CICS TS for VSE/ESA Hot Topics

Presented by:
John Lawson
illustro Systems
1950 Stemmons Frewy, Suite 2016
Dallas, Texas 75216
Phone: 214-800-8900
http://www.illustro.com

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Objectives

- Provide you with useful CICS tips you can take home and use
- Get you to share your tips with the rest of us

Note: The topics covered in this presentation assume no vendor products are being used, just a standard IBM VSE and CICS TS system.

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CICS Startup and Shutdown

- CICS startup recommendations
  - Use START=AUTO in CICS SIT or startup JCL overrides
  - Type of startup based on last CICS shutdown
    - WARM start if normal CICS shutdown
    - Emergency restart if not normal CICS shutdown
      - CEMT PERFORM SHUTDOWN IMMEDIATE is not a normal shutdown
  - Use START=COLD in CICS SIT or startup JCL overrides only if necessary

- CICS startup recommendations...
  - COLD start
    - Forced if CICS system catalog datasets (DFHGCD and DFHLCDD) are redefined
    - Skeleton SKCICCLD in ICCF library 59
    - May also need to redefine restart dataset (DFHRSD)
    - Cold starts all resources in SIT
    - Loads resource definitions from CSD groups define in lists in SIT GRPLIST parameter

- CICS startup recommendations...
  - WARM start
    - After CEMT PERFORM SHUTDOWN (NORMAL) and START=AUTO startup
    - Warm starts all resources in SIT except those with COLD option specified
    - Loads resource definitions defined when CICS was last running from system catalog DFHGCD
    - Startup override NEWSIT=YES
      - Uses all SIT settings except FCT, CSDxxxx and GRPLIST parameters
CICS Startup and Shutdown

- CICS startup recommendations...
  - Emergency restart
    - After CEMT PERFORM SHUTDOWN IMMEDIATE or CICS crash and START=AUTO startup
  - Backout and recovery of inflight tasks
    - Performed using system log and restart dataset (DFHRSD)
  - Loads resource definitions defined when CICS was last running from system catalog DFHGCD

- CICS startup recommendations...
  - Global catalog (DFHGCD)
    - Journal status
      - Ignored if JSTATUS=RESET in startup overrides
      - Taken from DFHJACD for automatic archive journals
    - Installed RDO resources
    - Restart control record
    - Warm keypoint information
      - Heavily used during warm start and shutdown
        - Specify BUFNI=nn and BUFND=nn on DLBL

- CICS startup recommendations...
  - Local catalog (DFHLCD)
    - CICS TS domain parameter records and status information
      - Formatted with DFHCCUTL utility
    - If one system catalog dataset is redefined, both must be
CICS Startup and Shutdown

- CICS startup recommendations...
  - Define parameters for each LSRPOOL
    - KEYLEN – maximum keylength for files in pool
    - STRNO – number of strings for pool
    - Buffers – number and size of index and data buffers
  - Don’t let CICS calculate LSR pool values
    - Delays CICS startup
      - SHOWCB issued for each file
      - Extra I/O to VSAM catalog to determine LSR pool parameter values

- CICS SVA usage
  - $SVACICS IPL loadlist loads mandatory phases
    - Compatible with CICS/VSE 2.3 partitions
  - Other CICS TS phases in the SVA
    - If you don’t run CICS/VSE 2.3 partitions
    - If you run multiple CICS TS partitions
      - Saves real storage
      - Saves virtual storage (mostly 31-bit)
      - Saves startup time
    - Protects phases from corruption
      - SIT RENTPGM=PROTECT provides read-only protection for SVA-eligible phases loaded in CICS partition

- CICS SVA usage...
  - SIT SVA=YES
    - Tries to load modules from SVA first
    - Information message if module not in SVA
  - PRVMOD startup override
    - Specifies list of modules to load into partition
      - Use with SIT SVA=YES and LE/VSE modules in SVA
      - CICS supplied PRVMOD list DFH$SVEXJ
      - New PRVMOD list IESVAXCZ supplied with VSE/ESA 2.7
  - SIT SVA=NO
    - All SVA-eligible modules loaded into partition
CICS Startup and Shutdown...

