CICS Transaction Server for VSE/ESA

Technical Overview and Migration Considerations

Chris Smith
smithch@uk.ibm.com

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Overview
- What is it?
- What's the main new functions?
- e-business support

Migration considerations
- Planning
- Installation, Tailoring, Customisation
- Resource Definition
- Monitoring, Statistics, Trace, Dump
- Security
- Application Programming
- Coexistence with CICS/VSE V2.3

Further Information Sources

Summary
CICS Transaction Server for VSE/ESA: What is it?

- New version of CICS for VSE/ESA based on CICS for MVS/ESA V4.1
CICS Transaction Server for VSE/ESA: What is it?

- The CICS Transaction Server for VSE/ESA product package contains...
  - CICS Transaction Server for VSE/ESA
  - CICS/VSE V2.3
  - Report Controller
  - CICS Transaction Gateway V3.1, CICS Universal Clients V3.1
  - CICS/DDM, REXX for CICS

- Single license and price for the complete package
  - MLC same as for CICS/VSE V2.3 (maybe some country variation)

  - Delivered with VSE/ESA V2.4

- CICS Transaction Server for VSE/ESA V1.1.1 - General Availability 9/00
  - Delivered with VSE/ESA V2.5
  - CICS Web Support, 3270 Bridge, REXX for CICS

- CICS Transaction Server for VSE/ESA V1.1.1 update with VSE/ESA V2.6
  - ECI over TCP/IP, CICS Web Support SSL exploitation
  - Preview Announcement 4/01
CICS Transaction Server for VSE/ESA: What's new?

- e-business and Network Computing
  - CICS Transaction Gateway
  - CICS Web Support
  - CICS Universal Clients

- Application Support
  - Shared Data Tables
  - External CICS Interface (EXCI)
  - 3270 Bridge
  - REXX for CICS
  - Front End programming Interface (FEPI)
  - Global User Exit enhancements
  - Exit Programming Interface (XPI)
  - Comms Programming Interface (CPI-C)
  - API enhancements
  - SPI enhancements
  - Report Controller enhancements

- System Management/Administration
  - RDO extensions, including Files
  - Autoinstall extensions, including Programs
  - Automatic journal archiving
  - Data Management Facility
  - Monitoring and Statistics enhancements
  - Dump and Trace enhancements
  - External Security Manager support
  - In-Doubt Window Resolution Utility Program
  - Dynamic Transaction Routing enhancements
  - Sysgen step removal

- Availability
  - Storage Protection
  - VTAM Persistent Sessions
  - Intersystem Session Queue Management
  - DTB Failure Recovery

- Restructured CICS Code Base from CICS for MVS/ESA V4.1
  - Improved code quality, reliability, serviceability
  - Extensive Virtual Storage Constraint Relief
  - 31-bit support
  - Dynamic DSA Management
What's new?....Internal Restructure

- New Internal Domain Architecture

Diagram showing the relationships between various components such as User (US), Application (AP), CICS Catalog (GC/LC), Directory Manager (DD), Dispatcher (DS), Domain Manager (DM), Dump (DU), Kernel (KE), Loader (LD), Transaction Manager (XM), Trace (TR), Timer (TI), Storage Manager (SM), Statistics (ST), Security Manager (XS), Program Manager (PG), Parameter Manager (PA), Monitoring (MN), Message (ME), Kernel Linkage Routines.
What's new?....Internal Restructure

- Extensive Virtual Storage Constraint Relief
  - CICS code and control blocks above the 16 MB line

- Multiple Dynamic Storage Areas, managed by CICS

<table>
<thead>
<tr>
<th>ERDSA:</th>
<th>All RMODE(31) programs linked with SVA option</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESDSA:</td>
<td>User-key storage for non-reentrant RMODE(31) programs EXEC CICS GETMAIN.... SHARED ANY</td>
</tr>
<tr>
<td>EUDSA:</td>
<td>User key task lifetime storage</td>
</tr>
<tr>
<td>ECDSA:</td>
<td>CICS key storage for non-reentrant RMODE(31) programs CICS key task-lifetime storage, CICS Control Blocks</td>
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<tr>
<td>RDSA:</td>
<td>All RMODE(24) programs linked with SVA option</td>
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<tr>
<td>SDSA:</td>
<td>User-key storage for non-reentrant RMODE(24) programs EXEC CICS GETMAIN.... SHARED BELOW</td>
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<tr>
<td>USDA:</td>
<td>User key task lifetime storage</td>
</tr>
<tr>
<td>CDSA:</td>
<td>CICS key storage for non-reentrant RMODE(24) programs CICS key task-lifetime storage, CICS Control Blocks</td>
</tr>
</tbody>
</table>

