# IBM z/VSE
# Version 6 Release 2

*Release Guide*

SC34-2696-01

**Note:** Before using this information and the product it supports, be sure to read the general information under “Notices” on page 11.

This edition applies to Version 6 Release 2 of IBM® z/Virtual Storage Extended (z/VSE), Program Number 5686-VS6, and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces SC34–2696–00.

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# Contents

# About This Book

This manual first provides an introduction to z/VSE 6.2 and a list of the servers that are supported. It then provides an overview of the enhancements and changes implemented with z/VSE 6.2.

## 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 6.2.

## How to Use This Book

The book contains two chapters:

- Chapter 1, “Introduction and Server Support,” on page 1.
- Chapter 2, “Changes introduced with z/VSE 6.2,” on page 3.

## Where to Find More Information

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

### z/VSE IBM Documentation

IBM Documentation is the new home for IBM's technical information. The z/VSE IBM Documentation can be found here:

https://www.ibm.com/docs/en/zvse/6.2

You can also find VSE user examples (in zipped format) at

https://public.dhe.ibm.com/eserver/zseries/zos/vse/pdf3/zVSE_Samples.pdf

# Chapter 1. Introduction and Server Support

z/VSE 6.2 aims to continue the strategy that was defined for previous releases. This means:

- **Protect** customers' investments in the z/VSE platform,
- **Integrate** z/VSE into the overall IT environment, and
- **Extend** existing z/VSE application solutions by exploiting and leveraging *Linux on z Systems (IBM Z)* (or any other application platform).

Linux on z Systems (IBM Z) is central to z/VSE's strategy of enabling open standard e-business technologies to support new, more rapidly growing workloads.

Using the *z/VSE connectors*, you can integrate z/VSE resources with any Java-capable platform of your choice (that is, not only IBM Z).

The focus of z/VSE 6.2 is online transaction processing, security, and connectivity to improve the integration of z/VSE in a heterogeneous environment using web-based business solutions. Together with hardware exploitation, ease-of-use functionality, and support of the latest IBM Z and IBM System Storage technology, z/VSE 6.2 delivers additional functionality that may provide additional benefits to z/VSE clients. It helps clients with growing z/VSE workloads, and allows them to better protect their investments in the z/VSE platform. z/VSE 6.2 delivers CICS Transaction Server for z/VSE V2.2.

Clients make high demands on secure networking. TCP/IP for z/VSE V2.2 and IPv6/VSE V1.3 address the security requirements and provide security enhancements in the updated version or release of their product. Refer to "IBM TCP/IP for z/VSE V2.2 enhancements" on page 5 and "IBM IPv6/VSE V1.3 enhancements" on page 5.

z/VSE 6.2 introduces an architectural level set (ALS) that requires IBM zEnterprise 196, IBM zEnterprise 114, or later.

z/VSE 6.2 supports these IBM Z servers:

- IBM z14 (z14).
- IBM z13 (z13).
- IBM z13s (z13s).
- IBM zEnterprise EC12 (zEC12).
- IBM zEnterprise BC12 (zBC12).
- IBM zEnterprise 196 (z196).
- IBM zEnterprise 114 (z114).

For further details, see "Hardware Support" in z/VSE Planning .

# Chapter 2. Changes introduced with z/VSE 6.2

This section describes the changes delivered at General Availability of z/VSE 6.2.

It contains these topics:



## Installation of z/VSE 6.2

Starting with z/VSE 6.2, tape delivery is dropped. z/VSE V6.2 is delivered on DVD or through electronic delivery via Shopz. For initial installation you have to create either an installation disk or a physical tape volume.

Also starting with z/VSE V6.2, z/VSE can no longer be installed on disks of type 3380 (or disks of type 3390 in 3380 track compatibility mode). However, disks of type 3380 are still supported as data disks.

