MAINFRAME CRYPTO

Key Labeling

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Agenda – Key Labeling

- Master Keys
- Operational Keys
  - Purpose of Key Labels
- Data Set Encryption

Master Keys / Operational Keys

- Master Keys
  - 4 CCA Master Keys (DES-MK, AES-MK, ECC-MK, RSA-MK) and 1 EP11 Master Key (P11-MK)
  - Encrypt other (operational) keys
- Operational Keys
  - Encrypt data (messages, data sets, ATM PINs, other keys)

Master Keys and Master Key Parts

- ~~Passphrase Initialization (a passphrase is used to generate 4 CCA master keys: AES-MK, DES-MK, ECC-MK and RSA-MK)~~
- ICSF Panels
  - Multiple key parts (i.e., random numbers) are loaded and combined to create each of the 4 CCA master keys)
  - Each key part must be securely stored and available for recovery purposes
- Trusted Key Entry Workstation
  - Multiple key parts (i.e., random numbers) are stored on a smart card, which is secured by the PIN technology of the smart card

Why do we need key labels

- Index into the VSAM KSDS keystore (to find the record)
- Security (to find the SAF profile in the CSFKEYS class)
- Key lifecycle management
  - Key rotation
  - Purpose or ownership

ICSF Key Labels

- 64 byte character string, left justified, right padded with blanks
- 1st character alphabetic or national (#, $, @)
- The rest can be alphanumeric, national or period (.)
- All alphabetic are upper case

