



IBM IT Education Services

E31

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CICS TS for VSE/ESA Basic Structure and 31-bit Exploitation

VSE Technical Conference

November 10 - 12, 2003 | Hilton, Las Vegas, NV

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CICS TS for VSE/ESA

Basic Structure and 31-bit Exploitation

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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

CICS TS Basic Structure



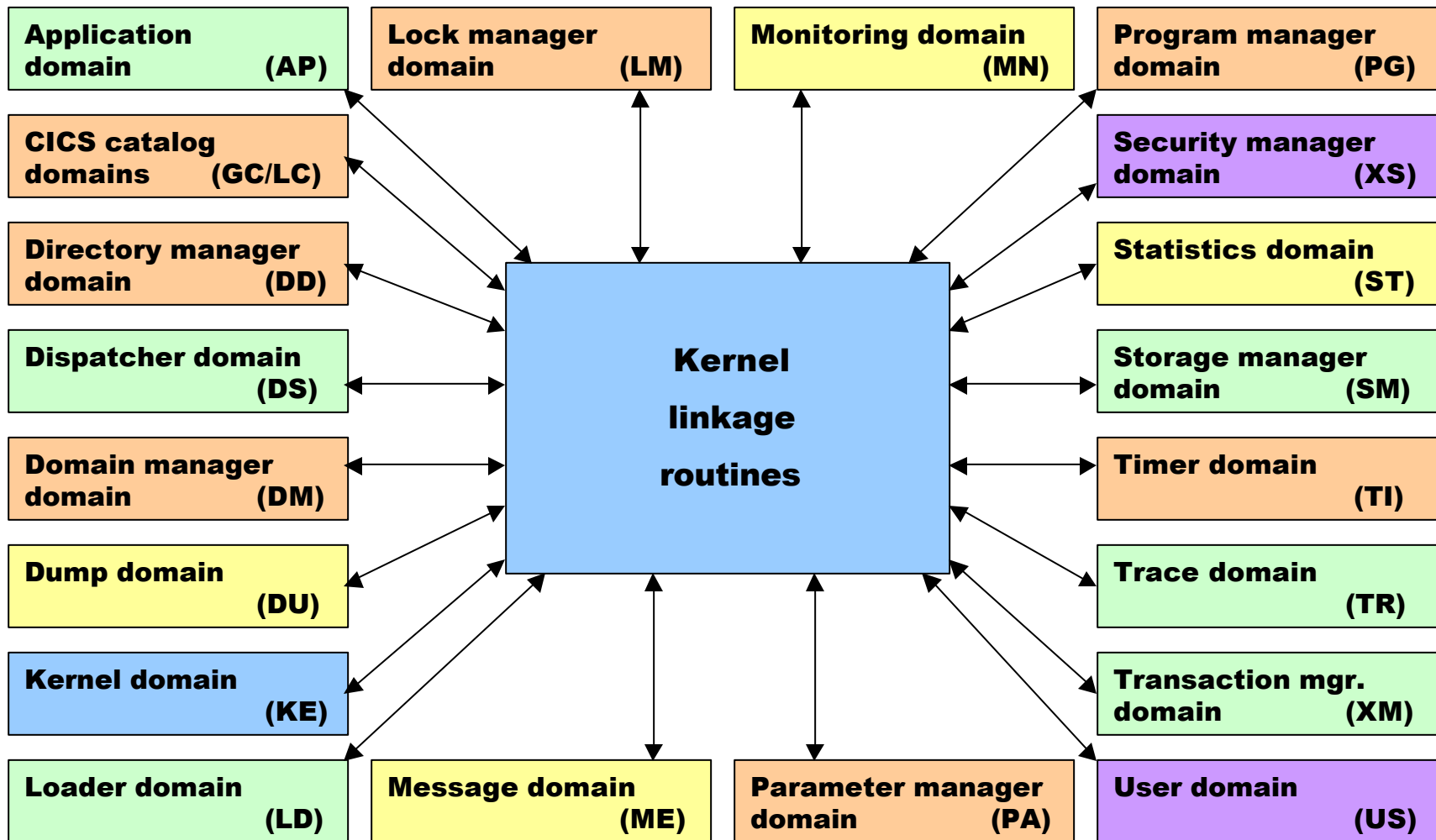
- CICS Transaction Server for VSE/ESA 1.1
 - Restructured CICS product
 - | New domain structure
 - Based on CICS for MVS/ESA 4.1 + function from CICS TS for OS/390
 - | Code base ported from OS/390
 - | Uses OS/390 “family” API
 - More 31-bit storage exploitation
 - More protection from storage overlay

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

CICS TS Basic Structure...

