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z/VSE Security Concepts and News

zES01

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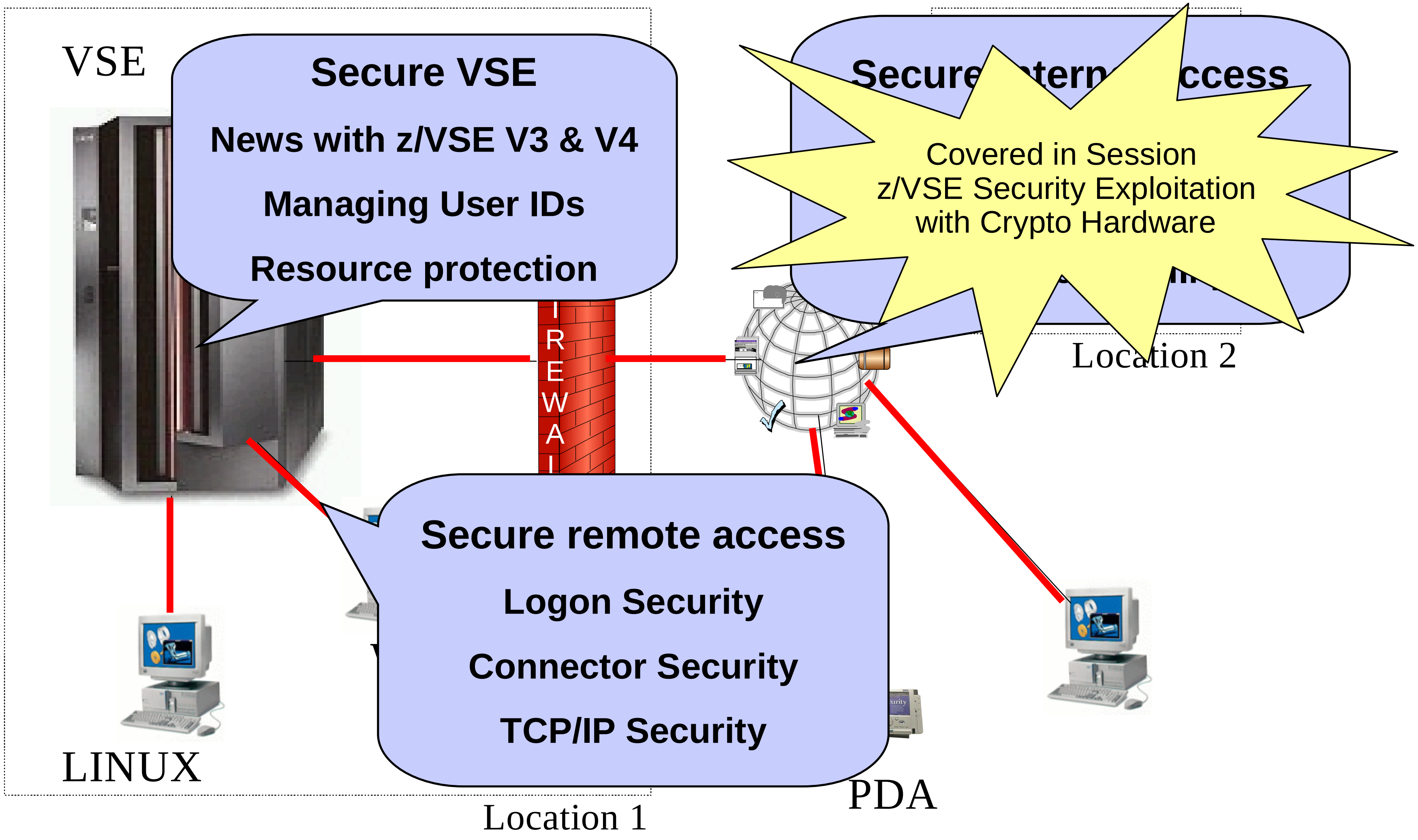
Security requirements

- Security requirements are increasing in today's world
  - Data security
  - Data integrity
  - Keep long-term data audit-save
- The number of attacks increase daily
  - Industrial spying
  - Security exploits, Denial-of-Service attacks
  - Spam, Phishing, …
- Not paying attention to security requirements can be very expensive
  - Your data is the heart of your company
  - Loosing your customer data is a disaster
  - You can loose customers
- IT Security gets more and more important
  - You need to consider the whole IT Environment not only single systems

Security in a heterogeneous environment



Secure VSE

News with z/VSE V3 & V4

Managing User IDs

Resource protection

Secure tern ccess

Covered in Session
z/VSE Security Exploitation
with Crypto Hardware

Secure remote access

Logon Security

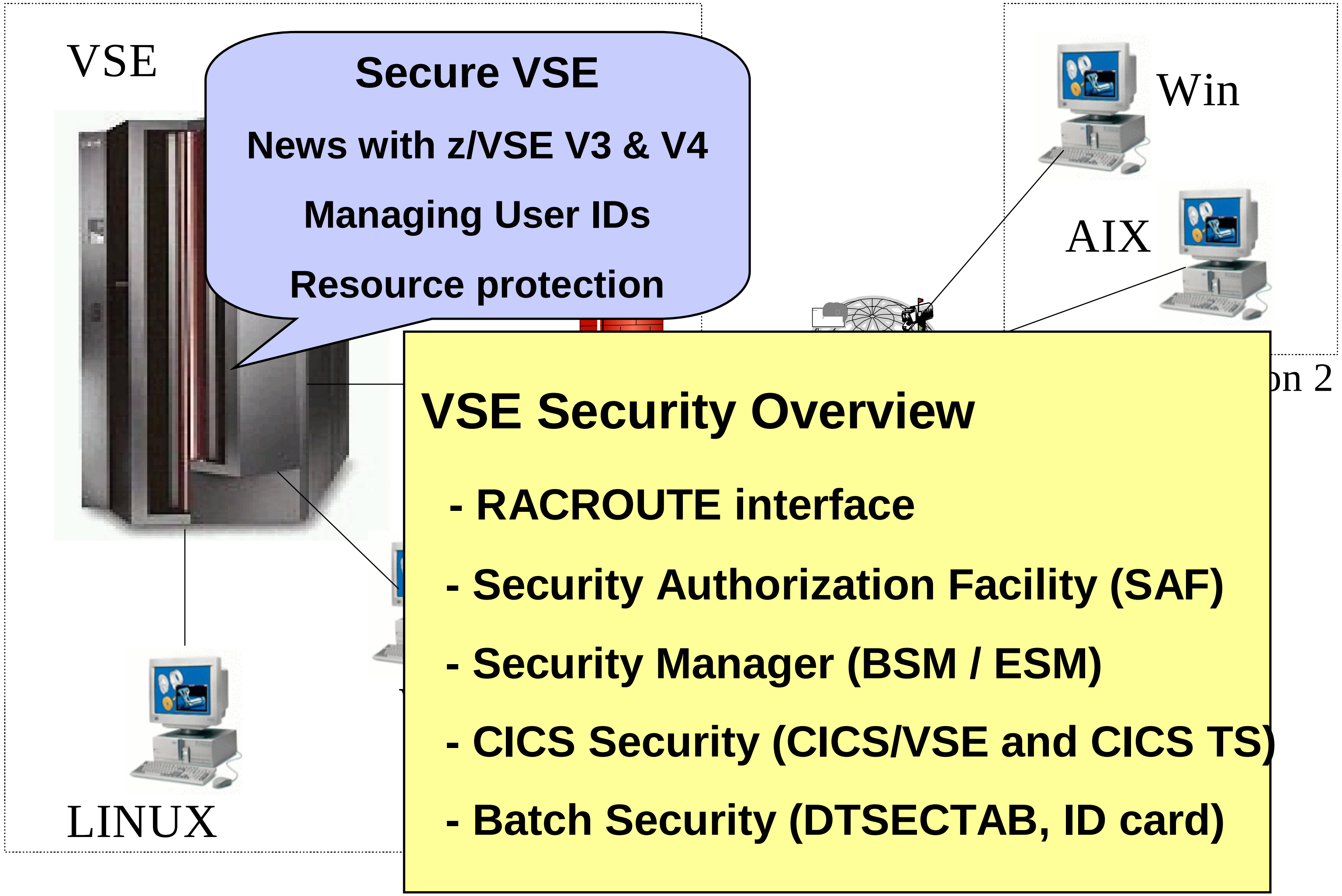
Connector Security

TCP/IP Security

Security in a heterogeneous environment

- Security is very important
  - Restrict access to systems
  - Keep secrets
  - Prove identity of users
  - Prevent data modification
- Security can be very complex
  - In an heterogeneous environment
  - A lot of different servers and technologies
- You must know what you are doing !
  - Incomplete security setup can be more dangerous than NO security