- Improved storage management algorithms
What's new?....Availability > Subsystem Storage Protection

- Protects CICS from *accidental* overwrite by user applications
- Requires ESA/390 processor with subsystem storage protection facility
- Selectable via SIT parameter STGPROT
- New RDO options for PROGRAM & TRANSACTION

- All applications run in one of two PSW keys:
  - User Key = Public Key = Key 9 = F4 Partition key
  - CICS Key = Partition Key
What's new?....Availability > Other Storage Protection

- **Read-Only Protection**
  - Not dependent on any hardware feature
  - Selectable via SIT parameter RENTPGM
  - Programs linked with SVA attribute loaded into key 0 storage
  - Alternative to SVA, but with no cross region sharing

- **Command Protection**
  - Selectable via SIT parameter CMDPROT
  - Validates start address of EXEC CICS output areas
  - Prevents CICS overwriting storage that application cannot modify
What's new?....Other Availability improvements

- VTAM Persistent Sessions
  - End-users do not have to re-establish sessions if CICS fails
  - Faster TOR restart and an alternative to XRF
  - Requires Inter-Enterprise option of VSE/VTAM 4.2

- Intersystem Session Queue Management
  - Enables early detection and management of queuing bottlenecks

- Dynamic Transaction Backout Failure Recovery
  - Avoids having to restart CICS
What's new?....Shared Data Tables

- Replaces and enhances Data Tables support in CICS/VSE V2.3
- Enables data sharing between CICS regions on same VSE image
- Data tables now held in a data space
- Uses Cross-Memory services to access data
- Now supports browse and generic key read operations
- Contents of data table do not appear in dumps
What's new?....External CICS Interface (EXCI)

- Enables a batch program to call a CICS application
  - Update resources with integrity while CICS is accessing them
  - Take CICS resources off-line and on-line for batch processing

- Two forms of the interface: EXEC CICS LINK and EXCI CALL
  - Distributed Program Link used to invoke the CICS program
  - Data passed between batch and CICS program via COMMAREA
  - LINK recommended for low frequency/single requests
  - CALL recommended for multiple requests

- MRO used for communication between batch and CICS partition

**Diagram:**
- Batch Program
  - EXEC CICS LINK
  - EXCI stub
- Exec Interface program issues:
  - INITIALIZE_USER
  - ALLOCATE_PIPE
  - OPEN_PIPE
  - DPL
  - CLOSE_PIPE
  - DEALLOCATE_PIPE
- CICS Transaction Server
  - DFHIRP
  - CICS Application
What's new?....CICS Web Support

- Allows access to CICS from Web Browser or Network Computer
- Direct TCP/IP connection using HTTP protocol
  - Secure Sockets Layer (SSL) support announced for VSE/ESA V2.6
- Support for "web aware" applications
  - New WEB and DOCUMENT API
- Support for access to existing COMMAREA based applications
- Support for access to existing 3270 transactions
  - Automatic HTML-3270 conversion
  - No change to application
What's new?....3270 Bridge

- Ability to run an existing 3270 based transaction without a 3270
  - No change to application

- 3270 terminal I/O requests intercepted by a bridge exit program

- CICS supplied 3270 bridge exit programs
  - Specific program for use with CICS Web Support
  - Sample program which uses TS or TD queues
What's new?....REXX for CICS

- Development and execution of REXX programs for CICS

- Provides access to
  - Most EXEC CICS API commands
  - CEMT interface
  - CEDA interface
  - DB2 via EXEC SQL

- Development environment
  - CICS-based
  - VSAM File system for REXX Execs and data
  - Text editor
What's new?....Front End Programming Interface (FEPI)

- Allows programs to be written to access existing CICS or IMS applications
  - FEPI Programs simulate 3270 LU 2 terminals and LU 0 devices

