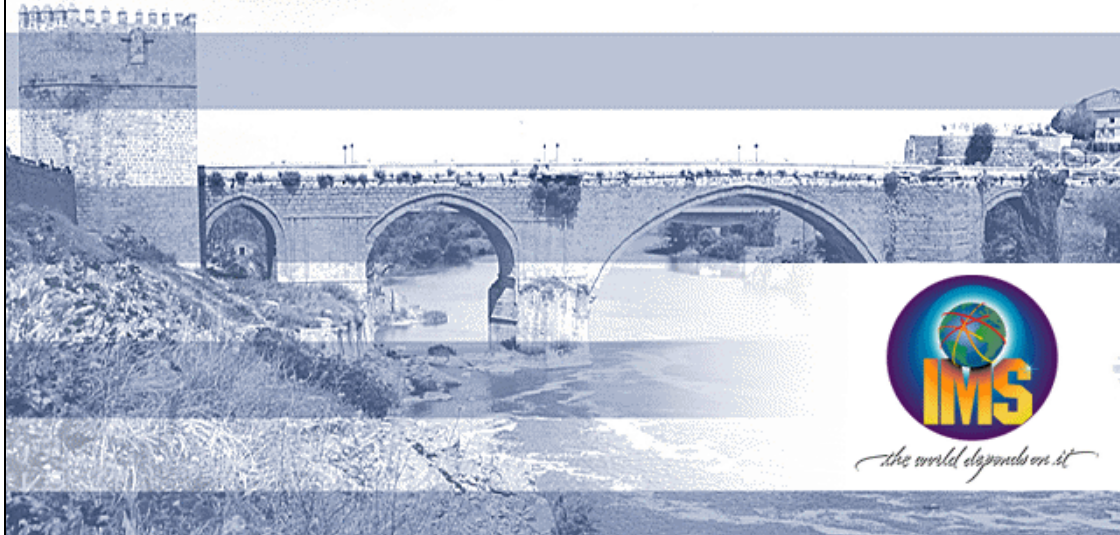
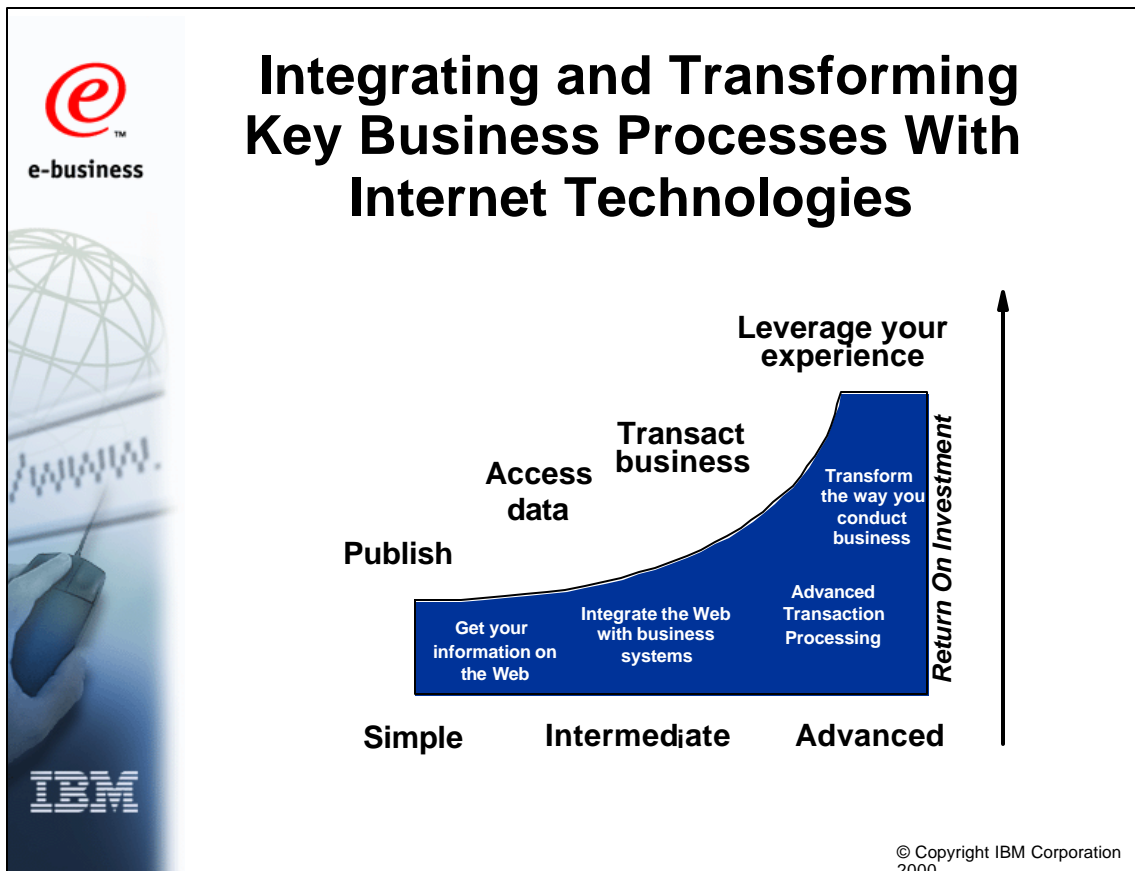


