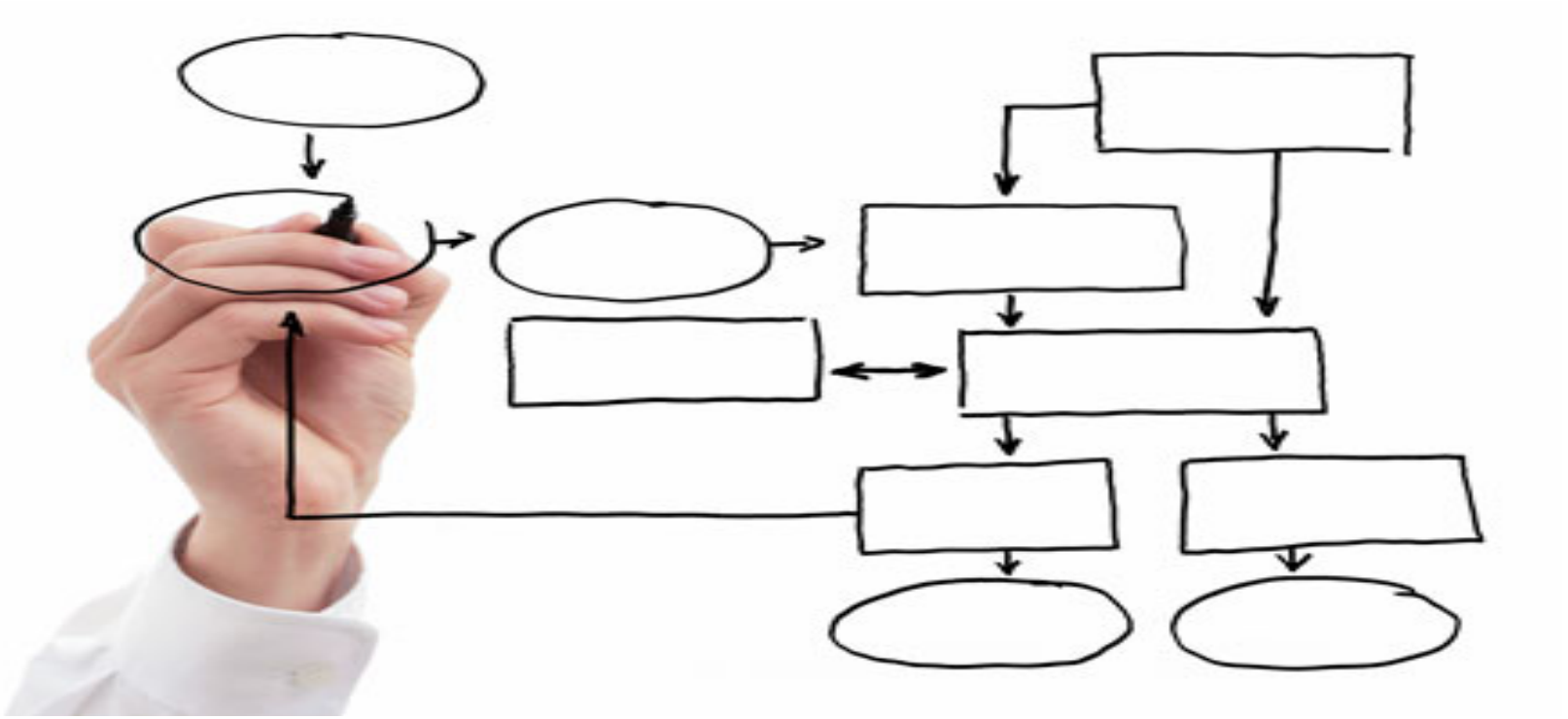

MIS 5121: Business Processes, ERP Systems & Controls

Week 12: *Systems Development 2: Data Dictionary, Program Security*

FOX | MIS
Management Information Systems

