

UNIT1 – IMS OVERVIEW

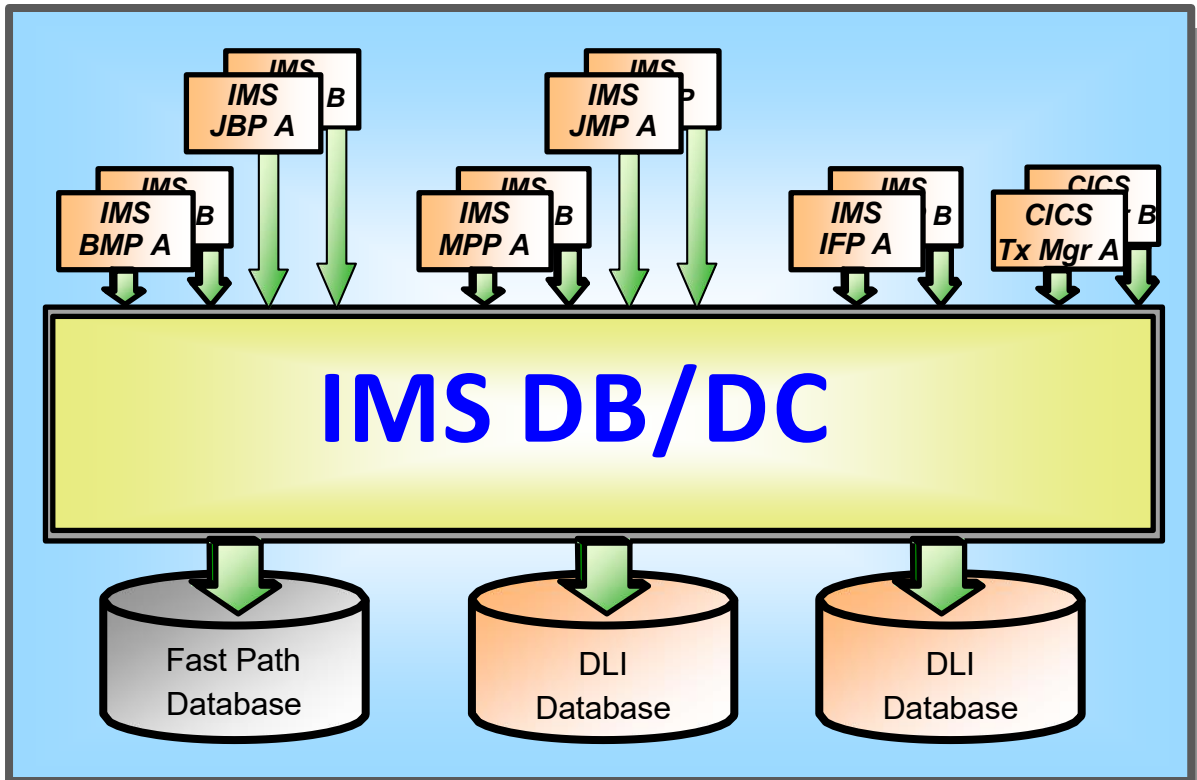
DATABASE (DB) and Transaction Management (DC or TM)

After completing this unit, you should be able to:

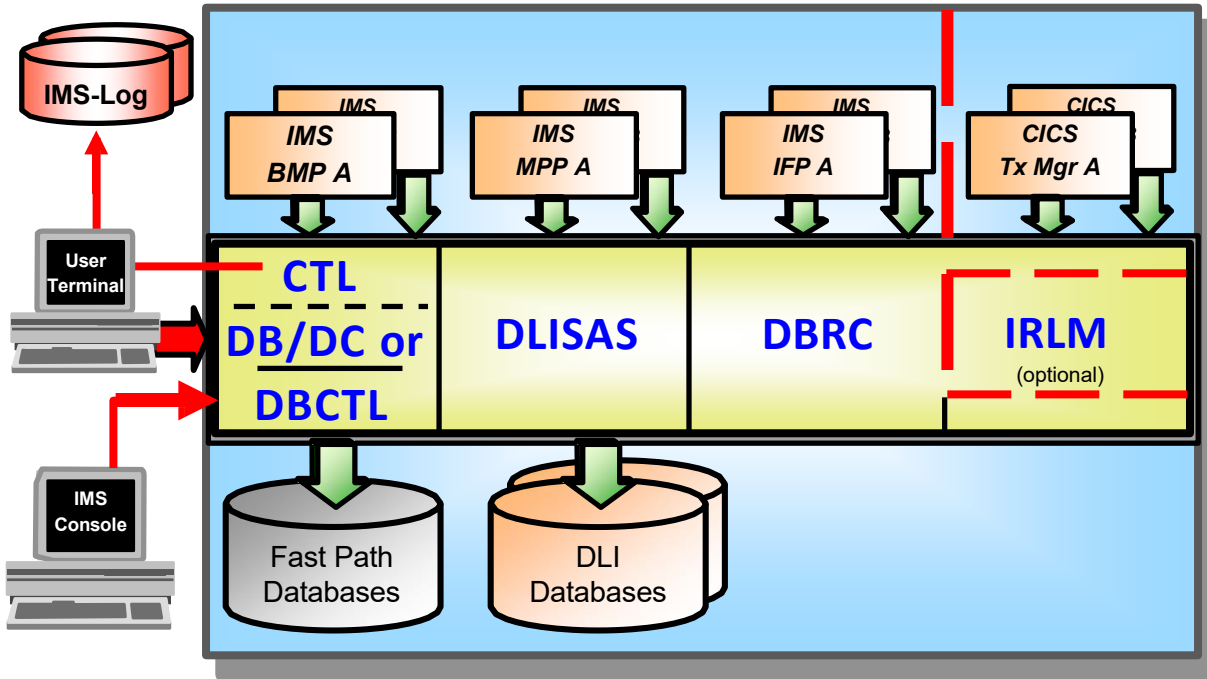
- Understand basic concepts of DL/1 (DL/I)
- Identify the IMS services that are provided by the Database Manager and Transaction Manager Features
- Describe the functions provided by the different **IMS** Address Spaces