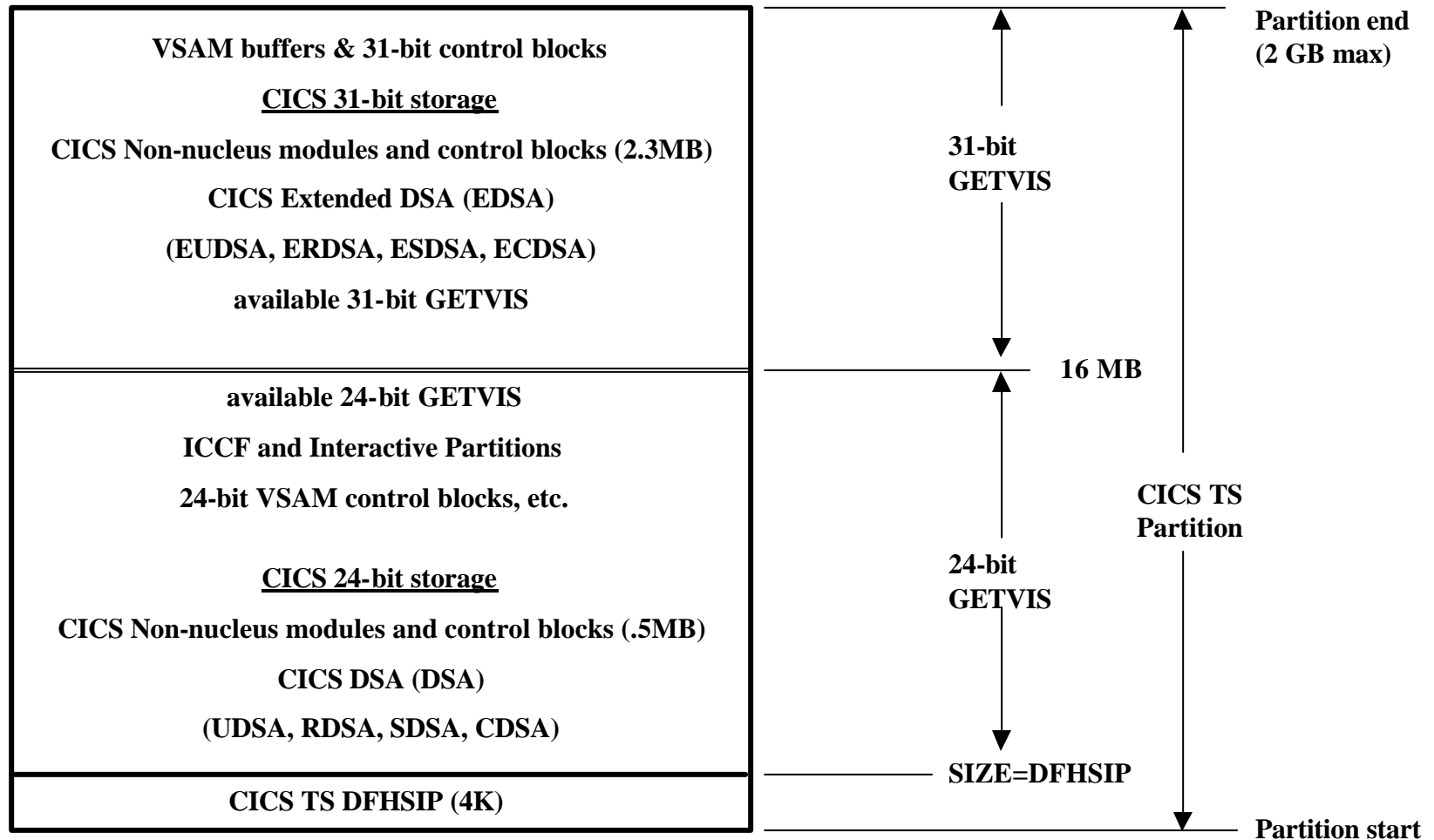


CICS TS Basic Structure...



