IMS: What's New and What's Next

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- The IBM Information Management System (IMS) is unsurpassed in database and transaction processing availability and speed. With the demands of the evolving e-business environment, and a marketplace working in Web time, IMS delivers the integrity, capability, and performance customers have learned to expect from IBM.
- IBM has been enhancing the IMS Database Manager (IMS DB) and the IMS Transaction Manager (IMS TM) with new enhancements to V7 and now with IMS Version 8 (V8), which enables you to shape how you:
- Transform the way you do business with integrated information
- Build e-business applications that tolerate the rigors of doing business on the net
- Run a scalable, available, safe, and easily manageable environment
- Leverage everything you learn in the process, and mine all your information to make better decisions
- IMS TM continues as IBM's premier transaction server for environments that employ relational and hierarchical data stores and require the utmost in integrity, capacity, availability, and performance for e-business and enterprise computing environments.
- IMS DB continues as IBM's premier hierarchical database server to provide and enhance high performance/capacity, superior integrity, and continuously available database management solutions for IMS TM and CICS users.

35 Years and still leading the industry !!!

e-business

e-business powered by IMS
IMS
the world depends on it

Web Services
JDBC Access
Internet Access
2000+
> 2500 Transactions Per Second
> 1000 Transactions Per Second
> 11000 Transactions Per Second
Concurrent Image Copy
Extended Terminal Option (ETO)
Shared Message Queues
APPC/IMS
Multiple Systems Coupling (MSC)
Remote Site Recovery
Local Hot Standby DBMS (XRF)
Data Base Concurrent Update From Multiple User/ System
Parallel Systems N-Way Data Sharing
Batch
Exploit MP Architecture
2-way Data Sharing
DBMS
1968
Two Phase Commit
Deadlock Detection

IBM Software

- Since its inception, IMS has been at the forefront of technology in Database and Transaction Management
- IMS has been the first at delivering IBM solutions
- Some examples are:
- Multiple Systems Coupling Facility - IMS has been distributing workload across multiple systems for a long time,
- Datasharing -- IMS has been the first to provide 2-way and then N-way data sharing, and extended that to Message sharing and network sharing as well.
- eXtended Recovery Facility provides a hot standby capability for IMS customers. IMS is the only DB/TM system to provide this level of high availability takeover support; the same is true for Remote site Recovery
- IMS Fast Path continues to support the highest transaction per second database access solution
- As we move further into the new era of computing, IMS is still leading the way. More than 30 years since the first IMS-ready message for the Apollo Space program, IMS and the zSeries are breaking technology barriers, but sometimes taken for granted. But we continue to lead the industry in performance, availability and ebusiness enablement.

IMS Runs the World...

Most Corporate Data is Managed by IMS

- Over 95% of Fortune 1000 Companies use IMS
- IMS Manages over 15 Billion GBs of Production Data
- $2.5 Trillion/day transferred through IMS by one customer

Over 50 Billion Transactions a Day run through IMS

- IMS Serves Close to 200 Million Users a Day
- Over 100 Million IMS Trans/Day Handled by One Customer
- 120M IMS Trans/day, 7M per hour handled by one customer
- 6000 Trans/sec across TCP/IP to single IMS
- 11,700 Trans/sec (over 1 Billion/day) with IMS Data/Queued sharing on a single processor

Gartner Group: **"A large and loyal IMS installed base. Rock-solid reputation of a transactional workhorse for very large workloads. Successfully proven in large, Web-based applications. IMS is still a viable, even unmatched, platform to implement very large OLTP systems, and, in combination with Web Application Server technology, it can be a foundation for a new generation of Web-based, high-workload applications."**

IBM Software

- Industries worldwide rely on IMS to run their businesses. IMS is part of everyday life. Chances are you are using IMS when you turn on a light, make a telephone call, get a business loan, process accounting records, use your ATM card, put money in a bank, rent a car, purchase insurance, travel, send a package, track in-transit packages, trade stocks, control inventories, process payroll, update personnel records, control an assembly line, control a railroad, use corporate database, run a government agency, conduct international business/banking, and many more.
- More than ninety-percent of the Fortune 1000 companies use IMS. IMS serves 200 million end users, managing over 15 billion Gigabytes of production data and processing over 50 billion transactions every day. IMS still owns the high-volume on-line transaction and database management environment.
- IMS customers have been driving their own growth and the world's business with IMS
- One customer had transferred over $2.5 Trillion through IMS in a single day.
- Over 100 million transactions were handled by one customer in a single day on a single sysplex system
- 7 million Transactions/ hour and 120 million transactions/day were handled by another customer.
- IMS in-house testing has reached nearly 6000 transactions/sec across TCP/IP to a single IMS on a single machine. That equates to over 500 Million per day.
- And we have reached over 11,700 trans/sec (over 1 Billion trans/day) with IMS Data/Queued Sharing on a single zSeries machine (limited only by the size of the processor used in testing).
- One large customer has also indicated they have reached over 3000 days without an outage and still going strong.
- IMS, IBM's premier hierarchical transaction and database management system, is the product of choice for critical on-line operational applications and data where support for high availability, performance, capacity and integrity, and low cost are key factors. Today, IMS manages the world's mission-critical data and has been at the forefront of the swing back to mainframe usage.
- A recent Gartner Group Vendor Catalog entry stated "A large and loyal IMS installed base. Rock-solid reputation of a transactional workhorse for very large workloads. Successfully proven in large, Web-based applications. IMS is still a viable, even unmatched, platform to implement very large OLTP systems, and, in combination with Web Application Server technology, it can be a foundation for a new generation of Web-based, high-workload applications."

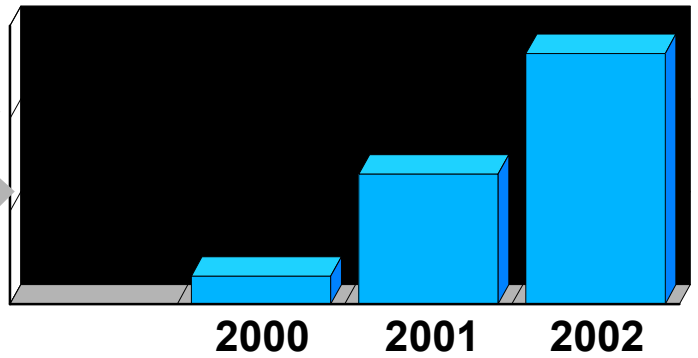
IMS: The World Depends on it

- 2 yr. IMS Mips Growth +28%
- DM Tools +38% Growth
- Greater than 1300 customers in IMS V7 production *
- 2002 Revenue Growing
  - Version to version upgrades
  - New license growth

IMS V7 Fastest in Customer Acceptance

Highest in Customer Satisfaction

IMS V7 License Growth



IBM Software

- There is no better way to show the value and strength of IMS to its customers and to IBM then through its increased growth.
- Customer's IMS Mips have been growing rapidly over the past two years at a rate of 28%.
- Their IMS Data Management Tools have also been growing at a rate of 38%
- IMS V7 installations have also been growing rapidly with greater then 1300 customers in production with IMS V7.
- And the Revenue stream for IMS has been growing year to year with version upgrades and new license growth.

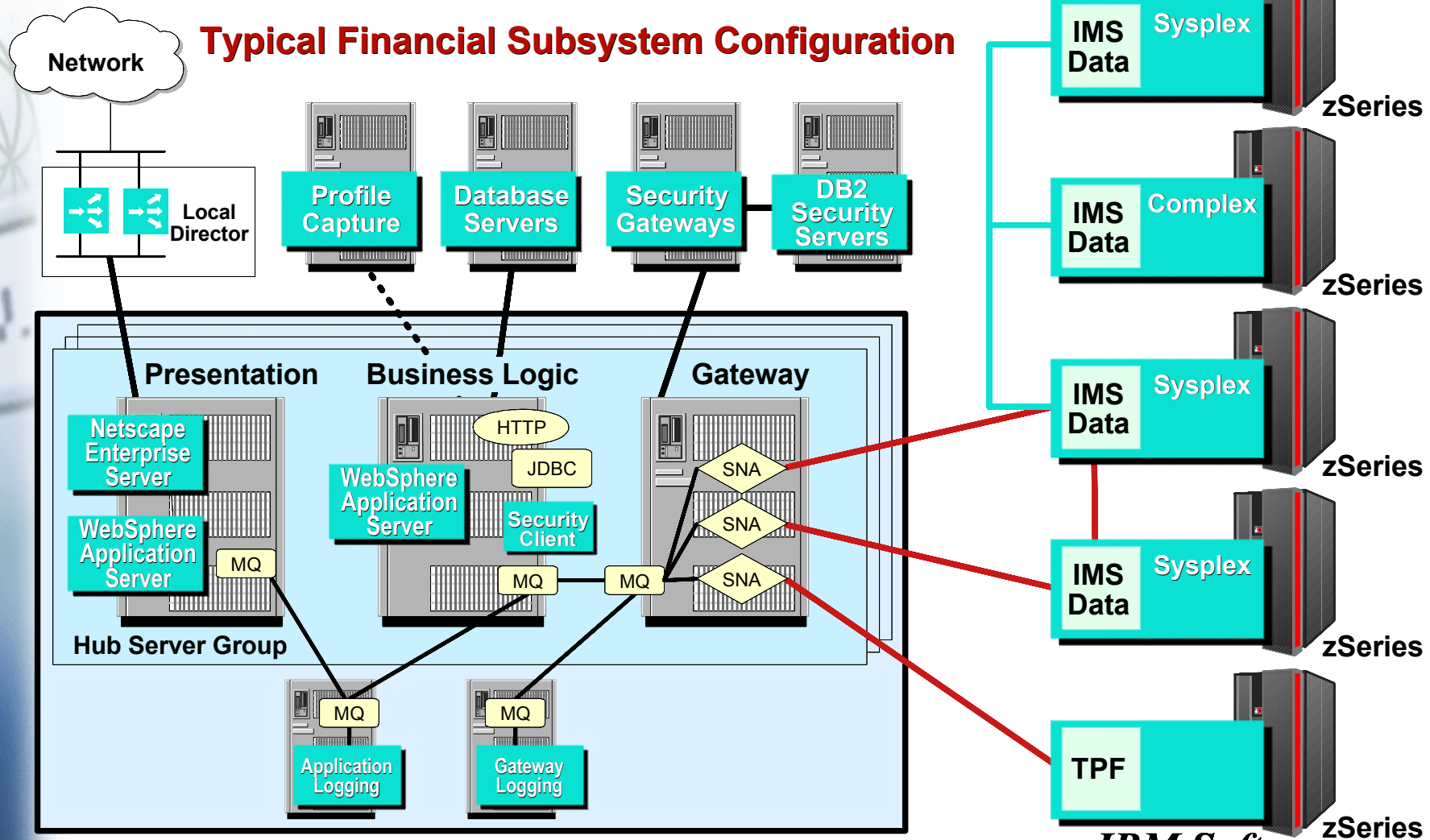
Infrastructure Trends: Complex System Topology

e-business

e-business powered by IMS — IMS — the world depends on it

The increasing challenge of managing large systems is due to the inherent complexity of the solution and the sheer number of heterogeneous components

Typical Financial Subsystem Configuration



Front-end for Web presence for financial services

IBM Software

- Information technology has significantly changed to address the changing world of business. Market forces have been changing the way we do business. Regulation, economics, have been changing as businesses become more global. Growth of the internet, the global reach, the new commerce channels are changing the way everybody does business, like the upswing in mergers and acquisitions. Views into information are becoming as important as the information itself. Amalgamation and aggregation have become widespread in the industry. Businesses are exploiting new technologies to enable new customers with new information across the web, in a global day. Businesses are being challenged with balancing priorities and need new ways to gain and retain competitive edge to address increasing demands and sophistication of their customers. IMS customers are at the bleeding edge of this reality. Yet at its heart, business stays the same. Industry forces are making the highest demands for performance and availability, along with interoperability, flexibility, and support for new, emerging technologies. This is something IMS people have been hearing for years. And IMS continues to help efficiently provide heterogeneous access across global networks and in addressing companies' changing needs. IBM is providing integrated solutions with IMS to help our customers with on demand processing. And the increasing challenges of managing the complexity of the solution and the sheer number of heterogeneous components are being addressed by IMS and the environment/products with which it runs.

IMS Is Ideal For e-business

- IMS is ideally suited to be the backbone of e-business solutions:
  - IMS is secure
    - z/OS and IMS offer significant security options
  - IMS is scalable with high performance
    - The Internet can introduce unpredictable volumes
    - IMS already drives the worlds largest workloads
  - and with high availability
    - The Internet requires 24 x 7 x 365
    - IMS provides the highest availability
  - e-business with IMS offers investment protection

Linux enabled !!!

... run your e- business applications on Linux and connect through IMS Connect

IBM Software

- e-business is no longer simply about static web pages -- it's about putting your entire business on the internet, integrating new applications with existing transaction systems to handle the explosive growth of the Internet economy. It's a place where customers, suppliers, and business can come together securely, anywhere, any time.
- e-transaction processing is about the evolution of e-business. Extreme IT needs for e-transaction processing are scalability, non-disruptive capacity upgrades, availability, security, flexibility , high bandwidth, balanced systems with ability to handle mixed workloads and system and storage management. Advanced Transaction processing calls for continuous up time for applications, high levels of security, end-to-end business transaction integrity, real time data currency, and management of unpredictable volumes.
- IBM is delivering the ideal solution for our customers in addressing their e-business needs for this complex environment, providing simpler and more integrated solutions, and continuing the focus on software that lasts forever.
- IMS customers, comprised of many of the largest, leading edge companies, demand solutions that can provide consistent support across a wide variety of products and flexibility in addressing a number of very specific, unique demands. For this, these solutions make use of standard communication protocols, flexible mapping, and application building tools on a variety of platforms.
- In this continuing internet evolution, these solutions are continuing to be enhanced. IMS enhancements and tools are continuing to be provided which improve internet security, performance, and predictability, help simplify Internet access, and offer more flexibility in enhancing and writing new applications to exploit the capability of the Web. This includes Linux access through IMS Connect to IMS.

IMS Continues to Address Challenges of a Rapidly Changing World

Providing Quality through

- **Information Integration with New Application Development/Connectivity**
  - ✓ Ease/broaden user access
  - ✓ Web, Java, XML and Linux access
  - ✓ Ease application developer effort
  - ✓ Auto-application-generation tools
- **Manageability**
  - ✓ Ease installation and operations efforts
  - ✓ High levels of security
  - ✓ End-to-end transaction integrity
  - ✓ Real time data currency
  - ✓ Highest code quality
- **System Scalability in Performance/Capacity/Availability/Recovery**
  - ✓ Handling increasing workload
  - ✓ Handling unpredictable volumes
  - ✓ More hours for workload
  - ✓ Continuous up time for applications and user access
- **e-business with IMS extends the investment**

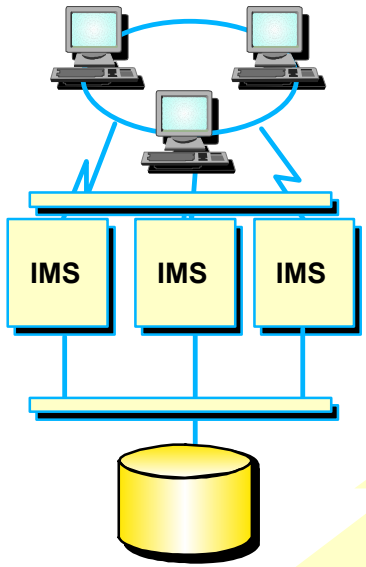
IBM Software

- IMS is continuing to address the challenges of a rapidly changing world. It is providing the utmost in quality through
- Information Integration with new Application Development/Connectivity solutions. These solutions ease and broaden user access, opening IMS applications and data up to the Web, Java, XML and Linux environments. New technology and automatic application generation tooling ease application developer efforts.
- IMS along with the S/390 and the z/Series have been providing solutions to ease Manageability as well. These solutions ease installation and operations efforts, provide a high level of security, end-to-end transaction integrity, and real time data currency,
- Systems Scalability is also provided to handle the increasing workload and unpredictable volumes, as well as more hours for workload and the continuous uptime demands for applications and user access.
- All of this is provided with the highest quality and availability and for the lowest cost of computing. Customers are using this power to take on new e-business related applications, greatly extending their investments.

IMS - Version 7

Ideal for e-business

- ✓ Information Integration with Application Development and Connectivity
- ✓ Manageability
- ✓ Scalability in Performance, Capacity, and Availability



Enhancements

- Extended Large DB support
- Enhanced DB recovery
- Faster Restart with Multinode Persistent Sessions
- IMS Java Application support
- Enhanced Connectivity
- Enhanced Systems Mgmt Tools

Benefits

- ✓ Enable Customer Growth
- ✓ Enhance Workload Balancing
- ✓ Increase Availability; Ease of Use
- ✓ Preserve Current Application Investment
- ✓ Enable New Applications

Strategic Open Access for S/390 and z/Series Enterprise Servers

IBM Software

- To help all our customer with growth, availability, and systems management, we have been providing IMS Version 7 and a number of related tools.
- IMS V7 extended its large database support and extending partitioning to other database types.
- IMS V7 is providing enhanced support for database recovery.
- IMS V7 is providing the Rapid Network Reconnect facility, providing faster reconnect, utilizing the facilities of VTAM's Multinode Persistent Sessions.
- Other support in IMS V7 is being provided to enhance operations across the Sysplex, and to improve workload balancing, single system image, and backup and recovery.
- One of the many tools provided alongside IMS V7 is the Online Recovery Service facility, for improved availability.
- Another tool is IMS Connect, a high performance facility for enhanced TCP/IP and local/390 access to IMS.
- These enhancements, as well as additional items, are provided to continue improvement in availability, systems management, performance/capacity, and for optimizing use of IMS in enterprise and network computing environments.

IMS V7 Database Manager Enhancements

Integration with Applic Devt/Connectivity

- **IMS Java and XML support**
- **Open Database Access (ODBA)**

Manageability

- **Installation enhancements**
  - ►Usability enhancements
  - ►HALDB samples
- **Logger enhancements**
  - ►Administration and Control
- **External Subsystem Attach Facility diagnostic enhancements**
- **IMS systems parameter display**
- **Fast Path Enhancements**
  - ►I/O toleration enhancements
  - ►Performance monitoring support
  - ►Multiple Area Data Set I/O Timing
  - ►Expansion of compressed data for Single dependent segment Scan
  - ►IMS Monitor enhancements for FP

Scalability in Performance, Capacity and Availability

- **High Availability Large Database**
- **Application Control Block Generation (ACBGEN) enhancements**
  - ►increased number of program limits
  - ►time/version info added
- **DBRC Enhancements**
  - ►Recovery Control (RECON) online upgrade, online access, large record warning, loss notification, improved diagnostics
  - ►Image Copy Genmax and Recovery enhancement
  - ►DB administration enhancements
- **Forward Recovery enhancements**
  - ►Change accumulation spill record handling for smaller, faster change accums
- **Image Copy 2 Enhancements**
  - ►compression option added for space savings
- **I/O Performance enhancements**
  - ►Ficon support
  - ►ESS support
- **CSA Constraint relief**

IBM Software

- IMS V7 Database Management enhancements also include: Improved availability in database recovery and reorganization, increased performance in database size, and improved systems management in diagnostics and error handling. To name a few of these additional enhancements:
- High Availability Large Databases provided significant increase to database size to provide virtually-unlimited databases and provide for partitioning of that data for reorganization without taking the database down.
- IMS Database Recovery Control (DBRC) enhancements improve diagnostics information, improve Database integrity protection, eliminate abends, provide large Recon record support, Recon loss notification, and online upgrade for migration/coexistence.
- Storage relief is provided through the use of: Common Storage Area (CSA) constraint relief, providing more below-the-line 16M Common Storage Area usage is made available by moving modules and control blocks above the 16M line.
- Image Copy 2 Enhancements - IMS V7 provides a specification in the control card to allow the user to invoke compression for the copy. Alternatively, the DBRC.GENJCL.IC command can be used.
- Change Accumulation Enhancements - In a block level data sharing environment, the Change Accum Utility creates spill records which are used for later runs of the utility whenever the utility does not have all the logs that were produced while data sharing was active. IMS V7 will produce fewer spill records than in IMS V6. The Database Recovery utility cannot accept change accum date sets with spill records; however the Online Recovery Service facility will accept these inputs.
- Application Control Block (ACB) Gen Enhancements - IMS V7 adds a time and IMS version to FP DMBs in ACBLIB, similar to that available for Full Function MBs and provides other miscellaneous changes to ACBGEN to improve performance and diagnostics.
- Logger enhancements are provided with more dynamic capability to change system checkpoint frequency which improves system management and availability. A number of other systems management enhancements to the logger are also provided.
- The Installation and installation verification process (IVP) panels are changed to have the same look and feel as panels for other IBM products. Support is also provided for Data Facility Storage Management Facility (DFSMS) constructs and HALDB sample applications
- Fast Path database enhancements are provided for Data Entry Database (DEDB) I/O Toleration improving handling of write errors, as well as the addition of support for performance monitoring capabilities.
- MADSIOT=(list structure name,timeout value) is a new keyword in DFSVSMxx that controls the detection of a "long busy" state. This support is applicable only in a MADS environment . The timeout value, expressed in seconds, causes no further access to the ADS and all read/write operations go to a good ADS. When the "long busy" condition is over, the ADS is recovered using the contents of the good ADS from the list of CIs saved in the Coupling Facility.
- A new keyword, EXPANDSEG, is allowed on the SCAN Utility SYSIN stream. The SCAN Utility detects the Compression Exit specified on the DBD. The SCAN user exit is passed the expanded segment for both the SORT and NOSORT cases. The DFS2671 message is changed to indicate which user exit is used and the number of segments expanded.
- The IMS V7 Monitor provides monitoring of Fast Path resources. It also supports "constraints" or limitations which can be placed on what is monitored for both the full function database and fast path environments.. For example, monitoring can be limited to specific databases , areas, dependent regions or to a specific time interval. only. This support does not include any extended reporting capability.

