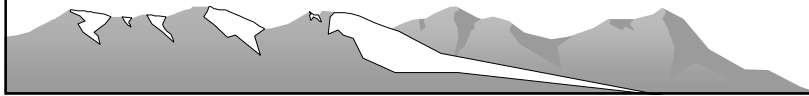


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## *LE Considerations*

*World Alliance of VSE and VM*

*April 28, 2003*



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## Intended Audience

- ◆ Application programmers dealing with trying to move COBOL applications from COBOLII to LE COBOL
- ◆ Not intended to cover language differences
- ◆ Emphasis on making what you have work more or less as is



## Presentation Outline

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- ◆ Why programs don't work
- ◆ Abend conditions/output
- ◆ COBOL compile options
- ◆ Runtime options
- ◆ Coding techniques

## Presumptions

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- ◆ LE is properly installed
- ◆ LE is accessible to CICS (CEE elements defined)
- ◆ COBOL is language of choice

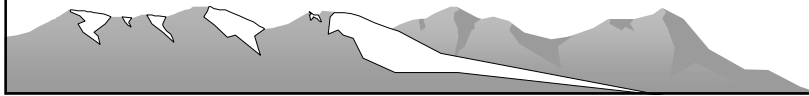
## Why programs don't work

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◆ 'But it used to work – what happened'?

◆ Symptoms are:

- ◆ Abends
- ◆ Garbage on screens (online systems)
- ◆ Long running processes
- ◆ 'Results may be unpredictable'



## Why programs don't work

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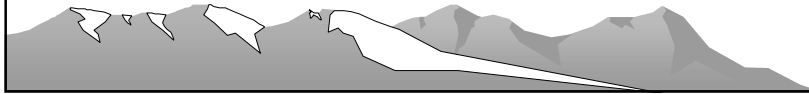
- ◆ Working storage not initialized properly
  - ◆ WSCLEAR may be set differently
- ◆ Subscripting/indexing of tables (overflow conditions)
- ◆ Storage overflows
- ◆ VSAM sequential file processing with random or dynamic access
- ◆ Mixed LE and non/LE programs



## Abend Conditions/Output

---

- ◆ Online Only
  - ◆ APCH, APCO
- ◆ Batch/Online
  - ◆ 4038, 4042, 4083, 4086, 4088, 4093



## Abend Conditions/Output

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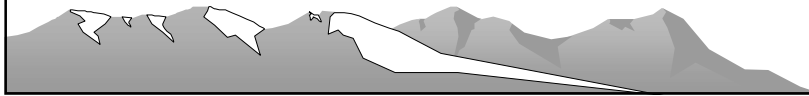
- ◆ APCH – usually when initializing a program
  - ◆ Calling AMODE24 program from AMODE31
  - ◆ Program compiled with COBOLII runtime defined as LE to CICS
  - ◆ CICS LE support not set up correctly



## Abend Conditions/Output

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- ◆ APCO – Usually during start up – not enough storage for initialization of run time environment



## Abend Conditions/Output

---

- ◆ 4038 – Catchall for LE Abends
  - ◆ Subscripting out of range in table (either 0 or off the end) (SSRANGE)
  - ◆ File status error that was not programmed for
  - ◆ Inconsistent data control block info for a file



## Abend Conditions/Output

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- ◆ 4042, 4083

- ◆ Storage Violations

- ◆ 4086, 4088, 4093

- ◆ Not enough storage available
- 


## Abend Conditions/Output

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- ◆ CEEMSG File

- ◆ Detailed Information on abend

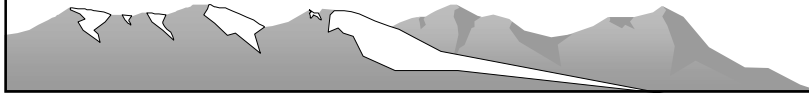
- ◆ 'The reference to table COBOL-NAME by verb number N on line NNNN addressed an area outside the region of the table'

- ◆ Usually followed by message giving name of program and displacement
- 

## COBOL Compile Options

---

- ◆ **OPTIMIZE(FULL) vs. OPTIMIZE(STD)**
  - ◆ Will make programs that have lots of unreferenced data items work faster and take up less space
  - ◆ Can be savings of up to 5% in speed and 80% in size



## COBOL Compile Options

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- ◆ **SSRANGE**
  - ◆ Will trap problems with out of bounds conditions on tables
  - ◆ Traps subscript of 0
  - ◆ When program run with **SSRANGE**, abend 4038 will occur if error condition met
  - ◆ For production, run with **NOSSRANGE** for speed

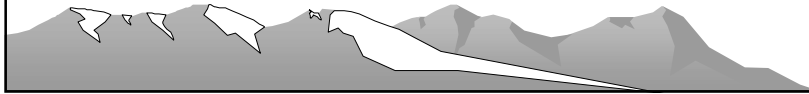


## COBOL Compile Options

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- ◆ TEST(ALL,SYM)

- ◆ Allows debugging by statement using Debug Tool/VSE
- ◆ NEVER EVER use for production compilation!



## Runtime Options

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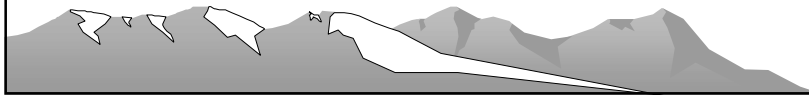
- ◆ Can be system wide or by program
- ◆ System wide program is CEECOPT.A (use CEEWCOPT.Z to assemble)
- ◆ Program specific is CEEUOPT.A (use CEEWUOPT.Z to assemble)
- ◆ Object for CEEUOPT must be included in phase of any COBOL program that uses it
- ◆ Above contained in PRD2.SCEEBASE





## Runtime Options

- ◆ CBLPSHPOP(OFF)
  - ◆ Speeds up programs considerably if they do not contain CICS EXEC HANDLE CONDITION/AID/ABEND commands
  - ◆ Default is OFF (check runtime options)



## Runtime Options

- ◆ STORAGE((00,NONE,NONE,0K),OVR))
  - ◆ Automatically initializes working storage in programs to x'00'
  - ◆ Default is as shown above; many shops use NONE instead of 00, thus removing WS-CLEAR
  - ◆ Reserve stack (the fourth parameter) should ALWAYS be 0K for CICS programs (CICS doesn't use the reserve stack, but storage gets reserved for it anyway if anything but 0K is specified)



## Runtime Options

- ◆ CHECK(ON)
  - ◆ Required to allow the SSRANGE compile option to work
  - ◆ Default is OFF (check runtime options)



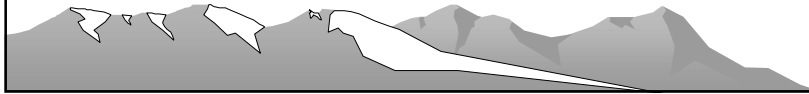
## Coding Techniques

- ◆ Indexing vs. Subscripting
  - ◆ Index (as in INDEXED BY clause) is supposed to be faster
  - ◆ Don't use SEARCH command
  - ◆ If subscripting, use COMP sub and limit



## Coding Techniques

- ◆ Perform statement
  - ◆ If statement looks like: `PERFORM VARYING SUB FROM 1 BY 1 UNTIL CONDITION-IS-MET OR SUB > SUB-LIMIT...` , then change it to `PERFORM VARYING SUB FROM 1 BY 1 UNTIL SUB > SUB-LIMIT OR CONDITION-IS-MET`
  - ◆ Original syntax will cause table overflow condition with `SSRANGE`



## Coding Techniques

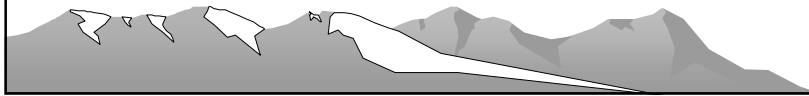
- ◆ Use `INITIALIZE` statement or individual `MOVES` to set fields to non-garbage values
  - ◆ `STORAGE` parameter in runtime support may be set to `NONE` for efficiency



## Coding Techniques

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- ◆ Ensure that CALL parameter lists and COMMAREAs are consistent
  - ◆ Can cause storage violation/leak if not



## Coding Techniques

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- ◆ VSAM I/O
  - ◆ Sequential process of DYNAMIC/RANDOM file (with START and READ NEXT) can be very slow in batch process
  - ◆ Consider SEQUENTIAL access or changing file to be sequential backup of VSAM file

