S82

IMS Tools from IBM— A Complete Spectrum

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IMS Technical Conference

Miami Beach, FL   October 22-25, 2001
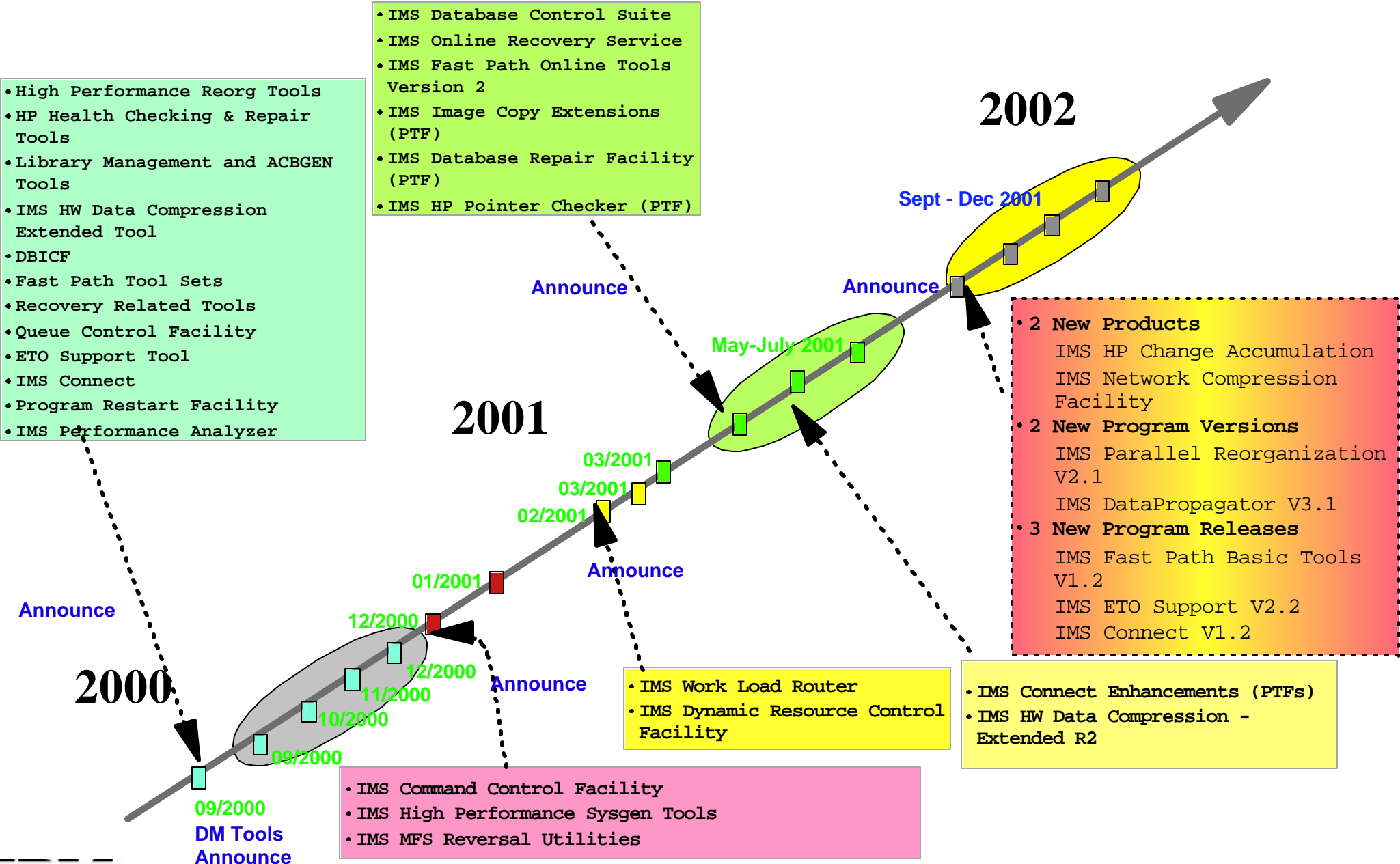
S/390 Data Management Tools Strategy

⚠ **Significant IBM investments targeted at the growing tools market**
  - ➤ Development, marketing, sales, & support

⚠ **New and enhanced suite of products**
  - ➤ Comprehensive capabilities
  - ➤ Competitive and affordable

⚠ **Available for multiple releases of IMS and DB2**

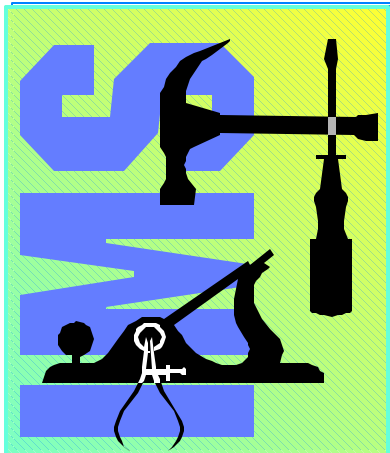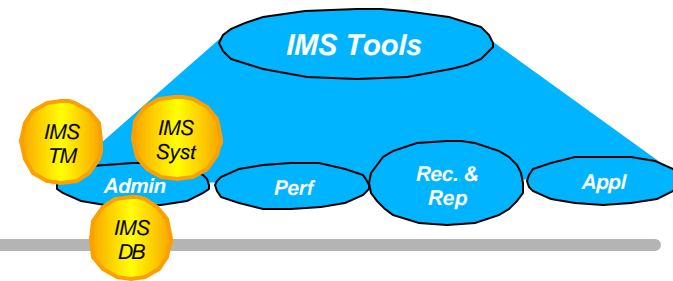*Since last September announcement, 50+ Tools*

IBM Data Management Tools for OS/390

Cost Effectiveness

System Utilization

DBA Productivity

Administration

Performance

Recovery & Replication

Application Mgmt.

Evolution of IBM's IMS Tools

- **High Performance Reorg Tools**
- **HP Health Checking & Repair Tools**
- **Library Management and ACBGEN Tools**
- **IMS HW Data Compression Extended Tool**
- **DBICF**
- **Fast Path Tool Sets**
- **Recovery Related Tools**
- **Queue Control Facility**
- **ETO Support Tool**
- **IMS Connect**
- **Program Restart Facility**
- **IMS Performance Analyzer**

- **IMS Database Control Suite**
- **IMS Online Recovery Service**
- **IMS Fast Path Online Tools Version 2**
- **IMS Image Copy Extensions (PTF)**
- **IMS Database Repair Facility (PTF)**
- **IMS HP Pointer Checker (PTF)**

2002

Sept - Dec 2001

Announce

Announce

May-July 2001

- **2 New Products**
  IMS HP Change Accumulation
  IMS Network Compression Facility
- **2 New Program Versions**
  IMS Parallel Reorganization V2.1
  IMS DataPropagator V3.1
- **3 New Program Releases**
  IMS Fast Path Basic Tools V1.2
  IMS ETO Support V2.2
  IMS Connect V1.2

2001

03/2001

03/2001

02/2001

Announce

01/2001

12/2000

Announce

2000

12/2000

11/2000

10/2000

09/2000

- **IMS Work Load Router**
- **IMS Dynamic Resource Control Facility**

- **IMS Connect Enhancements (PTFs)**
- **IMS HW Data Compression - Extended R2**

Announce

09/2000

DM Tools Announce

- **IMS Command Control Facility**
- **IMS High Performance Sysgen Tools**
- **IMS MFS Reversal Utilities**

IMS Tools Product Portfolio

IMS Tools

IMS TM · IMS Syst · Admin · Perf · Rec. & Rep · Appl · IMS DB

IMS DB Administration

- ▶ *IMS High Performance Unload 5655-E06*
- ▶ *IMS High Performance Load 5655-E07*
- ▶ *IMS High Performance Prefix Resolution 5655-E08*
- ▶ *IMS Index Builder 5655-E24*

- ▶ *IMS Parallel Reorganization V2 5655-F74*

- ▶ *IMS High Performance Change Accumulation 5655-F59*

- ▶ *IMS High Performance Pointer Checker 5655-E09*
- ▶ *IMS Data Base Repair Facility 5655-E03*
- ▶ *IMS Library Management Utilities 5655-E04*

- ▶ *IMS Advanced ACBGEN 5655-E05*
- ▶ *IMS Sequential Randomizer Generator 5655-E11*
- ▶ *IMS Compression - Extended 5655-E02*
- ▶ *IMS Data Base Control Suite 5655-F76*
- ▶ *IMS Data Base Integrity Control Facility*
- ▶ *IMS Fast Path Basic Tools 5655-E30*
  - DEDB Unload/Reload
  - DEDB Pointer Checker
  - DEDB Tuning Aid
- ▶ *IMS Fast Path Online Tools V1 5655-E31 (V2 5655-F78)*
  - Online Pointer Checker with optional Image Copy
  - Online Data Extract
  - Online Area Extender

IMS TM Administration

- ▶ *IMS Queue Control Facility 5697-E99*
- ▶ *ETO Support 5655-E12*
- ▶ *IMS Dynamic Resource Control Facility 5697-D14 (PSLC)*
- ▶ *IMS Workload Router 5697-B87 (PSLC)*

IMS System Administration

- ▶ *IMS IMS High Performance Sysgen Tools 5655-F43*
- ▶ *IMS Command Control Facility 5655-F40*

Performance Management

- ▶ *IMS Performance Analyzer 5655-E15*
- ▶ *IMS Network Compression Facility 5655-E41*

Recovery / Replication
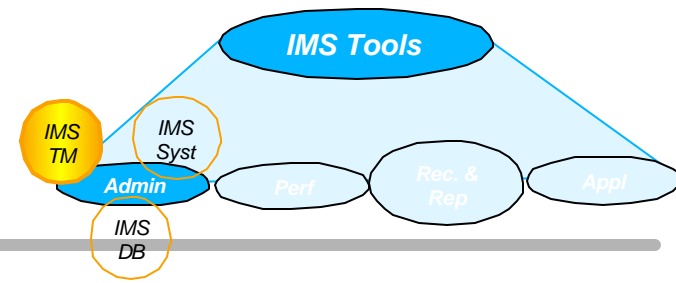
- ▶ *IMS Image Copy Extensions 5655-E10*
- ▶ *IMS DEDB Fast Recovery 5655-E32*
- ▶ *IMS Recovery Saver 5655-E16*
- ▶ *DB2 Recovery Manager 5697-F56*
- ▶ *Online Recovery Service (ORS) 5655-E50*
- ▶ *IMS Data Propagation 5655-E52*

Application Management

- ▶ *IMS Connect 5655-E51*
- ▶ *IMS Message Format Services Reversal Utilities 5655-F45*
- ▶ *IMS Program Restart Facility 5655-E14*
- ▶ *Batch Terminal Simulator 5655-A14 (PSLC)*

IMS Tools for ...

