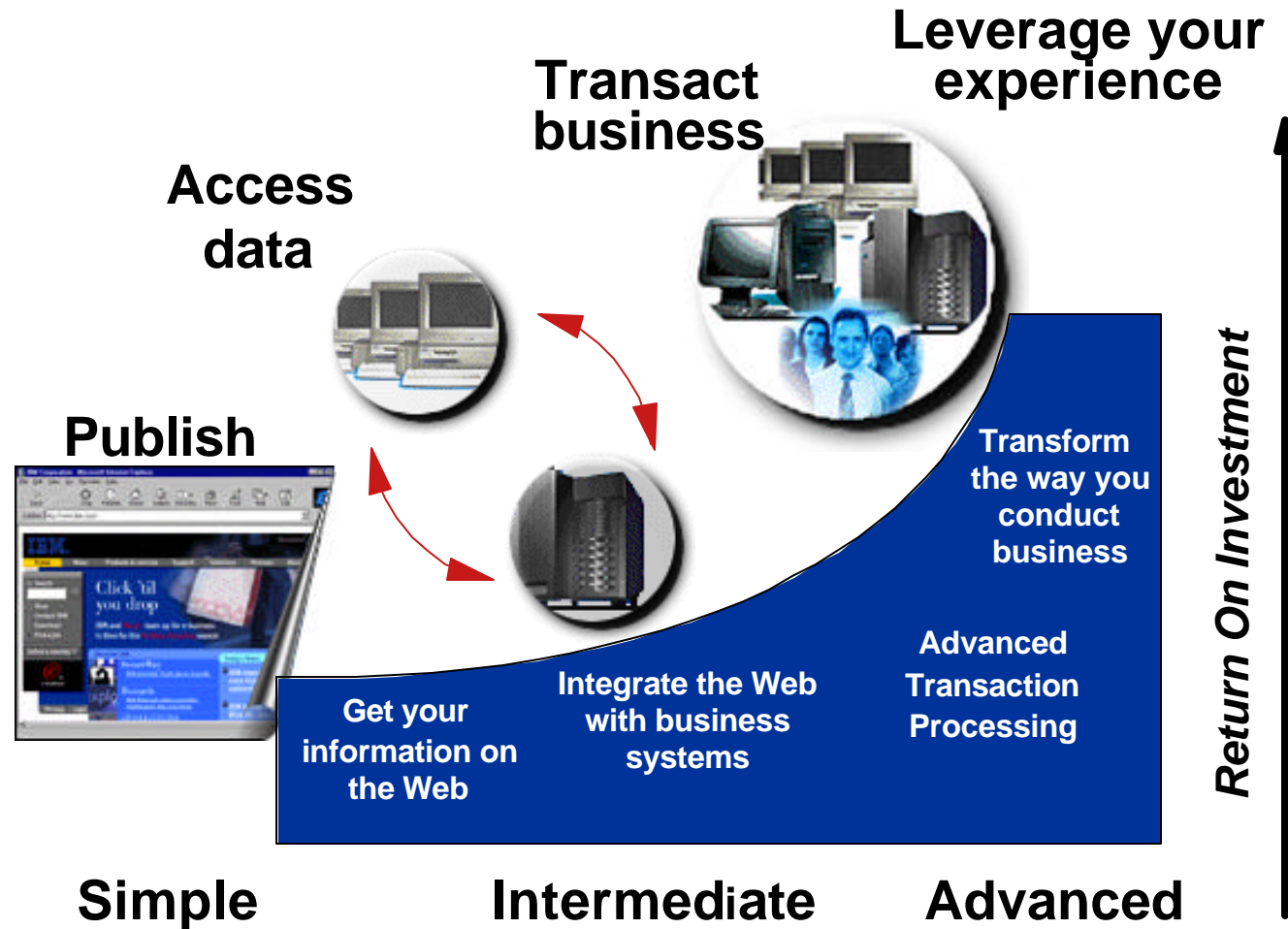e-business powered by IMS

IMS

the world depends on it

IMS: Leading the Marketplace in Information Integration with Management Might and System Scalability

Barbara Klein

bk@us.ibm.com

# Integrating and Transforming Key Business Processes With Internet Technologies

Leverage your experience

Transact business

Access data

Publish

Return On Investment

Transform the way you conduct business

Advanced Transaction Processing

Integrate the Web with business systems

Get your information on the Web

Simple   **Intermediate**   **Advanced**

Challenges
for e-transaction processing
in a rapidly changing economy

- Can the Technology support my maximum requirements now?
- Can my system grow along with my business?
- What design minimizes points of failure?
- When there's a e-business demand spike, will the system respond automatically?
- Unhackable security: who's tested it?
- Can I integrate new and existing technologies?
- What about the cost of Ownership?
- How do I stay competitive with my costs driven down?
- Can I trust my business to e-transaction processing?

Business Demands

Business Costs

e-business

IBM
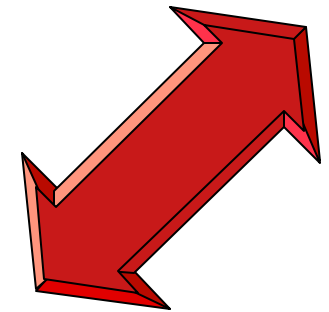
IMS Continues to Address Challenges of a Rapidly Changing World

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
- **Management Might**
  - ✔ 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**

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 Trillion/day transferred thru IMS by one customer
- **Over 50 Billion Transactions a Day run through IMS**
  - IMS Serves Close to 200 Million Users a Day
  - Over 79 Million IMS Trans/Day Handled by One Customer on a Single Production Sysplex, 30 Million Trans/Day on a single CEC
  - 120M IMS Trans/day, 7M per hour handled by one customer
  - 4000 Trans/sec (250 Million/day) across TCP/IP to a single IMS
  - 11,200 Trans/sec (nearly 1 Billion/day) with IMS Data/Queued sharing on a 2-CPC Sysplex
  - Over 3000 days without an outage at one large customer
- **In Top Ten Largest Revenue Producing "Software Company"**
- **Gartner Group Vendor Catalog entry**

"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."

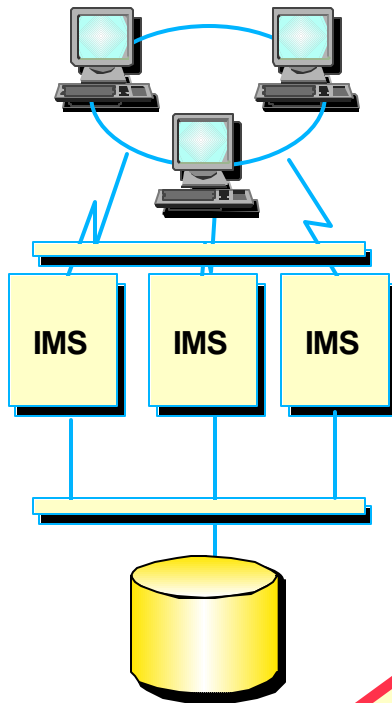# IMS Providing Integrated e-business Solutions

Ideal for e-business

- ✓ Continuous Availability
- ✓ Systems Management
- ✓ Performance/Capacity
- ✓ Application Development/ Connectivity

IMS   IMS   IMS

Solutions

- Parallel Sysplex Sharing
- Systems Management Function and Tools
- Open Access to IMS Transactions and Data
- Java Application Development Tools

