



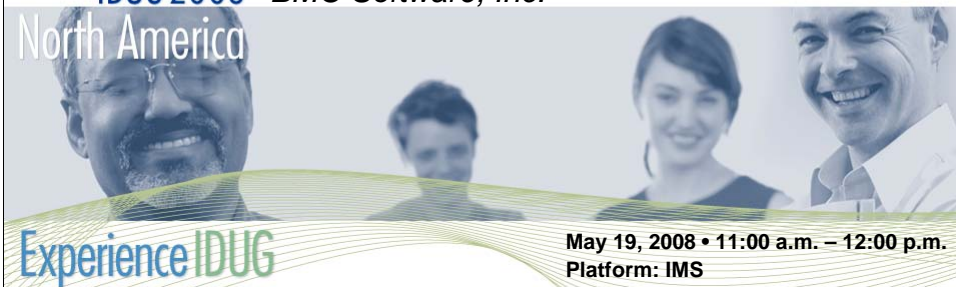
Session: J02

IMS for New Users

IDUG 2008

North America

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Experience IDUG

May 19, 2008 • 11:00 a.m. – 12:00 p.m.
Platform: IMS

This session provides a high-level overview of the IMS system. It presents the multiple address space structure of IMS and demonstrates how work flows thorough the system. The session will give new users an introduction to IMS concepts and terminology and will provide a framework into which the other technical presentation will fit.

Objectives

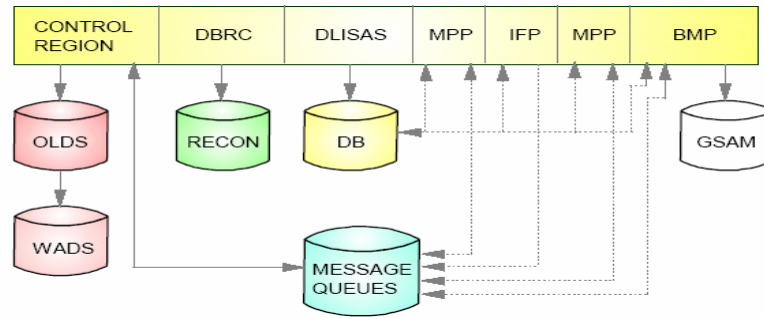
- Understand the overall structure of the IMS system
- Understand how work flows through IMS
- Appreciate the importance of logging for IMS and understand how it works
- Understand IMS terminology and concepts
- Understand the basic concepts behind DBRC

- IMS structure - Flow of an IMS transaction - IMS-Application communication - Message Format Services - IMS Logging - Archiving logs - DBRC Overview - IMS Restart - IMS Databases - IMS Utilities - Batch processing - IMS Security

- **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 Control Region**
 - Communicates with
 - ✓ Terminal Network - VTAM & BTAM
 - ✓ **Internet – TCP/IP and IBM WebSphere**
 - **Manages**
 - ✓ Messages Queues
 - ✓ Message Format Services
 - ✓ Logging
 - ✓ Scheduling
 - ✓ IMS Checkpoint Processing
 - ✓ Security Checking
 - ✓ Fast Path Databases
 - ✓ Output Processing

- **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

- **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**

- **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
- **JMP – Java Message Processing**
 - **MPP that uses Java and OO COBOL**
- **JBP – Java Batch Processing**
 - **BMP that uses Java and OO COBOL**

- **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**
 - **Message Transmission**

IMS Transaction Flow



- **Message Input (VTAM)**
 - **MFS Formatting**
 - **Message Logged**
 - **Placed on Message Queue**

- **Transaction Scheduled**
 - **PSB Located**
 - **DBDs Located**
 - **Program Located**
 - **Scheduled 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**
 - Reversed or not committed
 - **Output Message(s) Cancelled**
 - **Original Transaction Handled**
 - **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 but Idle

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**

IMS/Application Communication...

- **Fast Path Transactions**
 - **Entered from FP-eligible Terminal**
 - **Dedicated Buffer (EMHB)**
 - **Single Segment Input / Output**
 - **Response Mode**
 - **Non-conversational**
- **Access to All Database Types**

IMS/Application Communication...



- **BMP (Batch Message Processing)**

- **MVS / JES Scheduled**

- **Initialization**

- **Control Region Connection**

- Access Message Queue *

- Access Databases *

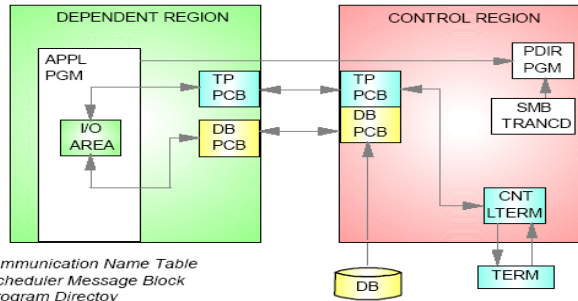
- Access MVS Files *

- **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*

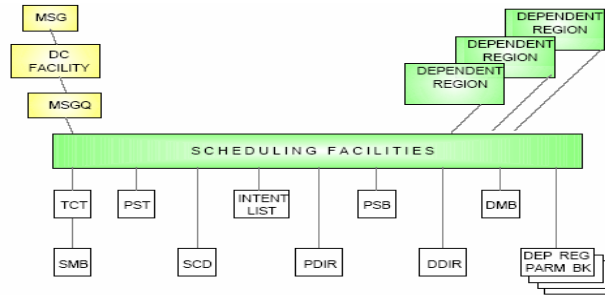
- **Application Program Interface**
 - **Calls to IMS**
 - Receive Message (GU, GN)
 - Send Message (ISRT, CHNG)
 - **Control Region**
 - **Interface to Terminals**
 - **Scheduling**
 - SMB - Transaction Identification
 - PDIR - Identify Online Program
 - **PSB**
 - **Data Access Control**
 - TP - Message Source/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