IMS Tools

IMS TM

IMS Syst

Admin

IMS DB

Perf

Rec. & Rep

Appl

IMS Transaction Manager Administration

IMS Queue Control Facility 5697-D69

> ➤ IMS TM is obviously excellent at "processing" IMS Message Queues
> ➤ But it only contains limited facilities for external "management" of the queues
>   > ► "Queue Management" is the function of IMS QCF

⚠ **Replacement for IMS Message Requeuer product (MRQ)**

⚠ **Supports both DASD Queues and Shared Queues**

⚠ **Traditional Functions**

  ➤ IMS message queue recovery after a cold start
       Following planned or unplanned outage

  ➤ IMS application program recovery
       To reprocess some transactions after the program is corrected

  ➤ IMS stress, regression and application testing
       Production load simulation
       Creation of test cases

  ➤ Port messages to other IMS systems
       New release migration/fallback
       To test recovery on a backup site

⚠ **Queue Management ....**

IMS Queue Control Facility -   Queue Management

⚠ **"Very Long Message" Detection & Management**

➤ For Non-Shared Queues, the QCF Space Notification Exit monitors processes that exceed user specified message queue usage and allows these processes to continue, be aborted or be WAITed to prevent exceeding the message queue limits

➤ TSO/ISPF interface provides panels to look at and manage tasks (and their messages) that have been WAITed by the QCF Queue Space Notification Exit

  resume, abort or suspend

⚠ **General Queue Management (via ISPF or batch, for shared or non-shared queues)**

➤ look at queue status

  eg. understand reasons why queues are filling up

➤ list, view, copy or move messages off the IMS message queues (while IMS is active)

➤ load messages onto the queues (that have previously been copied or moved from message queues, or extracted from an IMS log)

➤ The ISPF front-end ATTACHes the QCF BMP

  multiple concurrent ISPF sessions are allowed

IMS ETO Support Tool 5655-E12

⚠ **The Extended Terminal Option (ETO) of IMS was designed to be easy to implement**
  ➤ But, users discovered application dependencies on terminal related names

⚠ **Consequently (and for other reasons) ETO implementation usually requires the use of various ETO Exits**
  ➤ must be written in assembler

⚠ **The ETO Support Tool allows you to define your ETO requirements in a DB which is read into in-memory tables**
  ➤ no exits need be coded
  ➤ DB can be updated via batch or IMS transaction
  ➤ tables can be dynamically refreshed

⚠ **Includes command/keyword security**
  ➤ checking by RACF (or equivalent)
  ➤ or by ETO Support Tool itself

◆**Supported options include**
  ► **Auto-sign-on**
  ► **Pre-ETO sign-on messages**
  ► **Userid suffixing for multiple signons by same user**
  ► **Cleanup of IMS Conversations at Sign-off**

◆**V2R2 Enhancements - Announced 09/2001 - GA 12/2001**
  ► **SLUTYPEP support to specify Logon Descriptor, change DFS3650 Msg, override IMS Option on LU by LU basis**
  ► **SLU1 Console support**
  ► **SLU1/3270 enhanced to allow execution of an IMS Transaction in place of DFS3650 Msg**
  ► **Support multiple IMS versions with single FMID**
  ► **Support LTERM names that start with numeric value**
  ► **Shared Queue support**

More TM Management Tools!

⚠ **Dynamic Resource Control Facility 5697-D14**

➢ Runs as an MPP (or Message-driven WFI BMP)

➢ 47 Functions provided in areas of

problem determination
monitoring resource utilization
analyzing performance

> "Puts comprehensive resource information at your fingertips and helps you spot and resolve potential problems before they become critical"

⚠ **IMS Workload Router 5697-B87**

➢ Non-Sysplex Environment

Exploit benefits of MSC for workload distribution
Allow transaction affinity routing

➢ Sysplex Environment

Balance transaction workload in sysplex
Superseded by IMS shared queues
Allow transaction affinity routing
Exploit IMS cloned resource environment
Connect two or more Parallel Sysplexes
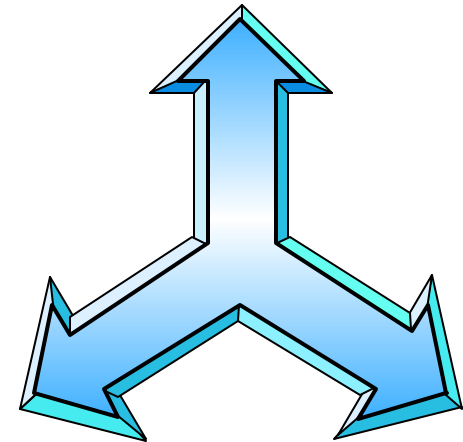
Removes need for user-written MSC user exits

IMS Tools for ...

IMS Tools

IMS TM

IMS Syst

Admin

Perf

Rec. & Rep

Appl

IMS DB
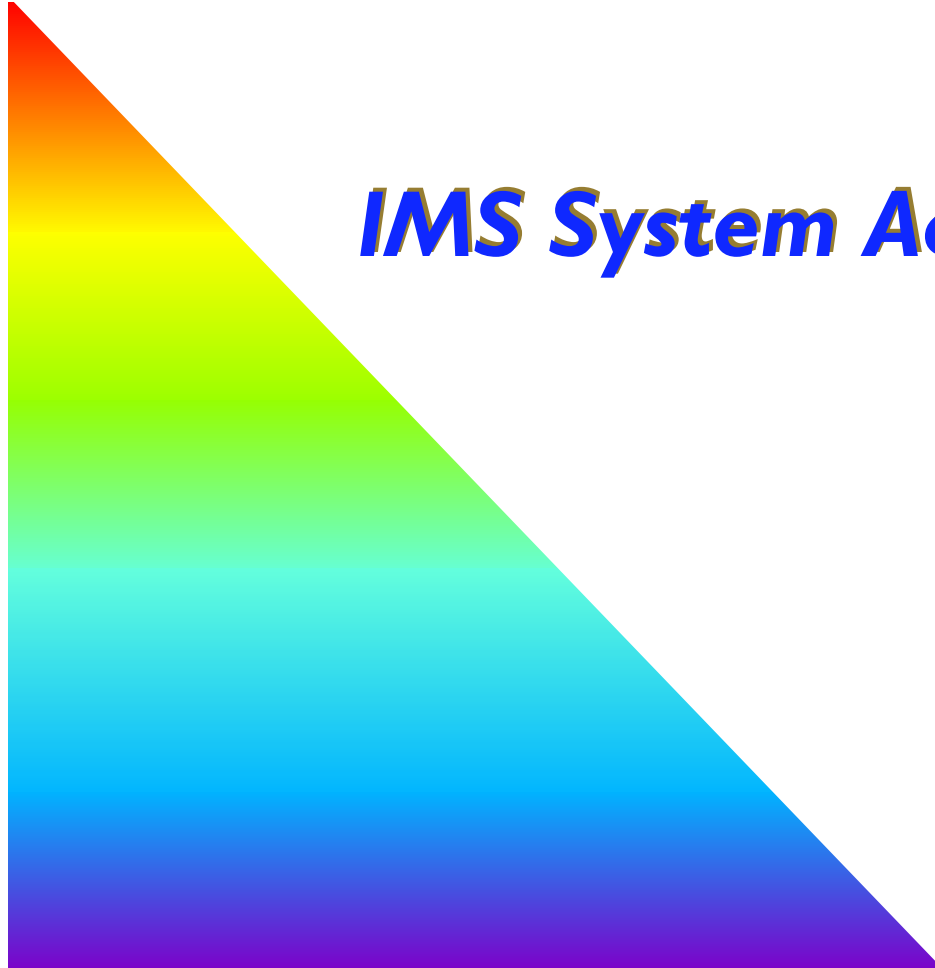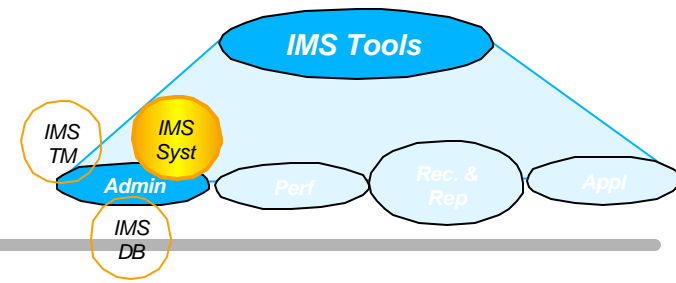
IMS System Administration

IMS High Performance Sysgen Tools 5655-F43

⚠ **Fast Sysgen**
- ➤ A high-performance tool for doing a MODBLKS Gen
   - changing TRANSACT, APPLCTN, RTCODE, DATABASE macros
   - Updates MODBLKS and MATRIX datasets
- ➤ Can be done as a **single step** batch job ...
   - user specifies target libraries (active, inactive, A and/or B copy)
- ➤ ... or can be done online
   - /MODIFY PREPARE MODBLKS FASTGEN
      - *where it is performed as first step of online change*

⚠ **Merge/Clone**
- ➤ Reads MODBLKS for upto 64 IMS systems
   - Can recreate IMS Sysgen macro sources
- ➤ Updates all MODBLKS so that they all contain the same set of definitions (TRANSACT, APPLCTN, DATABASE)
- ➤ Automatically coordinates database access (ACCESS=) and MSC SYSID values
- ➤ With the CLONE option, an additional system definition is built

⚠ **Sysgen Compare**
- ➤ Verifies that two sets of MODBLKS and MATRIX modules are the same
- ➤ Reporting capability
   - Transaction affinity
   - PSBLIB/DBDLIB Analysis report

IMS Command Control Facility (CCF) 5655-F40

⚠ **Issue commands for IMS TM or IMS DBCTL systems**
  - ➢ via a batch utility (MVS Batch, IMS Batch or BMP)
  - ➢ or from an ISPF interface
      to maintain CCF option dataset
      to issue IMS commands

⚠ **Process IMS commands in all or selected systems of an IMSplex using the batch interface**

⚠ **Ensure successful processing of database /START, /STOP, /DBR, and /DBD commands**

⚠ **Synchronize Online Change and database commands across all regions in a sysplex using the batch command processor**
  - ➢ "canned procedures" provided for coordinating online change, and deleting messages on dead letter queue

TSO ISPF
(1) Set up CCF options
or
(2) Enter IMS command to
one system

CCF Options

- IMSPROD = IMSA, IMSB, IMSC
- names of DD statements for CCFCMD00
- Global and job specific options

Command input

MVS BATCH JOB
(command processor)
CCFCMD00

- Can also be BMP or DLI
- Checks for completion of /STA, /STO, /DBD, and /DBR

APPC
/DBR...
IMSB /STA...