- 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

CICS Storage Organization



CICS Transaction Server Partition

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.

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

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

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

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

CICS Storage Organization...

■ Storage Protection

- Protects CICS code and control blocks from accidental overwrite

- CICS-Key = partition key

- User-Key = key 9

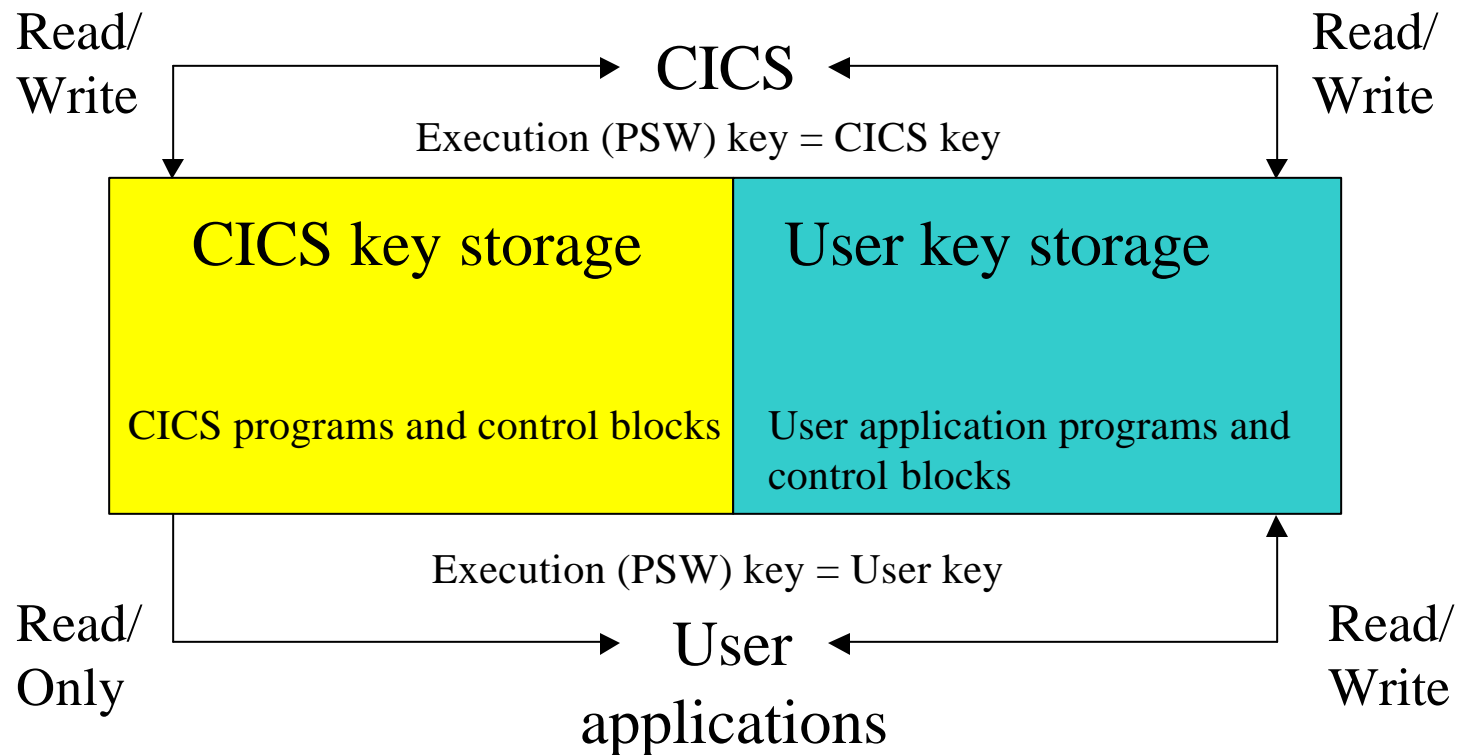
- Initialization parameter STGPROT=YES|NO

- CICS TS cannot run in F4 if STGPROT=YES due to key conflict

- F4 default is CICS/VSE 2.3 coexistence partition

CICS Storage Organization...