- ‘Node’ Separator, not required, but recommended

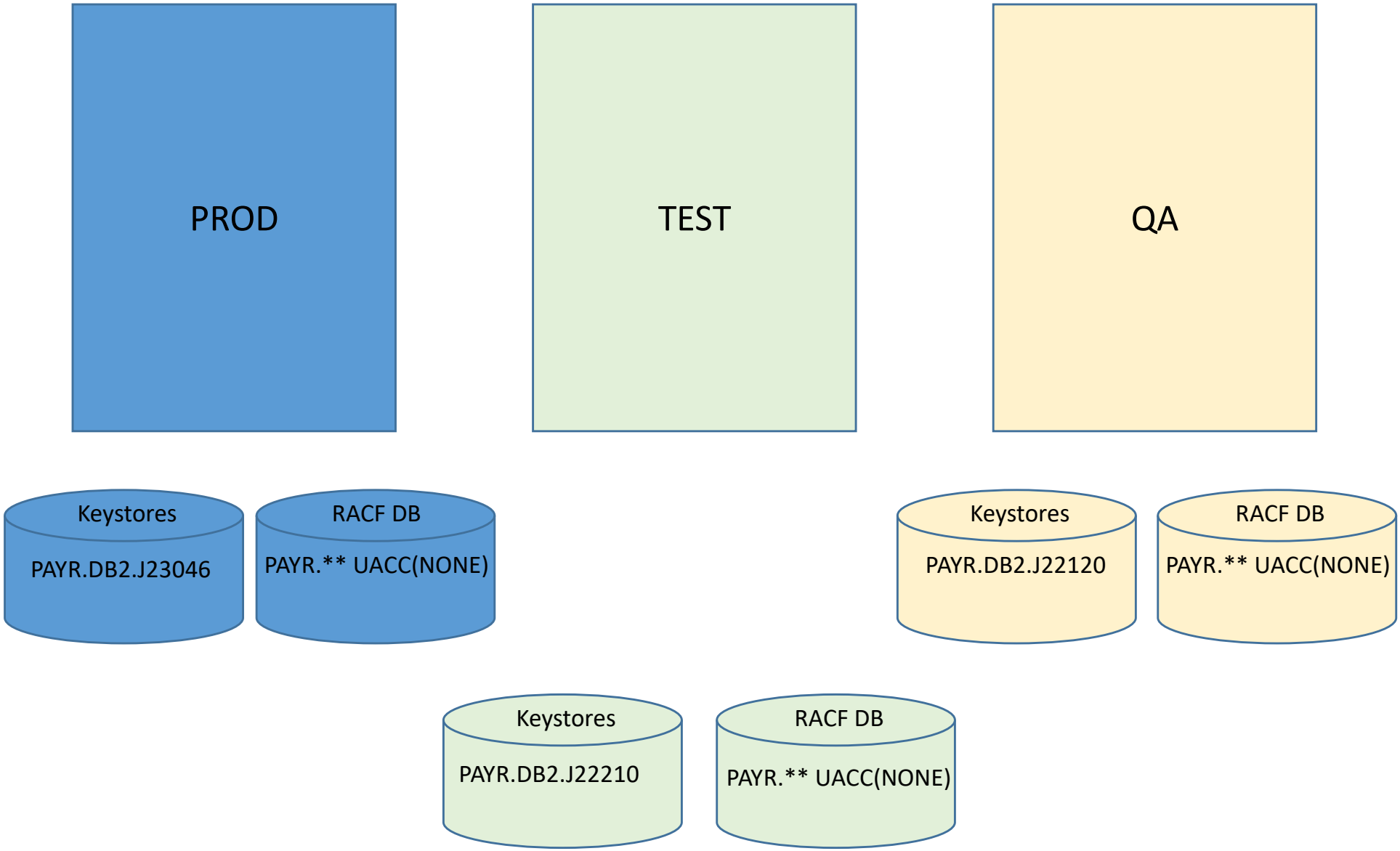
Key Labels and SAF profiles

- Bad Examples
  - THISISAREALLYLONGKEYLABELTHATHAS44CHARACTERS
  - MYKEY
  - X
- Good Examples
  - env.application.algorithm.date
    - PROD.APPX.AES256 .D180321 SAF(PROD.APPX.**)
  - env.businessunit.usage.algorithm.date
    - PROD.PERS.PAYROLL .D20180321 SAF(PROD.PERS.PAYROLL.*)
    - PROD.PERS.MEDICAL .D20180321 SAF(PROD.PERS.MEDICAL.*)
  - subsys.application. date.identifier.sequence
    - DB2.APPX.20180316. PAYROLL.V1 SAF(DB2.APPX.*.PAYROLL.*)
    - CICS.APPX.20180321.PARYOLL.V1 SAF(*.APPX.*PAYROLL.*)

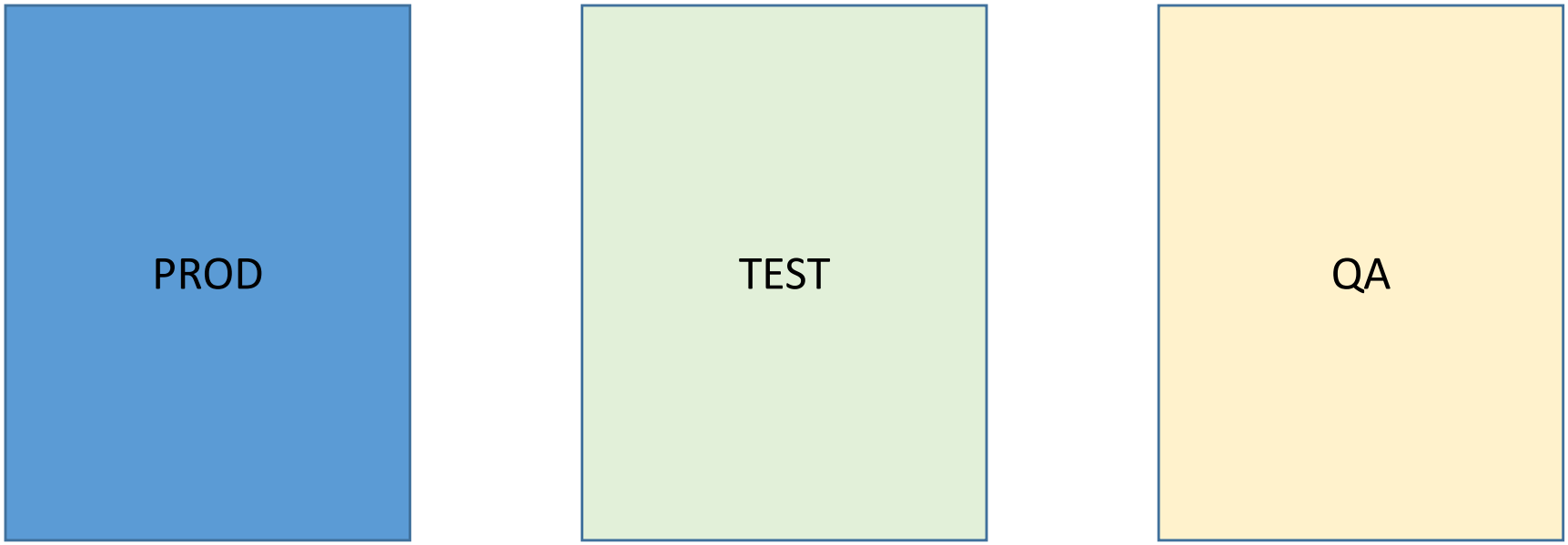
Qualifiers

- Userid – BOYDG, TS159876
- Environment – PROD, TEST, QA, SYSPROG
- Purpose – DSE, PE, ATM, GUARDium
- Organization/Business Unit – PERS, FIN, MFG
- Application – APPX, CostCenter, DB2
- Secondary Application – APPY
- Generation/Cycle – V01, 00001, 001
- Date – J23046, 20230215, D230215, D20230215

