

IMS for New Users

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B03



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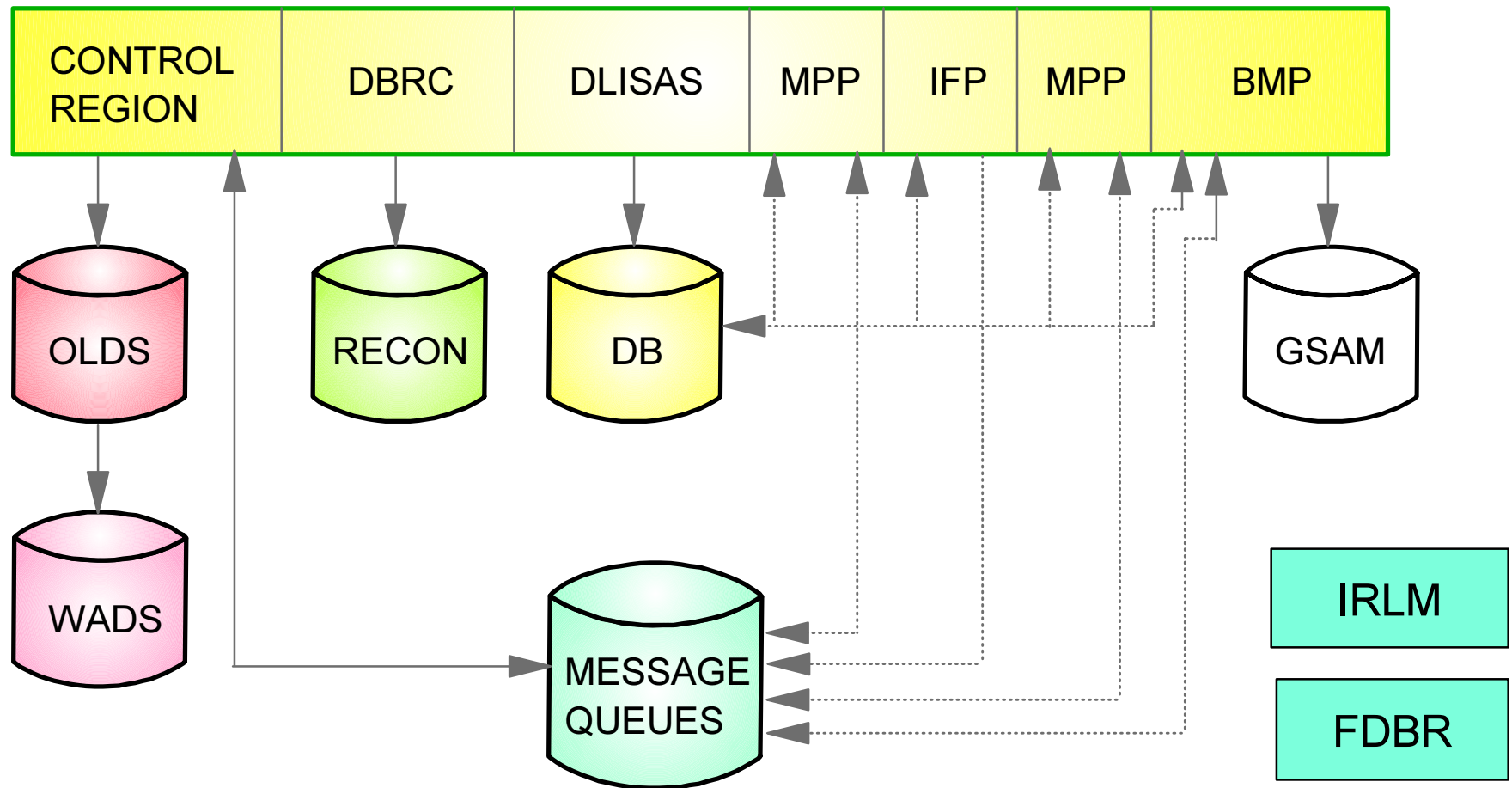
Topics

- ◆ **IMS Structure**
- ◆ **IMS Transaction Flow**
- ◆ **IMS/Application Communications**
- ◆ **Message Format Services**
- ◆ **IMS Scheduling**
- ◆ **IMS Online Logging**
- ◆ **Archiving Overview**
- ▲ **DBRC Overview**
- ▲ **IMS Restart**
- ▲ **Full Function Databases**
- ▲ **Fast Path Databases**
- ▲ **IMS Utilities**
- ▲ **Batch**
- ▲ **IMS Security**

IMS Structure

▲ MVS Subsystem

- ▶ Multiple Address Spaces



IMS Structure ...