IMS DB/DC overview



IMS System Components Overview

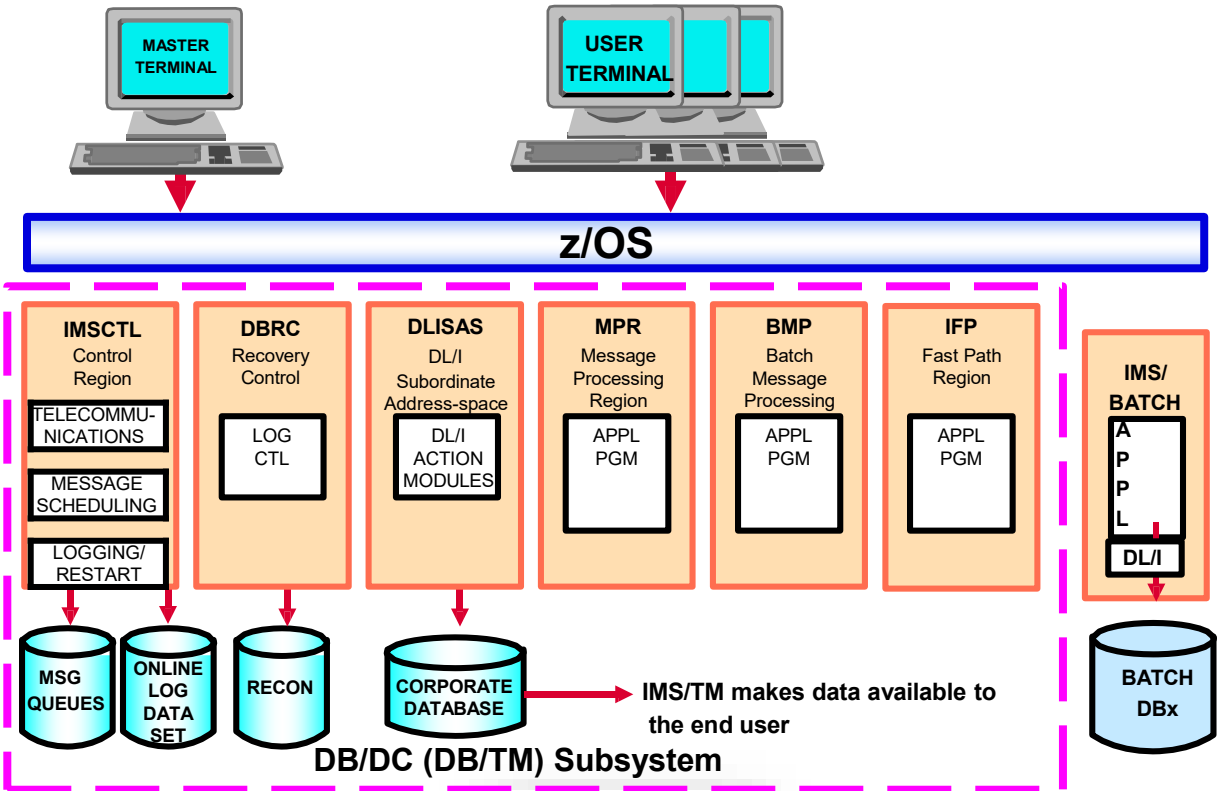


IMS System Integrity functions

- Common Logging Facility:
 - Database changes, transactions, system status changes
- Uses *Two-Phase Commit* protocol with DB2 and other Subsystems (MQ,CICS) to coordinate commit or abort across all resources modified in a unit of work (UOW)
- Automatic system checkpoints:
 - Based on system activity
 - System Recovery and Emergency Restart
- Database Recovery Control
 - Automated tracking of Logs and authorizing DBs used by IMS system
- Dynamic Backout
 - Automatic backout for program ABENDs:
 - Databases are returned to prior consistent state – as though transaction never occurred
 - Facilitates sharing of data by multiple programs - locks are released
- Normal Restart
 - Start with unprocessed input/output from previous execution