IMS V7 Transaction Manager Enhancements

e-business

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Integration with Application Devt and Connectivity

- **IMS Java and XML support**
- **OTMA Callable Interface**
- **ETO Enhancements**
  - ►Associated Printer support
  - ►Autologon enhancements
  - ►LTERM assignment flexibility
  - ►ETO descriptor record limit removed
  - ►Command Compatibility

Manageability

- **Sysplex Queue Sharing Enhanced**
  - ►CQS enhancements for Shared Queues
  - ►Asynch APPC/OTMA for Shared Queues
- **Routing Exit enhancements**
- **RACF Pass Ticket Support**
- **Clarified USERID for applications**
- **External Subsystem Attach Facility (for DB2) Trace enhancements**
- **Installation enhancements**
  - ►Usability enhancements
  - ►Java samples
- **IMS systems parameter display**

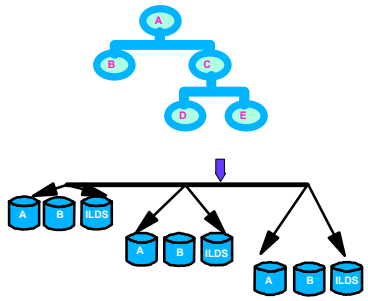
Scalability in performance, capacity, and availability

- **Rapid Network Reconnect**
- **Deferred VTAM ACB Open to prevent time-outs**
- **Improved checkpoint frequency control**
- **SLUP Finance Session Coldstart capability**
- **VTAM Generic Resources enhancement for VTAM to manage the affinity**
- **Queue Space Notification Exit**
- **I/O SPOOL usability and performance enhancements**
- **SLU2 exception response enhancement**

IBM Software

- The IMS V7 Transaction Manager is also providing many additional enhancements -- in the area of application development and connectivity, systems management, sysplex sharing, network load balancing, capacity and availability. To name a few of these additional enhancements:
- Rapid Network Reconnect, utilizing the facilities of VTAMs Multinode Persistent Sessions, permits IMS TM to automatically reconnect terminal sessions following any kind of IMS failure and subsequent IMS restart, thereby reducing network reconnect time after IMS, MVS or VTAM failure in a sysplex environment. It provides fast terminal reconnect to IMS by eliminating terminal logons and VTAM session startup traffic. IMS restart is required after IMS failure.
- Shared Queues and Fast Path sharing enhancements, utilizing the coupling facility, provide asynchronous APPC/OTMA (open transaction manager access facility) shared message queue enablement, additional client support (multiple clients and additional client information and control), enable user autologon for a printer when application output becomes available and performance ad miscellaneous enhancements to shared Fast Path Expedited Message Handler (EMH) and Sequential Dependent Segments (SDEP's).
- Associated Printer Support: By enabling autologon to a printer, enqueued messages from a backend application can be delivered to the associated front end printer when shared queues is
- Queue Space Notification Exit enhancement: The exit is notified of a stopped destination so that action could be taken to prevent the system from being saturated with undeliverable messages.
- RACF (or equivalent) Pass Ticket Support: The /SIGN ON command accepts a new keyword, APPL, which allows an application name to be specified when creating a Pass Ticket . A Pass Ticket is used as an alternative to a password and removes the need to send RACF (or equivalent) passwords across the network.
- Spool Enhancements: A new IMSWT= specification is allowed in DFSDCxxx. A five character specification replaces the first five characters of the IMSWTxxxJOBNAME in the /START REGION IMSWTxxx for auto scheduling the spool print utility.
- Autologon (ETO enhancement): When a user is signed on to an ETO terminal interactively, such as in an interactive signon, or using the /OPNDST command, that terminal is not available for autologon of other users until the first user is signed off, either via /SIGN OFF or via an ASOT timeout.
- ETO descriptor limit: The existing limit of 50 records per descriptor for ETO descriptors is removed.
- IMS is being made Tivoli ready and enhancements are being provided for management of IMS through the Tivoli Global Enterprise Manager, and the Tivoli Manager for OS/390

IMS V7 HALDB for IMPROVED CAPACITY & DATA AVAILABILITY



- ✓ Extends IMS Full Function database size
  - ➡ 1001 Partitions x 10 data set groups x 4G = 40 Terabytes
- ✓ Provides data availability through partition independence
- ✓ Provides easier manageability with smaller partitions of the database
- ✓ **Enhancements since IMS V7 GA:**
  - ➡ Performance Improvements in Secondary index migration, Indirect list data sets (ILDS) creation, DFSMAID0, Secondary index option during Load
  - ➡ Management Improvements with Recon Partition List Command support, Batch command initialization and change/delete of HALDB and associated partitions, Limit BMP/Batch/JBP Calls to one partition, Unload Reload status enhancement

- IMS V7 High Availability Large Data Base Support allows for 1001 partitions to a max capacity of 40 gigabyte each. This means you can have over 40 Terabytes OSAM and VSAM databases. That would be 20,000 3390 devices. This works out to 6600 bytes for each person on earth. This compares to V5/6 when we just expanded to allow 8 gigabyte databases
- This support also allows for a partition to be taken offline, have something done to it and be independently brought back online. This means each partition could be individually unloaded and reloaded and while offline a batch reorg could be done to on it. Or the entire database could be taken offline and each partition could be reorged in parallel, greatly speeding up the offline reorg process.
- Since delivery of IMS V7 HALDB we have been providing additional enhancements for performance and manageability to ensure this as the base for any future database activity. Performance improvements were provided in secondary index migration, ILOG data sets (ILDS) creation, and DFMAIDO. Management enhancements were provided with RECON partition LIST command support and Batch Command initialization of HALDB and its associated partitions.

Assicurazioni Generali implementing HALDB

Challenge:

- Partition DB Support solved the database size limit back in 1997, but availability issues also needed to be addressed.

Solution:

- IMS V7 HALDB

Benefits:

- Secondary Index Partitioning
- Concurrency
- IMS code
- Availability with Parallel IC/REORG/RECOVERY
- Capacity for planned 30GB DB with 9 partitions

The insurer without frontiers

- The Generali Group consists of 500 companies directly or indirectly controlled by the Trieste-based Parent Company, Assicurazioni Generali, Italy's top insurance company. The Generali Group carries on insurance operations in some 50 markets over the five continents, through a network of more than 140 local units (branches and subsidiary companies) as well as through a number of specialized offices providing assistance to multinational clients the world over. In terms of written premiums, the Generali Group holds the third place in Europe and ranks among the 20 largest insurers at world level.
- IMS has a strong presence in Generali's Italian IT infrastructure. Five IMS Systems (two production) run the major IMS business critical applications. First and only company in Italy with IMS DB FF Partitioning (since 1997), QPP customer for IMS Version 4.1 in 1990 (ETO Support) and IMS Version 7 in 2000 (HALDB & IMS Connect). HALDB and IMS Connect are the major IMS projects undergoing this year. Planned production for HALDB and IMS Connect is 2Q 2001.
- Generali is implementing HALDB in 2Q2001 to provide the capacity and availability they require for their databases.
- Secondary Indexes - with HALDB you can now partition secondary indexes
- IMS code - Generali are really pleased that the solution they will use is integrated in as "IMS code" as opposed to a separate product.
- Availability due to parallel ic/reorg/recovery - their data is more available as a partition at a time (or in parallel) can be image copied/reorged/or recovered. (Not the entire DB is affected)
- HALDB gives them the capacity to be able to store 30GB of data in 9 partitions for one of their DBs (but it is also capable of handling even bigger DBs)

IMS V7 DB Recovery Control Facility Enhancements

- **DBRC Concurrent RECON Upgrade**
  - RECON can be upgraded without stopping pre-IMS V7 systems
- **RECON Loss Notification**
  - MVS console message for RECON loss
  - Benefit - automation aid
- **DBRC Support for PROCOPT=L/LS**
  - Image Copy required at initial database load
  - Benefit - improved data integrity
- **DBRC Image Copy GENMAX**
  - GENMAX no longer automatically increased when number of image copies specified is exceeded
  - Benefit - usability
- **Large RECON record warning**
  - Warning message
  - Benefit - automation aid, increased availability
- **RECON Access improvement**
  - Change to scheme to serialize accesses to RECON
    - online system favored over batch jobs
  - Benefit - reduced I/O bottlenecks that impact online systems
- **DBRC serviceability**
  - LIST.DBDSGRP, LIST.HISTORY enhancements

✓ **Enhancements since IMS V7 GA:**

- ➡ **Support of HALDB performance/management enhancements**
- ➡ **List History timeline - can just point to the timeline only**
- ➡ **DD Cards - alt DD for SYSIN**
- ➡ **Genjcl user partition support**

IBM Software

- Numerous other enhancements in IMS V7 relate to IMS Database Recovery Control (DBRC):
- DBRC Support for PROCOPT=L/LS -- In IMS V7, DBRC requires an image copy after a load application (PROCIOPT=L/LS) has run and will issue a warning message for databases being updated without an image copy. Prior to IMS V7, DBRC did not require a valid recovery point after a load application had been run.
- DBRC Concurrent RECON Upgrade -- Prior to IMS V7, all IMS activity needs to be shut down in order to upgrade the RECON to a new release level. IMS V7 provides a new CHANGE.RECON.UPGRADE command that can be issued from a DBRC batch job. The RECON must have been created by DBRC in IMS V6 or been upgraded to the V6 level. The RECON Batch Upgrade Utility is still supported for pre-V6 RECONs.
- DBRC IC GENMAX Changes --In IMS V7, the GENMAX value will no longer be increased automatically. It can only be changed using the CHANGE.DBDS command.
- DBRC Serviceability enhancements --Debugging recovery problems often requires knowing the precise order in which different events affecting a database occurred. The LIST.HISTORY command provided much information, but the user was required to construct his own timeline. IMS V7 DBRC provides a graphical timeline that interrelates all activities and reduces the amount of records printed for any given Database Definitions (DBDs) or areas. Also prior to IMS V7, there was no option to provide a list of DBDSGRP names which have a member for a specific named DBD. IMS V7 provides a new optional value on the existing ALL parameter which lists all of the DBDSGRP records containing the specified member(s).
- In addition, DBRC enhancements have been provided since GA in 2001 and we've continued providing these into 2002 to ensure support of the new HALDB performance and management enhancements as well as:
- to provide List History timeline to allow you to just point to the timeline only - The timeline is a graphic representation of the output produced from a LIST.HISTORY request. It is included at the end of the listing of records for the given request - the amount of this output can be sizable. There are times when it is desired to only view the timeline. This item provides this option.
- DD Cards providing alt DD for SYSIN - This is an interface into DBRC that allows the caller to specify and alternate SYSIN, SYSPRINT and/or IMS datasets.
- Genjcl user partition support - A GENJCL.USER command that specified a partition dataset would repeat the process for each DBDS under the Master data base rather than just the DBDSs under the specified partition data base. This produced duplicate and unwanted output. This item provides an option to specify that only DBDSs under the partition DB be processed.

IMS V7 Java supports Integrated e-business Application Development

- **Providing the capability to write, compile and run IMS Java programs**
  - Provides a set of packages (groups of classes) for input-output message handling and access to IMS services, and support APIs familiar to Java programmers
  - Applications written in Java can run in IMS as MPPs, BMPs, IFPs
- **Using the APIs/Tools familiar to Java programmers**
  - JDBC for data access to IMS DB and/or DB2
  - Host and VisualAge tools for development
    - Compile using High Performance Java Compiler or Persistent Reusable Java Virtual Machine
      - ► Create VisualAge projects and do Remote Build
      - ► Edit using VisualAge editor
    - Remote debugging using VAJava Remote Debug tool
    - Performance Tracing

IBM Software

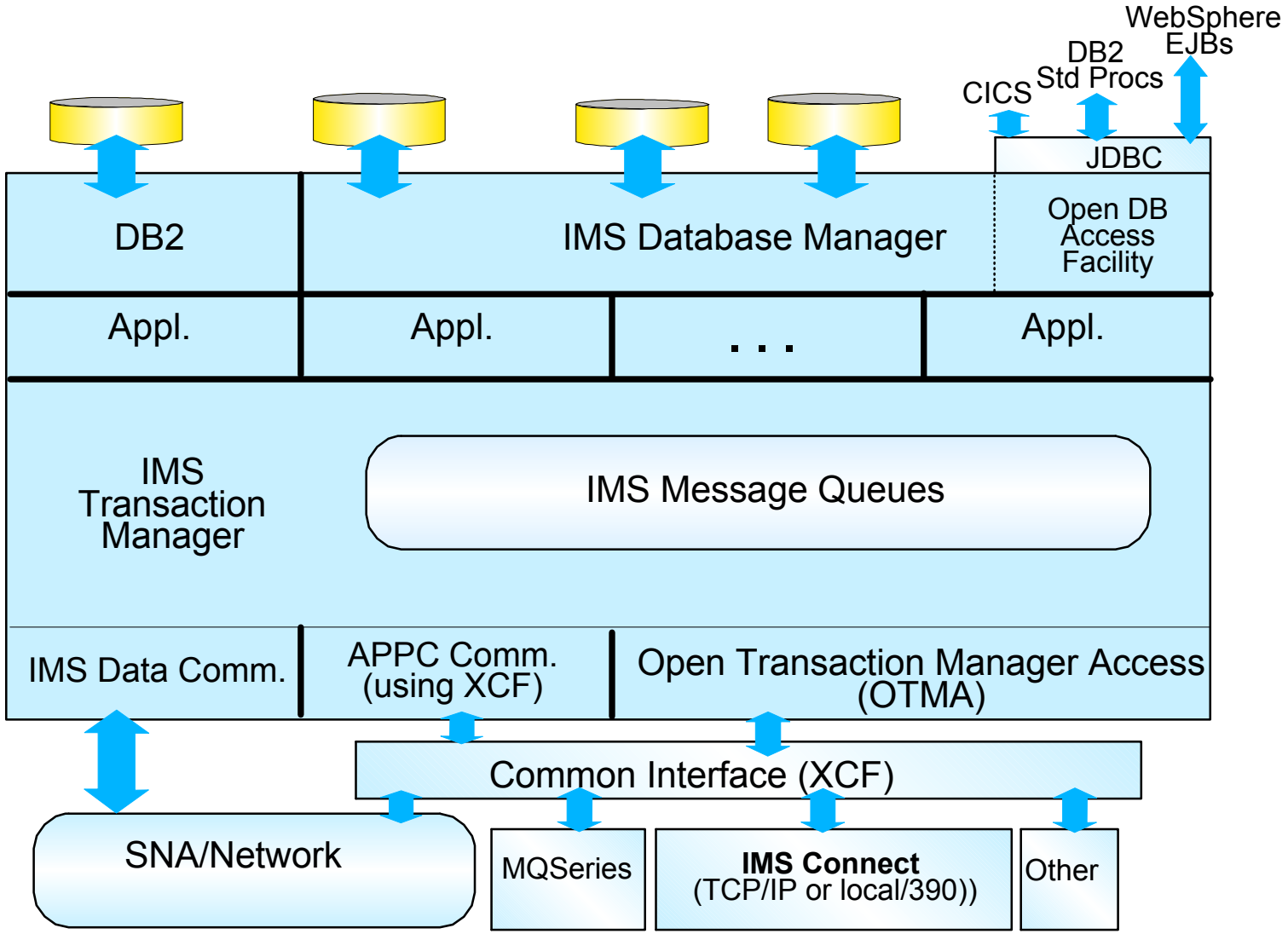
- IMS Java support is also being added to IMS Version 7. It will provide for applications written in Java and run in IMS as MPPs, BMPs, or IFPs. It will also provide the class libraries for input/output message handling. It will use JDBC for data access to IMS DB and/or DB2 databases. It will also allow SQLJ to be used for accessing DB2 databases.
- It will also take advantage of the Visual Age and other available tools on the workstation or S/390 to provide integrated e-business application development for our customers. The Java application initially could be compiled using the High Performance Java Compiler, and subsequently through the new Persistent Reusable Java Virtual Machine. You can create VisualAge projects, do remote building, and edit using the VisualAge editor. Remote debugging can be done using VAJava's Remote Debug Tool. And performance tracing can also be done. This allows for new and existing Java programmers to use the latest advances in tools and technologies in writing new applications that run in IMS and access the existing infrastructure of data and applications already existing.

IMS V7 Java for Integrated e-business Application Development/Connectivity

- ✓ Application programmer productivity
  - Java access to IMS input/output message queues
  - Uses VisualAge tools for development
  - JDBC access to IMS DB and DB2 data for IMS TM Java applications
- ✓ **Enhanced since IMS V7 GA**
  - New Java Dependent Region support for Persistent Reusable Java Virtual Machine replacing HPJ
  - JDBC access to IMS DB from CICS Java applications, DB2 Stored Procedures, or WebSphere ejbs in OS/390 and z/OS environments
  - New Java Tool support
  - Java Installation and Usability Enhancements
  - Java-Cobol Interoperation

- Java is the base for new application development and connectivity.
- In the base of IMS Version 7 is our IMS Java application support to enhance the ability of our customers and business partners to provide integrated e-business application development with IMS.
- The object of this function is to provide support for you to write Java applications and run them as IMS applications using Visual Age workstation and host tools for development and testing.
- Compiling is provided initially through the High Performance Java compiler.
- We provide access to IMS TM message queues and to IMS DB and DB2 data through JDBC.
- 2002 enhancements are being provided to this support for IMS DB access from CICS/390 Java applications, DB2/390 Java Stored procedures and WebSphere applications, opening IMS DB up to better integration and use across platforms and across application environments. IMS would also be providing this support for WebSphere application Server access to IMS.
- New Java Region Types are also being provided. IMS V7 Java support cuirrently utilizes the High Performance Java Compiler. This support enhances the IMS V7 Java support to run with the new Scalable JVM, providing enhanced tool support for developing these Java applications to run in IMS.
- And we are providing new Java Tooling, as well as installation and usability enhancements and Java Cobol Interoperation.

Information Integration with Middleware Subsystem Access



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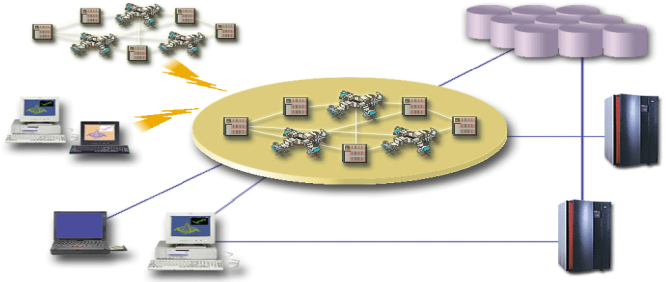
- Traditionally messages come into IMS through its SNA data communication protocol from VTAM. With APPC/IMS support in Version 4, IMS took advantage of the new Cross Coupling facility (XCF) to communicate with APPC/MVS. This was a software facility that allowed MVS subsystems to communicate more efficiently. With the IMS Version 5 Open Transaction Management Access (OTMA) facility, IMS extended its use of XCF for use by other IBM subsystems, such as TCP/IP, MQSeries, and DCE/RPC, providing them more efficient and richer capabilities in accessing IMS. OTMA allows access to existing, unchanged IMS applications on any IMS TM system on any MVS system of an MVS sysplex as well.
- The Open Database Access facility (ODBA), for easier database access, has also been recently provided.

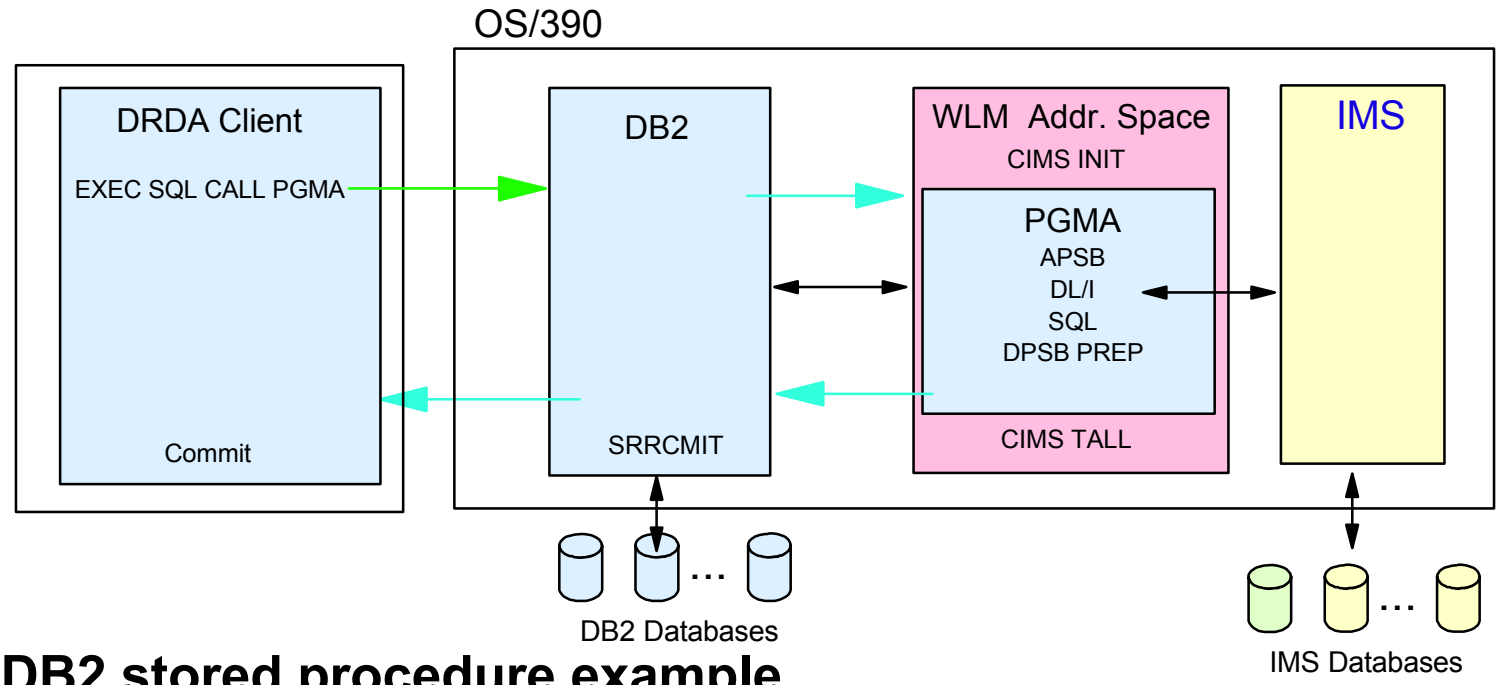
What is Open Database Access?