A P P C

IMSA   **IMSB**   **IMSC**
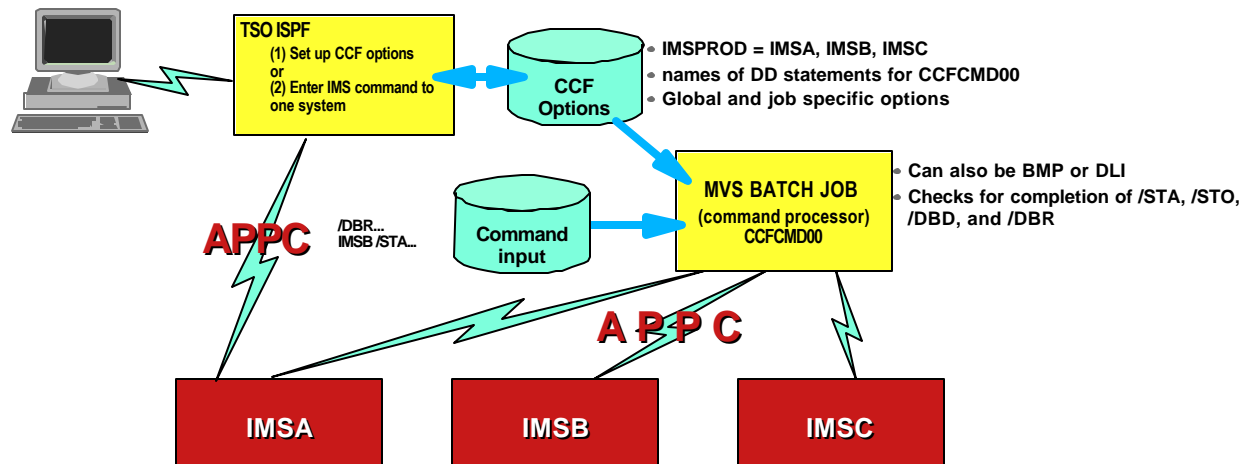
A similar implementation is possible with DBCTL systems, except that CCF uses APPC to communicate with a BMP, which in turn issues ICMD and RCMD commands. However, it is not possible to check for completion of DB commands (using DFS0488I)

CCF Batch Command Processor

⚠ **Read commands from CCFSYSIN. For example,**
- ➤ /DBR ...   execute on all systems
- ➤ IMSA /DBR ...   execute only on IMSA
- ➤ /DBR .. GLOBAL   execute on one system

⚠ **Enter commands**
- ➤ For /STA DB, it can check in DBRC or MODBLKS for ACCESS=...

⚠ **After each command, analyze response**
- ➤ For /DBR, /DBD, /STA and /STO, look for DFS0488I messages
- ➤ If a DB command fails, retry after user-specified interval, a user-specified number of times

⚠ **After /DBD or /DBR, it can optionally check with DBRC that DB is not open for update anywhere**

⚠ **After an unexpected response, take user specified action**
- ➤ abend with specified return code
- ➤ continue but terminate with specified return code
- ➤ issue WTOR (ignore, abend, retry)
- ➤ ignore it

All "user specified options" are defined in the CCF Options Dataset
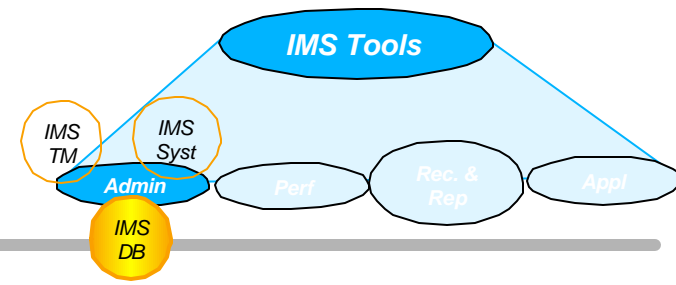
IMS DB Administration

DB Reorganization

⚠ **All IMS DB users have a need to reorganize DBs on a regular basis**
  ➤ The pressure for increasing availability creates ever growing demands for fast reorganization utilities

⚠ **The new products that support reorganization of full function DBs* are**
  ➤ IMS High Performance Unload (5655-E06)
  ➤ IMS High Performance Load (5655-E07)
  ➤ IMS High Performance Prefix Resolution (5655-E08)
  ➤ IMS Index Builder (5655-E24)
  ➤ IMS Parallel Reorg V2 (5655-F74)

* "Full Function DBs" are HISAM, HDAM, HIDAM, PHDAM, PHIDAM, secondary index and PSIndex

IMS High Performance Unload

⚠ **Replaces (and enhances) DBT HSSR feature**
- ➤ fully compatible JCL

⚠ **Includes full support for HALDB**
- ➤ unload one, several or all partitions
- ➤ migration/fallback support

⚠ **DB Unload Utilities**
> dynamic allocation of DB datasets
> option to leave compressed data compressed
> multiple unload formats
> can unload broken DBs
> variety of statistical reports

⚠ **Application programming interface**
- ➤ Includes HSSR's API
> for stand-alone batch programs
> transparent to programmer

⚠ **Sequential Subset Randomizer**
> Randomizing module to enable fast
> sequential processing of DB subset

NEW!
- HALDB
- DB Dynamic Allocation
- Self Optimization
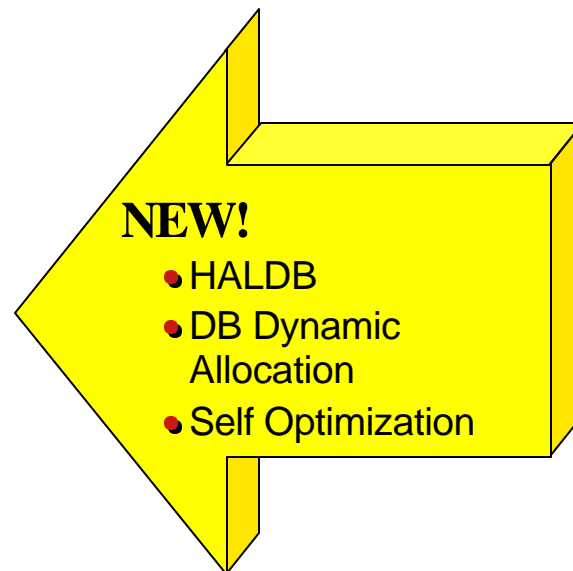
IMS High Performance Load

⚠ **Includes two utilities**
- ➢ DB Load
- ➢ HDAM Physical Sequence Sort for Reload (PSSR)

⚠ **DB Load Utility**
- ➢ complements High Performance Unload Utility
  - compressed/uncompressed input in various formats
  - dynamic allocation of DB datasets
- ➢ supports HALDB
  - including a high-speed alternative to IMS Partition Initialization Utility
  - and migration reload
- ➢ can be used to initialize empty DBs

NEW!
- HALDB
- DB Dynamic Allocation
- Self Optimization

⚠ **HDAM PSSR Utility**
  Avoids "cascading" on Reload (when too many roots randomise to same block)

IMS Index Builder

⚠ **Add or Rebuild all or some secondary indexes of an IMS database**
- ➢ Using as input:
  - Output from initial load or reload after a reorg
  - DL/I scan of the IMS database
  - Output from prefix resolution (DFSURIDX)
- ➢ Supports empty secondary indexes
- ➢ Easy-to-use one step procedure
- ➢ Sorts and Loads Multiple Indices in Parallel

⚠ **Rebuild HIDAM primary index**

⚠ **DBRC notification support**

⚠ **HALDB support for IMS V7**

⚠ **Simplifies Index recovery and maintenance**
⚠ **Reduces Index maintenance time**
⚠ **Eliminates need to image copy Indexes**

IMS Parallel Reorganization V2

⚠ **Replaces IMS Parallel Reorganization V1**
  ➢ Support IMS V5, IMS V6 and IMS V7

⚠ **Functional Improvements**
  ➢ Execution of the following utilities in one address space
    - IMS HP Unload
    - IMS HP Load
    - IMS Index Builder
  ➢ Dynamic allocation of Input and Output database datasets
  ➢ Full DBRC support, including DBRC notification
  ➢ Automated name swapping
  ➢ Automated IMS Command Processing

> *IMS Parallel Reorganization provides the infrastructure to operate IMS HP Unload, IMS HP Reload and IMS Index Builder in parallel, allowing a significant reduction in the reorganization time.*

DB Health Checking

⚠ **All IMS DB users have a need to**
- ➢ Check for pointer errors
- ➢ Repair bad pointers or segment data
- ➢ Monitor space usage and other aspects that might require DB Reorganization

⚠ **New tools for DB Health checking**
- ➢ IMS High Performance Pointer Checker (5655-E09)
- ➢ IMS DB Repair Facility (5655-E03)

Include full support for HALDB
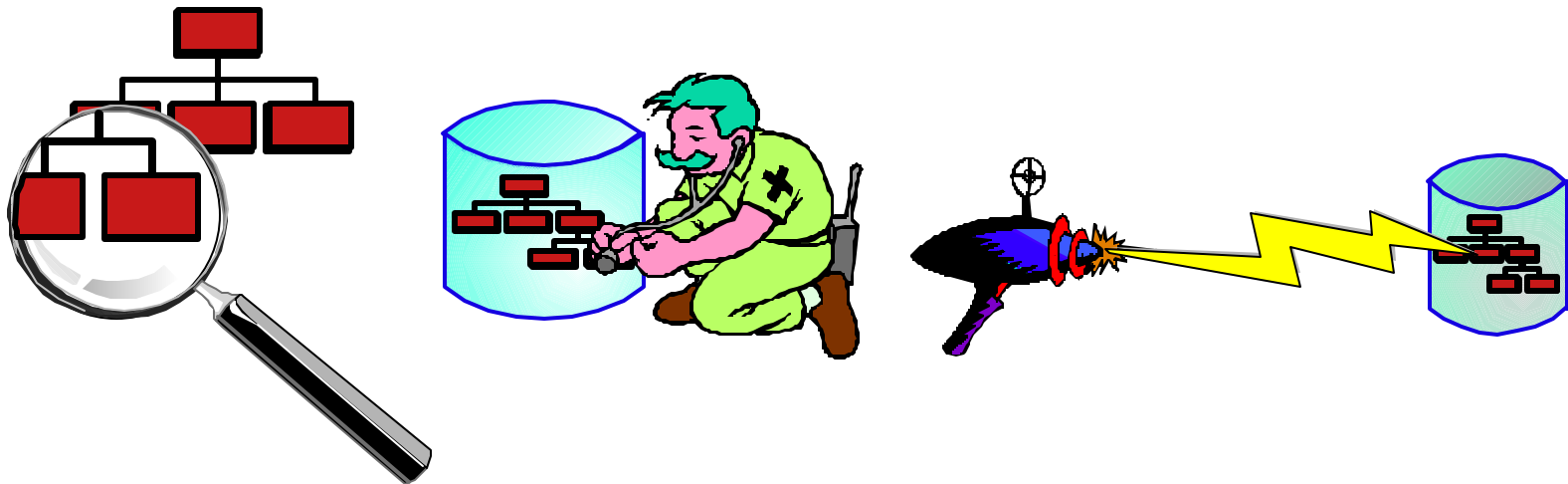
IMS HP Pointer Checker