Security in a heterogeneous environment



Secure VSE

News with z/VSE V3 & V4

Managing User IDs

Resource protection

VSE Security Overview

- **- RACROUTE interface**
- **- Security Authorization Facility (SAF)**
- **- Security Manager (BSM / ESM)**
- **- CICS Security (CICS/VSE and CICS TS)**
- **- Batch Security (DTSECTAB, ID card)**

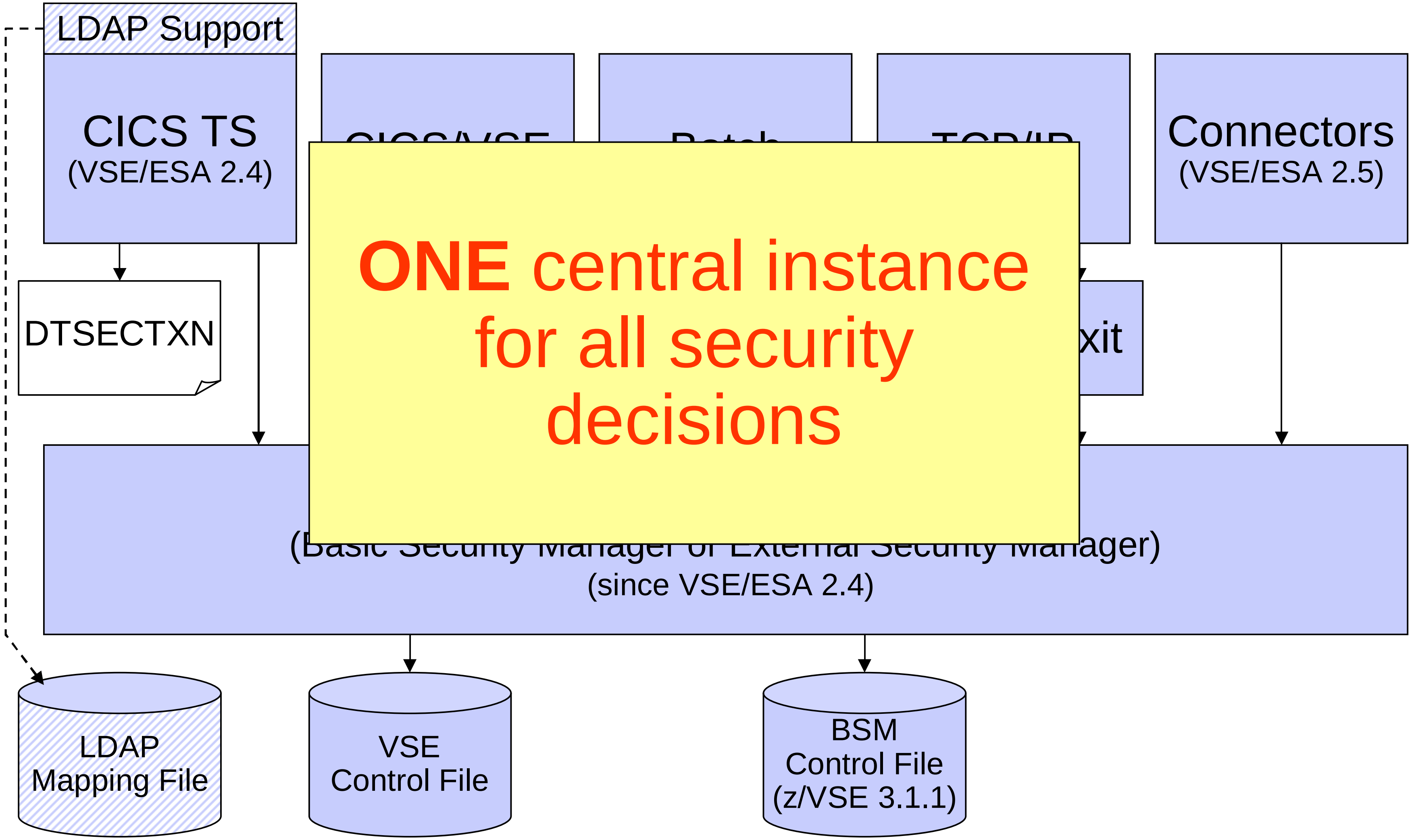
Why secure VSE ?

- Prevent unauthorized access to VSE and data
  - Keep secret data secret
  - Data modification by unauthorized users
- Prevent users from damaging the VSE system (maybe by accident)
  - Deletion of members or entries
  - Submission of jobs

VSE Security Overview

- VSE/ESA 2.3 (or below)
  - SECHECK macro (DTSECTAB)
  - CICS/VSE internal security
- VSE/ESA 2.4-2.7, z/VSE 3.1
  - Security Server (BSM/ESM)
  - Security decisions delegated to Security Manager
  - Architecture defined interface (RACROUTE)
- New with z/VSE 3.1.1: BSM enhancements
  - User Groups
  - Description field for all profiles
  - BSM Resource Profiles
  - New resource classes
- New with z/VSE 4.1: Audit-logging and reporting
- New with z/VSE 4.2: LDAP Signon support

VSE Security Components

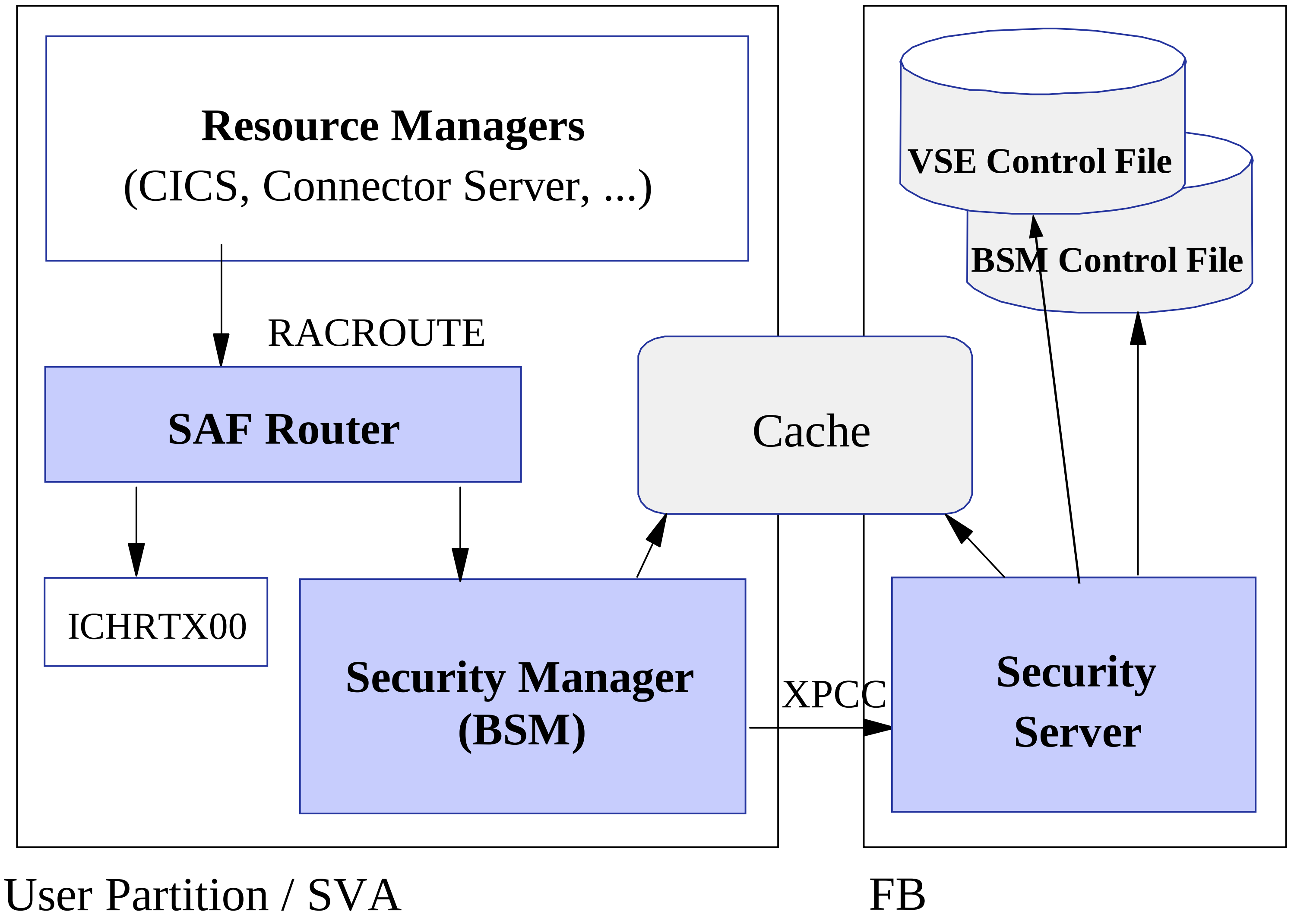


ONE central instance for all security decisions

Security Managers

- Basic Security Manager (BSM)
  - Part of VSE Central Functions
  - Sign on Security
  - Transaction Security
  - Resource Security
- External Security Manager (ESM)
  - CA-Top Secret
  - BIM Alert
  - Vendor

