



# IMS for New Users

E01

*Rod Murchison*



# Topics

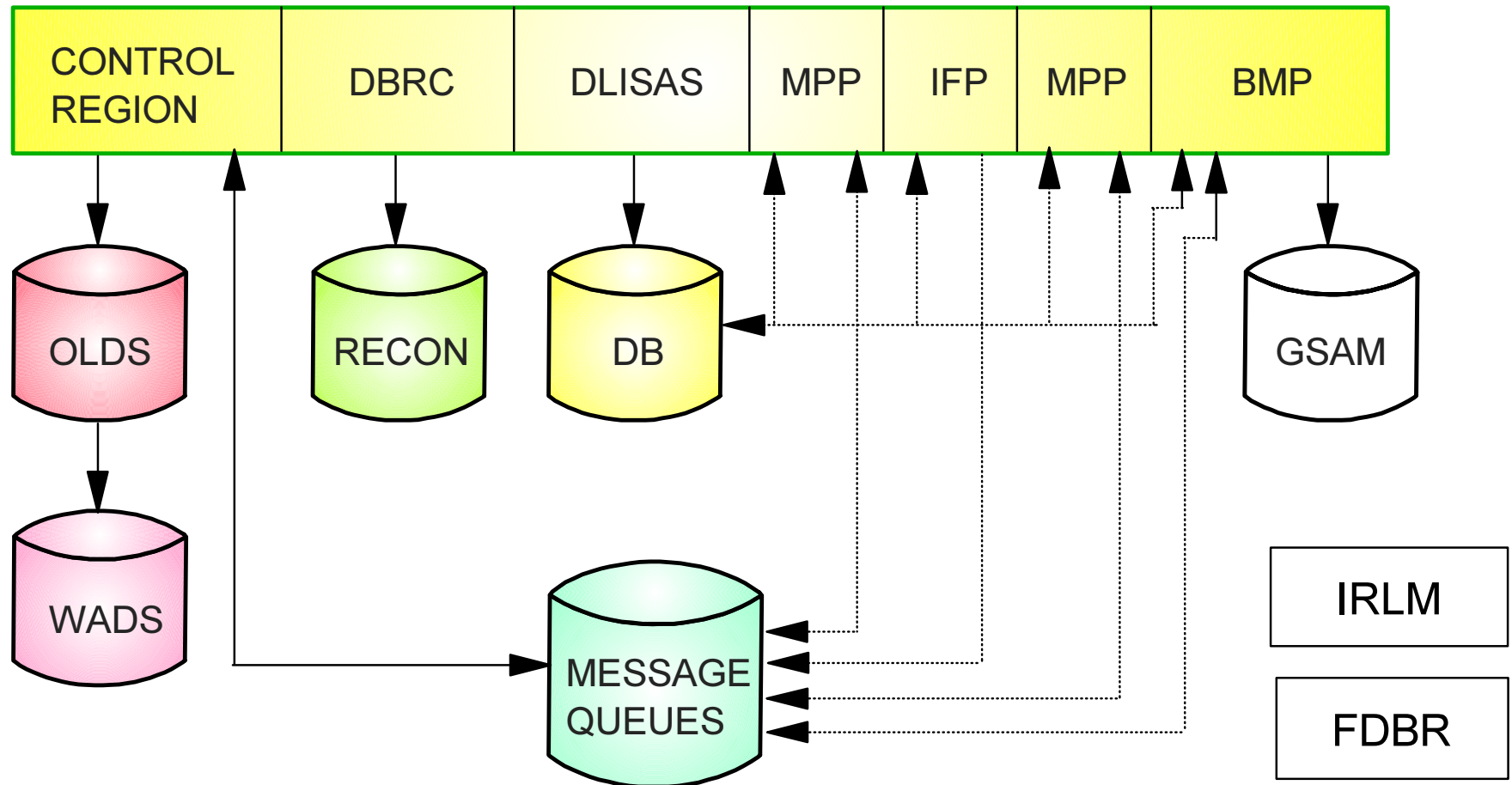
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- ◆ **IMS Structure**
- ◆ **IMS Transaction Flow**
- ◆ **IMS/Application Communications**
- ◆ **Message Format Services**
- ◆ **IMS Scheduling**
- ◆ **IMS Online Logging**
- ◆ **Archiving Overview**
- ▲ **DBRC Overview**
- ▲ **IMS Restart**
- ▲ **Full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

# IMS Structure

## ▲ MVS Subsystem

### ► Multiple Address Spaces



# IMS Structure ...

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## ▲ IMS Control Region

- ▶ Communicates with
  - Terminal Network - VTAM & BTAM
  
- ▶ Manages
  - Messages Queues
  - Message Format Services
  - Logging
  - Scheduling
  - IMS Checkpoint Processing
  - Security Checking
  - Fast Path Databases
  - Output Processing

# IMS Structure ...

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## ▲ 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 ...