An upgrade to z/VSE 6.2 can be done using initial installation or Fast Service Upgrade (FSU). FSU can only be used, if upgrading from a z/VSE V6.1 system. FSU from z/VSE V5 to z/VSE V6 is not possible. Both initial installation and FSU will fail if your IBM Z server is not z196 / z114 or higher. Also FSU cannot be used if your system disks are of type 3380 (or of type 3390 in 3380 track compatibility mode).

z/VSE 6.2 is shipped as English Version only.

Tape-less initial installation using a SCSI installation disk is now possible:

- Starting with z/VSE V5.2, clients can create an installation disk from a DVD image or internet delivery and then perform initial installation using this installation disk. Previously this support was available for 3390-type installation disks only. Now support for FCP-attached SCSI disks in an LPAR environment as well as emulated FBA and virtual FBA disks in a z/VM guest environment is added.

## Support of innovative IBM Z and IBM System Storage technology

z/VSE 6.2 supports innovative IBM Z technology:

- z/VSE 6.2 delivers an Architectural Level Set that requires IBM zEnterprise 196, IBM zEnterprise 114, or later.
- Increased performance using the High Performance FICON for z Systems (zHPF) protocol:
  - The zHPF channel Input/Output (I/O) architecture is designed to improve the execution of small block I/O requests. z/VSE translates applicable I/O commands into the zHPF protocol and thus transparently exploits the zHPF protocol for user applications. This brings the benefits of IBM Z and IBM System Storage to z/VSE clients. Selected I/O intensive applications may especially benefit from a FICON Express16S+ on an IBM z14, or FICON Express16S on an IBM z13 or z13s with the zHPF protocol and IBM DS8880 storage.

  - z/VSE provides the support for both the LPAR and z/VM guest environment. For z/VM guests the appropriate service level is required.
- The Vector Facility for z/Architecture of a z14 or a z13 potential to improve performance:
  - The Vector Facility is also referred to as Single Instruction Multiple Data (SIMD). The z/VSE support allows user applications to use SIMD instructions and thus fulfill customer requirements. When using SIMD instructions in a z/VM guest environment the appropriate z/VM level is required.
- FICON Express16S+ on a z14:
  - FICON Express16S+ supports a link data rate of 16 gigabits per second (Gbps) and autonegotiation to 4 or 8 Gbps for synergy with existing switches, directors, and storage devices.
  - z/VSE transparently supports the FICON Express16S+ in three modes of operation:
    - CHPID type FC when utilizing FICON or Channel-to-Channel (CTC).
    - CHPID type FC for support of zHPF operations.
    - CHPID type FCP for use with FCP-attached SCSI disks.
- OSA-Express6S features - an Ethernet technology refresh:
  - The OSA-Express6S family of features is exclusive to the z14.
  - z/VSE transparently supports four modes of operation:
    - CHPID type OSC for TN3270E and non-SNA DFT 3270 emulation.
    - CHPID type OSD for TCP/IP traffic with exploitation of two ports per CHPID.
    - CHPID type OSE for SNA and TCP/IP passthru traffic with exploitation of two ports per CHPID.
    - CHPID type OSX for access control to the Intra Ensemble Data Network (IEDN).
- z/VSE supports the Crypto Express6S adapter in both IBM Common Cryptographic Architecture (CCA) coprocessor and accelerator mode. It can be used in an LPAR and z/VM guest environment.
- Elliptic Curve Cryptography (ECC) acceleration with a Crypto Express6S in an IBM z14 or with a Crypto Express5S in an IBM z13 or IBM z13s.
- FlashCopy Space Efficient (SE) support for Extent Space Efficient (ESE) volumes:
  - FlashCopy SE allows clients to use an ESE volume as the target volume with the NOCOPY option.
  - IBM DS8880 R8.1 is required to configure ESE volumes.
- Transparent support of TS7700 R4.1.1.

## CICS Transaction Server for z/VSE 2.2

The z/VSE 6.2 package is delivered with CICS Transaction Server for z/VSE 2.2 (CICS TS for z/VSE 2.2), a new release of CICS TS.