Storage Protection



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

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

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 CEDD DEFINE LSRPOOL
 - Non-Shared Resource (NSR) file buffers
 - | FCT or RDO BUFNI and BUFND values
- Increase buffers to reduce I/O

31-Bit Exploitation

VSE Components...



- VSE/VSAM support with CICS...
 - CICS system datasets
 - | VSAM buffers allocated in 31-bit storage
 - | CICS Catalog Datasets DFHGCD and DFHLCD
 - 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)

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

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 linked with 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

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)

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

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)

31-Bit Exploitation

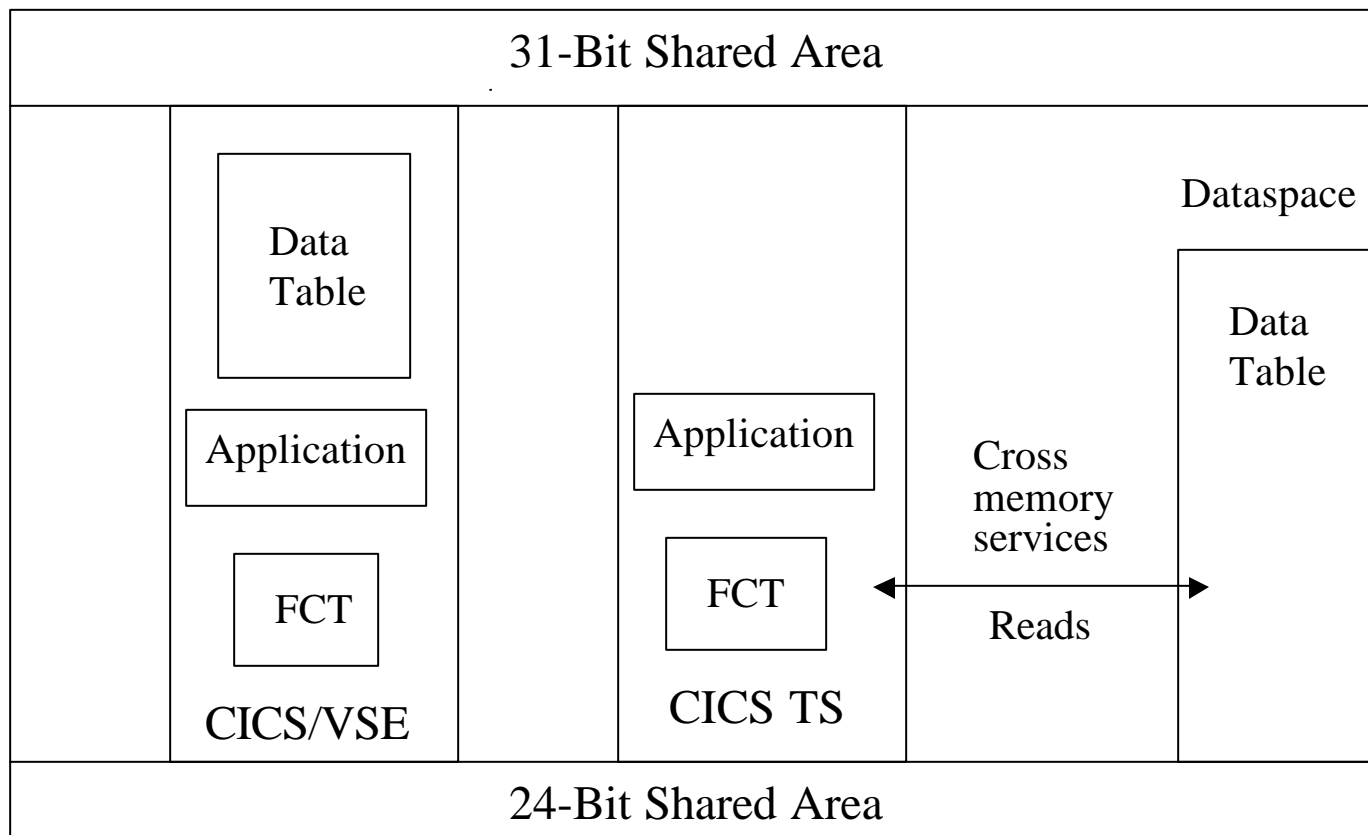
CICS Components...



- 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

31-Bit Exploitation CICS Components...