IMS DB/DC System



IMS DB/DC Dependent Regions (1 of 2)

- The RTE for your applications

- Maximum of 4095 *Dependent Regions (PSTs)*
 - Message Processing (MPRs) and Java Message Processing (JMPs) Regions :
 - Selective start-up at IMS initialization or some later time (Automation)
 - Processes *online* transactions from terminals
 - IMSCTL automatically *schedules* application programs for execution to process IMS/DB databases, or DB2 tables
 - Many different application programs can be processed in a given MPR throughout processing period
 - But only one at a time
 - Batch Message Processing (BMP) and Java Batch Processing (JBPs) Regions:
 - Started when JOB submitted by operations or scheduling software
 - Runs one application-program to process queued messages, IMS databases, DB2 tables, and/or MVS files while IMS DB/TM system is available
 - JBP Regions do not access IMS Queues

IMS DB/DC Dependent Regions (2 of 2)

- The RTE for your applications

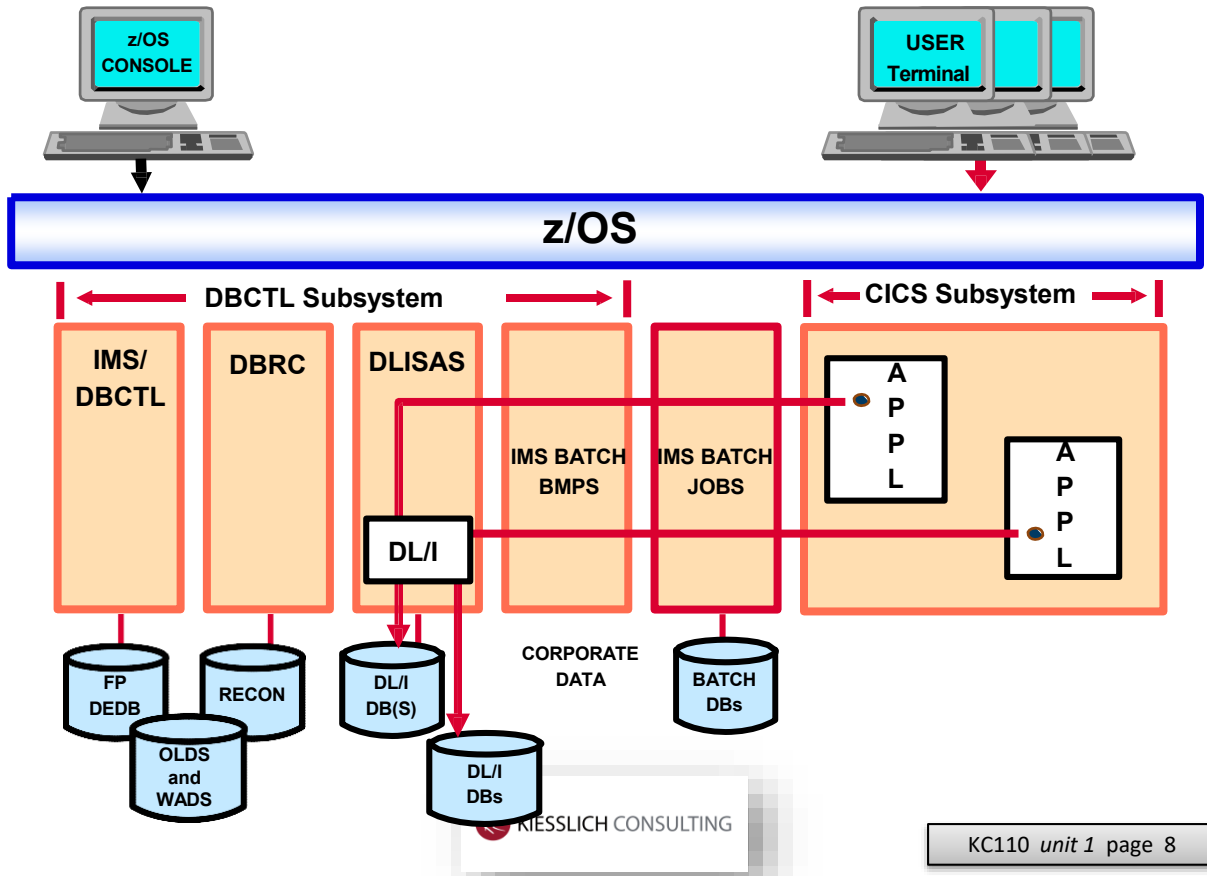
– Interactive Fast Path (IFP) regions:

- Processes *online* transactions from terminals:
 - Very similar in use to MPR Regions
 - For large transaction volumes that require fast response
- Can access IMS databases or DB2 Tables
 - Name is misleading since IFP Regions do NOT need to access Fast Path databases
- Bypass IMS/TM Scheduler and instead use Expedited Message Handler (EMH) scheduling
 - EMH Scheduling uses a very simple FIFO scheduling algorithm

– CICS Connections:

- CICS Systems are not *Dependent Regions* from the IMS Perspective
- However, IMS DB/DC Systems can serve in the role of an IMS DBCTL system and permit multiple connections to multiple CICS Regions:
 - Each of these connections between CICS and IMS counts against the 4095 (999) maximum dependent region count
 - DBCTL description on next foils

IMS Database Control Subsystem



IMS DBCTL "*Dependent Regions*" resp. *THREADS* (1 of 3)

- Maximum of 4095 connections to IMS DBCTL:
 - Each CICS that uses the services of an IMS Control region can have multiple connections,
 - Each of these connections is called a ***thread***
 - Multiple CICS regions might use the services of a single IMS Control region
 - Batch Message Processing (BMP) regions are also available to IMS DBCTL Systems (Similar to BMPs in IMS DB/DC System) :
 - Started when JOB submitted by operations
 - Runs one application-program to process IMS/DB databases, and/or MVS files



IMS DBCTL "*Dependent Regions*" resp. *THREADS* (2 of 3)

- Unlike with IMS/TM, these batch-type programs will not process input from IMS queues --- cannot in a DBCTL environment as **no msg queue** exists! (No TM part, so no Terminals, no WTOR, no ... **)
- this BMP region type is called “non-message driven” ... or “batch-oriented”
- Anyway, if running in a DC Environment (Message queues) this type can produce output going to a msg queue
- The connection limit (999 /4095) applies to the one IMS system for the total number of threads (all CICS connection and ODBA threads) and BMPs.



IMS DBCTL "*Dependent Regions*" resp. **THREADS (3 of 3)**

- ✓ IMS DB/DC (or IMS DBCTL) and CICS must run under the same MVS image (z/OS) because the interface uses Cross Memory Services !!
 - ✓ More than one CICS subsystems can be connected to one IMS, but a single CICS can be connected to only one IMS system at a time
- see Definition of DRA table – Database Resource Adapter

[DRA startup table - IBM Documentation](#)

(<https://www.ibm.com/docs/en/ims/15.5.0?topic=dra-startup-table>)

→ see CICS Setup Connect to IMS by CDBC

[Connection, disconnection, and inquiry transactions for the CICS DBCTL interface - IBM Documentation](#)

(<https://www.ibm.com/docs/en/cics-ts/6.x?topic=dbctl-connection-disconnection-inquiry-transactions-cics-interface>)

→ see CICS providing IMS Operation by CDBM

[CDBM operator transaction - IBM Documentation](#)

(<https://www.ibm.com/docs/en/cics-ts/6.x?topic=dbctl-cdbm-operator-transaction>)

IMS System Address Spaces (1 of 2)

- IMS Control Region is always required:
 - Can be configured as a DB/DC, DCCTL or DBCTL Region
 - Provides common Service functions such as logging and scheduling
 - Provides IMS data communication facilities for DB/DC or DCCTL
 - Provides the DBCTL functions required for CICS access to IMS DBs
 - Multiple CICS regions might use the services of single IMS Control region
- Data Base Recovery Control (DBRC) Address Space is always required:
 - Assists in providing IMS System integrity by tracking all IMS Systems logs
 - Also optionally provides for database recovery support for IMS Full Function and Fast Path databases
 - Stores system and database recovery information in Recovery Control (RECON) data sets