- **Open Database Access (ODBA) is a callable interface for accessing data managed by IMS DB**
  - Based on the DRA interface provided for CICS applications
  - Also provided through the IMS V6 service process
- **ODBA allows IMS DB and OS/390 application programs to be developed, installed, and maintained independently of each other**
- **ODBA provides for failure isolation and independent resource recoverability**
  - Requires OS/390 Resource Recovery Services (RRS)

- Open Database Access (ODBA) for IMS is making it easier for customers to access the valuable information stored in their IMS Databases. ODBA makes it possible to access IMS DB subsystems from any OS/390 application address space.
- In fact because synchpoint processing is coordinated through the use of OS/390 Resource Recovery Services (RRS) from one address space, you can connect to more than one IMS DB subsystem on the same MVS image, as well as commit or back out changes with just one call.
- ODBA is also easy to use. Your application issues DL/I calls to an IMS database application interface block (AIB). The application supplies the AIB, an IMS connection table suffix, and a program specification block (PSB) name. ODBA connects you to "IMS and schedules your PSB in a single bound. To make DL/I calls, you have to supply only a program communication block (PCB) name. In addition the DB2 Stored Procedures function has added support for ODBA in DB2 Version 5, allowing DB2 to coordinate synchpoint processing through RRS.

DB2 Stored Procedure Example

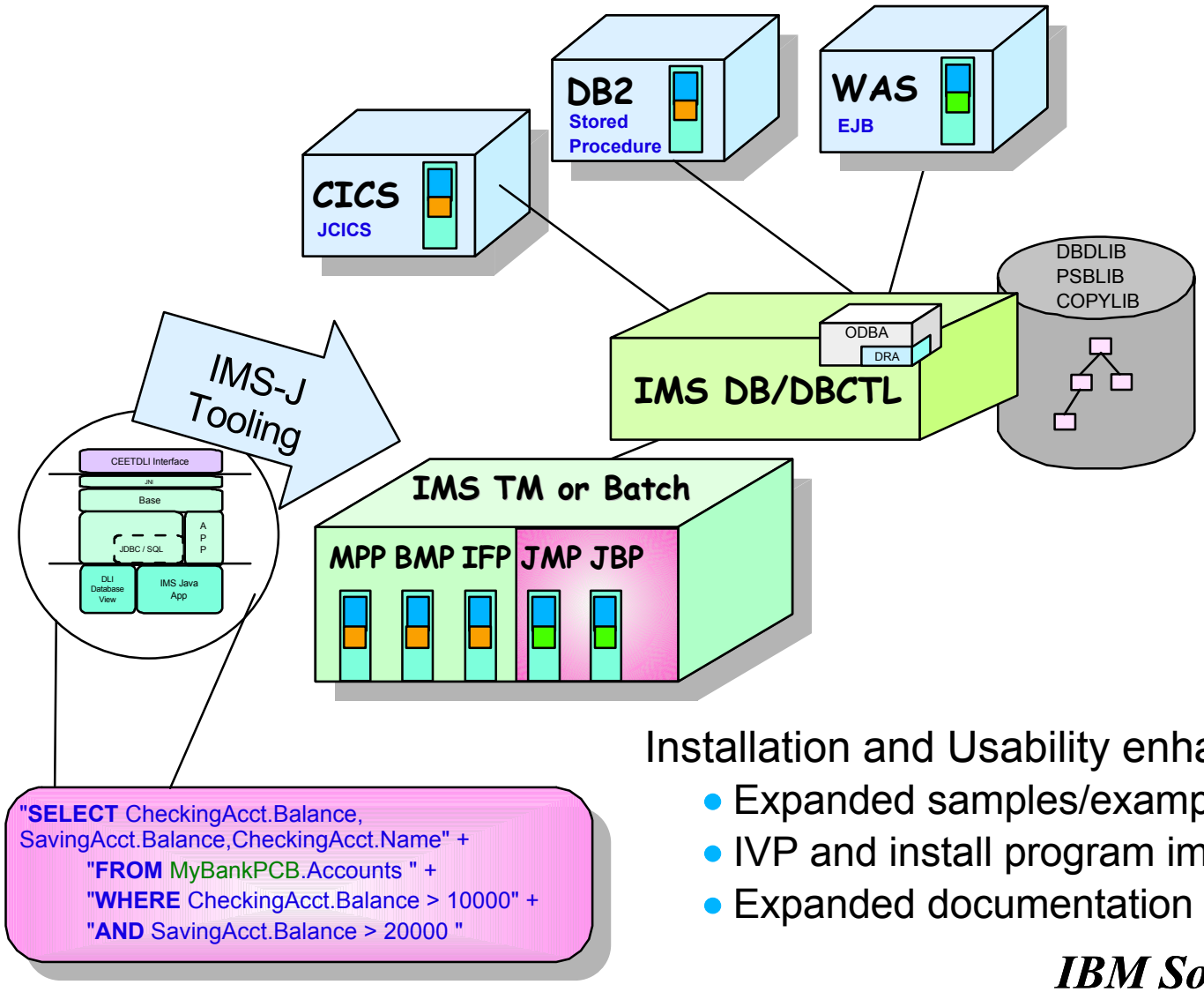


- **DB2 stored procedure example**
  - DL/I calls to IMS DB
  - Client program does commit when stored procedure returns or DB2 can issue SRRCMIT
- **Enhancements since IMS V7 GA**
  - JDBC calls to IMS DB from DB2 Java Stored Procedures, IMS and CICS/390 Java applications, and WebSphere ejbs

IBM Software

- This example shows a DRDA client issuing an SQL call which invokes a DB2 stored procedure. The call could be issued by any DB2 program, including one running in the MVS system where DB2 and IMS are executing.
- The DB2 Stored Procedure must run in a Workload Manager (WLM) established stored procedures address space. This is required for support of recoverable resources (RRS/MVS). DB2 Version 5 or a later release is required for the use of these WLM established address spaces.
- The stored procedure application program does not issue the CIMS calls. These are done by DB2 when it establishes and shuts down the address space. There may be multiple WLM stored procedures address spaces and each address space may have multiple tasks (TCBs). These characteristics are determined by WLM and DB2 parameters.
- Those interested in implementing DB2 Stored Procedures may want to refer to redbook, Getting Started with DB2 Stored Procedures: Give Them a Call through the Network, SG24-4693.
- Built on the ODBA support is the JDBC access to IMS DB provided through the IMS V7 service stream. This is available in S/390 or z/OS environments from IMS TM, DB2, CICS, and WebSphere application servers.

The Big Picture: JDBC Access to IMS Data



Installation and Usability enhancements

- Expanded samples/examples
- IVP and install program improvements
- Expanded documentation

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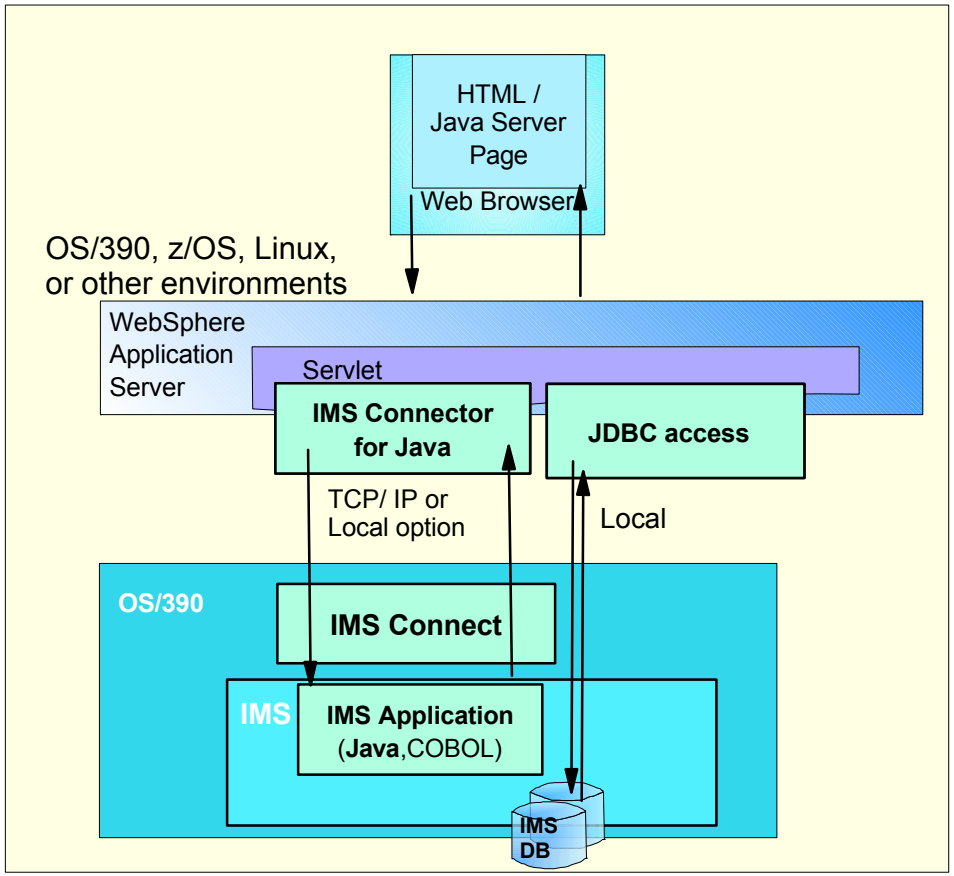
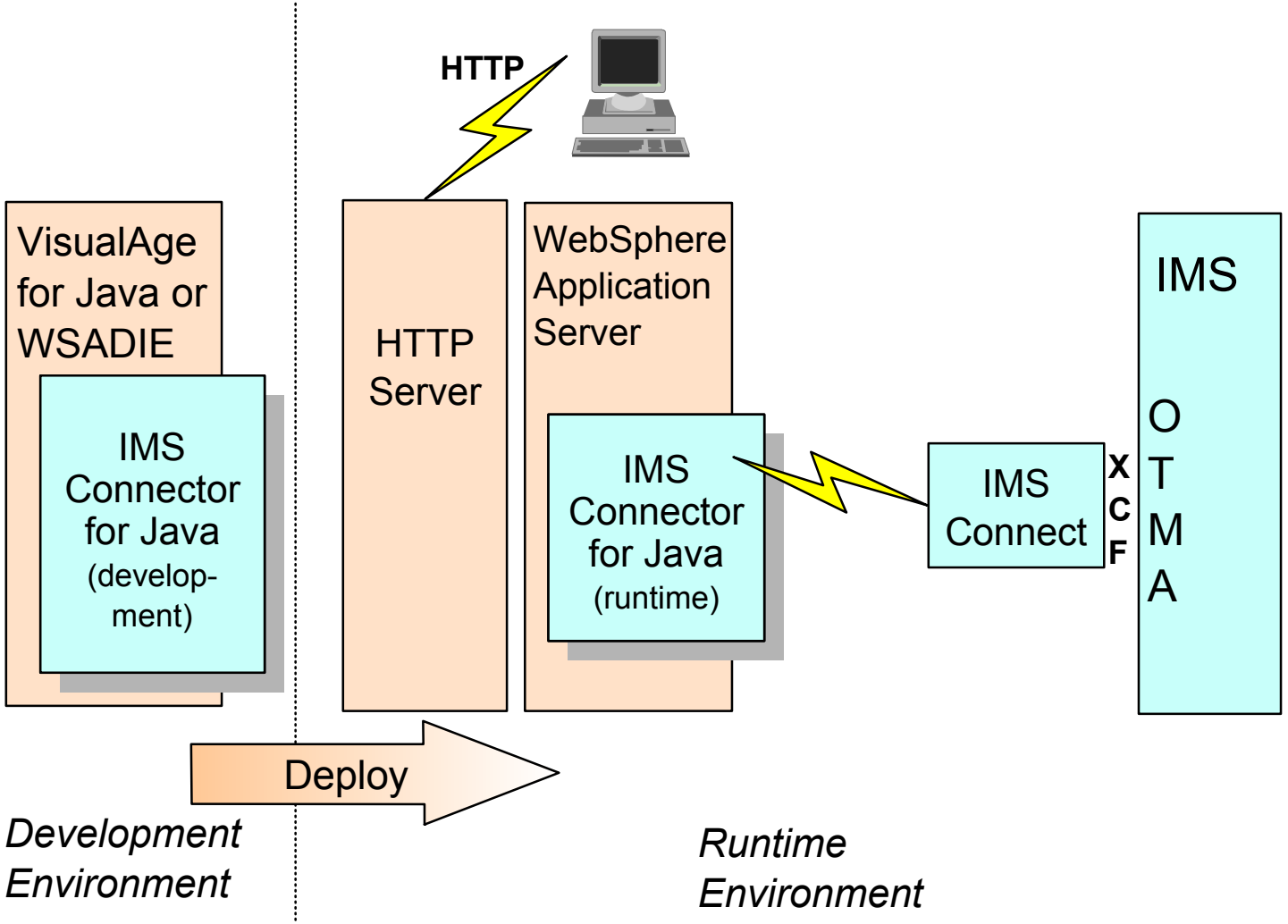
- IMS has been taking advantage of the Java environment for Web connectivity to IMS applications, for writing IMS applications running in IMS, and for writing applications running in other environments that access IMS DB data. And IMS continues to enhance its Java application support and access to IMS DB through JDBC.
- JDBC support enhances the IMS Java support for enabling JDBC access to IMS DB data not only from IMS TM environments but also now from a CICS/390 Java application, DB2/390 Java Stored procedure, and/or a WebSphere/390 Enterprise Java Bean.
- Java tooling can be used. Java Tooling introduces a new IMS utility called DLIModel, which automatically constructs the required IMS Java metadata class from PSB and DBD source (earlier V7 users were responsible for creating this class manually). This utility allows information on additional fields, long Java-style names and data types to be supplied from user-coded control statements and/or from XMI descriptions of COBOL copybook members. If desired, it will produce XML descriptions of databases that conform to the OMG's Common warehouse Metamodel 1.1. This greatly eases development of Java applications and JDBC access to IMS DB.
- Java Installation and Usability enhancements are also being provided - with expanded sample applications for IMS, WebSphere, CICS and DB2 Stored Procedures, expanded examples for logically related databases and secondary indexes, improvements for installation and Installation Verification program (IVP) applications and expanded documentation.

IMS e-business Application Development/Enablement



- Since the beginning IMS Tools have been provided to exploit the latest programming technologies for the Internet and Java. This includes enablement of interactive and multimedia applications in a simplified fashion. With Java, users can transparently download and seamlessly run applications. It is becoming widely used and is platform independent.
- IBM is also providing a common connector framework with a set of common, consistent Java interfaces that connectors for any subsystem can and are implementing, making it easier for programmers not to worry about the differences between those subsystems. For such, IMS has provided an IMS Connector for Java development and runtime code. By being compliant with the Common Connector Framework, IMS Connector for Java can be used in any component server environment that supports the Common Connector Framework. And we have now extending that to the JCA/J2EE environment.
- This shows the runtime environment of a Java Servlet Application (running under OS/390, z/OS, Linux or another environment). When a user executes the application and provides the appropriate input data, IMS Connector for Java within the Java Application establishes a connection with IMS Connect through a TCP/IP (or Local Option, if in the same LPAR as Connect) connection. IMS Connect, running under OS/390 or z/OS can run in the same or separate LPAR from IMS. It will forward the transaction request to the IMS application through the IMS OTMA (Open Transaction Manager Access) interface, using MVS XCF (Cross-system Coupling Facility). The IMS application could be written in Java or another language. IMS Connect would also send the output back to the IMS Connector for Java application in a similar manner.
- In the servlet runtime environment, the user can invoke the HTML page using the web browser and put in the input data. The request will be sent to webserver and the corresponding servlet will be invoked by the WebSphere application server. The servlet will then use the IMS Connector for Java to establish and connection with IMS and invoke the requested transaction with the input data through IMS Connect.
- The output result will be handed back to the IMS Connector for Java in the servlet via IMS Connect and send to the output HTML page by the web server.
- Development on NT can be deployed in any WebSphere environment.

IMS e-business Connectivity Environment



- The IMS Connector for Java Development support originally shipped with VisualAge Java, which has been evolving into the WebSphere Studio Application Development Integration Edition (WSADIE) to develop Java applications running under WebSphere.
- The IMS Connector for Java J2EE Runtime piece ships with IMS Connect for download to the WebSphere platform for deployment in connecting to IMS transactions via IMS Connect.

Application Management...
IMS Connect for Broader e-business Connectivity

IMS Connect V1R1

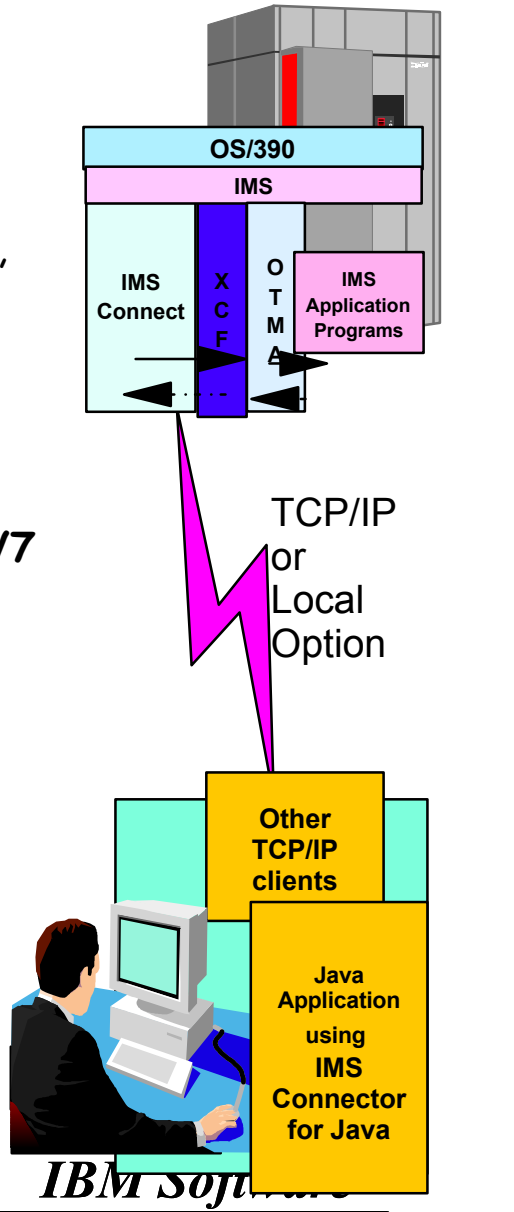
- ✓ **Provides enhanced TCP/IP access to IMS**
- ✓ Improved Performance with Persistent Sockets
- ✓ Enhanced Usability with user exit, command improvement, and asynchronous output support
- ✓ Ease Serviceability with Dump formatting enhancements
- ✓ Enhance Manageability with SMP/E Install/Maintenance
- ✓ **Base function runs with IMS V6 TM**
- ✓ **Asynch output and future enhancements require IMS V7**

IMS Connect V1R1 Enhancements

- ✓ Local/390 support
- ✓ Unicode
- ✓ ACK/NAK required notification support
- ✓ Output message structure change

IMS Connect V1R2

- ✓ IMS Connector for Java J2EE Runtime support for WebSphere access
- ✓ Used with VAJava/WASADIE's IMS Connector for Java J2EE Development support



- IMS Connect V1R1 was provided with IMS V7 GA as a new separately priced product for IMS. It provides enhanced IMS TCP/IP support. New enhancements in 2001 provided through the service process include:
- Local support, available via APAR PQ45057 4/01, for communication using Program Calls without requiring TCP/IP from a webserving application to IMS in a z/OS or OS/390 environment, easing the management in this environment. This support is used by the VisualAge for Java (VAJava) IMS Connector for Java for creating Java applications that can access IMS transactions from WebSphere Application Servers for zOS and OS/390.
- Unicode support, available via APAR PQ47906 5/01, for sending Unicode application data to an IMS host application capable of dealing with Unicode, such as a Java application running in IMS.
- ACK/NAK required notification support, available via APAR PQ46195 4/01, provides client notification that an ACK or NAK response is required by the client without additional testing of data received. This notification will be sent to the Client in the CSM and RSM.
- Output message structure change, available via APAR PQ48182 5/01, to include the full message length preceding the output message to the client, reducing the design and coding effort of a client application.
- In web computing the system must match capacity to business requirements on an as-needed basis and provide an easy growth path, minimize downtime and provide quick return on investment. These are available with IMS and IMS Connect along with and the S/390. Recent enhancements have included improvements to the processing of requests, yielding overall increases in throughput. Performance improvements, higher bandwidth networking, and numerous other enhancements continue to make IMS and the S/390 a powerful, flexible system for growth in web serving as well as the rest of mission critical work.
- IMS solutions exploit the security, performance, and other facilities of the S/390 to optimize performance. Testing with IMS Connect has demonstrated very high transactions rates.
- Early IMS Connect performance data resulted in nearly 6000 trans/second with a single IMS and single IMS Connect. Early performance work on IMS Connect shows potential for even more growth in this transaction rate as well.
- With IMS Connect V1R2 we provided IMS Connector for Java J2EE runtime support for these new applications accessing IMS transactions.