Data Table Support



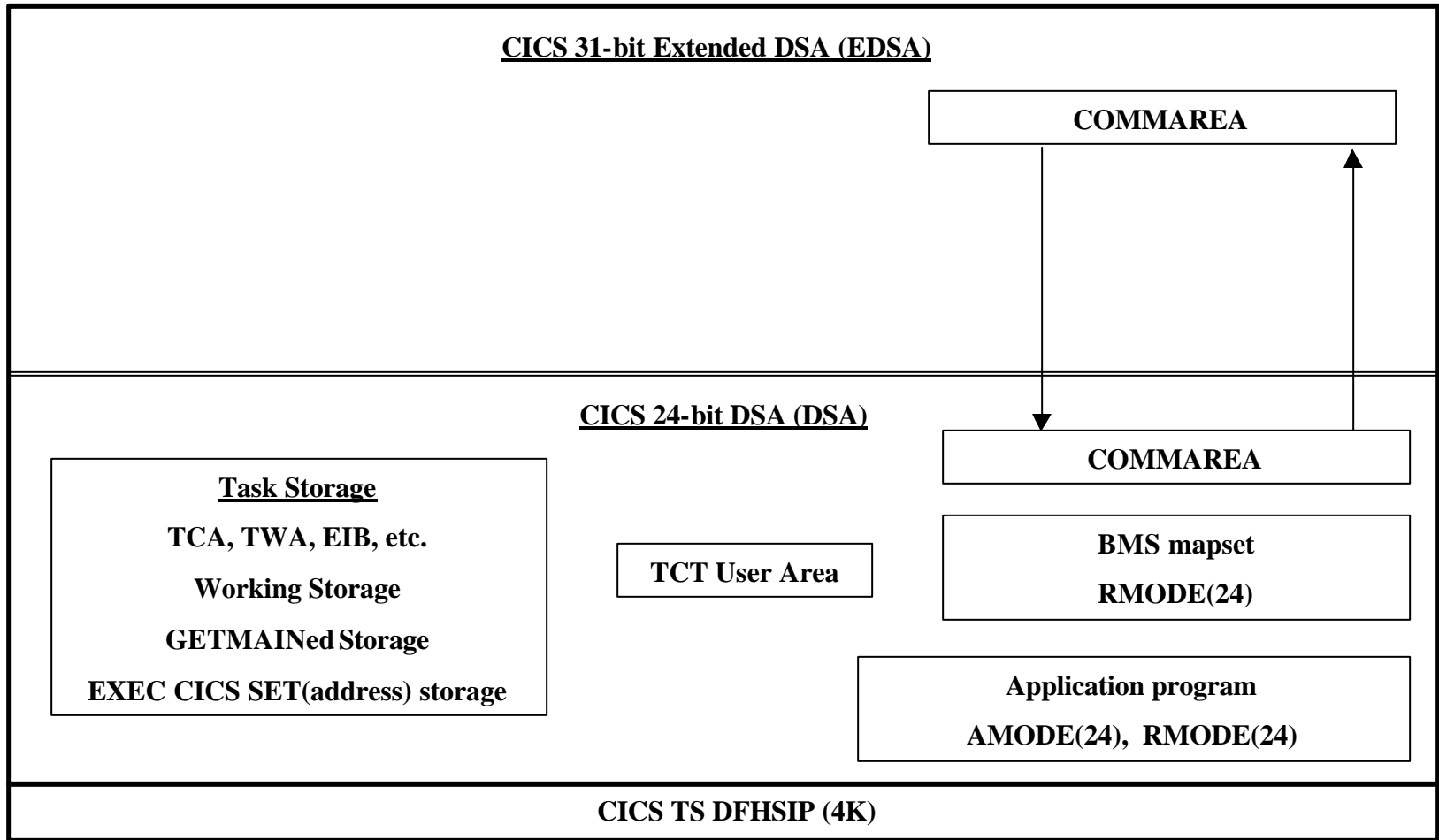
31-Bit Exploitation

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

31-Bit Exploitation CICS Applications...



CICS Transaction Server Partition – 24-bit application storage layout

31-Bit Exploitation CICS Applications...



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

31-Bit Exploitation CICS Applications...



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

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)

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)

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)

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)
 - CICSDATAKEY
 - CDSA (24-bit) or ECDSA (31-bit)

31-Bit Exploitation CICS Applications...