New capabilities provided with CICS TS for z/VSE V2.2 are:

- Enhancements to CICS Explorer to more easily manage CICS resources:
  - Define new CICS resources and modify or delete existing resources.
  - Monitor, control, and update dynamic storage areas and global temporary storage queue statistics.
  - Support for "definitions" views for selected CICS resources.
- An upgrade of CICS Web Support (CWS) to HTTP/1.1 to support the latest web browsers and applications:
  - CWS has been upgraded to comply with HTTP/1.1, providing support for the latest web browsers and applications. New function has been added, such as persistent connections, pipelining, and chunking, to improve performance and security.
- CICS API enhancements:

  - Support for UTF-8 and UTF-16, for use in data conversion, when using the channels and containers API.
  - Support for the APPEND parameter for PUT CONTAINER, to append specified data to existing container data.
  - Support for the BYTEOFFSET parameter for GET CONTAINER, to retrieve data at a specified offset in a container.
  - Support for date and time stamp formats that are in general use across the internet.
  - Support for Language Environment (LE) MAIN for Assembler applications.

A detailed description can be found in CICS Transaction Server for z/VSE Enhancements Guide .

## IBM TCP/IP for z/VSE V2.2 enhancements

IBM TCP/IP for z/VSE V2.2 is the only IBM TCP/IP for z/VSE release that can be used with z/VSE V6.2. It replaces IBM TCP/IP for z/VSE V2.1. It delivers support for the TLS 1.1 and TLS 1.2 protocols for enhanced security.

## IBM IPv6/VSE V1.3 enhancements

IBM IPv6/VSE V1.3 is the only IBM IPv6/VSE release that can be used with z/VSE 6.2. It replaces IBM IPv6/VSE V1.2. These are some of the highlights of the new IPv6/VSE release:

- New FTP server security interface to simplify security definitions:
  - FTP access to the z/VSE file system is protected using the Basic Security Manager (BSM) or any other External Security Manager (ESM) product that clients may choose. This allows clients to simplify their security definitions by using the resource class FACILITY as a single source.
- SSH (Secure Shell) copy facility for secure file transfer using SSH to and from z/VSE:
  - This facility uses a Linux pass-through image to facilitate an SSH connection to a remote host, providing for secure file transfer using SSH to and from z/VSE. It is compatible with the IBM TCP/IP for z/VSE product, LFP, and z/VM IP Assist.
- TXT2PDF generation facility to convert a text file into a Portable Document Format (PDF) file:
  - This facility is based on the Open Source TXT2PDF utility and converts a text file into a Portable Document Format (PDF) file. It provides many options to control the conversion, output appearance, and final presentation.
- Enhanced security through encrypted password facility:
  - Passwords are no longer stored as clear text on the system.

## Networking enhancements

The z/VSE Linux Fast Path (LFP) allows selected TCP/IP applications to access the network without requiring a TCP/IP stack on z/VSE. LFP is already available in a z/VM guest, or LPAR environment. To offer clients more connectivity options, LFP running as z/VM guest can now also communicate with a TCP/IP stack in an LPAR. For more details see z/VSE TCP/IP Support .

## Security enhancements

These are security enhancements provided for z/VSE 6.2:

- OpenSSL component of z/VSE (z/VSE Cryptographic Services):
  - Is upgraded to OpenSSL 1.0.2h to benefit from newer SSL/TLS functions for enhanced data in flight encryption.