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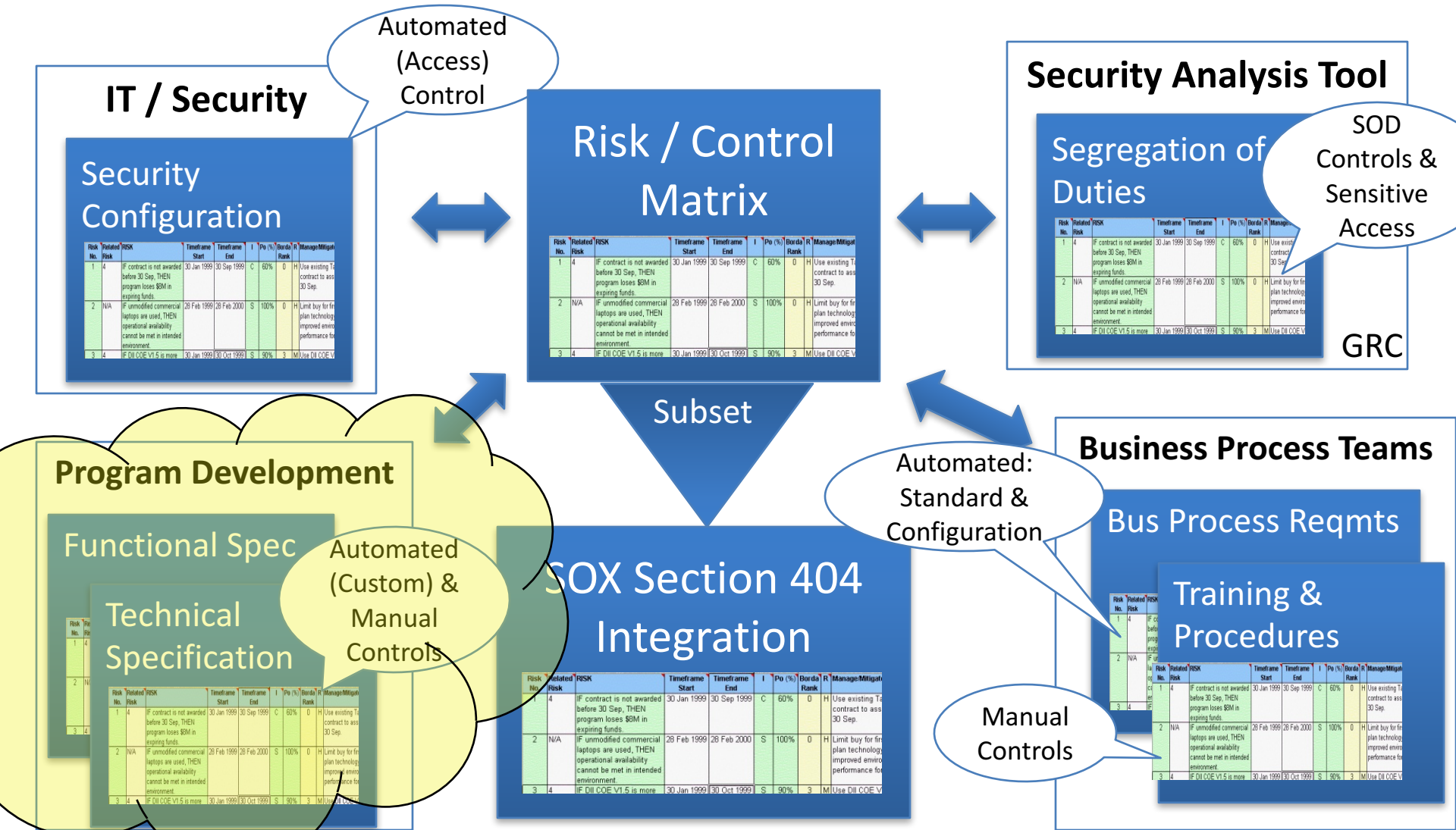
Controls: Integration Points

Risk/Control Matrix can serve as the primary vehicle for integrating control design into project activities and deliverables