Strategic Open Access S/390 and z/Series Enterprise Server

Benefits

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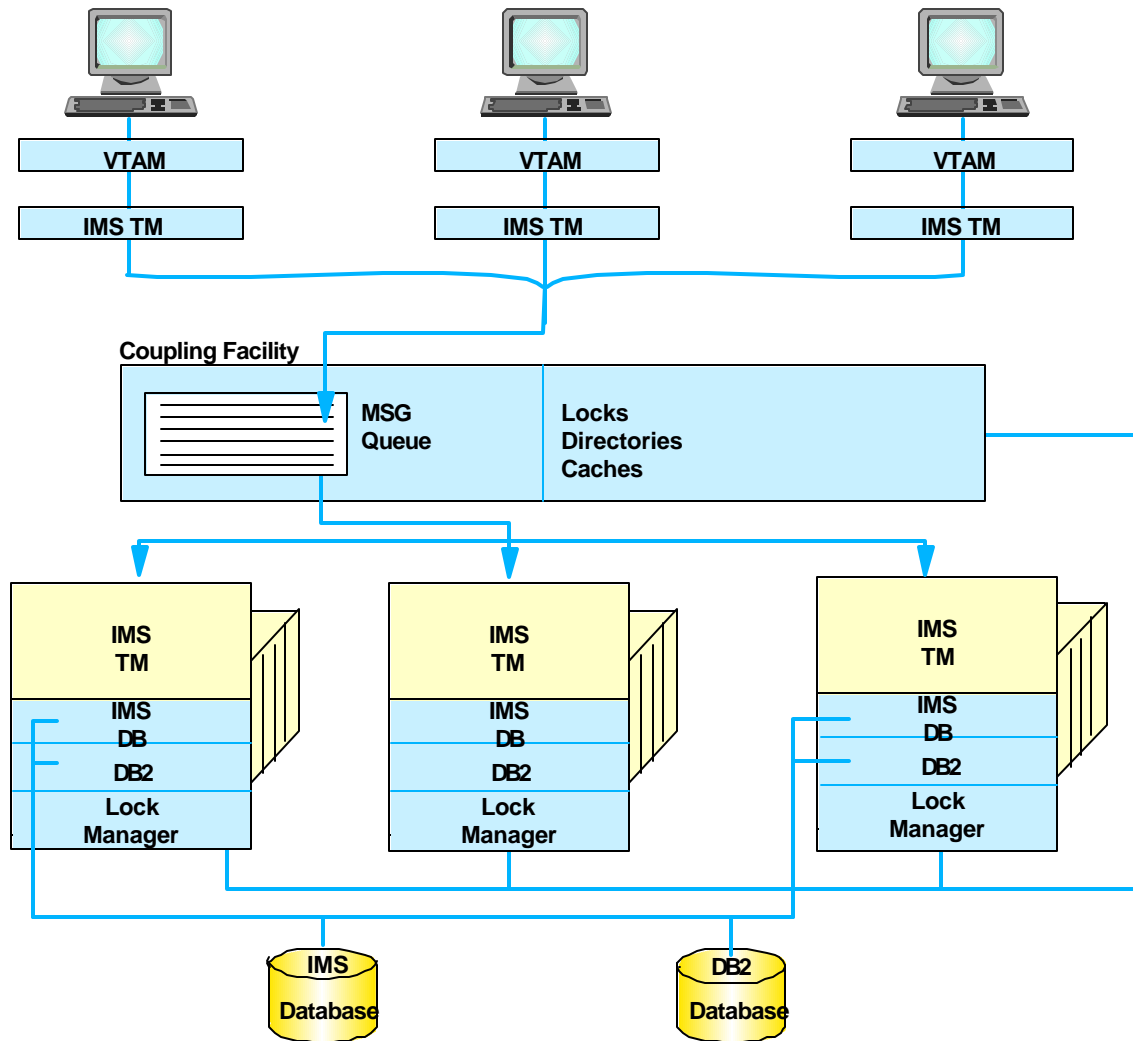- ✓ Preserve Current Application Investment
- ✓ Enable New Applications

the world depends on it

IMS

e-business

IBM

IMS in a Parallel Sysplex

VTAM — **IMS TM** (x3)

Coupling Facility
- MSG Queue
- Locks / Directories / Caches

IMS TM / IMS DB / DB2 / Lock Manager (x3)

IMS Database

DB2 Database

Allocation of workstations

Dynamic Workload Balancing

Data Sharing
  ‣ IMS DB
  ‣ DB2

Easier access and management of enterprise applications and data

PMU - French Horse Racing

- PRIX D'AMERIQUE 2001
  - ► This 80th edition has seen the victory of Varenne driven by G.P. Minnucci
  - ► This 80th edition has seen the victory of the IMS Betting Application which reached 1100 transaction per second during half an hour!
- IMS Betting Application Design
  - ► 2 IMS subsystems with data sharing
    - – designed for 1400 tr/s
  - ► Using IMS Fast Path TM
    - – Expedited Message Handler
  - ► Using IMS Fast Path DB
    - – 3 VSO DEDBs with SDEPs
    - – 1 shared VSO DEDB

SIS-West/Swest

Providing 24-hour Availability

Problem: 24-hour Home Banking required redesign into 24-hour database update with minor or no change to existing applications

Solution: New design of IMS Fast Path Data Entry Databases

Benefits: Legacy applications needed little or no change, to allow:
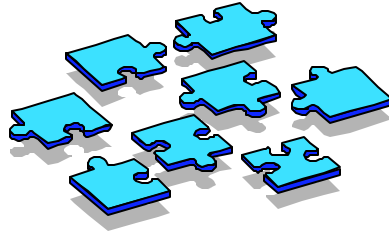
- Consistent reporting from on-line Databases
- Reporting on any historical information for the given time period
- Vertical view to the data (changes over time)
- 24 hour update of Databases

IMS Systems/Data Management Tools

Administration

- IMS High Performance Load
- IMS High Performance Unload
- IMS Index Builder
- **IMS Fast Path Basic Tools**
- **IMS Fast Path Online Tools**
- **IMS ETO Support**
- IMS Library Management
- IMS Advanced ACB Generator
- IMS DB Repair Facility
- IMS HD Compression -Extended
- IMS Sequential Randomizer Generator
- IMS High Performance Prefix Resolution
- **IMS High Performance Pointer Checker**
- **IMS High Performance Sysgen**
- **IMS Command Control Facility**
- **IMS Message Format Services**
- **IMS Database Control Suite**
- **IMS High Performance Change Accum**
- **IMS Network Compression Facility**
- **IMS Parallel Reorg**

Database Recovery/Replication Mgmt

- IMS DEDB Fast Recover
- **IMS Image Copy Extensions**
- IMS Recovery Saver
- IMS Database Recovery Control Facility
- **IMS Online Recovery Service**
- **IMS DataPropagator**

Database Performance Management

- IMS Performance Analyzer
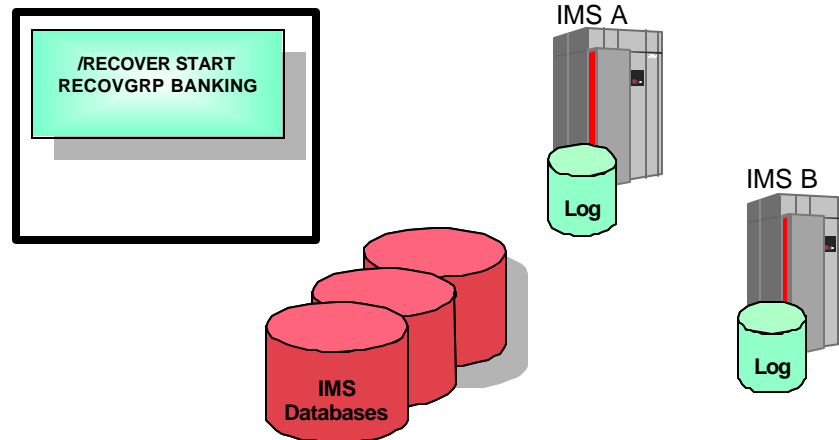- IMS Queue Control Facility

Application Management

- IMS Program Restart Facility
- **IMS Connect**

*Manage
Automate
Monitor
Tune...*

IMS Online Recovery Service for IMPROVED AVAILABILITY

IMS A

```
/RECOVER START
RECOVGRP BANKING
```
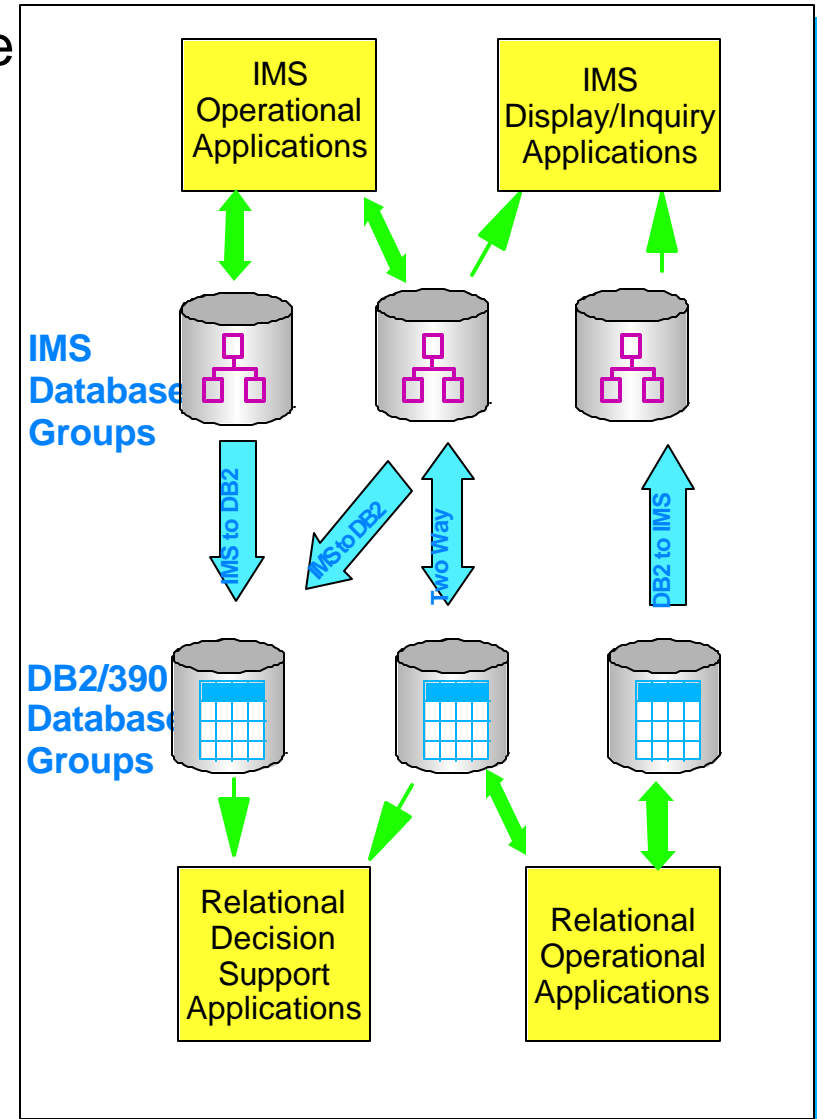
Log