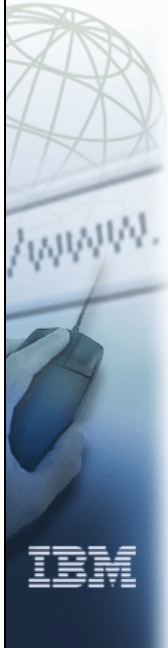
IMS: Serving the 21st Century



- ▶ As we begin the new century, IMS is still leading the way. More than 30 years since the first IMS-ready message from the Apollo Space program, IMS and the S/390 are breaking technology barriers, but sometimes taken for granted. 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 now providing integrated solutions with IMS to help our customers further. I will cover here the IMS strategy, recent announcements, and future directions for IMS, and for the S/390 environment in which it runs -- to provide the solutions for IMS in Serving the 21st century, leveraging Information for our customers to win in the 21st century.



- ▶ When e-business adds e-commerce, simple becomes complex. e-business is about integration and transformation, resulting in a transaction explosion.
- ▶ The future is in creating/expanding new-existing information out to wider networks of people, economically. Customer's needs must be addressed, new technologies exploited, application concerns handled. We need to ensure simplicity, maintain security, maximize your skills, while optimizing your company's return on investment.
- ▶ 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.



IMS

Ideal for e-Business

IMS delivers...

- ✓ Unpredictable volumes
- ✓ Continuous up time for applications
- ✓ High levels of security
- ✓ End-to-end transaction integrity
- ✓ Real time data currency

e-business with IMS extends the investment

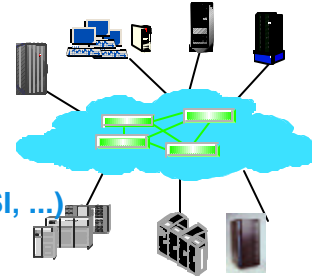
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- ▶ In the new world of e-transaction processing, S/390 and IMS can uniquely integrate new applications with existing data to harness the global opportunity of enterprise-critical e-business. IMS meets extreme IT needs for e-transaction processing.
- ▶ IMS and the S/390 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 web-serving with the IBM WebSphere Application Server Enterprise Edition and SecureWay Communications Server for OS/390. A balanced system is provided for world class solutions with the S/390 Workload manager, Tivoli manager for OS/390 and the new OS/390 InfoPrint, the first server to print through Internet protocols. IMS together with the S/390 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 allowed us to deliver improving price/performance to our customers. That improvement approaches a factor of 100 over the last 120 years. In 2Q, S/390 MIPS shipment grew 118 percent, marking the 4th consecutive quarter of better than 60 percent MIPS growth. Customer surveys indicate that about 1/3 of this year's MIPS volumes will be used for new workloads, like e-business related applications.