How can I ensure CICS TS shuts down?
- Issue CEMT P SHUT IMMEDIATE
  - Generally a very bad idea!
- Manually try to find and terminate task(s)
  - Can take a long time
  - Operator training?
- SIT terminal shutdown limit
- Write program to find and fix hung tasks
- Time, effort, testing, skills available, etc.
- Implement sample shutdown program DFH$SDAP

CICS Startup and Shutdown...

SIT terminal shutdown limit
- Helps ensure completion of normal shutdown
  - VTAM terminals and ISC LU6.1 and LU6.2 sessions
- TCSWAIT=mm
  - Time CICS waits before taking terminal shutdown actions
  - Facility disabled if TCSWAIT=NO|NONE|0
- TCSACTN=action
  - Action CICS takes after TCSWAIT time expires
  - NONE - no action, message issued if terminal hung
  - UNBIND – force close all hung terminals
  - FORCE – force close VTAM ACB

CICS Startup and Shutdown...

DFH$SDAP implementation
- Customize DFH$SDAP if needed
  - Change delay time - default is 10 seconds
- Translate and compile DFH$SDAP
  - Assembler source in DFH$SDAP.A in PRD1.BASE
- Define transaction SDAP
- Define program DFH$SDAP
- Add PLT shutdown table entry for DFH$SDAP
  - In Phase 1 (before DFHDELIM)
CICS Startup and Shutdown...

- General logic flow of DFH$SDAP
  - Phase 0 (called from PLTSD)
    - Check that system shutdown is in progress
    - START transaction SDAP with 10 second delay
  - Phase 1
    - PURGE all tasks except shutdown and itself
    - START transaction SDAP with 10 second delay
  - Phase 2
    - FORCEPURGE all tasks except shutdown and itself
    - START transaction SDAP with 10 second delay

- Phase 3
  - FORCECLOSE VTAM
  - START transaction SDAP with 10 second delay

- Phase 4
  - PERFORM SHUTDOWN IMMEDIATE
  - End SDAP task

- Console messages to keep operator informed of progress

---

CICS Startup and Shutdown...

- Other VSE CICS skeleton considerations
  - VSE CICS startup skeletons
    - Increase MXT=20 override in SKCICS startup
    - Remove PERM from LIBDEF if you run other jobs in the same partition when CICS is down
  - VSE CICS SIT skeletons
    - SIT TCTUALOC=ANY
      - Change to TCTUALOC=BELOW if 24-bit addressing mode applications do EXEC CICS ADDRESS TCTUA
    - SIT STATRCD=ON
      - Only required for interval statistics recording to DMF
Use of CICS CSD is optional but recommended for FCT definitions:
- CEDA DEFINE FILE
- CEDA DEFINE LSRPOOL
  - Index and data buffers can be defined separately
- Can still use FCT macro table
- DFHFCT TYPE=FILE for files
- DFHFCT TYPE=SHRCTL for LSR pools
  - One set of buffer definitions for index and data buffers
- Must use macro table for DA files

Installing files defined in the CSD
- If the file already exists in the running system
  - CEMT SET FILE(filename) CLOSED DISABLED
- Install the file definition
  - CEDA INSTALL GROUP(groupname) with the file definition

Installing LSRPOOLS defined in the CSD
- LSRPOOL is created when first file using the pool is opened
- LSRPOOL is not deleted until all files in the pool are closed

CEDA DEFINE LSRPOOL

DEFINE LSRPOOL (TESTPOOL) CONFIGured=TEST
  SNAME=TESTPOOL
description
  memPool=64 DSize=512
  memPool=128 DSize=1024
  memPool=256 DSize=2048
  memPool=512 DSize=4096
  memPool=1024 DSize=8192
  memPool=2048 DSize=16384
  memPool=4096 DSize=32768
  memPool=8192 DSize=65536

PYS=SYSID=CIC1 APPLID=DCDCICSP  
### Resource Definition

**CEDA DEFINE LSRPOOL...**

```
DEFINE LPOOL(2) G(TEST) DATA4K(5) DATA8K(3) DATA16K(6) INDEX512(10) OVERTYPE TO MODIFY
SYSID=CIC1 APPLID=DBDCCICSPF
```