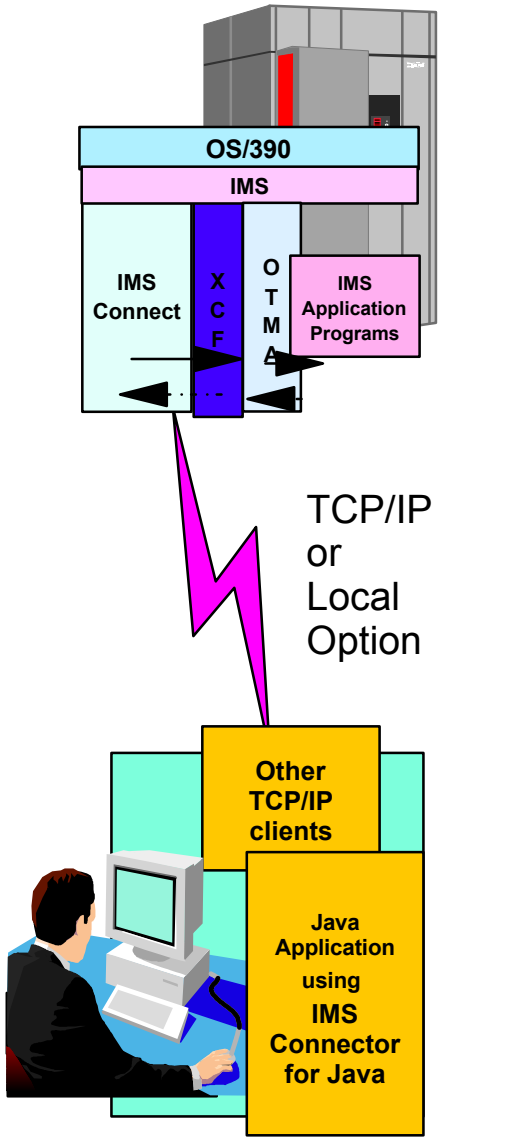
Application Management...
IMS Connect for Broader e-business Connectivity

IMS Connect 2002 Enhancements

- ✓ Two-phase Commit Support in Local 390 environments
- ✓ Security enhancements
  - Passticket support
  - IMS Connector for Java Container-managed Sign-on support for local option
  - User Message Exits
- ✓ More Granular timeout (eg. by transaction)
- ✓ ipv6 support
- ✓ IMS V8 Operations Manager distributed interface

IMS Connectivity Requirements

- ✓ Two-phase Commit Support in Distributed TCP/IP environments and across Sysplex
- ✓ Security items
  - IMS Connector for Java Container-managed Sign-on support for distributed environments
  - Trusted user support
  - Security environment controls
  - SSL support
  - Automatic reconnect
  - DATASTORE keywords RACF= and RACFID=



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- Additional enhancements are being provided in 2002 for IMS Connect for two phase commit support, initially for the OS/390 and z/OS environment through the Local option, then later for the distributed environments.
- Passticket support is also being provided to enhance IMS Connect security.
- The IMS Connector for Java has also been providing security enhancements with Container managed sign-on support, initially for local option environments, and later for distributed environments
- And IMS Connectivity has a number of additional requirements also currently being investigated:
- Support for IPV6
- Support for the IMS V8 Operations Manager Interface for distributed operations
- Additional Security items:
- PING command support
- Need for time out granularity at a message
- Relief of limitations on the use of User Message exits
- Capability to control the security environment
- "Trusted user" support
- Auto reconnect
- RACF= and RACFID = keywords on DATASTORE Command
- SSL support

Merita Bank in Finland replaces SNA gateways by IMS Connect

Challenge:

- To eliminate complex and error prone protocol conversion between TCP/IP based branch office network and SNA based host connection to IMS.

Solution:

- IMS Connect

Benefits:

- Simplified network connections to IMS
- SNA Servers can be given up
- Increased availability and efficiency
- No changes needed in IMS applications

IBM Software

- One customer that is realizing the benefits of IMS Connect is Merita Bank in Finland. Merita Bank is the Finnish part of the Nordea, the largest financial services group in the Nordic and Baltic region
- Merita Bank is running over 3 million IMS-transactions during a normal banking day, approx. 190 tx's per second during the peak hour, and most of the transaction are coming from the bank's branch office network that has been TCP/IP based for several years already
- The connection from the bank office's workstation has been through SNA gateways that convert the protocol between TCP/IP and IMS SNA SLUTYPEP (WS -> bank office server -> banking net -> SNA server -> 3745/2216 -> IBM host)
- 13 500 defined SNA sessions (from which up to 5 000 concurrently active) requires several SNA servers and the servers have not been working as reliably as desired and the error in SNA server has wide affects in IMS transaction processing
- A project was established to replace SNA gateways by IMS Connect that enables the straight connection from workstation to IMS by using TCP/IP (WS -> banking net - IBM host (OSA Express)).
- Merita Bank was a Jump Start customer for IMS Connect and the project started a limited pilot production last autumn and now they are expanding the production deployment in phases. They began their IMS Connect usage with IMS version 6.
- In the tests the IMS Connect has been proved to be very stable, reliable and efficient
- And all this was done without touching the IMS Applications

The Bekins Company

Challenge:

- Quickly develop new ways to provide services to customers and authorized agents

Solution:

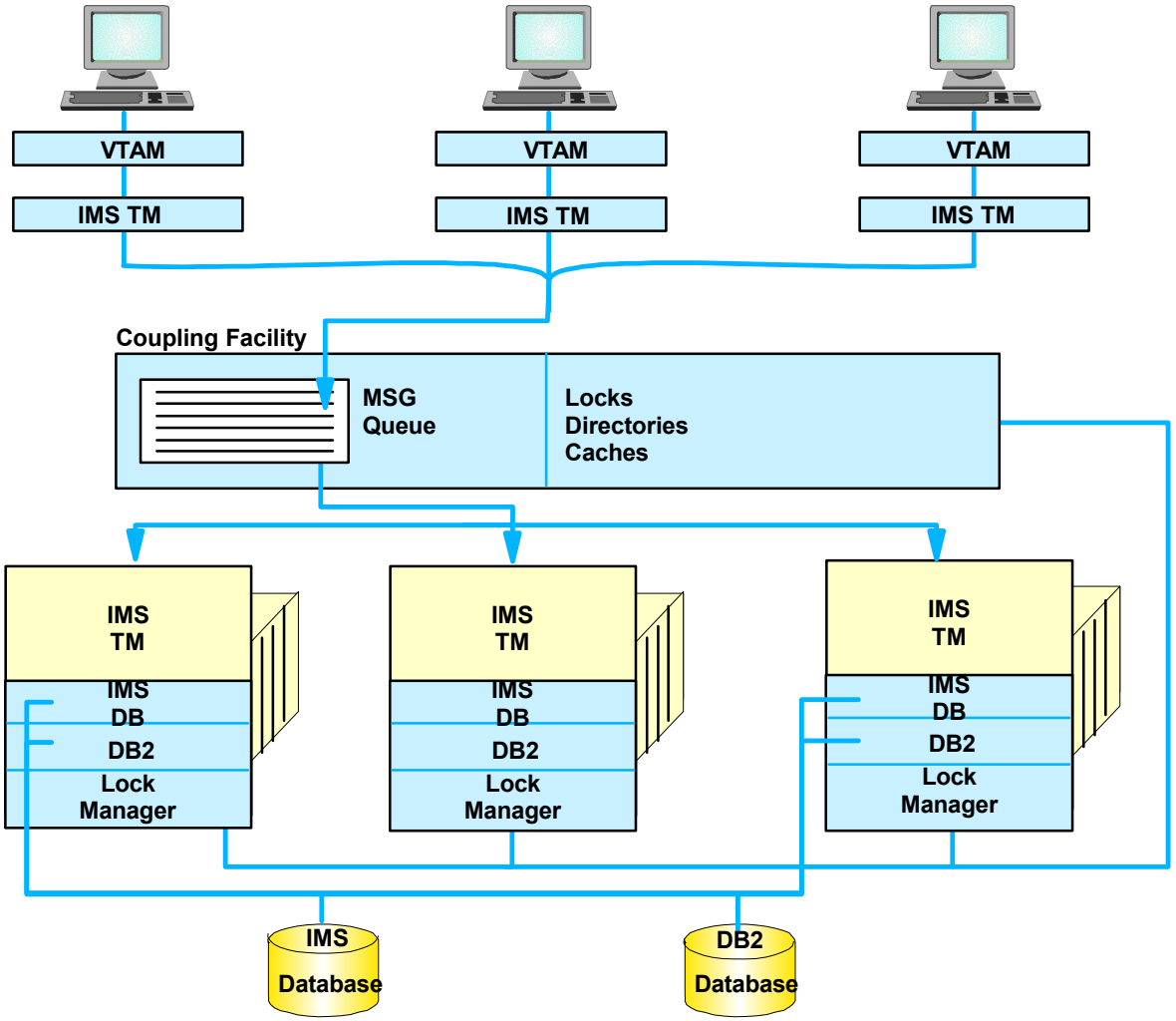
- Publish parts of Web-based shipping and tracking system as web services and integrate the services with existing workflow
- Create private e-marketplace to broker shipping orders to authorized agents
- Offer customers automated access to available capacity

Benefit:

- "The potential benefits from extending our business capabilities through Web services will make the $10.3 million payback we attributed to our first B2B e-business application seem like a drop in the bucket."
  -- Randall Mowen, Director of Data Management & e-business Architecture

- Bekins has been providing high-quality transportation and distribution services across North America for more than a century. The company's e-business journey started in July 1999 when it launched a Web-based shipping and tracking system for its customers, including major e-commerce retailers who ship high-value products direct-to-business and direct-to-consumer. The goal was to put shipment tracking information directly into the hands of its customers and their end customers via the Internet, in order to stay competitive and improve customer service.
- Using the IBM WebSphere platform, including VisualAge for Java, company developers completed the initial release in record time, providing a highly robust, scalable and secure e-business solution which resulted in total financial benefits of more than $10.3 million annually, in terms of increased revenue, reduced operating expenses and IT Development savings. It paved the way for Bekins to quickly move even more of its business online, now getting added mileage of new applications for Order management and Inventory management.
- Both solutions run on IBM WebSphere platform including WebSphere Application Server running on WinNT, IBM WebSphere Studio and IBM VAJava. Within this framework, developers are able to quickly web-enable existing COBOL applications. These applications access data from IMS and DB2 databases on the IBM S/390 platform.

IMS in a Parallel Sysplex



- **Allocation of workstations**
- **Dynamic Workload Balancing**
- **Data Sharing**
  - IMS DB
  - DB2

Easier access and management of enterprise applications and data

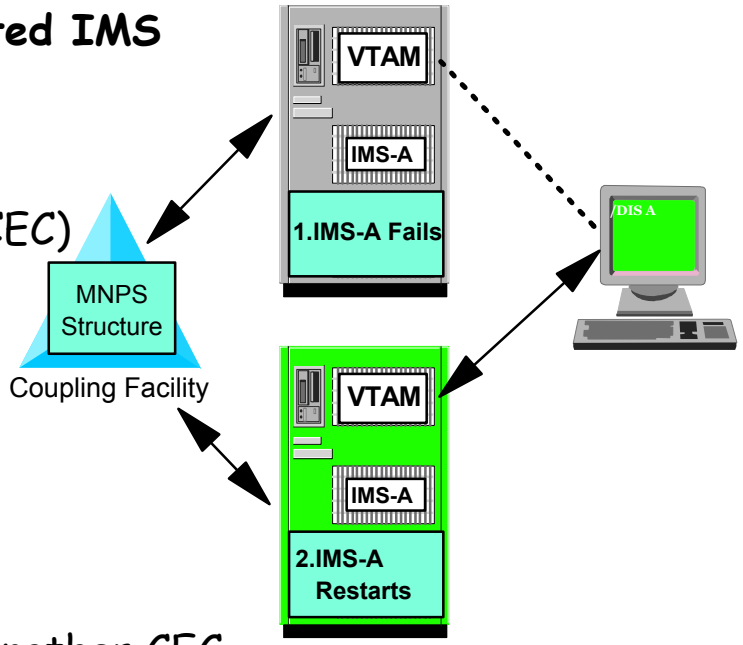
IBM Software

- IMS continues to strengthen its support of the Enterprise by providing the highest in performance availability, security, integrity, at the least cost per transaction. In doing this it has been exploiting the hardware/software environments that it has grown up along side of. IMS fully exploits for customer advantage the new technology and power of OS/390 and the Parallel Sysplex. Existing IMS data sharing capability was enhanced with IMS Version 5 to take advantage of the coupling facility for storing lock information and for easy availability of that information by all systems in the Sysplex environment. The lock manager in each system could access the locks as they needed to. In addition to data sharing, IMS V5 provided necessary information to the MVS workload manager to assist with workload balancing of resources across the Sysplex. IMS also enhanced message routing between systems to take advantage of workload balancing information, and IBM provided the IMS Workload Router to use these facilities to push the work to the available system. Significant enhancements for IMS V6 are being added to those provided in IMS V5 to complement the Parallel Sysplex hardware and operating systems facilities. IMS V5 also provided Remote Site Recovery, which allowed backing up an IMS system with another at a different location. A database at another system is maintained to match the primary database and/or a log is maintained that can dynamically and quickly update that remote data base to allow takeover in the event of failure.
- IMS V6 improved the IMS V5 Data Sharing and Workload manager enhancements with additional data sharing (storing changes and unaltered data on the coupling facility for Sysplex access, and providing additional Fast Path sharing), message sharing (providing message queues and fast path messages on the coupling facility for Sysplex access), and message routing enhancements (utilizing VTAM Generic resource support). As customer workload grows, the power that distributing data and applications across the Sysplex provides is needed. End users want to be able to access applications and data transparently, regardless where the work is processing. This enhanced support provides improved end user interaction, improved IMS availability, improved workload balancing, and offers increased capacity and growth in moving into Parallel Sysplex environments.
- IMS's Fast Path capabilities continue to be enhanced to provide the fastest access through the system, continuing to lead database products. Against industry standard benchmarks it continues to show as the best price performance at the lowest cost, confirming that nothing in the transaction market matched the speed and power of the IBM S/390 with IMS.

IMS V7 Rapid Network Reconnect Highlights and Benefits

Highlights

- **Terminals automatically reconnect to restarted IMS**
  - end user signs on again after IMS restart
- **VTAM maintains persistent session**
  - Single node persistent session (single IMS/CEC)
    - after IMS restart of failed IMS
    - network reconnects to restarted IMS in same CEC
    - Coupling Facility not required
  - Multinode-persistent session (>1 CEC/IMS)
    - After IMS restart of failed IMS
    - Network reconnects to restarted IMS in another CEC
    - IMS application must register in Coupling Facility MNPS structure
- **If MNPS, all VTAMs with MNPS must be connected to Coupling Facility structure**



Benefits

- **Faster reconnect of terminal network after IMS restart**

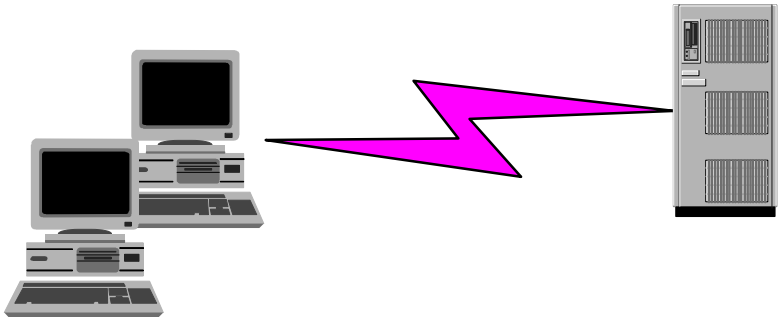
IBM Software

- With Rapid Network Reconnect, IMS V7 allows VTAM terminal sessions to automatically reconnected to the failed IMS following an MVS, CEC, VTAM, or IMS outage and be subsequently restarted on the same or another CEC within a sysplex. The end user of the terminal session signs on again after IMS restart of the failed IMS and the session logon process is not required.

- Two levels of persistent session support are provided:
- 1) Multinode where reconnect may be on another CEC in a sysplex.
- 2) single-node where reconnect must be on the same CEC as the failed IMS
- The picture shows the Multinode persistent session scenario where failed IMS-A is restarted on another CEC in the sysplex. Sessions will be automatically reconnected when IMS-A is restarted on the other CEC.

- This support requires an APPN network and HPR. For MNPS, all VTAMs must be connected to a CF structure. The Coupling Facility is sued to track session initiate/terminate.

IMS V7 Rapid Network Reconnect for IMPROVED AVAILABILITY



- ✓ Provides reduced network reconnect time after IMS, MVS, or VTAM failure in a sysplex environment
- ✓ Permits IMS TM to automatically reconnect terminal sessions following any kind of IMS failure and subsequent IMS restart

- IMS Systems availability is improved with IMS V7 Rapid Network Reconnect. It improves system availability by allowing IMS TM to automatically reconnect terminal sessions following any kind of IMS failure and subsequent restart -- reduces network reconnect time after IMS, MVS, or VTAM failure in a Sysplex environment.

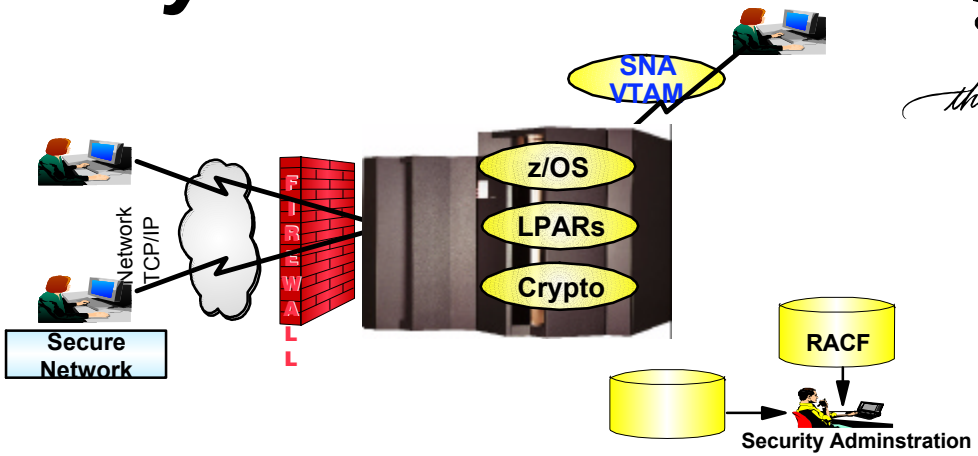
IMS V7 Common Queue Server Enhancements

Highlights

- Support for multiple clients
  - Achieves better utilization of the CQS address space
    - Storage
    - Problem determination
    - Operations
- Security checking during CQS registration
- Interface enhancements
  - Diagnostics
  - CQS requests

- IMS V7 enhances the Shared Queues support that was introduced in IMS/ESA V6 by allowing a single CQS (Common Queue Server) address space to support multiple clients, e.g., IMS systems, that reside on the same CEC as CQS. CQS continues to be the component that accesses the coupling facility structures. The multiple client support improves storage utilization and simplifies problem determination (e.g., only one CQS address space to analyze) as well as operational procedures (fewer address spaces to monitor).
- The ability to use RACF or another security product to control CQS registration is also being added. This prevents an unauthorized client from accessing CQS and issuing commands that could prevent other clients from connecting to a structure.
- CQS also provides several interface enhancements in the area of diagnostics and in the CQS requests. IMS does not take advantage of these but they are available for new clients, e.g., vendor monitors, to use.

IMS V7 Security Enhancements



Highlights

- **Enhanced PassTicket Support (uses RACF or equivalent)**
  - New keyword parameter on the /SIGN ON command
    /SIGN ON userid PassTicket APPL applname
  - Provides greater flexibility for the end-user/program
    - PassTicket creation can use IMSID (same as before)
    - PassTicket creation can use the IMS application name
  - Allows the creator of PassTickets to specify the value by which it knows IMS
- **New system-wide default SAPPLID=applid in DFSDCxxx**
  - Enables the use of PassTickets for VGR connections to IMS
- **USERID Clarification**
  - An indicator associated with the **userid** field that defines its content
  - Provides a method that allows IMS application programs and exits to determin whether a user was signed on at the time a transaction was entered

- The RACF PassTicket is a one-time-only password that is generated by a requesting product or function. It is an alternative to a password and removes the need to send passwords across the network in clear text. It makes it possible to move the authentication of a mainframe user ID from RACF (or equivalent) to: (a) another authorized function executing on the host system or, (b) to the workstation environment. In prior IMS releases, when a /SIGN ON command was received by IMS that contained a PassTicket instead of a password, the signon process failed unless the PassTicket was created using the IMSID as the application name. Since the IMSID may not be known to other systems that might enter the signon command, more flexibility has been needed in the IMS processing of the PassTicket. The new keyword APPL in the /SIGN ON command allows the end-user or program to specify a name, e.g., the IMS VTAM application name, rather than the IMSID when creating the PassTicket.
- In a VGR environment, the remote end user does not know which IMS will be chosen for the connection. The DFSDCxxx PROCLIB member provides a system-wide default name SAPPLID that can be used for all the IMSs in the generic group.
- When signon security is active in an IMS system, the userid field can contain: the user's identification from the source terminal during signon, the LTERM name of the source terminal if signon is not active, or the PSB name of a source BMP or transaction. Many IMS applications depend on knowing whether or not the value reflects a userid in order to perform different application functions. A common method to determine this is to check for the equality of the values in the USERID and LTERM fields. If the USERID is equal to the LTERM, it is assumed that this is not a true USERID. With ETO support, however, the method of equality of these values cannot be used in situations where the LTERM and USER structures are created based on the userid name. In this case, the LTERM is always equal to the USERID.
- The USERID clarification enhancement provides a method by which IMS application programs, either by querying the IOPCB or by issuing an INQY call, can determine the nature of the value passed in the USERID field. The information is also provided to several user exits.
- Additional enhancements are also being provided

IMS V7 Enhancements through YE2001 via the Service Process

- Enhanced HALDB and DBRC Performance/Management
- 64-bit real support
- 255 OSAM Database Buffer Subpools
- Additional Sense Codes/Message Information for use with the z/OS Communications Manager
- External Subsystem Support enhanced for DB2 MVS group support

- In addition to the HALDB and DBRC enhancements mentioned earlier, IMS enhancements provided through YE2001 via the IMS service process include: 64 bit real support: IMS V5, V6 and V7 were all enabled to run on the new z/OS systems. IMS V7 also provided page fixing of OSAM and Log buffers above the 2GB bar. Expanded storage is now combined with central storage, thereby eliminating paging between expanded and central storage.
- Additional sense codes and information on IMS V7 messages were provided for enhanced support of the z/OS and OS/390 Communications Manager. IMS is now sending a signon screen after LUSTAT x"082b' and is including the TCP/IP address in IMS messages.
- IMS support for DB2 MVS groups is an IMS Dependent Region Group attach, providing Dependent Region access to available DB2, for Sysplex restart.

