

CICS TS for VSE/ESA Virtual Storage Management and Tuning

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Topics

- CICS TS Basic Structure
- CICS TS Storage Organization
- 31-bit Virtual Storage Exploitation
 - VSE components
 - CICS TS components
 - CICS applications
- Summary



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CICS TS Basic Structure

- CICS Transaction Server for VSE/ESA 1.1
 - Restructured CICS product
 - New domain structure
 - Based on CICS for MVS/ESA 4.1 + function from CICS TS for OS/390
 - Code base ported from OS/390
 - Uses OS/390 "family" API
 - More 31-bit storage exploitation
 - More protection from storage overlay



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CICS TS Basic Structure...

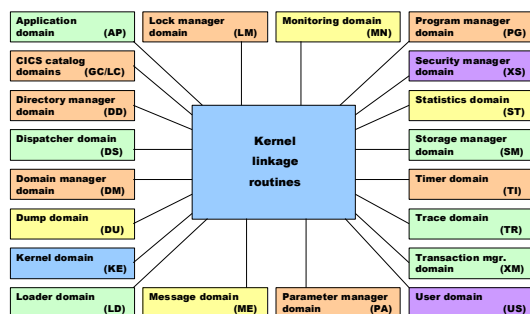
- Restructure of CICS into domains
 - More 31-bit exploitation
 - Standardized interfaces
 - Improved CICS code quality
 - Better serviceability and problem determination
 - Enhances CICS use of extended architecture
 - Object code only (OCO) modules



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CICS TS Basic Structure...



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CICS TS Basic Structure...

- CICS TS Partition Storage Organization
 - Most of CICS nucleus above 16 MB line
 - All major CICS control blocks above 16 MB line
 - 8 Dynamic Storage Areas (DSA)
 - 4 DSAs above 16 MB line in extended (31-bit) DSA (EDSA)
 - 4 DSAs below 16 MB line in 24-bit DSA

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CICS Storage Organization

VSAM buffers & 31-bit control blocks CICS 31-bit storage CICS Non-nucleus modules and control blocks (2.3MB) CICS Extended DSA (EDSA) (EUDSA, ERDSA, ESDSA, ECDSA) available 31-bit GETVIS	31-bit GETVIS 16 MB 24-bit GETVIS SIZE=DFHSP	Partition end (2 GB max) CICS TS Partition Partition start
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available 24-bit GETVIS
ICCF and Interactive Partitions
24-bit VSAM control blocks, etc.

CICS 24-bit storage
CICS Non-nucleus modules and control blocks (.5MB)
CICS DSA (DSA)
(UDSA, RDSA, SDSA, CDSA)
CICS TS DFHSP (4K)

CICS Transaction Server Partition

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CICS Storage Organization...

- Dynamic Storage Areas
 - CDSA and ECDSA (CICS DSA)
 - CICS-key storage
 - Non-reentrant programs
 - Control blocks
 - Task-lifetime storage
 - UDSA and EUDSA (User DSA)
 - User-key storage
 - Task-lifetime storage
 - TCA, TWA, EIB, EIS, etc.

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CICS Storage Organization...

- Dynamic Storage Areas...
 - SDSA and ESDSA (Shared DSA)
 - User-key storage
 - Non-reentrant programs
 - EXEC CICS GETMAIN....SHARED storage
 - RDSA and ERDSA (Read-only DSA)
 - Key-0 storage
 - All SVA-eligible programs not in SVA

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CICS Storage Organization...

- Dynamic Storage Areas...
 - Initial allocation from system initialization parameters (cold start)
 - EDSALIM, DSALIM
 - ECDSASZE, ERDSASZE, ESDSASZE, EUDSASZE
 - CDSASZE, RDSASZE, SDSASZE, UDSASZE
 - From local catalog on non-cold start, overridden by system initialization options

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CICS Storage Organization...

- Dynamic Storage Areas...
 - SIT EDSALIM
 - Maximum size of CICS 31-bit DSAs
 - Define in 1M multiples
 - Minimum size 10MB, default 20MB
 - SIT DSALIM
 - Maximum size of CICS 24-bit DSAs
 - Define in 256K multiples
 - Minimum size 2MB, default 5MB

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CICS Storage Organization...

- Dynamic Storage Areas...
 - No SIT options, startup overrides only
 - ECDSASZE, ERDSASZE, ESDSASZE, EUDSASZE
 - Defines size of DSAs in 31-bit GETVIS
 - CDSASZE, RDSASZE, SDSASZE, UDSASZE
 - Defines size of DSAs in 24-bit GETVIS
 - Use default size 0
 - CICS acquires DSA storage dynamically
 - Additional increments defined as extents
 - DSAs managed using 4K page size

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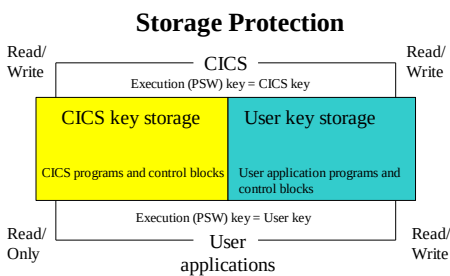
CICS Storage Organization...