**CEDA DEFINE LSRPOOL...**

```
SYSID=CIC1 APPLID=DEMO
```

### Batch Define (DFHCSDUP)

**// JOB DEFGROUP DEFINE GROUP DEMOGRP**

```
// EXEC DFHCSDUP
DELETE (GROUP) TNS(10) TNSCATALOG(AMR) DATA(AMR)
DEFINE PROGRAM (TESTPRO) GROUP (DEMOGRP) DATA (AMR)
DEFINE FILE (TESTFILE) GROUP (DEMOGRP) LENWLD(10)
DEFINE FILE (TESTFILE) GROUP (DEMOGRP) DA[4] IN(5)
DEFINE FILE (TESTFILE) GROUP (DEMOGRP) LNUMID(10)
```

### Extracting Definitions (DFHCSDUP)

**// JOB DEFGROUP EXTRACT GROUP DEMOGRP**

```
// EXEC DFHCSDUP
EXTRACT PROGRAM (PRD1.BASE) GROUP (DEMOGRP) NAMENTS
*/
```

**NOTE:** Sample COBOL user program DFH0CBDC in PRD1.BASE must be compiled.
Resource Definition...

- Define user groups in separate group list
  - Group list: a list of groups that CICS installs on a CICS COLD start
    - Specified in SIT GRPLIST=LIST parameter
    - Up to 4 lists can be specified during CICS TS startup
    - GRPLIST not used on WARM or EMER restart
  - IBM supplied definitions in VSELIST, VSELST2, and DFHLIST
- Duplicate definition hierarchy
  - RDO definitions override duplicates in macro table
  - Last group in last list processed overrides duplicates in earlier groups

External CICS Interface (EXCI)

- Allows VSE batch program to link to program running in CICS TS
  - Similar to Distributed Program Link
  - Same VSE system
- User-written Client and Server programs
  - Samples supplied
- Two interfaces in Client
  - CALL interface
  - EXEC CICS LINK

EXCI...

```
// JOB CLIENT
  ...
  // EXEC client_prog, SRC3300
  ...
  /
```

Any partition

CICS TS Partition

```
APPLID - DBDCCICS
  EXCI CONNECTION
  DFHMIHS
  server_prog
```

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EXCI Implementation

- Requirements
  - Interregion Communications (IRC) must be defined and active in the target CICS
  - SIT ISC=YES, IRCSTRT=YES
  - CONNECTION and SESSION definition
  - ACCESSMETHOD must be IRC
  - PROTOCOL must be EXCI
  - CONNTYPE
    - Must be GENERIC for EXEC CICS LINK interface
    - Can be GENERIC or SPECIFIC for CALL interface
    - Only one session supported per EXCI connection on VSE
  - VTAM APPLID used to identify target CICS

EXCI Implementation...

CICS TS EXCI Generic CONNECTION Definition

<table>
<thead>
<tr>
<th>OBJECT CHARACTERISTICS</th>
<th>CICS RELEASE = 0410</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONN. View Connection( CON1 )</td>
<td>Connection CNG1</td>
</tr>
<tr>
<td></td>
<td>Group EXCISP5</td>
</tr>
<tr>
<td></td>
<td>Description SAMPLE EXCI CONNECTION DEFINITION</td>
</tr>
<tr>
<td>CONNECTION IDENTIFIERS</td>
<td></td>
</tr>
<tr>
<td>NameSpace</td>
<td></td>
</tr>
<tr>
<td>AccessMethod</td>
<td></td>
</tr>
<tr>
<td>REMOTE ATTRIBUTES</td>
<td></td>
</tr>
<tr>
<td>REMOTEHOST</td>
<td></td>
</tr>
<tr>
<td>REMOTEAPPLID</td>
<td></td>
</tr>
<tr>
<td>CONNECTION PROPERTIES</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Protocol TCP</td>
</tr>
<tr>
<td></td>
<td>Addr</td>
</tr>
<tr>
<td></td>
<td>Source</td>
</tr>
<tr>
<td></td>
<td>Destination</td>
</tr>
<tr>
<td></td>
<td>User</td>
</tr>
</tbody>
</table>

EXCI Implementation...