IMS V7 Enhancements in 2002 via Service process

- Enhanced HALDB and DBRC Performance/Management
- New Java Region Types, JDBC access, and Tooling
- Fiber Channel support
- Resource Recovery Service (RRS) enhancements
- System Log Data Set (SLDS) Read Support
- Remote Site Recovery (RSR) Enhanced Statistics
- APPC and OTMA Message enhancements
- OTMA Security and Management Enhancements
- Enhanced Sysplex Coupling Facility support
  - System Managed Duplexing
  - Automatic Altering
  - System Managed Rebuild

- In addition to the additional HALDB, DBRC, Java and JDBC enhancements discussed earlier, there are also a number of additional 2002 IMS enhancements being provided through the IMS service process. These include:
- S/390 FICON CTC for MSC - IMS Customers require a reliable, high bandwidth host-to-host communications support between IMS systems. This is the role of the Multiple Systems Coupling (MSC) facility in IMS. One of the physical host-to-host MSC connections supported by IMS is the MSC channel-to-channel (CTC) hardware support. On the new z/Series processors, CTC bandwidth is to be enhanced by implementing the Fibre connection (FICON) channel support for CTCs. This FICON support will be significantly faster than the current Enterprise System Connection (ESCON) support that is available today. It's estimated that one FICON CHPID can do the work of 8 ESCON CHPIDs (ie: 8x more bandwidth). This increased bandwidth is the result of faster data transfer rates (1gb/sec for FICON versus 200mb/sec for ESCON), I/O rates up to 5000/second (depending on data block size), and CCW and data pipelining. The distance between hosts is also increased to 100 kilometers. IMS MSC support is provided for this new Ficon CTC support, greatly improving the bandwidth across systems. Hardware requirements for this are for at least one side of the MSC link to be a G6 processor with the FICON channel and FICON CTC micro code. The other side (IMS) can be any processor with a FICON channel. Operating system support is provided in OS/NP V1R2 with service stream enhancements for OS/390 R6 and later.
- IMS FICON support in Work Area Data Set (WADS) consists of setting a flag in the Work area dataset (WADS) I/O Block which indicates that the channel can perform channel command prefetching. This increases the execution speed of the channel program.
- Batch RRS support was provided which allows batch programs to use MQ with coordinated commit. It also provides for a full two phase commit for batch programs accessing DB2 as well as IMS DB, where today's Batch Attach from DB2 does not support coordinated commit. And it also allows for work which captures data and proprogates it to another system (DB2) to participate in the 2-phase syncpoint process along with the IMS work, thus making sure that all the work is done or not done where it is all part of the same unit of recovery.
- Also added was an option at to whether you wanted to use RRS or not.
- IMS V7 System Log Data Sets (SLDS) Read Support allows internal log read requests access to SLDS data after restart completes. IMS had always had access to the Online Log Data Sets (OLDS) and restart had always been able to read from SLDS. Prior to this enhancement, the restriction on SLDS access after restart had been an occasional concern when long running Batch Message Programs (BMPs) didn't take enough checkpoints or something got into a loop writing lots of log data, causing the OLDS to wrap unusually quickly. This restriction also allowed the loss of messages in a shared queues environment in situations where the messages are committed at a time when shared queues were not available. With this enhancement, these messages could be retrieved from the SLDS datasets.

32 (Cont)

- Remote Site Recovery Statistics have also been enhanced
- APPC and OTMA Message enhancements are being provided.
- OTMA Security and management enhancements are also being provided.
- And IMS is providing enhancements to take advantage of the new z/OS's Coupling Facility (CF) duplexing function for IMS Shared Message Queue structures and IMS Fast Path Expedited Message Handler (EMH) structures. When CF duplexing is enabled, z/OS creates a duplex copy of the structure for failure recovery. If the IMS Shared Queues structure or the EMH structure fails or a connection to the structure is lost, z/OS switches to the unaffected structure instance without the overhead of a structure rebuild. CF duplexing also enables system-managed rebuild. MVS does the structure rebuild for a planned reconfiguration to do the structure copy if no IMS Common Queue Server (CQS) is up. The advantage to system rebuild is that CQS does not have to be up. CQS managed rebuild is still needed to address CF failure, structure failure, or loss of connectivity.
- CF Structure Duplexing support for IMS Data Sharing is being provided through the IRLM 2.1 service process.
- IMS is also providing the following IMS Fast Path Virtual Storage Option (VSO) Coupling Facility (CF) enhancements through the IMS Version 7 service process:
  - System-managed rebuild provides for rebuilding a VSO structure to enable migration of a VSO structure from one CF to another for planned reconfiguration without taking the VSO structure offline. All structures can thus be migrated using a single command.
  - Automatic Altering of VSO structure size and entry-to-element ratio provides for dynamically expanding or contracting a VSO structure based on its actual CF storage usage with exclusive control as needed. Over-configured CF storage can be reclaimed when OS/390 and/or z/OS need CF storage.
  - System Managed Duplexing of VSO structures allowing dual VSO structure support without explicitly defining both primary and secondary structures in IMS Database Recovery Control (DBRC) Facility and in a CFRM policy. It provides for the automatic switch of modes when a loss of connectivity, a structure failure, or a CF failure occurs in one of the VSO structure instances.
- And JDBC for WebSphere V4 for z/OS and OS/390 enhanced IMS Java support for enabling JDBC access to IMS DB data from a WebSphere/390 Enterprise Java Bean
- Other key requirements for providing EJBs in IMS that we are currently working to address would provide client-side access to a WebSphere 390 EJB from an IMS Transaction. The latter would require additional WebSphere as well as IMS changes and would need to be in a follow-on IMS Version.

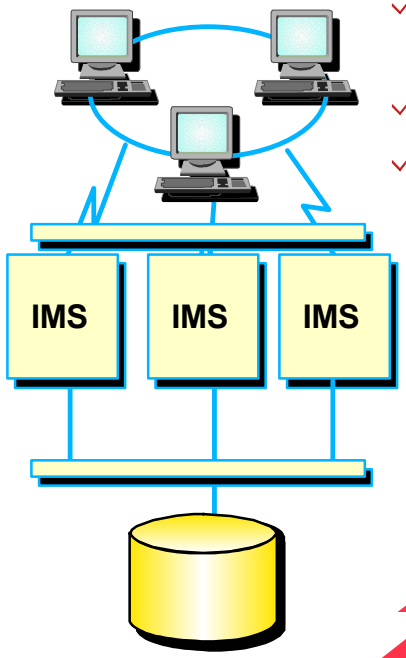
IMS Version 8: Providing Integrated e-business Solutions

e-business

e-business powered by IMS — the world depends on it

Ideal for e-business

- ✓ Integration with Application Development/Connectivity
- ✓ Manageability
- ✓ Scalability in Performance, Capacity, and Availability



Enhancements

- Sysplex Terminal Management
- Sysplex-wide Resource Mgmt
- Sysplex-wide Operations with Single Point of Control
- Enhanced DB Recovery Ctrl
- Simplified Installation Process
- Enhanced Systems/Data Mgmt Tools
- Enhanced JAVA and XML

Strategic Open Access OS/390 and z/OS Enterprise Servers

Benefits

- ✓ Enable Customer Growth
- ✓ Enhance Workload Balancing
- ✓ Increase Availability; Ease of Use
- ✓ Preserve Current Application Investment
- ✓ Enable New Applications

IBM Software

- With IMS V8, IMS is focused on further strengthening its support as the e-business Server of choice. This is in support of IBM's Strategy for helping customers in their e-business enablement and the growth, availability, and systems management that the e-business environment requires. IMS focus thus is on providing Information Integration with open access and supporting tools for the e-business environment, continually improving, systems management/usability, and system scalability with increased availability, performance and capacity. With V8 IMS is delivering the next stage of this function.
- IMS has been providing support as an e-business Server with improvements in data, workload, and network sharing. IMS V8 provides more transparent Sysplex Terminal Management to enhance e-business availability.
- Systems Management too has been a key area with IMS customers in managing their e-business servers. IMS has focused traditionally on ensuring a single system image. IMS provided workload management information and support of VTAM's Generic resources to help with the balancing of work across the Sysplex. IMS is providing additional e-business Server management enhancements with Sysplex-wide Resource Management, Sysplex-wide Single Image Operations, Simplified System Definition and Improved Diagnostics.
- IMS is also providing continued enhancements to eliminate bottlenecks and impediments to growth. Java is a key area for new application development. IMS Java support and the IMS Connector for Java provide Java application development/execution in IMS and in applications/servlets accessing IMS. These IMS Java enablers utilize the VAJava development tools. IMS V8 is providing enhanced performance for this environment, and providing better integration with the VisualAge and WebSphere development tool set.
- New Technology as it evolves with XML continues to be exploited to enable new Application Development tooling. IMS is forging a strong alliance with the AD community to provide an integrated tool solution for enhancing support for IMS Java applications and connectivity to the Internet.
- Additional Systems/Data Management and Business Intelligence tools are also being provided to better integrate and ease use of IMS as an e-business server. As tooling evolves we will continue to take advantage of the latest technologies for our customers to enhance their ability to use our products with these tools.
- In addition we continue to provide whatever we can for education and usability of our products. We are planning major changes to the way our users use our information through a graphical Information Center that they can use to build their own custom books.

IMS V8 Database Manager Enhancements

Information Integration with Appl. Devt and Connectivity

- Java and XML enhancements
- Dynamic LE Runtime Parameters

Manageability

- Coordinated Online Change
- Single Image Operations Manager
- Syntax Checker
- Fast Path Shared VSO CF enhancements

Scalability in Availability/Recovery/ Performance/Capacity

- IMS/DB2 Coordinated disaster recovery support
- DBRC Enhancements
- DB Image Copy 2 Enhancements
- Parallel Database Processing
- Fast Path DEDB Enhancements
- CSA/VSCR Enhancements

- IMS V8 Database Management enhancements include:
- Enhanced application development and connectivity with Java and XML
- Improved availability in database restart and recovery
- Increased performance/capacity in logging, recovery, and in database size
- Improved manageability with single point of operations control and concurrent online change for the sysplex, and in easing systems generation.

IMS V8 Transaction Manager Enhancements

Information Integration with Appl. Devt and Connectivity

- Java and XML enhancements
- Dynamic LE Runtime Parameters

Manageability

- Sysplex Wide Resource Manager
- Coordinated Online Change
- Single Image Operations Management
- Sysplex Terminal Mgmt
- Transaction Trace
- Syntax Checker

Scalability in Availability/Recovery/ Performance/Capacity

- APPC/OTMA Synchronous Shared Queues support
- APPC enhancements
- CSA/VSCR enhancements

- IMS V8 Transaction Management enhancements include:
- Enhanced application development/execution and connectivity with Java and XML
- Improved systems availability in error handling and network reconnection
- Increased performance/capacity in routing and in workload balancing
- Improved manageability with single point of operations control and concurrent online change for the sysplex, and in easing systems generation

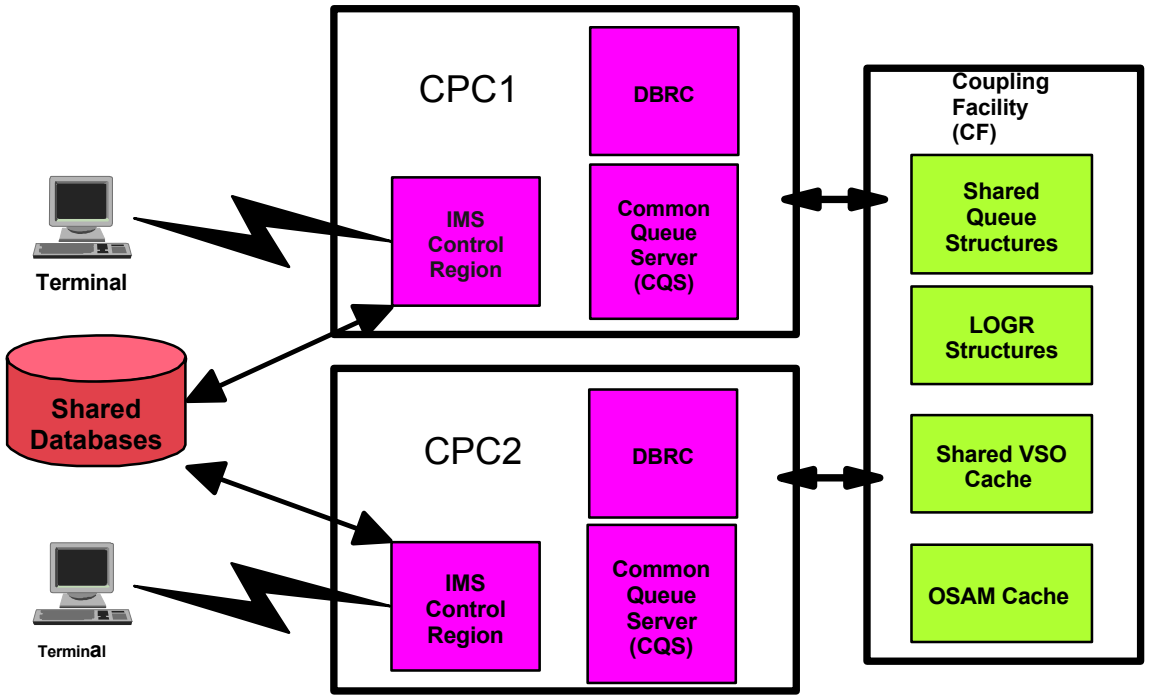
IMS V8 Dynamic LE Runtime Parameters

Eases Application Development

- Dynamically updates Language Environment (LE) runtime parameters for an IMS Transaction or Batch Message Program
- Makes it easier to use Debug Tool for application testing
- Done without requiring CEEROPT and CEEUOTP to be changed, reassembled, and relinked when parameters need to be changed

- Dynamic LE Runtime Parameters provide the ability to dynamically update Language Environment (LE) runtime parameters for an IMS transaction or Batch Message Program and make it easier to use the Debug Tool for application testing. This would be done without requiring CEEROPT and CEEUOTP to be changed, reassembled, and relinked when parameters need to be changed.

IMS Sysplex Manageability



SYSTEMS MANAGEMENT REQUIREMENTS

- PRESENT A SINGLE SYSTEM IMAGE AND PROVIDE EASE OF USE THROUGH A SINGLE POINT OF CONTROL ACROSS THE SYSPLEX
- ENABLE USERS TO RESUME STATUS ON ANOTHER IMS IN IMSPLEX
- COORDINATE/MANAGE ONLINE CHANGE ACROSS THE IMSPLEX
- ADDITIONAL REQUIREMENTS

IBM Software

- IMS Version 8 continued to enhance the management of IMS.
- In the sysplex area we are helping our customers address the following requirements:
- The IMS Sysplex should present a single system image and provide ease of use through a single point of control.

  --System management of IMSs sharing databases and/or message queues in a sysplex becomes more difficult as you add IMSs

  -- Most commands and automation processes today can only affect an individual IMS

  -- Commands may be entered using E-MCS console to route command to all IMSs in IMSplex

  -- Commands that affect the sysplex can be issued on each IMS
- VTAM Generic resource users need to be able to resume state on another IMS in the sysplex

  -- User cannot resume state if routed to another IMS
- Online Change should be coordinated and managed across the IMS Syplex

  -- Manual online change process is extremely difficult in IMSplex

  -- Each IMS today manages its resources locally

  -- Resources must be genned on each IMS

  -- Resource definition consistency is not enforced. A transaction defined on one IMS can be defined as an lterm on another

  -- Multiple users with the same name can sign on at the same time

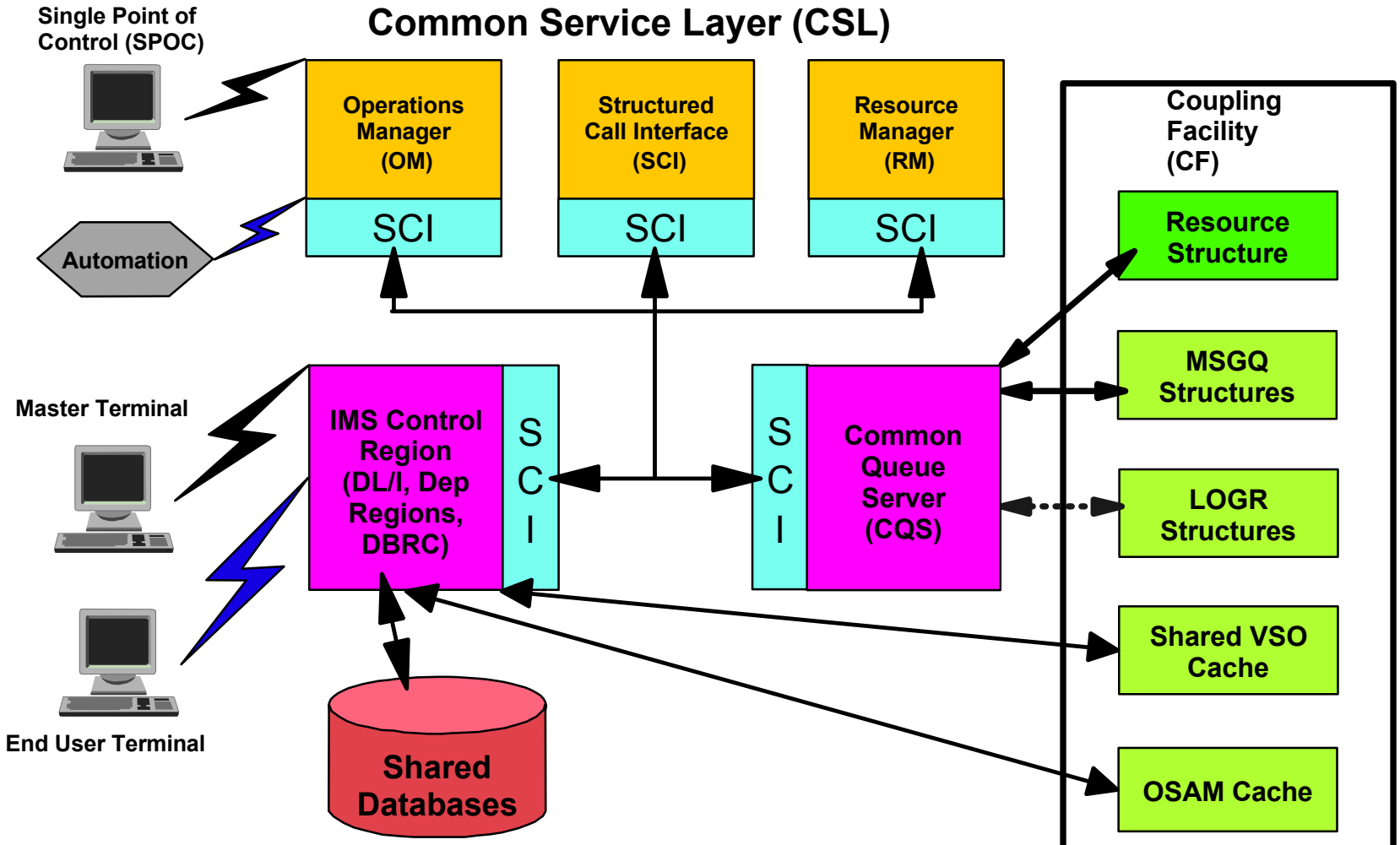
  -- Multiple nodes with the same name can log on at the same time

  - -Multiple lterms with the same name can be active at the same time
- Additional IMS requirements

  -- Eliminate restriction that resource names and IMS keywords must be unique

  -- Provide synchronous responses for IMS commands

IMS V8 Sysplex Management Enhancements



Structured Call Interface provides communication interface between IMS address spaces on same or across CPCs using XCF