  - The Elliptic Curve Cryptography (ECC) hardware acceleration with a Crypto Express6S in CCA coprocessor mode is transparently used. If the hardware is not available, the ECC software implementation continues to be used.
- Clients can choose to use OpenSSL for their online and batch applications for enhanced data at rest and data in flight security and more flexibility
- Ability to use OpenSSL for CICS Web Support:
  - Clients using CICS Web Support with SSL/TLS are now able to choose between the OpenSSL component delivered as part of the z/VSE operating system and the SSL component of a TCP/IP stack. This simplifies the configuration, gives clients more flexibility, and allows them to take advantage of the OpenSSL security.
- EZA 'Multiplexer' and EZA OpenSSL support:
  - The EZA 'Multiplexer' simplifies the use of the EZA interface with any TCP/IP stack. Clients can configure which EZA interface phase is to be used for a given TCP/IP stack ID.
  - It also allows clients to use OpenSSL for the EZA SSL/TLS interface, independent of the used TCP/IP stack.
- Ability to use SSL/TLS connections for remote VTAPEs to achieve transport layer encryption of sensitive tape data during network transfer.
- Basic Security Manager (BSM) simplifies the administration of batch resources:
  - The z/VSE Basic Security Manager (BSM) distinguishes between repositories for online and batch security definitions. The repository to protect batch resources is the phase DTSECTAB. It contains library, sublibrary, member, and file definitions. Whereas online resources can be easily maintained using the dialogs of the Interactive User Interface (IUI), the DTSECTAB needs to be updated for each batch resource. To simplify the administration of batch resources, z/VSE provides a common interface for both online and batch resources. An IUI dialog is offered that builds a DTSECTAB with the resources specified.
- Enhanced LDAP sign-on support:
  - z/VSE provides a RESET option for the LDAP user mapping tool to clear the cached password hash for a user. This forces a full LDAP sign-on to be performed next time the user signs in.
  - z/VSE provides wildcard support for the CHANGE and DELETE commands of the LDAP user mapping tool to allow modification or deletion of multiple user records with one command. This, for example, allows clients to generate a new VSE password for all mapped users with one command.
- VSE/POWER enables TLS 1.0 (and higher) for PNET SSL connections.

## DL/I VSE V1.12 enhancement

These are the enhancements provided for z/VSE 6.2:

- DL/I introduces a partitioning function for hierarchical direct (HD) databases. Partitioning of a database allows users to increase the database storage capacity for one segment type up to 8 gigabytes (GB). This eliminates the current limitation of 4 GB. The partitioning function allows DL/I applications to transparently handle growing data.
- The partitioning function will be made available as a PTF for DL/I VSE V1.12 after general availability of z/VSE V6.2.

## Connector enhancements

These are the enhancements provided for z/VSE 6.2:

- z/VSE SOAP Engine enhancement:
  - The existing z/VSE Simple Object Access Protocol (SOAP) implementation integrates z/VSE CICS applications in a heterogeneous environment using web services. User programs utilizing the z/VSE SOAP Engine are currently restricted by the COMMAREA and its 32K limitation. To meet the needs

of CICS applications with growing data, z/VSE exploits the CICS Channels and Containers API for the SOAP Engine. The Channels and Containers API has been available since z/VSE V6.1 and CICS TS for z/VSE V2.1. The use of Channels and Containers lifts the COMMAREA limitation and also allows the transfer of large amount of data for the SOAP protocol. User programs utilizing the z/VSE SOAP Engine are still able to use the COMMAREA interface for compatibility.

- New z/VSE REST Engine with JSON support:
  - An essential part of the strategy of z/VSE is to integrate z/VSE in a heterogeneous environment. Representational State Transfer (REST) is a software architecture style consisting of guidelines and best practices for creating web services. REST has gained widespread acceptance across the web as a simpler alternative to, for example, SOAP based web services. RESTful systems typically communicate over the Hypertext Transfer Protocol (HTTP), using JavaScript Object Notation (JSON) or XML for the payload. z/VSE provides a REST Engine that allows clients to provide RESTful web services running in a CICS environment. The REST Engine can also be used to develop CICS applications that consume RESTful web services that are hosted outside of z/VSE. The REST Engine supports various payload types including JSON and XML.
- z/VSE database connector enhancement:
  - The existing z/VSE database connector DBCLI (Database Call Level Interface) allows z/VSE applications to access a relational database on any suitable database server. The database server may run on a platform other than z/VSE. With the current functionality, clients need to implement their own applications using the DBCLI programming interface to access the database. z/VSE further enhances the z/VSE database connector DBCLI. For ease of use both a batch interface and an interactive interface are provided allowing clients to perform database queries without implementing an application first.
  - CICS REXX support will be added to DBCLI.
- z/VSE Script Connector enhancement:
  - The new VSE Script Server Trace Support allows to trace and debug your own VSE Scripts. Trace can be activated for 3 areas: INSTRUCTIONS, CONDITIONS and PARAMETERS.