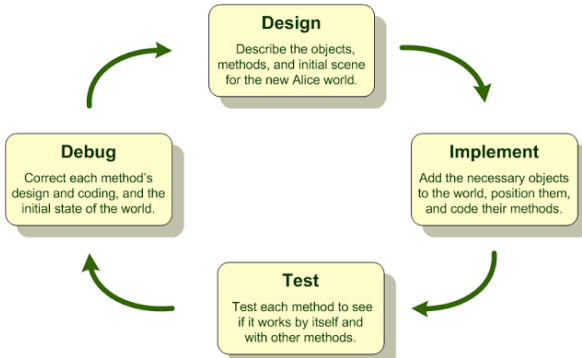


Key Information Technology Risks

- System Security
- Information Security Administration
- Data Migration
- Data Interface
- Instance Profile Security
- Change Management
- Transport Security
- Table Security
- **Data Dictionary, Program and Development Security**
- Logs and Traces
- Firefighter access
- Powerful User ID's and Profiles
- Background Processing (Batch vs. foreground: real-time)

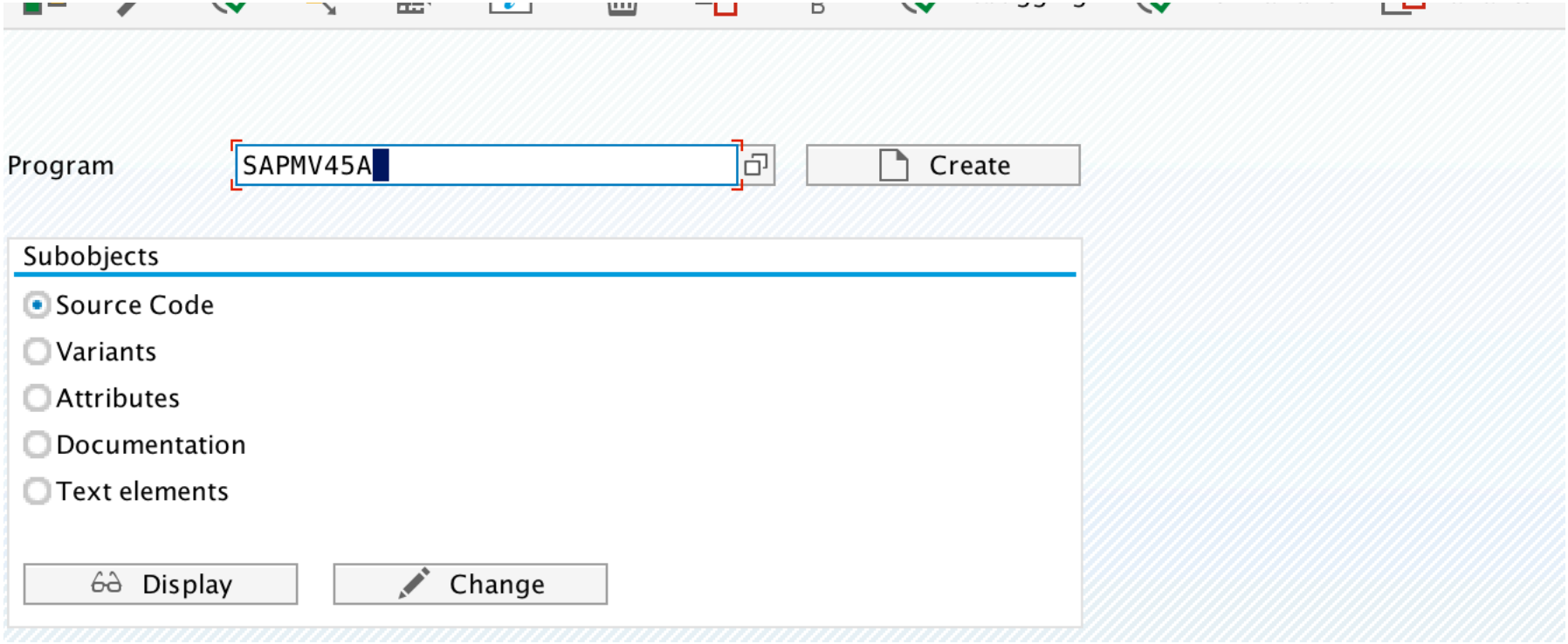
Program & Development Security

- Types of Development Objects (FRICE)
  - **F**orms – outputs (invoices, Purchase orders, ...)
  - **R**eports – custom reports
  - **I**nterfaces – SAP to other systems
  - **C**onversions – Data migration
  - **E**nhancements – Change system logic, use additional fields, etc.
    - User-Exits: defined SAP branches to custom code (lower risk)
    - Change SAP code (high risk, long term extra maintenance)
  - Workflow – non-config components, logic
- Development: custom programs
  - Typically ABAP (SAP SQL extension programming language)



Programs in SAP

- Transaction SE38 (Program Editor)
  - This program used when executing Create Sales Order transaction VA01



ABAP Editor: Display Mod. Pool SAPMV45A

Mod. Pool SAPMV45A Active

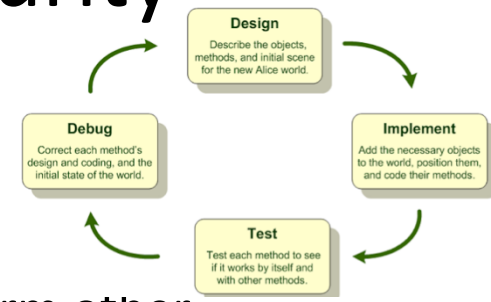
```
*---------------------------------------------------------------------*

         INCLUDE MV45ATOP.

ENHANCEMENT-POINT SAPMV45A_03 SPOTS ES_SAPMV45A STATIC.
*$*$-Start: SAPMV45A_03----------------------------------------------
ENHANCEMENT 2  ECO_HBS_SAPMV45A.    "active version
*include for RE-SCM sales functions. also known as Home Building Soluion
 INCLUDE DI_HBS_MV45AF01.
ENDENHANCEMENT.
*$*$-End:   SAPMV45A_03----------------------------------------------
*---------------------------------------------------------------------*
*        U S E R - E X I T S
*        U S E R - E X I T S
*        U S E R - E X I T S
*---------------------------------------------------------------------*
*        INCLUDE MV45ATZZ.             " Data definitions in MV45ATOP
         INCLUDE MV45AOZZ.              " User-modules PBO
         INCLUDE MV45AIZZ.              " User-modules PAI
         INCLUDE MV45AFZA.              " User-forms < 3.0
         INCLUDE MV45AFZB.              " User-forms
         INCLUDE MV45AFZC.              " User-forms < 3.0D
         INCLUDE MV45AFZD.              " User-forms   3.0E
         INCLUDE MV45AFZF.              " User-forms   3.0F