▲ IMS Control Region

- ▶ Communicates with
 - Terminal Network - VTAM & BTAM
 - CICS systems (DBCTL)
 - External Subsystem Interface (DB2 or MQ)

- ▶ Manages
 - Messages Queues
 - Message Format Services
 - Logging
 - Scheduling
 - IMS Checkpoint Processing
 - Security Checking
 - Fast Path Databases
 - Output Processing

IMS Structure ...

▲ DBRC - Data Base Recovery Control

- ▶ Records
 - Logging & Archiving Activity
- ▶ Manages
 - Databases & Recovery
- ▶ Authorizes Database Access

▲ DLISAS

- ▶ Database Support
 - Database Management
VSAM & OSAM
 - Pool Management
DMB & PSB
 - Directory Management
PDIR & DDIR

IMS Structure ...

▲ MPP - Message Processing Program

- ▶ Online Processing
 - DL/I Interface
 - Input from Message Queue
 - DL/I Database
 - Output to Terminals or Programs
 - IMS Controlled Program Execution

▲ IFP - Fast Path Program

- ▶ Online Processing
 - DL/I Interface
 - Input from Expedited Message Handler
 - DL/I Database
 - Output to Terminals or Programs
 - IMS Controlled Program Execution

IMS Structure ...

▲ **BMP - Batch Message Processing**

▶ Batch Processing

- Job Management Controlled Execution
- GSAM Database Access
- Extended Checkpoint/Restart
- DL/I Interface

DL/I Database

Input from Message Queue

Output to Terminals or Programs

IMS Structure ...

▲ Queued Application Interface

- ▶ Simplified API (GU, GN, ISRT)
- ▶ Application Ignores
 - Network Issues, Terminal Type, Recovery

▲ Multiple Address Space Design

- ▶ Cross-Memory
 - DL/I Database Access
 - DBRC
- ▶ CSA and ECSA
 - Common Blocks & Pools

▲ IMS Design Advantages

- ▶ Application Integrity & Isolation
- ▶ Data Security
 - Separate Program & Data Buffers
Other Program's Area Not Accessible
- ▶ Parallelism in n-Way Environments

IMS Transaction Flow

▲ Message Input (VTAM)

- ▶ MFS Formatting
- ▶ Message Logged
- ▶ Placed on Message Queue

▲ Transaction Scheduled

- ▶ PSB Located
- ▶ DMBs Located
- ▶ Program Located
- ▶ Scheduling Logged

IMS Transaction Flow ...

▲ Application Program Processing

- ▶ Initialization

- ▶ Obtain Message (GU)

- ▶ Database Call(s)
 - Changes Logged

- ▶ Message Request(s)
 - Output Messages(s) Logged

- ▶ Obtain Next Message (Optional)
 - Database Write(s)
 - Queue Output to Destination
 - Sync-Point Logged

IMS Transaction Flow ...

▲ Normal Transaction Termination

- ▶ Sync-Point
 - Database Write(s)
 - Queue Output to Destination
 - Termination Logged

▲ IMS Output Message Process

- ▶ Take Message from Message Queue
 - MFS Formatting
 - Send Message to Terminal
 - Send Completion Logged

IMS Transaction Flow ...

▲ Abnormal Termination

- ▶ Database Changes Backed Out
- ▶ Output Message(s) Cancelled
- ▶ Original Transaction
 - Message Deleted or Retained
 - Depends on ABEND Type
 - DFS555I Sent to Terminal

IMS/Application Communication

▲ MPP (Message Processing Program)

- ▶ Interactive Mode

- ▶ Input Message (Transaction)
 - Schedule Region
Program Loaded
Message Processed
Databases Accessed
Transaction Termination

- ▶ Next Message
 - Different Program Potential
 - Repeat Process

- ▶ No Messages
 - No Transactions
 - Region remains idle until scheduled again

Access to All Database Types

IMS/Application Communication

▲ Fast Path Processing

▲ IFP (Fast Path Region)

- ▶ Wait for Input
- ▶ Started by Operator
 - PSB / Program JCL Defined
- ▶ Parallel Scheduling Allowed
- ▶ Processes Fast Path Transactions

▲ Fast Path Transactions

- ▶ Entered from FP-eligible Terminal
 - Dedicated Buffer (EMHB)
- ▶ Single Segment Input / Output
- ▶ Response Mode
- ▶ Non-conversational

IMS/Application Communication ...

▲ BMP (Batch Message Processing)

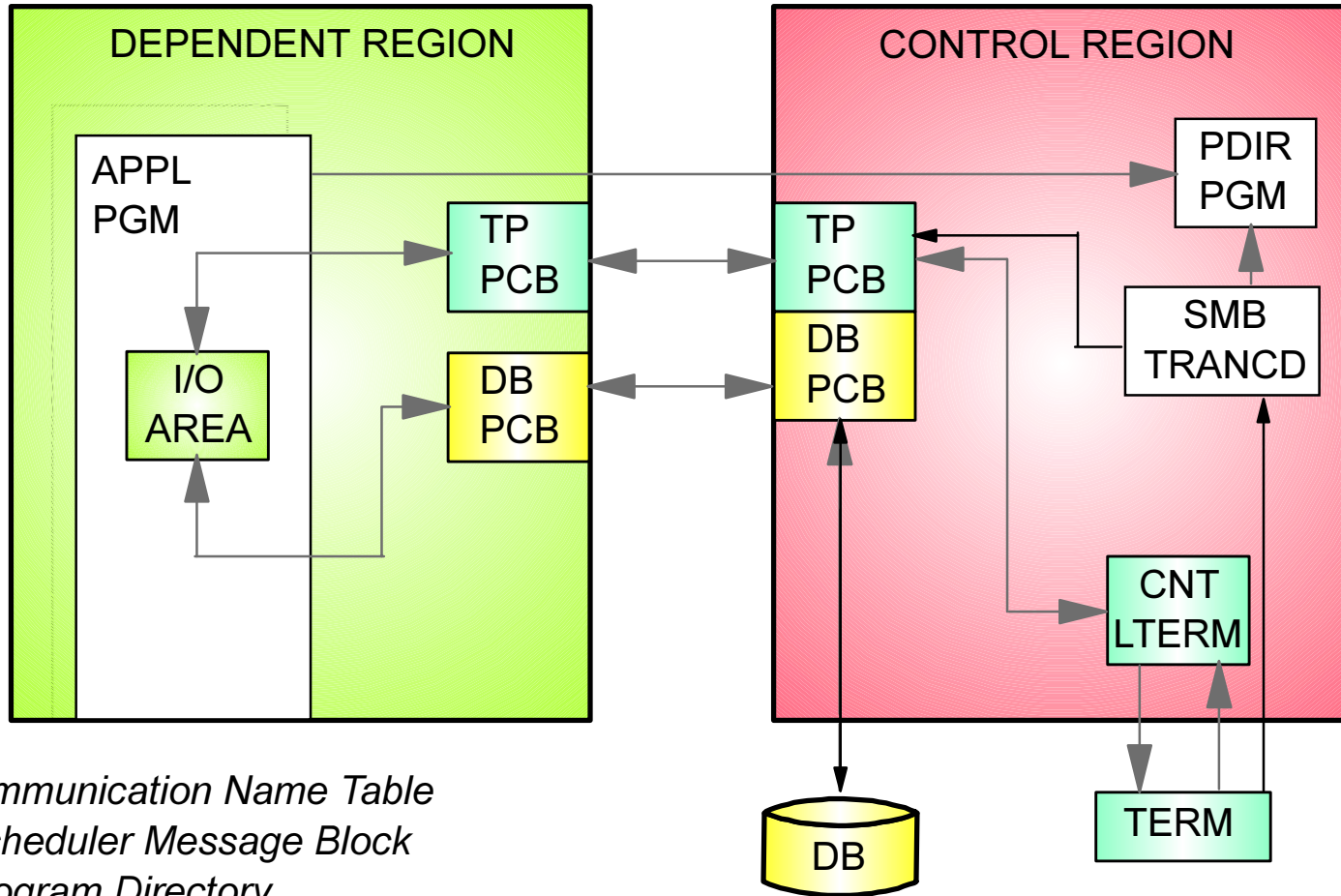
- ▶ MVS / JES Scheduled

- ▶ Initialization
 - Control Region Connection
 - Access Message Queue *
 - Access Databases *
 - Access MVS Files *

- ▶ Termination
 - Region by MVS / JES

*NOTE: * Optional*

IMS/Application Communication ...



*CNT - Communication Name Table
 SMB - Scheduler Message Block
 PDIR - Program Directory
 PSB - Program Specification Block
 PCB - Program Communication Block*

*DB PCB - Database Access
 TP PCB - Message Access
 I/O PCB - Receive Messages
 - Send Message to Originator
 ALT PCB - Send Message to Destination*



IMS/Application Communication ...

▲ Application Program Interface

- ▶ Calls to IMS
 - Receive Message (GU, GN)
 - Send Message (ISRT, CHNG)

▲ Control Region

- ▶ Interface to Terminals
 - VTAM and / or BTAM
- ▶ Scheduling
 - SMB - Transaction Identification
 - PDIR - Identify Online Program
- ▶ PSB
 - Data Access Control
 - TP - Message Destination
 - DB - Database View & Access

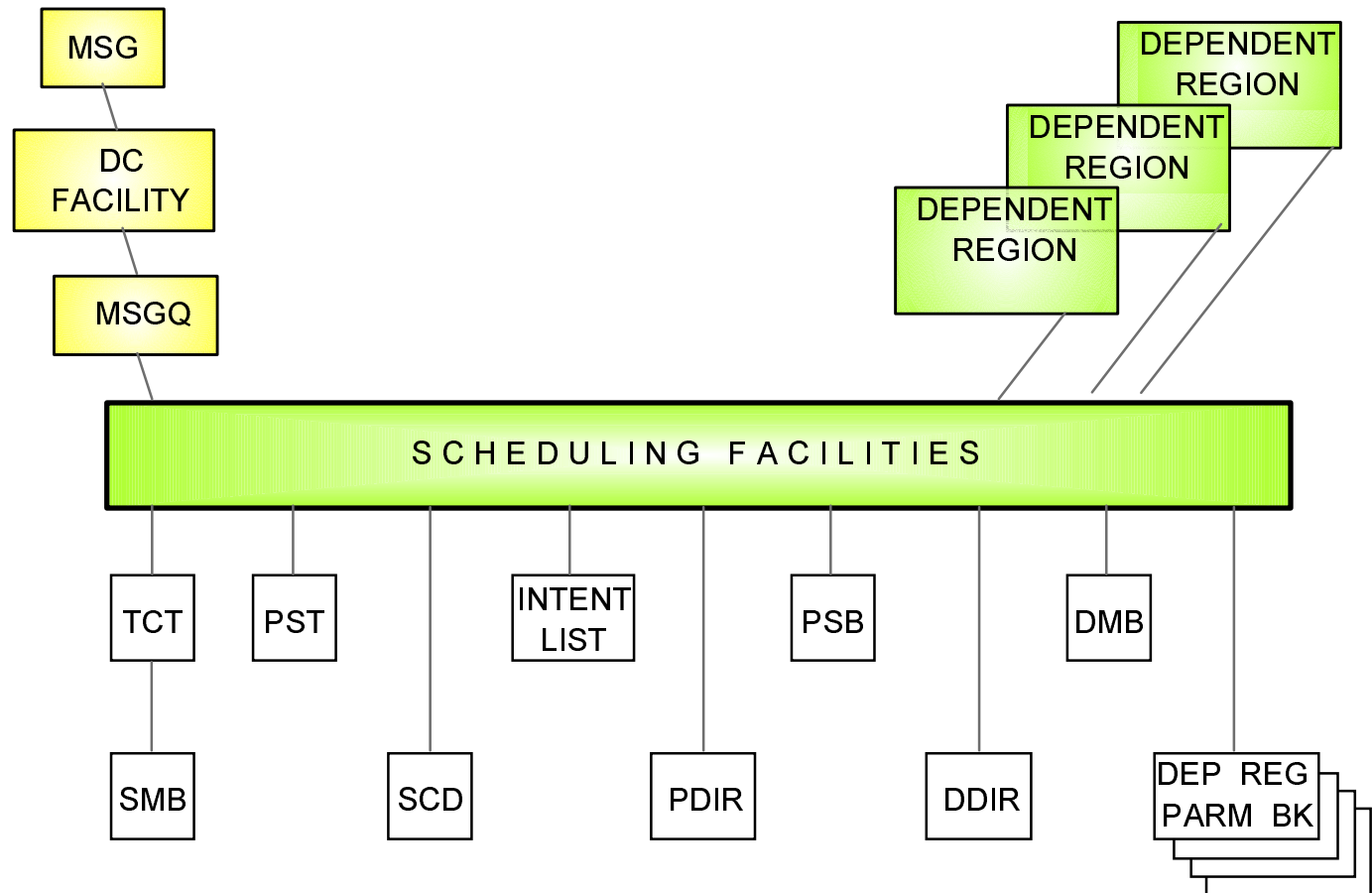
Message Format Services

▲ Message Editor

- ▶ Input & Output Messages
- ▶ Device Independent Application
 - Logical Messages
 - Rearrange Screen Format
 - New Printer Forms Design
- ▶ Physical & Logical Paging

IMS Scheduling

Environment



TCT - Transaction Class Table

SMB- Scheduler Message Block

PST - Program Status Table

DMB - Database Management Block

DDIR - Database Directory

PDIR - Program Directory

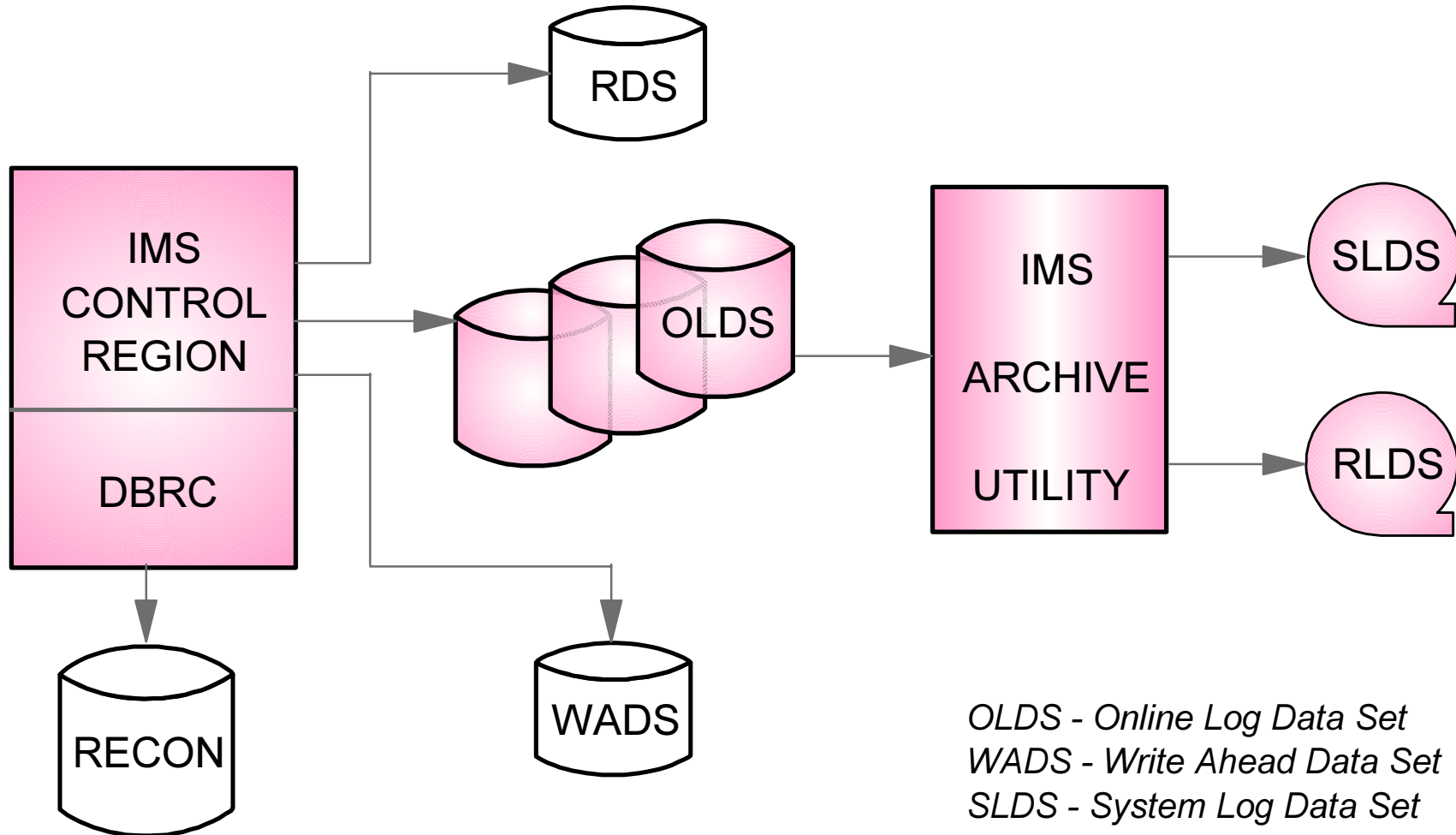
SCD - System Contents Directory

IMS Scheduling ...

▲ Scheduling Phases

- ▶ Select Candidate Transaction
 - By Class
 - By Priority within Class
- ▶ Verify Resource Availability
 - Allocate & Reserve
- ▶ Load Program
 - Dependent Region

IMS Online Logging



*OLDS - Online Log Data Set
WADS - Write Ahead Data Set
SLDS - System Log Data Set
RLDS - Recovery Log Data Set
RECON - Recovery Log Data Set
RDS - Restart Data Set*

IMS Online Logging ...

▲ Online Log Data Set

- ▶ Record of all System Activity
 - System Checkpoints
 - Schedule / Terminate PSB
 - Database Changes
 - Terminal Messages
 - Sync-Point
 - Trace / Diagnostics
 - Accounting

IMS Online Logging ...

▲ Write Ahead Data Set

- ▶ Used to Satisfy Log Write Ahead
- ▶ May be Used to Close the OLDS

▲ System Log Data Set

- ▶ Copy of All OLDS Records
 - Useable for Restart

▲ Recovery Log Data Set

- ▶ Copy of All Database Records
 - Required for Database Recovery

Archiving Overview

▲ Batch Utility - DFSUARC0

- ▶ Single Pass of OLDS
 - Creates SLDS(s)
 - Optionally Creates RLDS(s)
- ▶ Input of All Unarchived OLDS
- ▶ Invoked
 - Automatically (ARC=n)
 - GENJCL.ARCHIVE

DBRC Overview

▲ Logging & Archiving

- ▶ Records Information
 - OLDS, SLDS, RLDS

▲ Controls Database Access

- ▶ Registered Databases
- ▶ GENJCL Support
 - Verifies Input
- ▶ Recovery Control
 - Record Utility Information
- ▶ Share Control
 - Record Utility Information
 - Checks Flags & Counters
 - Database Authorization

IMS Restart

▲ Automated Process

- ▶ Type Determined During Restart
- ▶ Can be Overridden

▲ COLD

- ▶ Initial Installation
- ▶ Change in IMS Configuration

▲ WARM

- ▶ Normal Restart
- ▶ Successful Termination
/CHE FREEZE, PURGE, or DUMPQ

▲ EMERGENCY

- ▶ After IMS system failure
 - IMS ABEND
 - MVS or hardware failure

Full Function Databases

▲ Hierarchic Structure

▲ Sequential Organization

- HSAM - Hierarchic Sequential

▲ Indexed Organization

- ▶ Sequenced by Key
 - HISAM - Hierarchic Index Sequential
 - HIDAM - Hierarchic Index Direct

▲ Direct Organization

- ▶ Random Sequence
- ▶ No Primary Index
 - HDAM - Hierarchic Direct

▲ Secondary Index

- ▶ Alternate Key Sequence

Full Function Databases ...

▲ Database Access

▲ Physical Access Method

▶ Databases

- VSAM - HISAM HIDAM HDAM GSAM
- OSAM - HIDAM HDAM
- BSAM - HSAM GSAM
- QSAM - HSAM

▶ Secondary Indexes

- VSAM

Fast Path Databases

▲ Hierarchic Structure

- ▶ DEDB - Data Entry Data Base
 - Similar to HDAM
 - VSAM ESDS
 - Partitioned
 - Multiple Copies

- ▶ MSDB - Main Storage Data Base
 - Root Segment Only Database
 - Resides in Main Storage
 - Insert and Delete Restrictions

▲ Access

- ▶ MPP
- ▶ BMP
- ▶ Fast Path Application

Utilities

▲ Full Function Databases

▶ Reorganization

- HISAM Unload / Reload
- HD Unload / Reload
- Pre-Reorganization
- Scan
- Prefix Resolution
- Prefix Update

▶ Image Copy

- Batch
- Online

Utilities ...

▲ Full Function Databases ...

- ▶ Change Accumulation
- ▶ Recovery
- ▶ Batch Backout

▲ Fast Path Databases

- ▶ Concurrent Image Copy
- ▶ DEDB Initialization
- ▶ DEDB Direct Reorganization
- ▶ DEDB Scan & Delete
- ▶ DEDB Create / Compare
- ▶ Change Accumulation
- ▶ Recovery
- ▶ MSDB Maintenance

Batch

▲ Stand Alone MVS Job

- ▶ No Message Access
- ▶ Control Region Not Needed
- ▶ Checkpoint / Restart Support
- ▶ GSAM Support
- ▶ DASD Logging Optional
- ▶ DBRC Optional
- ▶ NO DEDB / MSDB Access

▲ Private Database Access

- ▶ No Locking
- ▶ Access by This Job Only
- ▶ Logging Optional

Batch ...

▲ Shared Database Access

- ▶ IRLM Required
 - Locking
- ▶ DBRC Required
 - Database Access Control
- ▶ Logging Required
 - If Update Intent

▲ DB2 Support

- ▶ DB2 Batch Attach
- ▶ Checkpoint / Restart
 - Logging Required
- ▶ GSAM

IMS Security

▲ Standard IMS Security (SMU)

- ▶ LTERM
- ▶ Transaction
- ▶ Command

▲ Enhanced Security

- ▶ RACF
 - Sign-on
 - Verifies User Access
 - Userid Logged With Changes
 - Transaction
 - Verifies User Access
 - Dependent Region Connection
 - Verifies Region Access to IMS

Summary

▲ Multi-Region Structure

- ▶ Dependent Region Type

▲ Transaction Flow

▲ Features and Functions

▲ Logging

▲ Utilities

Further Information

IMS Manuals

- ▶ For detailed information about how IMS works
 - Administration Guide - System
 - Administration Guide - Database Manager
 - Administration Guide - Transaction Manager
- ▶ Installation and System Definition
 - Installation Volume 1 - Installation information
 - Installation Volume 2 - System Definition information
- ▶ Messages
 - Messages and Codes
 - DFS and DSP messages or abend codes
 - Common Queue Server and Base Primitive Environment
 - CQS and BPE messages or abend codes

Redbooks

- ▶ IMS Primer
 - A very useful introduction to IMS

Other sessions at this conference

- ▶ Session B02 - IMS DB Basics
- ▶ Session B10 - A Basic Introduction to Resource Definition in IMS