LE/VSE Enhancements from VSE/ESA 2.3 to z/VSE 6.2

This document contains a reference summary for:

LE/VSE Release	z/VSE Release	Additional Information
1.4.10	6.2	• Enhancements with LE/VSE 1.4.10 in z/VSE 6.2.0
1.4.9	6.1 5.2	•Enhancements with LE/VSE 1.4.9 in z/VSE 6.1.0 and 5.2.0 •Announced end-of-service for z/VSE 5.2 is 2018/10/31
1.4.8	5.1	•Unsupported since 2016/06/30 •Enhancements with LE/VSE 1.4.8 in z/VSE 5.1.0
1.4.7	4.3	•Unsupported since 2014/10/31 •Enhancements with LE/VSE 1.4.7 in z/VSE 4.3.0
1.4.6	4.2	•Unsupported since 2012/10/31 •Enhancements with LE/VSE 1.4.6 in z/VSE 4.2.0
1.4.5	4.1	•Unsupported since 2011/04/30 •Enhancements with LE/VSE 1.4.5 in z/VSE 4.1.0
1.4.4	3.1	•Unsupported since 2009/07/31 •Enhancements with LE/VSE 1.4.4 in z/VSE 3.1.0
1.4.3	2.7	•Unsupported since 2007/02/28 •Enhancements with LE/VSE 1.4.3 in VSE/ESA 2.7.0
1.4.2	2.6	•Unsupported since 2006/03/31 •Enhancements with LE/VSE 1.4.2 in VSE/ESA 2.6.0
1.4.1	2.5	•Unsupported since 2003/12/31 •Enhancements with LE/VSE 1.4.1 in VSE/ESA 2.5.0
1.4.0	2.4 2.3 2.2 1.4	•Unsupported since 2002/06/30 •Enhancements introduced with LE/VSE 1.4.0 in VSE/ESA 2.3.0
1.1.0	2.1 1.4	•Unsupported since 1997/12/31

Table of Content:

1 Enhancements with LE/VSE 1.4.10 in z/VSE 6.2.0

1.1 Introduction

A new modification level, LE/VSE V1R4.10, is delivered with z/VSE 6.2 as part of the VSE Central Functions component. Included herein ...

Please note:

- LE/VSE V1R4.10 is bound to z/VSE 6.2 and available via base install and Fast Service Upgrade (FSU).

- This modification level is not appropriate for previous VSE/ESA or z/VSE Releases.

The Fast Service Upgrade facility does support "cleanup" activities, by removing a former LE/VSE 1.4.x release.

1.2 LE/VSE Conforming Assembler Main Support

Starting with z/VSE 6.2 there is a new CICS translator option LEASM that instructs the CICS translator to generate appropriate entry and exit coding to make an assembler program an LE/VSE conforming MAIN.

This also provides more relief with condition handling due to the possibility to code EXEC CICS HANDLE CONDITION and EXEC CICS HANDLE ABEND LABEL.

For details please refer to:

- z/VSE 6.2 CICS Release Guide, SC33-8300, respectively …

- LE/VSE 1.4.9 Programming Guide, SC33-6684, and/or ...
  Chapter 26 Assembler Considerations (e.g. regarding CEEENTRY MAIN=YES coding that is triggered by use of LEASM)

- IBM Knowledge Center:
  https://www.ibm.com/support/knowledgecenter/SSB27H_6.2.0/pdfs_6.2.0_neu.html

2 Enhancements with LE/VSE 1.4.9 in z/VSE 6.1 and 5.2

2.1 Introduction

A new modification level, LE/VSE V1R4.9, is delivered with z/VSE 6.1 and 5.2 as part of the VSE Central Functions component. Included herein a set of functional enhancements and improvements for batch and CICS environments (with new trace control for CICS LE-enabled programs, CICS identification of PL/1 for VSE/ESA fetchable subroutines) and various items for storage and performance optimization. The set is complemented by CEETRACE specific enhancement ("optional extra"). For the latest documentation and information on CEETRACE please refer to z/VSE Home Page:

http://www-03.ibm.com/systems/z/os/zvse/downloads/tools.html#ceetrace

Please note:

- LE/VSE V1R4.9 is bound to z/VSE 6.1, respectively z/VSE 5.2 and available via base install and Fast Service Upgrade (FSU).

- This modification level is not appropriate for previous VSE/ESA or z/VSE Releases.

The Fast Service Upgrade facility does support "cleanup" activities, by removing a former LE/VSE 1.4.x release.

2.2 Run-Unit Work Area (RUWA) Trace Control for CICS LE-Enabled Programs

A new transaction is supplied with LE/VSE 1.4.9 (called "CRUT") which can be used to activate, query and deactivate the run-unit work-area (RUWA) tracing function. This capability provides information on a LE/VSE CICS program's run-unit storage requirements. Specifically it includes both application and run-time storage amounts needed to successfully execute the program.

- The CRUT transaction is shipped with LE/VSE 1.4.9 (z/VSE 5.2) and BSM-enabled.

- CRUT will accept three options along with the transaction code: ON | OFF | QRY.

- The RUWA trace facility can be auto-enabled by adding program CEL4CRUT to CICS startup PLTPI table.

For details please refer to LE/VSE 1.4.9 Debugging Guide and Run-Time Messages (SC33-6681).

2.3 PL/I Fetchable Subroutines under CICS now visible in CEMT report

Prior to z/VSE 5.2 the "CEMT I PROG" CICS command did not show the language for a fetched PL/1 subroutine.

- A customer requirement suggested to overcome this restriction.

- The first load or fetch of a target PL/1 subroutine will now allow LE/VSE to provide CICS with the necessary information.

- As a result the "CEMT I PROG" CICS command is now complemented with this "Pli" language specific reference information.

2.4 Miscellaneous Improvements

Attached will be a short reference of various changes implemented in LE/VSE 1.4.9.

- Better performance for iconv() open functionality when using UCS-2 table converters. This improvement also addresses a customer requirement.

- A new Attention Routine command (S CEE,REFRESH) was made available to allow for instant update of LE/VSE status information (e.g. in case PTFs have been applied).

- Batch storage requirements for ALL31(ON) environments have been further reduced with LE/VSE 1.4.9.

The NEWC transaction available since LE/VSE 1.4.2 is now capable of reloading LE/CICS run-time options plus refreshing CEETRACE information (in case the tooling is active).

3 Enhancements with LE/VSE 1.4.8 in z/VSE 5.1.0

3.1 Introduction

A new modification level, LE/VSE V1R4.8, is delivered with z/VSE 5.1 as part of the VSE Central Functions component. It's related scope is about add-ons for application programming such as supplements to the PL/1 Multitasking capability and additional samples for existent and new callable services. Enhanced support for VSAM SHR(4) files is available to LE/C applications, also. Furthermore added trace capabilities are at hand for diagnostic purposes and supplied via the "optional extra" CEETRACE tooling. Please also be aware of numerous documentation updates for the System Programmer C (SPC) environment.

More detailed references are available via z/VSE 5.1 Release Guide (SC33-8300) respectively listed in the sections following here.

Please note:

- LE/VSE V1R4.8 is bound to z/VSE 5.1 and available via base install and Fast Service Upgrade (FSU).

- This modification level is not appropriate for previous VSE/ESA or z/VSE Releases.

The Fast Service Upgrade facility does support "cleanup" activities, by removing a former LE/VSE 1.4.x release.