*        include mv45afzg.              " User-forms   3.1G
         include mv45afzh.              " User-forms   4.6B
         INCLUDE MV45AFZZ.              " User-forms
         INCLUDE MV45AFZ4.              " User-forms   4.0
ENHANCEMENT-POINT SAPMV45A_01 SPOTS ES_SAPMV45A STATIC.
*$*$-Start: SAPMV45A_01----------------------------------------------
ENHANCEMENT 1  /SAPMP/SALES_ORDER_V_SAPMV45A.    "active version
*MILL 0008 01 TSCH Kundenauftragsversion
         INCLUDE MILL_VS_MV45A.     "item versioning
         INCLUDE MILL_CAD_MV45A.    "CAD interface
```

```
***INCLUDE MV45AFZH.

*---------------------------------------------------------------------*
*                                                                     *
* This include is reserved for user modifications                     *
* Forms for sales document processing                                 *
*                                                                     *
*---------------------------------------------------------------------*

*-----------------------------------------------------------------*
*       FORM AUTHORIZATION_VALUE_SPLIT                            *
*-----------------------------------------------------------------*
*       This userexit can be used to split up the total authorization
*       value of sales order items with regard to invoices that will be
*       created from these items in the future.
*
*       Order items/schedule lines are stored in the table
*       OPEN_VALUES. A grouping term, which can be set freely, must
*       be entered in the field OPEN_VALUE-ZUKRI. The authorization is
*       carried out separately for each grouping term!
*
*       The program includes 2 examples. Please apply your own coding
*       if necessary:
*
*       1) an invoice simulation is used to find out in which order
*          items/schedule lines will be invoiced in ONE billing
*          document. The field OPEN_VALUES-ZUKRI contains the document
*          number of the virtual invoice document (DA_XVBRP-VBELN).
*          Please see application help: Sales and Distribution ->
*          Billing -> The General Billing Interface, especially order
*          type, order item category and invoice type. Please be aware
*          that this simulation may temporarily affect system
*          performance. This example employs order txpe TA, item
*          category DLN and Invoice type FX. Please make sure that
```