- FEPI programs are CICS applications
  - Extension of the EXEC CICS commands with similar names/functions
    - e.g. EXEC CICS FEPI ALLOCATE, EXEC CICS FEPI SEND
  - Two Interfaces: Keystroke/screen-image, and datastream

- Back-end applications remain unchanged
What's new?....Global User Exits

- Many new exit points....
  - e.g. Interval Control, Journal Control, Temporary Storage, File Control

- New Exit Programming Interface (XPI) for additional function
  - XPI implemented as a series of macros
  - Many functions, e.g. Suspend, Resume, Wait, Take Dump
  - Exit program must be fully reentrant

- Interface changes
  - Usage of registers and parameter lists standardised
  - Exit programs must be able to run in 31-bit environment

- Some exit points obsoleted....
  - e.g. Dispatcher, File Control, Storage Control
What's new?...Resource Definition and Autoinstall

- RDO extended
  - Files
  - Consoles
  - Transaction Class

- Removal of installed resources online
  - CEMT DISCARD or EXEC CICS DISCARD

- Autoinstall extended
  - Programs
  - Mapsets
  - Partitionsets

- New Autoinstall sample programs
What's new?....Automatic Journal Archiving

- Prompt submission of archive jobs
- Removes need for users to implement own archiving facility
- Provides greater security
- Removes need for operator invention

Diagram:

- Journal Archive Control Dataset (DFHJACD)
- Journal Control
- Journal Archiving Services (DFHJAP)
- Journal Archive Submission Program (DFHJASP)
- VSE/ESA Sub-library Skeleton
- Archive Job
What's new?....Data Management Facility

- New mechanism for collecting CICS monitoring and statistics data
- DMF runs in its own VSE/ESA partition and collects data from CICS
  - Cross-memory transfer from CICS to a DMF data space
  - SMF 110-format records written to VSAM files
  - DFHSTUP for processing of statistics data
  - DFH$MOLS for processing of monitoring data
- Potential for use as a central monitoring and statistics repository
- DMF does not support data from CICS/VSE V2.3
What's new?....Monitoring/Statistics/Trace/Dump

- **Monitoring**
  - DFHMCT revised
  - Record formats revised
  - New CEMT/SPI commands

- **Statistics**
  - DFHSTUP enhanced
  - New online sample program
  - New CEMT/SPI commands

- **Trace**
  - More trace points and more information
  - New CETR transaction

- **Dump**
  - All CICS system dumps now produced with VSE SDUMP function
  - Improved dump control and dump formatting
What's new?....Security

- All security checking now done by an External Security Manager

- Basic Security Manager supplied with VSE/ESA 2.4
  - Supports Signon and Transaction Attach security only

- Full function External Security Managers available from other vendors
  - CA-Top Secret delivered with VSE/ESA 2.4
  - Other ESM products available from BI Moyle and MacKinney Systems

- CSSN and CSSF transactions obsolete, replaced by CESN and CESF

- All security based on Userid

- New Command and Surrogate User checking (not supported by BSM)
What's new?....Other enhancements

- Common Programming Interface - Communications (CPI-C)
- Command Level programming interface enhancements
- New Transaction Manager
- Report Controller improvements
- Additional entry points for Dynamic Transaction Routing
- APPC LU6.2 Persistent Verification
- In Doubt Window resolution utility
- SYSGEN step eliminated
What's new?....e-business Support

**TCP/IP support announced for CICS TS for VSE/ESA 1.1.1 with VSE/ESA V2.6**
e-business Support: CICS Transaction Gateway

- Provides an interface to CICS from Java and the Web
  - from a Web Browser
  - from any Java execution environment
- Allows CICS programs or 3270 transactions to be invoked
- Is an IBM e-business Connector
- Runs on several platforms in conjunction with a Web Server
  - Windows NT, Windows 2000, OS/2
  - AIX, Solaris, HP-UX, OS/390, z/OS, Linux for S/390
- CICS Universal Clients component gives access from non-Web browser
- Two Versions currently available
  - CICS Transaction Gateway V3
    - Delivered as part of CICS Transaction Server for VSE/ESA package
  - CICS Transaction Gateway V4
    - Separately priced product
**e-business Support: CICS Web Support**