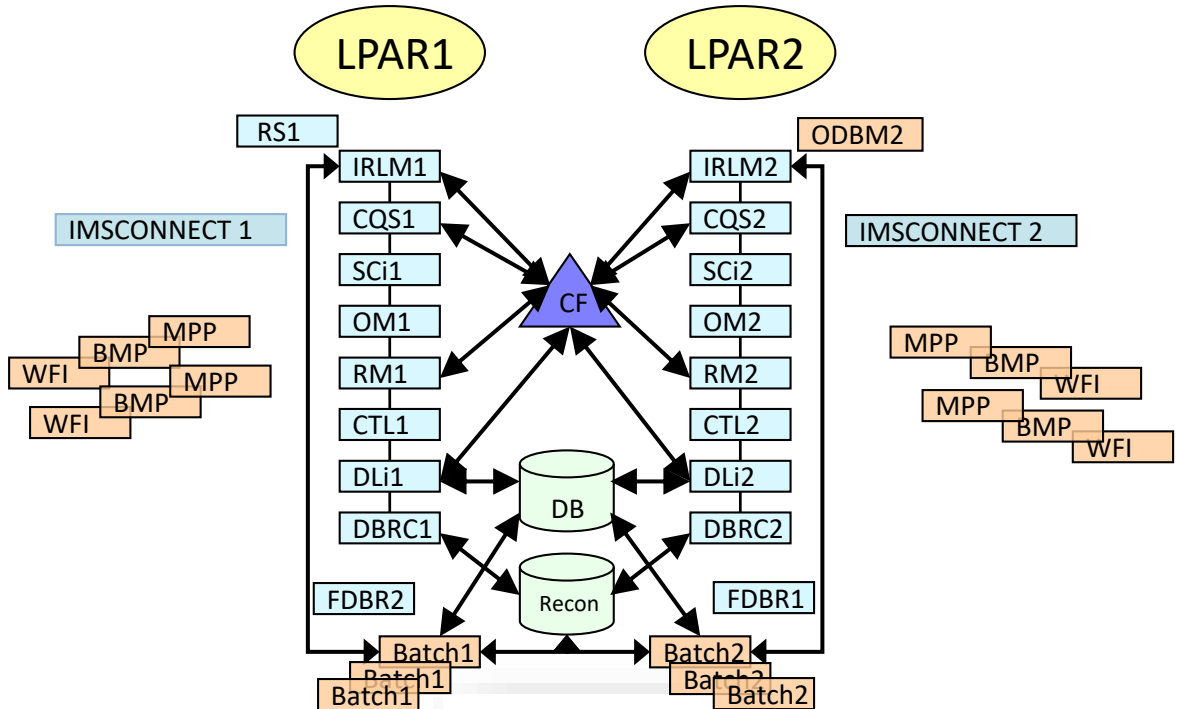


IMS System Address Spaces (2 of 2)

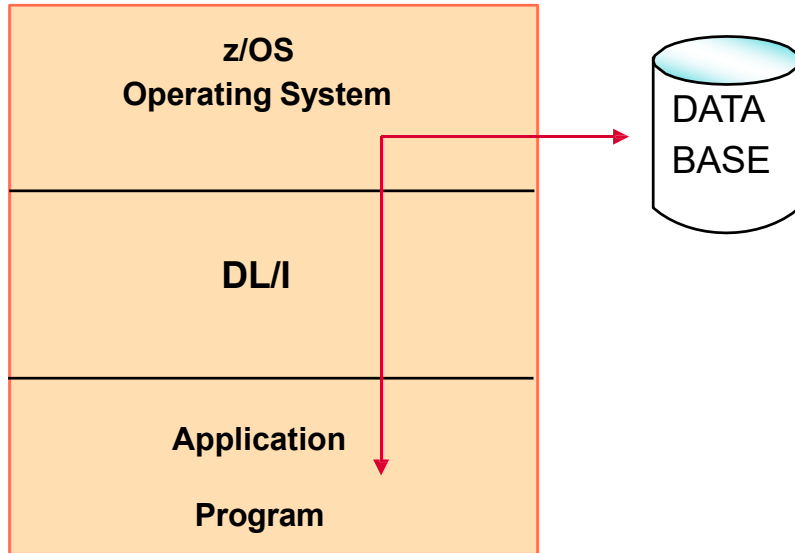
- DL/I Subordinate Address Space:
 - Also called *DLI SAS* or *Separate Address Space*
 - Contains DL/I code, control blocks and buffers for the databases as well as an ENQ/DEQ pool (locking related), if IRLM is not used
 - Usually present ... [but only definitive required if CICS is connected as CCTL]
 - Official terminology: Required if a *Coordinated Controller* (CCTL) is connected to the IMS System
 - A CCTL is usually just another way of saying *CICS*
- Inter Region Lock Manager (IRLM) is Optional (old : IMS RLM)
 - Can be used instead of PI
 - When using block level **data sharing**, IRLM is **mandatory**
- Additional / Optional Address Spaces:
 - Common Queue Server (CQS) ASID used for Shared Queues
 - Common Service Layer (CSL) was introduced in IMS V8 to aid in managing multiple IMS Systems working together as an **IMSPLEX**
 - CSL Address Spaces f.i. : Operations Manager (OM), Resource Manager (RM), maybe ODBM Servers , as well Structured Call Interface (SCI) Address Space, ...