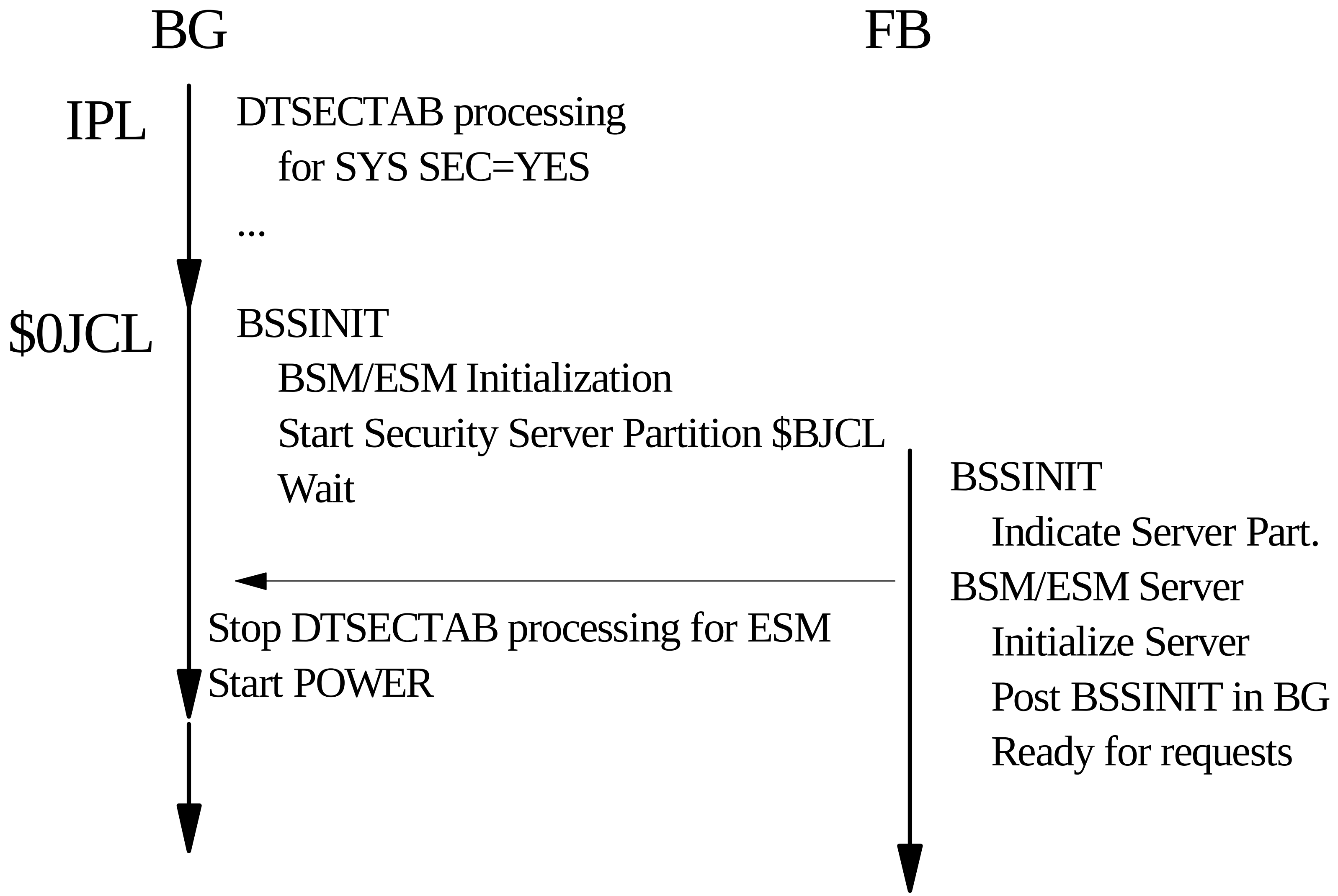
Security Authorization Facility (SAF) and Basic Security Manager



RACROUTE interface

- Architecture defined interface
- External interface to the Security Authorization Facility (SAF)
- To be used by Resource Managers and Subsystems
  - CICS TS
  - VSE Connector Server
  - DITTO/ESA for VSE
  - TCP/IP Security Exit
  - Interactive Interface Sign on

Common Security Startup



BG

FB

IPL

DTSECTAB processing
for SYS SEC=YES
…

$0JCL

BSSINIT
BSM/ESM Initialization
Start Security Server Partition $BJCL
Wait

BSSINIT
Indicate Server Part.
BSM/ESM Server
Initialize Server
Post BSSINIT in BG
Ready for requests

Stop DTSECTAB processing for ESM
Start POWER

Common Security Startup (continued)

- Security manager (BSSINIT) has to initialize before other partition or POWER are active
- BSSINIT will fail, if there are other partition active
- Static partition required for Security Server
- SYS ESM=phasename in IPL proc to start ESM
- If no ESM is started, BSM is activated
- For SYS SEC=YES with ESM a DTSECTAB protection is active until ESM is initialized

Basic Security Manager - Recovery

- If an active Security Manager does not allow to recover from a problem
  - IPL cuu LOADPARM ..P
  - STOP=DPD
  - 0 SYS SEC=RECOVER
  - BSSINIT will not start a Security Manager
  - Re-IPL required to start Security Manager again

Basic Security Manager

- Provides RACROUTE support for
  - Sign on (CICS and VSE Connector Server)
  - Batch sign on (ID statement)
  - Transaction security
- Supports also the SVC-based security calls
  - SECHECK
- Resource classes
  - USER
  - DATASET
  - VSELIB, VSESLIB, VSEMEM
  - TCICSTRN
  - New with z/VSE 3.1.1: MCICSPPT, FCICSFCT, JCICSJCT, SCICSTST, DCICISDCT, ACICSPCT, APPL, FACILITY

Basic Security Manager - New with z/VSE 3.1.1

- New BSM repository
  - BSM Control File (VSAM file)
  - Maintains a copy in data space for performance reasons
  - Replaces DTSECTXN
- New resource classes (see next foil)
- Description field for all profiles (20 characters)
- User Groups
  - Replaces the security classes concept for CICS
- Password rules can be changed by command
- New admin functions
  - BSTADMIN (console or batch)
  - Interactive Interface Dialogs

Basic Security Manager - New with z/VSE 3.1.1

- New resource classes
  - TCICSTRN - Transactions (as on VSE/ESA 2.7)
  - MCICSPPT - Application programs
  - FCICSFCT - Files
  - JCICSJCT - Journals
  - SCICSTST - Temporary storage queues
  - DCICISDCT - Transient data queues
  - ACICSPCT - Transactions (CICS START)
  - APPL - Applications
  - FACILITY - Miscellaneous resources

Basic Security Manager - New with z/VSE 4.1

- Audit-Logging and Reporting
  - All access attempts to protected resources can be logged
    - Allowed access as well as disallowed access
  - Possible attacks can be detected
    - E.g. multiple logon attempts with invalid password
  - You can comprehend who did when access which resource
  - Analysis can be done using a reporting tool
    - Summary report
    - Detailed report of all access attempts
  - Uses the CICS DMF Tool
    - Creates SMF records containing logging information
  - New with z/VSE 4.2:
    - Logging of important BSTADMIN commands