IBM Storage Area Networks

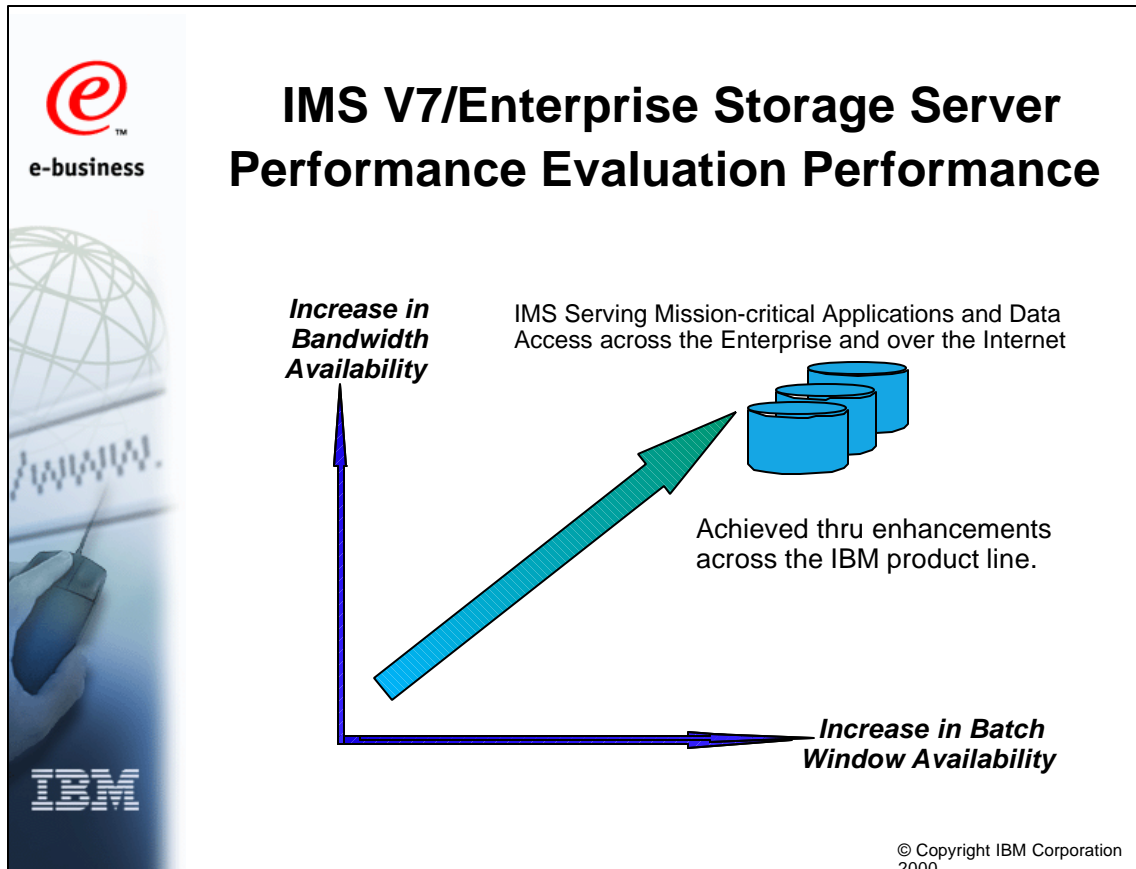
- Providing dedicated, centrally managed, secure information infrastructure
- Enabling any-to-any interconnection of servers and storage systems
- Enterprise Storage Server: The new Standard
 - Breakthrough Performance
 - Comprehensive Availability
 - Extensive Connectivity
 - Heterogeneous attachments - any server to any storage
 - Multiple protocols (FICON, SCSI, ...)
 - Low Total Cost of Ownership




Emerging Fibre Channel Technology

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- ▶ Customers also face challenges in managing storage. Then need to facilitate enterprise-level universal access and sharing of resources, support unpredictable explosive information technology growth, provide affordable 24X365 availability, simplify and centralize storage resource management, improve information protection and disaster tolerance, and enhance security and data integrity of new computing architectures. A storage Area network (SAN) is a dedicated centrally managed, secure information infrastructure, which enables any-to-any interconnection of servers and storage systems. Over a 30 year evolution, SANS are now rapidly being extended and integrated into enterprise-wide distributed network environments using Fiber Channel Technology.
- ▶ The IBM Enterprise Storage Server is a new generation of enterprise disk storage systems designed to provide world class performance, scalability, and universal access to data across all enterprise computing environments. ESS provides extensive scalability with capacity configurations ranging from 420 GB to 11.2TB. Breakthrough performance is made possible by a powerful storage architecture, SSA disks and in special synergy with S/390 storage. Comprehensive availability is there with no single points of failure or repair. The ESS Remote copy function improves availability by mirroring the data in a remote location, thereby providing availability should a disaster occur. With FlashCopy you can have a guaranteed point in time copy of your data in 2-5 seconds. The ESS connects to all the major channel types including ESCON, Ultra SCSI, FICON, and FC/AL; plus all major server types such as S/390, UNIX, Intel-based servers, and the AS/400. The ESS can attach to fibre today via the IBM SAN data gateway. The ESS will provide the lowest total cost of ownership due to its low initial acquisition cost, field upgrade capability, and the ESS specialist storage management software



- ▶ IMS solutions also exploit IBM Enterprise Storage subsystem products to optimize performance. Testing with IMS Version 7 and the Enterprise Storage Server (ESS) have demonstrated increases in Online Log Data Set logging Bandwidth and in Batch window availability.
- ▶ Test results indicated a possible 1/3 reduction in utilites and sequential update Batch Message Programs that increase the overall batch window availability.
- ▶ They also indicated an overall improvement of 175% in bandwidth over the IBM RAMAC Virtual Array (RVA) storage subsystem and 500% over the IBM RAMAC2 storage subsystem.
- ▶ We are continuing to identify, develop, and exploit new features and advance functions together with IBM's OS/390, Network, Storage and Enterprise servers to provide continually increasing performance for our customers. And we are publishing the details of these measurements in our Newsletters and on our website.



e-business application deployment

BUILD RUN MANAGE

NT Linux AIX Solaris OS/2 NetWare HP-UX OS/400 OS/390

Application Framework for e-business

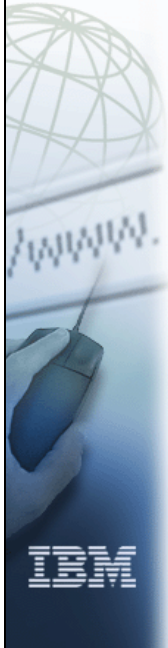
- Extends existing applications into the world of e-business
- Rich capabilities to support simple to sophisticated applications
- Applications scale to support 24x7xmillions of users