- Storage Protection
 - Protects CICS code and control blocks from accidental overwrite
 - CICS-Key = partition key
 - User-Key = key 9
 - Initialization parameter STGPROT=YES|NO
 - CICS TS cannot run in F4 if STGPROT=YES due to key conflict
 - F4 default is CICS/VSE 2.3 coexistence partition

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CICS Storage Organization...

Storage Protection



The diagram illustrates the storage protection for CICS and user applications. It shows two main storage areas: CICS key storage (yellow) and User key storage (blue). CICS key storage contains CICS programs and control blocks, while User key storage contains user application programs and control blocks. The CICS key storage is protected by the CICS key (Execution (PSW) key = CICS key) and allows Read/Write access. The User key storage is protected by the User key (Execution (PSW) key = User key) and allows Read/Write access. The User applications area is also shown, protected by the User key and allowing Read/Write access.

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CICS Storage Organization...

- Storage Protection...
 - Requires ESA/390 Subsystem Storage Protection facility
 - IBM Multiprise 2000 and 3000
 - IBM Parallel Enterprise Servers G3, G4, G5, G6
 - IBM 9672 Parallel Enterprise Server
 - Integrated Server 3006
 - P/390 systems
 - Some ES/9021, ES/9121, and ES/9221 models



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CICS Storage Organization...

- Read-Only Protection
 - Read-only access to SVA-eligible phases not in SVA
 - Initialization parameter RENTPGM=(PROTECT|NOPROTECT)
 - PROTECT - RDSA and ERDSA key zero storage
 - NOPROTECT - RDSA and ERDSA CICS-key storage
 - Does not depend on Subsystem Storage Protection facility



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31-Bit Exploitation VSE Components

- VSE/VSAM support with CICS
 - Index and data buffers
 - Allocated in 31-bit partition GETVIS if available
 - Local Shared Resource (LSR) pool buffers
 - Index and data buffers are managed separately if defined with CICS TS CEDA DEFINE LSRPOOL
 - Non-Shared Resource (NSR) file buffers
 - FCT or RDO BUFNI and BUFND values
 - Increase buffers to reduce I/O



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31-Bit Exploitation
VSE Components...

- VSE/VSAM support with CICS...
 - CICS system datasets
 - VSAM buffers allocated in 31-bit storage
 - CICS Catalog Datasets DFHGCDC and DFHLCDC
 - Specify buffering parameters on DLBL
 - CICS Restart Dataset DFHRSD
 - Specify buffering parameters on DLBL
 - CICS Temporary Storage and Transient Data files
 - SIT TS=(buffers, strings)
 - SIT TD=(buffers, strings)


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31-Bit Exploitation
VSE Components...

- VSE/VSAM support with CICS...
 - DL/I database VSAM buffer usage
 - HIDAM KSDS, HDAM and HIDAM secondary index, HISAM KSDS, SHISAM KSDS (index buffers)
 - HISAM ESDS and SHISAM KSDS (data buffers)
 - Allocated in 24-bit partition GETVIS (default)
 - Change DLZACT to allocate buffers in 31-bit partition GETVIS
 - DLZACT TYPE=CONFIG HSMODE=ANY


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31-Bit Exploitation
VSE Components...

- LE/VSE Options
 - Runtime options
 - ALL31(OFF), STACK(BELOW) for 24-bit applications
 - ALL31(ON), STACK(ANY) for full 31-bit support
 - Program must be linkedited AMODE(31)
 - Use CEEUOPT for programs that are AMODE(24)
 - Compile options
 - DATA(24) for working storage in 24-bit storage
 - DATA(31) for working storage in 31-bit storage


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31-Bit Exploitation VSE Components...

- Shared Virtual Area (SVA)
 - Most CICS TS modules and programs are RMODE(ANY)
 - SIT SVA option controls use of SVA for modules
 - SIT SVA=YES uses CICS TS modules in SVA
 - SIT SVA=NO loads CICS TS modules in read-only DSA
 - CICS program definition controls use of SVA
 - DEFINE PROGRAM... USESVACOPY(NO)



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31-Bit Exploitation CICS Components

- Most CICS control blocks allocated in 31-bit partition storage
 - Resource definitions and tables except JCT and sequential terminals in TCT
 - BMS mapsets
 - Linkedit BMS mapsets RMODE(ANY)
 - TCA, TWA, EIB, EIS
 - Transparent to application programs



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31-Bit Exploitation CICS Components...

- Dynamic backout buffers
 - Specify size in SIT DBUFSZ
- Trace tables
 - Allocated in 31-bit partition storage
 - CICS internal trace table
 - SIT TRTABSZ=16 (256 KB in VSE supplied SIT tables)
 - CICS transaction trace table
 - SIT TRTRANSZ=16 (512 KB in VSE supplied SIT tables)



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31-Bit Exploitation

CICS Components...

- CICS Data Tables
 - Data in memory for VSAM files
 - High performance file access for files with high READ and BROWSE activity
 - Allocated in 31-bit partition storage in CICS/VSE
 - Allocated in VSE Data Space in CICS TS

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31-Bit Exploitation

CICS Components...