IMS B

IMS Databases

Log

✓ **Increased performance in recovery situations**
- Reduce the time that critical databases are unavailable

✓ **Increased flexibility in recovery options**
- Perform 'logical recoveries' - true Point-In-Time recovery

✓ **Increased simplicity of the recovery process**
- IMS manages the recovery

✓ **Additional enhancements to ORS V1R1 since GA**
- **Stacked image copy support**
- **Compressed Image copy support**
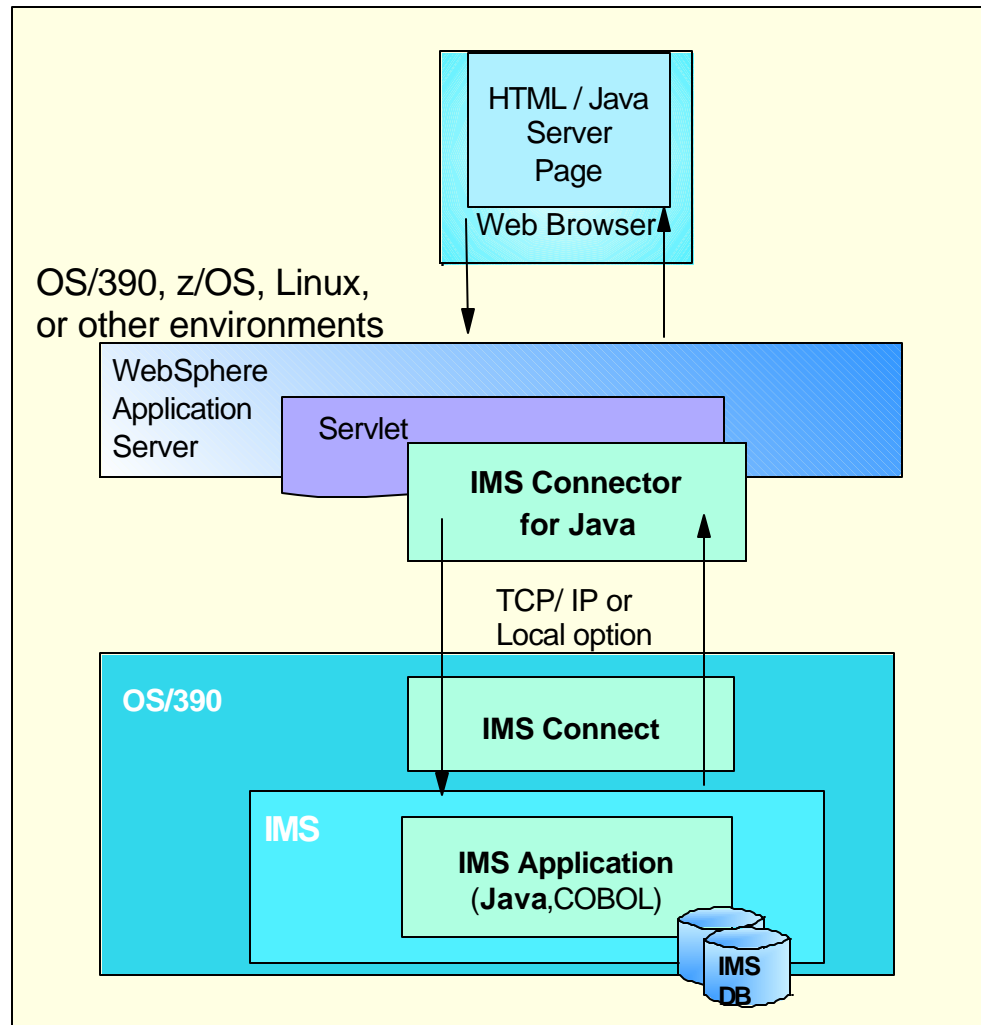- **Stacked log data set support**

IMS DataPropagator for Broader Application Integration

- Decision Support - Data Warehouse
  - ► User access to stable data
  - ► Propagate only data of interest
  - ► Exploit relational query tools
- Application coexistence
  - ► Two masters with applications accessing data in both systems
  - ► Data in both systems synchronized
- **IMS DPROP V3 enhancements**
  - ► Operations/administration simplified/less error prone use
  - ► Asynchronous near real-time propagation improves performance

No Change to Existing Applications

IMS Operational Applications

IMS Display/Inquiry Applications

IMS Database Groups

IMS to DB2

IMS to DB2

Two Way

DB2 to IMS

DB2/390 Database Groups

Relational Decision Support Applications

Relational Operational Applications

IMS e-business Application Development/Enablement

HTML / Java
Server
Page

Web Browser

OS/390, z/OS, Linux,
or other environments

WebSphere
Application
Server

Servlet

**IMS Connector
for Java**

TCP/ IP or
Local option

OS/390

IMS Connect

IMS

IMS Application
(**Java**,COBOL)

**IMS
DB**

IMS Connect for Broader e-business Connectivity

IMS Connect V1R1 Enhancements

- ✔ Local Support
- ✔ Unicode Support
- ✔ ACK/NAK required notification support
- ✔ Output message structure change

IMS Connect V1R2 Enhancements

- ✔ Incorporation of the IMS Connector for Java J2EE Runtime support for WebSphere access
- ✔ Used with VAJava's IMS Connector for Java J2EE Development support

IMS Connect Requirements

- ✔ Two phase Commit Support

Other TCP/IP clients

Java Application using IMS Connector for Java

TCP/IP or Local Option

OS/390

IMS

IMS Connect

X C F

O T M A
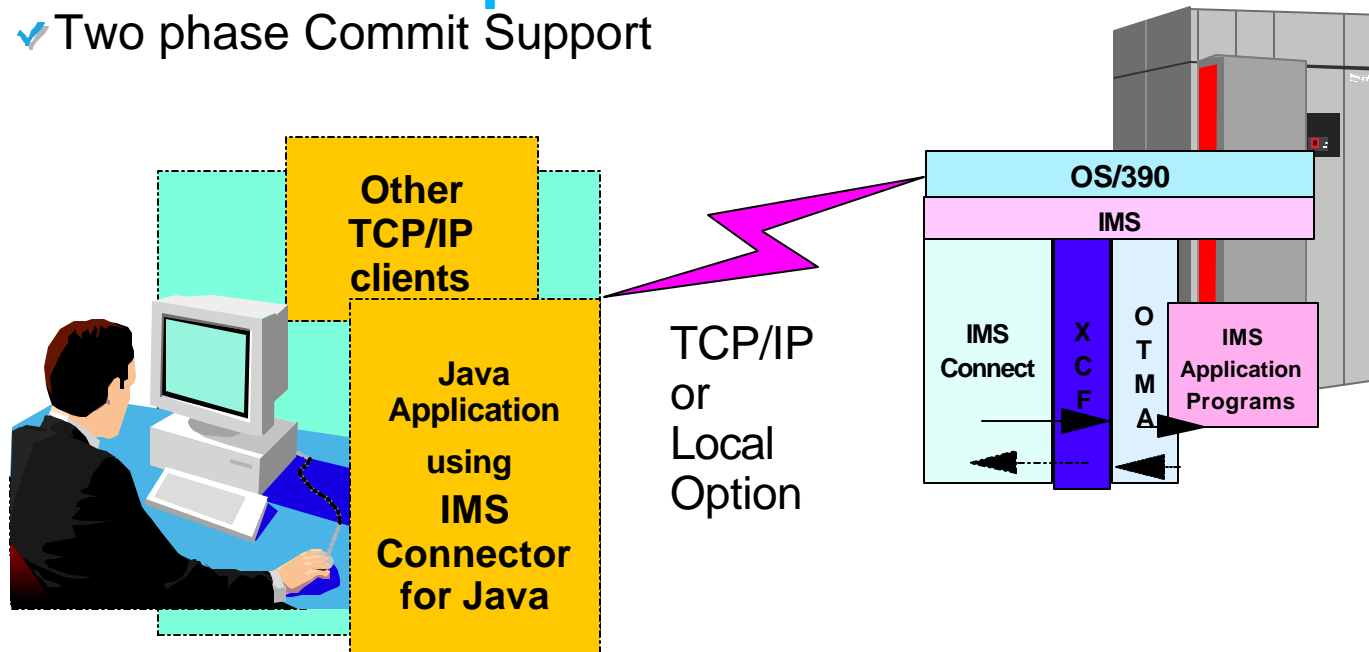
IMS Application Programs

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**

The Bekins Company

Challenge:

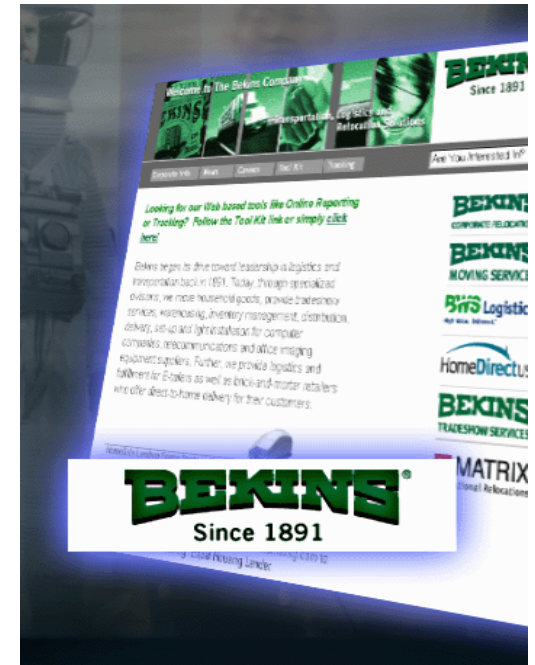- Quickly develop new ways to provide services to customers and authorized agents

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."
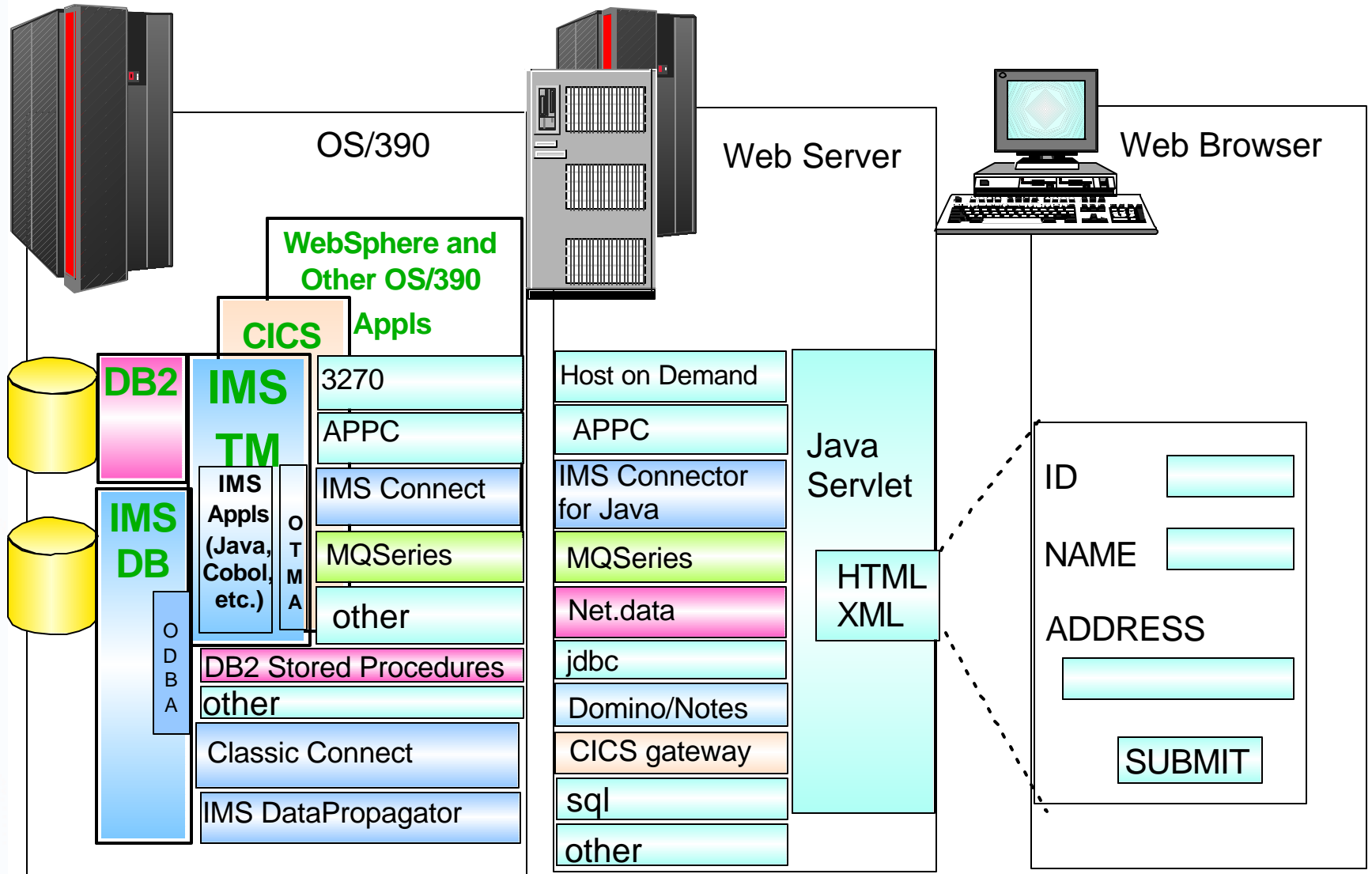
    -- Randall Mowen, Director of Data Management & e-business Architecture

Leveraging IMS Applications and Data

e-business

OS/390

Web Server

Web Browser

WebSphere and Other OS/390 Appls

CICS

DB2

IMS TM

IMS DB

IMS Appls (Java, Cobol, etc.)

O T M A

O D B A

| 3270 |
| APPC |
| IMS Connect |
| MQSeries |
| other |
| DB2 Stored Procedures |
| other |
| Classic Connect |
| IMS DataPropagator |

| Host on Demand |
| APPC |
| IMS Connector for Java |
| MQSeries |
| Net.data |
| jdbc |
| Domino/Notes |
| CICS gateway |
| sql |
| other |

Java Servlet

HTML XML

ID

NAME

ADDRESS

SUBMIT

IBM

Sanlam South Africa

First in Insurance South Africa
to implement Java Servlets on S/390

Challenge: Allow commercial banks to execute IMS transactions which administer the ceding of life insurance policies

Solution: Write Java servlets using IMS Connect, WebSphere Application Server, RACF and OS/390 HTTP server

Benefits: Banks could now administer the ceding of policies via the Internet without having to incur network infrastructure costs.

Caja Madrid

Developing a new banking application for deployment nationwide across 1600 bank branches

Challenge Build the new insurance and customer relationship management systems, deploy them on the branch network for over 9000 users

Solution VisualAge Pacbase and VisualAge for Java in conjunction with IMS and MQSeries

Benefits Investment protection

Smooth professional evolution of development staff

IMS - Version 7

Ideal for e-business

- ✓ **Continuous Availability**
- ✓ **Systems Management**
- ✓ **Performance/Capacity**
- ✓ **Application Development/ Connectivity**

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Enhancements

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

IMS	IMS	IMS
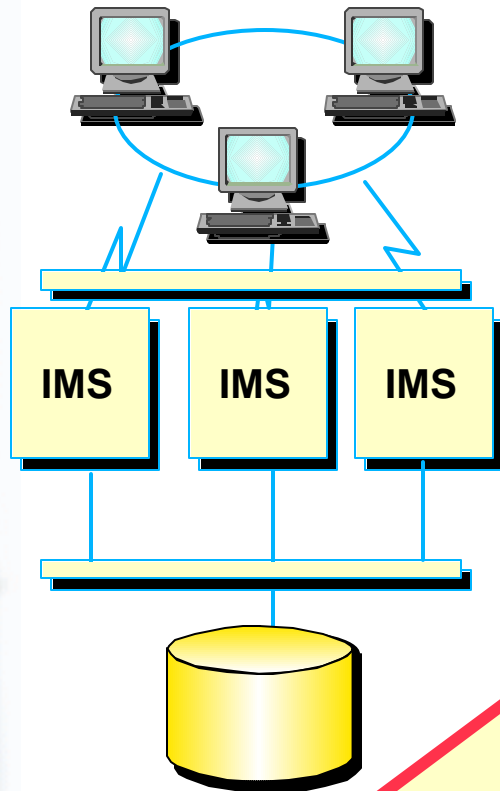
Strategic Open Access S/390 Enterprise Server

Benefits

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

IBM

IMS V7 High Availability Large DB Support for IMPROVED CAPACITY & DATA AVAILABILITY
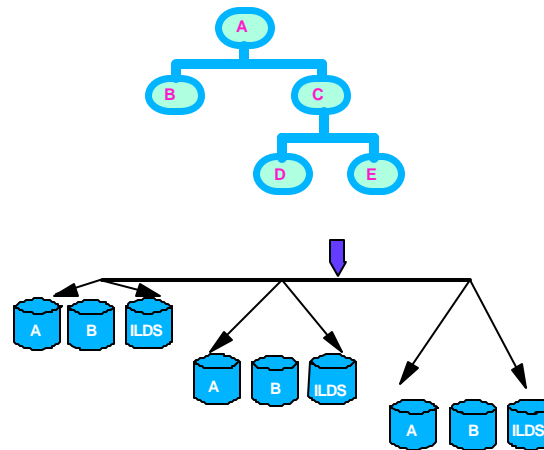
✔ Extends IMS Full Function database size

➡ 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 enhancements**

➡ **Manageability enhancements**

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

IMS V7/Enterprise Storage Server Performance Evaluation

Increase in Bandwidth Availability

IMS Serving Mission-critical Applications and Data Access across the Enterprise and over the Internet
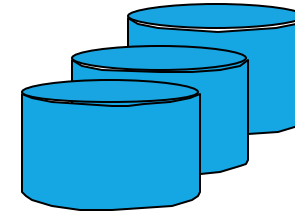
Achieved thru enhancements across the IBM product line.