3.2 Enhanced LE/C Support for VSAM SHR(4) Files

This support allows LE/C (HLL) applications to exploit VSE/VSAM SHR(4) support for KSDS or RRDS files, opened in separate partitions (for different access modes).

General Considerations

- LE/VSE C Run-Time does not provide support for read-integrity or write-integrity on any VSAM SHR(4) files !

- Data integrity on concurrent VSAM reads and writes can be safe guarded by specifying the » dsn= keyword » on all calls to fopen() function.

- For VSAM SHR(4) files opened in update mode it is the programmer's responsibility to handle any potential control-interval (CI) concurrent-access locks !

- VSAM KSDS and RRDS SHR(4) files are supported if LE/C run-time keyed-only "seek" or "positioning" functions are used or if option "noseek" is used when the file is opened (fopen / freopen functions)

- RBA-based seek/positioning functions are only supported on VSAM ESDS SHR(4) files.

Also see LE/VSE V1R4.8 C Run-Time Programming Guide, SC33-6688.

3.3 PL/I Multitasking, Fetchable PL/I Programs and Run-Time Options

How LE/VSE Options Affect Processing Behaviour:

- Run-time option or storage reports (generated in a fetched sub-task) will report « IBMESTUB » as enclave name, instead invoking sub-task program name

- Fetchable PL/I programs executing in a multi-tasking environment use the LE/VSE system-wide default BATCH run-time options !

- To change behaviour … override the default options by creating a CEEUOPT.OBJ member, later included at linkedit time. This CEEUOPT will only be used if the fetchable routine is executed within a multi-tasking environment. Fetchable PL/I program tasks inherit JCL specified run-time option overrides.

Also see LE/VSE V1R4.8 Programming Guide, SC33-6684.

3.4 PL/I Multitasking – Complementary Callable Service: CEEPUSR

There is a new (PL/I only) Callable Service: « CEEPUSR » supplied with LE/VSE 1.4.8 allowing to retrieve the address of a pre-allocated storage area (common task area).

- This area is used by PL/I multitasking applications for inter-task communication.
  It's size is determined by JCL SETPARM variable « TASKCOM ».
  For example:
  // SETPARM TASKCOM=22K   => up to 3 digits with K or M suffix !

- LE/VSE will attempt to allocate the requested storage size for the user.

- After allocation this area is under full responsibility of programmer (not LE !)

- A shipped sample member (IBMPUSR.P) is available in PRD2.SCEEBASE library

- This service is not available or supported under CICS !

- The PTF for APAR PM17894 (PL/I VSE/ESA compiler) is prerequiste for use !

Also see LE/VSE V1R4.8 Programming Reference Guide, SC33-6685.

3.5 CEE5INF Callable Service – Sample for COBOL

With LE/VSE 1.4.8 modification level the set of samples for « CEE5INF » Callable Service is complemented by member IGZT5INF.C (for the COBOL language). The part is shipped in PRD2.SCEEBASE library.

- The CEE5INF service capability, introduced with z/VSE 4.1 allows to extract system, sub-system and ennvironment info from currently-active enclave.

- In a wider scope this enhancement allows the writing of « single source » COBOL/VSE programs for target "batch" and "CICS" environments !

- For details on the above matter a related z/Journal article is being published soon ! Please watch out for subject news in Q4/2011 - Q1/2012 time frame, here:
  http://www.mainframezone.com

Also see LE/VSE V1R4.8 Programming Reference Guide, SC33-6685.

3.6 TCP/IP Callable Functions

The LE/VSE C Run-Time Socket API was enhanced to support Ipv6.

New functions introduced with IPv6 support are:

- inet_ntop, inet_pton   (convert internet address format binary <=> text)

- getaddrinfo, getnameinfo   (socket address <=> node name and service location)

- freeaddrinfo   (free addrinfo structure returned by getaddrinfo)

- gai_strerror   (text string describing the error)

- if_freenameindex,   (network interface mapping)
    if_indextoname,
    if_nameindex,
    if_nametoindex

Note:
No TCP/IP or SSL related routine is functionally integrated into the C Run-Time library.
The function call is routed to be served by the TCP/IP implementation.

For an overview on callable TCP/IP and SSL functions please refer to LE/VSE V1R4.8 C
Run-Time Library Reference Guide, SC33-6689.

Detailed functional description for each TCP/IP and SSL Callable Function is outlined in
manual z/VSE TCP/IP Support, SC34-2640. Please refer to chapter: TCP/IP Support for the
LE/VSE C Socket Interface. There are also details on Linux Fast Path and IPv6/VSE.

3.7 Documentation for System Programming C (SPC) Environment

There are significant updates to « System Programming C Environment (SPC) »
documentation.

Attached will be a summary list, sorted by sections available in LE/VSE V1R4.8 C Run-Time
Programming Guide, SC33-6688.

Using Functions in the SPC Environment

- sprintf() function: there is no support of floating point conversion specifiers
    (e,E,f,g or G).

Creating Freestanding Applications

- Cannot do arithmetic's using long double or float variables

Initializing a Freestanding Application

- exit() and sprintf() functions
- Table 36: "Parts Used for Freestanding Applications" was complemented

Linkage Recommendations

- Do not use EDC0XSPC include book (forces CEESTART which is unintended!)

Overall:

- Missing JCL and INCLUDE information was added to documentation

Updated SPC samples (JCL and source books)

– EDCJN018.Z

– EDCJN019.Z

– EDCJL089.Z

– EDCJL090.Z

– EDXJL097.A

– EDCJL098.A

– EDCJL099.A

3.8 Miscellaneous Enhancements

This section outlines minor enhancements introduced with the LE/VSE 1.4.8 modification level.

New Messages

- CEE3216S - CEE3219S => related to IEEE exceptions (ports from LE for z/OS)

- CEE3228S, CEE3229S => related to IEEE exceptions (ports from LE for z/OS)

- CEE3902W => related to new CEEPUSR callable service !

Replaced Messages

- CEE3220S => related to IEEE exceptions (ported from LE for z/OS)

Using __last_op Codes

- Analysis of this structure allows to judge about reasons for I/O failures that might be experienced in course of LE/C application execution.

- Please refer to LE/VSE V1R4.8 C Run-Time Programming Guide, SC33-6688.

- Chapter 14, Table 27 ... now includes the latest __last_op codes.

- Table 27 has been updated to include the decimal values of the __last_op codes.

LE/C Applications and Creation of VSE Librarian Members (DATA=YES parameter)

- "DATA=YES" will be supported as an optional fopen() parameter.

- Any other specification on "data=" keyword will result in the fopen() failure.

- For backward compatibility "data=no" behavior will remain the default when processing librarian members !

- Omitting optional "data=yes" parameter will invoke the default DATA=NO behavior

4 Enhancements with LE/VSE 1.4.7 in z/VSE 4.3.0

4.1 Introduction

A new modification level, LE/VSE V1R4.7, is delivered with z/VSE 4.3 as part of the VSE Central Functions component. The related focus has been on enhancements in the dynamic program call area, introduction of PL/1 Multitasking capability and further diagnostic support facilities.

More detailed references are available via z/VSE 4.3 Release Guide (SC33-8300) respectively in the sections following.

Please note:

- LE/VSE V1R4.7 is bound to z/VSE 4.3 and available via base install and Fast Service Upgrade (FSU).

- This modification level is not appropriate for previous VSE/ESA or z/VSE Releases.