Programs in SAP – User Exit

```
*  controlling parameter
*    DA_EXAMPLE        must be set with the number of the example
*                      = 1, if you want to have invoice simulation
*                      = 2, if you want to have special fields
*---------------------------------------------------------------------
FORM AUTHORIZATION_VALUE_SPLIT TABLES OPEN_VALUES STRUCTURE BEZS132.

  DATA: DA_EXAMPLE(2) TYPE N VALUE 0.
  DATA: DA_AUART LIKE VBAK-AUART VALUE 'TA'.
  DATA: DA_FKART LIKE VBRK-FKART VALUE 'FX'.
  DATA: DA_PSTYV LIKE VBAP-PSTYV VALUE 'DLN'.
  DATA: DA_SUBRC LIKE SY-SUBRC.

  IF DA_EXAMPLE EQ 1.
*   first example: invoice simulation
    PERFORM AUTHORIZATION_VALUE_SPLIT1 TABLES OPEN_VALUES
                                       USING DA_AUART
                                             DA_FKART
                                             DA_PSTYV
                                    CHANGING DA_SUBRC.
    IF DA_SUBRC NE 0.
*     message Innn "error in invoice simulation, no split of
*                   authorization value possible"
    ENDIF.

  ELSEIF DA_EXAMPLE EQ 2.
*   second example, for example shipping point
    PERFORM AUTHORIZATION_VALUE_SPLIT2 TABLES OPEN_VALUES.

  ENDIF.
ENDFORM.
```

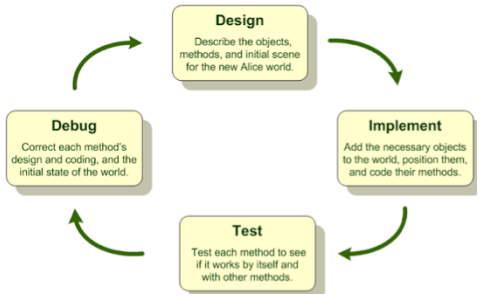
Program & Development Security



- Is program code 'good'
  - Does what it's supposed to do
  - Limited to requirements only (not branch off to perform other nefarious actions)
  - Well-behaved: doesn't mess up other programs, logic, operation of ERP system

- Good Development Practices
  - Clear, documented, approved requirements defined before coding
  - Define Requirements, Design Logic before major coding (e.g. use of function modules for common logic)
  - Peer Code Reviews
  - Experienced development leadership
  - Test, Test, retest **BEFORE** moving to PRD (strong change management governance)