⚠ **Replaces DBT SMU key components (Pointer Checker, Space Monitor)**

⚠ **Executes on DB or image copy**
  ➤ including H/W Concurrent Copy of IMS V6

⚠ **Also includes**
  ➤ HD Tuning Aid,
  ➤ DB Historical Data Analyzer, and
  ➤ DB Segment Restructure Utility

Reports include:
- **Segment and Pointer Statistics**
- **Bit Map Displays**
- **Free Space Maps**
- **FSE Analysis**
- **HD Tuning Statistics Report**
- **DB Record Distribution Statistics Report**
- **Pointer Validation Reports**
- **Database Repair Guidelines Report (if necessary)**
- **Root Allocation Reports (by block and RAP)**
- **Space Analysis and Data Set Reports (including non-IMS datasets)**
  - ► **includes space exception reports**

Enhancements via PTF PQ44834
- **New thresholds can be monitored and reported**
  - ► available extents
  - ► CI and CA splits
  - ► used space as % of allocated space
  - ► in last extent (DB or DSet)
  - ► No. of days since last reorg

HP Pointer Checker Components
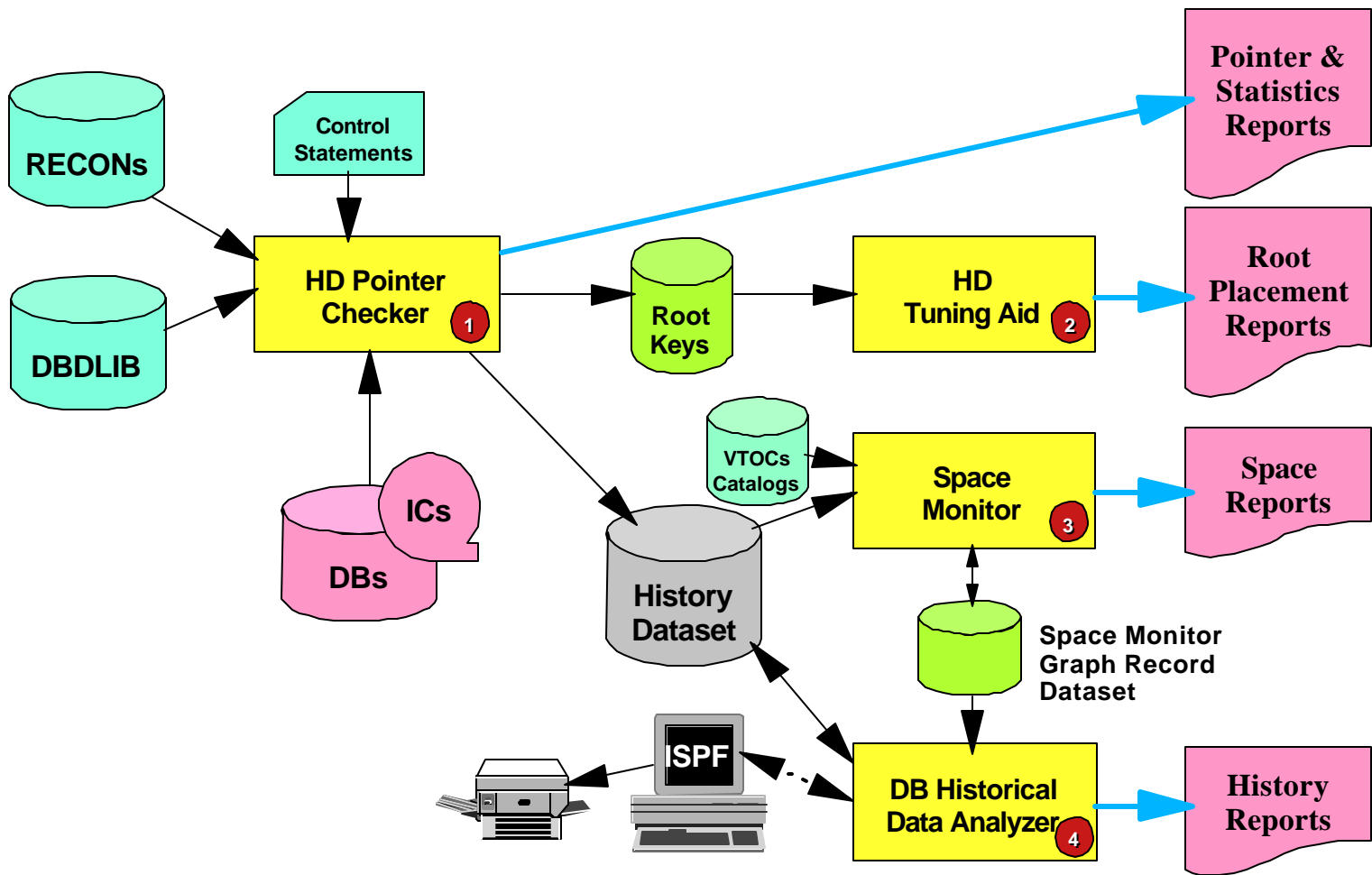
DB Repair Facility

⚠ **IMS DB Repair Facility replaces DBT VSAM Zapper**

- ➢ Supports All IMS Databases
  - VSAM and OSAM DBs
  - DEDB via APAR PQ44923
  - HALDB
- ➢ Interactive via an ISPF front-end
- ➢ Includes
  - Pointer navigation
  - Display RAPs within Block or CI
  - Display FSEAP and FSE Chain within Block or CI
  - Backout safety feature
  - Audit history
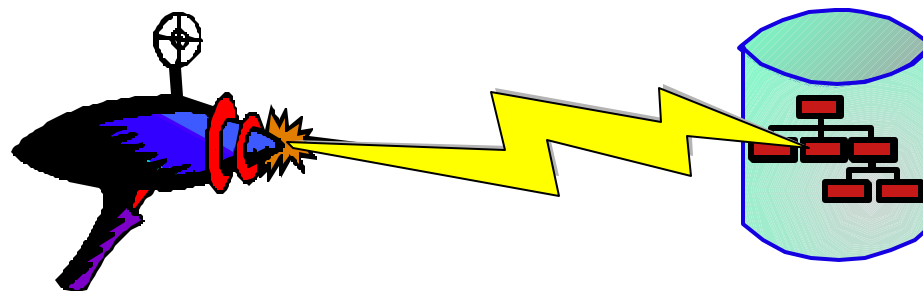
IMS High Perf. Change Accumulation

⚠ **New tool**
- ➢ Replaces and enhances IMS Parallel Change Accumulation
  - ► Improved Operations
  - ► Improved Flexibility and Performance
- ➢ Support IMS V6 and IMS V7

⚠ **Functionalities**
- ➢ Parallel execution of multiple IMS CA jobs in a single address space.
- ➢ Parallel streaming of both input and output data
    - Input data from RLDS's
    - Output data to new CA's datasets
    - Single pass of input/output
- ➢ ISPF and Batch Interface
- ➢ Automatic submission
- ➢ Full DBRC Support

IMS HP CA provides an environment in which multiple CA jobs can be run in parallel, instead of in sequence.

Other DB Administration Tools

⚠ **Library Management Utilities 5655-E04**
- ➤ DBD/PSB/ACB Mapper
- ➤ DBD/PSB/ACB Compare
- ➤ DBD/PSB and ACB Reversal

⚠ **IMS Advanced ACB Generator 5655-E05**
- ➤ Replaces "Fast ACBGEN" tool and standard IMS ACBGEN utility
  - Much faster
  - Better reporting (eg. PSB and DBD size distributions)
- ➤ Includes ACBLIB Analysis Utility
  - Verify that all members are at the same IMS level
  - Verify that ACBLIB contains no PSB, no DBD, only ACB
  - Reports
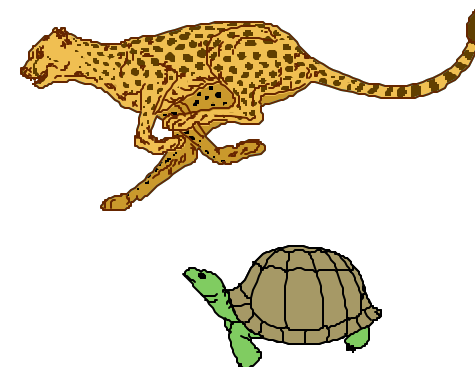
■cont....

Include full support for HALDB

Other DB Administration Tools

⚠ **IMS Sequential Randomizer Generator 5655-E11**
- ➢ Analyzes DB keys and DB record lengths to produce a sequential randomizer for a DEDB or HDAM DB
- ➢ Enables high performance access of DB with both direct and sequential processing

⚠ **IMS Hardware Data Compression - Extended 5655-E02**
- ➢ Enhances facilities available in IMS itself
- ➢ Works on Image Copies, High Performance Unload files and IMS Unload files
- ➢ Includes sample Compression Dictionaries
- ➢ Enables effectiveness of existing dictionaries to be assessed
- ➢ Allows monitoring of dictionary effectiveness over time
- ➢ Builds DBD and Reload JCL

Include full support for HALDB

IMS Data Base Control Suite V2   5655-F76

⚠ **"The Ultimate Tool Workbench "**
- ➤ Remodelling of Version 1
  - simpler user interface
  - no built-in tools
  - reduction in the number of datasets, panels and processing steps

⚠ **Intuitive ISPF Front-end integrates control of DB Administration activities**
- ➤ Backup & Recovery
- ➤ Change Accumulation
- ➤ Other DBRC functions
- ➤ DB Reorganization
- ➤ Pointer checking and space monitoring*
- ➤ DB Repairing*
- ➤ Library (DBD/PSB/ACB) management*

⚠ **Supports Full Function, HALDB, and Fast Path DBs**

⚠ **Exploits IMS Base Utilities and/or IBM High Performance Tools**

* Requires the appropriate IBM Tools - HP Pointer Checker, Data Base Repair Facility and/or Library Management Utilities

Fast Path Basic Tools 5655-E30

⚠ **This is a package of tools to help with analysis, maintenance, tuning and migration (HDAM) of Data Entry Data Bases (DEDB)**

Note: These utilities replace and *greatly enhance* those previously available as components of the Data Base Tools product (DBT).