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- ▶ Key to all of this is:
- ▶ Cross-platform distributed middleware for access to your existing and new IMS applications and data.
- ▶ An application development environment that brings things together and offers consistency. WebSphere and Java can provide the development tools and run time application server environments across platforms.
- ▶ Integrated end-to-end systems management capability to manage networks applications and databases and all the other things that customers run in their environment. Tivoli can provide the systems management.
- ▶ And of course IMS is providing Transaction and Database integration for this. We are focusing for IMS on all the parts and their integration, in particular on the integration of products, of applications, and the development and runtime tools used with them, and of the operational environment.



e-business



IMS Runs the World...



■ Most Corporate Data is Managed by IMS

- Over 90% 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 (350 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-CEC Sysplex
- 3000 days without an outage at one large customer

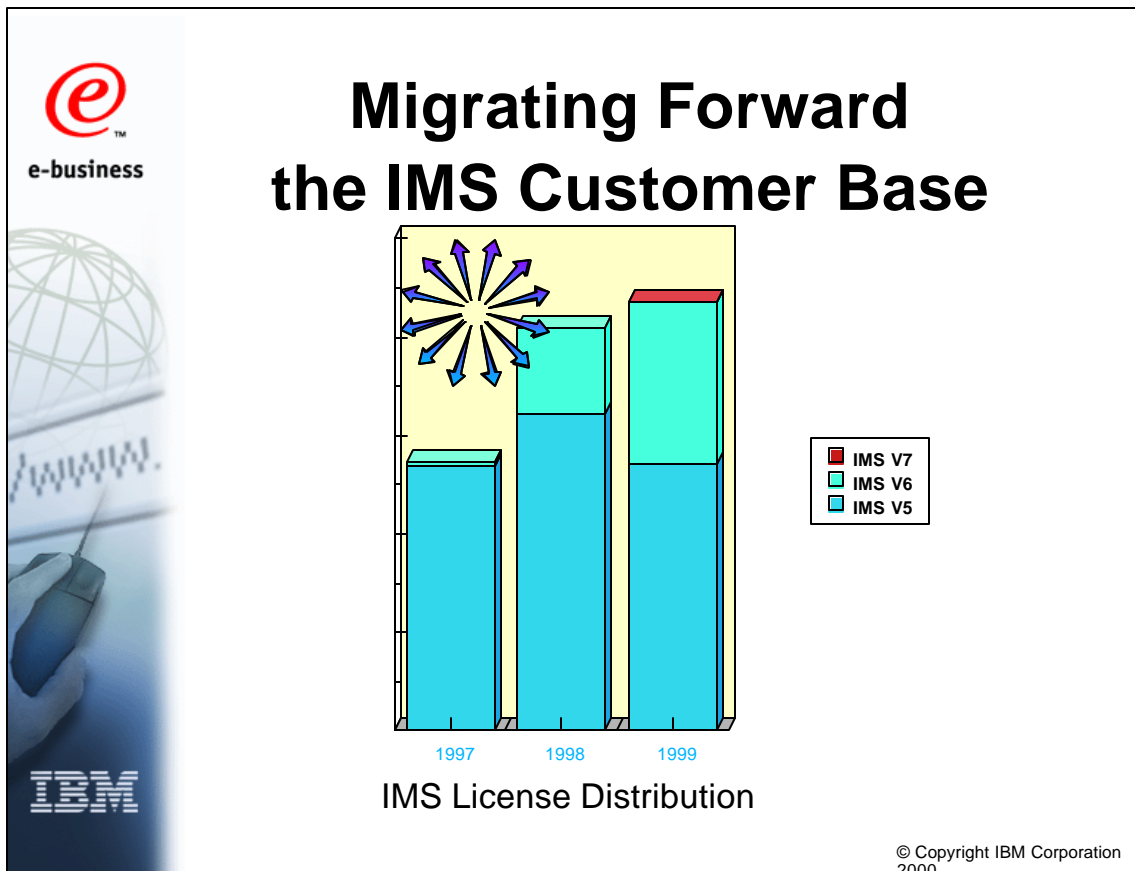
■ Ninth Largest Revenue Producing "Software Company"

"A still large and loyal IMS installed base due to the rock solid reputation of a transactional power horse for very large workloads. IMS is already successfully proven in large, web-based applications."