The Fast Service Upgrade facility does support "cleanup" activities, by removing a former LE/VSE 1.4.x release.

4.2 LE/VSE Service for International Currency

A new Callable Service CEE5MC2 (Get International Currency as String) has been introduced to return the default currency symbol for specified country code in 2 ways.

- 4-character fixed length string (default currency symbol)

- 3-character alphabetic fixed-length string (international currency symbol)

Country	Currency Symbol	Int. Currency Symbol
Australia	$ X'5B404040'	AUD
Finland	€ X'5A404040'	EUR
Germany	€ X'9F404040'	EUR
Japan	¥ X'5B404040'	JPY
United Kingdom	£ X'5B404040'	GBP
United States	$ X'5B404040'	USD

code page dependent

Special char, code page dependent   Readable in nearly all code pages !

Syntax

>>─CEE5MC2─(─country_code─,─
─currency_symbol─,─
─international_currency_symbol─,─fc─)
─)

currency_symbol (output)
A 4-character fixed-length string returned to the calling routine. It contains the default currency symbol for the country specified. The currency symbol is left-justified and padded on the right with blanks

international_currency_symbol (output)
A 3-character alphabetic fixed-length string returned to the calling routine. It contains the international currency symbol for the country specified.

The subject also addresses a Marketing Field Requirement and corresponding VSE solution in this area (MR0810045420).

For details, refer to LE/VSE 1.4.7 Debugging Guide and Run-Time Messages (SC33-6681).

4.3 CEEFETCH Macro Enhancements

The CEEFETCH macro (used to dynamically load a routine that can be later deleted) has been enhanced to support a "wider range" of possible target/candidate routines, respectively enhance the scope of dynamic load capabilities.

The new parameters available are:

- **ENTRYPT** (previously loaded module may or may not be LE/VSE conform)
  … relies on FTCHINFO keyword set. If specified, it is mutually exclusive with NAME, NAMEADDR and SEARCH keywords.

- **FTCHINFO** (for dynamic calls to all sorts of target routines, main + sub-,in particular, if LE/VSE conformity cannot be assumed). It instructs LE/VSE to attempt a load on the target module. This keyword must be used in combination with: NAME, NAMEADDR or ENTRYPT.

The combination of ENTRYPT and FTCHINFO implies environment preparation (where applicable) and information about the module previously loaded by the user.

If CEEFETCH call target is AMODE24 fetchable C-subroutine, MSG EDC5052I might be issued since the AMODE of the application should match the run-time library!

Considerations when using CEELOAD in place of CEEFETCH

While similar dynamic load capabilities also exist via CEELOAD macro, you should be aware that they underlay certain restrictions:

- Target must be an LE/VSE conforming subroutine!

- In contrary to CEEFETCH there is no corresponding delete service!

- Limited auto-cleanup capabilities (termination processing), limited scope (enclave/thread).

- Not supported on target COBOL/VSE programs compiled with SEParate compiler option.

- Cannot be used with target of re-entrant C/VSE routines (writable static context).

- CDLOAD should not be used in an HLL-application/call context, anyhow!

Use of CEEFETCH therefore is the recommended state-of-the-art choice for dynamic call implementations.

For details on both macros please refer to LE/VSE 1.4.7 Programming Guide (SC33-6684).

4.4 PL/I Multitasking

This item introduces the PL/I multi-tasking capability for application programming and relies on specific compile option support in the PLI/VSE compiler (see below).

The key concepts and facilities that sum up PL/I multi-tasking are:

- Creating of PL/I Tasks   (CALL TASK,PRIORITY,EVENT)

- Coordination and Synchronization of PL/I Tasks   (WAIT statement)

- Termination of PL/I Tasks   (RETURN / END statements)

- STOP and EXIT Processing   (entire app <=> subtasks/children)

- How LE/VSE Options Affect Processing   (inherit caller program options)

- Debugging of PL/I Tasks   (Debug Tool or CEETRACE)

- Example of PL/I Multitasking   (shipped part: IBMIVPMT.P)

Further considerations:

1. Along with this support the following messages are new **IBM0565S** and **IBM0566S**.

- Related to ATTACH task request, respectively task creation

2. Message **IBM0900S** was complemented to outline associated ONCODE=2050.

•Indicates the WAIT statement not coded properly

3. PLI/VSE programs to exploit multi-tasking must be generated with **TASK** compile option.

•PTF for **APAR PM17894** (for PL/I VSE/ESA compiler) is prerequisite for use.

•Please ensure the LE/PLI 1.4.7 PTF for **APAR PM26532** is applied/present to benefit from PL/1 multi-tasking initialization process improvements.

For details, refer to LE/VSE 1.4.7 Programming Guide (SC33-6684).

4.5 Bad Branch Info to CEE5DMP (LE/VSE dump)

Prerequisite Info regarding "Break Event Address Register" (BEAR):

•BEAR is a 64-bit CPU register, updated with the address of any instruction that causes a break in sequential instruction execution.

•Here, the instruction address in PSW is replaced, not incremented (by instruction length).

•If feature is present (determined by hardware => z9-109 and above processors), the content of BEAR is stored at real storage location X'110'.

•Overall it serves as hardware provided debugging assist … for "wild" branches.

LE/VSE relies on BEAR information as defined by the z/Architecture:

•When available, BEAR info (about bad branch) is included in CEE5DMP "condition information section".

•In case not, the DSA (linkage information) is used in an attempt to produce invalid branch details in CEE5DMP.

•Please ensure the LE/VSE 1.4.7 GA PTF for PM26031 is applied/present before using this new capability.

For details, refer to LE/VSE 1.4.7 Debugging and Run-Time Messages Guide (SC33-6681).

4.6 LE/C - TCP/IP Multiplexer capability

The new TCP/IP multiplexer configuration relies on a table that assigns the name of an interface phase to a SYSID value.

•The TCP/IP stack is identified by a unique SYSID. Based on SYSID value the TCP/IP multiplexer can determine the TCP/IP interface phase that is to be used.

•Related new messages are **EDCT010S** (SYSID value), **EDCT011S** (Interface LOAD), and **EDCV020W** (warning).

•Messages EDCT001S, EDCT002S, EDCV001I, and EDCV099I have been adjusted in LE/C TCP/IP multiplexer context.

For details, refer to section "Configuring the LE/C TCP/IP Socket API Multiplexer" in LE/C Run-Time Library Reference (SC33-6689).

4.7 Miscellaneous Enhancements

There are further **new messages** that have been introduced (mainly in the context of enhancements mentioned before):

•CEE3458E (related to new CEE5MC2 Callable Service)

11

- CEE3519C (related to CEEFETCH macro, CEEFTCH control block in use)

- CEE3559W (error recovery with CICS when MSGFILE - LSTQ option is set)

User abend U4093
Additional reason code 160 (X'A0') was introduced for attempts to implicitly create another enclave (explanation + specific programmer response).

Message U4083 (X'FF3')
Has been refined by adding BEAR related debugging information.

COBOL Return Codes to CICS
Improved programmer response for return code 51001 (to ease problem follow-up).

LE/CICS run-time option defaults
The initial storage values for LE/VSE run-time options ANYHEAP, BELOWHEAP, HEAP, STACK were changed to optimize storage use and reduce paging for higher workloads (taking into consideration the needs for CICS storage accounting areas (SAA)).