Increase in Batch Window Availability

IMS V7 Rapid Network Reconnect for IMPROVED AVAILABILITY
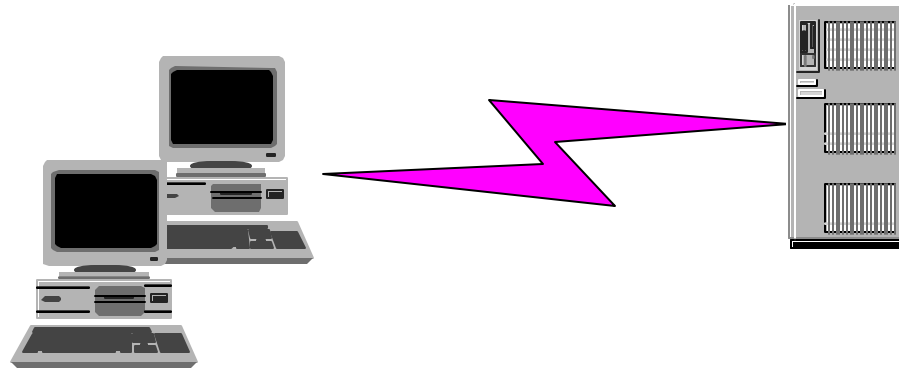
✔ Provides reduced network reconnect time after IMS, MVS, or VTAM failure in a sysplex environment

✔ Permits IMS TM to automatically reconnect terminal sessions following any kind of IMS failure and subsequent IMS restart

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

✓ **Application programmer productivity**

- Java access to IMS input/output message queues
- JDBC to access IMS DB and DB2 data
- Uses VisualAge tools for development

✓ **Enhanced since IMS V7 GA**

- **New Java Dependent Region support for Persistent Reusable Java Virtual Machine**
- **JDBC access to IMS DB from CICS/390 Java applications, DB2/390 Stored Procedures, and Websphere applications**

The Big Picture:
JDBC Access to IMS Data
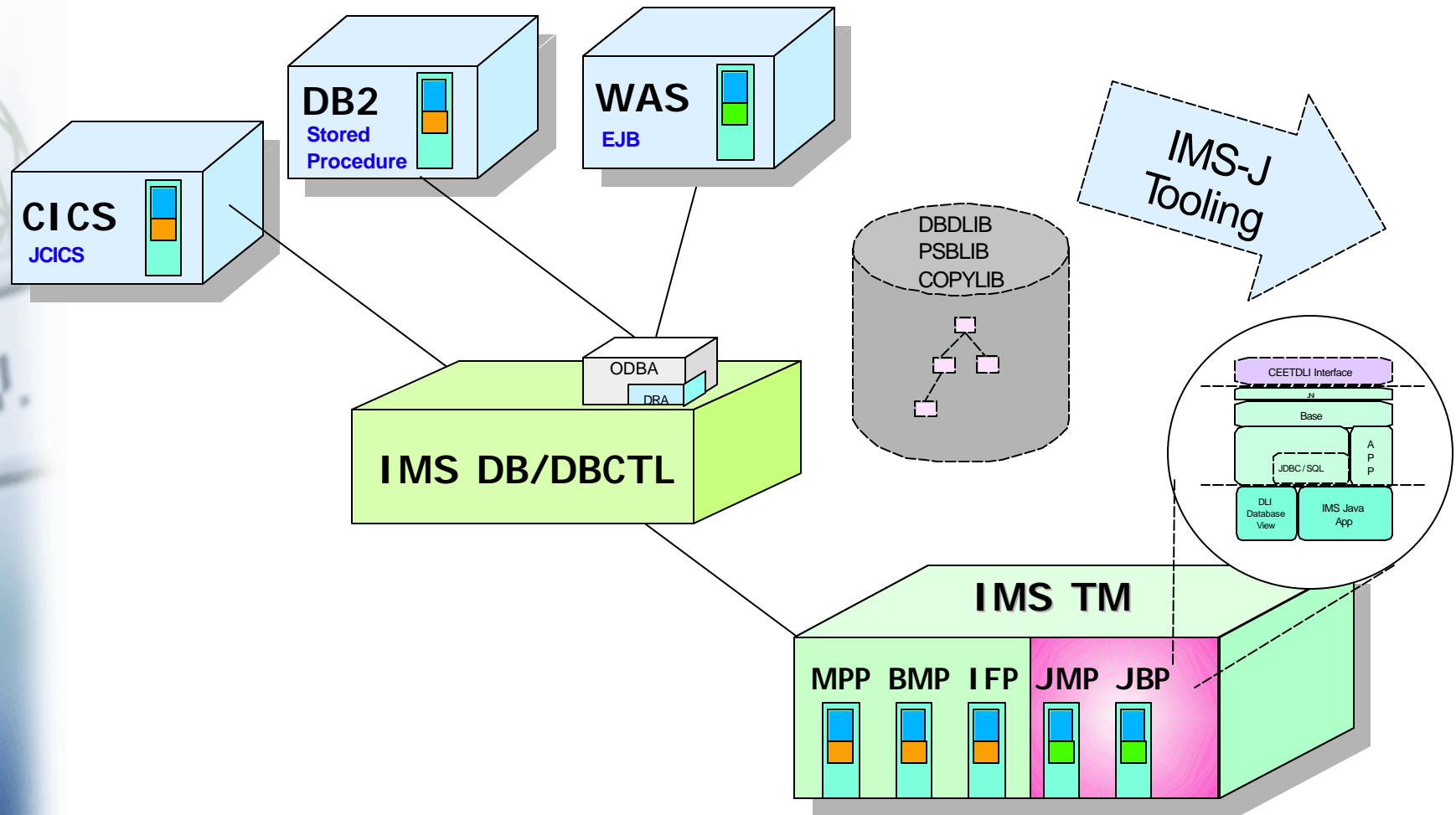
XML and IMS for Transparent Application Integration

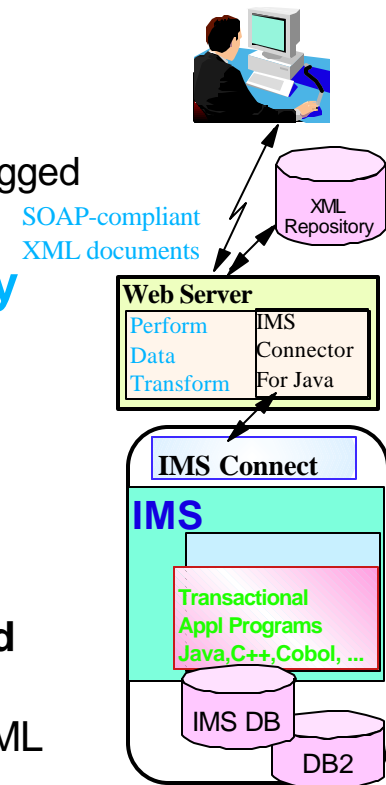■ **Processing XML Documents in New IMS Applications Today**

- **Customers can write IMS C++ or IMS Java applications using the XML Toolkit for OS/390**
  - Tran code still must be EBCDIC, rest of data can be XML
  - Java/C++ 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

■ **XML and IMS Requirements**

- **Processing XML Documents in new/changed IMS Cobol and PL/I applications using the XML Toolkit for OS/390**
- Supporting SOAP(Simple Object Access Protocol)-compliant XML documents for Industry tooling and evolution to Web Services
- Transforming XML for existing IMS applications using Web Server and/or IMS Connect
- Using XML as an IMS Data Definition language

SOAP-compliant XML documents

XML Repository

Web Server
Perform Data Transform | IMS Connector For Java

IMS Connect

IMS

Transactional Appl Programs Java,C++,Cobol, ...