## Ease of use functionality enhancements for SCSI-only systems

The enhancements for the z/VSE SCSI support are those that clients may no longer be forced to include a physical tape device in the configuration. This reduces costs and simplifies the configuration.

- Tape-less initial installation using a SCSI installation disk:
  - Starting with z/VSE V5.2, clients can create an installation disk from a DVD image or internet delivery and then perform initial installation using this installation disk. Previously this support was available for 3390-type installation disks only. Now support for FCP-attached SCSI disks in an LPAR environment as well as emulated FBA and virtual FBA disks in a z/VM guest environment is added.
- Stand-alone dump using a SCSI dump disk:
  - Occasionally z/VSE support asks clients to take a stand-alone dump for further problem analysis. The stand-alone dump can be created on a tape or disk device. Currently, ECKD disks, and, in a z/VM guest environment, additionally FBA-type disks are supported. z/VSE now allows clients to create a stand-alone dump on an FCP-attached SCSI disk in an LPAR environment.

## Job Control and Attention Routine enhancements

These are the main Job Control and Attention Routine enhancements provided with z/VSE 6.2 :

- Prior to z/VSE 6.2, when a VSE Job gets canceled, the JCL return code is not updated. So it could happen that a VSE job is terminated with a maximum return code of 0 (or with no return code at all), although the job was canceled by the VSE system or by the operator. z/VSE 6.2 provides new Job Control standard options (STDOPT) which, when defined, will automatically set a JCL return code when a job is canceled. There are different STDOPTs for abnormal termination, operator cancel, and JCL cancel situations. Each of these STDOPTS may be temporarily overwritten with a Job Control OPTION

statement within a job. The VSE system behavior is unchanged if neither the new STDOPT nor the new OPTION statements are specified. The Job Control and Attention Routine commands QUERY STDOPT and QUERY OPTION are extended to show the setting of the new standard and temporary options.

- To provide even more flexibility in automatic job processing, z/VSE 6.2 also extends the Job Control SET command to set the JCL last return code and the maximum return code.
- z/VSE 6.2 provides a new pre-defined system level symbolic parameter named IJBLPNM. This parameter contains the name of the LPAR where z/VSE is running (either native or as a VM guest).
- The Attention Routine commands VOLUME and QT have been extended with new selection parameters to limit the amount of output.

For more details please refer to z/VSE System Control Statements.

## Other enhancements

These are the enhancements provided with z/VSE 6.2:

- To use large processor storage and improve performance, z/VSE backs data-spaces with megabytes (MB) frames if feasible. z/VSE internally decides when to resolve the MB frames to balance the system. The function was introduced with z/VSE V4.3. To allow users to create huge data spaces that will be released later, without taking away processor storage for other applications, z/VSE adds support to also free related MB frames when releasing a data-space.
- The Librarian program has been extended to read input from SYSLNK. Like the LIBR command INPUT SYSIPT a new command INPUT SYSLNK allows to switch the input for the following Librarian commands to be read from SYSLNK.
- The SDAID tool has been extended to print the specified TRACE command at the beginning of the trace records, if OUTDEV has been set to be printer. It helps users to understand the trace output better, or to distinguish more traces recorded with different settings.

# Chapter 3. Items no longer supported with z/VSE 6.2

These are the items no longer supported with z/VSE 6.2 onwards:

- Starting with z/VSE 6.2, CICS transactions can no longer be protected using table DTSECTXN. Use the Basic Security Manager (BSM) instead.

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# Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/VSE enable users to:

- Use assistive technologies such as screen readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

## Using Assistive Technologies

Assistive technology products, such as screen readers, function with the user interfaces found in z/VSE. Consult the assistive technology documentation for specific information when using such products to access z/VSE interfaces.

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