Language Environment for Dummies

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Agenda

- What is a Run-time Library?
- Why LE?
- LE Terminology
- LE CEL Functions
- Setting Run-time Options
- Appendix
What is a Run-Time Library?

- A Run-time Library works together with the code produced by a compiler to provide functionality for an application
  - Obtain and manage storage
  - Read and write data
  - Perform math calculations

- There are advantages to providing function in a Run-time Library
  - Greatly reduces need for the compilers to generate the code
  - Shields the languages from needing detailed knowledge of the underlying operating system and hardware
  - Greatly reduces the need to recompile and re-link when fixes are required to run-time functions
So, Why Language Environment?

- Since their creation, customers were having trouble getting COBOL and PL/I to play nicely together
  - COBOL and PL/I each designed to be stand-alone, unaware of each other
    - When leaving a COBOL program to return to a PL/I program, the COBOL library might free storage that PL/I still wanted
    - Language-specific Math Libraries produced different results

- Customers at GUIDE and SHARE worked with IBM to design a solution
  - The result: Language Environment
Time to make the doughnut...

- Pre-LE environment
  - 4 independent products
  - upward incompatibilities
  - loose adherence to standards
  - purely a customer application enabler

- LE environment
  - 1 product for z/OS, z/VM and VSE
  - 100% upward/downward compatibility
  - strict adherence to standards
  - part of the z/OS base
  - exploiters include USS, TCP/IP, BCPii, LOTUS Domino, WebSphere, etc...
Other Advantages

Language Environment not only helped the languages to cooperate with each other, but also allowed member languages to share each other’s features. For example:

- COBOL can use the C and PL/I condition handling infrastructure
- Storage managed in a 'common' fashion
- All languages now access the excellent Fortran library math routines
- “hybrid” languages – Enterprise PL/I
Language Environment for z/VM, z/OS, VSE

Source Code
- PL/I
- COBOL
- C/C++
- Fortran
- Assembler

Compilers
- PL/I
- COBOL
- C/C++
- Fortran
- ASM

Operating Environments
- IMS
- TSO
- Batch
- CICS
- DB2
- UNIX System Services

Operating Systems
- z/OS
- z/VM
- VSE

no run-time required
LE Terminology - Program Management

- **main program** – the routine that causes the LE environment to be initialized
- **routine** either a procedure, function, or subroutine
  Equivalent HLL terms:
  - COBOL  - program
  - C/C++   - function
  - PL/I     - procedure, BEGIN block
- **ILC** – inter-language communication – application contains a mixture of languages, which introduces special issues
  - how the languages' data maps across load module boundaries
  - how conditions are handled
  - how data can be passed and received by each language
LE Terminology - Program Management

- **member language** – a high-level language that is compiled with an LE-supported compiler
- **member event handler** - member-supplied routine that is called at various times as a program runs when a significant event has occurred, or when the environment needs some information that is held by the member
- **LE-Enabled** - Routine that can run with LE run-time, and may also run with previous run-times. Cannot make use of Language Environment callable services.
- **LE-Conforming** - Routine that can run only with the LE run-time library. Can make use of LE callable services.
LE Terminology – Callable Services

**LE Callable Services** – programmatic way of utilizing LE services
- AWI - Application Writer Interface
- CWI - Compiler Writer Interface
- CEE prefixed – general to all platforms
- CEE3 prefixed – specific to only z/OS

- SHARE Session: Introducing LE Callable Services, plus a User's View of Why and How You Should Exploit Them in Your Applications – Fri 9:30AM

**USS Assembler Callable Services** – supported by the C/C++ specific portion of the Run-time
- BPX prefixed
LE Terminology – Program Model

- **region** - the range of storage the application set runs in
- **process** - set of applications that accomplish a task
- **enclave** - an application - set of modules that accomplish some subtask
- **thread** - dispatchable unit of work that shares storage with others in the enclave
LE Terminology - Program Model

region

process

enclave

main

sub

sub

enclave

main

sub

sub
LE Terminology - MVS 'Model'