CICS TS EXCI Specific CONNECTION Definition

<table>
<thead>
<tr>
<th>OBJECT CHARACTERISTICS</th>
<th>CICS RELEASE = 0410</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONN. View Connection( CON2 )</td>
<td>Connection CNG2</td>
</tr>
<tr>
<td></td>
<td>Group EXCISP5</td>
</tr>
<tr>
<td></td>
<td>Description SAMPLE EXCI CONNECTION DEFINITION</td>
</tr>
<tr>
<td>CONNECTION IDENTIFIERS</td>
<td></td>
</tr>
<tr>
<td>NameSpace</td>
<td></td>
</tr>
<tr>
<td>AccessMethod</td>
<td></td>
</tr>
<tr>
<td>REMOTE ATTRIBUTES</td>
<td></td>
</tr>
<tr>
<td>REMOTEHOST</td>
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<td>REMOTEAPPLID</td>
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<td>CONNECTION PROPERTIES</td>
<td></td>
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<tr>
<td></td>
<td>Protocol TCP</td>
</tr>
<tr>
<td></td>
<td>Addr</td>
</tr>
<tr>
<td></td>
<td>Source</td>
</tr>
<tr>
<td></td>
<td>Destination</td>
</tr>
<tr>
<td></td>
<td>User</td>
</tr>
</tbody>
</table>
EXCI Implementation...

CICS TS SESSIONS Definition

<table>
<thead>
<tr>
<th>OBJECT CHARACTERISTICS</th>
<th>CICS RELEASE = 0410</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEDA View Session( CON1SESS )</td>
<td></td>
</tr>
<tr>
<td>Sessions</td>
<td>CONSIDES</td>
</tr>
<tr>
<td>Group</td>
<td>EXCIDS</td>
</tr>
<tr>
<td>Description</td>
<td>SAMPLE SESSIONS DEFINITION FOR EXCI</td>
</tr>
<tr>
<td>SESSION IDENTIFIERS</td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td>CON1</td>
</tr>
<tr>
<td>SENDPipe</td>
<td></td>
</tr>
<tr>
<td>RECEIVESize: 04096</td>
<td>1-30720</td>
</tr>
<tr>
<td>SENDSize: 04096</td>
<td>1-30720</td>
</tr>
</tbody>
</table>

EXCI Programming Interface

- Client CALL interface
  - 6 different calls
  - Fairly complex
  - Best for multi-request applications
    - Issue multiple DPL_requests
    - Get/put multiple file records, etc.
  - Supports generic or specific EXCI connections

- Initialize_User
  - Provides application name for specific connection
- Allocate_Pipe
  - Specifies target CICS APPLID and type of connection requested
- Open_Pipe
- DPL_Request
  - Links to server program with optional COMMAREA
- Close_Pipe
- Deallocate_Pipe
**EXCI Programming Interface ...**

- Client EXEC CICS LINK interface
  - One simple command
    - All 6 calls in 1 command
    - Best for one-time requests
    - Single command to CICS
    - Single record transfer
  - Requires translator option XOPTS(EXCI)
  - Supports generic EXCI connections only

---

**EXCI Programming Interface ...**

- Multiple batch EXCI program execution
  - Only one program can use an EXCI connection at a time
  - Code retry routine if no pipe available
    - Return code 202 on EXEC CICS LINK or OPEN PIPE call
    - Only option for EXEC CICS LINK
  - Only one EXCI generic connection can be defined per CICS
  - Define multiple EXCI specific connections with different NETNAMEs
    - Code call interface programs to use different application name (netname) on call

---

**EXCI Programming Interface...**

- Any partition
  - IRB
  - APPLIC (EXEC)
    - INITIALIZE (EXECUTION (BATCH1))
    - ALLOCATE_PIPE (EXECUTION (BATCH1))
    - SPECIFIC_PIPE (EXECUTION (BATCH1))
  - APPLIC (CALL)
    - INITIALIZE (EXECUTION (BATCH2))
    - ALLOCATE_PIPE (EXECUTION (BATCH2))
    - SPECIFIC_PIPE (EXECUTION (BATCH2))

---
Monitoring CICS GETVIS usage

- IUI storage dialog (363)

- GETVIS partit

- CEMT INQ DSA
Monitoring CICS DSA usage...