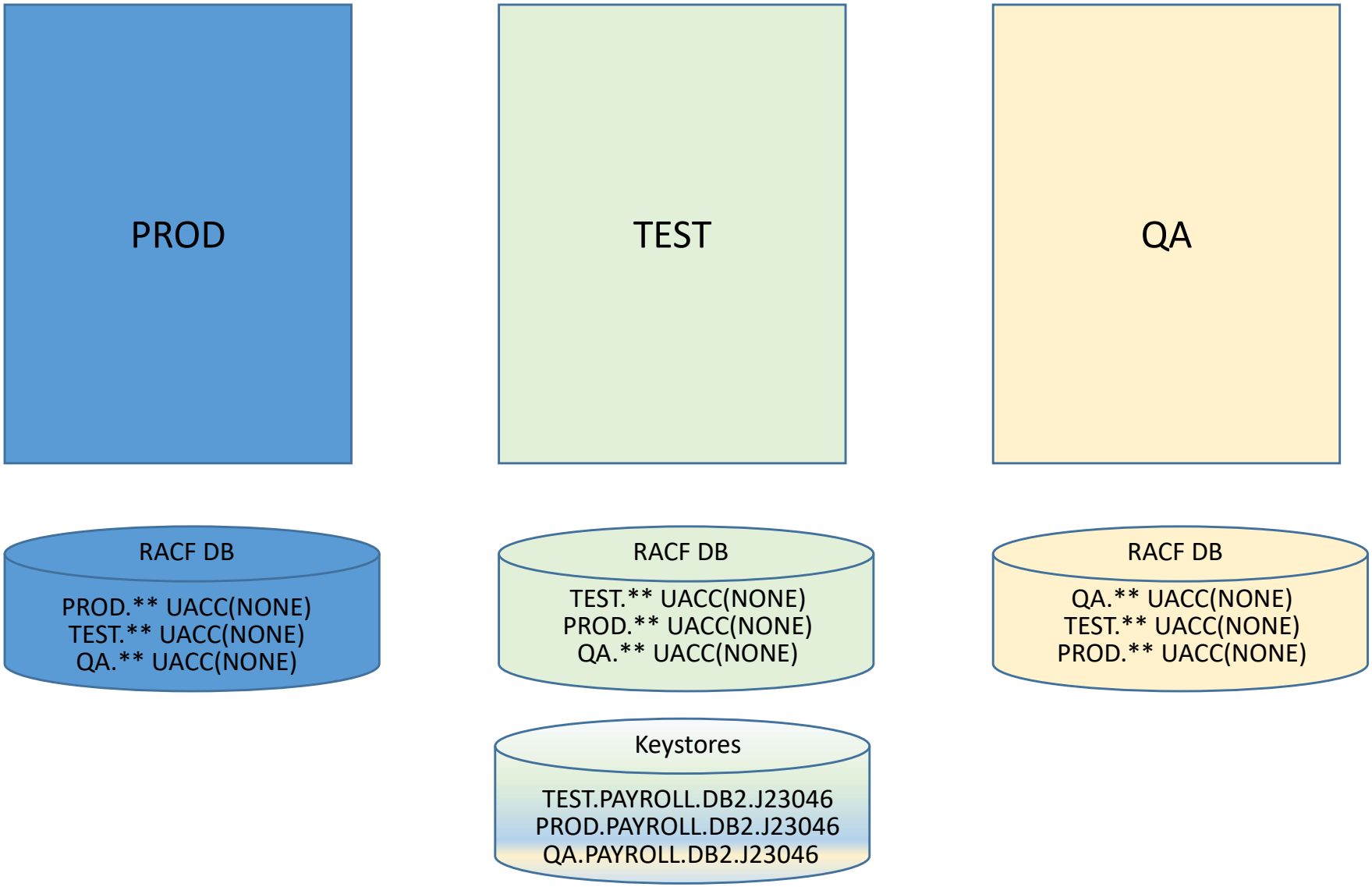
Isolated Environments



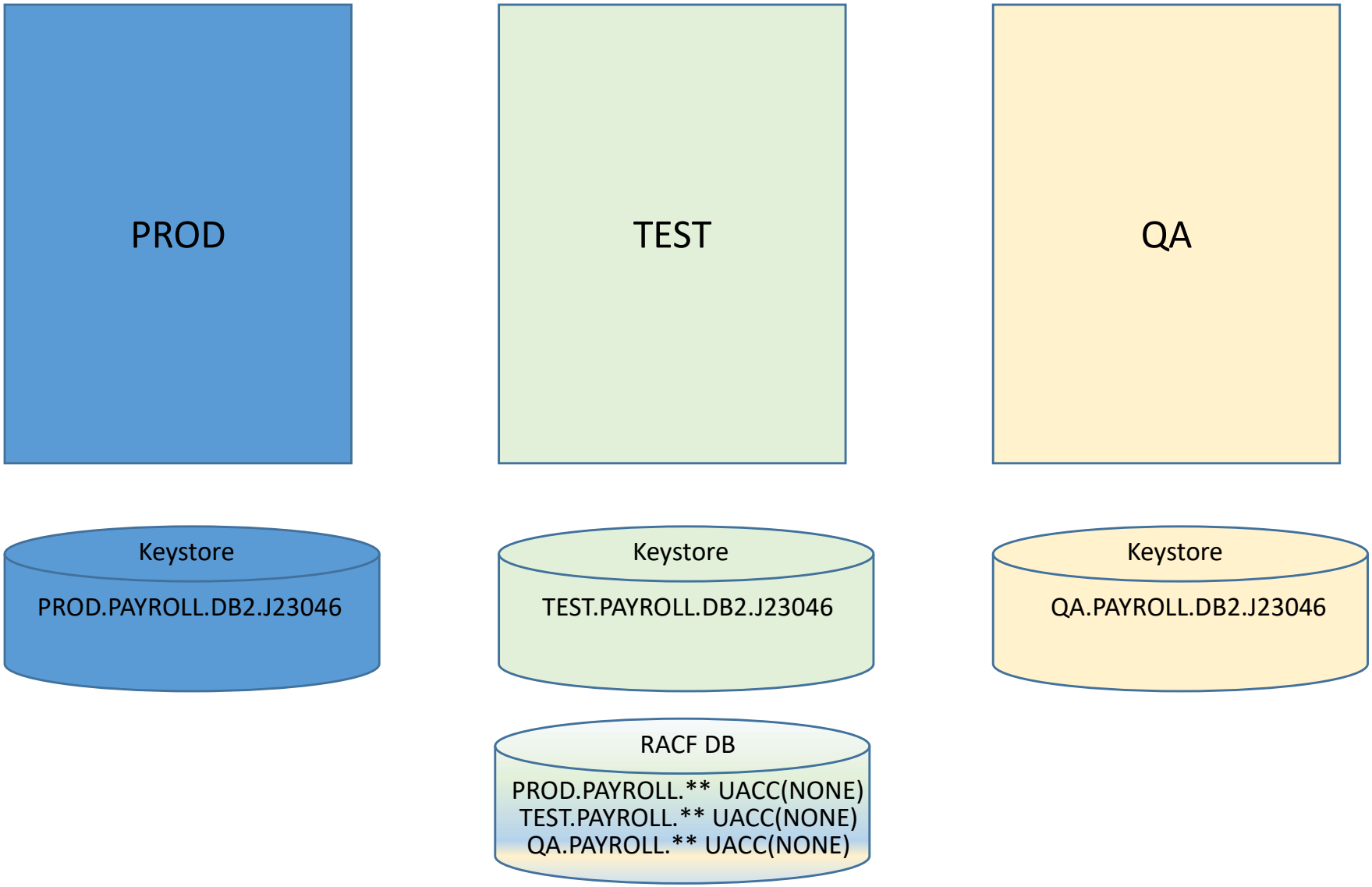