Data Table Support

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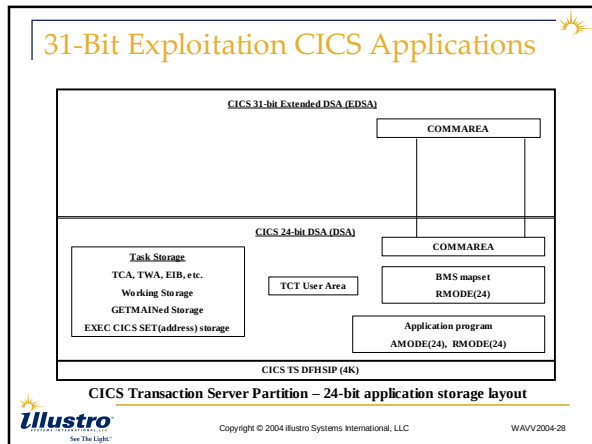
31-Bit Exploitation

CICS Applications

- How to control 31-bit DSA usage
 - Transaction definition
 - Program definition
 - EXEC CICS GETMAIN requests
 - Program's addressing mode (AMODE) and residency mode (RMODE)
 - SIT options

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31-Bit Exploitation CICS Applications...

- Controlling DSA usage with transaction definition parameters
 - Controls DSA used for task lifetime storage
 - TASKDATALOC(value)
 - BELOW UD SA or CD SA
 - ANY EUD SA, ECDSA, UD SA, or CD SA
 - Program must be linked AMODE(31)
 - TASKDATAKEY(value)
 - USER UD SA or EUD SA
 - CICS CD SA or ECDSA

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31-Bit Exploitation CICS Applications...

- Controlling DSA usage with program definition parameters
 - Controls DSA used for EXEC commands with SET option
 - DATALOCATION(value)
 - BELOW UD SA or CD SA
 - ANY EUD SA, ECDSA UD SA, or CD SA
 - Program must be linked AMODE(31)

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31-Bit Exploitation
CICS Applications...

- Controlling DSA usage with program definition parameters ...
 - Controls DSA used for loading non-reentrant programs
 - EXECKEY(value) and program linked RMODE(24)
 - USER SDSA (24-bit)
 - CICS CDSA (24-bit)
 - EXECKEY(value) and program linked RMODE(ANY)
 - USER ESDSA (31-bit)
 - CICS ECDSA (31-bit)



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31-Bit Exploitation
CICS Applications...

- Controlling DSA usage with program definition parameters ...
 - Controls DSA used for loading reentrant programs
 - Program linked RMODE(24) and SVA-eligible
 - RDSA (24-bit)
 - Program linked RMODE(ANY) and SVA-eligible
 - ERDSA (31-bit)



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31-Bit Exploitation
CICS Applications...

- Controlling DSA usage by applications
 - EXEC CICS GETMAIN options
 - Requested storage acquired in 24-bit DSA
 - LENGTH option
 - FLENGTH BELOW option
 - FLENGTH option in program linked AMODE(24)
 - Requested storage acquired in 31-bit DSA
 - FLENGTH option in program linked AMODE(31)



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31-Bit Exploitation CICS Applications...

- Controlling DSA usage by application request
 - EXEC CICS GETMAIN options
 - Override TASKDATAKEY
 - USERDATAKEY without SHARED option
 - UDSA (24-bit) or EUDSA (31-bit)
 - USERDATAKEY + SHARED option
 - SDSA (24-bit) or ESDSA (31-bit)
 - CICS DATAKEY
 - CDSA (24-bit) or ECDSA (31-bit)

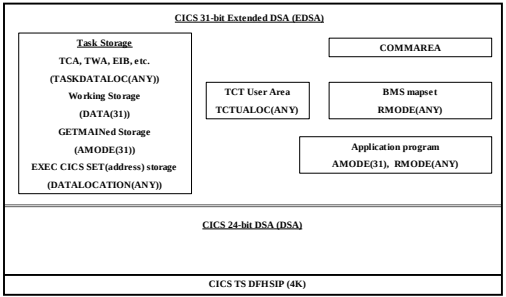
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31-Bit Exploitation CICS Applications...

- Controlling DSA usage with SIT options
 - TCT User Area (TCTUA)
 - SIT TCTUALOC=BELOW|ANY
 - BELOW UDSA or CDSA
 - ANY EUDSA, ECDSA, UDSA or CDSA
 - Programs referencing TCTUA must be AMODE(31)
 - SIT TCTUAKEY=USER|CICS
 - USER SDSA (24-bit) or ESDSA (31-bit)
 - CICS CDSA (24-bit) or ECDSA (31-bit)

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31-Bit Exploitation CICS Applications



CICS Transaction Server Partition – 31-bit application storage layout

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Summary

- More VSCR in CICS TS
- Significant savings after migration without change
- More savings possible with changes
 - AMODE(31) and RMODE(ANY) for applications
 - Application GETMAIN requests
 - CICS TS transaction and program definition changes



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