- **region**: address space
- **process**: application
- **enclave**: pgm
  - **main**
  - **sub**
LE Terminology – Multi-threading 'Model'

region

process

enclave

thread

main

sub

sub

sub

thread

sub

sub
CICS Terminology

- **region** - the range of storage the application set runs in
- **transaction** - set of applications that accomplish a task
- **run-unit** - an application - set of modules that accomplish some subtask
LE Terminology - CICS 'Model'

region - Region

process - Transaction (Thread)

enclave

RunUnit

enclave

main

sub

sub

main

sub

sub
LE CEL Functions

- CEL is a set of common functions and routines used by all member languages of LE
  - Initialization/Termination
  - Storage Management
  - Condition Handling
  - Message Services
  - Date/Time Services
  - Math Functions
- Behavior customizable by the use of Run-time Options
Common LE Functions – Initialization/Termination

- LE code linked with the module begins a bootstrap process to initialize LE
  - initial storage is obtained
  - this LE instance 'registered' with UNIX System Services
  - condition handlers initialized
  - active member language specific run-time is initialized
- Control is given to the application code

- Once the application ends and 'returns' to LE
  - The LE environment is terminated
  - System resources obtained during initialization and throughout the execution of the application are cleaned up
Common LE Functions - Storage Management

- LE manages two types of storage for use by the application (and itself):
  - HEAP - used for COBOL WORKING-STORAGE, C malloc, and PL/I ALLOCATE requests
  - STACK - module linkage (save areas), C and PL/I automatic variables, COBOL LOCAL-STORAGE
- Initial storage is obtained with one GETMAIN and managed internal to LE
Common LE Functions - Condition Handling

- **Condition** - Any change to the normal flow of a program
  - a.k.a. exception, interruption
  - Could be detected by hardware or software (ours or yours)
- **Condition Handler** – A routine called by LE to respond to a condition
  - Registered by application using CEEHDLR, or part of a member language semantics, such as PL/I ON statements
- **Condition Handler Response**
  - Resume – after corrective action taken, control returns to a 'resume cursor'
    - Either back to point of failure, or to a new resume point set by the condition handler
  - Percolate - decline to handle the condition, LE calls next condition handler
  - Promote - change condition meaning and percolate
Common LE Functions - Condition Handling

- Diagnostic Documentation
  - messages (same as module prefixes)
    - CEE CEL
    - IGZ COBOL
    - IBM PL/I
    - AFH FORTRAN
    - EDC C/C++
  - CEDUMP and/or system dump
  - Run-time Options Report
  - Run-time Storage Report
Common LE Functions - Condition Handling

LE Abend Codes
- designated as USER abends
- U4000-4095 - reserved for applications running under LE
- many abends codes have associated reason codes to further isolate the problem
- some abends are the result of LE problems while others are application problems
- ‘special’ processing needed to generate U1000 style abend codes
Common LE Functions - Message Services

- allows HLLs to 'issue' common messages
- messages written to a common place - LE's MSGFILE
- 'abstracts' system failures from the application
- can be formatted in:
  - Mixed-case American English (ENU)
  - Uppercase American English (UEN)
  - Japanese (JPN)
Common LE Functions – Date/Time Services

- provides a consistent 'answer' when requesting date and time from the running system
- format date and time by country code
- parse date and time values
- convert between different formats (Gregorian, Julian, Asian, etc)
- calculate days between dates, elapsed time
- get local time
- handle 2 year dates as part of Y2K solution
Common LE Functions – Math Services

- derived from FORTRAN math functions
- binary, single floating point, double floating point, IEEE support
- See the LE Programming Reference for a complete list
Run-Time Options

- Allows users to specify how Language Environment behaves when an application runs
  - Performance tuning
  - Error handling characteristics
  - Storage management
  - Production of debugging information
- May be set in many different locations with varying scopes
Setting Run-Time Options

- To set default RTOs for applications across all systems
  - **Installation defaults** (CEEDOPT/CEECOPT/CELQDOPT)
    - SMP/E USERMOD used to update Language Environment modules
    - Note: USERMODs will be eliminated after V1R13!