Shared Environments



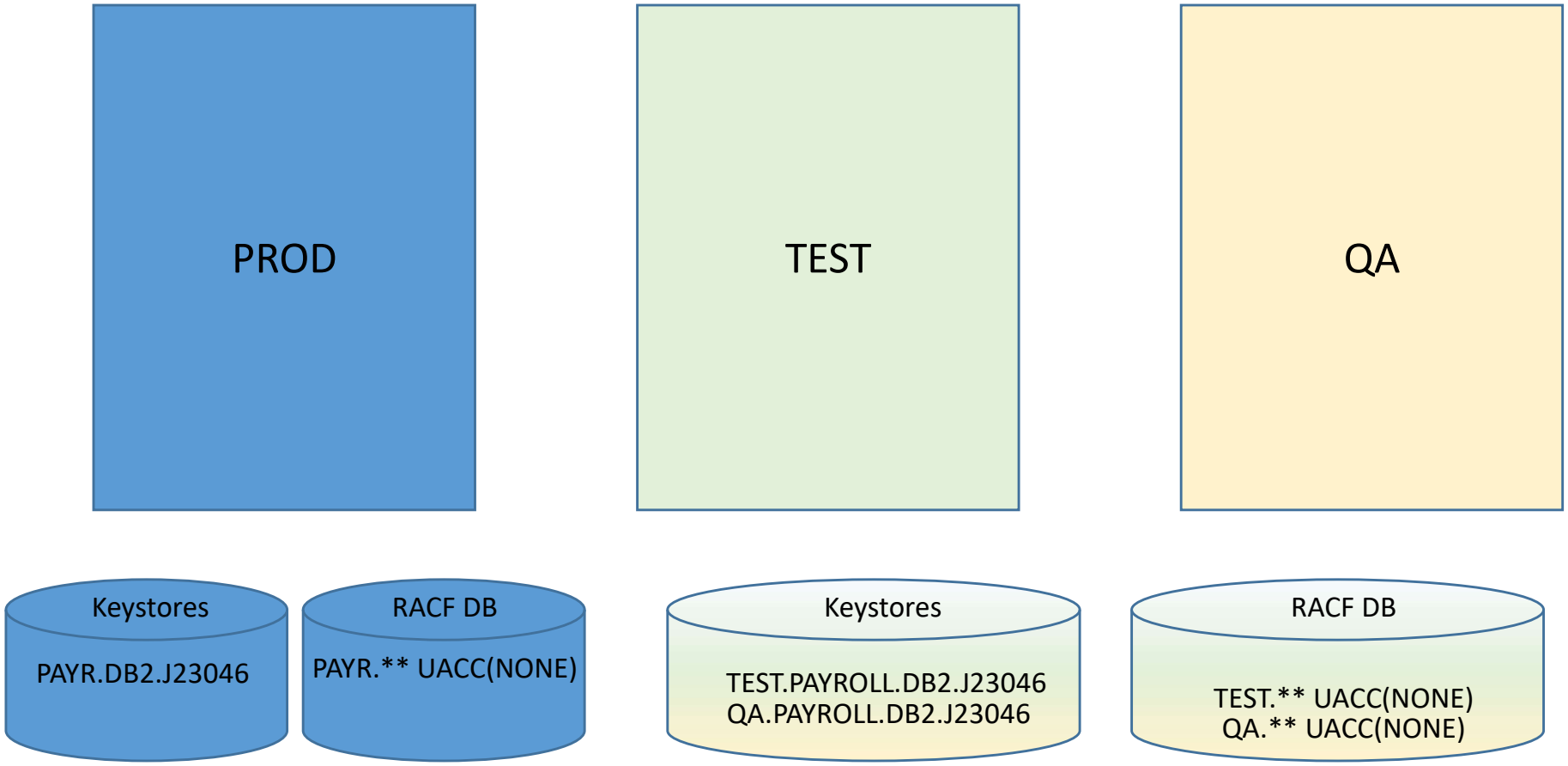
Shared Keystore/Unique RACF DB



Shared RACF DB / Unique Keystore