For details, refer to the corresponding sections in LE/VSE 1.4.7 Debugging and Run-Time Messages Guide (SC33-6681) and LE/VSE 1.4.7 Customization Guide (SC33-6682).

5 Enhancements with LE/VSE 1.4.6 in z/VSE 4.2.0

5.1 Introduction

A new modification level, LE/VSE V1R4.6, is delivered with z/VSE 4.2 as part of the VSE Central Functions component. The related focus has been on new attention routine commands relief in the PLI/ programming area and further diagnostic options (new trace tool).

More detailed references are available via z/VSE 4.2 Release Guide (SC33-8300) respectively in the sections following.

Please note:

- LE/VSE V1R4.6 is bound to z/VSE 4.2 and available via base install and Fast Service Upgrade (FSU).

- This modification level is not appropriate for previous VSE/ESA or z/VSE Releases.

The Fast Service Upgrade facility does support "cleanup" activities, by removing a former LE/VSE 1.4.x release.

5.2 New Attention Routine Commands

There are new Language Environment related **AR-commands** to manage LE/VSE batch run-time option overrides from the VSE console.

- **D CEE,OPTS** displays any batch run-time override options that might be set.

- **S CEE,OPTS=run-time option** used to establish a new run-time option override.

- **S CEE,CLEAR** clears the LE/VSE run-time option overrides in place

For details, refer to LE/VSE 1.4.6 Debugging Guide and Run-Time Messages (SC33-6681).

5.3 LE PL/I runtime support

LE PL/I runtime support has been improved. This will reduce the current limitations for PL/1 application programs and the fetch command.

For details, refer to Information APAR II11716.

5.4 CEETRACE ("As-Is Support Only

A new tracing tool is introduced with LE/VSE 1.4.6 on "AS IS" supported basis. While CEETRACE is not intended to replace the LE/VSE dump information its strength is to complement the already-available LE/VSE dump to assist in application-problem analysis.

CEETRACE feature provides an execution-statement history log prior to any subsequent application failure. A COBOL/VSE source-code extraction utility is supplied with the CEETRACE feature. The utility actually produces the source code from a COBOL/VSE load module that was originally compiled using the SEPARATE sub-option of the compiler TEST option.

For details, please refer to the document **CEETRACE Feature, Installation and User's Guide**. You can find this document on the **z/VSE Home Page** but please be aware that it is not described in the LE/VSE Version 1 Release 4 Modification Level 6 manuals.

5.5 LE/VSE High Level Language User exit

Support has been added for load modules that use the current LE/VSE High Level Language User exit.

For details, refer to the LE/VSE 1.4.6 Customization Guide (SC33-6682) and LE/VSE 1.4.6 Programming Guide (SC33-6684).

5.6 Run-Time Options Changes

The default run-time option UEN (uppercase U.S. English) has been changed to ENU (mixed-case U.S. English).

For details, refer to the LE/VSE 1.4.6 Customization (SC33-6682) and LE/VSE 1.4.6 Programming Guide (SC33-6684) or LE/VSE 1.4.6 Programming Reference Guide (SC33-6685).

6 Enhancements with LE/VSE 1.4.5 in z/VSE 4.1.0

6.1 Introduction

A new modification level, LE/VSE V1R4.5, is delivered with z/VSE 4.1 as part of the VSE Central Functions component. Please note that the product name has changed and may also be referred to as LE for z/VSE.

Overall this release addresses a number of user and vendor submitted requirements, usability, and z/OS affinity issues accompanied by improvements to storage initialisation (in particular for PL/I users), messages, CLER transaction and the ability to display CICS Default Run-Time options via AR command. A number of new LE/VSE Callable Services, C functions, macros and programming samples have been introduced or enhanced. There also exists support for PL/1 fetchable modules to subsequently fetch other PL/1 fetchable modules (by name) combined with improvements in the Inter-language Communication (ILC) area.

For technical references (manuals, for example), LE/VSE is still referred to as LE/VSE V1.4.5 or LE/VSE Version 1 Release 4 Modification 5.

More detailed references are available via z/VSE 4.1 Release Guide (SC33-8300) respectively in the sections following.

Please note:

- LE/VSE V1R4.5 is bound to z/VSE 4.1 and available via base install and Fast Service Upgrade (FSU).

- This modification level is not appropriate for previous VSE/ESA or z/VSE Releases.

The Fast Service Upgrade facility (from an origin VSE/ESA 2.7.x or 3.1.x system) does support "cleanup" activities, by removing a former LE/VSE 1.4.x release.

6.2 Language Environment for z/VSE

The name IBM Language Environment for VSE/ESA has been changed to **Language Environment for z/VSE**. However, the short form LE/VSE remains unchanged. In addition, the names of programs related to Language Environment for z/VSE remain unchanged (such as IBM COBOL for VSE/ESA, IBM C for VSE/ESA, IBM PL/I for VSE/ESA, or Debug Tool for VSE/ESA).

6.3 LE/VSE Callable Services

The following callable services are new with LE/VSE 1.4.5, respectively z/VSE 4.1.0:

- **CEE5INF:** suits to extract system, subsystem and environment information from the currently-active enclave.
- **CEEENV:** allows manipulating enclave environment variables from non-C applications (retrieve, set, modify or delete operations).
- **CEEDLYM:** suspends the processing of the active enclave for a specified number of milliseconds.

For details, refer to the LE/VSE 1.4.5 Programming Reference (SC33-6685) and/or LE/VSE 1.4.5 Programming Guide (SC33-6684).

6.4 LE/CICS Run-Time Options via AR-command

A new attention routine (AR) command **D CEE,CEECOPT** is available (complementing the existing support) which can be used to produce a report of the current CICS installation-wide default run-time options on VSE console.

For details, refer to the LE/VSE 1.4.5 Debugging Guide and Run-Time Messages (SC33-6681).

6.5 FETCH and PL1

Programmers that implement the new **PL/1 fetching** of other PL/1 programs from a fetched phase must call these fetched phase(s) explicitly by name. The use of entry points or pointers is not supported.

6.6 DOS/PL1 Storage Compatibility

To provide DOS/PL1 storage compatibility for PL/I VSE users, the sub option **CLEAR** has been introduced for the STORAGE run-time option.

For details, refer to the LE/VSE 1.4.5 Customization Guide (SC33-6682).

6.7C-Run-Time Library Functions

The library functions **strcasecmp()** and **strncasecmp()** are new. They are used for comparing strings. For details, refer to the LE/VSE 1.4.5 C Run-Time Library Reference.

6.8LE/VSE Assembler Macro Support

Macro **CEEGLOB** is new. It is used to extract the Language Environment product information at assembly-time. For details, refer to the LE/VSE 1.4.5 Programming Guide (SC33-6684).

6.9CLER Transaction

The LE/VSE supplied transaction **CLER** has been updated. The transaction allows you to actively display and modify LE/VSE CICS-wide default run-time options, while your CICS system is running. It now includes the HEAPCHK run-time option.