- To set default RTOs for applications on one or more systems
  - **System defaults**
    - Options specified in a PARMLIB member (CEEPRMxx)
    - Options specified with an operator command (SETCEE)

- To affect applications running within a region
  - **Region Level Overrides** (CEEROPT/CELQROPT)
    - CICS TS, LRR users (e.g. IMS), also Batch
    - Separate module loaded at run-time during region initialization
    - CLER transaction for CICS environment (RTO subset)
Setting Run-Time Options

- To provide RTO settings for a specific application:
  - **Application Level Overrides** (CEEUOPT/CELQUOPT)
    - CSECT linked with the application
  - **Programmer Overrides**
    - #pragma runopts for C/C++
    - PLIXOPT for PL/I

- To provide RTO settings for a given run of an application:
  - **Program Invocation Overrides**
    - USS shell: export _CEE_RUNOPTS=‘run-time options’
    - In batch, on EXEC card: PARM=
  - **DD:CEEOPTS Overrides**
    - Optional data set in which run-time options may be specified
Setting Run-Time Options

- Options Merge (priority)
  - Program Invocation Overrides
  - DD:CEEOPTS Overrides
  - Programmer Overrides
  - Application Level Overrides
  - Region Level Overrides (where applicable)
  - System Defaults (CEEPRMxx and SETCEE)
  - Installation Defaults (through V1R13)

- For more information on setting run-time options, see Appendix
Key Run-Time Options

• Subtopics

• Tuning
  • Additional Information in SHARE sessions:
    • Look What I Found Under the Bar! (Thu 3:00PM)

• Diagnostics
  • Additional Information in SHARE sessions:
    • Heap Damage, Is Your Insurance Up-to-Date? (Fri 8:00AM)
    • LE Crime Scene Investigation (Fri 11:00AM)
Key Run-Time Options - Tuning

- ALL31 (option)
  - ON For AMODE 31 programs
  - OFF For AMODE 24 programs
    (can be determined dynamically)
Key Run-Time Options - Tuning

- ANYHEAP(initial, increment, location, disp)
- BELOWHEAP(initial, increment, disp)
- HEAP(initial, increment, location, disp, init24, incr24)
  - initial: Minimum size of initial heap segment
  - increment: Minimum size of additional segments
  - location: BELOW (<16MB), ANYWHERE
  - disp: KEEP, FREE (action when empty)

Notes:
- ANYHEAP/BELOWHEAP used internally by Language Environment
- HEAP – used for application-related storage
  - COBOL WORKING-STORAGE (for RENT programs)
  - Dynamic storage (C malloc, C++ new, PL/I ALLOCATE)
Key Run-Time Options - Tuning

- STACK(init, incr, location, disp, dsinit, dsincr)
  - init: Actual size of initial stack segment
  - incr: Minimum size of additional segments
  - location: BELOW, ANYWHERE
  - disp: KEEP, FREE (action when empty)
  - dsinit: XPLINK initial stack
  - dsincr: XPLINK increment stack

- Notes:
  - Used for Dynamic Save Areas / Stack Frames
  - C/C++ and PL/I local variables, COBOL LOCAL-STORAGE
  - Must use STACK(,,BELOW) when running ALL31(OFF)
Key Run-Time Options - Tuning

• RPTSTG(option)
  • OFF     Storage report not requested
  • ON      Generates a report of stack/heap usage
            • including recommended settings

• Caution:
  • Use only for application tuning. Do not make RPTSTG(ON)
    system wide default due to significant performance impact.

Consider CICS TS dynamic storage tuning as an alternative.
Key Run-Time Options - Diagnostics

• DYNDUMP(hlq,U4039 Behavior,U40xx Behavior)
  • hlq – may be user-specified, or:
    • *USERID   |   *USERID.hlq
    • *TSOPREFIX |   *TSOPREFIX.hlq
  • U4039 Behavior - with TERMTHDACT(UADUMP/UAONLY/UATRACE)
    • NODYNAMIC – Do not create IPCS-readable dump (default)
    • DYNAMIC – Create IPCS-readable dump if no other dump DD name
    • FORCE – Create IPCS-readable dump instead of other dumps
    • BOTH – Create IPCS-readable dump in addition to other dumps
  • U40xx Behavior – non-U4039 dumps
    • TDUMP – Create IPCS-readable dump (default)
    • NOTDUMP – Do not create IPCS-readable dump
Key Run-Time Options - Diagnostics

**HEAPCHK(ON|OFF, frequency, delay, level, call-depth, num-entries, pool-num)**

- **OFF** Normal processing
- **ON** Checks HEAP structures on get/free
- **frequency** How often the HEAP is checked
- **delay** Number of get/free before starting
- **level** Number of calls to be displayed in Heap Storage Diagnostic Report
- **call-depth** Number of calls to be displayed for HEAPPOOLS Serviceability
- **num-entries** Number of entries to be recorded in the heap pool trace table for the main user heap
- **pool-num** ID of the heap pool to be traced
Key Run-Time Options - Diagnostics