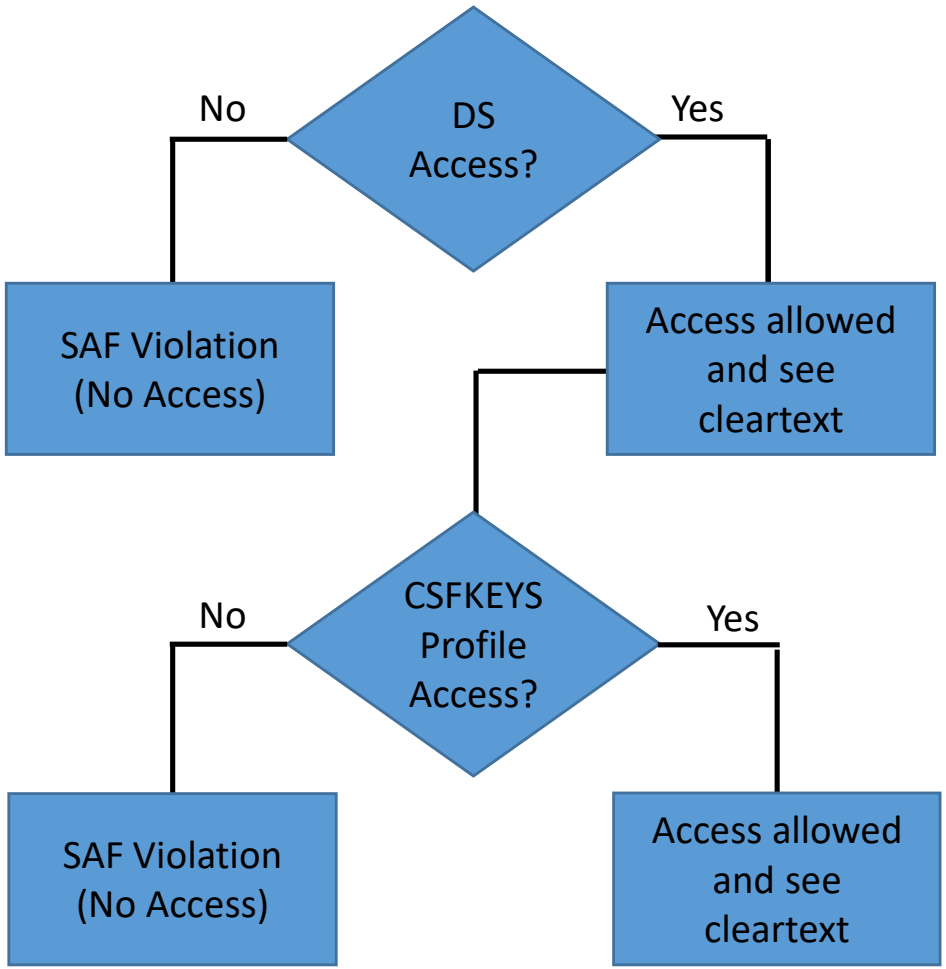


Shared Environments

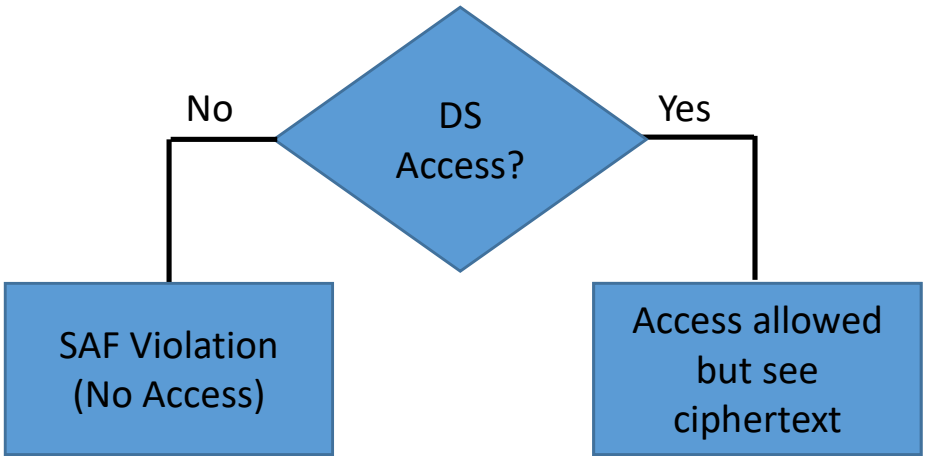