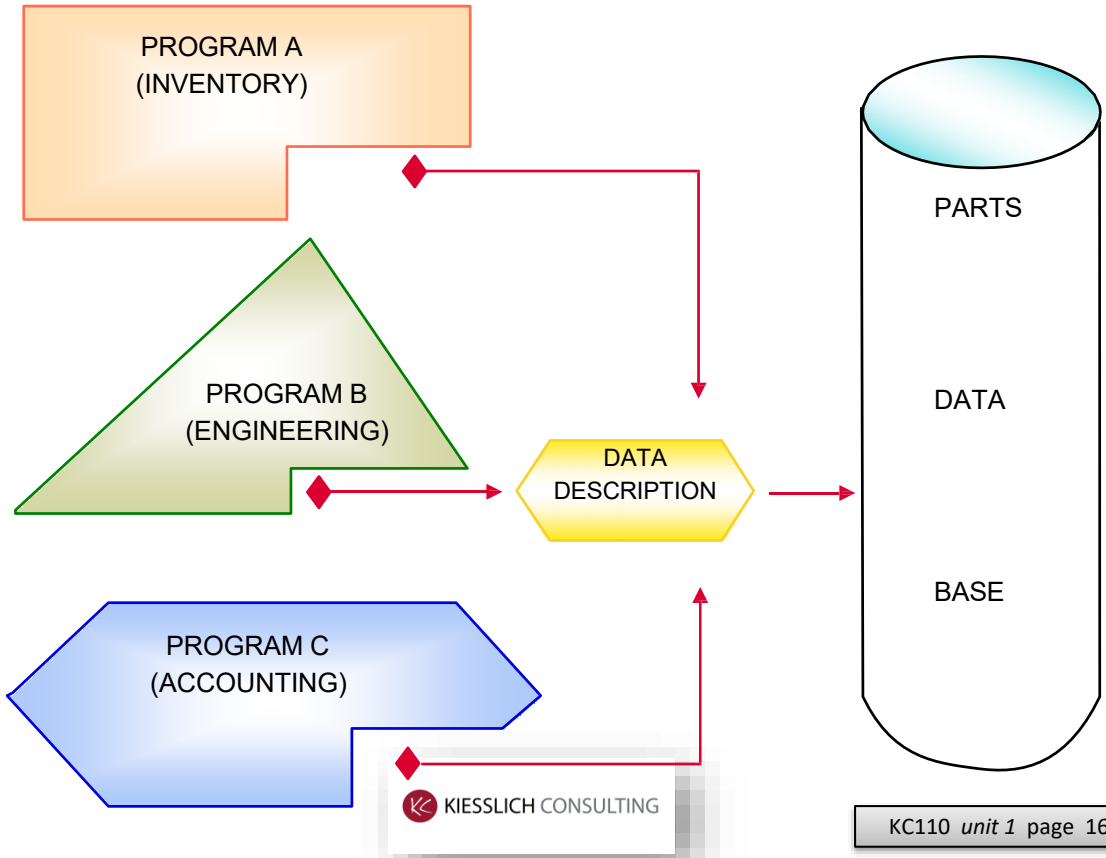
2 way IMSPLEX mit Shared Queues, Repository Server und ODBM