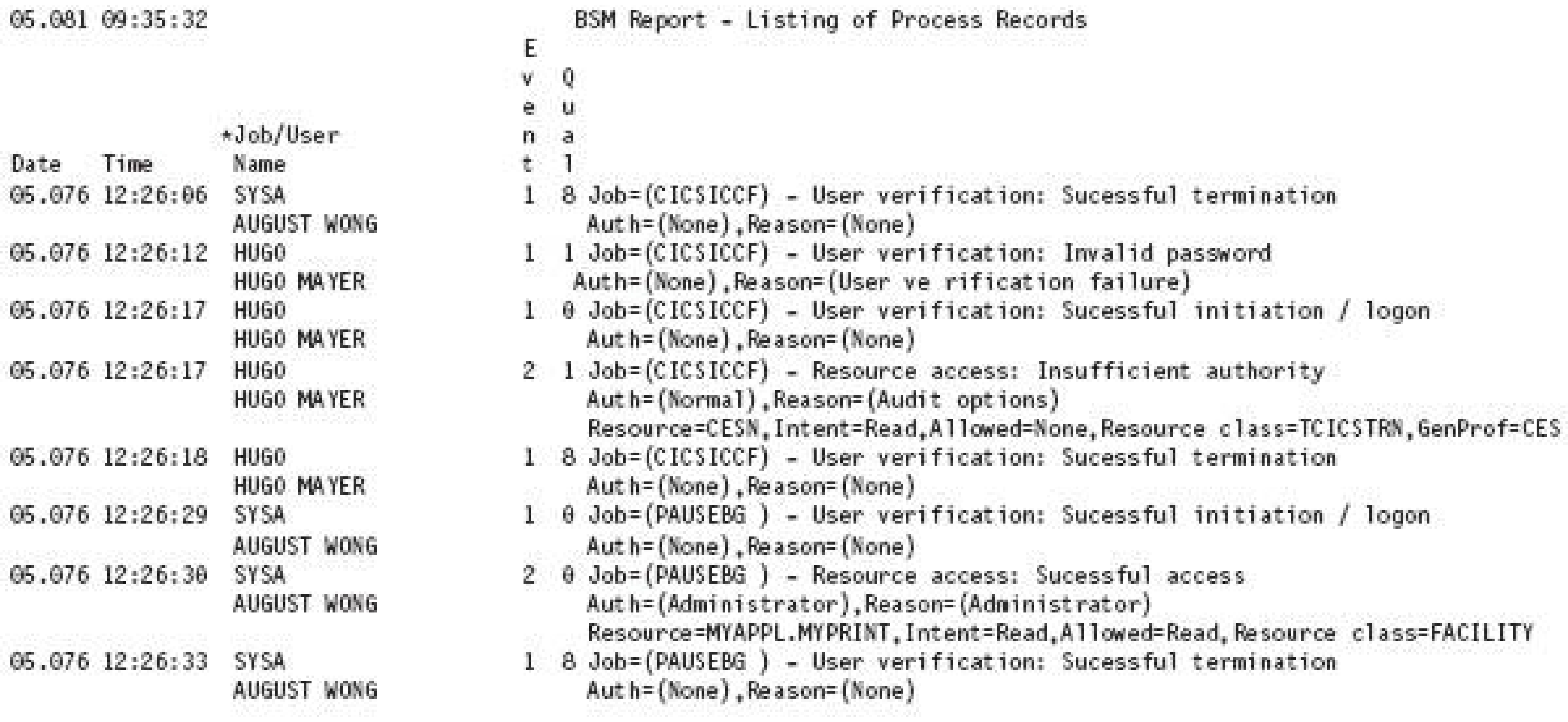
Audit-Logging and Reporting

- To activate logging for a specific resource, you need to specify the AUDIT option (BSTADMIN) on the resource profile
  - AUDIT(***audit-level, access-level***) ß New with z/VSE 4.2
    - **audit-level:**
      - **ALL:** Specifies that all authorized accesses and detected unauthorized access attempts should be logged.
      - **FAILURES:** Specifies that all detected unauthorized access attempts should be logged (the Default).
      - **SUCCESS:** Specifies that all access attempts that were authorized should be logged.
      - **NONE:** Specifies that no logging should be done.
    - **access-level:**
      - **ALTER:** Logs ALTER access-level attempts only.
      - **READ:** Logs access attempts at any level. READ is the default value if the access-level is omitted.
      - **UPDATE:** Logs access attempts at the UPDATE and ALTER level.
- **Note: You should use the auditing function with care. It will increase the BSM and DMF processing and might negatively affect the performance of your z/VSE system!**

Audit-Logging and Reporting

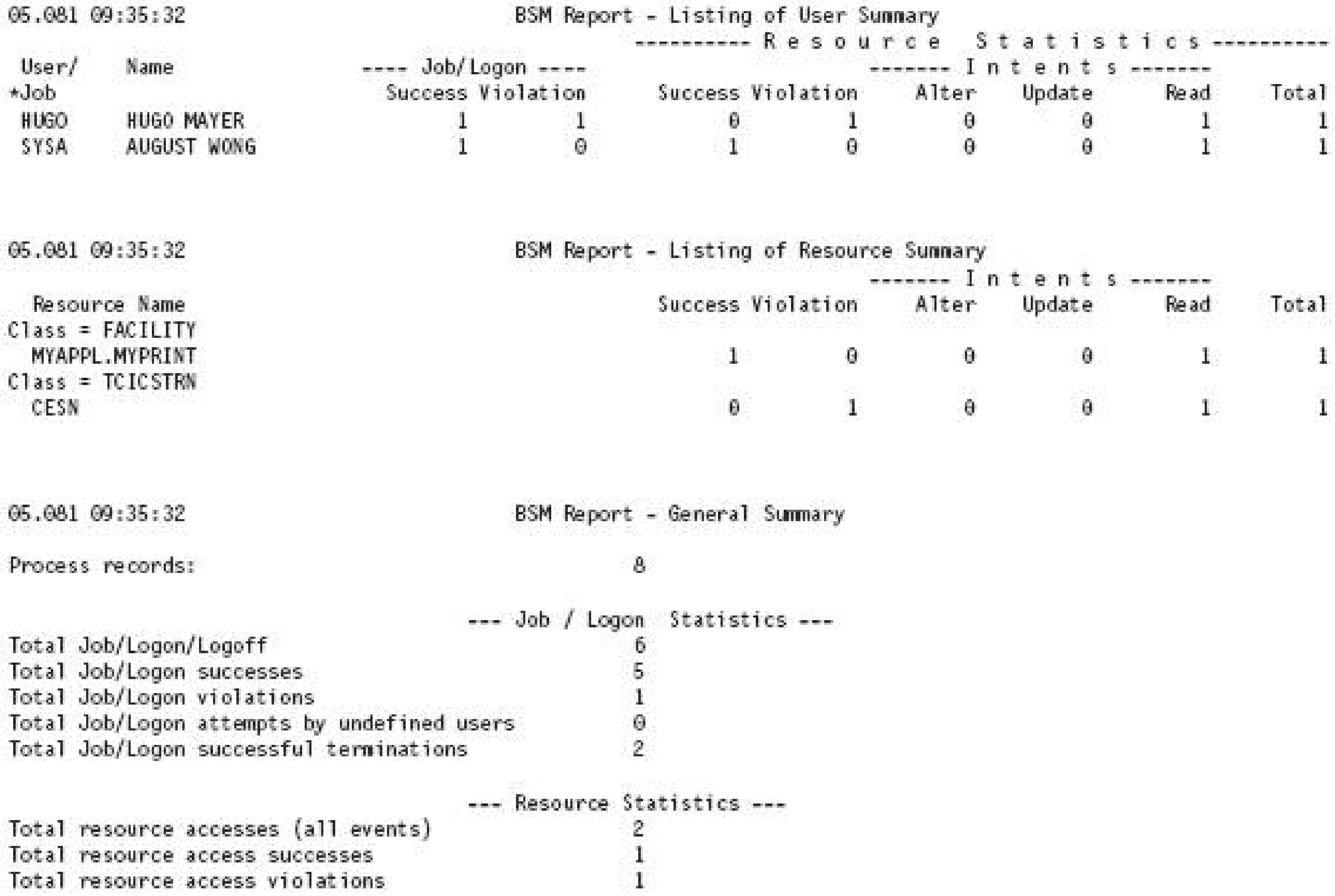
- **Audit-Logging uses the CICS DMF facility to store the recorded SMF records**
- **Use the DMF dump utility DFHDFOU to dump the audit records (type 80) to a intermediate file**
- **Use the BSM Report Writer to create a readable report from the audit records**
- **The report contains**
  - A detailed listing of the processed records
  - A summary of the user entries
  - A summary of the resource entries
  - A general summary