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## ▲ 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 ...

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## ▲ **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 ...

## ▲ 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

## ▲ Queued Application Interface

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



# IMS Transaction Flow

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## ▲ Message Input (VTAM)

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

## ▲ Transaction Scheduled

- ▶ PSB Located
- ▶ DMBs Located
- ▶ Program Located
- ▶ Scheduled Logged

# IMS Transaction Flow ...

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## ▲ Application Program Processing

- ▶ Initialization
- ▶ Obtain Message (GU)
- ▶ Database Call(s)
  - Changes Logged
- ▶ Message Request(s)
  - Output Message(s) Logged
- ▶ Obtain Next Message (Optional)
  - Database Write(s)
  - Queue Output to Destination
  - Sync-Point Logged

# IMS Transaction Flow ...

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## ▲ 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 ...

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## ▲ 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

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## ▲ 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 but Idle

# IMS/Application Communication

## ▲ Fast Path Processing

## ▲ Access to All Database Types

### ▲ 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 ...

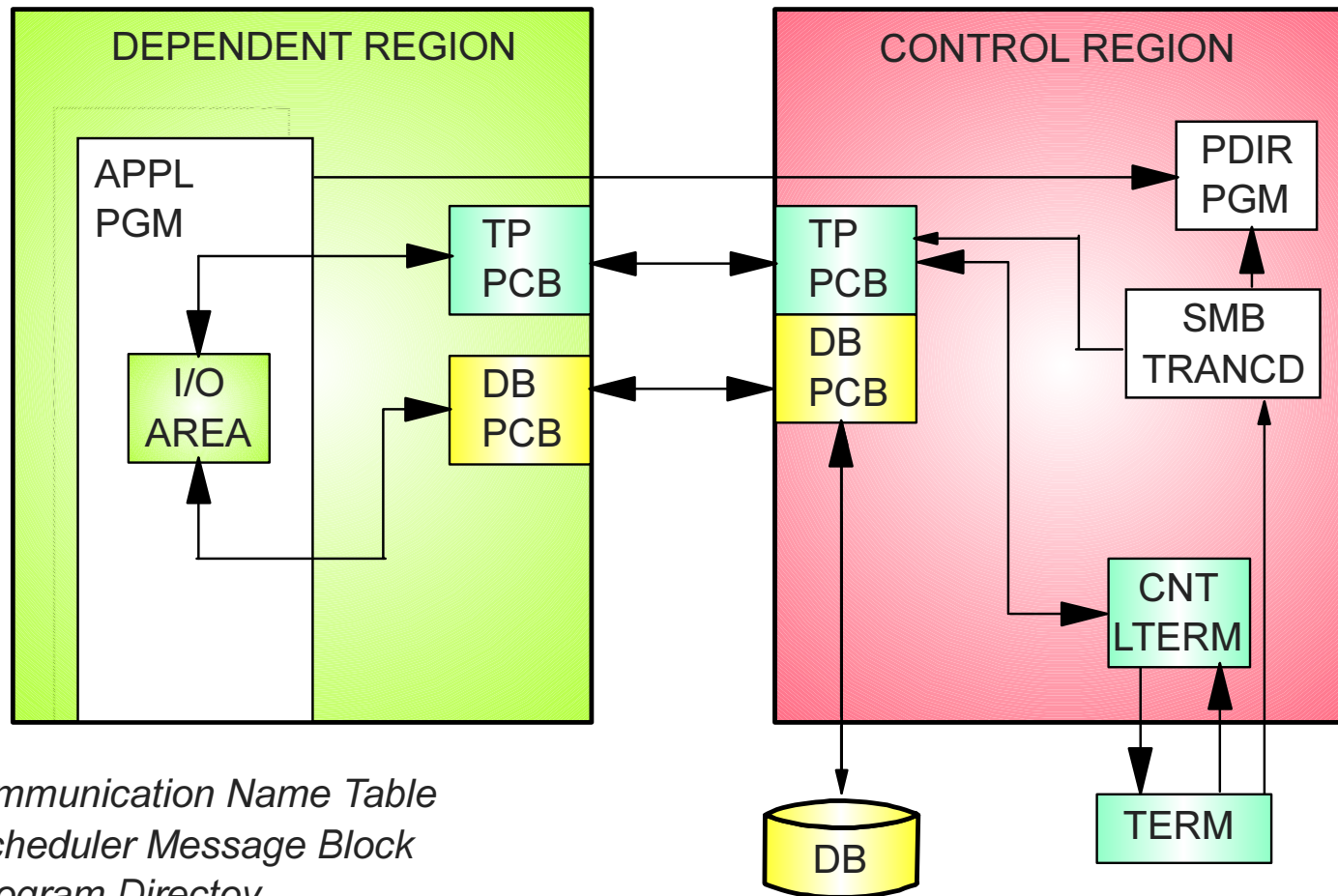
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## ▲ BMP (Batch Message Processing)