- **HEAPCHK(ON|OFF, frequency, delay, level, call-depth, num-entries, pool-num)** *(continued)*
  - **Caution:**
    - Use only for application tuning/diagnostics. Do not make **HEAPCHK(ON)** system wide default due to serious performance impact.
  - **Notes:**
    - To generate only Heap Storage Diagnostic Report use, e.g.
      - **HEAPCHK(ON,0,0,10,0)**
    - To activate only **HEAPPOOLS Serviceability** use, e.g.
      - **HEAPCHK(ON,0,0,0,5)**
Key Run-Time Options - Diagnostics

• STORAGE(getheap, freeheap, stack, reserve)
  • getheap        One byte value used to initialize every heap allocation
  • freeheap       One byte value used to initialize every heap free
  • stack          One byte value used to initialize every stack allocation
  • reserve        Amount of space to reserve for out of storage condition processing
Key Run-Time Options - Diagnostics

- STORAGE(getheap, freeheap, stack, reserve) (continued)

Notes:
- STORAGE(AA,EE,,,) useful for debugging
  - When HEAPCHK(ON), free elements are checked to ensure they contain the freeheap value
- STORAGE(00,,,) is equivalent to COBOL WSCLEAR
- STORAGE(,,00,) vs. STORAGE(,,CLEAR,,)
  - 00 is very expensive (especially for C/C++)
  - CLEAR sets to binary zeros the unused portion of the initial stack segment just prior to the “main” getting control
Key Run-Time Options - Diagnostics

• TERMTHDACT(option)
  • QUIET Messages off, no dump
  • MSG Messages only, no dump
  • TRACE CEEDUMP with traceback only
  • DUMP CEEDUMP
  • UADUMP CEEDUMP, optional system dump
  • UAONLY System dump only, no CEEDUMP
  • UATRACE System dump and traceback

• Notes:
  • SYSMDUMP DD card required for system dump
    (unless DYNDUMP is being used)
Key Run-Time Options - Diagnostics

• **TRAP(option)**
  - **ON, SPIE**  Condition handling enabled
  - **ON, NOSPIE**  Allows user applications to have their own SPIE routine, Language Environment condition handling will take place via the ESTAE
  - **OFF**  Condition handling disabled, some functionality not available *(AVOID)*

• **Notes:**
  - **TRAP(ON, SPIE)** *highly* recommended for normal processing
Key Run-Time Options - Diagnostics

• **RPTOPTS**(option)
  - OFF Options report not requested
  - ON Generate a report of all current options (upon successful termination)

• **Notes:**
  - Automatically included in CEEDUMP
Other Good sessions

- What's New in LE for z/OS Mon 11:00AM
- What's New in Enterprise PL/I V4R1 and C/C++ V1.12 Mon 12:15PM
- Full Speed Ahead with COBOL into the Future Mon 1:30PM
- REXX Language Coding Techniques Tues 12:15PM
- User Experience: Writing a Web-enabled CICS/COBOL Program Wed 8:00AM
- COBOL Performance – Myths and Realities Wed 11:00AM
- Language Environment Futures Workshop/AMODE 64 Discussion Wed 4:30PM
- An Introduction to using REXX with Language Environment Thu 1:30PM
- Look What I Found Under the Bar! Thu 3:00PM
- Heap Damage, Is Your Insurance Up-to-Date? Fri 8:00AM
- Introducing LE Callable Services, plus a User's View of Why and How You Should Exploit Them in Your Applications Fri 9:30AM
- LE Crime Scene Investigation - Finding debugging clues in LE dumps Fri 11:00AM
Appendix

- Supported Releases
- Compilers Compatible With LE
- Compilers That Require LE
- The Life of a Module
- Setting Run-time Options
## Supported Releases

<table>
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<th>Supported Release Level</th>
<th>FMID</th>
<th>Support Withdrawn</th>
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<tr>
<td>z/OS V1.10</td>
<td>HLE7750</td>
<td>9/30/2011</td>
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<tr>
<td>z/OS V1.11</td>
<td>HLE7760</td>
<td>9/2012*</td>
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<tr>
<td>z/OS V1.12</td>
<td>HLE7770</td>
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</tr>
<tr>
<td>z/OS V1.13</td>
<td>HLE7780</td>
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* Indicates Projected Date
Compilers Compatible with LE

Object modules compiled with the following compilers will run with LE without having to be re-linked or if linked with LE do not need to be recompiled:

- C/370 Versions 1 and 2
- OS/VS COBOL Release 2
- VS COBOL II Release 3 or later
- OS PL/I Version 1 Release 3 (object modules), Version 1 Release 5.1 and Version 2, all releases (load modules)
- VS FORTRAN Versions 1 and 2 (MVS only)
- FORTRAN IV H Extended (MVS only)
- FORTRAN IV G1 (MVS only) for OS/390 VS FORTRAN and FORTRAN IV (in compatibility mode)
Compilers that Require LE

- z/OS XL C/C++
- OS/390 C/C++
- C/C++ Compiler for MVS/ESA(TM)
- AD/Cycle® C/370(TM) Compiler
- VisualAge for Java, Enterprise Edition for OS/390
- Enterprise COBOL for z/OS
- Enterprise COBOL for z/OS and OS/390
- COBOL for OS/390 & VM
- COBOL for MVS & VM (formerly COBOL/370)
- Enterprise PL/I for z/OS
- Enterprise PL/I for z/OS and OS/390
- VisualAge PL/I for OS/390
- PL/I for MVS & VM
- AD/Cycle PL/I for MVS & VM
- VS FORTRAN and FORTRAN IV (in compatibility mode)
The Life of a Module

LE libraries that may get involved:

SCEEMAC, SCEEH.*

SCEELKED, SCEELKEX, SCEEOBJ, SCEECPP, SCEELIB, SCEEBND2

SCEERUN, SCEERUN2, SCEELPA, SCEECICS
Setting Run-Time Options

- Installation defaults (CEEDOPT/CEECOPT/CELQDOPT)
  - Also referred to as system-wide defaults
  - SMP/E USERMOD to Language Environment modules
  - All options must be specified

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
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<tr>
<td>CEEDOPT CSEC</td>
<td>00110000</td>
</tr>
<tr>
<td>CEEDOPT AMODE ANY</td>
<td>00120000</td>
</tr>
<tr>
<td>CEEDOPT RMODE ANY</td>
<td>00130000</td>
</tr>
<tr>
<td>CEEXOPT ABPERC= ((NONE), OVR),</td>
<td>X00140000</td>
</tr>
<tr>
<td>ABTERMENC= ((ABEND), OVR),</td>
<td>X00150000</td>
</tr>
<tr>
<td>AIXBLD= ((OFF), OVR),</td>
<td>X00160000</td>
</tr>
<tr>
<td>ALL31= ((ON), OVR),</td>
<td>X00170000</td>
</tr>
<tr>
<td>ANYHEAP= ((16K, 8K, ANYWHERE, FREE), OVR),</td>
<td>X00180000</td>
</tr>
<tr>
<td>BELOWHEAP= ((8K, 4K, FREE), OVR),</td>
<td>X00190000</td>
</tr>
</tbody>
</table>
Setting Run-Time Options

- System defaults
  - Options may be specified in a PARMLIB member
    - CEEPRMxx
  - Options may be specified with an operator command
    - SETCEE
  - Reduces the need to maintain USERMODs for CEEDOPT/CEECOPT/CELQDOPT
Setting Run-Time Options

- System defaults (continued)
  - Specifying options in PARMLIB member
    - Member name CEEPRMxx
      - Member(s) specified at IPL time using CEE=xx via IEASYSxx or at the system parameters prompt
      - Can be dynamically changed via SET CEE=yy command
  - Options specified in groups

CEEDOPT (ABPERC(NONE) ALL31(ON)
          rptopts(on) )  /* Options report */

CEECOPT(anyheap(4k,4080,anywhere,free))

CEEDOPT(ALL31(OFF) )  /* Turn off this option */
Setting Run-Time Options

- System defaults (*continued*)
  - Using the SETCEE system command
    - Overrides the current system defaults
  - Usage
    - Specify one group per command
    - Up to 126 characters
  - Example:

    ```
    SETCEE ceedopt, rptstg(on), rptopts(on)
    ```
Setting Run-Time Options

- System defaults (continued)
  - Displaying the system defaults
    - D CEE displays the active members
      
      ```
      d cee
      CEE3744I 17.57.31 DISPLAY
      CEE=(JM)
      ```
    - D CEE,groupname displays the options for a particular group
      
      ```
      d cee,ceedopt
      CEE3745I 17.59.44 DISPLAY CEEDOPT
      CEE=(01)
      LAST WHERE SET OPTION
      -----------------------------------------------
      CEEPRM01       ENVAR("testing=roger","verify=1 2 3")
      CEEPRM01       HEAP (4194304,5242880,ANYWHERE,KEEP,
                        16384,16384)
      CEEPRM01       PROFILE (OFF,"XXX")
      CEEPRM01       RPTOPTS (ON)
      ```
Setting Run-Time Options

Region Level Overrides (CEEROPT)

- CICS TS and LRR users (e.g. IMS) only (pre-z/OS V1.10)
- Batch users (via CEEROPT/CELQROPT CEEPRMxx keyword) (V1.10)
- Separate load module dynamically loaded at run-time during region initialization
  - SCEESAMP(CEEWROPT)
  - Must be found in search order, such as STEPLIB for IMS and batch, or DFHRPL for CICS TS
- Specify only those options you wish to change

```
CEEROPT  CSECT                                                  00110000
CEEROPT  AMODE ANY                                              00120000
CEEROPT  RMODE ANY                                              00130000
  CEEXOPT  ALL31=((ON),OVR),                                      X00170000
            STORAGE=((00,NONE,NONE,0K),OVR)                          000210000
END
```
Setting Run-Time Options

- Region Level Overrides (CEEROPT) (*continued*)
  - Certain options can be overridden dynamically in CICS TS region via the CLER transaction
    - ALL31
    - CBLPSHPOP
    - CHECK
    - INFOMSGFILTER
    - RPTOPTS
    - RPTSTG
    - TERMTHDACT
    - TRAP
Setting Run-Time Options

- Application Level Overrides (CEEUOPT/CELQUOPT)
  - CSECT linked with the application
    - SCEESAMP(CEEWUOPT/CEEWQUOP)
  - Specify only those options you wish to change

```
CEEUOPT  CSECT                                                  00110000
CEEUOPT  AMODE ANY                                              00120000
CEEUOPT  RMODE ANY                                              00130000
  CEEUOPT  HEAP=(10M,10M,ANYWHERE,FREE),                  X00180000
    STACK=(1M,1M,ANYWHERE,KEEP)                      00 250000
END
```
Setting Run-Time Options

- Programmer Overrides
  - Compiled into program
    - `#pragma runopts` for C/C++
      ```
      #pragma runopts(ALL31(ON),ERRCOUNT(0),
                     STACK(2M,1M,ANYWHERE,KEEP),
                     HEAP(1M,500K,ANYWHERE,KEEP))
      ```
    - PLIXOPT for PL/I
      ```
      DCL PLIXOPT CHAR(140) VAR INIT('ALL31(ON)
                                      ERRCOUNT(0) STACK(2M,1M,ANYWHERE,KEEP)
                                      HEAP(1M,500K,ANYWHERE,KEEP)') STATIC EXTERNAL;
      ```
  - not available for COBOL
  - Internally generates CEEUOPT/CELQUOPT
Setting Run-Time Options

- Program Invocation Overrides
  - In UNIX System Services shell (case sensitive)
    - `export _CEE_RUNOPTS='run-time options'`
  - In batch, on EXEC card
    - COBOL (with CBLOPTS(ON))
      - `PARM='program arguments/run-time options'`
    - C/C++, PL/I, FORTRAN, Language Environment-conforming Assembler
      - `PARM='run-time options/program arguments'`
    - First program must be Language Environment-conforming
    - The slash is required to delineate the run-time options, even when no program arguments.
    - Note that PARM= is limited to 100 characters
Setting Run-Time Options

- **DD:CEEOPTS Overrides**
  - Optional data set in which run-time options may be specified
  - Allows up to 3K characters
  - Allows run-time options to be passed to non-Language Environment conforming main routines

```c
//MYAPPL01 EXEC
PROG=MYPRG, PARM='RPTOPTS(ON)/'
//CEEOPTS DD *
* THESE ARE MY OPTIONS:
ALL31(ON), HEAP(64K),
ENVAR("JOHN=MONTI"),
TERMTHDACT(UADUMP)
/*
```