For reference, please see LE/VSE 1.4.5 Customization Guide (SC33-6682).

```
CLER                                                            02/01/07
                                                                09:27:32
                    Language Environment for z/VSE V1 R4.5
                Dynamic CICS Run-time Option Modification Facility

ABPERC:   ( NONE   )           STORAGE:  ( 00    , NONE  , NONE  , 0      )
ABTERMENC:( ABEND  )           TERMTHD:  ( TRACE  , MSGFL , 0   ')
ALL31:    ( ON  )              TRAP:     ( ON   , MAX )
CBLPSHPOP:( ON  )              USRHDLR:  (                )
CHECK:    ( OFF )       TERMTHDACT LSTQ OPTIONS :
DEBUG:    ( OFF )              CLASS: ( L )   DISPOSITION: ( D )
DEPTHCOND:( 10  )              NODE-ID: (             )
ERRCOUNT: ( 20  )              USER-ID: (             )
HEAP:     ( 4096    , 4080   , ANYWHERE , KEEP , 4096    , 4080    )
LIBSTACK: ( 4096    , 4080   , FREE )
MSGFILE:  ( CESE )             HEAPCHK:  ( OFF , 1  , 0  )
RPTOPTS:  ( OFF )
RPTSTG:   ( OFF )
STACK:    ( 4096    , 4080   , ANYWHERE , KEEP )

     Please change the runtime option to the setting required.

<PF3> Exit  <PF4> Restore Defaults  <PF5> Update  <PF12> Exit(No Change)
```

Figure 1. BMS Map Used With the CLER Transaction

6.10Requirements solved with LE/VSE 1.4.5

The following requirements against LE/VSE are solved in z/VSE 4.1.0:

•**MR052906214** - dump storage referenced by active BLL, BLV and BLX cells in CEE5DMP. For details, refer to the description of the reg_stor_amount parameter in the section "TERMTHDACT" of the LE/VSE 1.4.5 Customization Guide (SC33-6682).

•**MR0720065753** - Customizing LE/VSE warning messages that might be repeated e.g. IGZ0068W, IGZ0041W.

7Enhancements with LE/VSE 1.4.4 in z/VSE 3.1.0

7.1 Introduction

A new modification level, LE/VSE V1R4.4, is delivered with z/VSE 3.1 as part of the VSE Central Functions component. It provides new diagnosis attention routine commands to identify LE/VSE installation status information and introduces enhancements to internationalization programming. Further topics are various updates to storage facilities (new callable service) and the integration of LE/VSE abends in the Online Problem Determination facility (OLPD) of the Interactive Interface. Please note:

- LE/VSE V1R4.4 is bound to z/VSE 3.1 and available via base install.

- This modification level is not appropriate for previous VSE/ESA Releases.

The Fast Service Upgrade facility (from an origin VSE/ESA 2.4.x, 2.5.x, 2.6.x or 2,7.x system) does support "cleanup" activities, by removing a former LE/VSE 1.4.x release.

More detailed references are available via z/VSE 3.1 Release Guide (SC33-8220) and z/VSE 3.1 Planning (SC33-8221).

7.2 Online Problem Determination Awareness (OLPD) for LE/VSE Abends

Subject enhancement is available via IUI update to "IESPDATX" exit and auto-enablement via the default LE/CICS abnormal termination exit "CEECXTAN" in z/VSE 3.1.

More detailed references are available via LE/VSE 1.4.4 Customization Guide (SC33-6682).

7.3 Enhancements for Internationalization Programming (Locales, Code-Page Converters & Euro)

1. New locales for the following countries:

> Austria, Belgium, Brazil, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, France, Finland, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Lithuania, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, United States

2. New UCS-2 code page converters for the following coded character sets:

> IBM-437, IBM-808, IBM-859, IBM-867, IBM-872, IBM-901, IBM-902, IBM-924, IBM-1124, IBM-1153, IBM-1154, IBM-1155, IBM-1156, IBM-1157, IBM-1160, IBM-1161, IBM-1370, IBM-1371, IBM-4909, IBM-4971, IBM-5123, IBM-5346, IBM-5347, IBM-5348, IBM-5349, IBM-5350, IBM-5351, IBM-5352, IBM-8482, IBM-9044, IBM-9061, IBM-9238, IBM-12712, IBM-16804, IBM-17248

More detailed references are available via LE/VSE 1.4.4 C Run-Time Programming Guide (SC33-6688).

7.4 Enhanced LSTQ Support (Availability for Batch Processing)

The existing facility that utilizes **VSE/POWER LSTQ** to store individual LE/VSE dump (tailored via sub-options of the TERMTHDACT run-time option) is **also available for LE/VSE batch** processing purposes. The function is present for optional tailoring via LE/VSE run-time option "TERMTHDACT" in LE/VSE CICS and batch environments.

Note: In case of regenerating installation-wide run-time options please be aware to keep coding the related LE/VSE provided macro (CEELOPT).

More detailed references are available via LE/VSE 1.4.4 Customization Guide (SC33-6682).

7.5 Improvements to LE/VSE Storage Issues & Messages

- *New callable service* **CEE5TSTG** to test storage areas for access authority prior to using them.

- *New messages* in regard to storage issues: CEE0814S, CEE3907I, CEE3908I.

Note: to benefit from CEE5TSTG functionality the calling application must be a LE/VSE-conforming application program.

More detailed references are available via LE/VSE 1.4.4 Programming Reference (SC33-6685) and LE/VSE 1.4.4 Debugging Guide and Run-Time Messages (SC33-6681).

7.6 Changes to Abend Handling Messages

- Improved 4083 (X'FF3') abend handling by providing more information related to assisting with abend diagnosis.

- *Updated messages*: CEEL000S, CEEL0002, CEEL003S, CEEL004S

More detailed references are available in LE/VSE 1.4.4 Debugging Guide and Run-Time Messages (SC33-6681).

7.7 LE/VSE Installation Status on System Console

Starting with LE/VSE 1.4.4 there will be **new attention routine (AR) commands** for displaying *BATCH installation status information* similar to functionality available in LE for z/OS. This comprises:

- LE/VSE batch run-time option report   **"D CEE,CEEDOPT"**

- Detailed reference of active LE/VSE exits   **"D CEE,CEEEXIT"**

- Language component installation status   **"D CEE,CEESTAT"**

This functionality is auto-enabled in z/VSE 3.1. However it relies on specific settings in system ASI startup and the supplied LE/VSE SVA load list: $SVACEE. In case you plan to customize your system please keep these settings to avoid function loss. It allows to easily retrieving basic LE/VSE BATCH installation information.

More detailed references are available via LE/VSE 1.4.4 Customization Guide (SC33-6682) and LE/VSE 1.4.4 Debugging Guide and Run-Time Messages (SC33-6681).

7.8 Allow to Monitor LE/VSE GETVIS-Usage

New LE/VSE specific sub pool-ids have been introduced for the "**GETVIS *partid*,DETAIL**" attention routine command. The function is intended for easy storage type problem analysis (including user heap control) and assist IBM service personal.

7.9 "CEEFETCH" and reverse "CEERELES" Macro (enhanced for COBOL)

The LE for z/OS compatible macro support via **CEEFETCH and CEERELES** allows for dynamic load/delete of reentrant **COBOL/VSE routines** (before z/VSE 3.1 only PL/I and C FETCHABLE reentrant subroutines were supported).

Prerequisites: COBOL/VSE only (no DOS/VS or COBOL II) RENT compiled target load modules.

More detailed references are available via LE/VSE 1.4.4 Programming Guide (SC33-6684).

7.10 COBOL Side-File Exits

There are two new exit modules that can be used to change the location and name of the side-file dataset. The functionality can be of interest in debugging environments.

- IGZIUXB in the BATCH environment.
- IGZIUXC when running under CICS.