**VSE transaction IEDC**

- **VSE transaction IEDC**
  - VSE IUI Display CICS TS Storage Dialog
  - Fastpath option 364
  - Can be implemented in CICS without IUI
  - Copy transaction and program definitions from groups VSESPG and DFH$STAT
    - Transaction IEDC
    - Programs IESSCTS, IESSVL, IESSCDA, IESSCRIO, IESEDSC, IESSCRH, DFH$STAS
    - Mapset IESEDSC

Problem Determination

**Debugging non-terminal tasks**

- EXEC CICS START TRANSID
- Transient data DCT entries with DEST=FILE,TRANSID=

**CEDX**

- Same as CEDF for terminal related tasks
- CEDX TRNX,ON|OFF
- EDFs first occurrence of TRNX
Problem Determination...

- Displaying task information
  - CEMT INQ TAS
    - Enter ? by task for more detail on 3270 terminal
    - Detailed output on CICS console terminal
  - CECI INQ TASK
  - EXEC CICS INQ TASK

Problem Determination...

IN TAS  
EXEC CICS INQ TASK

Problem Determination...

IN TAS  
EXEC CICS INQ TASK

Problem Determination...

IN TAS  
EXEC CICS INQ TASK
Problem Determination...

- CEMT INQ TAS
  - Status of task
    - RUN (running)
    - DIS (dispatchable)
    - SUS (suspended)
  - Principal facility
    - TER (terminal), TAS (non-terminal task)

Problem Determination...

- CEMT INQ TAS
  - Suspended task information
    - Name of resource transaction is waiting on - Hva
    - Resource type suspend is waiting on - Hty
    - How long suspended – Hti
    - Types of suspends described in CICS TS Problem Determination Guide
  - How the transaction was started
    - STA(TO|TP|QD|S|SD|U|D|DS)

Problem Determination...

- CEMT INQ TAS
  - How the transaction was started (STA)
    - TO terminal operator input
    - TP permanent transaction terminal attach
    - QD transient data trigger level attach
    - S START command without any data
    - SD START command with data
    - U User attached task
    - D Distributed program link
    - DS Distributed program link with syncpoint
Problem Determination

- Review SIT dump options
  - DUMP=YES|NO
    - Controls taking of system dumps
  - SYDUMAX=999, TRDUMAX=999
    - Maximum number of system and transaction dumps per dump code
    - VSE supplied SIT skeletons specify 1 for each
      - OK for system dumps, larger for transaction dumps

- Review SIT trace options
  - TRTRANSZ=40
    - Size of transaction trace table in KB
    - 128 in VSE SIT skeletons
  - TRTABSZ=16
    - Size of system trace table in KB
    - 256 in VSE SIT skeletons
  - Recommend larger values for active systems
    - 1000KB ~ 10,000 trace entries
    - Trace tables allocated in 31-bit partition storage

- Suppress system dumps for ASRA and ASRB abend
  - SIT ABDUMP and PCDUMP options obsolete
  - Specify in system dump table
  - Sample in VSE skeleton SKSUPDMP
    - CEMT SET SYDUMPCODE(AP0001) ADD NOSYSDDUMP
    - CEMT SET SYDUMPCODE(SR0001) ADD NOSYSDDUMP
    - EXEC CICS SET SYDUMPCODE(AP0001) ADD NOSYSDDUMP
    - EXEC CICS SET SYDUMPCODE(SR0001) ADD NOSYSDDUMP
    - or from a PLT initialization program

Problem Determination...

- Analyzing short on storage problems
  - Create entries in system dump table for short on storage conditions

```
CEMT SET SYDUMPCODE(SM0131)  ADD  SYSDUMP MAX(1)
CEMT SET SYDUMPCODE(SM0133)  ADD  SYSDUMP MAX(1)
or from a PLT initialization program
EXEC CICS SET SYDUMPCODE(SM0131)  ADD  SYSDUMP MAX(1)
EXEC CICS SET SYDUMPCODE(SM0133)  ADD  SYSDUMP MAX(1)
```

Problem Determination...

- Analyzing short on storage problems...
  - Format transaction and storage manager domains in system dump

```
INFOANA CICS system dump format options
CELL SYSDUMP DATA WRB(8080)
NoR. Task subpool summary

Task number Task subpool summary (SUMMARY)
  90000044 11 A C 0 0 8 0 0 0 0 0

```

Now it is your turn

Anybody got anything they want to contribute?