⚠ **DEDB Unload/Reload**
- ➤ DB AREA dynamically allocated
- ➤ Full DBRC interface
- ➤ Concurrent initialization and reload of Multiple DEDB Area Data Sets (MADS)
- ➤ Includes support for SDEPs
- ➤ Allows migration to/from HDAM
- ➤ Provides an API for reading/writing unload data set

⚠ **DEDB Pointer Checker**
- ➤ On area dataset or IC
    - Includes support for Hardware Concurrent Copy (IMS V6)
- ➤ DBRC interaction and Dynamic Allocation
- ➤ SDEP space utilization analysis

⚠ **DEDB Tuning Aid**
- ➤ For predicting effects of a DB change
    - works as an extension of the pointer checker

V1R2 Enhancements - Announced 09/2001 - GA 11/2001
- ► **New fast unload option**
    - ● Uses DFSMS media manager
- ► **Link between Reload and ICE to produce IC and notify DBRC**
- ► **Better reporting for Database Definition Record Create Utility**

Fast Path Online Tools 5655-E31

⚠ **DEDB Online Pointer Checker**
- ➤ Online interface to DEDB Pointer Checker and DEDB Tuning Aid
- ➤ Runs in a Fast Path Utility dependent region
- ➤ Produces report of pointer errors (choice of fast scan or in-depth analysis)
- ➤ Optionally creates set of sequential files which are input to DEDB Pointer Checker (or DEDB Tuning Aid) for space usage analysis, etc
- ➤ Optionally creates a Concurrent Image Copy

⚠ **DEDB Online Data Extract**
- ➤ Easy-to-use, flexible tool for extracting data for data reporting and populating test data bases
- ➤ Runs in a Fast Path Utility dependent region
- ➤ Uses locking to ensure data consistency
- ➤ Extraction criteria allows one or more tests of segment data at multiple locations
    - can extract all or subset of each selected segment
- ➤ Can write to file in DEDB Unload/Reload Utility format

⚠ **DEDB Online Area Extender**
- ➤ Enables increasing size of SDEP part, IOVF part, or both while Area is online
- ➤ Runs as a FP Utility similar to the Create Utility
    - creates new ADS with new specification, but deletes original ADS on completion

IMS Administration Tools - Future

⚠ **Utilities enhancements**

➤ Faster I/O operations (Load, Unload, etc..)

➤ Data availability improvements
   Online Reorg

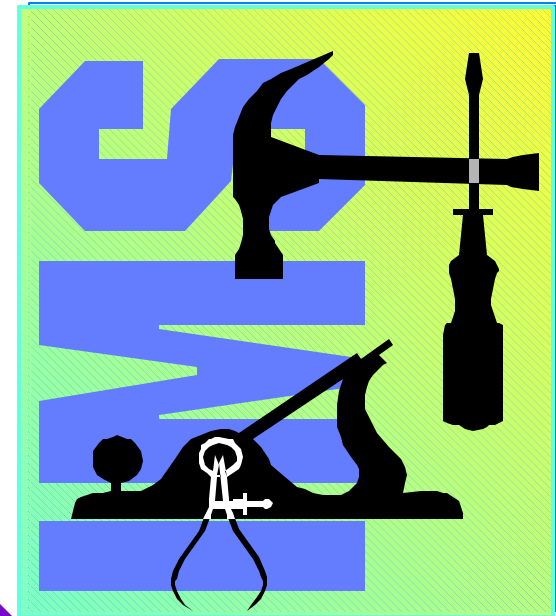➤ Usability enhancements to improve DBA productivity

⚠ **Automation tools**

➤ Utilities scheduling

➤ Self-managed operations

IMS Tools for ...

IMS Tools

IMS TM
IMS Syst
Admin
Perf
Rec. & Rep
Appl
IMS DB
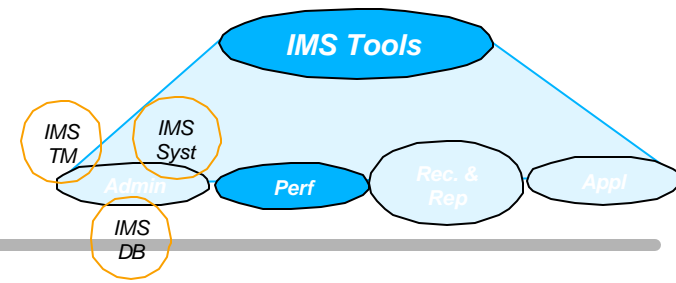
IMS Performance Management

IMS Performance Analyzer V3 5655-E15

- ⚠ **The standard for IMS Resource and performance management**
  - ➤ IMS Log and IMS Monitor Analysis Tool
  - ➤ Replacement for
    - IMSPARS - 5798-CQP (Log Analysis Tool)
    - IMSASAP - 5798-CHP (IMS Monitor Analysis Tool)
    - First 2 versions of IMS PA
- ⚠ **Supports**
  - ➤ IMS TM, IMS DBCTL or IMS Batch
    - Fast Path Log analysis since IMS V6
    - Fast Path Monitor analysis new with IMS V7
  - ➤ Consolidated reporting for IMSplex
    - Shared Q fully supported since IMS V6
  - ➤ Traditional SNA terminals, APPC, OTMA and MSC
  - ➤ ESAF
- ⚠ **Uses DBRC to select necessary logs**
  - ➤ for improved usability
  - ➤ using SLDSs
  - ➤ based on specified times
- ⚠ **Can use GDDM to graph extracted data or download it to a PC**

User specifies required reports and resources to be reported on, using ISPF

IMS Performance Analyzer 5655-E15 ...
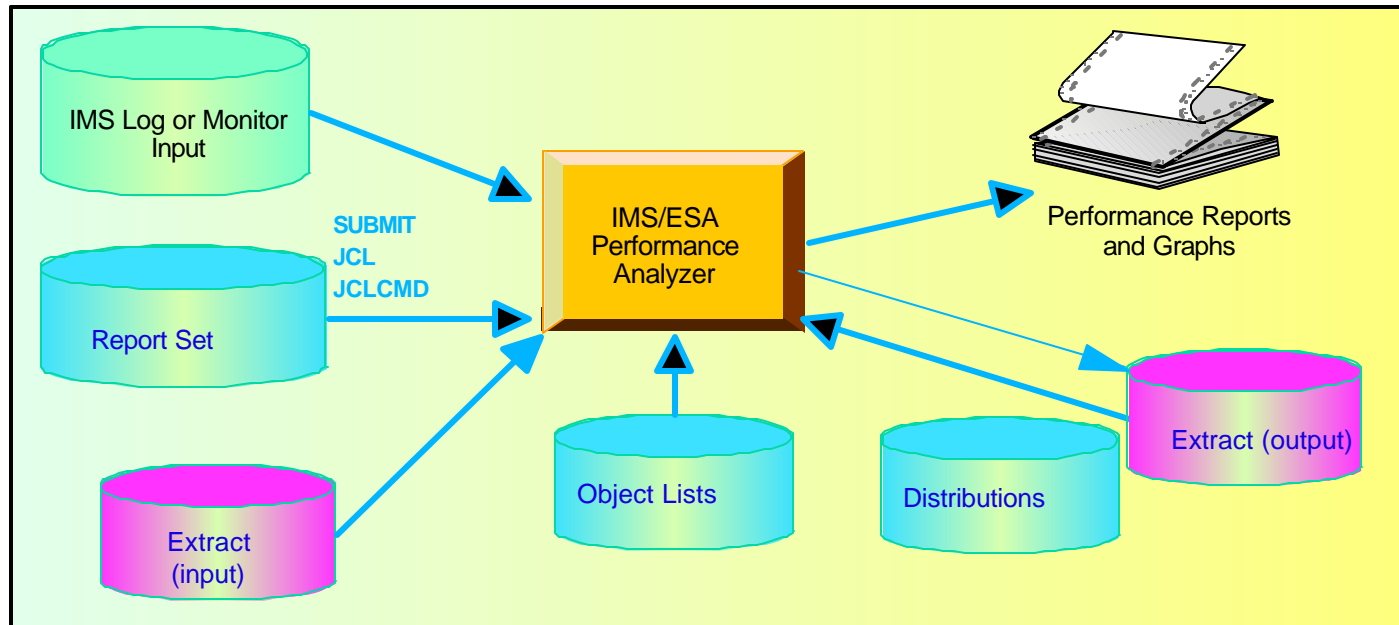
⚠ Report Set
➤ Selection of log or monitor reports with their associated options

⚠ Object List
➤ List of values that need to be specified in a report set
➤ Example of type of object list: database, IMSID, NODE, PSB, TRAN

⚠ Distribution
➤ Parameters that allow graph customization

IMS Network Compression Facility

⚠ **Replaces and enhances IMS Data Stream Tuner**
- ➤ Support for IMS V6 and IMS V7

⚠ **Functionalities**
- ➤ Compression of LU2 (3270) outbound data streams
  - Compression of all repeated characters
  - Elimination of non-display fields
- ➤ IMS specific (not VTAM) solution
- ➤ Improvement of the transaction response time to the user
- ➤ Easy installation
- ➤ No IMS or MFS changes needed
- ➤ ISPF Facility
  - Display statistics and options
  - Update currently used options
  - Trace data streams

- Are your IMS network optimization efforts a mystery?
- Are you actually exploiting all the features of available IMS network optimization products?
- Are you looking for just basic compression and monitor services?
- Would you prefer a non VTAM solution?

IMS Network Compression Facility focuses on providing low cost basic compression and optimization of IMS 3270 and LU type 2 outbound data streams. It is an IMS TM specific solution designed to help lower the cost of IMS network operations. It provides the basic services in a simple and easy to use package
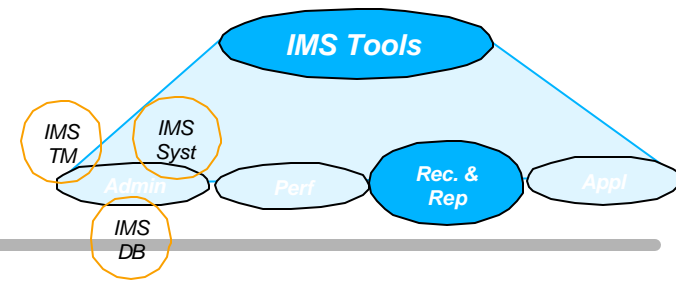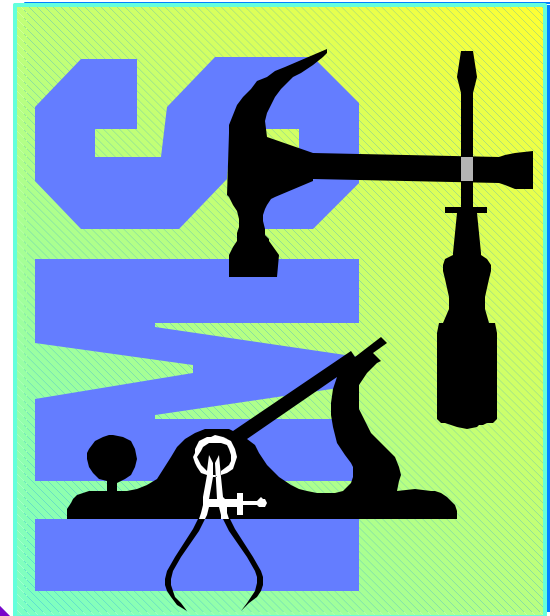
Performance Management Tools - Future