Member IGZWIUXB.Z and IGZWIUXC.Z are provided in LE/VSE installation sublibrary PRD2.SCEEBASE for tailoring purposes in both environments.

More detailed references are available via LE/VSE 1.4.4 Customization Guide (SC33-6682).

Also with respect to the COBOL side-file feature, a searching capability has been added to the LE/COBOL runtime, to allow for easier movement of both the COBOL PHASE and its associated SYSDEBUG side file member. As of LE/VSE 1.4.4, the LE/COBOL runtime will first use the library.sublibrary.membername.membertype information stored in the COBOL application PHASE. If the SYSDEBUG member cannot be found at this location, a search of the currently active (TEMP and PERM) PHASE 'libdef' search chain will be performed. This enhancement is available without any user intervention and is independent of the COBOL side file exit support.

7.11 DSECT Conversion Utility

Additional z/OS compatible options are available for the existing DSECT conversion utility. The functionality can be of interest for interlanguage communication between Assembler and C (in case C structures are required to map an Assembler DSECT).

More detailed references are available via LE/VSE 1.4.4 C Run-Time Programming Guide (SC33-6688).

8Enhancements with LE/VSE 1.4.3 in VSE/ESA 2.7.0

8.1Introduction

A new modification level, LE/VSE V1R4.3, is delivered with VSE/ESA 2.7. It provides new facilities for pre-initialization, program fetch & release, improved reporting on heap checking and run-time option maintenance under CICS. Please note:

- LE/VSE V1R4.3 is bound to VSE/ESA 2.7 and available via base install.

- This modification level is not appropriate for previous VSE/ESA Releases.

- The Fast Service Upgrade facility (from an origin VSE/ESA 2.4.x, 2.5.x or 2.6.x system) does support "cleanup" activities, by removing a former LE/VSE 1.4.x release.

Attached will be a function overview "sorted by" new LE/VSE 1.4.3 doc references. More detailed references are available via VSE/ESA 2.7 Release Guide (SC33-6718).

8.2LE/VSE Customization Guide

- The **CEELOPT macro** allows the modification of the default CLASS and DISP for dump output to be sent to the VSE/POWER LSTQ.

- The **CLER CICS transaction** allows the interactive display and modification of LE/VSE CICS-wide default runtime options, without the need to re-start CICS.

8.3LE/VSE Debugging and Run-Time Messages Guide

- *Run-Time Messages information* has been included on how to use the **HEAPCHK run-time option** to determine if a storage leakage exists. A storage leak occurs when a program does not return storage back to the heap, after it has finished using it.

8.4LE/VSE Programming Guide

- For the **CEE5PRM callable service**, support has been introduced for JCL invocation strings that are up to 300 characters in length (previously this was only 80 characters).

- **Assembler macro CEEFETCH** now allows loading fetchable, reentrant C and PL/I subroutines. This loaded LE/VSE-conforming HLL subroutine can then be later deleted using **CEERELES**.

- The currently active version of LE/VSE is now checked when the system is initialized using the CEEPIPI interface.

- Calling **CEEPIPI** with a delete_entry request now allows an entry to be deleted from the PIPI table. The entry is then available for subsequent CEEPIPI(add_entry) functions.

8.5LE/VSE Programming Reference Guide

- The **CEELOPT macro** can now be used to modify the default CLASS and DISP for output sent to the VSE/POWER LSTQ.

- LE/VSE now supports the query callable service **CEE5PRM** to return a program argument string of up to 300 characters in length.

8.6LE/VSE Run-Time Programming Guide

- For functions **fopen() and freopen()**, the maximum block size has been increased from 32760 to 65528.

- For functions **fseek() and ftell()**, the maximum block size has been increased from 32760 to 65528.

9Enhancements with LE/VSE 1.4.2 in VSE/ESA 2.6.0

9.1Introduction

A new modification level, LE/VSE V1R4.2, is delivered with VSE/ESA 2.6. It provides new and changed capabilities in the area of dump and storage management (CICS environment) as well as further common and language specific enhancement. Please note:

- LE/VSE V1R4.2 is bound to VSE/ESA 2.6 and available via base install.

- This modification level is not appropriate for previous VSE/ESA Releases.

- The Fast Service Upgrade facility (from an origin VSE/ESA 2.4.x or 2.5.x system) does support "cleanup" activities, by removing a former LE/VSE 1.4.x release.

9.2LE/VSE Dump under CICS directly to VSE/POWER LSTQ

This facility is an alternative to transient data destinations and utilises the VSE/POWER LSTQ to store individual LE/VSE dump output, as it is created, for any transaction abends. The overall purpose is to eliminate message-mixing problems associated with the use of CESE when multiple LE dumps are being taken under CICS. The default destination is the CESE transient data queue pre-customized with the MSGFILE run-time option. This support is present via sub-options of the TERMTHDACT run-time option.

Furthermore the amount of storage dumped around registers (during dump processing) can now be tailored. Using a new sub-option of the TERMTHDACT option, and a new option of the CEE5DMP service does this.

Also available with the PTF for APAR PQ58992, is the ability to direct CICS LE/VSE dump output to other system nodes over an active VSE/POWER PNET network. The produced LE/VSE dump LSTQ member attributes of DISP,CLASS and DEST can be tailored by the user using the supplied JCL member CEEWLSTQ in either the LE/VSE installation sublibrary or ICCF Library 62.

9.3   Optimized CICS storage at LE/VSE enclave initialisation time

When an LE-conforming MAIN program is started under CICS, LE will request an associated initialisation amount of storage (to execute the program) from CICS. Before VSE/ESA 2.6, this storage amount is rounded to be on a 4K-page boundary without considering that CICS added some extra bytes for the storage accounting area (SAA) to this total, which negated LE/VSE rounding. Now LE rounding code will take into account this CICS behaviour ensuring that the requested storage sizes actually fit on a page boundary (when allocated by CICS). This enhancement is only available to CICS/VSE 2.3 system users. Due to the storage history recording performed by CICS/TS, a single GETMAIN is only ever issued, upon second and subsequent executions of an LE-enabled application. This single GETMAIN comprises the transactions total storage requirements.

9.4C Run-Time Writable Static support for subroutines invoked via CEEPIPI CALL_SUB

With the new REXX/VSE socket support there is a requirement for REXX to invoke C programs to provide the TCP/IP access. This is accomplished using LE/VSE CEEPIPI services. Before VSE/ESA 2.6, there is no LE/VSE support to call C subroutines that are re-entrant (RENT) within a SUB-type pre-initialised environment. So, REXX/VSE had to exploit CALL_MAIN to circumvent this lack. This resulted in performance problems due to the initialisation and termination of MAINs to allow the writable static to be available. With support for RENT C subroutines via CEEPIPI CALL_SUB within an INIT_SUB_DP type environment, REXX/VSE gets performance relief against usage of CALL_MAIN.

9.5C Run-Time Socket API Enhancements

The LE/VSE C Run-Time Socket API now includes Secured Socket Layer (SSL) related functions, prefixed gsk*. Similar to the other TCP/IP functions these SSL functions are not functionally integrated into the C Run-Time library. The function calls are routed to be served by the TCP/IP product

9.6 New LE/VSE Callable Service to Simulate DELAY

This new LE/VSE service, named CEE5DLY, simply provides COBOL and C with an enclave level delay function similar to that available to PL/1 users via the PL/1 DELAY language verb. Its purpose is to complement batch functionality and make the service available to all LE/VSE Conforming Languages. There will be examples in the product ship library. The equivalent under CICS is EXEC CICS DELAY.