IMS DB

DB2

US Utility company

Building a cost-effective e-business Infrastructure with Java and XML

Challenge: Utility industry deregulation required differentiation by providing proliferating information to energy traders, providers, producers, consumers (e.g.. viewing account history online for reconciliation)

Solution: Establish generic e-business infrastructure based on thin-client architecture using XML and transaction processing between Internet client and existing IMS system through EJB, a Web Application Server Java Servlet, and MQSeries

Benefits: Enable device independence with respect to the client and to leverage its existing investment in legacy IMS transaction systems

IMS Version 7

Availability
- Rapid Network Reconnect
- Enhanced Shared Queues/FP sharing
- SLUP session status
- RECON Upgrade/Coexistence
- I/O toleration
- Fast Path MADS enhancements

Performance/Capacity
- High Availability Large Database support
- DB Fiber Channel support
- DBRC enhancements
- Large DBRC Recon Record support
- MSC Descriptor Limit
- New Exits
- New execution parameters
- ACBGEN capacity/perf enhancements
- DBRC enhancements
- Monitor enhancements

Application Development
- IMS Java
- XML Support
- OTMA Callable Interface

Systems Management
- Tivoli Readiness
- ETO Autologon and Printer enhancements
- SHQs Associated Printer support
- RACF PassTicket
- USERID/LTERM clarification
- Deferred ACB open
- MSC exit usability enhancements
- Diagnostics/Serviceability enhancements
- Compatibility enhancements
- Installation enhancements
- Commands enhancements
- Migration
- Additional Operator Information
- Logger enhancements

IMS Version 7 Status

- IMS V7 has had the Fastest Version Install Rate since its General Availability 10/27/00
- New Enhancements Provided since GA
- Services Available
- Redbooks Available or underway
  - IMS Version 7 Release Guide (with Java section)
  - IMS Version 7 High Availability Large Database Guide
  - A DBAs View of Online Recovery Service
  - IMS Version 7 and Java Application Programming
  - e-business Enablement Cookbook for OS/390, 3 Volumes
  - EJBs for z/OS and OS/390 WebSphere AS V4
  - Creating an Interactive B2B Web Application
  - Tivoli Business Systems Manager - A complete end-to-end solution
  - Application Integration using XML on z/OS and OS/390

  - More coming
- Online Information Available through ibm.com/ims

Additional IMS Enhancements thru IMS V7 Service Process

- 64-bit real support

- Additional Sense Codes/Message Information

- Sysplex Restart with DB2 MVS group support

- System Log Data Set (SLDS) Read Support

- Fiber Channel support

- Sysplex support
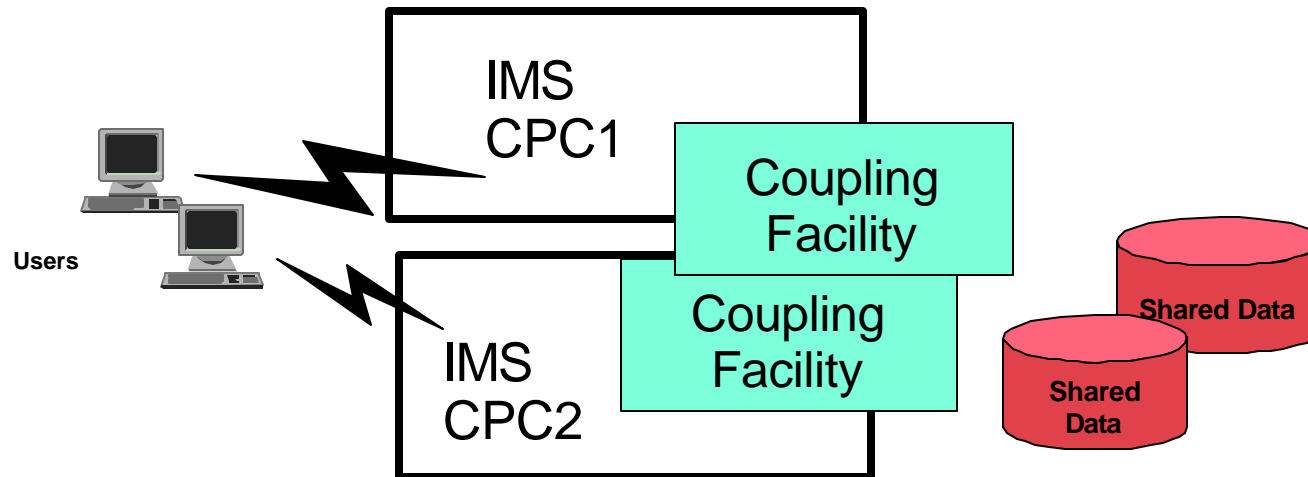
- Batch Remote Recovery Service (RRS) support

IMS Sysplex Enhancements

► CF Duplexing for IMS Shared Queues and Fast Path (FP) Expedited Message Handler (EMH)

► CF Duplexing for IMS Data Sharing through IMS Resource Lock Manager (IRLM)

► IMS Fast Path Virtual Storage Option (VSO) CF support

- ► System Managed Duplexing
- ► Automatic Altering
- ► System Managed Rebuild

IMS Multiple Systems Coupling Fiber Channel CTC Support
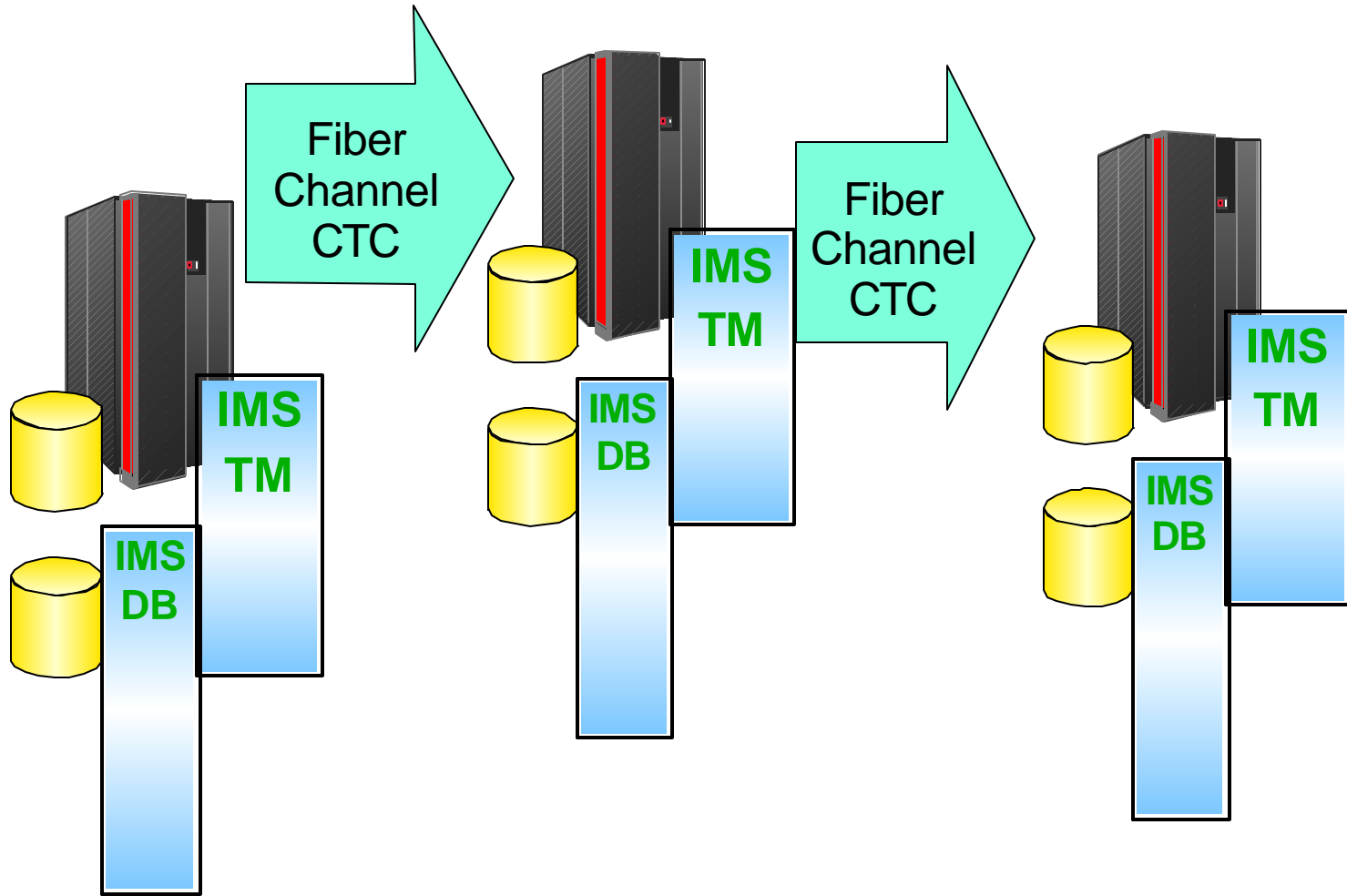
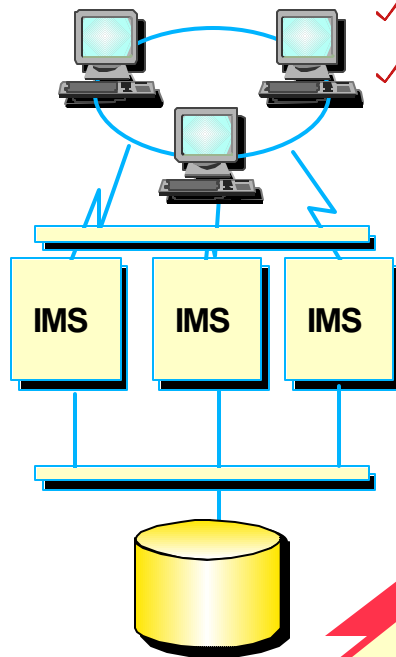Providing Reliable, High Bandwidth Host-to-Host Communications Support between IMS systems.