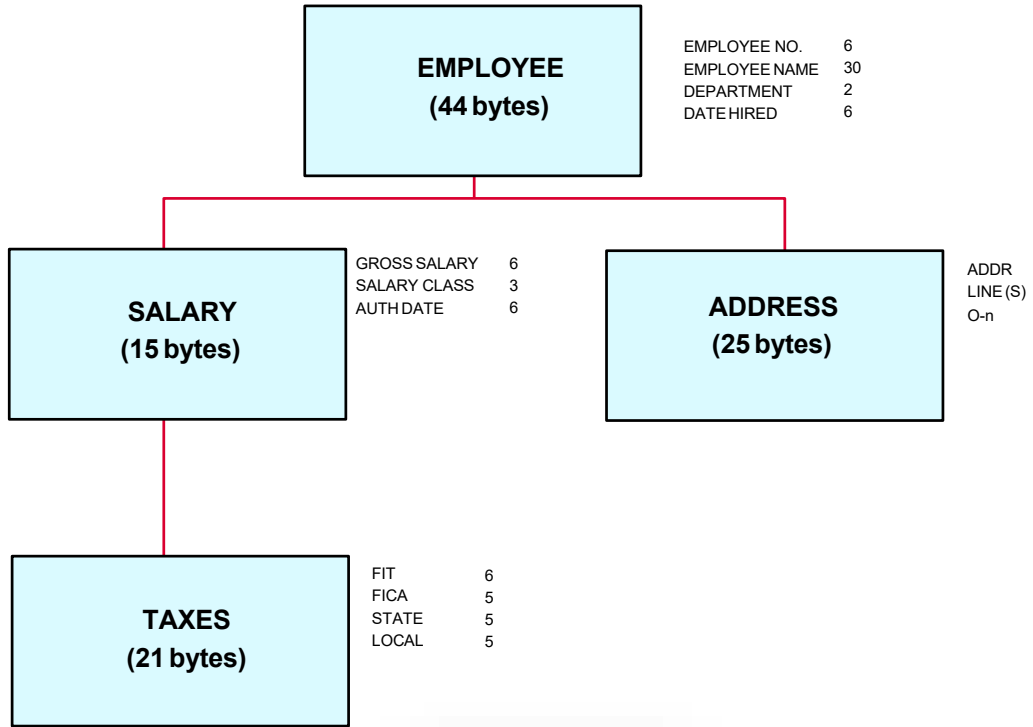
UNIT1_1 Basic Concepts



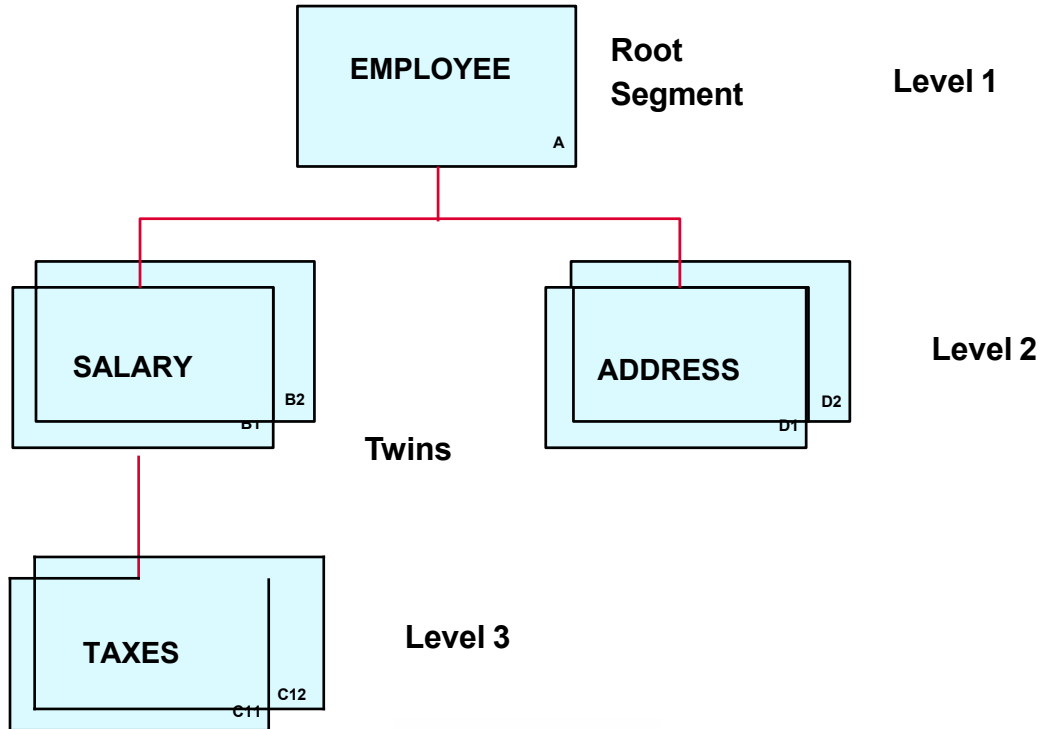
Database Approach



DL/I Hierarchy (1 of 2)

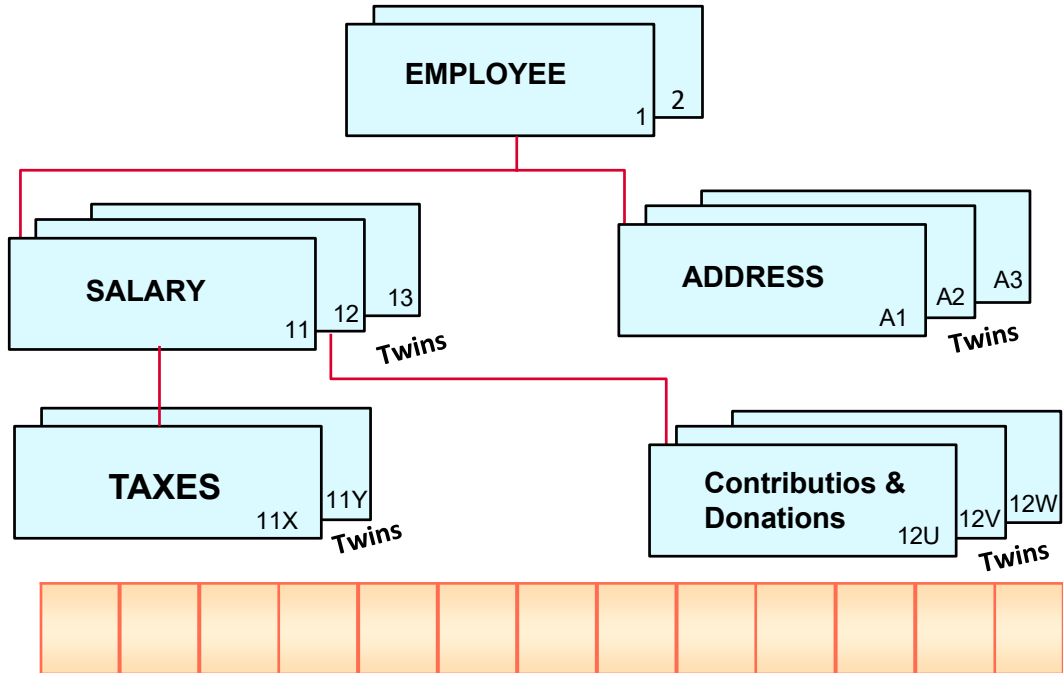


DL/I Hierarchy (2 of 2)