- ▶ 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*



# MS/Application Communication ...

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## ▲ 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

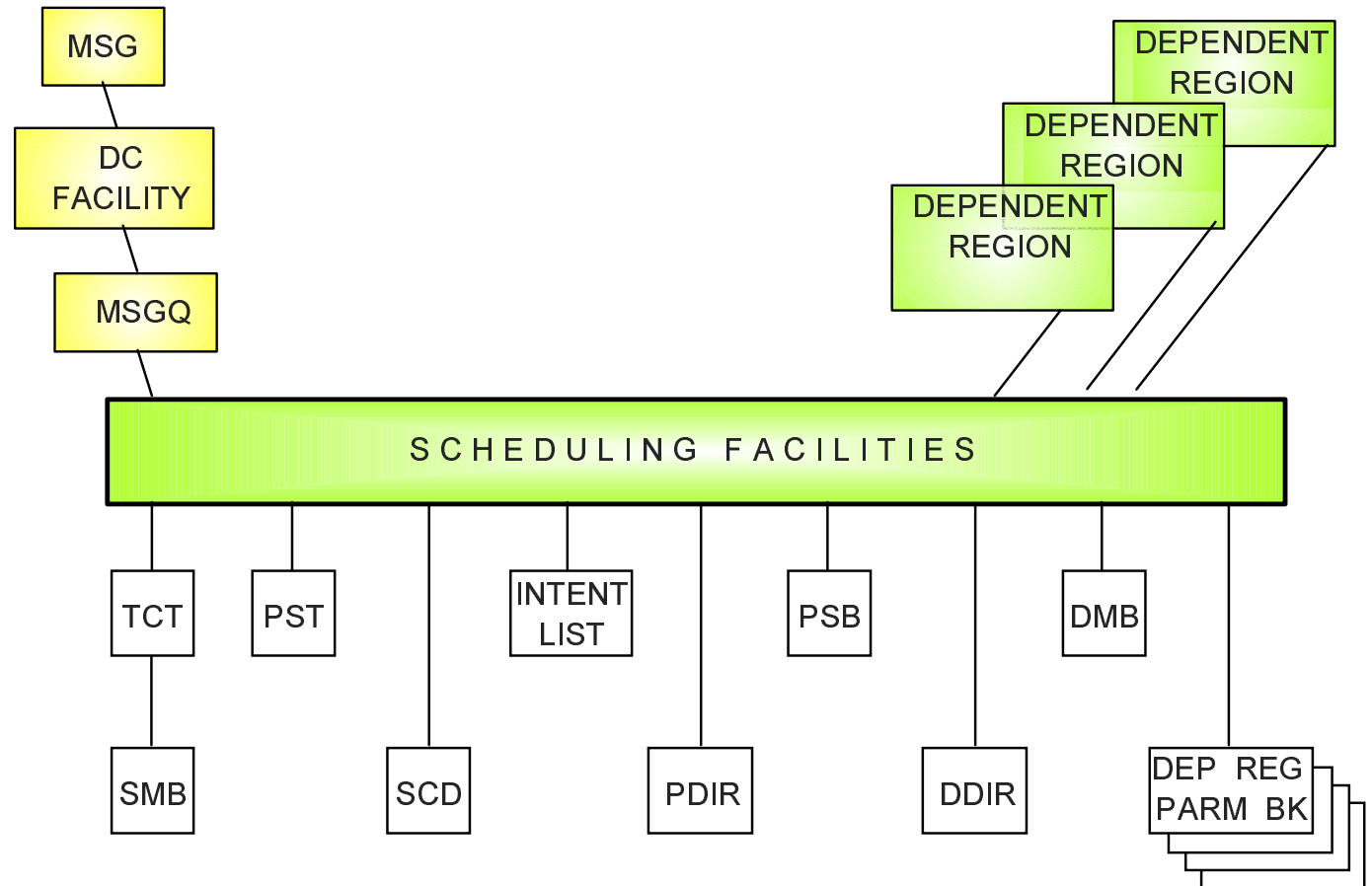
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## ▲ Message Editor