Audit-Logging and Reporting



```
05.081 09:35:32                            BSM Report - Listing of Process Records
                                       E
                                       v  Q
                                       e  u
                *Job/User              n  a
Date   Time      Name                  t  l
05.076 12:26:06  SYSA                  1  8 Job=(CICSICCF) - User verification: Sucessful termination
                 AUGUST WONG                Auth=(None),Reason=(None)
05.076 12:26:12  HUGO                  1  1 Job=(CICSICCF) - User verification: Invalid password
                 HUGO MAYER                Auth=(None),Reason=(User ve rification failure)
05.076 12:26:17  HUGO                  1  0 Job=(CICSICCF) - User verification: Sucessful initiation / logon
                 HUGO MAYER                 Auth=(None),Reason=(None)
05.076 12:26:17  HUGO                  2  1 Job=(CICSICCF) - Resource access: Insufficient authority
                 HUGO MAYER                 Auth=(Normal),Reason=(Audit options)
                                            Resource=CESN,Intent=Read,Allowed=None,Resource class=TCICSTRN,GenProf=CES
05.076 12:26:18  HUGO                  1  8 Job=(CICSICCF) - User verification: Sucessful termination
                 HUGO MAYER                 Auth=(None),Reason=(None)
05.076 12:26:29  SYSA                  1  0 Job=(PAUSEBG ) - User verification: Sucessful initiation / logon
                 AUGUST WONG                Auth=(None),Reason=(None)
05.076 12:26:30  SYSA                  2  0 Job=(PAUSEBG ) - Resource access: Sucessful access
                 AUGUST WONG                Auth=(Administrator),Reason=(Administrator)
                                            Resource=MYAPPL.MYPRINT,Intent=Read,Allowed=Read,Resource class=FACILITY
05.076 12:26:33  SYSA                  1  8 Job=(PAUSEBG ) - User verification: Sucessful termination
                 AUGUST WONG                Auth=(None),Reason=(None)
```

Audit-Logging and Reporting



```
05.081 09:35:32                            BSM Report - Listing of User Summary
                                                     ----------- R e s o u r c e   S t a t i s t i c s ----------
 User/    Name                ---- Job/Logon ----                        ------- I n t e n t s -------
*Job                            Success Violation      Success Violation    Alter    Update      Read     Total
 HUGO     HUGO MAYER                   1         1            0         1         0         0         1         1
 SYSA     AUGUST WONG                  1         0            1         0         0         0         1         1


05.081 09:35:32                            BSM Report - Listing of Resource Summary
                                                                         ------- I n t e n t s -------
  Resource Name                                        Success Violation    Alter    Update      Read     Total
Class = FACILITY
  MYAPPL.MYPRINT                                              1         0         0         0         1         1
Class = TCICSTRN
  CESN                                                        0         1         0         0         1         1


05.081 09:35:32                            BSM Report - General Summary

Process records:                                     8

                                       --- Job / Logon  Statistics ---
Total Job/Logon/Logoff                               6
Total Job/Logon successes                            5
Total Job/Logon violations                           1
Total Job/Logon attempts by undefined users          0
Total Job/Logon successful terminations              2

                                       --- Resource Statistics ---
Total resource accesses (all events)                 2
Total resource access successes                      1
Total resource access violations                     1
```

Basic Security Manager – Repositories

- VSE Control File (IESCNTL)
  - VSAM KSDS file
  - Contains all user profiles
- DTSECTAB
  - Contains resources like files, libraries, sub libraries and members
  - Only 2 user ids are still needed in DTSECTAB
    - (FORSEC, DUMMY)
- DTSECTXN (replaced by BSM Control File)
  - Transaction security profiles
  - Dialog (28) to define the profiles
- BSM Control File
  - Resource Profiles
  - Password rules
  - User groups

Basic Security Manager – User Profiles

- VSE Control File (IESCNTL)
  - All Users must be defined here (SNT no longer supported by CICS TS)
  - VSE/ESA 2.4 (or above) Control File records are NOT compatible with previous releases
  - New: description field
  - Definition
    - User Maintenance Dialog (211)
    - Batch utility IESUPDCF
- DTSECTAB
  - Contains 2 user ids for ASI procedure
  - No CICS TS user settings

Basic Security Manager – User Groups

- User Groups are stored in BSM Control File
- User IDs can be added (connected) into a group
- Replaces the security classes for CICS resources
- Definition
  - Security Maintenance Dialogs (282)
  - Batch utility BSTADMIN

Migrating to the new BSM Resource Profiles

- DTSECTXN no longer used
  - Use the new BSM Control File to protect CICS resources
- Migration steps:
  - Create group profiles from existing User-IDs
    - User Maintenance Dialog 211 – press PF6
    - Creates a group for each security class (GROUP01-GROUP64)
  - Migrate DTSECTXN definitions
    - Use Migrate Security Entries Dialog 285
- Detailed description:
  - See Administration Guide

Administrating new BSM resources

- BSTADMIN provides command to administrate the new BSM profiles
  - From the console in a PAUSE job
  - In a batch job

- Commands
  - ADD, CHANGE, DELETE
  - ADDGROUP, CHNGROUP, DELGROUP
  - CONNECT, REMOVE
  - LIST, LISTG, LISTU
  - PERFORM
  - STATUS

- Security Maintenance Dialogs – 28x

Password rules

- Password rules can be changed
  - Use BSTADMIN

```
PERFORM PASSWORD HISTORY|NOHISTORY
                 LENGTH(5)
                 REVOKE(4)
                 WARNING(3)
```

  - **HISTORY**: a password history is maintained
  - **LENGTH**: minimum password length of password
  - **WARNING**: number of days a warning is displayed before password is expired
  - **REVOKE**: number of unsuccessful sign-on attempts before user id is revoked

- Do not use IESIRCVT anymore !
  - Remove it from USERBG.PROC

LDAP Signon Support - New with z/VSE 4.2

- The LDAP sign-on support enables users to sign on to z/VSE using long, “company-wide” (corporate) user-IDs and passwords
  - The userid and password are authenticated using an LDAP server that is reachable via the TCP/IP network

- This use of “company-wide” user-IDs connects z/VSE with the centralized management of user-IDs
  - LDAP authorization is designed to integrate z/VSE into “Identity Management Systems”, such as IBM Tivoli products
- Covered in more details in separate session (Monday 8:00)

CICS Security

- CICS/VSE uses SNT for user verification
  - Duplicate user definitions
  - SNT users can not change password

- CICS TS uses RACROUTE calls for
  - Sign on
  - Resource Security
  - Transaction Security

CICS TS Sign on

- Native CICS TS sign on (CESN)
- VSE/Interactive Interface sign on (IEGM)
- Private sign on programs based on CICS SIGNON

- Sign on characteristics
  - Inherit user identification and password verification by Security Manager
  - CICS TS and Interactive Interface extracts subsystem specific user settings
    - CICS: Operator ID, Operator classes, ...
    - II: User type, Initial panel, access flags, ...
  - No user definitions to subsystems necessary

CICS TS Resource Security

- Most CICS TS resources can be protected now
  - Protection via Resource Classes and Resource Profiles, held in VSE.BSTCNTL.FILE
  - Transactions – as in previous releases
  - Programs, Files, Journals, Temporary storage, Transient data, Start Transactions, VTAM Applications, miscellaneous resources
- This is similar to Resource Level Checking under CICS/VSE
  - RSLC=YES defined within a transaction
  - RSLKEY defined for
    - Users being allowed to access protected resources
    - Resources for being allowed to be accessed

CICS TS Resource Security

- Resource security definitions under CICS TS
  - DFHSIT

SEC=YES	Enables security
XTRAN=YES	Resource Class TCICSTRN
XDCT=YES	Resource Class DCICSDCT
XFCT=YES	Resource Class FCICSFCT
XJCT=YES	Resource Class JCICSJCT
XPCT=YES	Resource Class ACICSPCT
XPPT=YES	Resource Class MCICSPPT
XTST=YES	Resource Class SCICSTST

CICS TS Resource Security

- Resource security definitions under CICS TS
  - Definition within single resource definition (e.g. file FILEA and FILEB)
    - Within DEFINE FILE: RESSEC(YES)
    - With BSTADMIN Resource Profiles for Resource Class FCICSFCT:
      - ADD FCICSFCT FILEA UACC(NONE) (resource = FILEA)
      - ADD FCICSFCT FILEB UACC(NONE) (resource = FILEB)
      - PERMIT FCICSFCT FILEA(GROUP1) ACCESS(UPDATE)
      - PERMIT FCICSFCT FILEB(GROUP1) ACCESS(READ)

CICS TS Resource Security

- **Enhancement for Report Controller Facility (RCF) to browse reports**
  - **Access protection under CICS/VSE 2.3**
    - RSLKEY for program DFHPSBRS – just 1 level of protection for all repots
    - All users with that RSLKEY can access all reports
  - **Access protection under CICS TS 1.1.1 (requires APAR PK11491)**
    - RSL concept retained for compatibility reasons
      - RSL keyword within SPOOLOPEN REPORT unchanged
    - For browsing purposes profile names
      - DFHRCF.BRSL01 – DFHRCF.BRSL24
    - There are 24 levels for browse protection now –
      - user must be authorized on access list of these related profiles DFHRCF.BRSLxx (RSLxx within SPOOLOPEN)
    - Protection based on report, not on browse program
  - **Definition for RCF protection**
    - ADD FACILITY DFHRCF.RSLnn UACC(NONE)
    - PERMIT FACILITY DFHRCF.RSLnn ID(usergroup1) ACCESS(READ)