IMS Version 8

e-business

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Ideal for e-business

- ✓ **Continuous Availability**
- ✓ **Systems Management**
- ✓ **Performance/Capacity**
- ✓ **Application Development/ Connectivity**

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Strategic Open Access S/390 and z/OS Enterprise Server

Enhancements

- **Coordinated IMS/DB2 Recovery**
- **Coordinate Online Change**
- **Sysplex Terminal Management**
- **Sysplex-wide Resource Mgmt**
- **Sysplex-wide Operations with Single Point of Control**
- **Enhanced DB Recovery Ctrl**
- **Simplified Installation Process**
- **Enh Systems/Data Mgmt Tools**
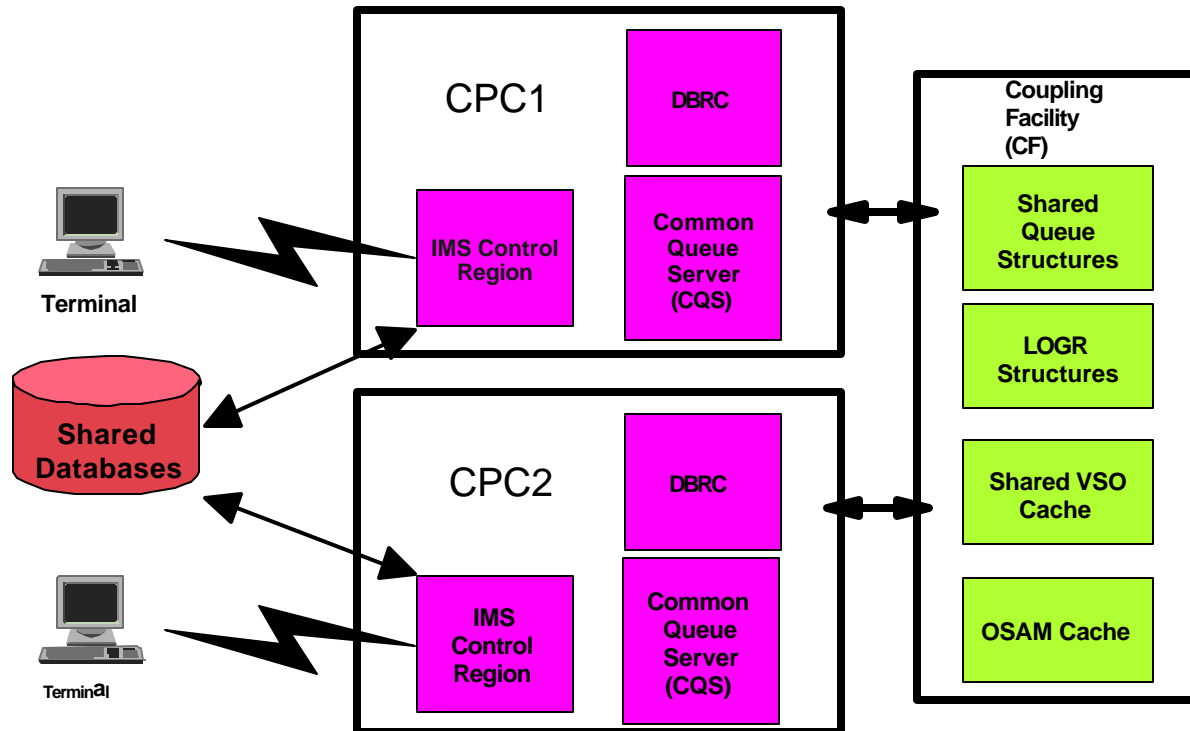- **Enhanced Java and XML**

Benefits

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

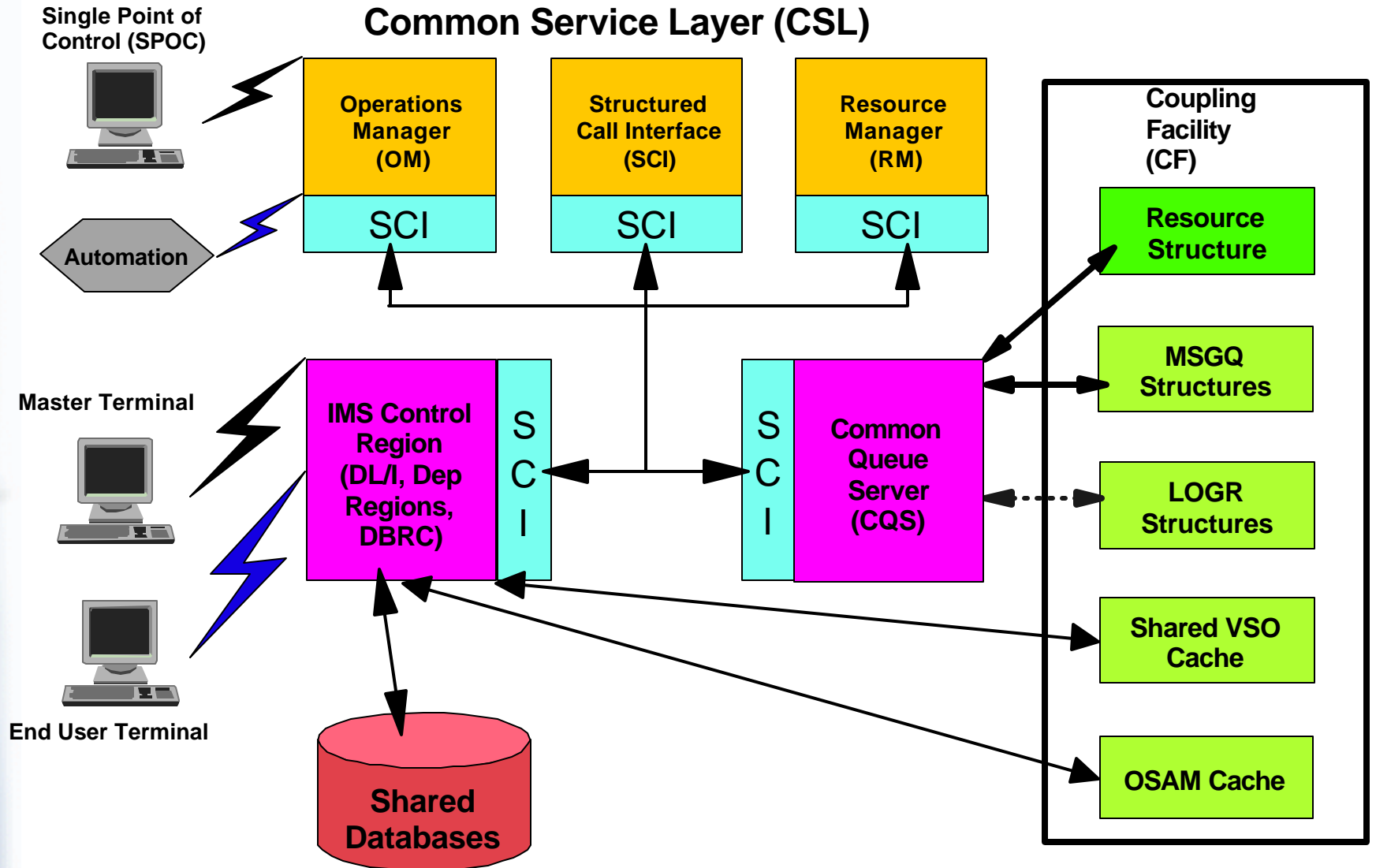**IBM**

IMS Sysplex Management

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**

IMS Sysplex Next Steps

Common Service Layer (CSL)

Single Point of Control (SPOC)

Automation

Operations Manager (OM)	Structured Call Interface (SCI)	Resource Manager (RM)
SCI	SCI	SCI

Coupling Facility (CF)

- Resource Structure
- MSGQ Structures
- LOGR Structures
- Shared VSO Cache
- OSAM Cache

Master Terminal

End User Terminal

IMS Control Region (DL/I, Dep Regions, DBRC)	SCI		SCI	Common Queue Server (CQS)

Shared Databases

IMS V8 Transaction Manager Enhancements

Availability/Recovery

- **Sysplex Terminal Management**
- **APPC/OTMA Synchronous Shared Queues support**
- **APPC enhancements**
- **Shared Msg Queues and FP EMH CF Duplexing support**

Systems Management

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

Performance/Capacity

- **MSC FICON support**
- **CSA/VSCR enhancements**

Application Development

- **Java and XML enhancements**
- **Dynamic LE Runtime Parameters**

e-business

IBM

IMS V8 Database Manager Enhancements

Availability/Recovery

- IMS/DB2 Coordinated disaster recovery support
- DBRC Enhancements
- DB Image Copy 2 Enhancements
- Parallel Database Processing
- Batch RRS support

Performance/Capacity

- Fast Path DEDB Enhancements
- CSA/VSCR Enhancements

Systems Management

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

Application Development

- Java enhancements
- Dynamic LE Runtime Parameters

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
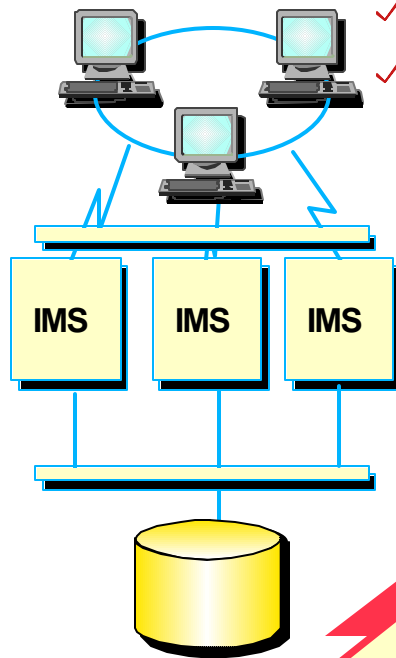- ➤ Increase opportunity for integration and visibility of IMS support for new technologies

IMS Follow-on

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Ideal for e-business

- ✓ **Continuous Availability**
- ✓ **Systems Management**
- ✓ **Performance/Capacity**
- ✓ **Application Development/ Connectivity**

IMS   IMS   IMS

Strategic Open Access S/390 and z/OS Enterprise Server

Enhancements

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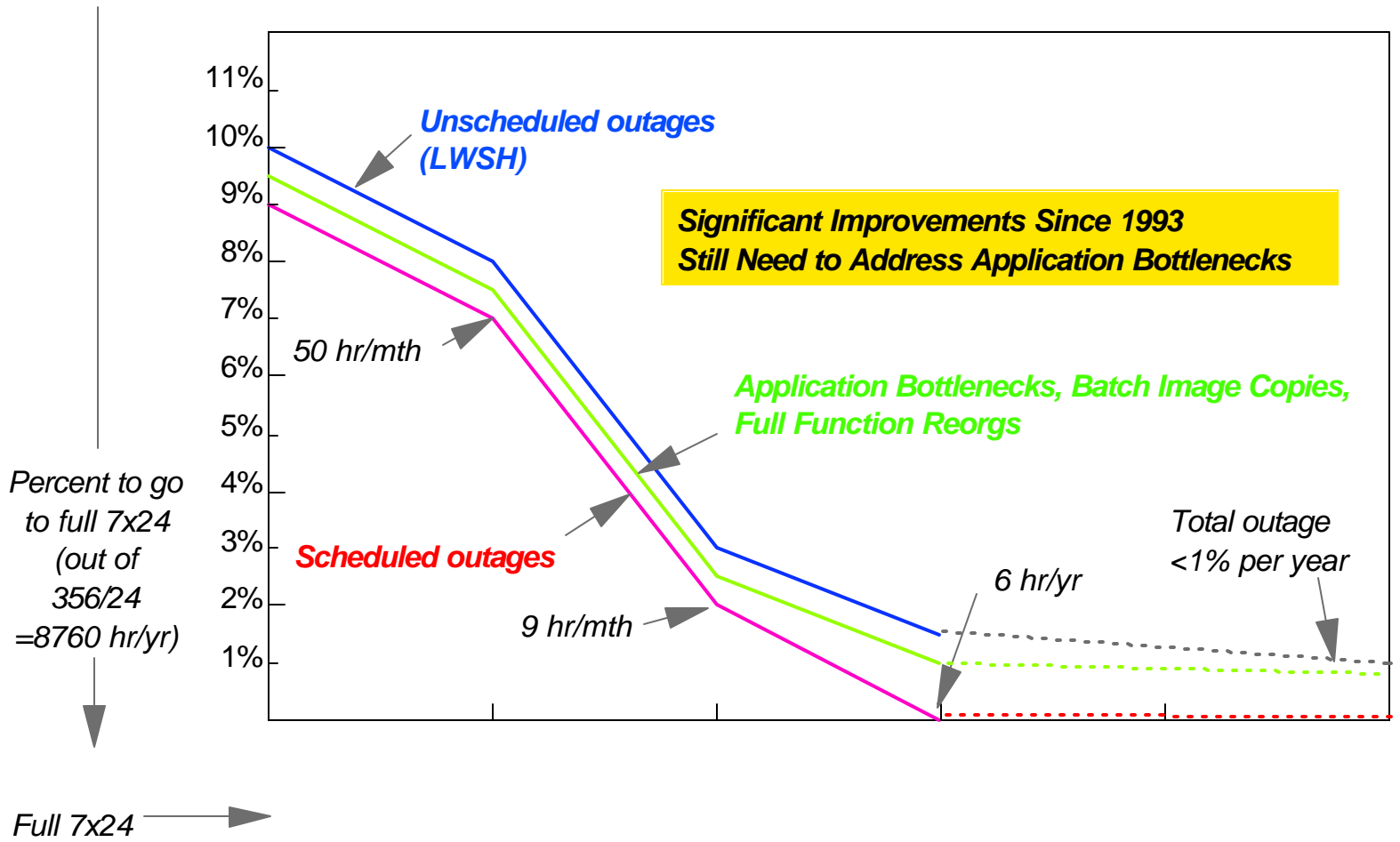- – **Broadened Java/XML Tooling**

Benefits

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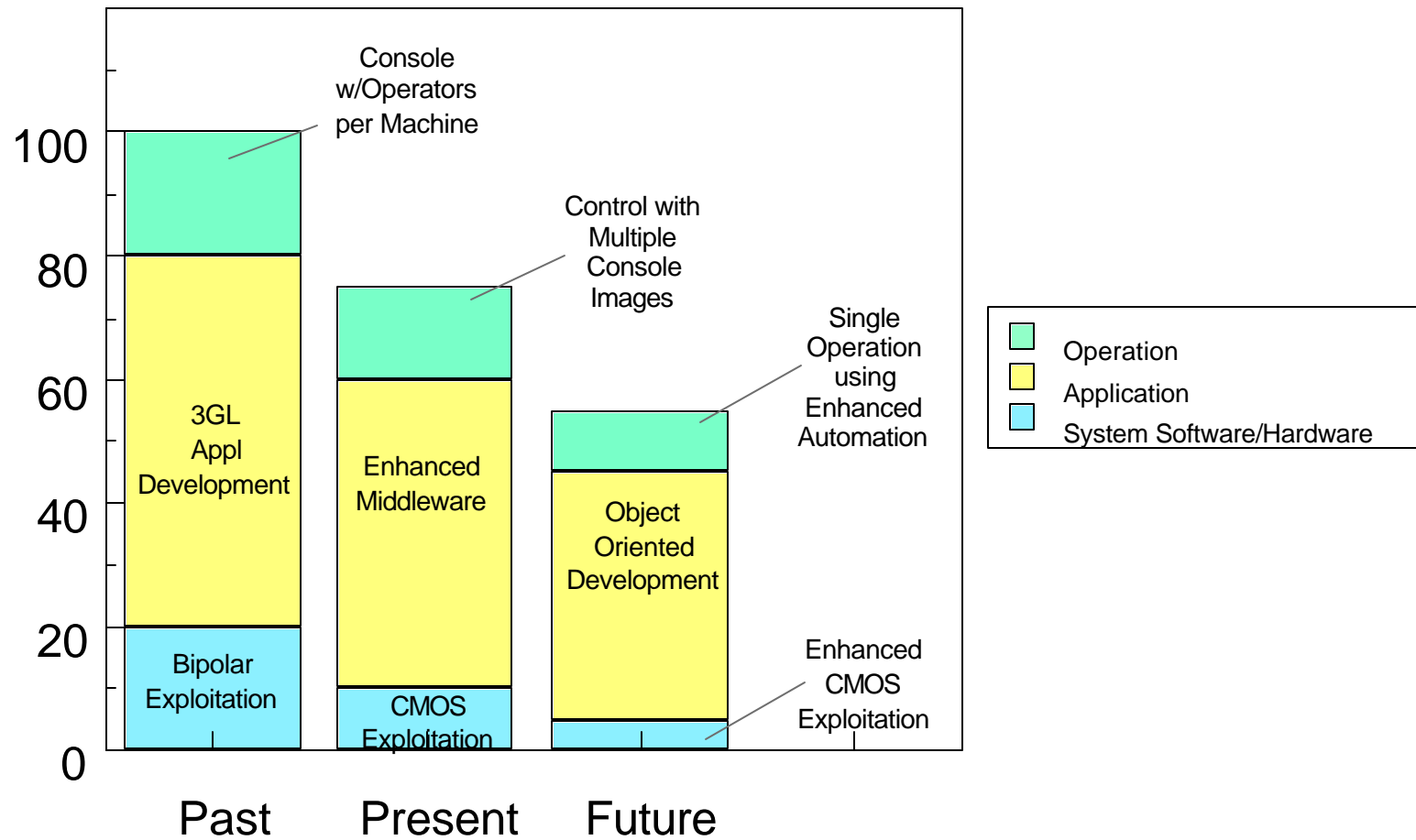- ✓ **Enable New Applications**

e-business

IBM

Maintaining IMS High Availability

Cost of Computing Evolution

Total Cost of Ownership

Performance/Scalability

Availability

Education & Skills

Tools & Utilities

Systems Management

IMS: Providing Leadership in the Marketplace

Simplifying Information Integration through Connectivity and New Application Development

Easing Management Might Reducing the Cost of Computing

Enabling System Scalability with Availability/Recoverability Performance/Capacity