- Gartner Group report

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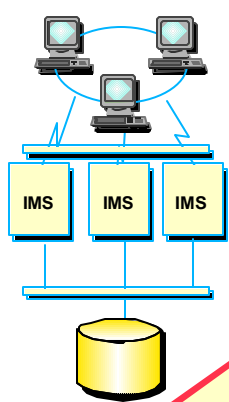
- Industries world-wide rely on IMS to run their businesses. IMS is part of everyday life. Chances are you are using IMS when you turn on a light, make a telephone call, get a business loan, process accounting records, use your ATM card, put money in a bank, rent a car, purchase insurance, travel, send 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 with IMS - over 79 million transactions were handled by one customer in a single day on a single sysplex system, 30 Million Trans/Day on a single CEC. 7 million Transactions/ hour and 120 million transactions/day were handled by another customer. IMS in-house testing has reached over 4000 transactions/sec across TCP/IP to a single IMS on a single machine (G6), and has reached 11,246 trans/sec (nearly 1Billion trans/day) with IMS Data/Queued Sharing on a 2-CEC Sysplex.. One large customer has also indicated they have reached over 3000 days without an outage.
- 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.
- From a Gartner Group Research Report "A still large and loyal IMS installed base due to the rock solid reputation of a transactional power horse for very large workloads. IMS is already successfully proven in large web-based applications."



- ▶ As IMS has been making major improvements to quality, installability, and usability, new versions are becoming easier to install and use. IMS customers have been moving rapidly forward to take advantage of newer technology provided with the more recent versions of IMS. IMS Version 5 proved to be the fastest growing version in IMS history. The newer IMS, Version 6, with significantly more function than any earlier versions, has been exceeding that rate of install. IMS licenses have been growing and revenue has been exceeding expectations with significant growth year to year.



IMS Providing Integrated e-business Solutions



**Strategic Open Access
S/390 Enterprise Server**

Ideal for e-business

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

Solutions

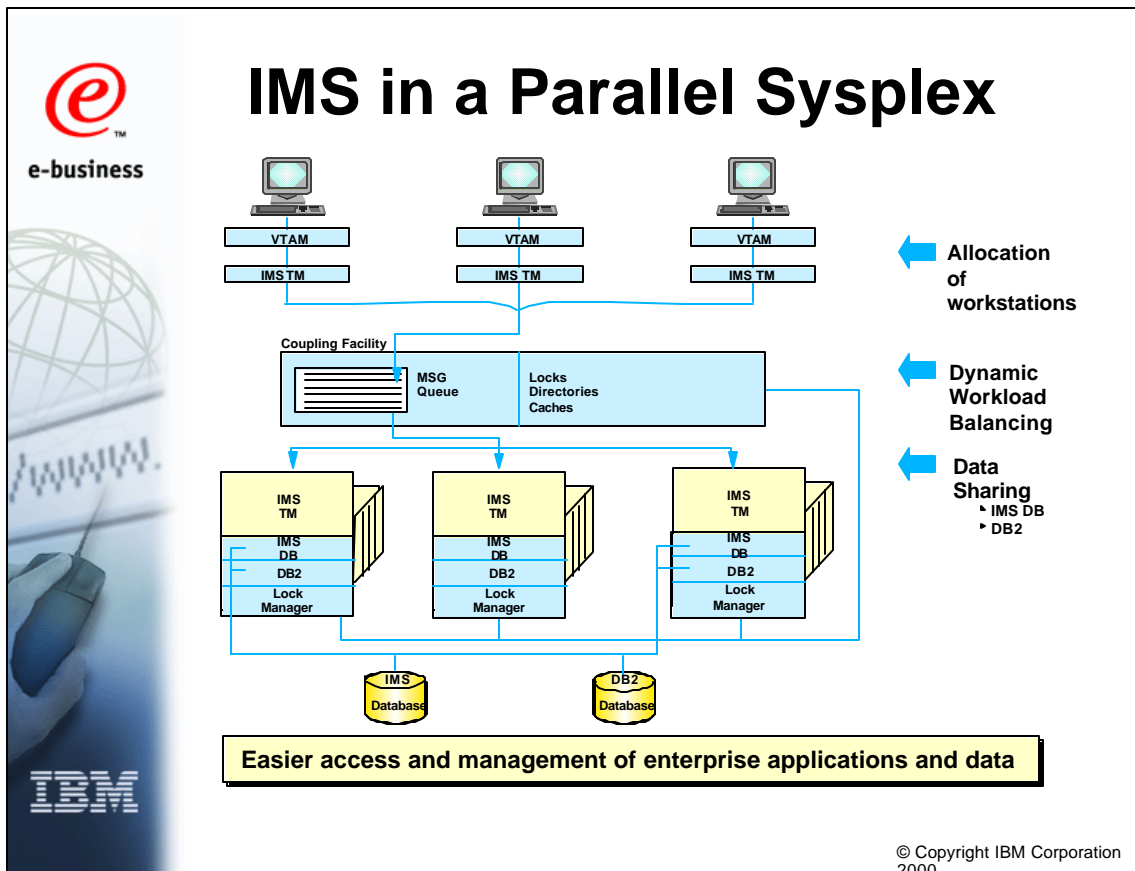
- Parallel Sysplex Sharing
- Systems Management Function and Tools
- Open Access to IMS Transactions and Data
- Java Application Development Tools