CICS Security - Prefixing

- CICS Prefixing can be used to differentiate between two or more CICS TS running on the same VSE system
- CICS Prefix is identical with the user id of the CICS startup job
  - SECPRFX=YES in SIT
  - SYS SEC=YES: user id in * $$ JOB or ID statement is used
  - SYS SEC=NO: user id in ID statement is used
  - When no user id is given: FORSEC is used

CICS Security - DTSECTXN Macro

- Macro to support CICS transaction profiles
  - Replaced by new BSM Control File
    - Can still be used for compatibility
  - CICS-region = user id in CICS startup job
  - transid = up to 4 characters
  - class = 1-64
  - 1 = public transactions
  - 64 = interactive interface transactions

```
DTSECTXN NAME={CICS-region.}transid,
         TRANSEC=(class)
         [,SUBTYPE={INITIAL | FINAL}]
         [,TYPE=GENERIC]
```

CICS Security - Coexistence

- Exit program for CICS/VSE to do user verification against BSM user profiles
- DFHXSE and DFHXSSCO in PRD1.BASE
  - Requires RACROUTE macro from GENLIB
- Requires default user entry in SNT
- Activate ESM in CICS/VSE
  - EXTSEC=YES in SIT

CICS Security – Migration from CICS/VSE

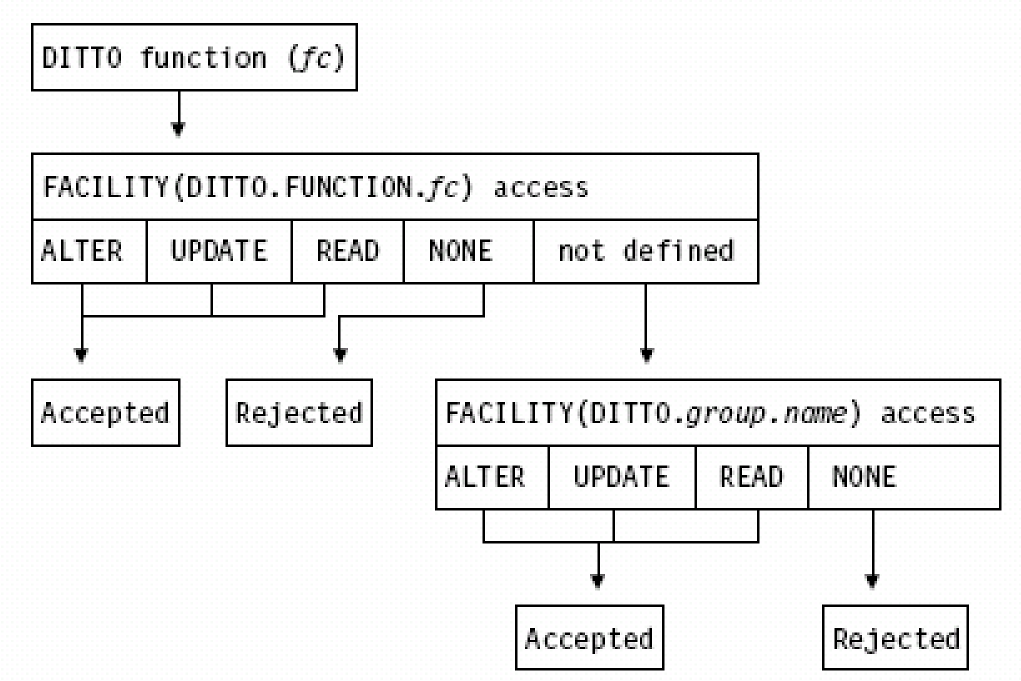
- Security related resource to be migrated
  - Interactive Interface user profiles from an old VSE control file
  - ICCF user records in DTSFILE
  - CICS user profiles from a CICS/VSE sign on table (SNT)
  - Transaction definitions from CICS/VSE PCT
  - For Batch security users: DTSECTAB
  - VSE migration utility IESBLDUP
  - migrate user profiles
- see VSE System Utilities manual

Batch Security

- ID statement or * $$ JOB specifies user id and password for a job
- User id and password are verified against
  - DTSECTAB
  - Security Manager (RACROUTE)
- Subsystems (LIBR, VSAM, ...) uses this user id to verify access rights against DTSECTAB

DITTO Security

- DITTO uses the FACILITY profiles to protect access to data

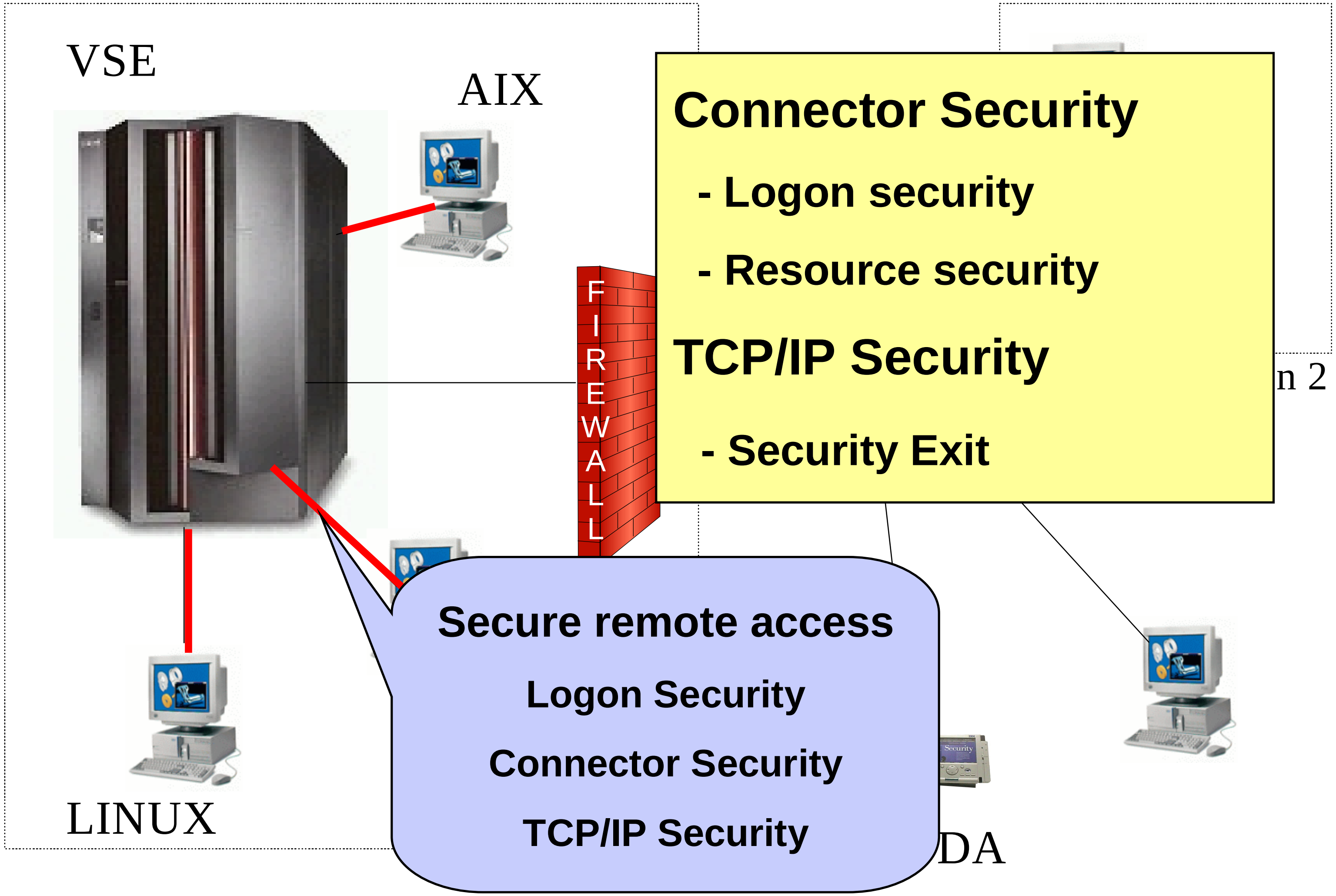


- Make sure batch security is active
  - IPL SEC=YES
- Make sure you define the FACILITY profiles
- ALTER, UPDATE and READ means accepted, NONE means rejected

Security Checklist for VSE

- SYS SEC=YES/NO
  - YES if batch security is required
- CICS SIT SEC=YES (!)
  - If NO, all users can logon without a password
- Change passwords for predefined users
  - POST, PROG, OPER, SYSA, ...

Security in a heterogeneous environment



Connector Security

- **Logon security**
- **Resource security**

TCP/IP Security

- **Security Exit**

Secure remote access

Logon Security

Connector Security

TCP/IP Security

Why secure remote access ?