⚠ **Batch Monitor Improvements**
⚠ **Online Monitoring Capabilities**

IMS DB **Recovery** *and Replication*

IMS Recovery Related Tools

⚠ **Basic IMS Recovery Related Utilities**
- ➤ IMS Image Copy Extensions
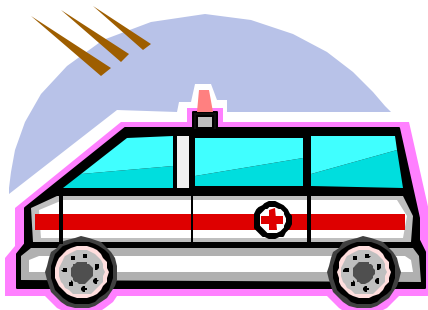- ➤ IMS DEDB Fast Recovery

⚠ **Enhanced Solutions**
- ➤ IMS Recovery Saver

- ➤ DB2 Recovery Manager
- ➤ Online Recovery Service (ORS)

IMS Image Copy Extensions 5655-E10

⚠ **Replacement for Image Copy and Recovery Utilities**
- ➤ For both Full Function DB and DEDB

⚠ **High Performance Batch or Concurrent Image Copy**
- ➤ Pointer checking during batch image copy or compressed image copy
  - Pointer Checking requires the use of the High Performance Pointer Checker tool
- ➤ Stacking of multiple output datasets
- ➤ Copying of DBRC DBDS and CAGRP Groups

⚠ **Can use Dynamic Allocation for all input and output datasets**
- ➤ one set of ICE JCL can be used for all image copies and recoveries
- ➤ can be used with or in place of DBRC GENJCL facilities

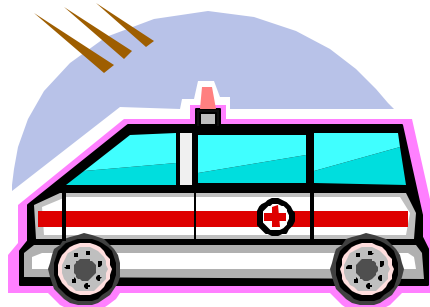⚠ **Enable image copy and hash check in a single step (for full function DBs or DEDBs) (UQ52882)**

⚠ **Avoids full DEDB AREA recoveries during enforced cold start**

    Closes the IMS Online Log

    Recovers all DEDBs (using the log)

    Produces status listing of the necessary subsequent system recovery activities

Point-of-Consistency Recovery

⚠ **IMS Recovery Saver 5655-E16**

➢ Restore an IMS system (all its databases, or a subset) to any point in time
   user does not have to quiesce IMS to create points of consistency
➢ For local system or remote site recovery
➢ Works by "altering reality"
   truncates logs to new timestamp and creates new RECON
   and so creates a point of consistency after the event
➢ Provides list of required user recovery actions

<div style="border:1px solid; background:yellow">
Fully supports N-way data sharing environments
</div>

⚠ **DB2 Recovery Manager 5697-F56**

➢ Primary function is to generate and run all the jobs necessary to recover a set of IMS and/or DB2 databases to a common point of consistency
   complements IMS Recovery Saver in this respect
➢ Provides a function for creating point of consistency across IMS and DB2
   called a "Virtual Image Copy"
   Interacts with online IMS and WAITs for BMPs to complete if updating any DB in set, issues /DBDs
   and checks for completion, Optional OLDS switch and /STA DBs
➢ Also provides facilities for registering or changing DBRC DB information, taking image copies, performing change accumulation, tidying and reorganizing RECONs

Online Recovery Service (ORS) 5655-E50

⚠ Customer Needs

- ➢ Easy recovery of shared databases and areas
  - Change accumulation is required in a data sharing environment
  - Incomplete Change Accumulation data sets cannot be used for recovery
- ➢ Database Availability
  - Recovery of database data sets and areas takes too long
  - Log data sets are read sequentially
  - Multiple DBDS and areas cannot be recovered simultaneously
- ➢ Timestamp Recovery
  - Does not allow sufficient granularity of the recovery timestamp in a data sharing, sysplex environment

⚠ Functionalities

- ➢ Online Commands used to
  - Build list of DBs/AREAs to be recovered
  - Start recovery for a list
- ➢ Online IMS is used to recover IMS database data sets
  - Input data sets read in parallel
  - DB data sets recovered in parallel
  - Change accumulation input is optional, including in a data sharing environment
  - Time stamp recovery to any time is supported
    - *All committed updates prior to this time are recovered. Later updates are discarded.*

Online Recovery Service (ORS) ...

IMS Control Region

DBRC

DLI/SAS

Database Recovery Manager

Recovery Data Manager

RECON

Fast Path Areas

DL/I DBDS

Image Copies

Change Accums

Logs
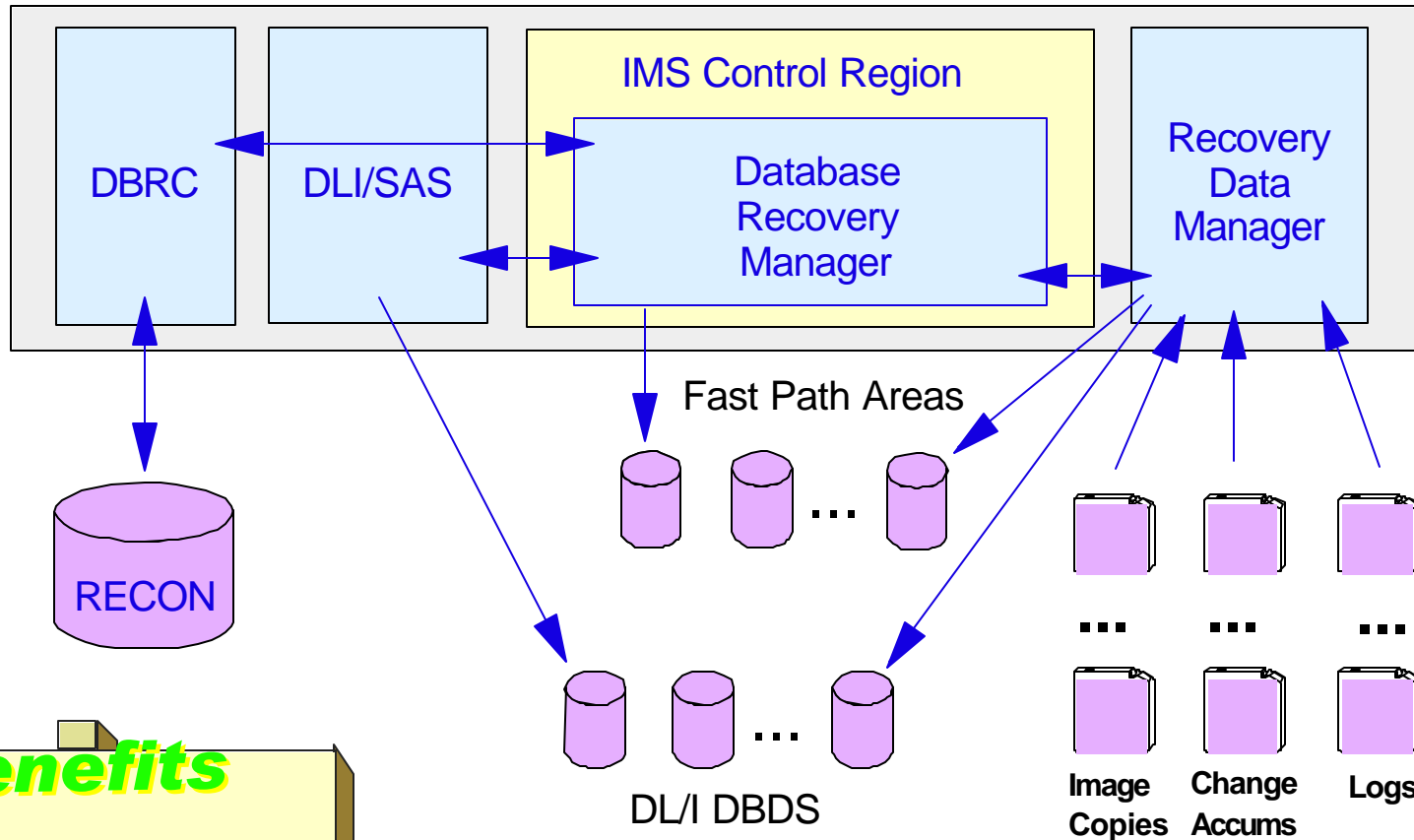
Benefits

Shorter DB Outages
Simplified Recovery

IMS DataPropagator V3 5655-E52

⚠ Customer Needs

- ➢ Decision Support
  - User access to stable data
  - Propagate only the data of interest
  - Exploit relational technology for query
- ➢ Application coexistence
  - Two masters
  - Data in both systems synchronized
- ➢ Application Migration
  - Gradual, orderly migration
  - Minimal risk

⚠ Functionalities

- ➢ IMS / DB2 MQSeries-based Data Propagation
  - Near Real-Time Asynchronous Propagation
    - *Capture Component*
    - *Apply Component*
    - *Event Marker Facility*
- ➢ IMS Log based Asynchronous Propagation
- ➢ IMS / DB2 Synchronous Propagation
- ➢ DB2 / IMS Synchronous Propagation
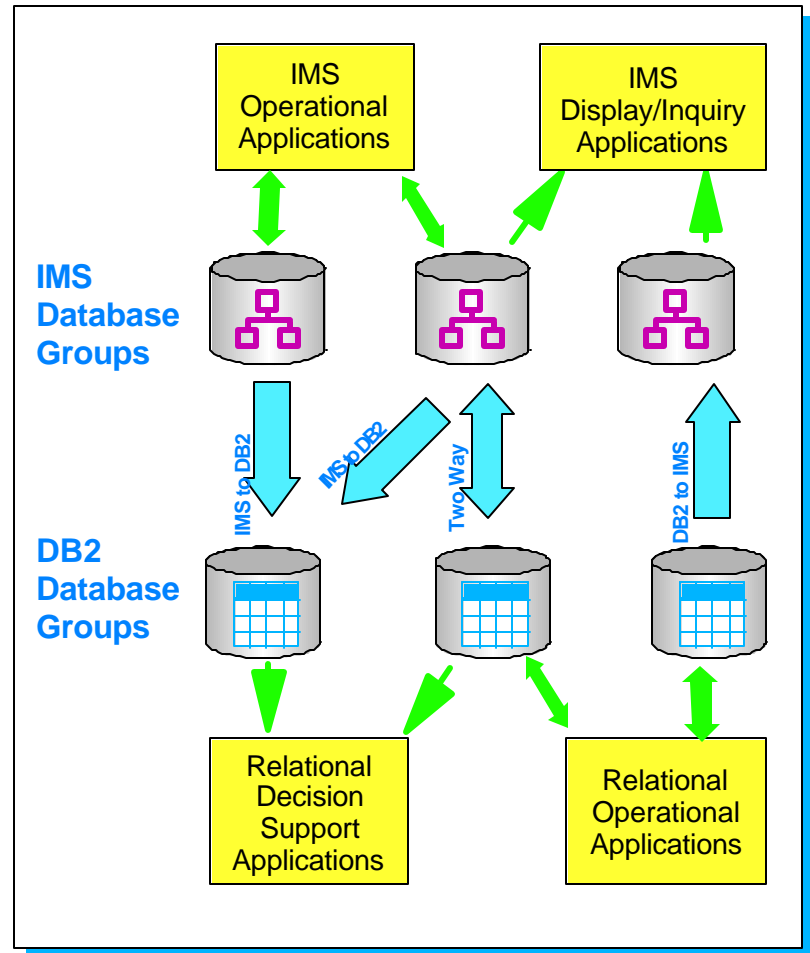
No Change to Existing Applications