■ Controlling DSA usage with SIT options

■ TCT User Area (TCTUA)

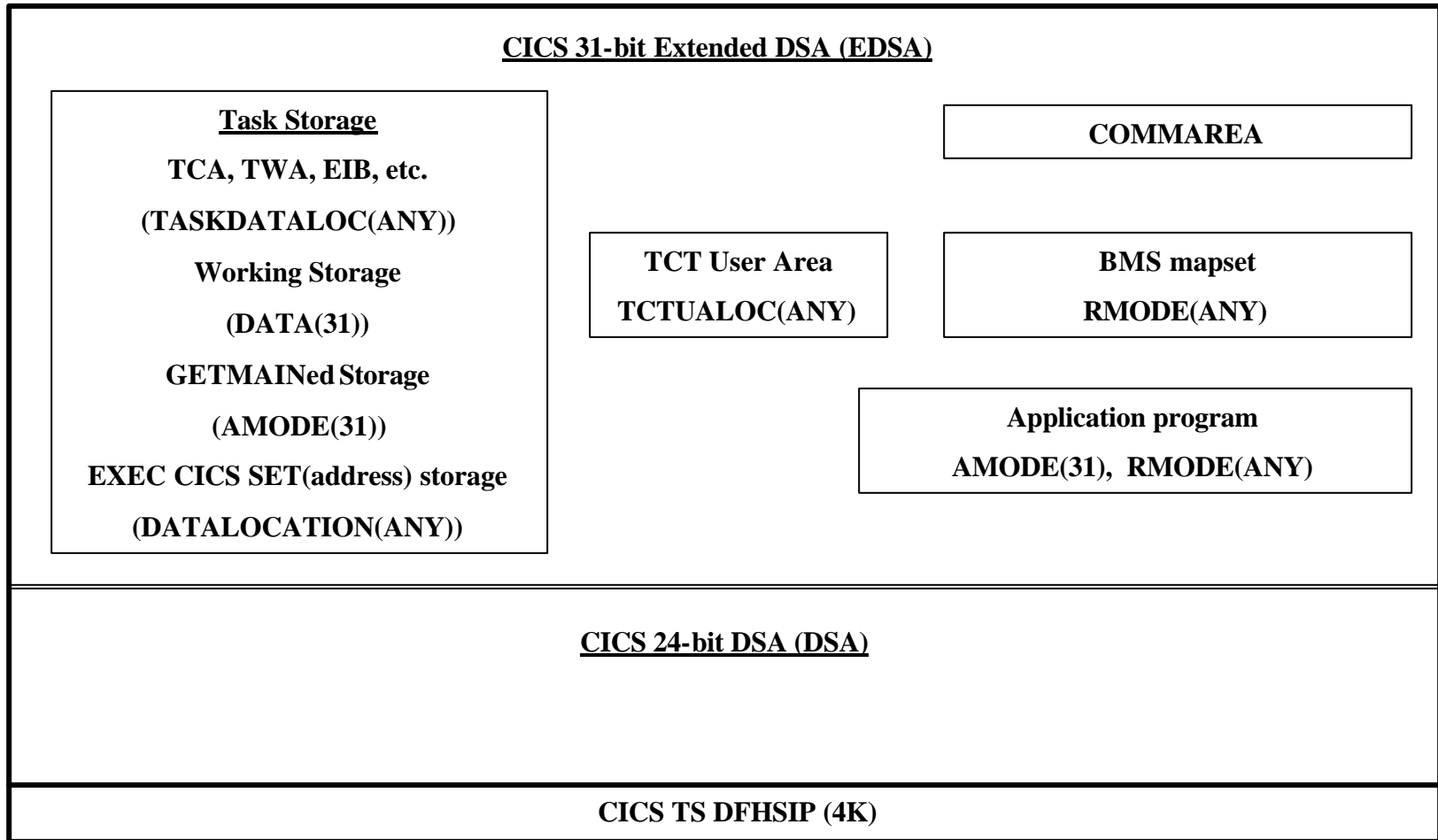
■ SIT TCTUALOC=BELOW|ANY

- 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)

31-Bit Exploitation CICS Applications...



CICS Transaction Server Partition – 31-bit application storage layout

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