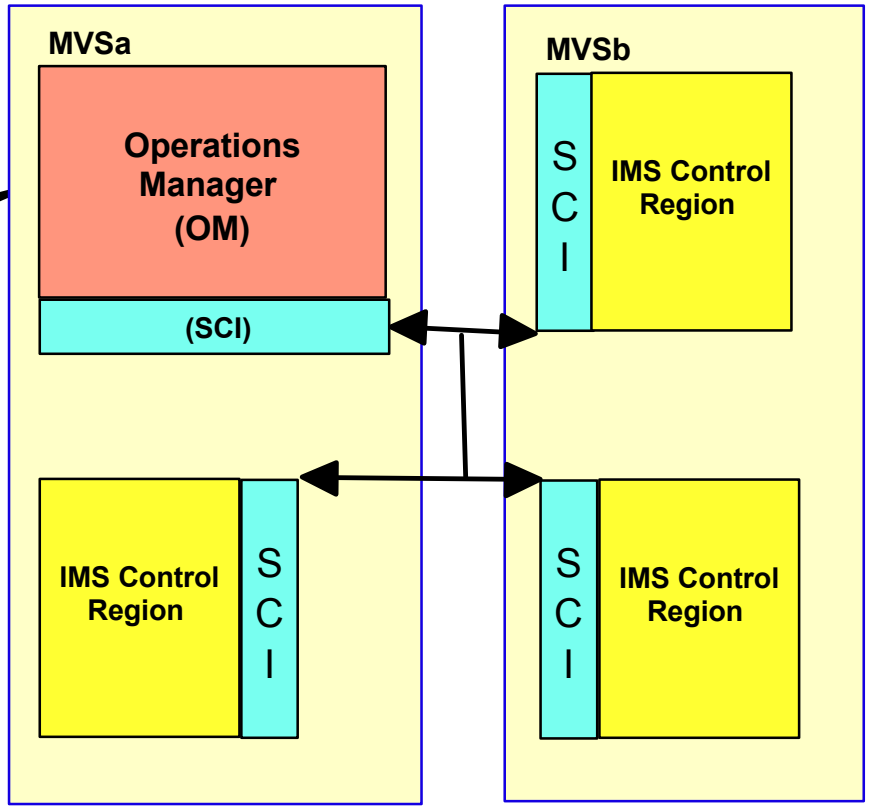
IBM Software

- IMS V8 provides the following management infrastructure and enhanced support:
- The IMS V8 Structured Call Interface is a new IMS address space which provides an interface for communication between IMS address spaces. Communication is provided on the same CPC or across CPC's using the MVS Cross Coupling Facility (XCF).
- The Resource Manager is a new IMS address space maintaining global resource information accessible by IMSs in the IMS Sysplex. It enables a user to resume work on another IMS and to enforce single active user signon in and IMS Sysplex, if requested. It enables name uniqueness enforcement for message destinations and provides support for IMS to coordinate Online Change across IMS Sysplex. It maintains local transaction tables to optimize performance
- Operations Manager. It is an IMS Address space which routes IMS Commands to interested IMS Modular Units across the IMSplex and consolidates IMS command responses. It provides an Application Programming Interface to allow a user or vendor to write tools to automate IMS operations. And it supports a Single Point of Control (SPOC) to present a single system image for the IMSplex by allowing the user to enter commands to all IMSs in the IMSplex from a single console. This SPOC is a 3270 TSO/ISPF Application running on S/390. It could also support a workstation Application connecting to OM.
- Sysplex Terminal Management allows VTAM to manage Generic Resource affinity while IMS can maintain VTAM terminal and user state data, if requested. It enforces resource type consistency for message destinations and resource name uniqueness. It supports global callable services for terminals/users allowing user exits to obtain node and user information across IMS Sysplex. It uses the Resource Manager (RM) to share VTAM terminal-related resources in the IMS Sysplex.
- IMS is providing more componetization, rewriting systems services with cleaner interfaces and extending its layered approach for Systems Management. The Structured Call Interface (SCI) ties it all together. The BPE (Base Primatives Environment) was first delivered in V5 and is exploited further with each subsequent version. Shared Queues (CQS- Common Queue Server) is the "Queue Unit", the first modular unit, delivered with IMS V6 and enhanced with IMS V7.
- The Common Service Layer is providing a single system image and easier systems management for the Sysplex environment.

IMS V8 Sysplex Operations Manager

Operations Manager

- Routes Commands
- Provides an API
- Provides Single Point of Control and supporting code for entering commands



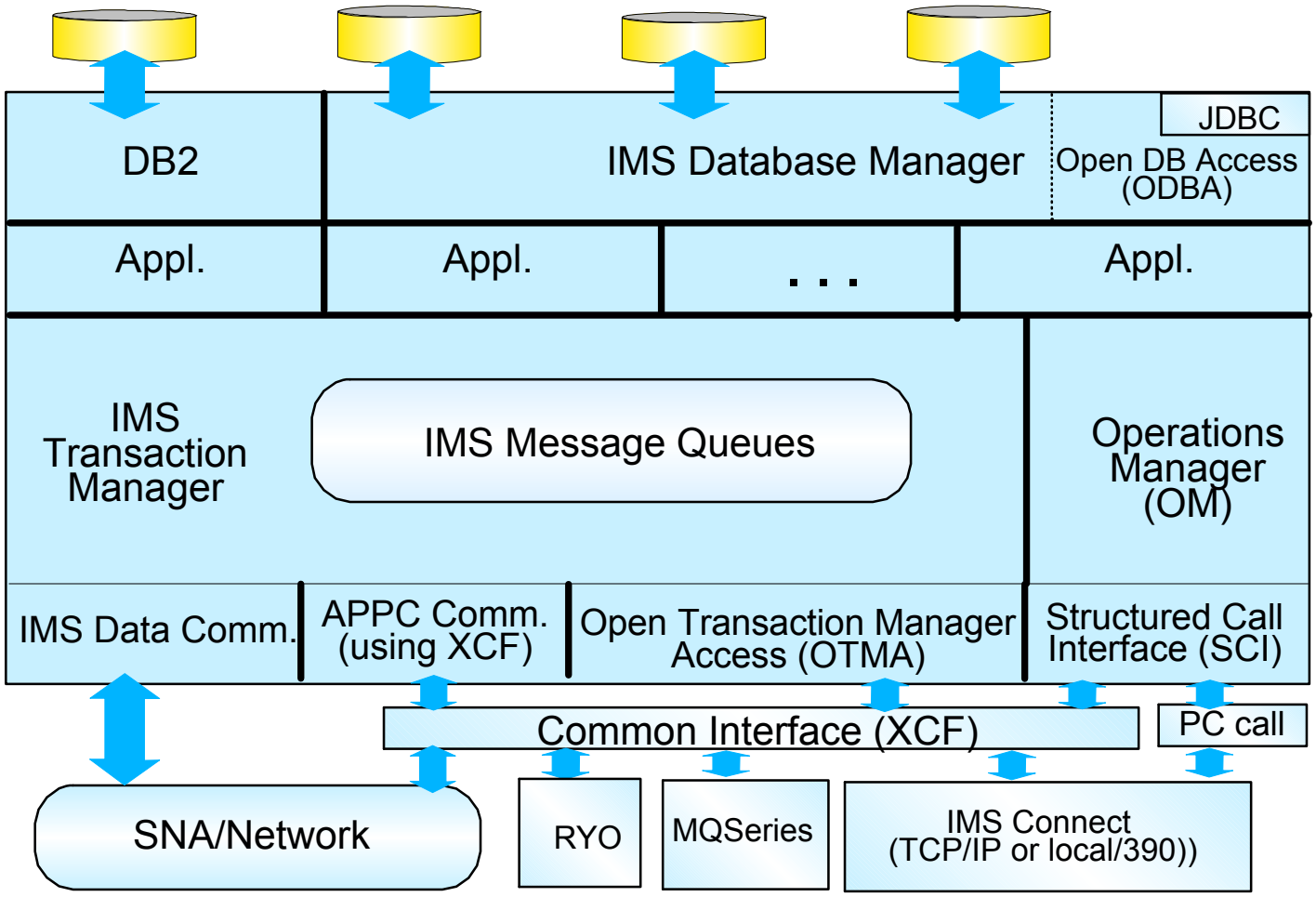
Single Point of Control (SPOC) can be used to control any IMS, with or without the presence of a Sysplex using

- TSO/ISPF Application, or
- DB2 V8 Control Center through Connect to IMS

IBM Software

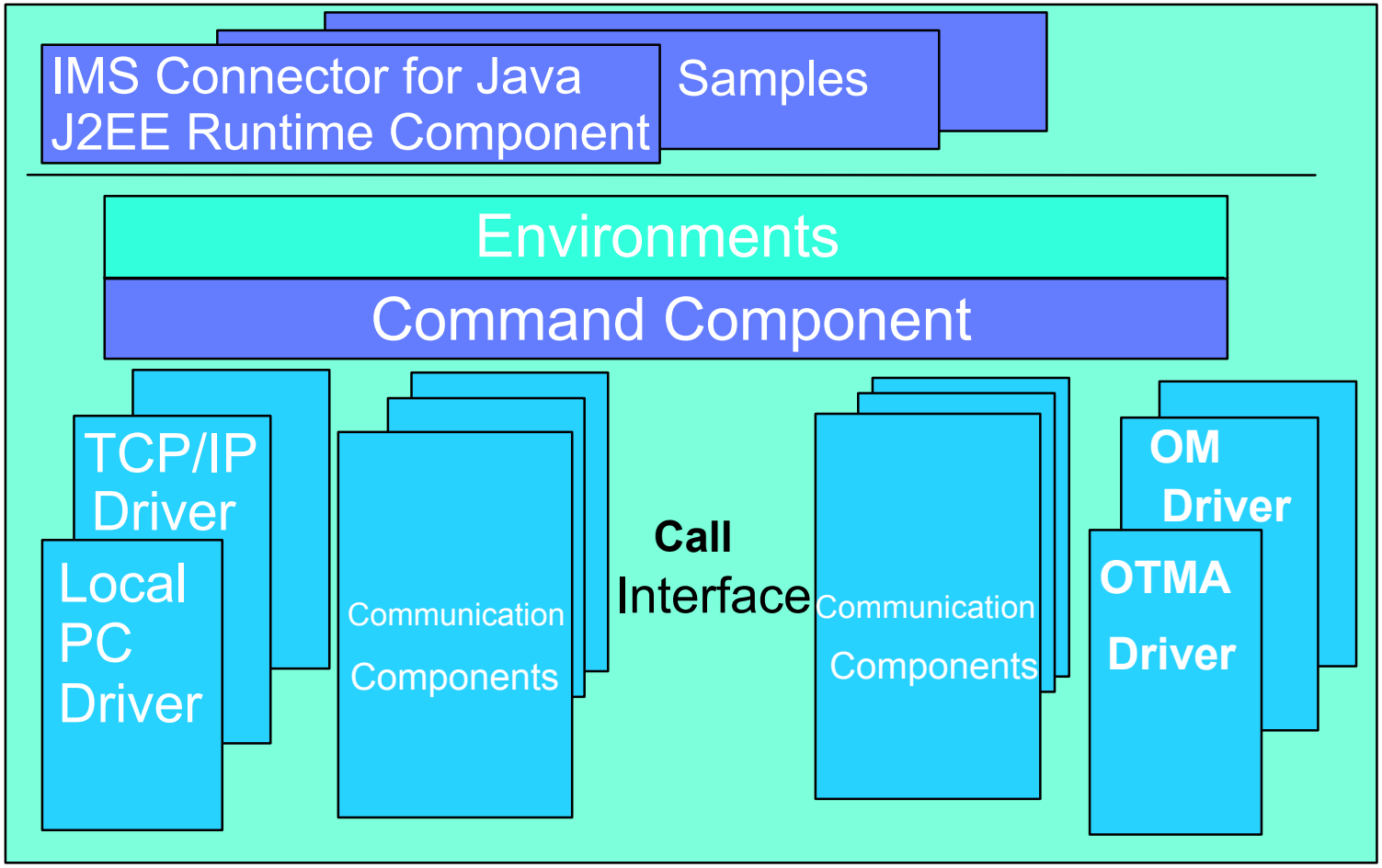
- IMS V8 Operations Manager
- Provides an IMS Address space which routes IMS Commands to interested IMSs across the IMS Sysplex and consolidates IMS command responses.
- Provides an Application Programming Interface to allow a user or vendor to write tools to automate IMS operations.
- Supports a Single Point of Control (SPOC) to present a single system image for the IMS Sysplex by allowing the user to enter commands to all IMSs in the IMS Sysplex from a single console.
- Although designed with Sysplex in mind to optimize operations across a Sysplex, the new V8 SPOC can also be used to improve systems management of commands in general, and the SPOC can be used to control any IMS, without the presence of a Sysplex. This support can provide operations management for a DBCTL environment, as well as for an IMS TM/DB environment. In addition, a GUI SPOC is being provided as part of the DB2 V8 Control Center early in 2003. Access to IMS from this IMS Control Center is provided through IMS Connect in through the new IMS V8 Structured Call Interface.
- Provides a 3270 TSO/ISPF Application running on S/390 or z/OS
- Provides DB2 V8 IMS Control Center code for distributed operations access to IMS operations management through IMS Connect.

Middleware Subsystem Access



- With IMS Version 8, IMS extended its use of XCF for use by other IBM subsystems, such as IMS Connect , for distributed operations access through the Structured Call Interface to the Operations Manager from the DB2 Version 8 Control Center as a single point of control.

IMS Connect Internal Structure Provides Connectivity Base for Future



IBM Software

- IMS Connect is part of the overall restructure of IMS for the 21st Century and is architected as the base for all future IMS Connectivity. Much of the function of IMS Connect can also be used with IMS V6 so you can start to take advantage of it before migrating your networks/applications/databases to IMS V7. The structure of IMS Connect is designed such that drivers can be interchangeable. That is, alternatives for the TCP/IP frontend or OTMA back end interfaces are already being provided. These are allowing IMS to exploit newer, additional, and enhanced protocols and/or interfaces. Along with IMS Connect is provided the IMS Connector for Java for access from Java applications and samples for other language access as well.
- With this structure IMS Connect could evolve to address other connectivity requirements, such as distributed database access to IMS DB.

IMS V8 Coordinated Online Change

Eases, manages, and automates change across the IMS Sysplex.

- Commands can be entered on one IMS
- Requests can be handled for coordinating change across all the IMSs in the IMS Sysplex
- Replaces manual coordination

- Coordinated Online Change eases, manages, and automates change across the IMS Sysplex. With coordinated online change, commands can be entered on one IMS and request that the new IMS Resource Manager coordinate an online change across all the IMSs in the IMS Sysplex, replacing the earlier manual coordination process.

IMS V8 Sysplex Terminal Manager

Recovers terminal state information after a session reconnect, and allows the terminal user to log back onto another IMS after a failure.

- Allows VTAM to manage Generic Resource affinity while IMS can maintain VTAM terminal and user state data, if requested
- Enforces resource type consistency for message destinations and resource name uniqueness
- Supports global callable services for terminals/users, allowing user exits to obtain node and user information across IMS Sysplex
- Uses the Resource Manager to share VTAM terminal-related resources in the IMS Sysplex
- Autologons can be initiated from a single IMS in the Sysplex

- Sysplex Terminal Management recovers terminal state information after a session reconnect, and allows the terminal user to log back onto another IMS after a failure. The Resource Manager is used to share VTAM terminal-related resources between IMS systems in the IMS Sysplex. IMS-managed VTAM Generic Resources affinity can be eliminated, while maintaining terminal and user state data. IMS will maintain VTAM terminal and user state data if requested. IMS enforces resource type consistency for message destinations and enforces resource name uniqueness. IMS supports the global Callable Services for terminals/users, enabling user exits to obtain node and user information across the IMS Sysplex.

- Sysplex Terminal Management
- Allows VTAM to manage Generic Resource affinity while IMS can maintain VTAM terminal and user state data, if requested
- Enforces resource type consistency for message destinations and resource name uniqueness
- Supports global callable services for terminals/users allowing user exits to obtain node and user information across IMS Sysplex
- Uses the Resource Manager (RM) to share VTAM terminal-related resources in the IMS Sysplex
- Autologons can now be initiated from a single IMS in the IMSplex. The installation designates one or more IMS systems as 'autologon frontend-capable' systems and IMS designates one of these as the active autologon system. When autologon output is generated from any system, IMS will initiate the autologon from the active autologon system. This eliminates printer 'thrashing'

IMS V8 Transaction Trace

Eases serviceability

Utilizes OS/390 and z/OS Transaction Trace facility for

- **Tracing a unit of work** through subsystems
- **Enabling show of flow** through components
- **Providing a consolidated place** to store tracking information
- **IMS Trace points** provided for
  - ➤ IMS Entry
  - ➤ IMS Exit
  - ➤ DL/I Entry
  - ➤ DL/I exit

- IMS V8 Transaction trace takes advantage of the OS/390 and z/OS Transaction trace facility to ease serviceability by providing transaction tracing information. Customers have asked for the ability to track a unit of work through multiple subsystems. This would enable the user to more easily debug problems in this type of environment.

IMS Resource Definition Manageability

Current System Generation Process

- Two stage, Batch, Assembler process
  - Cold Start
  - Online Change
    - Databases, Trans route codes, Appls, Security
    - Quiesces whole system

Requirements

- Reduce system generation time/effort
- Improve availability during change

- Another area of Manageability that IMS is addressing is that of the IMS Resource Definition. Currently this requires two stage, batch, assembler system generation process. This originally requiring cold start, has provided online change for some resources. These resources are the Databases, Trans route codes, Appls, Security. But this online change requires a quiesce of the entire system
- Requirements in this are are to reduce system generation time/effort and to improve availability during change.

IMS Resource Definition Manageability Staging

Reducing IMS System Generation effort

- **IMS V4 stopped using sysgen to support new function**
- **IMS V5/6 removed conditional assembly modules**
- **IMS V7 put non-conditional link-edit modules under SMP control**
- **IMS V8**
  - Removed RSR RLT/DLT feature install checking
  - Resource Manager/Coordinated Online Change
  - Syntax Checker
  - Packaging/Installation/IVP enhancements

- In the more recent IMS versions we have been focused on reducing the IMS System Generation time and effort
- IMS V4 stopped using sysgen to support new function
- IMS V5/6 removed conditional assembly modules
- IMS V7 put non-conditional link-edit modules under SMP control
- IMS V8 provided the Resource Manager/Coordinated Online Change, Syntax Checker, Packaging/Installation/IVP enhancements, and removed the RSR RLT/DLT features install checking.

IMS V8 Syntax Checker

Helps Reduce System Generation effort

- **New IMS ISPF application** which assists Systems Programmers in defining and maintaining the IMS parmlib members residing in the IMS PROCLIB
- **Parameter and value checking and detailed help text** at the parameter level tailored to the IMS version
- **Assists in moving from release to release** by identifying new parameters and obsolete parameters
- **Provide ability to ensure parameters are valid** prior to shutting down and restarting your IMS Control Regions.

IBM Software

- Syntax Checker is a new addition to the IMS installation process. Syntax Checker helps reduce the system generation effort by assisting the system programmers in defining and maintaining selected input parameter members residing in the IMS PROCLIB. It provides parameter syntax checking, parameter value verification and detailed help text at the parameter level tailored to the IMS release. It also provides assistance in migrating to a new release by identifying any new and/or obsolete parameters. Syntax Checker displays the proclib member in an ISPF panel. Any parameters or values in error are highlighted. The user may add, change or correct the value of the parameters. Detailed help text for a parameter is also available at the touch of a key. Using Syntax Checker, the system programmer can ensure the parameters are valid prior to shutting down and restarting IMS control regions. It eliminates the risk of parameter error during a start-up of IMS and the time-consuming process of tracking down and correcting parameter syntax or value errors.

IMS V8 Packaging, Installation and IVP Enhancements

New IMS Packaging and Installation Process

- SMP/E jobs removed from Install/IVP Dialog Process
- SMP/E Receive, Apply, Accept processing
- New Target and Distribution datasets
- No DFSJCLIN Job provided

Installation Verification Program Enhancements

- OM, RM, SCI, SPOC Sample Application
- Syntax Checker Sample Application

- New IMS Packaging and Installation Changes
- The SMP/E jobs have been removed from the Install/IVP Process.

  Instead: JCL is provided in the Program Directory to unload jobs that perform the SMP/E processing. The SMP/E install jobs contain instructions to customize the install to the customers site.

  This is a major change to the IMS install process. It was made to be consistent with IBM's installation standards.

  "Install/IVP" will be renamed "IVP" (Installation Verification Program). The IVP process will continue to provide the facility for verifying (testing) the installation of IMS.

- SMP/E Receive Apply Accept Processing
  The SMP/E install portion of IMS will use the standard Receive, Apply, Accept process. SYSGEN is still required to complete the IMS install process.

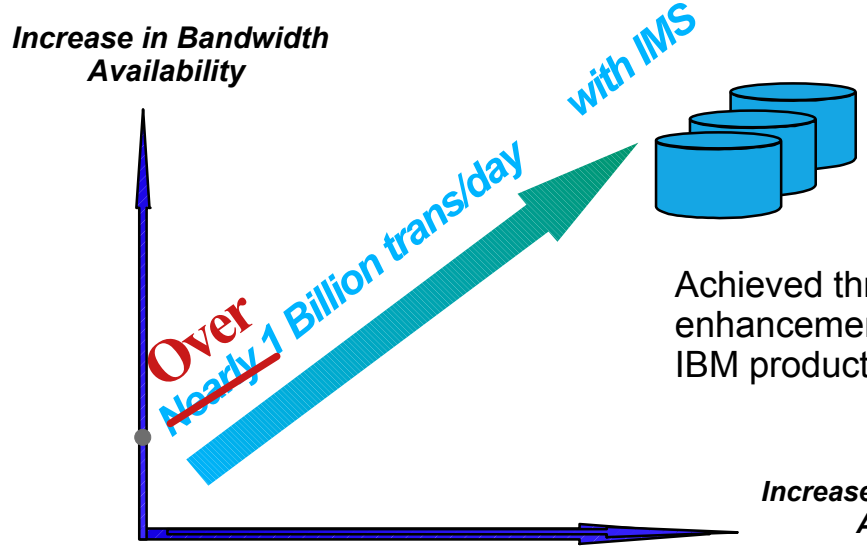
- New SMP/E target and distribution datasets provided a target dataset for source code, target and distribution datasets for optional user exits, and Java libraries.

- No DFSJCLIN job provided.
  The job was used to install non-SYSGEN parts. These part are now created by the SMP/E Apply process.
  The SMP/E GENERATE command will be used to build any JCL necessary to recreate the non-SYSGEN parts after the install.

- IVP Enhancements
- OM, RM, SCI, SPOC Sample Application
  IVP will provide jobs and tasks to test and demonstrate the defining and starting of an IMSPLEX and the use of SPOC to issue commands to the IMSPLEX.

- Syntax Checker Sample Application
  IVP will provide tasks to demonstrate the general use of
  Syntax Checker and the use of Syntax Checker to convert the IMS "PB" Proclib members (DFSPBxxx) from V7.1 to V8.1

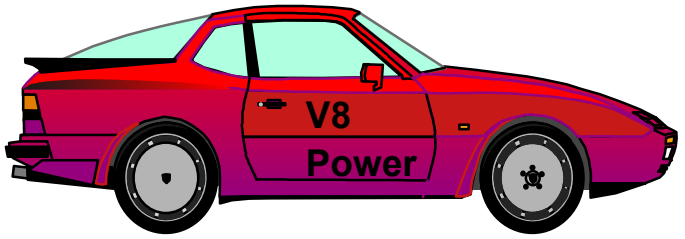
IMS V8 Scalability in Performance/Capacity/Availability/Recovery



IMS tight integration with IBM Storage Take advantage of PAV !!

Achieved thru enhancements across the IBM product line.

- **Local systems:**
  - z/Architecture 64-bit mode
  - Parallel Database Open
  - Up to 2048 Fast Path Areas per DEDB
  - CSA reduction
- **Parallel Sysplex:**
  - CSL address space
  - CF structure duplexing
- **Increased performance with Shark DASD**
  - MSC response time in microseconds
  - OLDS logging bandwidth up to 26.9 MB sec

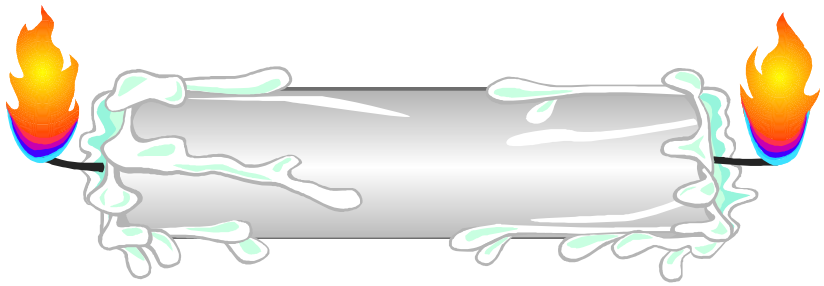


IBM Software

- IMS V8 meets extreme IT needs for e-transaction processing with the ultimate in performance/capacity, availability and systems management and technological leadership in connectivity and new application development.
- IMS along with the S/390 and the new zSeries have been delivering on the promise of e-business and continue to do so with new enhancements for e-transaction processing bandwidths capable of supporting the largest web sites and transaction rates through GB ethernet. Fiber connection technology and industry leading webserving with IMS and the IBM WebSphere Application Server, Security and Communications Servers. A balanced system is provided for world class solutions. IMS together with the S/390 and zSeries are delivering more comprehensive security protection, featuring centralized management and a strong suite of end-to-end products. We continue to provide and enhance our leading edge end-to-end transaction integrity and real time data currency with the sharing of data, networks, and messages, utilizing the sysplex and its coupling facility. Our technology transition from bipolar to CMOS has allowed us to deliver exponentially improving price/performance to our customers. Customers are using this power to take on new e-business related applications.
- IMS V8 not only has increased the transaction rate to over a billion trans/day with database access on a single processor, but has also made a lot of improvements for performance and capacity.

IMS V8 DB Recovery Control Enhancements

- **Automatic Recon Loss Notification** for quicker loss recovery
- **Eliminate abends** when authorizing database
- **RECON Command Authorization** controls RECON access/update via DBRC batch commands
- **16M RECON Record Size** helps users avoid problems caused by Recon Record size exceeding VSAM record size max
- **Prilog Compression** reduces overhead, improves performance



- IMS V8 Database Recovery Control Enhancements include:
- Automatic Recon Loss Notification adds support to automatically propagate a Recovery Control Data Set (RECON) reconfiguration to other DBRC instances. When an error on a RECON data set results in a RECON reconfiguration on one IMS subsystem, other DBRC instances using the same RECONs are notified. The result is that all IMS subsystems automatically deallocate the failed RECON data set so that the user can quickly recover from the loss.
- Eliminate abends - When authorizing databases or recording Extended Error Queue Elements (EEQEs), DBRC would no longer ABEND and be less likely to cause IMS to ABEND due to RECON record size problems. DBRC also would no longer abend when attempting to deallocate a database that is recorded in RECON as "already deallocated".
- RECON Command Authorization support allows users to control RECON access/update via DBRC batch commands as well as the High Availability Large Database (HALDB) Partition Definition Utility. User exit implementation allows user flexibility to customize security criteria and maintain an audit trail. This helps customers protect the integrity of database data by allowing finer control over the data one can access.
- 16M RECON Record Size helps users avoid problems caused by RECON records (such as the PRILOG record which identifies the primary log for an active system) exceeding the VSAM RECORDSIZE maximum. This eliminates planned and unplanned outages that are due to RECON record size. DBRC implements its own RECON record spanning.
- Prilog Compression has been enhanced to reduce its overhead, improving performance. Since DBRC now supports RECON records of unlimited size, compression is attempted whenever an Online Log Data Set (OLDS) is archived.

IMS V8 Image Copy 2 Enhancements

Eases Image Copy coordination and management

- **Multiple utility control statements** can be copied per execution
- **Group name support** names the datasets in one execution so can start and/or stop as a group
- **Single output data set** can be created for multiple image copies
- **DFSMSdss Optimize option** supported

- The Image Copy 2 enhancements allow multiple database data sets to be copied in one utility execution. The utility passes the data sets to DFSMSdss on multiple DUMP commands to be processed in parallel. Optionally the user can specify that the data sets are to be processed by a single DFSMSdss DUMP command which results in the image copies being written to the same output data set. Logical completion in most cases would be achieved for all of the database data sets in a very brief period of time. Also, the utility supports specification of a group name for the database data sets being copied. Logical completion is then indicated for the group rather than for the individual database data sets. With the added capabilities, users are able to better manage and automate image copy processing.

IMS V8/DB2 Coordinated Disaster Recovery

Aids in disaster recovery coordination in installations accessing DB2 via IMS

- 'eXtended Recovery Copy (XRC) tracking' added to IMS RSR
- Eases task synchronizing IMS and DB2 logs for disaster recovery
- Supports
  - IMS RSR For logs and (optionally) Databases
  - XRC for DB2 logs and boot strap data sets (BSDSs)

IBM Software

- IMS/DB2 Coordinated disaster recovery support: The IMS Remote Site Recovery (RSR) function is extended to provide support for coordinated IMS/DB2 disaster recovery by working with XRC (eXtended Remote Copy) for the DB2 logs. Without this support, if IMS and DB2 logs, log control information, and (optionally) database data to a remote site by independent transfer mechanisms, the customer has to synchronize the IMS and DB2 logs and ensure that the IMS and DB2 databases are consistent when a disaster occurs. This can be a time-consuming and error-prone process and puts data integrity at risk. The new support enhances IMS RSR for coordination of IMS and DB2 disaster recovery processing at a remote recovery site, offering an IBM-provided solution for synchronizing the logs. In the supported configuration, XRC is used for DB2 logs. With this support, the steps required by the user to synchronize the logs are greatly reduced.

IMS V8 Software Prerequisites and Migration SPEs

IMS V8 MINIMUM RELEASE LEVELS

- OS/390 V2R10 (5647-A01) with DFSMS
  - RACF (included in separately orderable SecureWay Security Server), or equivalent, if security is used.
  - High Level Assembler Toolkit
- z/OS V1R2
  - Required for APPC/OTMA Synchronous Shared Qs
  - Required for MSC Ficon CTC support
  - Required for Shared Qs/EMH CF Duplexing support
  - Required for System Mgd Duplexing of VSO structures
  - Recommended for Resource Mgr and Coordinate OLC
  - Enhances usability for Sysplex Terminal Manager

DBRC Migration/Coexistence SPE

- **on IMS V6**
- **on IMS V7**

- IMS V8 operates under OS/390 V2R10 configurations, or subsequent versions, releases and modification levels, including z/OS (5694-A01), unless otherwise stated, and requires the following minimum version, or release or modification levels:
- OS/390 V2R10 (5647-AQ1) with DFSMS (a base element of OS/390 V2R10)
- RACF (included in a separately orderable SecureWay Security Server feature of OS/390 V2R10), or equivalent, if security is used
- IBM High-level Assembler Toolkit (5696-234), a separately orderable feature of OS/390
- IMS V8 also operates in a virtual machine (VM) under control of OS/390 V2R10 and is intended for use in a customer program development, testing and non-XRF production environment with some restrictions.
- z/OS V1 R2 is required for IMS MSC Ficon CTC support.
- z/OS V1 R2 is required for Shared Queues/EMH CF Duplexing support and for System Managed Duplexing of VSO structures.
- z/OS V1R2 Communications Server Affinity enhancement can be optionally used with IMS V8 Sysplex Terminal Management for enhanced usability.
- z/OS V1R2 CF Duplexing is recommended, though not required, for IMS V8 Resource Manager and Coordinated Online Change.
- In order to take full advantage of the Coordinated Online Recovery, Sysplex Terminal Management, Single Image Operations Manager, and/or Sysplex Wide Resource Management, IMS on all the Sysplex systems involved should be on IMS V8.
- All systems involved in using APPC/OTMA Synchronous Shared Queues support need to be on IMS V8 and z/OS V1 R2 for its Multi-System Cascaded Transactions support. Resource Recovery Services must also be active on all these systems.
- IMS Java application support require the IBM Developer Kit for OS/390, Java 2 Technology Edition (5655-D35), with a special enhancement, referred to as the Persistent Reusable Java Virtual Machine (JVM). This is required for the IMS V8 Java Dependent Region support.
- JDBC access to IMS DB for DB2 Stored Procedures requires DB2 UDB for OS/390 and z/OS V7 (5675-DB2).
- JDBC access to IMS DB for CICS applications requires CICS Transaction Server for z/OS V2 (5697-E93).
- IMS/DB2 Coordinated Disaster Recovery Support requires the IMS V8 Remote Site Recovery (RSR) Record Level Tracking (RLT) feature.

Enabling Migration

Provide on a regular schedule, staged, more frequent, deliverables of key customer function to:

- Ease customer
  - planning for the new deliverables,
  - installation of and migration to the new releases,
  - integration into your system,
  - manageability of the new releases
  - maintenance on these deliverables,
- Ensure timeliness, minimized disruption, and quality through enhanced testing of the smaller enhancements delivered through the shorter release cycle, rather then through the service process.
- Improve integration and quality through staged delivery of the larger enhancements
- Provide opportunity for higher quality and more timely IBM and vendor tools
- Increase opportunity for integration and visibility of IMS support for new technologies

- We are also helping to enable migration with Version 8 by changing the to a staged, more frequent, regular deliverable schedule of key customer function to:
- Ease customer
- planning for the new deliverables,
- installation of and migration to the new releases,
- integration into your system,
- manageability of the new releases
- maintenance on these deliverables,
- Ensure timeliness, minimized disruption, and quality through enhanced testing of the smaller enhancements delivered through the shorter release cycle, rather then through the service process.
- Improve integration and quality through staged delivery of the larger enhancements
- Provide opportunity for higher quality and more timely vendor tools
- Increase opportunity for integration and visibility of IMS support for new technologies in strategic announcements and conferences.

IMS Tools Portfolio

Database Administration

- *IMS High Performance Unload 5655-E06*
- *IMS High Performance Load 5655-E07*
- *IMS High Performance Prefix Resolution 5655-I15*
- *IMS Index Builder V2R3 5655-E24*
- *IMS Parallel Reorganization V2 5655-F74*
- *IMS High Performance Pointer Checker 5655-E09*
- *IMS Data Base Repair Facility 5655-E03*
- *IMS High Performance Sysgen Tool 5655-F43*
- *IMS Command Control Facility 5655-F40*
- *IMS ETO Support 5655-E12*
- *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 V2R2 5655-F76*
- *IMS Fast Path Basic Tools 5655-E30*
  - DEDB Unload/Reload
  - DEDB Pointer Checker
  - DEDB Tuning Aid
- *IMS Fast Path Online Tools V2 5655-F78*
  - Online Pointer Checker
  - Online Data Extract
  - Online Area Extend
- *IMS HALDB Conversion Aid 5655-I01*
- *IMS Batch Backout Manager 5697-H75*

Manage
Automate
Monitor
Tune...

Performance Management

- *IMS Performance Analyzer 5655-E15*
- *IMS Network Compression Facility 5655-E41*
- *IMS Queue Control Facility 5697-E99*
- *IMS Workload Router V2R3 5697-B87*
- *IMS Buffer Pool analyzer 5697-H77*

Recovery / Replication

- *IMS Image Copy Extensions 5655-J56*
- *IMS DEDB Fast Recovery 5655-E32*
- *Application Recovery Tool for IMS and DB2 Databases 5697-F56*
- *Online Recovery Service 5655-E50*
- *IMS Data Propagation 5655-E52*
- *IMS High Performance Change Accumulation 5655-F59*

Application Management

- *IMS Connect 5655-E51*
- *IMS Message Format Services Reversal Utilities 5655-F45*
- *IMS Program Restart Facility 5655-E14*
- *Batch Terminal Simulator 5655-J57*

IBM Software

- In addition to IMS, IBM has been providing a wide range of price/performance, competitive Systems Management tools for IMS. This shows a summary of the IBM IMS tools available currently available. The tools provide support for speeding up and reporting on performance, extend the functions of and assist with testing of IMS, and provide system tools for querying, validating, managing, and tuning the IMS Database, These include for example tools necessary to maintain and repair databases Many tools serve multiple purposes. IBM offers tool functionality like IMS Control Suite that is not available from any other vendor. IBM offers high performance tools that are competitive within the industry at an affordable price. In fact when taken together "price/performance and functionality", IBMs IMS tool can be considered the best in the industry.

New/Enhanced IMS Tools

Announced March 2002:

- IMS Index Builder V2 R2 - includes SCAN performance fix
- IMS Queue Control Facility V1 R2 - Queue space user exit - freed up, Dynamic QCF table manipulation, Heavy user identification and action (threshold) support
- IMS HP Prefix Resolution V2 - Eliminates Batch Pipes prerequisite
- IMS HALDB Conversion Aid - Utilities to assist in FF to HALDB conversion:
  - An easy to use ISPF Front-end
  - Automatic Data Base Definition (DBD) conversion
  - Test database conversion
  - Index pointer healing
  - Partition modeling tool
- Service Stream enhancements delivering 1H2002
  - HP Pointer Checker - Dynamic Allocation Support
  - Parallel Reorg
    - HALDB Support
    - DBD Reversal Support
    - HISAM/SHISAM Support
  - DB Repair - FP support
  - Control Suite - Monitor and HALDB support
  - Checkpoint Wrapper (prpq) IMS V8 support/repackage
  - **Connect - 2 phase commit support**

- And IBM continues to provide a wide variety of new and enhanced tools. Here are some announced in March 2002.
- The IMS Index Builder can help you simplify index recovery and maintenance, reduce index maintenance time and eliminate the need to image copy index databases. It gives you an easy-to-use, one-step procedure for the maintenance of primary and secondary indices.
- The IMS Queue Control Facility delivers an enhanced replacement for the IMS Message Requeuer. It gives you an interactive ISPF front end, allowing you to Browse, Query, Unload and Dequeue messages, set controls for the Queue Overflow Protection feature, and more.
- The IMS High Performance Prefix Resolution performs the same functions as the IMS Prefix Resolution utility but with considerably reduced elapsed time.
- And the new IMS HALDB Conversion Aid can help you take advantage of HALDB by giving you utilities and aides to analyze, model and convert existing IMS database structures to a HALDB format..
- Additional 2002 enhancements for IMS Tools are also being provided through the service stream.

New/Enhanced IMS Tools

Announced September 2002:

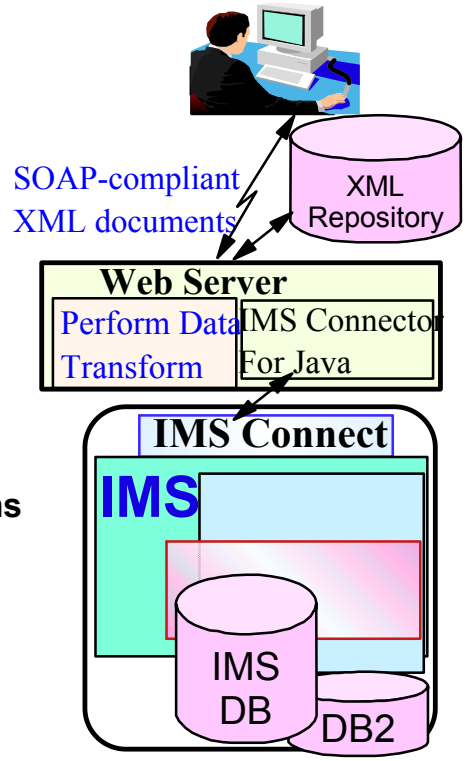
- **Application Recovery Tool for IMS and DB2 Databases V1R2** - HALDB and Sysplex Sharing enhancements
- **IMS Index Builder V2 R3** - availability/usability enhancements
- **IMS Batch Backout Manager V1** - enhances database availability
- **IMS Buffer Pool Analyzer V1** - provides information and helps determine impact of buffer pool changes
- **IMS Database Control Suite V2R2** - performance, usability, productivity, recovery, and Tools integration enhancements
- **IMS DEDB Fast Recovery V2R2** - shortens the recovery time
- **IMS Performance Analyzer V3R2** - enhances reporting, dialog and documentation.
- **IMS Batch Terminal Simulator V3** - enhanced auditing and support for Java and new technologies
- **IMS Image Copy Extensions V2** - creates new copy data sets from the IMS Image Copy data set.
- **Service Stream enhancements delivering 2H2002**
  - **IMS Connect V1R2 enhancements**

IBM Software

- And IBM continues to provide a wide variety of new and enhanced tools, announced in September 2002 were:
- Application Recovery Tool for IMS and DB2 Databases (previously known as the DB2 Recovery Manager) provides enhancements for HALDB and Sysplex sharing.
- The IMS Index Builder can help you simplify index recovery and maintenance, reduce index maintenance time and eliminate the need to image copy index databases. It gives you an easy-to-use, one-step procedure for the maintenance of primary and secondary indices. Enhancements are being provided for availability and usability in this administration process.
- IMS Batch Backout Manager helps you manage DL/I application ABENDS and improves database availability.
- IMS Buffer Pool Analyzer provides more than information on IMS database buffer pool hit rations and I/O rates. In addition it helps determine the impact of buffer pool changes before they are made to take the guess work out of the process.
- IMS DB Control suite brings together IMS Database tools and utilities into an integrated suite that contains all the functions necessary to centrally maintain and manage the IMS databases. Enhancements are being provided for performance, usability, productivity, recovery, and Tools integration.
- IMS DEDB Fast Recovery provides a fast alternative to DEDB recovery at an IMS Emergence Restart (ERE) failure and assists in operating and maintaining the data integrity of IMS databases beyond the IMS Cold Start. Enhancements shorten the recovery time at an unscheduled IMS Cold start while maintaining the integrity of the IMS Databases.
- IMS Performance Analyzer provides new functions and enhancements for improved monitor and log reporting, new log reports to replace user programs and to "health check" your system, enhanced DBCTL reporting, dialog and documentation.
- IMS Batch Terminal Simulator provides a comprehensive means for testing and checking IMS application logic and interfaces, teleprocessing and database activity, and 3270 format control blocks. Enhancements are provided for auditing, Java, and keeping pace with and supporting the latest technologies (eg. DB2 and WebSphere MQ call trace, etc.)
- IMS Image Copy Extensions provides a new function called Creation Image Copy that creates new copy data sets from the IMS Image Copy data set.
- Additional 2002 enhancements for IMS Tools are also being provided through the service stream.

XML and IMS for Transparent Application Integration

- **Processing XML Documents in New IMS Applications Today**
  - **Customers can write IMS C++ or IMS Java applications using the XML Toolkit for OS/390**
  - **Customers can write IMS Cobol or PL/I application using XML support for COBOL and PL/I**
    - Tran code still must be EBCDIC, rest of data can be XML
    - The IMS program can invoke XML parser to convert to non-tagged data
- **Bridging XML and Existing IMS Applications Today**
  - **Using MQSeries Integrator**
    - Dictionary support for messages
    - Routing and processing based on message content
    - US Utility built cost-effective e-business infrastructure to IMS
  - **Customers can enable existing IMS applications as Web Services via WAS**
- **XML and IMS Requirements**
  - **Generate XML doc for outputs from new COBOL and PL/I applications**
  - **Enable MFS-based IMS application programs as web services**
  - **Transform XML for existing IMS applications using IMS Connect**
  - **Using XML as an IMS Data Definition language**
  - **Storing/Extracting XML documents in/from IMS Databases**

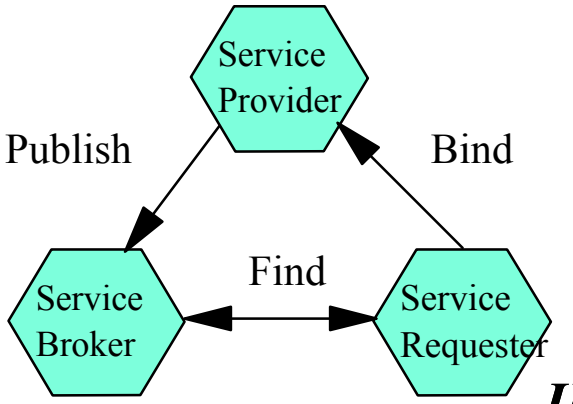


IBM Software

- And IMS Tools are also taking advantage of XML which is critical for future transparent application integration.
- Today, IMS documents can be processed in new IMS Java and C++ Applications, through use of the XML Parser, and/or access existing IMS applications using MQSeries.
- We are also making available IMS COBOL and PL/I XML Application Capability, using the IBM Enterprise Cobol and PL/I compilers, which allows you to develop new or modify existing IMS applications using XML support for COBOL and PL/I. This can be used to enhance your existing high performance IMS transactions written in COBOL and PL/I in a Business-to-Business environment by receiving and sending XML documents. IMS supports the transmission of XML documents in the data portion of the IMS message. The messages can be placed and retrieved for the IMS messages queue for all messages regions for IMS Message Processing Programs, Fast Path Programs and Batch Message Processing Programs.
- You can also enable existing IMS Cobol and C applications as Web Services by connecting SOAP and EJBs to IMS.
- Future requirements also offer enhanced support for industry tooling, additional languages, transformation, and the use of XML as an IMS Data Definition language.
- With the new WebSphere tooling you would be able to generate XML documents for outputs from new COBOL and PL/I applications.
- You would be able to web enable your MFS applications using XML.
- You would also be able to transform your MFS based IMS applications into web services.
- XML transformation processing could eventually be contained within IMS Connect.
- IBM's IMS E-Commerce Connectors Team at the Silicon Valley Laboratory developed the Common Application Metamodel (CAM). CAM is ar IBM open standard initiative for Enterprise Application Integration (EAI). It was submitted as a proposal to the Object Management Group (OMG). OMG is the world's largest software consortium with a membership of over
- 800 vendors, developers, and end users. See http://www.omg.org.
- A good description of CAM is part of a draft document, with diagrams and illustrations, at the web site for the Instituto Tecnologico de Informatica in Spain. Sections 6 (page 13) and 9 (page 79) are of special interest to those who have labored in the Open Transaction Management Access (OTMA) vineyards.
- See http://www.iti.upv.es/iti/i+d/mirrors/ftp.omg.org/pub/docs/ad/00-08-12.pdf.
- CAM defines and publishes a metadata exchange standard for information about accessing enterprise applications such as CICS and IMS. Anyone who has written COBOL COPYBOOK to XML translators or who has tried to make IMS message contents discernable to Java code, as have I, knows there has just got to be a better way. CAM is that better way!
- Because CAM provides physical representation of data types and storage mapping to support data transformation in an EAI environment, it enables Web services for enterprise applications.
- IBM has indicated CAM in their statement of direction for IMS. I would expect third party software developers to also adopt CAM, especially if and when it is accepted by OMG

Web Services - The Next Step In The Evolution of the Web

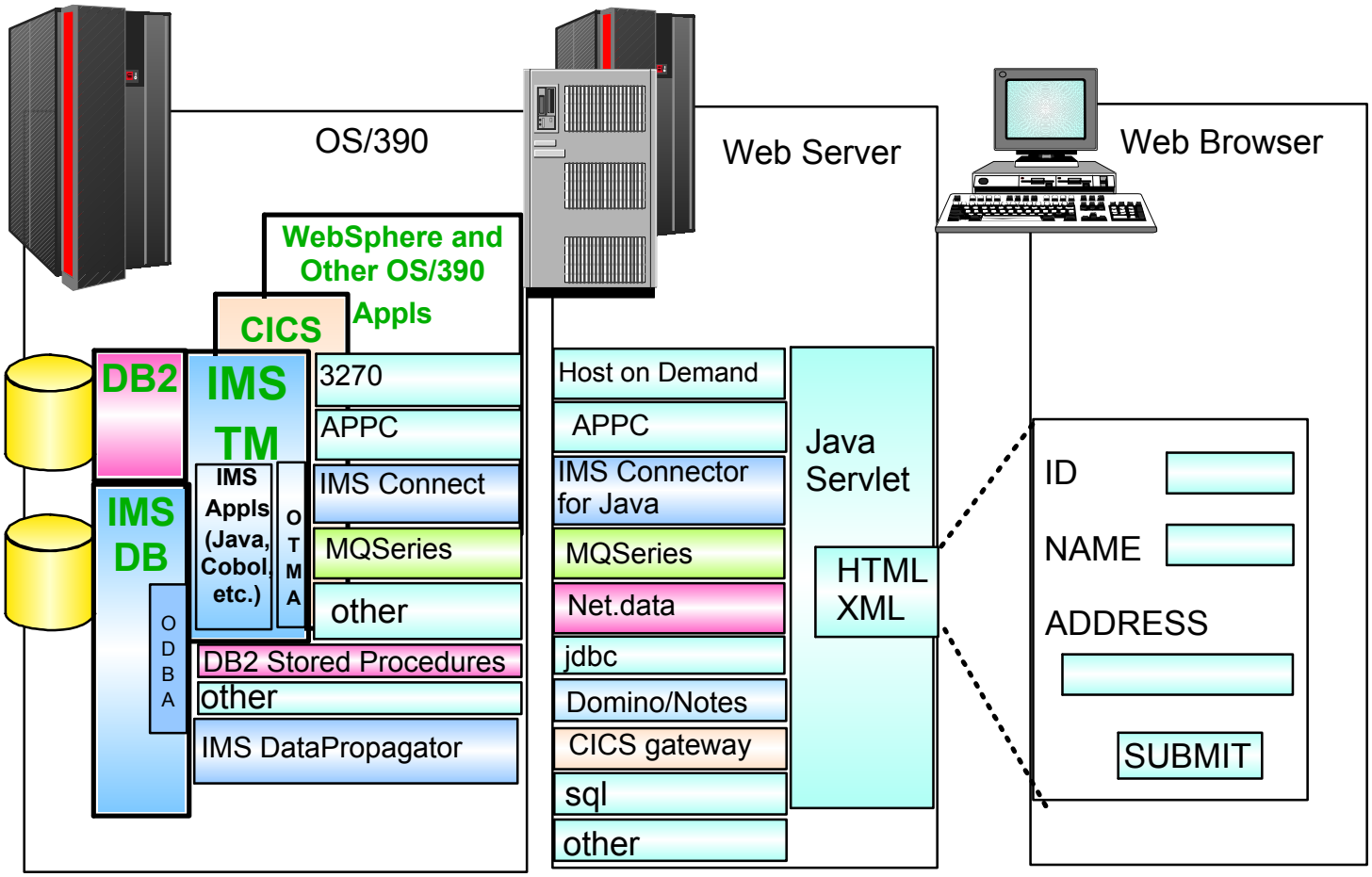
- Allow programmable elements to be placed on web sites where others can access distributed behaviors
  - Web Services are emerging as building blocks for constructing B2B applications that integrate business processes over the Internet
- Applications can use XML to expose their features while remaining neutral with respect to any operating system, programming language or backend server
- Typically transactional, requiring integration with existing systems



IBM Software

- Web Services offers the next step in the evolution of the web, creating the building blocks toward a more integrated web business.
- Using industry standard XML protocols and packets we can evolve to common information distribution and easier access.
- This not only provides for Business to Consumer but also Business to Business

Leveraging IMS Applications and IMS Data for Integration

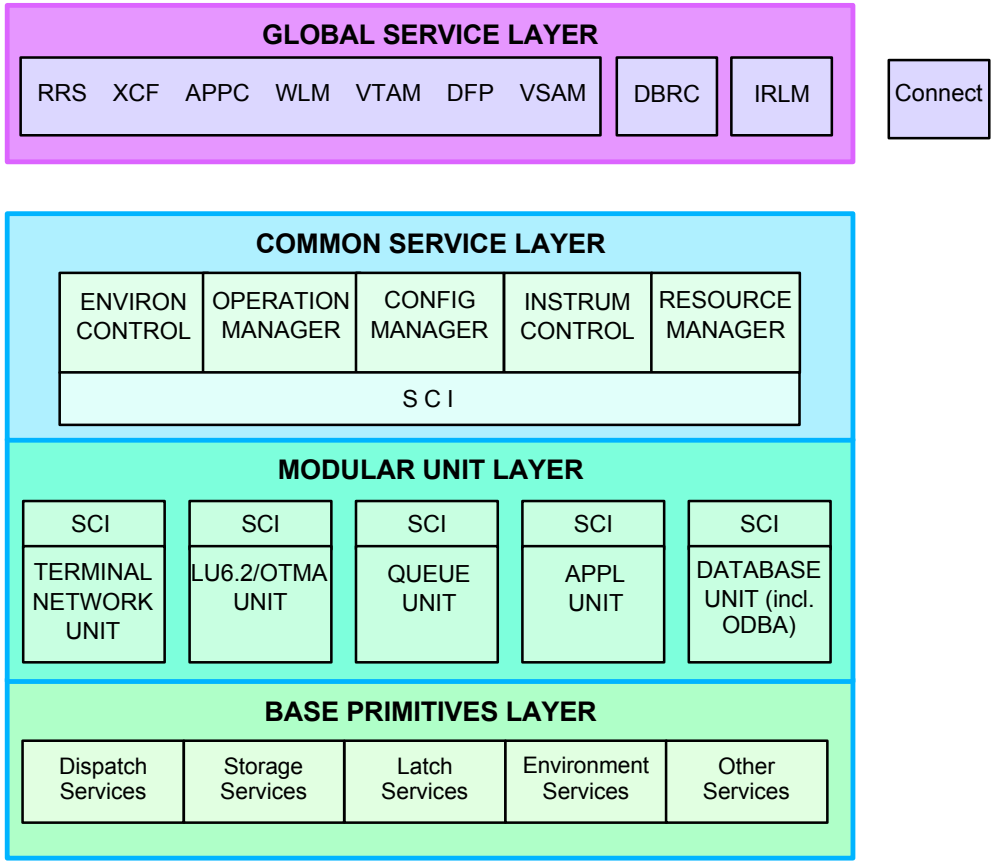


IBM Software

- Connectivity has always been a priority with IMS. IMS traditionally has supported a number of communications facilities (e.g.. 3270, APPC, TCP/IP, MQSeries, etc.). These solutions can use workstation or S/390 servers to access IMS. Information can be retrieved from the server system in a two-tier environment or in a three-tier environment. The Web servers have used connectors for IMS, DB2, CICS, MQ, etc., to communicate with the applications and data and to generate the formatted screen to be displayed on the browser. Our strategy here is to ship connectors with their tooling with VisualAge Java and with WebSphere for consistency across platforms and subsystems. We want people to connect regardless of the tool they are using and regardless of what they want to connect with. IBM's goal is to do the best job of integrating our tools. Applications can also use these tools to display information on the internet using HTML (Hypertext Markup Language), a markup language for describing pages of information displayed, or XML (extended markup language), for data interchange. Mapping activities, as well as enhanced function, can take place in the web server between the web and the existing network protocols and input/output streams.
- IMS has taken advantage of the new Cross Coupling facility (XCF), a software facility that allows MVS subsystems to communicate more efficiently, with its Open Transaction Management Access (OTMA) facility. This IMS access for TCP/IP through IMS Connect, for MQSeries, etc., provides a more efficient and richer capabilities in accessing existing, unchanged IMS applications. MQSeries solutions built on the IMS OTMA interface provide e-business access to IMS for other environments such as VisualAge Interspace to Visual Basic programs (i.e.. COM/DCOM) and Lotus Notes/Domino for notes and collaboration.
- New IMS application development for e-business can also take place with the IMS V7 Java support and the Java tools being provided.
- And the IMS Open Database Access facility (ODBA) provides a callable interface for easier database access as well. This facility is being used by DB2 Stored procedures so access is provided to IMS DB data as well as DB2 data and through this access can be provided through DB2 Connectors to the web.
- The IMS DataPropagator provides synchronous and asynchronous updates passed between IMS DB and DB2 databases to enable consistency and use in a mixed database environment. The IMS Data Propagator can provide IMS customers with advanced data integration and analysis capabilities, while leveraging their existing IMS data assets. IMS Data Propagator has been enhanced to run with IMS V7. Additional requirements are for near real time asynchronous update, Improved user interface, and support for additional environments.
- And IMS continues to support and enhance new technology for connectivity and e-business enablement into the foreseeable future.

Strategic IMS Architecture

- **Goals:**
  - Integration with open interfaces from and between IMS parts
  - Manageability with Restructured IMS components into independent units
  - Scalability through allowing multiples of units (mix and match different multiples of each) in a Sysplex environment



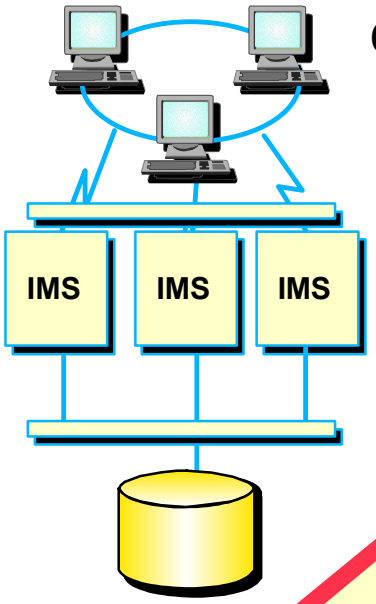
(BPE in V5, CQS in V6, ... and SCI in V8 ties it all together)

- IMS is being transformed through restructuring and rebuilding to enable and exploit the latest technological advancements and continue enhancing integration, manageability and scalability for the 21st Century.
- The goals for this Architecture are
- Integration with open interfaces from and between IMS parts
- Manageability with Restructured IMS components into independent units
- Scalability through allowing multiples of units (mix and match different multiples of each) in a Sysplex environment.

IMS Follow-on

Ideal for e-business

- ✓ Integration with Application Development and Connectivity
- ✓ Manageability
- ✓ Scalability in Performance, Capacity, and Availability



Enhancements

- HALDB Online Reorganization
- Eased Sysplex Manageability
- Enhanced Recovery/Control
- Simplified Installation/Definition Process
- Eased Serviceability/Usability
- Enhanced Security
- System and Connectivity Growth
- Enh Systems/Data Mgmt Tools
- Broadened Java/XML Tooling

Benefits

- ✓ Enable Customer Growth
- ✓ Enhance Workload Balancing
- ✓ Increase Availability; Ease of Use
- ✓ Preserve Current Application Investment
- ✓ Enable New Applications

Strategic Open Access
z/OS Enterprise Servers

IBM Software

- After IMS V8, IMS is focused on further strengthening its leadership role, helping customers in their e-business enablement and the growth, availability, and systems management that the newer environments and cost measures require. IMS focus thus is on providing Information Integration with open access and supporting tools for the e-business environment, continually improving, systems management/usability, and system scalability with increased availability, performance and capacity. The goal of IMS V9 is to deliver the next stage of this function.
- IMS would be providing enhanced availability of IMS High Availability Large Databases (HALDB) introduced in V7, with a fully integrated Online Reorganization support. This would provide concurrent online update and availability of data.
- IMS has been providing Sysplex support to ensure the highest in availability/performance for Systems growth. IMS would continue to enhance support for this environment and provide support for new capabilities in it. IMS would also be extending its XRF network switchover capability to newer SNA controllers using VTAM Multinode persistent sessions technology.
- Systems Management continues to be a key area with IMS customers in managing their systems. IMS would continue to enhance its single system image with expanded standard user-friendly commands and interfaces accessible across environments. IMS would also continue to ease the installation process, reducing/eliminating the gen requirement. Enhanced security and serviceability for application access and database usage are also being provided.
- IMS would also providing continued enhancements to eliminate bottlenecks and impediments to growth in the IMS systems and in connectivity to the IMS systems. IMS would be improving availability, performance, and capacity in the Fast Path and Database Recovery Control (DBRC) areas of IMS.
- Java continues to be a key area for new application development. IMS Java support and the IMS Connector for Java would be enhanced for the latest in standards and ease of use to allow customers to take advantage of the latest in tooling. IMS would also be providing enhanced performance for this environment, and providing better integration with the WebSphere development tool set.
- New Technology as it evolves with XML and Web Services would also continue to be exploited to enable new Application Development tooling. IMS is forging a strong alliance with the AD community to provide an integrated tool solution for supporting IMS Java along with other languages in IMS and in providing connectivity to the Internet.
- Additional IMS Data Management tools would also be providing better integrate and ease use of IMS as an e-business server. As tooling evolves we would continue to take advantage of the latest technologies for our customers to enhance their ability to use our products with these tools.
- In addition we continue to provide whatever we can for education and usability of our products. We would also be continuing to enhance the way our users use our information

IMS Directions

e-business

e-business powered by IMS — the world depends on it

IMS is Ideal for e-business

- ✓ Integration
- ✓ Manageability
- ✓ Scalability

IBM delivers at web speed...

10/00
IMS V7
- Large DB
- High Avail. DB
- IMS Java
- Rapid Restart

10/02
IMS V8
- Extend DB Connectivity
- Enhance Sysplex Operations
- Simplify Install Process
- Enhance Management Tools

10/04
IMS V9
- Availability - OLR
- Reduced Sysgen efforts
- Sysplex DB Commands

10/06
IMS V10
- Logical Front End-Back End Split
- DBRC Parallelism
- Incremental Dynamic Resource Definition

10/08
IMS V11
- Physical Fron End-Back Enc Split
- Sysplex Enhancement

Database *Sysplex* *Database & Operations* *Sysplex - Perf/Optimize & Availability* *Sysplex + Database*

IBM Software

- The IMS team is working with the Application Development Tooling teams to enable IMS e-business. These items include enhanced support for XML, Java, and other languages to enable better Integration in Application Development and Connectivity.
- IMS team is also rolling out, in conjunction with the z/Series, z/OS and IMS Data Management Tooling teams, a lot of new function for enhanced Manageability and Scalability.
- IBM is currently planning to deliver new versions on an every other year basis with interim year enhancements being provided with tooling and service stream enhancements.

IMS Information

IMS Information is available at http://www.ibm.com/ims
- Presentations/Papers, Newsletters, Redbooks, Fact Sheets, Announce Letters, additional documentation, etc.
- Technical Support Info (search on IMS)

IMS Redbooks/Redpieces
- SG24-5753 IMS V7 Release Guide
- SG24-5751 IMS V7 HALDB Guide
- SG24-6123 IMS Version 7 and Java Application Programming
- SG24-6536 IMS Version 7 Java Update
- SG24-6404 IMS Performance and Tuning Update
- SG24-6514 IMS e-business Connectors: A guide to IMS Connectivity
- SG24-6533 Ensuring Data Integrity Using IMS Tools
- SG24-6574 IMS Installation and Maintenance Processes
- SG24-6594 IMS Version 8 Implementation Guide - A Technical Overview
- SG84-6838 IMS DataPropagator Implementation Guide (11/02)

IMS Education at http://ww.ibm.com/services/learning/us

2003 Conferences:
- IBM Software Symposium in Munich, Germany in May
- IMS Technical Conference in Las Vegas, Nevada, in September
- IMS Technical Conference in Koenigswinter, Germany, in November

IMS Consulting Services
- Migration and skills transfer and customized offerings available at dmservices@us.ibm.com

IBM Software

- A wide range of IMS e-business Information is available
- The IMS solutions are generally available along with other IBM products in support of IMS. Additional documentation and information is available from the IMS home page at http://www.ibm.com/ims.
- The IBM International Technical Support Organization has been producing redbooks and redpieces with additional information, available at http:// www.redbooks.ibm.com. A number of IMS Technical Conferences are also being provided on an ongoing basis.
- The IMS Solutions offer a major step for IMS customers wanting to provide commercial services over the World Wide Web. Commercial services with access to IMS applications and data could include travel reservations, home banking, delivery tracking, service support, etc. Examples today exist in many industries. In a package delivery business, the company's customers track their individual packages from their own Internet access systems. The customer dials a server, asks for a package number, and sends it into the server to run the program to trace their package. A gateway server is provided for communication to the client and access to existing, unchanged IMS applications and data. The customers perceive this Internet access to delivery data as improved service. It also relieves staffing and support costs at he company, providing a good value on both sides. Another example exists in the banking industry. This project is home banking over the Internet. Forms are sent out and received back. Code formats messages and send them to the host S/390 system for processing by IMS. IMS applications accepts input and returns replies. Security is provided on the product server and S/390.

IMS: Providing Leadership in the Marketplace

Simplifying Information Integration through Connectivity and New Application Development

Easing Manageability Reducing the Cost of Computing

Enabling System Scalability with Availability/Recoverability Performance/Capacity

IBM Software

- The e-business cycle focuses on leveraging your existing knowledge and information and transforming your core business processes, managing technology in building new applications, and providing organizational efficiency. In all this you need to be running a high performance, available, scalable, secure environment. You use existing data to sharpen decision making and responsiveness. You prioritize which processes and applications need to be extended. You build new reusable applications integrated with existing ones. And you maximize deployment on secure platforms. And for each of these elements of the cycle, we are providing you the IMS solutions that you will need to help make all this work easily. Built on the power of the S/390, billions of dollars worth of IMS applications have been developed to run your mission-critical work in a safe environment with IMS. If you have money in a bank, feed, house, clothe your family, or protect them with health or insurance services, use educational or government information, etc., most of the information about this is kept securely in IMS databases, accessed through high performance IMS transactions and rapidly being processed across the internet for wider use. IBM will continue to invest heavily in IMS to enhance IMS to meet the stringent requirements of its customers -- to help them transform their core business processes with emerging technologies using IMS. Exploiting the latest in technologically-advanced hardware and software, IMS will help customers achieve new levels of price-performance and, at the same time, leverage their exiting investment in skills and applications for information access across the internet.