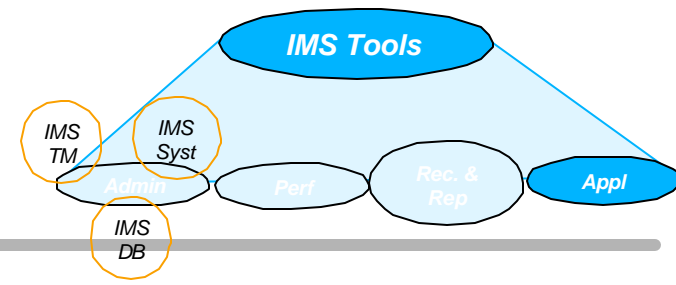# *Recovery and Replication Tools - Future*

⚠ Recovery Management

- ➢ Online Recovery - ORS enhancements
- ➢ Point in time recovery
- ➢ DB2 Coordinated recovery
- ➢ Recovery automation
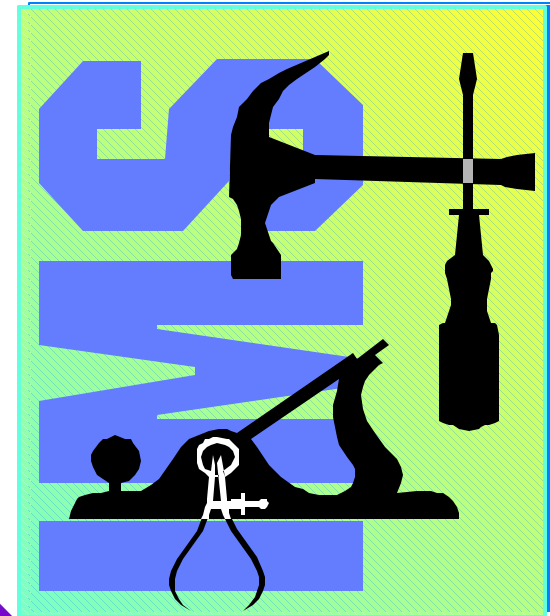- ➢ Improved usability

⚠ Replication

- ➢ Improved usability

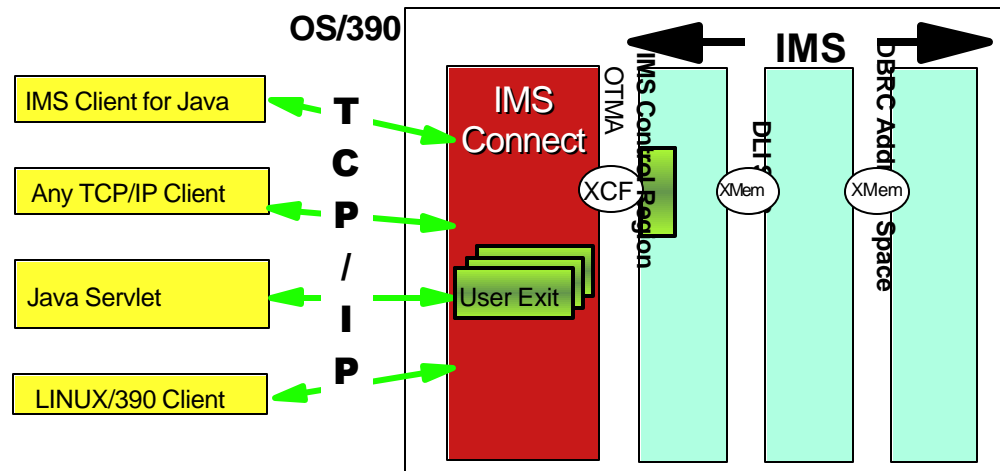# *IMS Tools for ...*

IMS Application Management

IMS Connect   5655-E51

⚠ **IMS Connect Address Space is the interface between TCP/IP and IMS transaction Manager**
  - ➤ Replaces and enhances the IMS TOC
      - "IMS TCP/IP OTMA Connector"

⚠ **IMS Connect can connect (via XCF) to any IMS systems in the sysplex**

⚠ **Supports access to IMS by LINUX/390 applications**

⚠ **The IMS Connector for Java (supplied with VisualAge for Java) enables Java Servlets or Server Pages (running in WebSphere Application Server) to access IMS transactions via IMS Connect**

IMS Connect has been benchmarked by IBM at 3,400 transactions per second (steady state; 4,000+ tps peak)
 - ★ **with single IMS and single IMS Connect address space**
  - ★ **39% CPU**

OS/390

IMS Client for Java

Any TCP/IP Client

Java Servlet

LINUX/390 Client

T C P / I P

IMS Connect

OTMA

XCF

User Exit

IMS Control Region

IMS

DLI

XMem

DBRC Addr Space

XMem

IMS Connect - Highlights

⚠ **All IMS TOC functions, plus ...**

➤ SMP/E installation and maintenance

➤ Persistent socket support (for send-then-commit OTMA protocol)

   Socket connection can be used by multiple transactions

   Provides for greater efficiency

➤ Asynchronous/unsolicited output support

   ISRTs to alternate TP PCBs

   Resend of replies following NAK'd output

   Remote application is required to ask for such output

   Synchronous output will carry flag to indicate when there is asynchronous output queued
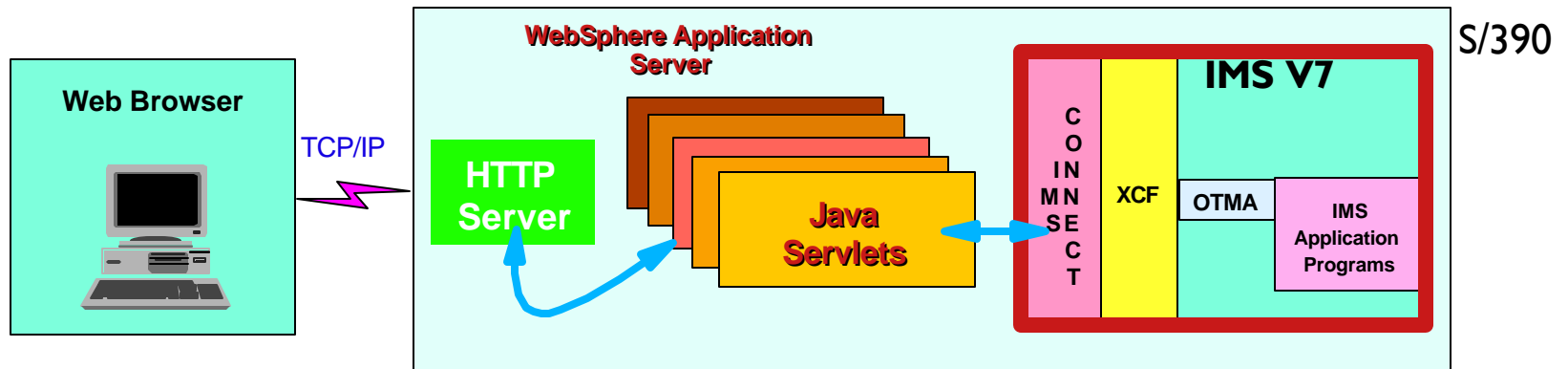
➤ Support for LINUX/390 clients
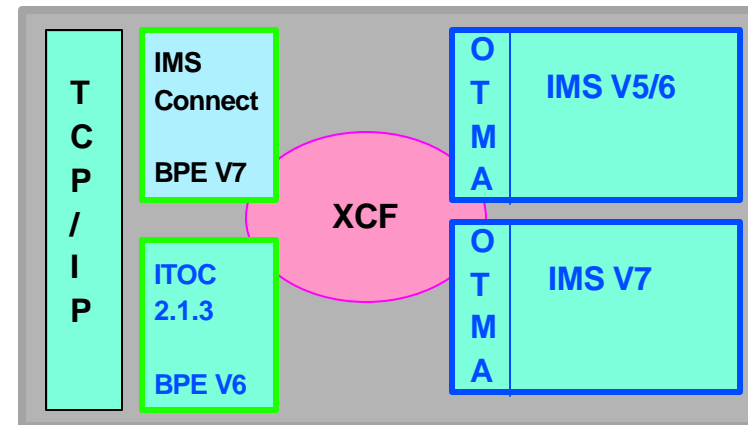
IMS Connect V1R2 Enhancements

⚠ **Local OS/390 Clients for IMS V7**

➢ Clients running on same OS/390 as IMS Connect do not need to use TCP/IP, but can communicate via cross memory services directly with IMS Connect

➢ Used by IMS Connector for Java 3.5.3

➢ Performance boost for two tier e-business solutions

WebSphere Application Server

Web Browser

TCP/IP

HTTP Server

Java Servlets

S/390

IMS V7

C O N N E C T

I M S

XCF

OTMA

IMS Application Programs

⚠ **Unicode support for IMS V7**

➢ For IMS applications that support Unicode - eg. IMS Java message processing programs

⚠ **WebSphere Adapter support via IMS Connector for Java J2C Runtime support**

➢ IMS Connector support conforms to the Java 2 Platform, Enterprise Edition, Connector Architecture Specification V1.0

➢ J2EE as the industry-wide standard version of IBM CCF

IMS Program Restart Facility 5655-E14

- **Enhances IMS Application Extended Checkpoint/Restart facilities**
  - For stand-alone batch and BMP
- **Enables restart**
  - on any system in sysplex
  - without changes to JCL
- **Implementation of PRF requires no JCL changes**
- **Can be used to restart programs that do not abend but which end with a non-zero return code**
- **Can supply global parameters to all batch/BMP jobs (ie. without JCL changes)**
  - eg. LOCKMAX=, DBRC=
- **Is especially useful in a datasharing environment to provide JCL parameters**
  - IRLM=, IRLMNM=
  - IMSGROUP=groupname + list of IMS ids in group
- **Can be used to reduce overhead of applications that are taking too frequent checkpoints**