Risk and *Recommendation*
Program Security



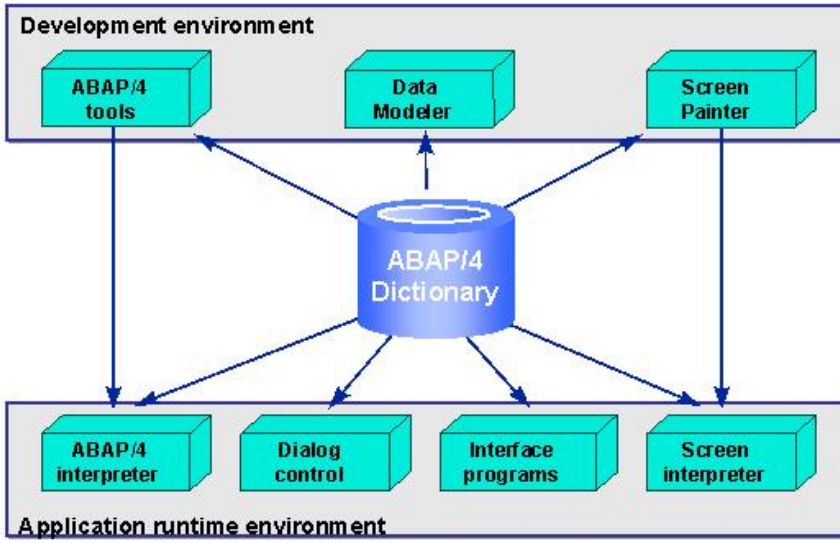
Risks:

- Unintended, nefarious uses of program code
- Users capable of executing programs directly can compromise standard controls (access security, audit trails)
- Display access to ABAP code gives backdoor access to program execution
- Debug authority provides unsecured table viewing and table change

Recommendations:

- Active review, manage program code details
- Access to run programs restricted via SAP Security / Authorizations
- Further secure programs via assignment to authorization groups
- Basis Admin no Display access to ABAP code (prevent backdoor access)
- Debug authority restricted to effectively monitored ‘emergency users’

Data Dictionary Security

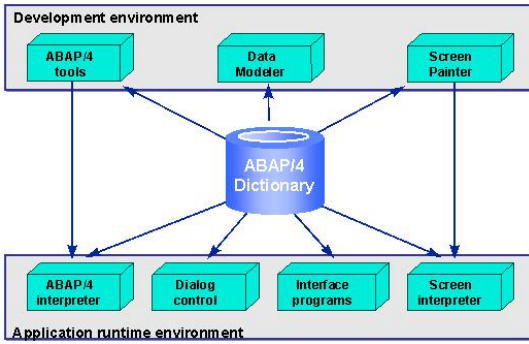


- Central Catalogue of:
  - Data definitions and descriptions
  - Relationships between data elements / structures
  - Relationships between data and use in programs and screens

- Control Concerns:
  - Data Dictionary changes could affect the data integrity in system
  - Access to make changes needs to be restricted to appropriate individuals
  - S_DEVELOP Authorization object controls access to create / maintain / delete APAP dictionary & repository objects

- Also called ABAP/4 Dictionary in SAP

Risk and Recommendation
Data Dictionary



Risks:

- PRD Access to S_DEVELOP Allows direct changes to Data Dictionary which could compromise integrity of the data
- Any Data Dictionary change could compromise integrity of the data

Recommendations:

- No one (including Basis Administrators) should have update access to Data Dictionary in Production (PRD)
- Changes to data dictionary performed in DEV, tested in QA and migrated to PRD per change management process
- Developer access restricted appropriately using SAP Security / authorization concept

Key IT Controls Overview

- Program, Development, Data Dictionary
  - 2-3 risks that exist
  - Common control recommendations for each

Extra Slides

Information Security Administration

- Security Administration can be:
  - Centralized
  - Decentralized
  - Hybrid of both

- Control Concerns:
  - Segregate:
    - Role Development
    - User Administration (Assign Roles, change).
  - Do not Develop / Change Roles directly in PRD
    - Develop and unit tested in DEV, integration tested in QA and migrated to PRD per change management process

Risk and Recommendation

Information Security Administration

Risks:

- If User Administration access is not limited, higher risk of unauthorized and excessive access in SAP
- No Segregation of User Administration tasks, higher risk of inaccurate or unauthorized access assigned to users and profiles in SAP

Recommendations:

- Define Owners of all SAP systems, clients and data or Processes
- System and Client Owners responsible for:
  - Approving all changes to their systems / clients
  - Authorizing overall access to the system
- Data / Process Owners responsible for:
  - Control of overall data / process components in the systems / clients
  - Authorizing specific access to data / processes within the PRD system
- Same people do not have access to create, maintain and assign roles
- Role Creation or maintenance not performed in PRD environment