Benefits


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

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- ▶ The IMS Transaction and Database Server for S/390 is evolving to further strengthen its support for Enterprise and Network Computing environments. IMS has been providing increased capacity and incremental horizontal growth and offering improved availability with network, message and data sharing, utilizing the coupling facilities of the S/390 and the latest technological advancements for security and integrity of OS/390. IMS has also been providing improved systems management in automated operations, workload balancing, dynamic routing, dump analysis and packaging enhancements. Building on a tradition of success, IBM has been offering additional product and tools for IMS which enhance enterprise computing systems management, availability, and capacity (for example, with the new Sysplex Recovery coordination, and High Performance DB tools).
- ▶ IBM is also offering additional product and tools enhancements for Network Computing to simplify access to both legacy and new IMS applications and data and enabling Lotus Notes access. IMS V5 introduced the IMS Open Transaction Manager Access facility for better integration and efficient access of IMS by other S/390 subsystems, such as MQSeries, TCP/IP, and DCE/RPC. IMS has been rolling out solutions for the e-business Extending the Enterprise IBM Connectors. These consist of common cross-product solutions, such as the IMS Connector for Java, MQSeries Connectors for Lotus Notes with IMS and for common internet access to IMS and CICS. IMS Connectors provide IMS specific solutions for network, internet, and object connectivity, and utilize the latest technology offered for the Web, Java, and Component Broker. IMS has been enabled for the 21st century and the Internet and as a result continues to grow.



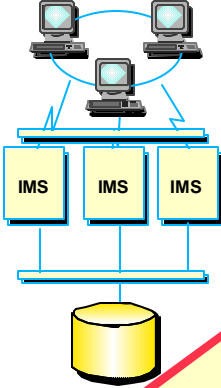
- ▶ IMS continues to strengthen its support of the Enterprise by providing the highest in performance, availability, security, integrity, at the least cost per transaction. In doing this it has been exploiting the hardware/software environments that it has grown up along side of. IMS fully exploits for 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 improves 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 capability continues 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 - Version 6



the world depends on it



**Strategic Open Access
S/390 Enterprise Server**

Ideal for e-business

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

Enhancements

- Sysplex Sharing Enhanced for Queues, Messages, Data, Networks
- Dynamic Routing with VTAM Generic Resources
- Enhanced Web/Java Connectivity
- Enhanced Network Integrity/Security
- Increased Capacity in Database Size
- Universal Time Keeping
- Enhanced Packaging/Installation

Benefits

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

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- ▶ In addition to extending utilization of the coupling facility and other Sysplex support, IMS V6 enhancements provide for improvements in availability, systems management, performance/capacity and network computing. IMS V6 is providing a number of items addressing many customer user requirements. These include: improved internet access, integrity and security enhancements in Network Computing; increased capacity in database size and constraint relief, increased throughput, and incremental horizontal growth with Sysplex routing and message and data sharing enhancements; higher availability with universal time keeping (including 4 digit Yr2000 support), online utilities and faster recovery, faster signon/off; improved systems management with packaging, installation, backup and recovery, workload balancing, and problem diagnosis enhancements.



SIS-West



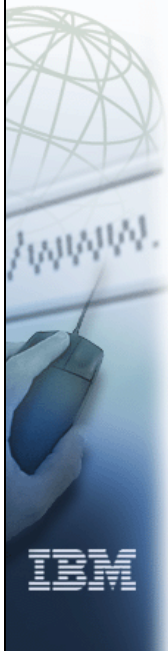
Provide 24-hour Availability

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



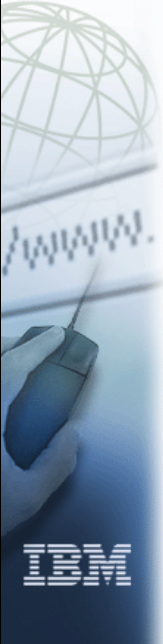
Benefits: Legacy applications needed little or no change, to allow:

- 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



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- ▶ **SIS West provides Savings bank services across Germany, handling 1000 transactions per second on 4 IMS systems. SIS West redesigned their customer information system to run in production for almost 18 months without interruption. The database was about .4 Terabytes of data, spread over 4 IMS systems. On-line changes are applied at any time. Several hundred reports are taken per day, some of them are based on final processing of the last day, others on last ultimo, or the 10th or the 20th of the month. Until June the customer allowed reporting on the last year-end. Some reports are taken on the last position. New applications are on development to deal with changes over time. A second database is in preproduction process. This is the savings account database, which is even larger. Due to the new technique, gradually, manageable, changing to truly 24-hour operation is possible without losing pace in a rapidly changing world. Hundreds (600-800) of legacy programs would have been affected in a regular redesign.**
- ▶ **Today, banks around the world are providing home banking to their users. Credit Mutuel, here in France, was one of the early users of home banking. They had provided access for their customers to their IMS applications and data with MQSeries Web solutions.**

Victoria

Dynamic Workload Distribution

Challenge: Increase capacity to handle heavy initial growth of application workload; and allow for continuous unlimited growth for the long run.