IMS Message Format Services Reversal Utilities 5655-F45

⚠ **IMS Message Format Services (MFS) Utilities consists of two utilities**

➢ MFS Reversal

Convert MFS MID/MOD/DIF/DOF control blocks back into IMS MFS utility control statements

Lost MFS source

Suspected difference between the MFS control blocks and MFS source

utility can reverse the control blocks and compare with source

It also provides useful summary reports of the IMS FORMAT library, including the relationships among members

as well as, or instead of, creating MFS source

➢ MFS Compare

The MFS Compare is designed to compare two sets of MFS *source* libraries to quickly highlight differences between them

Batch Terminal Simulator (BTS) 5655-A14

⚠ **Call Trace facility for Application Developers**
  - ➢ DL/1 calls
  - ➢ SQL calls
  - ➢ MQ calls
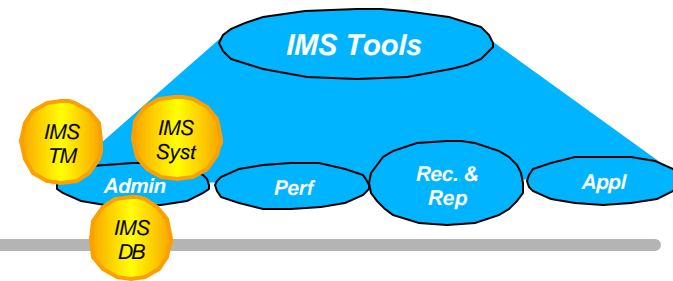
⚠ **Runs under TSO (or in batch)**
  - ➢ Displays full details of each call as it happens
  - ➢ For verifying or debugging programs
  - ➢ Printed output is useful as part of program's documentation
  - ➢ For MFS applications, the TSO screen acts as the IMS terminal screen
    - printout includes screen layout

➢ BTS did not feature in the recent announcements.
➢ BTS V2 already has IMS V7 support
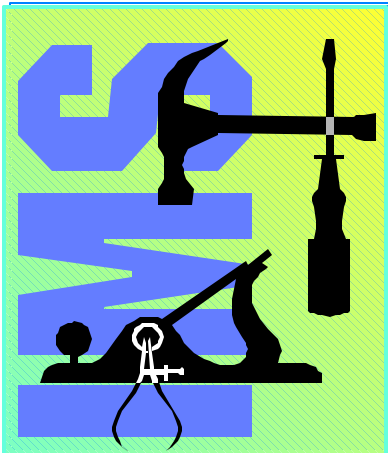➢ There are no plans to change the licensing

BTS

IMS Tools Product Portfolio

IMS Tools

IMS TM
IMS Syst
Admin
Perf
Rec. & Rep
Appl
IMS DB

IMS DB Administration

- ▶ *IMS High Performance Unload 5655-E06*
- ▶ *IMS High Performance Load 5655-E07*
- ▶ *IMS High Performance Prefix Resolution 5655-E08*
- ▶ *IMS Index Builder 5655-E24*

- ▶ *IMS Parallel Reorganization V2 5655-F74*

- ▶ *IMS High Performance Change Accumulation 5655-F59*

- ▶ *IMS High Performance Pointer Checker 5655-E09*
- ▶ *IMS Data Base Repair Facility 5655-E03*
- ▶ *IMS Library Management Utilities 5655-E04*

- ▶ *IMS Advanced ACBGEN 5655-E05*
- ▶ *IMS Sequential Randomizer Generator 5655-E11*
- ▶ *IMS Compression - Extended 5655-E02*
- ▶ *IMS Data Base Control Suite 5655-F76*
- ▶ *IMS Data Base Integrity Control Facility*
- ▶ *IMS Fast Path Basic Tools 5655-E30*
  - DEDB Unload/Reload
  - DEDB Pointer Checker
  - DEDB Tuning Aid
- ▶ *IMS Fast Path Online Tools V1 5655-E31 (V2 5655-F78)*
  - Online Pointer Checker with optional Image Copy
  - Online Data Extract
  - Online Area Extender

Performance Management

- ▶ *IMS Performance Analyzer 5655-E15*
- ▶ *IMS Network Compression Facility 5655-E41*

Recovery / Replication

- ▶ *IMS Image Copy Extensions 5655-E10*
- ▶ *IMS DEDB Fast Recovery 5655-E32*
- ▶ *IMS Recovery Saver 5655-E16*
- ▶ *DB2 Recovery Manager 5697-F56*
- ▶ *Online Recovery Service (ORS) 5655-E50*
- ▶ *IMS Data Propagation 5655-E52*

Application Management

- ▶ *IMS Connect 5655-E51*

- ▶ *IMS Message Format Services Reversal Utilities 5655-F45*
- ▶ *IMS Program Restart Facility 5655-E14*
- ▶ *Batch Terminal Simulator 5655-A14 (PSLC)*

IMS TM Administration

- ▶ *IMS Queue Control Facility 5697-E99*
- ▶ *ETO Support 5655-E12*
- ▶ *IMS Dynamic Resource Control Facility 5697-D14 (PSLC)*
- ▶ *IMS Workload Router 5697-B87 (PSLC)*

IMS System Administration

- ▶ *IMS IMS High Performance Sysgen Tools 5655-F43*
- ▶ *IMS Command Control Facility 5655-F40*

IMS Tools - Summary

⚠ **IBM's IMS Tools continue to grow and improve**
  ➢ evolution not revolution

⚠ **Performance is not an issue**
  ➢ we perform as well or better than the competition

⚠ **Impressive breadth and depth**
  ➢ a "complete spectrum" of tools
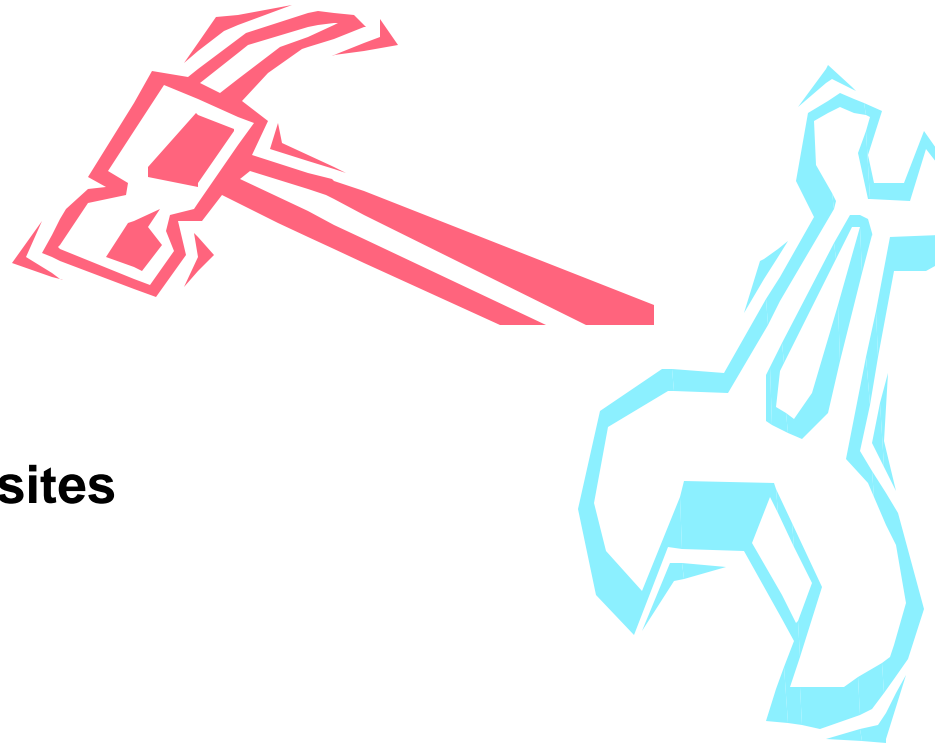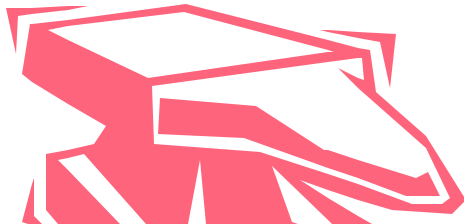
⚠ **For more information, visit our Web sites**
  ➢ IMS Home Page
      www.ibm.com/ims
  ➢ IBM IMS Tools
      www.software.ibm.com/data/db2imstools

DB2 Utilities & Tools Product Portfolio

DB2 V7 Base

- Base Utilities
  - CATMAINT
  - DIAGNOSE
  - LISTDEF
  - OPTIONS
  - QUIESCE
  - REPAIR
  - REPORT
  - TEMPLATE
- Standalone Utilities
  - DSNJLOGF
  - DSNJU003
  - DSNJU004
  - DSNUTILS
  - DSN1CHKR
  - DSN1COMP
  - DSN1COPY
  - DSN1LOGP
  - DSN1PRNT
  - DSN1SDMP
- DB2 Management Clients Package
  - Control Center
  - Stored Procedure Builder
  - DB2 Installer
  - DB2 Visual Explain
  - DB2 Estimator

Miscellaneous

- Miscellaneous
  - Net.Data for OS/390
  - DB2 Extenders
  - Rexx Language Support
- *DB2 Connect*

Database Administration

- *DB2 V7 Operational Utilities*
  - Copy
  - Load
  - Rebuild Index
  - Recover
  - Reorg Tablespace
  - Reorg Index
  - Runstats
  - Stospace
  - Unload
- *DB2 Utilities Suite*
  - DB2 V7 Operational Utilities
  - DB2 V7 Diagnostic & Recovery
- *DB2 Administration Tool*
- *DB2 High Performance Unload*
- *DB2 Automation Tool*
- *DB2 Object Comparison Tool*
- *DB2 Object Restore*
- *DB2 Log Analysis*
- *DB2 Archive Log Compression*
- *DB2 Table Editor (was DB2 Forms)*

- *DB2 Table Editor for iSeries*

Performance Management

- *DB2 Performance Monitor*
- *DB2 Buffer Pool Analyzer*
- *DB2 SQL Performance Analyzer*
- *DB2 Query Monitor*

Recovery and Migration

- *DB2 V7 Diagnostic & Recovery*
  - Check Data
  - Check Index
  - Check LOB
  - Copy to Copy
  - Mergecopy
  - Modify Recovery
  - Modify Statistics
  - Copy, Rebuild Index, Recover
- *DB2 Data Propagator*
- *DB2 Recovery Manager*
- *DB2 Row Archive Manager*
- *DB2 Change Accumulation Tool*
- *DB2 Log Analysis **

Application Management

- Base Tools
  - DB2I/SPUFI
- *DB2 Table Editor*
- *DB2 Bind Manager V2*
- *DB2 Path Checker*
- *DB2 Web Query Tool*
- *DB2 Data Export Facility*

- *DB2 Web Query Tool for iSeries*