10 Enhancements with LE/VSE 1.4.1 in VSE/ESA 2.5.0

### 10.1 LE/VSE 1.4.1 - Product Integration

A **simplified product structure** has been introduced with LE/VSE 1.4.1; in particular there are **fewer components** (one per supported language and LE Base) and **new CLCs**. Optionally a separate DBCS locale component can be installed, which is located on the extended base tape.

- **LE/VSE V1R4.1 is bound to VSE/ESA 2.5 and available via base install.** This modification level is **not** appropriate for previous VSE/ESA Releases.

- The Fast Service Upgrade facility (from origin VSE/ESA 2.4.x system) does support "cleanup" activities, removing the former LE/VSE 1.4.0 release.

- This is comparable to how VSE/ESA 2.3 integrated LE/VSE 1.4.0 (as base product) removing LE/VSE 1.1.0.

- LE/VSE 1.4.1 COBOL run-time routines (prefixed: IGZ*) are implemented with unique naming conventions.

- With former releases of LE/VSE and VS COBOL-II there have been batch- respectively CICS-specific modules (with the same names !) requiring 2 installation libraries.

- This need has been eliminated for LE/VSE 1.4.1. Only one installation sublibrary, PRD2.SCEEBASE is required now.

Note: The former sublibrary PRD2.SCEECICS might still be present on your system (this is with installations upgraded via FSU). However don't worry, the content has been deleted automatically and the sublibrary should remain empty.

10.2 LE/VSE 1.4.1 – Product Overview

The figure attached below gives a LE/VSE 1.4.1 product overview for VSE/ESA 2.5.
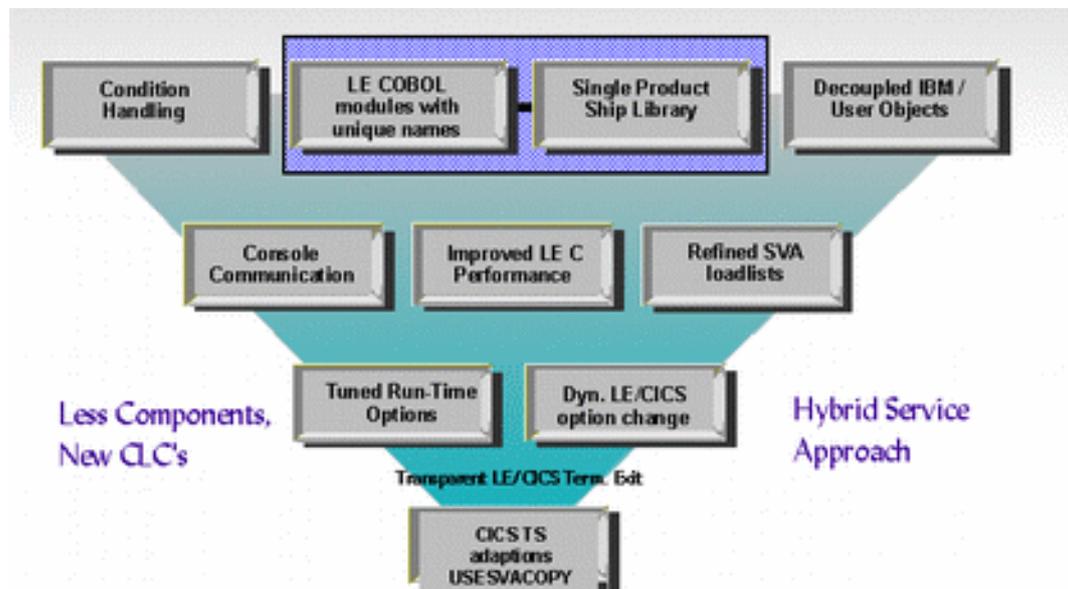
10.3 LE/VSE 1.4.1 - Key Changes in Structure

There is a **new service concept** (hybrid approach) focusing on phase replacement service rather than OBJ replacements. This eliminates the need and risk of link-editing phases on individual target environments that might not be set up appropriate.

- About 95% of the product is serviced that way.

- With LE/VSE 1.4.1 **"user-customizable" objects are decoupled from "IBM-type" objects.** The aim is to avoid "user-customizable" modules being part of central ship phases.

- A concrete change in this area is how run-time option processing was integrated. Corresponding generation jobs (skeleton support via CEEWDOPT and CEEWCOPT in ICCF Library 62) now build separate option phases (CEECOPT/CEEDOPT) rather than keeping "user-customizable" objects within LE/VSE batch/CICS initialization phases (CEEBINIT/CEECCICS). This is the way previous LE/VSE Releases were shipped by default. As a result the main initialization actors are not affected in any way by user tailoring. Also notice that run-time option generation has a locale dependency.

10.4 LE/VSE 1.4.1 - New Capabilities and Enhancements

Attached is an overview of product enhancements:

- **LE/CICS run-time options** can be set dynamically (in flight - no restart of CICS is required). Shipped transactions are "NEWC" & "ROPC" (BSM-security enabled); the run-time option report is directed to system console.

- There are **new LE/VSE messages at CICS start-up time**, which confirm that LE/VSE components are installed successfully --> MSG's CEE3550-3552I. This is accomplished by checking the presence of component-specific event handlers.

- The **LE/CICS Abnormal Termination exit** has been established in a way to allow transparency with CICS/VSE/TS type abend codes (prefixed: A***). Furthermore all unhandled conditions previously resulting in LE/VSE specific 4039 abends (plus additional dumps) will no more generate double CICS dumps (only original!) The shipped exit setting should be accompanied by a *"TERMTHDACT(DUMP)"* run-time option setting under CICS. The LE/VSE 1.4.1 exit setting is also called "null-exit" because it simply does a return to CICS rather than doing LE-specific processing. It is recommended *NOT* to change the exit setup provided via LE/VSE 1.4.1.

- **Condition Handling** is possible at different levels. Specifically there are new sub parameters MIN or MAX (for run-time option TRAP).

- LE/VSE 1.4.1 is now capable of telling users the name(s) of phase(s) that could not be loaded. Dependent on the type of call this is via MSG CEE3501S or CEE3503S.

- The **MSGFILE** run-time option now supports output to another transient data queue.

- There is a new **__console()** function that allows C/VSE programs to send and receive messages on VSE system operator console (WTO/WTOR-like capabilities).

- Concerning **TCP/IP**, additional **LE/VSE interface support** for new functions such as takesocket(), givesocket(), asynchronous I/O has been provided. Please refer to the TCP/IP section on main page for associated details.

- For CICS TS there are LE DTF builder enhancements (for extra 2520 devices).

- **Run-time options** have been further tuned and revised such as *"STORAGE(00,NONE,00,32k)"* in batch. The effect is a pre-allocation of "reserved stack frames" (for exclusive use by the condition handler). This was confirmed very useful in testing e.g. a "vague" 4087 RC0 abend could be transformed into a "concrete" 4088 RC1012 abend stating an out of storage condition (lack of GETVIS storage).

- LE/VSE routines itself have been **optimized for C processing** (performance improvements). The change is internal and does NOT require user interaction.

- Improved performance of COBOL/VSE date routines (reduced SVC's).

10.5 LE/VSE 1.4.1 - Refined SVA load lists

Attached is an overview related to pre-defined SVA load lists:

- From VSE/ESA 2.5 onwards, LE/VSE Base and LE/VSE C specific SVA load lists are pre-loaded in the ASI start-up.

- The corresponding load-list references are: $SVACEE, $SVAEDCM

- This change comprises a refined set of LE C-routines required to support the increasing amount of system-side C-exploiters such as VSE/POWER, Stored Procedure Server, Connectors, Debug Tool for VSE/ESA etc.).

- Overall 24-bit storage consumption is reduced further (only keeping: LE Base requiring about ~270k) below the line storage).

- "Double" routine loading is forestalled/impossible with the new SVA load list structure.

- Finally an overview of selectable packages ...

- Recommended: $SVACEE, $SVAIGZM, $SVAIBM, $SVAEDCM.

- Optional: $SVAIGZ, $SVAIBMM, $SVAEDC.

Be aware that e.g. batch and CICS-wide run-time option phases (CEEDOPT/CEECOPT) are contained in SVA load list $SVACEE and therefore need to be re-loaded to the SVA when customized. This is accomplished via the following job control from BG partition:

```
// LIBDEF *,SEARCH=PRD2.SCEEBASE (or user.lib, if applicable)
SET SDL
CEEDOPT,SVA    (respectively: CEECOPT,SVA)
/*
```

11 Enhancements with LE/VSE 1.4.0 in VSE/ESA 2.3.0

11.1 LE/VSE C Run-Time Socket API

This is an OS/390-compatible Application Programming Interface (API).
LE/VSE 1.4-provided sockets are the IBM-recommended method for TCP/IP network communication. Your applications can be ported to other LE environments (for example, OS/390) without changes in API use.

Besides portability, LE/VSE socket support "frees" your applications from any particular TCP/IP level, through use of dynamic calls. Service applied to the TCP/IP-provided sockets is available to LE/VSE applications without requiring an additional relink step in between.

11.2 New LE/VSE Run-Time Capabilities

These include:

- The new run-time sub option UADUMP of TERMTHDACT combines LE/VSE and VSE/ESA dump diagnostics, all in one.

- RETZERO(ON) forces return code 0 at end-of-job time for COBOL/VSE and COBOL II applications which call subroutines that do not maintain register 15 contents. This support is provided as migration assistance for customers who do not want to code MOVE 0 TO RETURN-CODE just before STOP RUN in order to avoid return code 4095.

- HEAPCHK lets you monitor use and consumption of user-controlled heap storage.

11.3 New System Programming C Facilities

These enable you to run specific C/VSE applications without the need for run-time library presence. Such applications are known as "Freestanding Applications." They are used, for example, as alternatives to Assembler exit routines. Another use is the development of

persistent C environments, allowing you to create the C environment once and use it repeatedly for execution.

11.4   New Locales and Charmaps

Twenty additional countries are supported with a set of new locales and charmaps. This includes Double Byte Character Support (DBCS) datasets for China, Taiwan and Korean.

11.5 Additional Information

Further details are documented in the IBM manual, VSE/ESA 2.3.0 Enhancement Guide (SC33-6629).

APARs associated with these new functions:

APAR #	Description
PQ09072	Socket API for TCP/IP
PQ09073	Socket API for TCP/IP (Japanese)
PQ08538	Run-time capabilities and improved condition handling
PQ08540	New COBOL sample routines for PQ08538
PQ08542	System Programming C Facilities
PQ08541	Upgrade to the prelinker for DLL support
PQ08543	Upgrade Localedef Utility to support new locale syntax
PQ09439	Japanese language messages update for PQ08543
PQ08547	New locales and charmaps supplied (no DBCS languages)
PQ08548	Korean
PQ08552	Simplified Chinese
PQ08553	Traditional Chinese

12 Overall Release / Component Reference Table

LE/VSE Release	Comp.-ID	CLC	Component Name
1.4.10	5686-VS6-32	62K	LE Base
	5686-VS6-33	62L	LE C Run-Time
	5686-VS6-34	62M	LE DBCS Locales
	5686-VS6-36	62W	LE COBOL Run-Time
	5686-VS6-37	62Z	LE PL/I Run-Time
1.4.9	5686-CF9-32	52K	LE Base
	5686-CF9-33	52L	LE C Run-Time
	5686-CF9-34	52M	LE DBCS Locales
	5686-CF9-36	52W	LE COBOL Run-Time
	5686-CF9-37	52Z	LE PL/I Run-Time
1.4.8	5686-CF9-32	51K	LE Base
	5686-CF9-33	51L	LE C Run-Time
	5686-CF9-34	51M	LE DBCS Locales
	5686-CF9-36	51W	LE COBOL Run-Time
	5686-CF9-37	51Z	LE PL/I Run-Time
1.4.7	5686-CF8-32	02K	LE Base
	5686-CF8-33	02L	LE C Run-Time
	5686-CF8-34	02M	LE DBCS Locales
	5686-CF8-36	02W	LE COBOL Run-Time
	5686-CF8-37	02Z	LE PL/I Run-Time
1.4.6	5686-CF8-32	01K	LE Base
	5686-CF8-33	01L	LE C Run-Time
	5686-CF8-34	01M	LE DBCS Locales
	5686-CF8-36	01W	LE COBOL Run-Time
	5686-CF8-37	01Z	LE PL/I Run-Time
1.4.5	5686-CF8-32	91K	LE Base
	5686-CF8-33	91L	LE C Run-Time
	5686-CF8-34	91M	LE DBCS Locales
	5686-CF8-36	91W	LE COBOL Run-Time
	5686-CF8-37	91Z	LE PL/I Run-Time
1.4.4	5686-CF7-32	81K	LE Base
	5686-CF7-33	81L	LE C Run-Time
	5686-CF7-34	81M	LE DBCS Locales

	5686-CF7-36	81W	LE COBOL Run-Time
	5686-CF7-37	81Z	LE PL/I Run-Time
1.4.3	5686-066-32	75K	LE Base
	5686-066-33	75L	LE C Run-Time
	5686-066-34	75M	LE DBCS Locales
	5686-094-03	7EW	LE COBOL Run-Time
	5686-094-06	7EX	LE PL/I Run-Time
1.4.2	5686-066-32	65K	LE Base
	5686-066-33	65L	LE C Run-Time
	5686-066-34	65M	LE DBCS Locales
	5686-094-03	6EW	LE COBOL Run-Time
	5686-094-06	6EX	LE PL/I Run-Time
1.4.1	5686-066-32	55K	LE Base (including Japanese)
	5686-066-33	55L	LE C Run-Time (including Japanese)
	5686-066-34	55M	LE DBCS Locales
	5686-094-03	5EW	LE COBOL Run-Time (including Japanese and CICS)
	5686-094-06	5EZ	LE PL/I Run-Time (including Japanese)
1.4.0	5686-094-01	1DS	LE Base
	5686-094-02	1DT	LE Japanese
	5686-094-03	1EW	LE COBOL Base
	5686-094-04	1EX	LE COBOL Japanese
	5686-094-05	1EY	LE COBOL CICS
	5686-094-06	1EZ	LE PL/I Base
	5686-094-07	1F1	LE PL/I Japanese
	5686-094-08	1F2	LE C Base
	5686-094-09	1F3	LE C Japanese

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14 Comments and Questions

Comments or questions on this documentation are welcome. Please send your comments to:

zvse@de.ibm.com