DSE and Access Methods

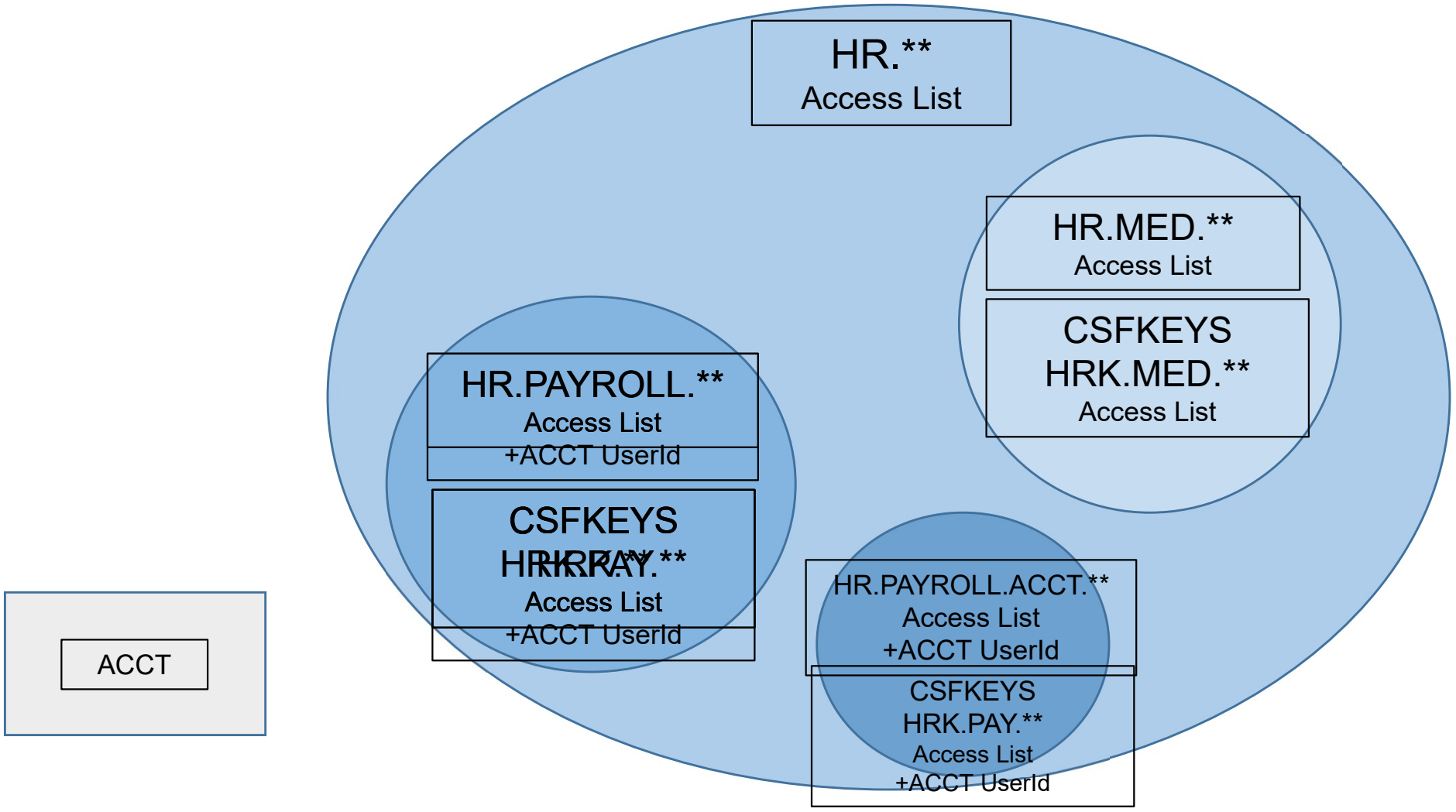
Standard Access Method
and
data set flagged for encryption



