includes IBM TotalStorage 3592 tape drives. The new z/VSE 3.1 support is easier to use and more extendable than the existing LCDD and VGS (VSE as a VM guest) 3494 Tape Library support.

z/VSE 3.1 support for the 3494 Tape Library is best used together with a tape management system from the independent software vendor of your choice.

IBM TotalStorage 3494 Virtual Tape Server

The IBM TotalStorage 3494 Virtual Tape Server (3494 VTS) is designed to help reduce operating costs and improve overall tape library processing performance. The subsystem writes virtual 3490E volumes to a tape volume cache on a high speed RAID disk buffer to help improve performance. It then stacks the virtual volumes on high capacity 3592 or 3590 cartridges.

A single 3494 VTS can be shared across multiple platforms, including IBM eServer zSeries, pSeries, and xSeries, as well as various non-IBM platforms.

z/VSE 3.1 supports the 3494 VTS using the native 3494 support only.

Other Enhancements Provided With z/VSE 3.1

Support for DB2 Version 7 Release 4

The DB2 Server for VSE Version 7 Release 4 is shipped on the z/VSE Extended Base Tape. The installation and Fast Service Upgrade (FSU) establish this new release of the DB2 Server for VSE.

Diagnosis and Debugging Enhancements

The diagnosis and debugging information has been enhanced by these items.

- The LOCATE command allows you to scan the virtual storage for the next occurrence of either a character-string or a hexadecimal-character string in which parts of the string may be unknown.
- The BSD trace of TCP/IP for VSE/ESA allows you to determine the BSD C-language functions that are called by an application using the TCP/IP C-language interface of LE/VSE.
- The VSE Connector Server trace allows you to obtain a full trace of the VSE Connector Server.
- The SDAID GETVIS/FREEVIS trace allows you to record the complete results of all GETVIS/FREEVIS requests which are provided by the VSE GETVIS/FREEVIS supervisor routines.
- The SDAID LOCK/UNLOCK trace provides you with information about requests made to lock or unlock a resource.
- The SDAID XPCC trace provides you with information about connections between different applications (cross-partition communication).

For details, refer to the manuals *z/VSE Diagnosis Tools*, SC33-8229 and *z/VSE Guide for Solving Problems* manual, SC33-8232.

LE/VSE Enhancements

Note: The LE/VSE Base Program (number 5686-094) is now included in the VSE Central Functions (5686-CF7). This means, you can no longer order it as a separate program product. For details, refer to the chapter “Base Programs” in the manual *z/VSE Planning*, SC33-8221.

These are the main enhancements provided with LE/VSE Version 1 Release 4 Modification Level 4, as part of VSE Central Functions.

- Support for attention routine (AR) commands, which you can use to display Language Environment information. For details, refer to the *LE/VSE Customization Guide*, SC33-6682.
- Enhancements for internationalization programming (locales, code page converters, and the Euro). For details, refer to the *LE/VSE Programming Guide*, SC33-6684 and the *LE/VSE C Run-Time Programming Guide*, SC33-6688.
- Online Problem Determination (OLPD) awareness of LE/VSE U40xx abends. This enhancement is available via the IUI update to the IESPDATX exit. It is auto-enabled via the default LE/CICS abnormal termination exit (CEEEXTRAN). For details, refer to the *LE/VSE Customization Guide*, SC33-6682.
- The existing facility that utilizes VSE/POWER LSTQ to store LE/VSE dumps (tailored using the sub-options of the TERMTHDACT run-time option), is also

available for LE/VSE *batch* processing. It can therefore be used optionally for LE/VSE CICS and batch environments. For details, refer to the *LE/VSE Customization Guide*, SC33-6682.

- Storage improvements. Callable service CEE5TSTG is new. You can use it to test the access that is available to a specified storage address. Assembler macro support via CEEFETCH and CEERELES now allows reentrant COBOL routines to be dynamically loaded and deleted. Before z/VSE 3.1, only PL/I and C FETCHABLE reentrant routines were supported. For details, refer to the *LE/VSE Programming Guide*, SC33-6684.

Changes to the Delivery Method for z/VSE Documentation

All z/VSE manuals (except for this manual, the z/VSE Release Guide) are available as **softcopy only**. This includes LE/VSE manuals, VSE/POWER manuals, CICS Transaction Server for VSE/ESA manuals, and so on.

You can obtain softcopy z/VSE manuals from either the:

- VSE Collection on DVD, SK3T-8348.
- VSE Collection CD-ROM, SK2T-0060.
- IBM Publications Center, which has this internet URL:
<http://www.elink.ibm.link.ibm.com/public/applications/publications/cgibin/pbi.cgi>

From the IBM Publications Center, you can download most z/VSE online publications free-of-charge in PDF or BOOK format.

Programs No Longer Available, and Dropped Devices

The optional programs listed in Table 1 can no longer be ordered together with z/VSE 3.1.

Table 1. VSE Optional Programs That Are No Longer Available

Optional Program (Withdrawn)	Replacement Optional Program
IXFP/SnapShot (5686-066)	No replacement
VSE/VSAM for VM Version 6 (5686-081)	No replacement

These devices are no longer supported by z/VSE 3.1:

Disks Devices

- 0671
- 3370
- 3375
- 3995
- 9332
- 9335
- 9336
- 9345.

Notes:

1. As a result of the withdrawal of the 9345 support, a Fast Service Upgrade from a 9345 device is not supported.
2. FBA devices can still be used with z/VSE 3.1 as “generic FBA” devices.

Tape Devices

- 2440
- 3422
- 3424
- 3430
- 9346
- 9347
- 9348

Network Communications Devices

- CETI
- SDLC ICA
- BSC ICA
- 2701
- 2703
- 3705
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z/VSE Release Guide
Version 3 Release 1

Publication No. SC33-8220-00

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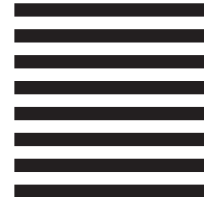
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File Number: S370/S390-34
Program Number: 5609-ZVS

Printed in USA

SC33-8220-00



Spine information:



z/VSE

Release Guide

Version 3 Release 1

SC33-8220-00