- Today most computers are part of a network
  - Can connect to your VSE system
- Prevent unauthorized access to VSE and data
  - Requires to authenticate the user (logon)
- FTP allows to access production data
  - VSAM
  - POWER entries (listings)

Connector Security

- VSE Connector Server acts as a Resource Manager
  - Issues RACROUTE calls for
    - User id and password verification
    - Resource security
- Connector user ids are the same as for CICS TS and Batch
- No additional user profile setup required

- But:
  - Additional access restriction by user id and/or IP address possible

Connector Security - Logon

- VSE Connector Server requires a client to logon with valid user id and password
- User id and password is checked via RACROUTE calls
- Additional information is extracted from ACEE and IUI or AF segment
  - User type, access flags, ...
- The user's ACEE is kept during the whole session
- Used to do resource access checking
- Multiple logon attempts with same userid is possible

Connector Security – Resource Security

- When a client issues a resource access request
  - The server does RACROUTE calls to check if the user is allowed to access the resource
  - Access is done only if user is allowed to access the resource
- VSE Connector Server runs under a special userid (VCSRV)
  - specified in ID statement in startup job
  - should be allowed to access all resources

Connector Security - User types

- Type 1 (Administrator)
  - read and write access for all resources
- Type 2 (Programmer)
  - read only access for all resources
  - allowed to submit jobs
- Type 3 (Application User)
  - read only access for selected resources

Connector Security – Resource classes

- The following Resource class are used
  - VSELIB, VSESLIB, VSEMEM (LIBR)
  - DATASET (VSAM)
- Resource not protected by Security Manager
  - POWER queue entries
    - protected by user type and access flag
  - Console
    - protected by user type and access flag
    - If user is allowed to access the console, he can issue all console commands, even REIPL NOPROMPT (!)
  - ICCF Libraries and Members
  - VSAM Record Mappings

Connector Security – Additional Security

- Configuration member allows to restrict logon (connect) by
  - User id
  - IP address
- See skeleton SKVCSUSR in ICCF library 59

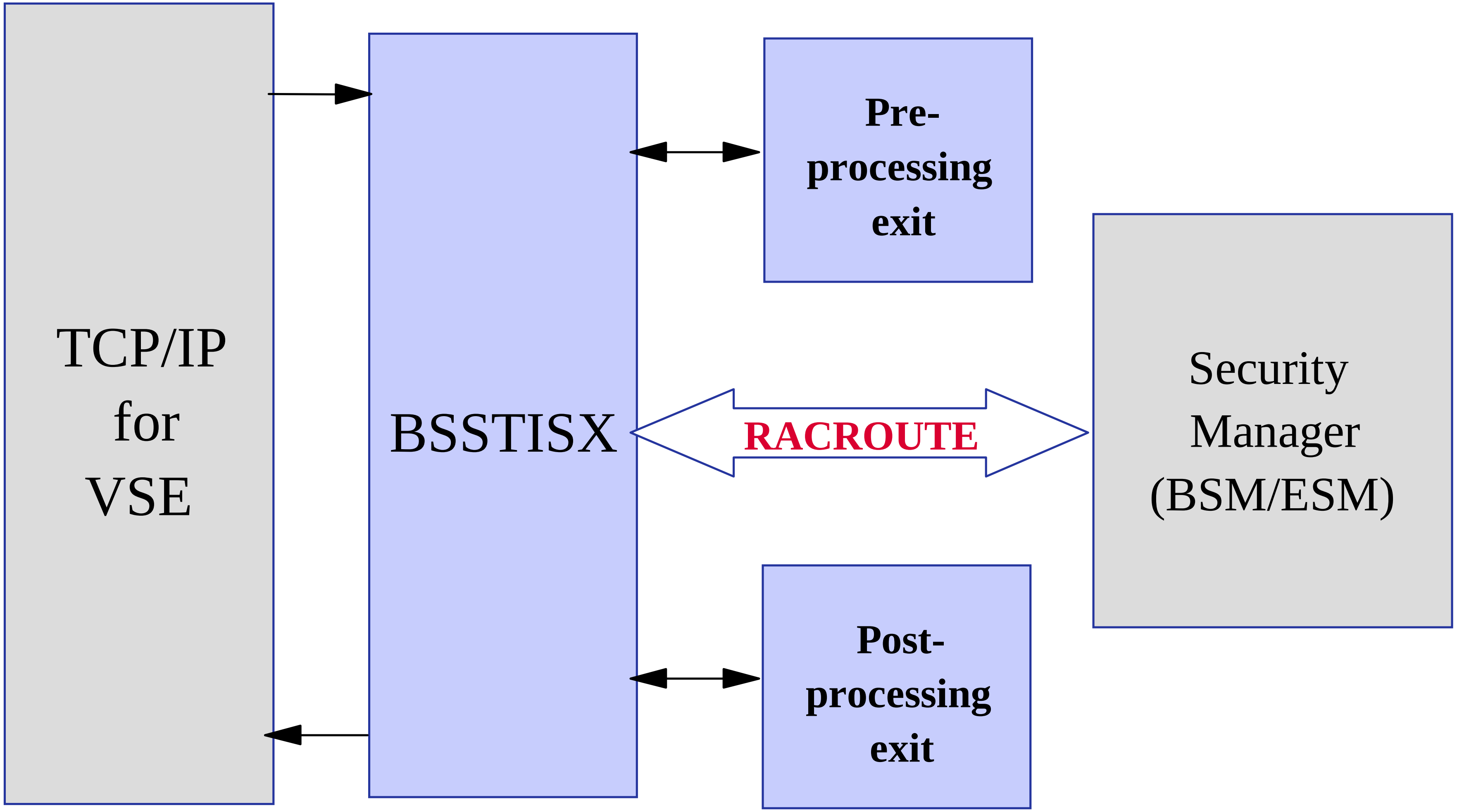
```
* ******************************************************************
* USERS FROM THIS IP'S ARE ALLOWED TO LOGON
* ******************************************************************
IP   = *,             LOGON = ALLOWED
* IP = 9.164.123.456, LOGON = DENIED
* IP = 9.165.*      , LOGON = DENIED
* IP = 10.0.0.*     , LOGON = ALLOWED
* ******************************************************************
* THIS USERS ARE ALLOWED TO LOGON
* ******************************************************************
USER = *,             LOGON = ALLOWED
* USER = BOBY,        LOGON = ALLOWED
* USER = SYS*,        LOGON = DENIED
```

TCP/IP Security

- In general TCP/IP uses its own user id definitions
  - DEFINE USER,ID=user,PASSWORD=pwd
  - Readable in initialization member (IPINITxx.L)
  - Duplicate user definitions

- Security Exit available from IBM to check the user ids and resource access via Security Manager

TCP/IP Security Exit



TCP/IP Security Exit

- Issues RACROUTE calls for
  - User identification and verification
  - Resource access control
    - VSE files, libraries, members
    - POWER entries
    - SITE commands
- Provides a pre- and post-processing exit interface
  - Activation
    - DEFINE SECURITY,DRIVER=BSSTISX[,DATA=data]
      - DATA=‘anonym_uid,anonym_pwd,preproc,postproc’
  - SET SECURITY=ON
- Also see new “RACROUTE encapsulation services”
  - Available on z/VSE Homepage for download