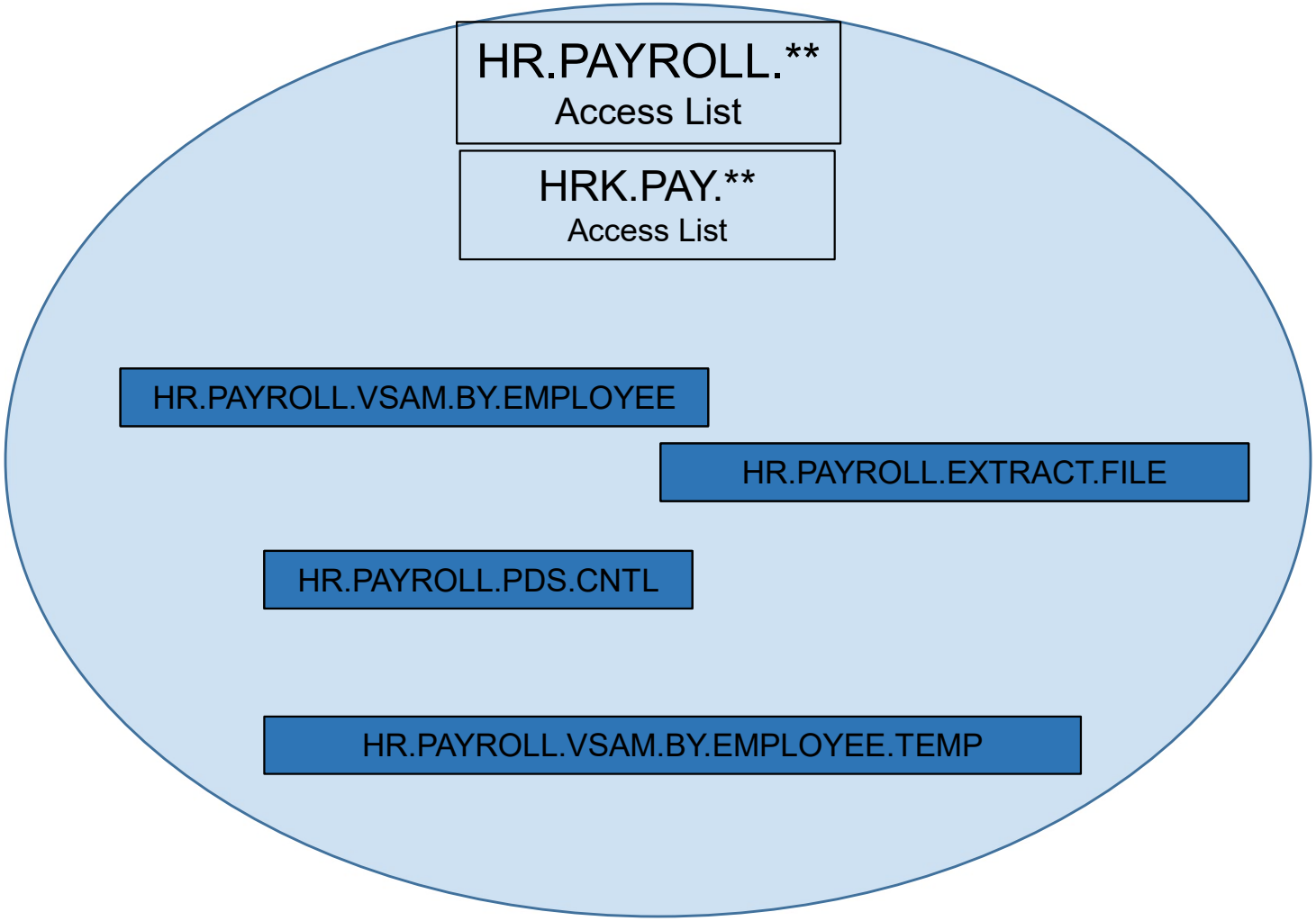
Non-Standard Access Method
and
data set flagged for encryption