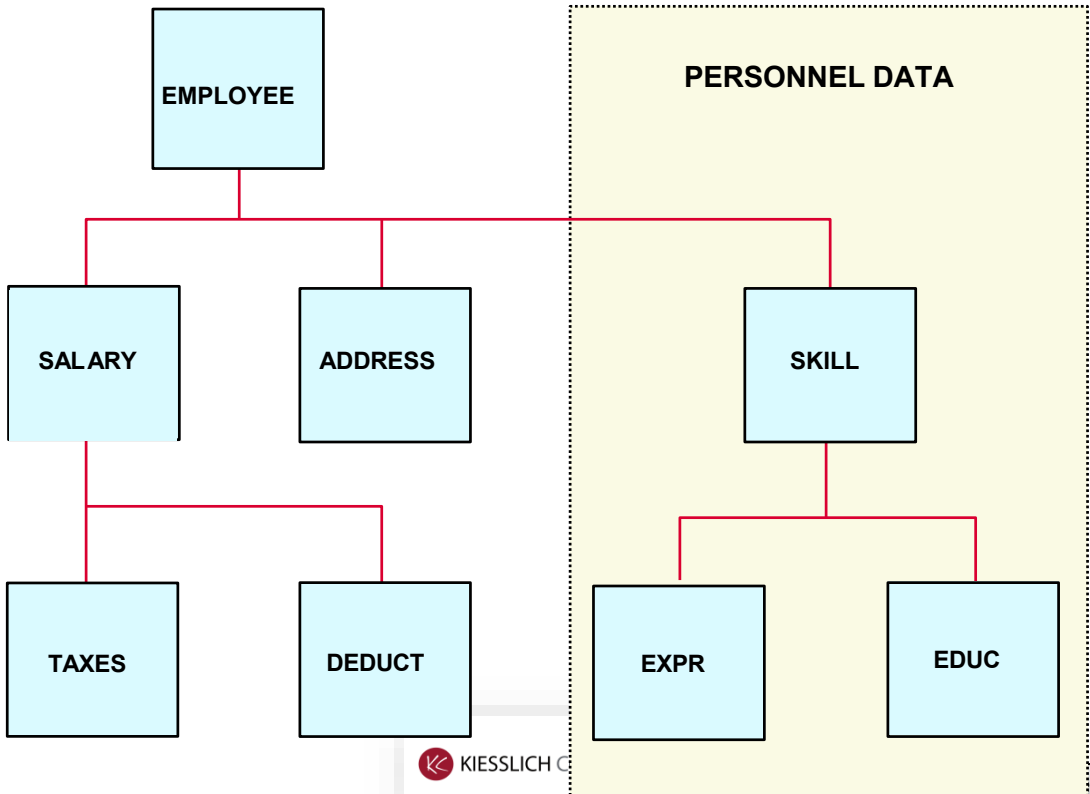


Hierarchical Sequence

traversal rules

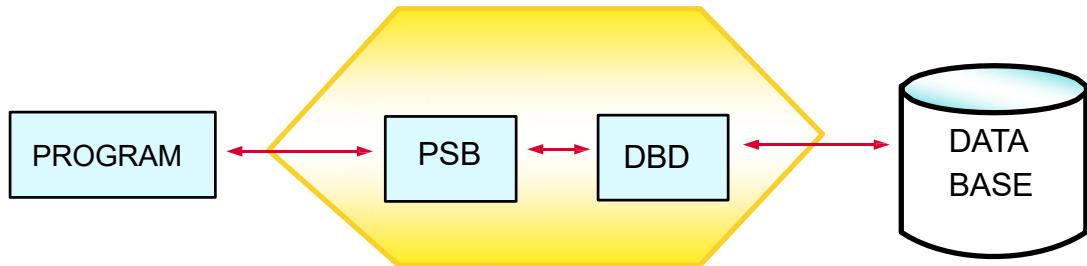


DL/I - DBD easy to Expand



“Data Independence” –

Separate the program from the physical characteristics of the databases



- Advantages:
 - Simplifies application program development
 - Provides security, integrity, and consistency of a database
 - Facilitates changes to database



Logical View / Physical View Layout



Find an employee
with a specified
skill (programmer?)

Execute complex
IMS, VSAM, z/OS, and
DASD low-level code

```
PCB      TYPE=DB , DBDNAME=EMPLOYEE , PROCOPT=A , KEYLEN=45
SENSEG   NAME=EMPLOYEE , PROCOPT=G
SENSEG   NAME=SALARY , PARENT=EMPLOYEE , PROCOPT=GR
SENSEG   NAME=TAXES , PARENT=SALARY
SENSEG   NAME=DEDUCT , PARENT=SALARY
PCB      TYPE=DB , DBDNAME=PROJECT , PROCOPT=G , KEYLEN=22
SENSEG   NAME=PROJECT
.
.
PSBGGEN  LANG=COBOL , PSBNAME=EMPLPROJ
END
```