TCP/IP Security - HTTPHACK.L

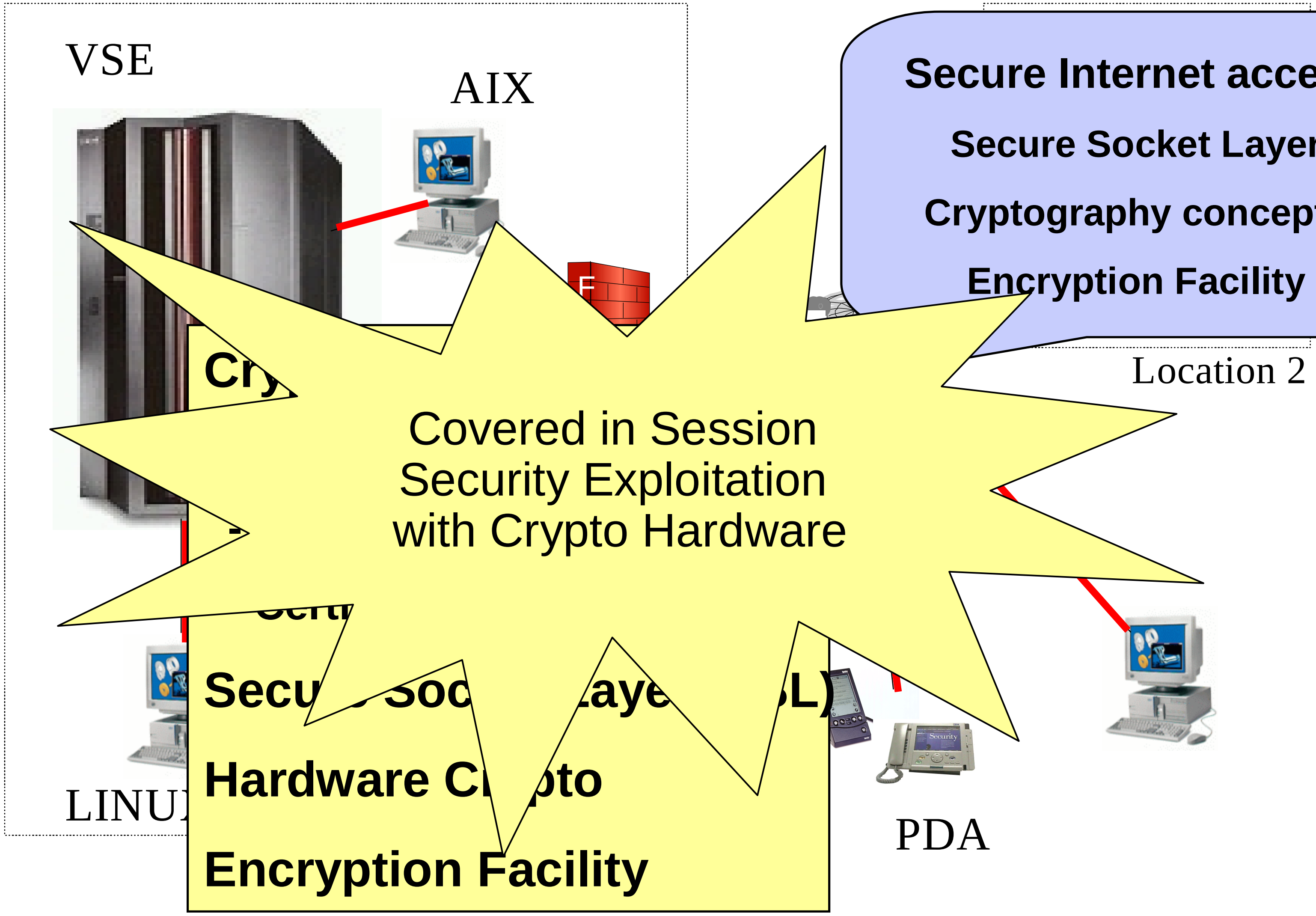
- Typical hacker attacks are normally no problem for VSE, only for Windows
- Rejects hacker attacks
  - by filtering known URL prefixes
- HTTPHACK.L:

```
* Example:
*
* "SCRIPTS/" will cover...
*       GET /SCRIPTS/ROOT.EXE?C+D
*       GET /SCRIPTS/ROOT.EXE?CAT+PASSWD
*       etc...
* =======================================================
SCRIPTS/
MSADC/
_VTI_BIN/
_MEM_BIN/
C/WINNT/SYSTEM32/CMD.EXE
D/WINNT/SYSTEM32/CMD.EXE
CGI-BIN/
```

Security Checklist for TCP/IP

- Connector Security
  - Set SECURITY=FULL (SKVCSCFG)
  - Define resource access rights (BSM/ESM)
  - Restrict remote access to specific users and IPs (SKVCSUSR)
- TCP/IP Security
  - SET SECURITY=ON in IPINIT member
  - Use Security Exit
  - Do not define users in IPINIT member

Security in a heterogeneous environment



Secure Internet access

Secure Socket Layer

Cryptography concepts

Encryption Facility

Covered in Session
Security Exploitation
with Crypto Hardware

Cry

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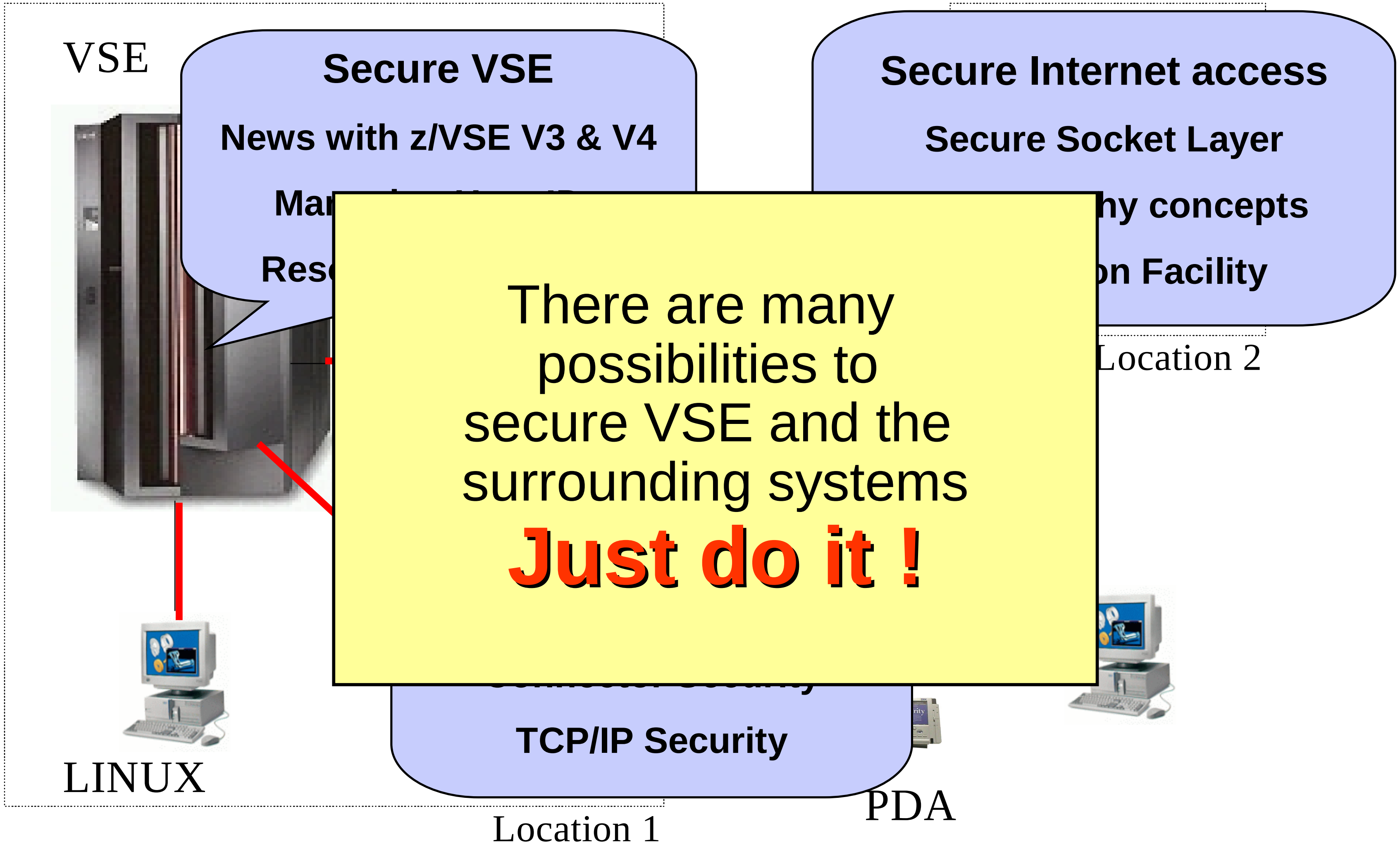
Secu Soc Laye SL)

Hardware Cr pto

Encryption Facility

Security in a heterogeneous environment



VSE

Secure VSE

News with z/VSE V3 & V4

Mar

Res

Secure Internet access

Secure Socket Layer

hy concepts

on Facility

Location 2

There are many possibilities to secure VSE and the surrounding systems

Just do it !

TCP/IP Security

LINUX

PDA

Location 1

Related Documentation

- New RedBook: Security on IBM z/VSE - SG24-7691
  - http://www.redbooks.ibm.com/redpieces/abstracts/sg247691.html
- IBM System z cryptography for highly secure transactions
  - http://www.ibm.com/systems/z/security/cryptography.html
- VSE Security Homepage
  - http://www.ibm.com/servers/eserver/zseries/zvse/documentation/security.html
- z/VSE Planning
- z/VSE Administration
- OS/390 Security Server External Security Interface (RACROUTE) Macro Reference (GC28-1922)
- OS/390 Security Server (RACF) Data Areas (SY27-2640)
- z/VSE V4R2.0 e-business Connectors, User's Guide
- CICS Enhancements Guide, GC34-5763

Questions ?

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