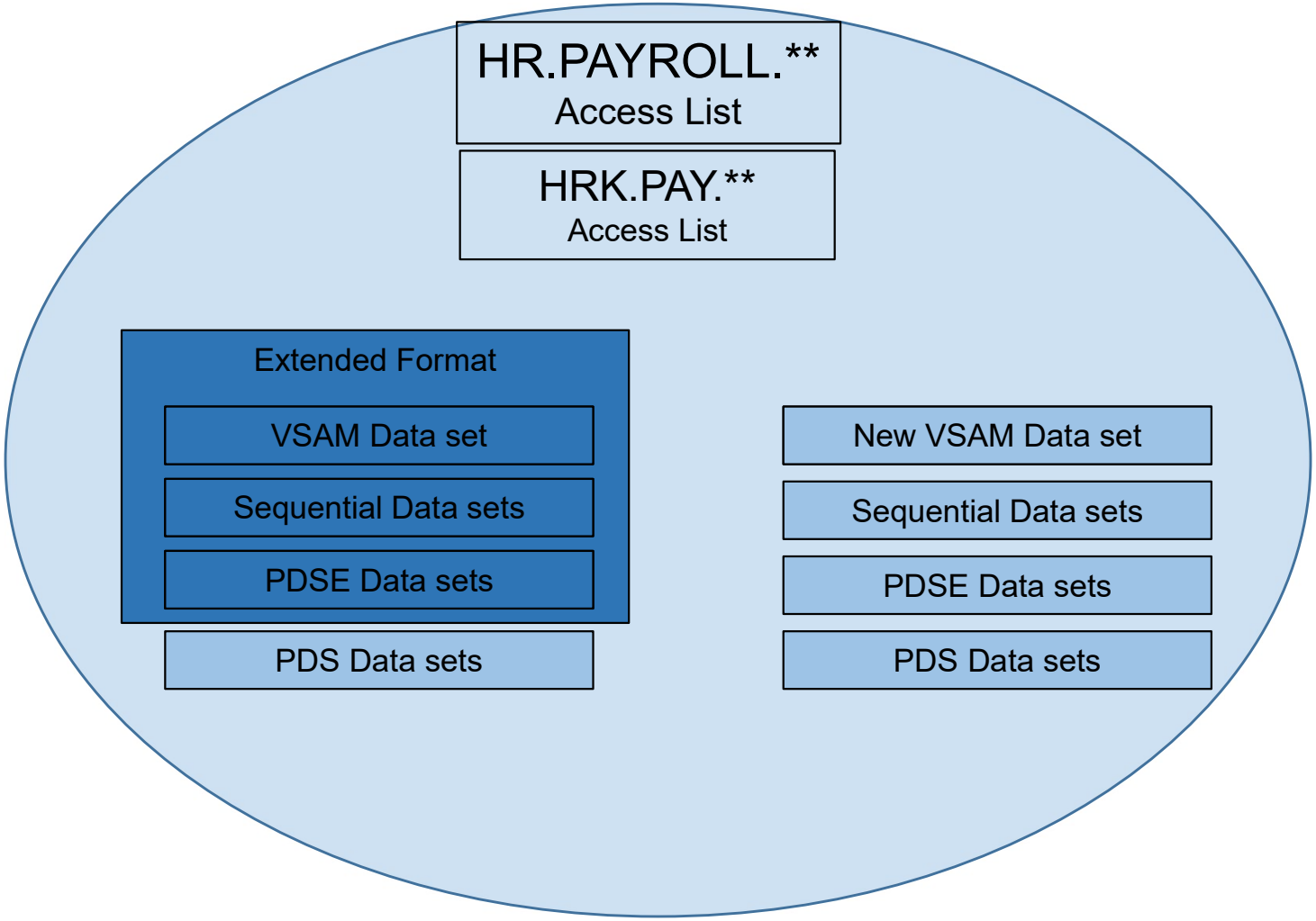
Key Label Access



PII vs non-PII Data Sets



Eligible Data Sets



READ ACCESS to FACILITY Profile

STGADMIN.SMS.FAIL.INVALID.DSNTYPE.ENC

Summary

- Secure your keys
- Key management is important; Use your key labels to
  - Know the purpose/owner
  - Know where the key is, in it's lifecycle
- Start small, with the number of keys

References

- NIST SP 800-57 Part 1 Rev 5 Recommendation for Key Management, Part 1: General
  - https://csrc.nist.gov/publications/detail/sp/800-57-part-1/rev-5/final
- ICSF Manuals
  - SC14-7507 ICSF System Programmer's Guide
  - SC14-7506 ICSF Administrator's Guide
  - SC14-7508 ICFS Application Programmer's Guide
- Redbook
  - SG24-8410 Getting Started with z/OS Data Set Encryption

Questions?