Solution: Full database sharing utilizing both IMS and DB2 sharing capabilities; and complementing this with dynamic online transaction workload distribution with Shared Queues.

Benefits: Basis provided for unlimited growth

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- ▶ Victoria is a member merged into the ERGO group, the second largest insurance group in Europe. They have a centralized computer center in Dusseldorf, Germany, and they are executing about 4.5 million IMS transactions each day and serving over 8 million customers. The growth of their application workload was about to outgrow the capacity of their installed production base (H5 8-way). An upgrade to a 10-way model would only have put off the real issue -- how to deal in the long run with continuous, unlimited growth. Among other possibilities, they decided to go the way of full database-sharing utilizing both IMS and DB2 sharing capabilities because of its unlimited growth potential. To take full advantage of the new Parallel sysplex architecture, this was logically the first of two steps. Dynamic online transaction workload distribution complements database sharing and is the basis for the unlimited growth mentioned before.





SIA - Cedborsa S.p.a. IMS Shared Message Queue

Challenge - *Customer I/T environment had the need to respond to an “ unpredictable ” increasing number of requests from the stock exchange market providing “ good ” response and availability*



Solution - *IMS SMO has been implemented to fully exploit Parallel Sysplex Architecture and to obtain workload balancing, continuous availability, incremental growth. IMS SMO has been inserted in a GeoPlex environment (continuous availability / disaster recovery)*

Benefit - *IMS workload spread on more than one machine. IMS subsystem more available, more capable and ready for “ unpredictable and unlimited “ growth*



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- ▶ SIA provides electronic services to all stock exchange investors.
- ▶ SIA had the need to improve system availability providing a better service to its clients.
- ▶ Customer workload was and is, strongly dependent on stock exchange financial market and, for this reason, IMS workload is almost unpredictable with a strong "dynamic" variation depending on stock exchange financial market movement.
- ▶ SIA decided to implement "IMS Shared Queues to be in a full Parallel Sysplex Architecture to make a better usage of the hardware capability for workload balancing and improved IMS availability.



e-business

PMU - French Horse Racing

- **PRIX D'AMERIQUE 2000**
 - ▶ This 79th edition has seen the victory of General du Pommeau driven by Jules Lepennetier at a record speed of 1'12"6.
 - ▶ This 79th 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 without data sharing
 - designed for 1400 trans/sec
 - ▶ Using IMS Fast Path TM
 - Expedited Message Handler
 - ▶ Using IMS Fast Path DB
 - 3 VSO DEDBs with SDEPs



BETTING
Where to bet
How to bet

INFO
Forthcoming
race meetings
Programme
Results

DISCOVER
A day at the races
Live racing
The horse
French horseracing
institutions



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- ▶ One of our newest IMS customers is PMU.
- ▶ The reputation for excellence of breeding and for French horse racing are a great asset for PMU in the exporting of its know-how to other markets. PMU often acts as a technical expert for foreign partners wanting to set up a pari mutual betting network on horse races or on their own events or for operators already present and wanting to increase their betting facilities.
- ▶ Since 1986, PMU's activities have been developing in three main directions using IMS to achieve high transaction rates:
 - ▶ Common Pool betting
 - ▶ Betting terminals located abroad are connected directly to the PMU network.
 - ▶ Technical assistance and the creation of networks
 - ▶ PMU also places expertise at the service of countries wanting to set up a betting network on French horse races.
 - ▶ Sales of programs, results and pictures
 - ▶ This service enables foreign operators to organize in their own countries, as individuals, betting on French horse racing.

Delivering Technology Leadership

IBM delivers at web speed...

- 1Q99
 - ▶ IMS V5 Refresh
 - ▶ Tivoli Perf Reporter for OS/390
 - ▶ Systems Automation/390 IMS feature
- 2Q99
 - ▶ IMS V6 Refresh
 - ▶ IMS Classic Connect V2 for NT/AIX
- 3Q99
 - ▶ Net.Commerce V3.1.2 for OS/390
- 4Q99
 - ▶ Dynamic Resource Control Facility
 - ▶ IMS V5/6 DB Fiber Optic Channel support
- 1Q00
 - ▶ IMS V7 QPP
 - ▶ IMS Connector for Java in VAJava 3.0
 - ▶ Program Restart Facility for IMS
 - ▶ IMS Perf Analyzer V2
 - ▶ IMS Connector for Java in VAJava 3.0.2