- Allows access to CICS from Web Browser or Network Computer

- Direct TCP/IP connection using HTTP protocol
  - Secure Sockets Layer (SSL) support announced for VSE/ESA V2.6

- Support for "web aware" applications
  - New WEB and DOCUMENT API

- Support for access to existing COMMAREA based applications

- Support for access to existing 3270 transactions
  - Automatic HTML-3270 conversion
  - No change to application
Migration Considerations
Migration....Planning

- Position current system in preparation
  - CICS/VSE V2.3, RDO

- Understand the CICS TS product changes

- Decide whether to run coexistent with CICS/VSE 2.3

- Involve third party product suppliers early

- Test and cutover in stages

- Some significant discontinued support
  - Macro level programs,
  - Direct control block reference,
  - Old languages
  - Internal security
  - BTAM

- Migration aids:
  - CICS TS coexistence with CICS/VSE V2.3
  - Application Migration Aid, DFHMSCAN, Security Migration Aid
Migration...Installation

- CICS TS is part of VSE/ESA 2.4 base package
- CICS/VSE V2.3 supplied on the extended base tape
- Predefined environments reflect virtual storage requirement increase
- Changes to CICS Datasets
  - New Catalogs
  - CSD mandatory
  - New Monitoring & Statistics files
Migration....Tailoring/Customisation

- Many SIT changes
- SYSGEN step removed
- Two phase PLTPI
  - Limited
  - Full function
- SIMODS removed
  - Use PLT stage 2
- Review all User Replaceable Modules
  - Must be command level and AMODE (31)
  - Must use COMMAREA
  - Some new URM's and some obsoleted
- Review all Global User Exits
  - Will need some change due to interface changes
  - Many new Global User Exit points and some removed
Migration.....Resource Definition

- The CSD...
  - Is mandatory
  - Use DFHCSUDP to convert existing CICS/VSE V2.3 CSD for CICS TS
  - Can be shared between CICS TS and CICS/VSE V2.3

- Some resources now RDO only
  - Transactions, Programs, Mapsets, VTAM terminals/links, MRO connections, Consoles
  - Use DFHCSUDP to migrate tables to CSD
  - All other tables must be reassembled against CICS TS macros
Migration.....Monitoring and Statistics

- Data Management Facility (DMF) used for monitoring and statistics data
  - DMF datasets and operational procedures
  - TD queues CSSM and CSSN obsolete

- CSTT obsolete
  - Replaced by new CEMT and SPI functions for statistics and monitoring

- Monitoring
  - New SIT options
  - MCT revised
  - ACCOUNTING records obsolete
  - PERFORMANCE records enhanced
  - New Global User Exit (XMNOUT)
  - DHHEMP macro obsolete (use EXEC CICS MONITOR command)

- Statistics
  - New online sample program, DFH0STAT
  - Use of DFHSTUP requires change
Migration.....Trace and Dump

- **Trace**
  - Trace data volume has increased
  - New CETR trace Transaction
  - New Auxiliary trace formatting utility

- **Dump**
  - All CICS system dumps now produced with VSE SDUMP function
  - CICS dump data sets contain only transaction dumps
  - New Dump Table used to control the taking of Dumps
  - New Dump formatting program
Migration.....Security

- CICS Internal Security discontinued
- All security checking performed by an External Security Manager
- Applications which exploit CICS internal security will need changing
- All security based on User ID

- Decide which External Security Manager meets security requirements
  - BSM supports Signon and Transaction Attach security only
  - CA Top-Secret delivered on VSE/ESA 2.4 Extended base tape
  - Other ESM products from BI Moyle and MacKinney Systems

- BSM includes a utility to migrate SNT and PCT data
  - Builds on CICS Security Migration Aid shipped with CICS/VSE 2.3
CICS/VSE 2.3 command level programs are object compatible with CICS Transaction Server provided they don't:

- issue any CICS macros
- access any CICS control blocks directly
- issue any EXEC CICS ADDRESS CSA commands

Language support:

<table>
<thead>
<tr>
<th>Language</th>
<th>Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-level Assembler</td>
<td>Application will run on CICS TS without need for recompile</td>
</tr>
<tr>
<td>COBOL for VSE/ESA</td>
<td></td>
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<tr>
<td>PL/I for VSE/ESA</td>
<td></td>
</tr>
<tr>
<td>C for VSE/ESA</td>
<td></td>
</tr>
<tr>
<td>DOS/VS COBOL</td>
<td>Application will run OK, but re-link with LE libraries for Y2K support</td>
</tr>
<tr>
<td>VS COBOL II</td>
<td></td>
</tr>
<tr>
<td>C/370</td>
<td>Application will not run on CICS TS - recompile with LE enabled compiler</td>
</tr>
<tr>
<td>DOS PL/I</td>
<td></td>
</tr>
<tr>
<td>RPG</td>
<td>Not supported - run on CICS/VSE 2.3 in coexistence mode.</td>
</tr>
</tbody>
</table>

Note: CICS TS exploits LE/VSE performance fix PQ23382
Migration.....Coexistence

- Provided to enable a staged migration
- MRO communication between CICS TS and CICS/VSE V2.3
- Care needed with SVA modules
Migration.....Coexistence

CICS/VSE V2.3
- Macro Level Applications
- BTAM Terminals
- Resources
- Files
- Queues

CICS TS for VSE/ESA
- VTAM Terminals
- Command Level Applications
- Resources
- Files
- Queues

Transaction Routing
Transaction Routing
Function Shipping
Further Information

- **Websites**
  - CICS
  - CICS Transaction Server for VSE/ESA
  - VSE/ESA
  - ITSO
    - [http://www.redbooks.ibm.com](http://www.redbooks.ibm.com)

- **Announcement Letters**
  - CICS Transaction Server for VSE/ESA: 298-373, 299-156
  - CICS Transaction Server for VSE/ESA V1.1.1: 200-293
  - VSE/ESA V2.5: 200-288
  - VSE/ESA V2.6 Preview: 201-097
## Publications

<table>
<thead>
<tr>
<th>Title</th>
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<tbody>
<tr>
<td>IBM CICS Transaction Server for VSE/ESA product publications</td>
<td></td>
</tr>
<tr>
<td>Release Guide</td>
<td>GC33-1645</td>
</tr>
<tr>
<td>Migration Guide</td>
<td>GC33-1646</td>
</tr>
<tr>
<td>Enhancements Guide (Provided with V1.1.1)</td>
<td>GC34-5763</td>
</tr>
<tr>
<td>Internet Guide</td>
<td>SC34-5765</td>
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<tr>
<td>External Interfaces Guide</td>
<td>SC33-1669</td>
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<tr>
<td>REXX Guide</td>
<td>SC33-5764</td>
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<tr>
<td>IBM Red Books</td>
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<tr>
<td>Migration to VSE/ESA V2.4 and CICS Transaction Server for VSE/ESA V1.1</td>
<td>SG24-5595</td>
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<td>Implementation of VSE/ESA V2.4 and CICS Transaction Server for VSE/ESA V1.1</td>
<td>SG24-5624</td>
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<tr>
<td>CICS Transaction Server for VSE/ESA: CICS Web Support</td>
<td>SG24-5997</td>
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<tr>
<td>Revealed! Architecting Web Access to CICS</td>
<td>SG24-5466</td>
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<tr>
<td>Getting Started with TCP/IP for VSE/ESA V1.4</td>
<td>SG24-5626</td>
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<tr>
<td>e-business Solutions for VSE/ESA</td>
<td>SG24-5662</td>
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</tbody>
</table>

- **Downloadable from CICS and Redbooks Websites**
CICS Transaction Server for VSE/ESA - Summary

- Major new version of CICS for the VSE/ESA platform
  - Broad range of significant improvements and new function
    - Includes CICS Web Support

- Inclusive product package containing...
  - CICS Transaction Server for VSE/ESA
  - CICS/VSE V2.3
  - CICS Transaction Gateway
  - CICS Universal Clients
  - Report Controller,
  - CICS/DDM
  - REXX for CICS

- Migration more complex than previous
  - Start planning NOW
  - Implement RDO on CICS/VSE V2.3 if not already
  - Convert macro applications to command level
  - Analyse security requirements
  - Coexistence with CICS/VSE V2.3 allows staged migration