- ▶ 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*

*PST - Program Status Table*

*DMB - Database Management Block*

*DDIR - Database Directory*

*SCD - System Contents Directory*

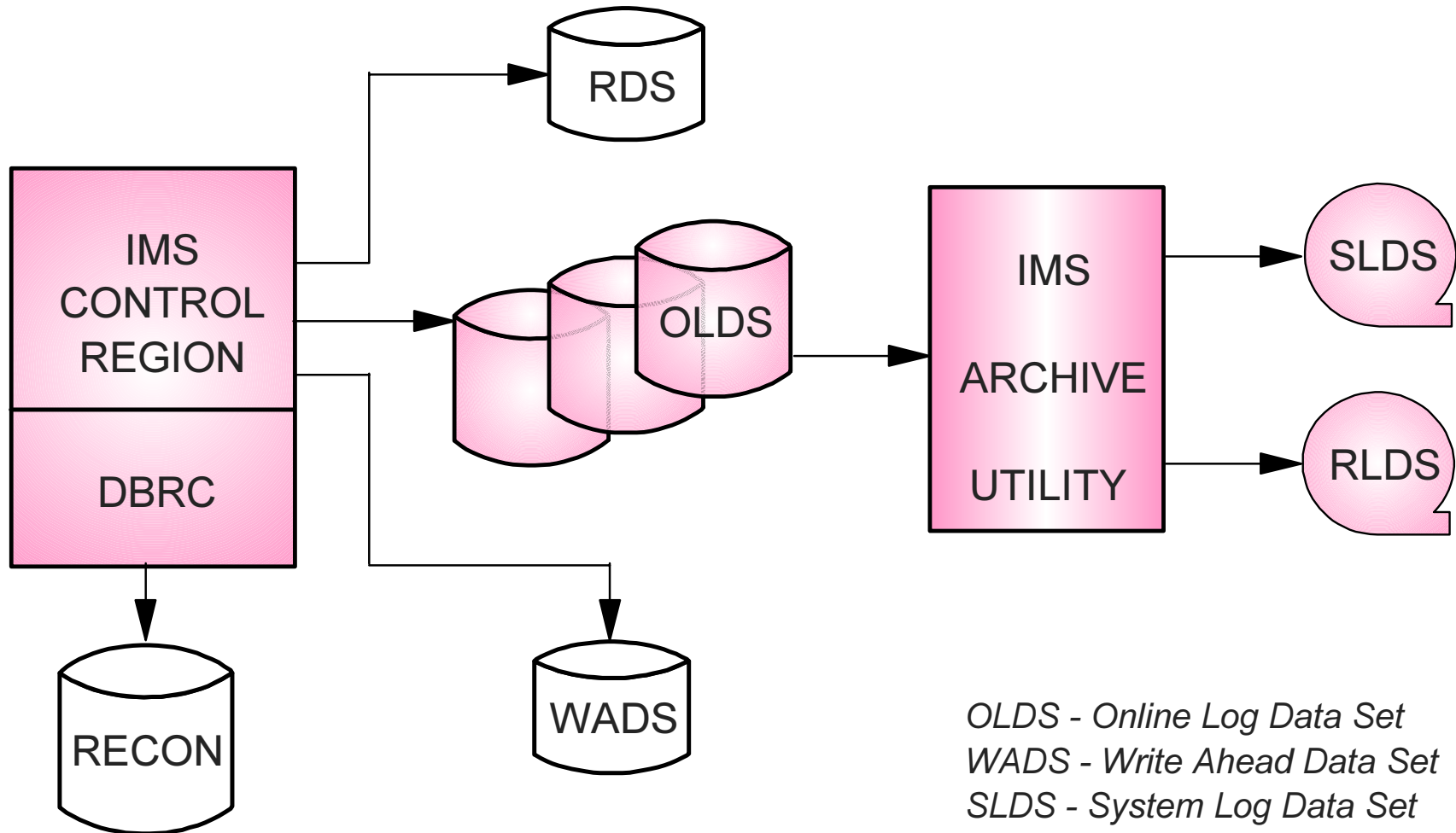
# IMS Scheduling ...

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## ▲ 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 ...

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## ▲ 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 ...

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## ▲ 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

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## ▲ 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

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## ▲ 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 or System Failure

## ▲ Database Backout

- ▶ Automatic - Emergency Restart

# Full Function Databases

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## ▲ 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 ...

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## ▲ 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

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## ▲ 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

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## ▲ Full Function Databases

- ▶ Reorganization
  - HISAM Unload / Reload
  - HD Unload / Reload
  - Pre-Reorganization
  - Scan
  - Prefix Resolution
  - Prefix Update
  
- ▶ Image Copy
  - Batch
  - Online

# Utilities ...

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## ▲ 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

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## ▲ 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 ...

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## ▲ 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

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## ▲ 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

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## ▲ Multi-Region Structure

- ▶ Dependent Region Type

## ▲ Transaction Flow

## ▲ Features and Functions

## ▲ Logging

## ▲ Utilities

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**End**