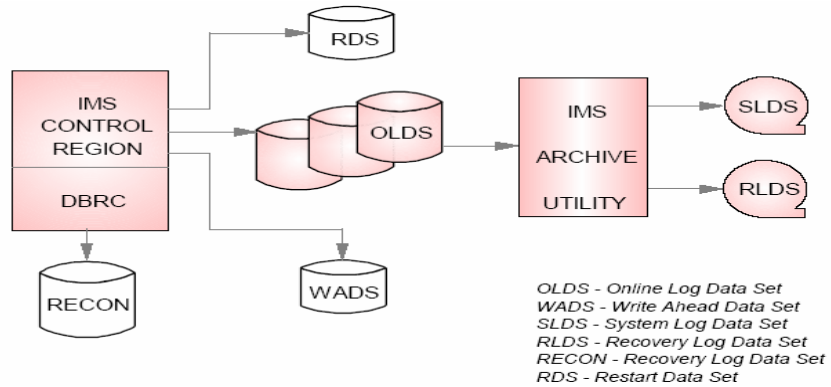
TCT - Transaction Class Table
 PST - Program Status Table
 DMB - Database Management Block
 DDIR - Database Directory
 SCD - System Contents Directory

Starts when a dependent region becomes available. This happens when one finishes its queue of transactions or a new region is started. IMS will select the next transaction by class and the highest priority within that class. If all of the resources that this transaction needs are available, it is scheduled. If not, the next highest priority transaction in the class is selected. If there are no more transactions of that class, then it checks the next class assigned to the region.

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



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 Change Records**
 - **Used 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)**
 - **Manually (GENJCL.ARCHIVE)**

- **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

IMS Restart

- **Emergency**
 - **After IMS or System Failure**

- **Database Backout**
 - **Automatic – Emergency Restart**

Full Function Databases



- **Hierarchic Structure**
- **Sequential Organization**
 - **HSAM - Hierarchic Sequential**
- **Direct Organization**
 - **Random Sequence**
 - **No Primary Index**
 - **HDAM - Hierarchic Direct**
 - **PHDAM – Partitioned Hierarchic Direct**

For more detail on IMS Full Function Database, attend session J08 on Tuesday at 4:00 pm.

Full Function Databases

- **Indexed Organization**
 - **Sequenced by Key**
 - **HISAM - Hierarchic Indexed Sequential**
 - **HIDAM - Hierarchic Indexed Direct**
 - **PHIDAM – Partitioned Hierarchic Indexed Direct**

- **Secondary Index**
 - **Alternate Key Sequence**

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Full Function Databases...



- **Database Access**
 - **Through Calls to DL/I**

- **Physical Access Method**
 - **Databases**
 - **VSAM - HISAM HIDAM HDAM GSAM**
 - **OSAM - HIDAM HDAM**
 - **BSAM - HSAM GSAM**
 - **QSAM – HSAM**

 - **Secondary Indexes**
 - **VSAM**

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Fast Path Databases



- **Hierarchic Structure**
 - **DEDB - Data Entry Data Base**
 - Handled by DLI Region
 - Similar to HDAM
 - VSAM ESDS
 - Partitioned
 - Multiple Copies
 - Can Reside in Storage with VSO

 - **MSDB - Main Storage Data Base**
 - Handled by CTL Region
 - Root Segment Only Database
 - Resides in Main Storage
 - Insert and Delete Restrictions

VSO DEDBs are taking over from MSDB.

Fast Path Databases ...

- **Access**
 - **MPP**
 - **BMP**
 - **Fast Path Application**

Utilities



- **Full Function Databases**

- **Reorganization**

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

Utilities...



- **Image Copy**
 - **Batch**
 - **Online**

- **Full Function Databases ...**
 - **Change Accumulation**
 - **Recovery**
 - **Batch Backout**

Utilities...

- **Fast Path Databases**
 - **Concurrent Image Copy**
 - **DEDB Initialization**
 - **DEDB Direct Reorganization**
 - **DEDB Scan & Delete**
 - **DEDB Create / Compare**
 - **Change Accumulation**
 - **Recovery**
 - **MSDB Maintenance**

(Pure) 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**

(Pure) Batch...

- **Private Database Access**
 - **No Locking**
 - **Access by This Job Only**
 - **Logging Optional**

- **DB2 Support**
 - **DB2 Batch Attach**
 - **Checkpoint / Restart**
 - **Logging Required**
 - **GSAM**

(Pure) Batch...

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

IMS Security

- **Standard IMS Security (now obsolete)**
 - **LTERM**
 - **Transaction**
 - **Command**

IMS Security...

- **Enhanced Security**
 - **RACF (or Equivalent External Security Manager)**
 - **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 Types**

- **Transaction Flow**

- **Features and Functions**

- **Logging**

- **Utilities**

Session J02

IMS for New Users



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