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- ▶ Since IMS V6 availability, a number of additional enhancements were provided to the IMS Family in 1998. In 1999, IMS V5 and V6 were refreshed for easier installation and serviceability of enhancements. This rolled up enhancements to IMS V6, delivered through the service process, including VTAM Generic Resources support enhanced to allow VTAM to own/manage the affinities to allow end users to logon to another IMS in the event of failure, the Open Database Access facility with improved IMS DB access from other subsystem and a Callable interface to the Open Transaction Manager Access Facility)
- ▶ The Tivoli Performance Reporter for OS/390 V1.4 became available offering centralized systems reporting over the enterprise, valuable in performance reporting, capacity management, service-level management, and accounting, and providing even easier access to enterprise-wide IMS data, via the new Viewer, a Java interface that allows graphical and tabular representations of Performance Reporter data from any desktop environment.
- ▶ The IMS feature of the SA/390 product (providing single operations point of Control for IMS) was updated to support IMS V6.
- ▶ In April we provided a new version of the IMS Classic Connect product.
- ▶ In addition for web enabling commerce we have announced a new release of Net.Commerce for OS/390 which provides access to IMS applications and data.
- ▶ In keeping with our direction to continue to enhance our IMS Tools, we made available the Dynamic Resource Control Facility, an online monitor that puts comprehensive resource information at your fingertips and helps you spot and resolve potential problems before they become critical.
- ▶ IBM also delivered IMS DB support for the S/390 Fiber Channel, the new high performance I/O channel being delivered with the new processors. FICON is a fully compatible evolution of parallel and ESCON channels and provides both improved I/O rates as well as additional bandwidth.
- ▶ We also provided enhanced Java facilities with the IMS Connector for Java. And IBM continues to enhance its object-oriented programming support for IMS.
- ▶ In the first quarter of this year, we have already enhanced our IMS Connector for Java and some of our systems management/database tools, including adding a program restart facility, to ensure the correct ID used with the IMS extended restart facilities.



IMS Tools Portfolio

Data Management - HP Utilities & Aids

- **DBT:**
 - SMU - HD Pointer Checker
 - HSSR - High Speed Unload
 - FRR - High Speed Reload
 - LMU - Library Management Tools
 - FACB - Fast Acbgen
 - Zapper - VSAM Zapper
 - Fast Prefix Resolution
 - SDO - Seq DAM Optimizer
- **IPR - Parallel Reorg**
 - Unload
 - Reload
 - Index Builder
 - Fast Scan
 - Fast Prefix Resolution
- **IMS Index Builder**

TM Management - Utilities & Aids

- **DST - Data Stream Tuner**
- **IMS Connect**
- **ETO Support**
- **MRQ - Message ReQueuer**
- **WLR - Workload Router**

Database Administration

- **Control Suite**
- **DBICF**

Performance Management Tools

- **IMS PA - Performance Analyzer**
- **DRCF - Dynamic Res Ctl Facility**

Test

- **BTS - Batch Terminal Simulator**

Backup and Recovery

- **DBT ICE - IC w Pointer Checker & Compression**
- **Recovery Saver**
- **Parallel Change Accum**
- **Program Restart Facility for IMS**
- **IMS Online Recovery Service**

Fast Path - Utilities and Aids

- **DBT**
 - DEDB UR -Unload/Reload
 - DEDB PC -Pointer Checker
 - DEDB TA -Tuning Aid
- **Fast Recover - Fast Path Recovery**

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- ▶ 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 to you. The tools provided 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", IBM's IMS tool can be considered the best in the industry.



Tucson Medical Center



"IBM Delivers Cost Savings and Improved Availability"

Challenge: Run extremely lean shop on mainframe with performance, availability, simplicity


Solution: Replace existing Tools with IBM IMS Tools

Benefits:

- IMS DBT Fast Unload (HSSR) is faster
- IMS DBT Fast Reorg Reload is faster for HIDAM databases
- IMS Index Builder is faster
- Bonus of IMS Partition DB and still saved money

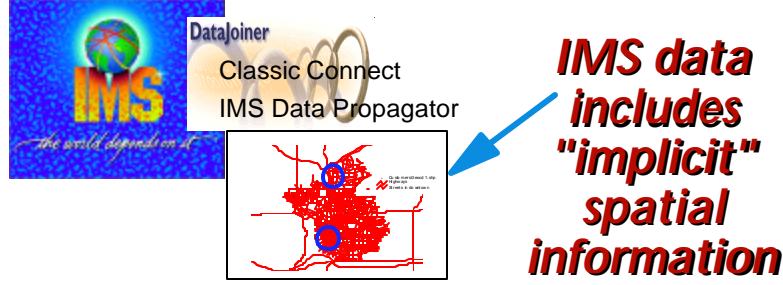
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- ▶ Tucson Medical Center (TMC) conducted benchmarks between IBM's Database Tools and competitive Top of the Line tools. TMC was interested in evaluating IBM tools was because of a concern over the cost of competitive tools. The challenge given to IBM was to prove that we had "comparable" performance and could meet TMC's reorg batch window times.
- ▶ TMC's benchmark results showed successful performance. In addition, the extra bonus that TMC received was to implement IMS Partition DB to solve their data capacity and availability issues. Even with obtaining extra tools, TMC still saved money with IBM solution.
- ