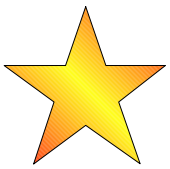
LE/VSE Hints & Tips (3)

Further news, experiences & rising stars



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VM/VSE Technical Conference 2000

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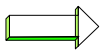
Note: This presentation is a follow on of previous LE/VSE Hints & Tips sessions (held in 1998, 1999)
- http://www.s390.ibm.com/products/vse/vsehtmls/reno98.htm --> Document 'levsetc.pdf'
- http://www.s390.ibm.com/products/vse/vsehtmls/top3.htm --> Document '31c.pdf'

Contents

Abbreviations used:
- IP : integral part of VSE/ESA x.x.x



LE/VSE Functions on VSE/ESA 2.4.0

- Performance enhancements (storage relief in batch and CICS)
  --> APAR PQ23382, PTF **UQ27971** and APAR PQ23385, PTF **UQ28062**
  --> Further details are available in VSE/ESA **Software Newsletter**
  G225-4508-**18** (1st/2nd Quarter, 1999)
- LE/CICS-wide option defaults to console
  --> APAR PQ24821, PTF **UQ29092**
- Additional support for internationalization (locales, unicode support)
  --> APAR PQ24052, PTF **UQ26808**
- Small OME enhancements (CEE3200S, abend 4042, ucondef() utility msg. in the range EDC4201 - 4237)
- Symbolic feedback codes (OME dependency: CEE240 for CEE3200S, II10706)
- A consolidated view of LE/VSE 1.4.0 APAR enhancements up to the VSE/ESA 2.4.0 level will be available via:
  --> LE/VSE Enhancement Guide SC33-6778-00

IP: VSE/ESA 2.4.0
available since 06/25/99

The PTFs are also part of your installation if you run latest LE/VSE PSP service on pre-VSE/ESA 2.4 releases ...

Some Service Options Beyond VSE/ESA 240

- Improper calculations, different abends along with CICS 31-bit shortage
  --> APAR PQ31256, PTF **UQ36945**
- Enhanced LE/VSE dump output to show storage around PSW and general purpose reqisters (traceback):
  --> APAR PQ27448, PTF **UQ34938**
  --> APAR PQ27450, PTF **UQ34939**
- C Prelinker corrections and enhancements
  --> APAR PQ34263, PTF **UQ39017** and APAR PQ31101, PTF **UQ37475**
- VSAM, consistency explicit/implicit VSAM managed SAM processing
  --> APAR PQ30638, PTF **UQ38147**
- LE/VSE Conforming Assembler, CEEENTRY macro enhancements
  --> APAR PQ36828, PTF **UQ43069** (supersedes: PQ26738 / UQ33950)
- Program check with CEECCICS in SVA
  --> APAR PQ24407, PTF **UQ31119**

IP: VSE/ESA 2.4.1
available since 11/27/99

IP: VSE/ESA 2.4.2
available, June, 2000

The PTFs are also part of your installation if you run latest LE/VSE PSP service on pre-VSE/ESA 2.4 releases ...

Preventive Service Planning (PSP)

--> PTF Bucket Option ...

- LE/VSE 1.4.0 became base product in VSE/ESA 2.3.0. With this release LE PTF application switched to "indirect" service apply
- PSP buckets can be ordered based on the VSE refresh level to minimize amount of PTF's sent. We actually count ~ 200 APARs with LE/VSE 1.4.0

Refresh	Upgrade	Subset
E143, E144	VSEESA14x	IBMLANG/1DS
E21x (--> better do FSU)	VSELE140	Required subset(s)
E22x (--> better do FSU)	VSEESA22x	IBMLANG/1DS
E23x (--> PSP or FSU)	VSEESA23x	IBMLANG/1DS
E24x (--> PSP or FSU)	VSEESA24x	IBMLANG/1DS

IBMLANG/1DS comprises all LE/VSE components

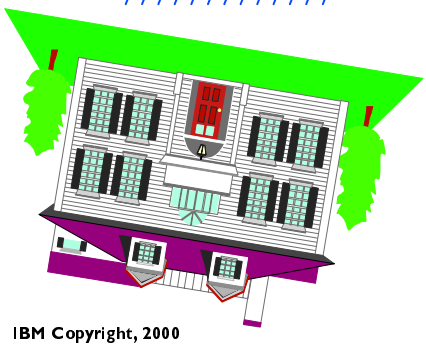
NOTE: PSP orders should not just pick up IBMLANG/1DS. They should comprise other subsets (installed on your system). Of special interest can be CICS (ensuring synchronization with LE/VSE)

Effects with Non-LE/VSE-Conforming Applications

- No preserving of certain registers
- Inconsistent use of storage areas and lost linkage to save areas (R13 corrupted ...)
- No traceback capabilities

```
TRACEBACK:
  DSA ADDR  PROGRAM UNIT  PU ADDR   PU OFFSET  ENTRY     E ADDR    E OFFSET  STATEMENT  STATUS
  007CB018  CEEHDSP       007D920   +0000DCE   CEEHDSP   007D920   +0000DCE              CALL
  00794528  CEEHSGLT      007243A8  +0000005C  CEEHSGLT  007243A8  +0000005C             EXCEPTION
  007940I8  IGZCMSG       00779E40  +0000037A  IGZCMSG   00779E40  +0000037A             CALL
  007920I8  IGZEQOC       007C7000  +00000F8C  IGZEQOC   007C7000  +00000F8C             CALL
  0070ICE0  TEST          00700078  +00000296  TEST      00700078  +00000296      22     CALL
```

- No robustness / reliability at run-time ...



- Typical error is the corrupted back chain (backward linkage problem) --> abend 4083 RC3 ?
- Stack frame allocation failures can be a further indication --> abend: 4088 RC99 ?
- Any subroutines on DOS/VS COBOL 1.2.4 level ?
- COBOL applications not relinked under LE/VSE ?
- Non-LE Conforming Assembler ? --> further focus ...

LE/VSE-Conformity with Assembler ...

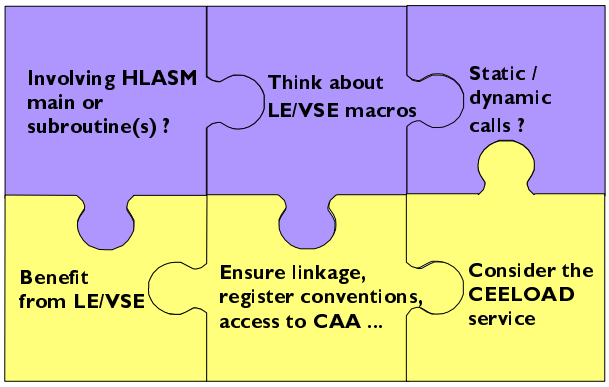
- To create and maintain mixed language applications in an LE/VSE environment the following macros and services can assist to ensure operating LE/VSE-conform:
  - LE/VSE assembler macros (CEEENRTY/CEETERM)
  - LE/VSE preinitialization service (CEEPIPI)
  - LE/VSE C-specific macros (EDCPRLG/EDCEPIL)
- This helps to organize complexity, preserve linkage (internal & user-type routines), honors register conventions, ensures that save areas stay intact
- Shortly saying it keeps LE/VSE's integrity ...

```
PGM-A
        <-- PGM-B
                <-- PGM-C
                        <-- PGM-D
```

Simplified program linkage ("traceback" view)

- Examples and details not covered here are available on LE/VSE Home Page --> http://www.s390.ibm.com/le_vse/samples.htm
- You may also wish to refer to --> Software Newsletter, Third/Fourth Quarter 1999 (G225-4508-19)

Robust LE/VSE Application Structure



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Recent APAR PQ36828 (superseding PQ26738/UQ33950) provides additional flexibility for programmers using LE/VSE-conforming assembler macro CEEENTRY. This particularly affects new capabilities via the "RMODE=" and "BASE=' parameters (it is now possible to specify the residency mode and allow for using multiple base registers). Furthermore it allows multiple executions of CEEENTRY within single assembly.

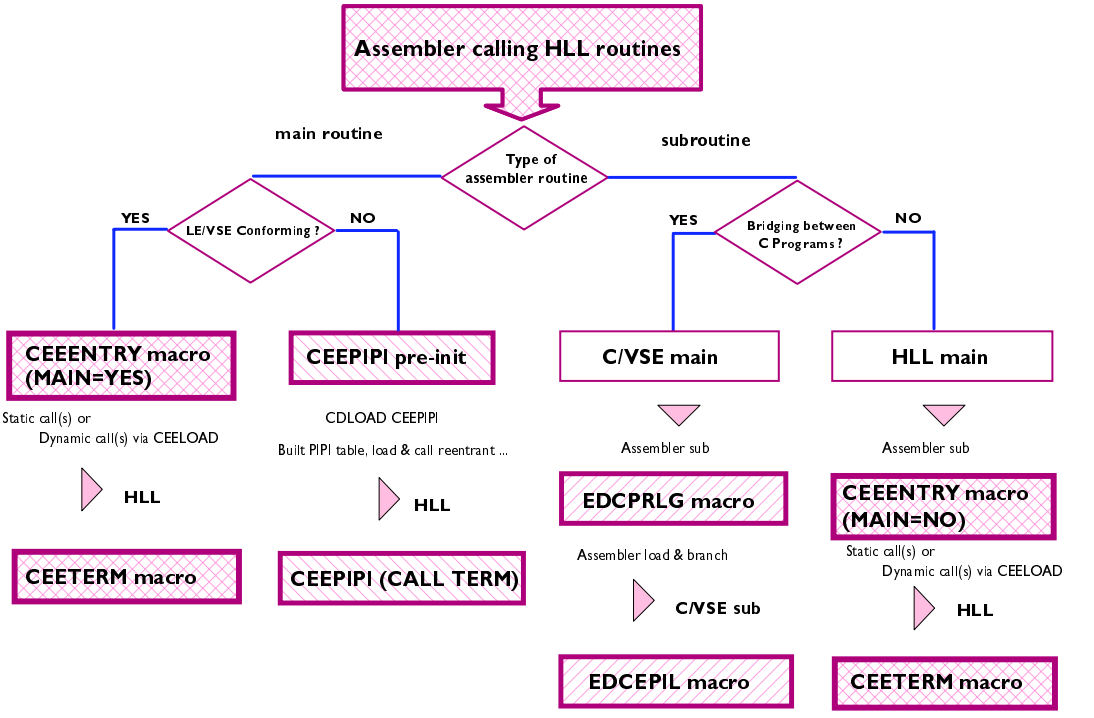


Fig. Assembler Calling High Level Language (HLL) Routines

LE/VSE Run-Time Options to Use With Caution

- **ABTERMENC(ABEND)**
  - Default is RETCODE
- **ALL31(OFF)**
  - AMODE switch, especially on CICS
  - ALL31(ON), if all migrated 31-bit
- **CBLOPTS(ON)**
- **CHECK(ON)**
  - Maps to COBOL/VSE "SSRANGE" compiler option
- **HEAP(ANYWHERE)**
  - Relationship between COBOL compiler options RMODE, DATA(24|31), HEAP run-time option and CICS 24-bit GETVIS limit of 64k
  - Avoid HEAP(BELOW), it ignores DATA
- **RTEREUS(OFF)**
  - (ON) for very special environments repeatedly calling LE batch, can have nasty side effects
- **STACK**
  - STACK(BELOW) with ALL31(OFF)
  - STACK(ANY) with ALL31(ON)

- **STORAGE(NONE,,K)**
  - If variables are pre-initialized
- **STORAGE(00,NONE,NONE,xxK)**
  - Maps to VS COBOL II WSCLEAR
  - Migration assist for DOS/VS COBOL relying on preinitialized storage pattern

COBOL

- **STORAGE(00,NONE,00,xxK)**
  - 3rd parameter is for PLI/VSE automatic variable storage (preinit service)
  - It's use has a performance impact

PL/I

- **TERMTHDACT(UADUMP)**
  - For diagnosis in batch, LE/VSE and redriven partition dump
  - Not recommended under CICS !
- **TERMTHDACT(DUMP)**
  - This is the appropriate setting for diagnosis in CICS and to avoid the LE/CICS abnormal termination exit to drive EXEC CICS DUMP(4039) requests
  - CICS SIT setting: PCDUMP=YES is useful
- **TRAP(ON)**
  - Permanent setting to keep LE/VSE's integrity, starts condition handling
- **TRAP(OFF)**
  - Only on request of IBM service personal

Languages and CICS Transaction Server for VSE/ESA

- CICS Transaction Server for VSE/ESA **supports**:
  - All LE/VSE conforming compilers (C/VSE, COBOL/VSE, PLI/VSE)
  - LE/VSE enabled HLASM via **CEEENTRY macro** and **MAIN=NO** parameter. There exists no support for MAIN=YES under CICS
  - DOS/VS COBOL and VS COBOL-II (if relinked / using LE run-time)

  Note: For VS COBOL-II applications the translator option XOPTS(COBOL2) is still supported. Nevertheless the run-time must be LE/VSE. Hence there is no need to support CICS SIT COBOL2 parameter, anymore !

- CICS TS **will not support**:
  - DOS PL/1 and C/370 applications (recompilation with LE-conforming compiler is required)
  - RPG-II (not supported by LE, either)

VSE/ESA 2.4.x

CICS Coexistence in VSE/ESA 2.4.x --> General remarks

- CICS/VSE and CICS TS can coexist in VSE/ESA 2.4.x environments, both operating with LE/VSE 1.4.0
- Settings in SIT table .....
  - PLI=**NO** ... (CICS/VSE only), recommended to indicate that LE/VSE is going to provide run-time support. On the contrary PL1=YES is the setting to involve the obsolete DOS PL/I 1.6.0 run-time library (that went EOS, 06/30/1997)
  - COBOL2=**NO** ... (CICS/VSE only), is the setting to ensure LE/VSE run-time support for COBOL applications (even DOS/VS COBOL and VS COBOL II, if relinked under LE/VSE)
  - START=**COLD** (CICS/VSE and CICS TS) ... at least first time !
- CICS CSD migration, via shared or non-shared option (internal security has been removed from CICS TS, file support added etc.)
- LIBDEF aspects (PRD2.CICSOLD), different APPLID for optional CICS/VSE)
- Second CICS/VSE/TS enablement (LE/VSE destination queues present ?)
- Languages requiring specific CICS Release (e.g. RPG-II --> CICS/VSE)
- CICS/VSE --> DL/I 1.10.0, CICS Transaction Server --> DL/I 1.11.0x

CICS Translator Options Required for COBOL applications

- For COBOL/VSE or VS COBOL II online programs (VS COBOL II must at least be relinked to involve LE/VSE run-time) one of the following CICS/VSE or CICS TS translator options must be used. This will apply to mainline programs as well as to copybooks that may be translated separately
  - XOPTS(**COBOL2**) was a minimum setting for VS COBOL II type programs, preferable matching the ANSI74 standard. It may also be used in a COBOL/VSE
  - XOPTS(**ANSI85**) implies COBOL2 and can also be applicable for COBOL/VSE or VS COBOL II compiled program units. However this settings is appropriate in case the application exploits ANSI85 functionality such as nested programs
  - XOPTS(**COBOL3**) is a CICS TS only translator option which you may wish to use as an indicator for a COBOL/VSE or SAA AD/Cycle COBOL/370 cross compile program unit. It implies ANSI85 and COBOL2. By the way CICS TS doesn't support the SIT COBOL2 parameter since the run-time must be LE/VSE

VSE/ESA 2.4.x

Problem Determination Strategies

--> "Ways" to retrieve useful data about an incident

- Is there any of the following available ?
  - LE/VSE type "4xxx" abend (with associated reason code)
  - LE/VSE type console messages (prefix: CEE, IBM, IGZ, EDC)
  - Further conditions supplemented via message CEE0374C
  - Output on CICS DEST=CESE|CESO destination (IUI dialog: "Inspect Message Log" or CICS shutdown statistics)
  - LE/VSE dump, by preference taken with TERMTHDACT(UADUMP) in batch and TERMTHDACT(DUMP) under CICS
  - CICS Auxiliary Trace of LE/CICS interface area, transaction dump
  - Eventually for CICS TS, DFH0STAT statistics
- General debugging approaches if nothing above was useful
  - Stack frame validation, back and forth (-> R13, pointer to callers stack frame)
  - Condition information block (CIB)
  - Common Anchor Area (CAA, -> dump entry via R12)
  - Check for LE/VSE Debugging Guide & Run-time Messages (shows techniques)
  - Debug Tool for VSE/ESA (breakpoint settings etc.)
  - Consider to raise a PMR with us

Tracing the LE/CICS Interface

--> Condensed AUXTRACE samples, CICS/VSE/TS

- Failure during LE/VSE ownership processing, COBOL/VSE application (**CICS/VSE**)

```
ID  REG 14   REQD TASK FIELD A  FIELD B  CHARS   RESOURCE  TRACE TYPE
D1 00000000 3203 00057 00000000 00779D54 ........PCMM0010 LIP ESTABLISH OWNERSHIP TYPE
D1 0075DD36 2203 00057 00000000 00779D54 ........PCMM0010 LIP PROGRAM CHECK RECOVERY
FD 1606139C 0104 00057 004A85B9 004A85B9 ........          ... REPEAT 06139 TIMES
D1 007C4282 2205 00057 00000000 00000008 ........          LIP RETN PROGRAM CHECK RECOVERY
F2 807C4478 6004 00057 C1E2D9C1 00000000 ASRA....          PCP ABEND
F1 4075ACF2 CC04 00057 000000C8 018523A4 ...H....          SCP GETMAIN INITIMG
```

X'D1' trace entries

Note: This symptom was caused by an unresolved EXTRN in the linkedit for CEECCICS done by the customer after changing runtime options. Specifically, an incorrect CEECOPT (wrong CSECT name) creating an unresolved EXTRN for CEEDOPT.

DFHLIP: Language Interface Program

- Successful execution of C/VSE application (**CICS/VSE**)

```
ID  REG 14   REQD TASK FIELD A  FIELD B  CHARS   RESOURCE   TRACE TYPE
D1 00000000 1403 01325 00000000 004FCB84 ........EDCYCROP   LIP THREAD INITIALIZATION
....
D1 00455EF8 2105 01325 00000000 00000000 ........           LIP RETN RUN UNIT END INVOCATION
D1 00455EF8 1503 01325 00000000 00000000 ........           LIP THREAD TERMINATION
D1 00454BC8 1505 01325 00000000 00000000 ........           LIP  RETN THREAD TERMINATION
F0 40454D0E 8004 01325 00000000 00000000 ........           KCP DETACH
```

- Same C/VSE application (**CICS/TS**)

DFHAPLIx: Language Interface Program

```
01818 1 LD 0002 LDLD  EXIT  ACQUIRE-PROGRAM/OK    82302000,02302000,2E00,0,REUSABLE,ESDSA,OLD_COPY
01818 1 AP 1940 APLI  ENTRY START_PROGRAM          EDCYCROP,CEDF,FULLAPI,EXEC,NO,01C91C60,00000000,...
01818 1 SM 0301 SMGF  ENTRY GETMAIN                A3C4,YES,RUWAPOOL,TASK31
01818 1 SM 0302 SMGF  EXIT  GETMAIN/OK             02003AA8
01818 1 AP 1948 APLI  EVENT CALL-TO-LE/VSE         Thread_Initialization EDCYCROP
01818 1 AP 1949 APLI  EVENT RETURN-FROM-LE/VSE     Thread_Initialization OK EDCYCROP
01818 1 SM 0301 SMGF  ENTRY GETMAIN                250,YES,LE_RUWA,TASK24
01818 1 SM 0302 SMGF  EXIT  GETMAIN/OK             006C0448
01818 1 AP 1948 APLI  EVENT CALL-TO-LE/VSE         Rununit_Initialization EDCYCROP
```

Messages & Conditions on VSE Console

- The following is a summary of LE/VSE diagnostic messages typically appearing on VSE Console:
  - CEE3320C pointing to abend PSW
  - CEE3321C VSE cancel code and interruption code reference
  - CEE3322C with LE/VSE abend code references ('4xxx' type code)
  - CEE1000S referring to accompaining LE/VSE ('4xxx') abend and hex. reason code -> Abend OME search string: '**CEEABENDC**'

- Identify further conditions via console message:
  - CEE0374C **COND=IGZ3S** ---> IGZ0003S Logic error I/O operation
  - Mid-padding with zeros is useful. The string will then map to an existing run-time message number which can be looked at
  - The "COND=...." reference remains a reliable event indicator, even if the actual message cannot be issued !
  - If caused by online applications it is likely that LE/VSE couldn't write a message to it's destination queues (setup omission to provide CICS DCT entries for DEST=CESE|CESO)

Enhanced LE/VSE Dump & Traceback

```
CEE5DMP V1 R4.0: NOID                                    03/30/00 1:12:58 PM                PAGE:    1
DUMP WAS CALLED FROM STATEMENT NUMBER 8 AT OFFSET +000000C0 FROM ERR  ON-UNIT WITH ENTRY ADDRESS 005003F0
INFORMATION FOR ENCLAVE DSU102   .....

  TRACEBACK:
    DSA ADDR  PROGRAM UNIT  PU ADDR   PU OFFSET  ENTRY         E ADDR    E  OFFSET   STATEMENT  STATUS
    00546A50  CEEKKMRA      0056A7E8  +000008C4  CEEKKMRA      0056A7E8  +000008C4              CALL
    00566A70  IBMRKDM       0364CC00  +000000BA  IBMRKDM       0364CC00  +000000BA              CALL
    00546960  DSU102        005000F8  +000003B8  ERR  ON-UNIT  005003F0  +000000C0           8  CALL
    00546750  IBMRERPL      0052DF98  +0000063E  IBMRERPL      0052DF98  +0000063E              CALL
    00546668  CEEEV010      03630180  +00000126  CEEEV010      03630180  +00000126              CALL
    0057B018  CEEHDSP       03679478  +00001232  CEEHDSP       03679478  +00001232              CALL
    00544260                005664BD  +00000000                005664BD  +00000000              EXCEPTION
    00544018  CEEYSMG       0056B4C0  +0000042C  CEEYSMG       0056B4C0  +0000042C              CALL
    00546448  IBMRKST       0364CD82  +00000272  IBMRKST       0364CD82  +00000272              CALL
    00546258  DSU102        005000F8  +000001AC  DSU102        00500100  +000001A4          14  CALL
    005461C0  IBMRPMIA      00533E60  +0000024A  IBMRPMIA      00533E60  +0000024A              CALL
    005460D8  CEEEV010      03630180  +00000282  CEEEV010      03630180  +00000282              CALL
    00546018  CEEBBEXT      0051B1B8  +00000132  CEEBBEXT      0051B1B8  +00000132              CALL

  CONDITION INFORMATION FOR ACTIVE ROUTINES
    CONDITION INFORMATION FOR  (DSA ADDRESS 00544260)
      CIB ADDRESS: 0057B4E8
      CURRENT CONDITION:
        CEE3503S THE LOAD REQUEST FOR PHASE SORT     WAS UNSUCCESSFUL.
      LOCATION:
        PROGRAM UNIT:  ENTRY:  STATEMENT:  OFFSET: +00000000
      MACHINE STATE:
        ILC..... 0000    INTERRUPTION CODE..... 0000
        PSW..... 075D1E00 8056BFAA
        GPR0..... 00501C50  GPR1..... 0056C0F8  GPR2..... 00501C50  GPR3..... 00527D38 ....

            ABEND CODE: 00000022 REASON CODE: 00000000
    STORAGE DUMP NEAR CONDITION, BEGINNING AT LOCATION: 0056BF9A
      +000000 0056BF9A  C2F41872 50703188 18074110 BC380A04  9680A1B6 5870C2F0 9640711B 9680C30C  |B4..&..h........o.....B0o ..o.C.|

  CONTROL BLOCKS FOR ACTIVE ROUTINES:
    DSA FOR CEEKKMRA: 00546A50
      +000000  FLAGS.... 0000      member... 4040      BKC...... 00566A70  FWC...... 00546F98  R14...... 80536EEE
       .....
      +00004C  NAB...... 00546F98  PNAB..... 40404040  .......
```

Read from bottom to top

Statements in PLI/VSE Source Program:
--> compiled with option TEST(ALL,STMT)

```
 8 ON ERROR CALL PLIDUMP(....);  request dump
 9 .....
14  CALL PLISRTB (....);     invoke IBM DFSORT
```

PQ27448 / UQ34938

PQ27450 / UQ34939

Sample LIOCS Issues

- There is DTF macro support in LE/VSE (front end to VSE LIOCS)

- Scenario 1: LE/VSE issues msg. **CEE3751S** not being capable of locating LIOCS phase IJDFAPZY. Device affected was a 4248 printer. Problem turned out to be caused by COBOL 'RESERVE 1 AREA' specified in the FILE CONTROL area. This specification is not acceptable along with an DTF attribute 'IOAREA2=YES'. ==> Removing 'RESERVE' from the printer statement ensured normal EOJ.

- Scenario 2: COBOL OPEN issues msg. **IGZ0083W** refering to an unsupported device. This happens if the EXTRACT macro fails to identify the device associated with the SYSxxx number provided or the PUB device code is unknown. First do a "LISTIO" command, in addition the following console commands are useful to verify the PUB device code.
  - 'STATUS 00C,ALL' --> this command will display PUB/X addresses
  - 'SHOW PUB#.8' ('SHOW PUBX#.C0') --> list the PUB code string
  - PUB code sample display: 000CFF00 **10**0002F8 (means the actual device code is X'10' for a 2501 device instead X'11' for 2540 which is the reason for msg. IGZ0083W)
  - Verify IPL ADD cards & VM profile settings for VSE guest(s)

STXIT & Debugging

- The LE/VSE condition manager routine does establish own STXIT handling
- This is triggered by run-time option **TRAP(ON)** and comprises get_storage and init_STXIT save area processing
- Vendor development tools, debuggers and in-house assembler programs that issue own STXIT PC or STXIT AB macros interfere with LE/VSE condition handling !

- There is a possibility to establish an LE/VSE assembler exit selecting specific events to be picked up / ignored by LE/VSE condition handling
- Ensure having applied PQ27042 / UQ30448 (STXIT loop)
- Not yet documented STXIT msg. (**4093 RC 200**, LE/VSE unable to establish any STXITs during initialisation processing), Info APAR: **II11827**

Involving Sort Products

--> unlabeled tapes, dependencies to FASTSRT ...

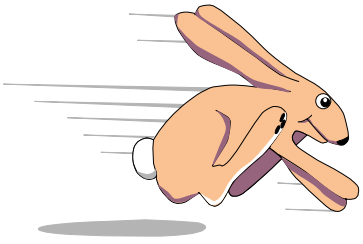
- Be careful with "FASTSRT" compiled COBOL/VSE programs, in particular those dealing with unlabeled tapes
- LE COBOL determines - whether labeled or unlabeled tape - from presence or absence of // TLBL statement
- LE COBOL constructs the SORT control statements (SORT, OPTION etc.) based on the file and record definitions in the COBOL program

- With "FASTSRT" no vendor exit gets called from LE/VSE. SORT is doing the OPEN (LE COBOL can't preempt any characteristics since they might be revised "outside" of LE/VSE)
- SORT by default assumes a standard label file and expects to see // TLBL
- To change this to unlabelled requires the LABEL=U to be specified on the SORT OPTION control statement
- Be aware that concurrent SORT STXIT usage can impact LE/VSE condition handling and/or performance. Refer to related enhancements such as the STXIT=NO|MIN customization option (in DFSORT 3.4)

Generate LE/VSE Applications Capable to Run Under CICS TS and CICS/VSE

- Be aware of the Interactive Interface support (Primary Library, OPTION 8, translate and compile ...) in order to build your applications.
- This will ensure usage of language independent stubs such as CICS DFHELII, related options etc.

- NOTE: Every CICS TS related transaction need to be "security-enabled" prior to it's first execution. The Interactive Interface provides associated support via dialog TAS$SECF, accessible via main selection path "Resource Definition" --> "Define Transaction Security".



Some Recommendations with C/VSE

- In case C/VSE compilations fail with improper character references the actual code page can be responsible for it. "1047 US" is a useful setting.
- C function **tmpfile()** relies on presence of VSAM managed SAM support for cluster "DEFAULT.MODEL.SAM.ESDS" and requires: "// DLBL IJSYSUC,' ...'
  --> It is recommended to refer to VSAM VSESPUC since IJSYSCT does not hold a predefined ESDS model definition !
- Non-labeled tape operations and fread(), fopen(). Improved behaviour via LE/VSE PQ24997 / UQ33953 and PQ24999 / UQ33954 supplemented by VSE/AF DY45123
- Prelinker enhancements & corrections, PQ31101 / UQ37475
- Do not use CEELOAD to dynamically load C modules that have writable static. C programs compiled RENT do have writable static, C programs compiled NORENT do not have writable static
  - If any program in a phase uses writable static, the PHASE will require writable static switching. CEELOAD does not provide support to switch writable static when calling a C function
  - To circumvent this restriction, if possible, compile your C modules with the NORENT option
  - This restriction is also documented in Info APAR I10024

Hitparade - Inquiries Level2 ....
--> Overview (sorted by frequency)

- Storage related topics (all sorts of)
- Coding restrictions in specific target environment
- **New/removed/changed language elements**
- InterLanguage Communication with Assembler
- LE/VSE destinations not present (various symptoms)
- Consistency with implicit / explicit VSAM managed SAM open (APAR PQ23160 superceded by APAR PQ30638) ....
- LE/CICS interface problems
- Storage overlays CEDF, SSRANGE ...
- DTF problems
- Static, dynamic calls & fetchable attribute
- COBPACK or predefined SVA loadlist related topics
- CICS macro level programs not supported
- IUI II, related topics (indirect PTF apply)
- JCL RC 3000, RC 4095 (RETZERO option ...)
- COBOL/VSE compiler msg. via IGYWEIN1/2 etc.

"Common" Inquiries ...

- **Need to retailor options after applying related maintenance** (e.g. PQ15901) PTF cover letters mention such a need ! Up-to date option source should be used
- **Transition 24-bit to 31-bit** (associated impact from compile options (e.g. RMODE, DATA), dependency in run-time (e.g. ALL31, STACK, HEAP)
- **Partition ALLOC values** too small and/or SIZE values too big. This is a problem for LE/VSE having a need for partition GETVIS storage (below & above)
- **New/removed/changed language elements**, for example:
  - **ASSIGN** clause (file handling), file types ...
  - **BLOCK CONTAINS** clause / compile option sensitive NO/CMPR2 (ANSI74/85)

  "Also see COBOL/VSE Migration Guide, GC26-8070-00"
- 60-80% of problems caused by **improper source coding**
- **ANSI standard** requirements e.g. for OPEN processing (since VS COBOL-II times)
- **New/changed vendor interfaces**
  - PRODEXIT SVC, input/output parameter list
  - Avoidance of ANSI-85 pre-open checks before building a DTF and issuing the OPEN (as a result of exit RC4)
- **Errors with vendor products active,** Temporary deactivate (in order to see whether symptoms change)
  - Can accelerate time for problem determination
  - Might cause extra efforts. e.g. like 're-IPL' - to disable successfully
- **Performance / storage relief** PTFs e.g. PQ23382
- **Coding restrictions** "See COBOL/VSE Programming Guide, SC26-8072-01, Chapt.23"
- **Avoid rare storage** resources
  - Helps LE/VSE to be smart and establish it's control blocks, full condition handling etc.

"CICS" Related Inquiries ...

- **Sample CICS type indicators**
  - APCH (wrong language interface activated)
  - APDA (missing CICS entries in PPT, CSD or required LE component not installed
  - APCS (CICS unable to make connection to LE/VSE to determine application characteristics) etc.
- **Do not use CICS macro level** programs with LE/VSE, also see Info APAR **II09069**
- **Abnormal termination null-exit** if experiencing 4039 (CEEWCEXT)
- **2nd CICS customization** for LE/VSE
  - Think about setup for DCT/PPT/CSD to avoid termination errors and suffer from missing diagnostics
- **Ensure reentrency running CICS "RENT"** compiled programs
- **Do not violate CICS resource definitions** for LE/VSE (dynamic load of modules will fail CEE3503S)
- **Non unique modules naming conventions,** especially between LE/VSE, VS COBOL-II and COBOL/VSE (COBOL batch / CICS). Take care with LIBDEF, SVA ..
- **For CICS/VSE only** you may wish to optimize page fragmentation via LE/CICS storage settings (e.g. for run-time options ANYHEAP, BELOWHEAP, HEAP, LIBSTACK, STACK). The idea is to substract 2 * 8 bytes, the size of CICS storage accounting areas (SAA) and specify a value of **4080 bytes** rather than default of 4096 bytes. CICS/VSE first / second SAA comparison takes place to detect storage violations. This change is not applicable in CICS TS subsystems, here "crumbled zones" are used instead of SAA's

"Latest" Inquiries ...

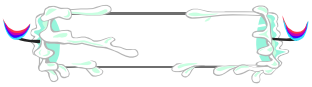
- **SAM Open Processing** failures (such as program checks) ? Eventually caused by "non-LE" type modules, also called IGZEQOC (3rd party software or VS COBOL-II). Consistency for explicit/implicit VSAM managed SAM OPEN PQ30638 ...
- **COBOL/VSE programs** compiled with FASTSRT option and SORT product interference (see page 21)
- **Various symptoms** due to missing LE/VSE error destination queues ....
  - Msg. IGZ0037S, IGZ0061S
  - Msg. CEE0374c while running program IGZCPRS, IGZCMSG etc.
- **Segment Translation exceptions** after service apply, nomore running ALL31(OFF) and STACK(BELOW) e.g. if AMODE switch is required ...
- **Combined usage of** LE/VSE provided Assembler macro CEEENTRY and VSAM type macros (conflicting use of R13 !).
  Resolution can be to save R13 before and restore after call to VSAM
- **Wrong parameter combination** along with dependent run-time (respectively compile time) options. For example:
  - ALL31 and STACK
  - HEAP(BELOW), wondering why specification of COBOL DATA compile option was ignored

"Seldom" Inquiries ...

- **Establish Ownership Call** fails (used to determine the language of the main program and amount of storage to be preallocated by CICS). May happen if ...
  - *Unresolved EXTRNs* on runtime routines exist in user programs
  - Incorrect CSECT names are used for CICS default run-time option assembly
  - COBOL bootstrap is not link-edited OK
  - *LE enabled CICS/VSE program that runs* AMODE(24), DATA(24), ALL31(OFF) or HEAP(„BELOW,??,,) and requests *more than 65504 bytes* (working-storage & total of LE storage options - below the 16MB line)
  - These are not the only failures that can occur in the call ...
- **If selected, use the recommended LE/VSE SVA load lists**
  - LIBRARIAN 'LIST' function is useful to LIST content of '$SVA*.PHASE' members
  - LE/VSE Inst.&Cust. Guide SC33-6682-01, Appendix F. holds module description lists
- **LE/VSE 1.1 linked programs** do not need to be relinked under LE/VSE 1.4 (RES capability)
- **DOS VS COBOL 1.2.4 subroutines** involved ...
- User writes beyond array boundaries
- **DTF related topics** (e.g. missing LIOCS phase, unsupported device etc. / page 19)
- **Incorrect CSECT names** in LE/VSE source books (CEEXOPT macro usage / customization)

Storage Related Sample Scenario ...

- Imagine a storage situation (reaching partition GETVIS limit) while starting to initialize LE/VSE
- Of importance is the question whether condition handling was asked for and actually could have been established (TRAP run-time option). TRAP(ON) will initiate LE/VSE condition handling to take place
- Do not run with TRAP(OFF) even if this might look comfortable (e.g. the "saving" of extra code in the partition). It can generate nasty side effects !
- Better prepare yourself for out-of-storage conditions in advance
- The 4th parameter of run-time option STORAGE(00,NONE,00,**32k-64K**) will preallocate "reserved stack frames" for the condition handler (prior to any further activities) --> batch environment
- In some test scenarios this was confirmed very useful (clearness of abend message e.g. former 4087 RC0 could be transformed into a storage condition 4088 RC 1012)

~~TRAP(OFF)~~  ~~No reserved stack frames, and/or small GETVIS areas~~

Migration Topics

--> snapshot view

- There is no need to include PRD2.SCEECICS library in CICS HLL compile/links however CICS startup JCL must specify PRD2.SCEECICS before PRD2.SCEEBASE
- Recent questions like: "I relinked many DOS/VS COBOL/CICS programs under LE/VSE, but forgot to include library PRD2.SCEECICS. Do I need to restart from beginning ? => No
- CCCA/VSE **V2R1** (migration assist for COBOL CICS & batch)
- Comparators in PLI/VSE versus DOS PL/I
- No CICS macro level programs supported by ERTLI CICS/LE interface --> II09069
- For further migration aspects you might wish to refer to ....
  * LE/VSE Home Page (select: 'migration')
    - http://www.s390.ibm.com/le_vse
  * COBOL/VSE Migration Guide GC26-8070-00
  * LE/VSE V1R4 Run-time Migration Guide, SC33-6687-00
  * LE/VSE Hints & Tips (1), Technical Conference, April 1998
    - http://www.s390.ibm.com/products/vse/vsehtmls/reno98.htm
    - Document 'levsetc.pdf'
  * LE/VSE Hints & Tips (2), Technical Conference, May 1999
    - http://www.s390.ibm.com/products/vse/vsehtmls/top3.htm
    - Document '31c.pdf'

LE/CICS Abnormal Termination Exit

- Did you ever experience LE/CICS abend code **4039** ?
- This is a general indicator that an unhandled condition has occurred
- In consequence an LE/CICS abend exit is involved which prevents CICS abend codes to appear

  - What can be done ?

- Verify the setting of LE/CICS run-time option TERMTHDACT. Suboption DUMP is the recommended setting under CICS
- If this does not help the exit can be customized. Related description can be found here:
  - **Software Newsletter**, Third/Fourth Quarter 1999 (G225-4508-**19**)
  - http://www.s390.ibm.com/products/vse/vsehtmls/newslett.htm (--> Document 'vsedleu.pdf')

NOTE: Do not involve the CICS translator when reassembling the exit. Dependent on the options used this may cause trouble !

Date-Related Experiences with LE/VSE

- Leap year, 02/29/00 and INTEGER FROM DATE/DAY
- Hardcoded century in EDCPRLG macro (PQ32076 / UQ36679)
- Do not use 'ACCEPT DATE' under CICS
  - Indicator can be msg. IGZ0096C "failing to load IGZEDTE"
  - Support is not applicable here
  - Use EXEC CICS ASKTIME/FORMATTIME services instead
- Be aware of date semantics, date processing and date related logic problems
  - COBOL/VSE Programming Guide SC26-8072-01, Chapter 22
- Exploit LE/VSE Date & Time Callable Services (for conversions, calculation ...)
  - CEEDATE, CEEDATM, CEEDAYS, CEEGMT etc.
- Most locales might return 2-digit date representations. This is not considered an error and is compatible to many other platforms

Example: strftime() function with %x conversion specifier .....

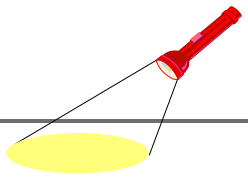
```
strftime(dest, sizeof(dest)-1, "%x\n", timeptr);
```

Documentation References / News

- LE/VSE and language related books are accessible from LE/VSE Home:
  --> http://www.s390.ibm.com/le_vse/books.htm
- The following books can be of special interest:
  - PLI for VSE/ESA V1 R1.0 Migration Guide, SC26-8056-**01**
  - PLI for VSE/ESA V1 R1.0 Programming Guide, SC26-8053-**01**
  - LE/VSE Enhancement Guide, SC33-6778-**00** (the book was issued along with VSE/ESA240 and comprises individual updates for the LE/VSE R4 bookshelf)
  - LE/VSE C Run-time Programming Guide, SC33-6688-**01**
- CD ROM collection kit, SK2T-0060-15 (issued in December 1999)
- VSE Software Newsletters, 1999 (G225-4508-**18,19**)

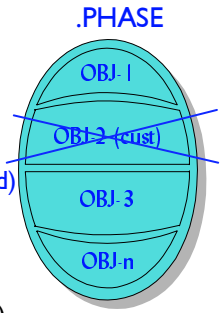
- VSE Home Page:
  --> Latest VSE/ESA Hints & Tips (including LE/VSE update for VSE/ESA 24x)
  --> References to overall product status, events, education etc.
  --> http://www.s390.ibm.com/vse
- LE/VSE Home Page (Info, Samples, Related Books etc.):
  --> http://www.s390.ibm.com/le_vse

Directions of LE/VSE ...



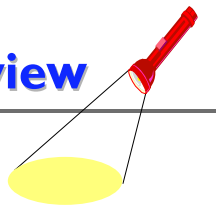
- Unique naming conventions (LE COBOL run-time routines)
- Single LE/VSE ship library (self determining whether COBOL CICS/Batch)
- Improved condition handling and error MSG's CEE3501S, CEE3503S
- Dynamics for LE/CICS run-time option settings in flight (no restart of CICS)
- LE/VSE component specific CICS startup messages

- Decoupled user and IBM OBJ's (e.g. CEECOPT/CEEDOPT/CEEDEXT....)
- Hybrid service concept (focus on phase-, allow object-service where required)



- LE/CICS Abnormal Termination exit (established as null-exit per default)
- Less components / separate DBCS locale compid on extended base tape
- FSU/IUI support (comparable to "LE/VSE snap-out" concept in VSE/ESA 2.3.0)
- Optimized C environment (performance improvements for several functions)
- LE/VSE Release bound to VSE/ESA Release. Running LE/VSE 1.4.1 is applicable for VSE/ESA 2.5 only
- There will be a LE/VSE Release Guide, Version 1 Release 4.1, SC33-6779-00

Directions of LE/VSE ... a deeper view



- Serviceability - easier debugging at customer and IBM site
  - Improved condition handling, TRAP suboptions etc.
  - LE/CICS initialization MSG's based on presence of component-specific event handler
  - Abnormal termination exit for LE/CICS is pre-customized with the null-exit capability
  - Revised option settings in LE/VSE 1.4.1 run-time, new defaults ...
- Serviceability - simplifying LE/VSE structure
  - New CLCs for LE/VSE 1.4.1, less components, obsolete ship library PRD2.SCEECICS ...
  - LE/VSE 1.4.1 DBCS Locale component 568606634 CLC 55M on extended base tape
  - Decoupling of user-customized objects from IBM ship code. Phase service where possible. Results in minor changes on customization tasks ... (saves re-link steps)
  - Unique naming conventions COBOL batch/CICS (concept of stub routines etc.)
- Customer Requirement
  - Dynamic alteration facility to change LE/CICS run-time options in flight. Immediate option report to console. Shipped transids "NEWC" & "ROPC" (BSM-enabled)
- TCP/IP Support
  - Add LE/VSE interface support for TCP/IP takesocket(), givesocket(), asynch. I/O
- Support for CICS TS
  - LE DTF builder enhancements for extra 2520 devices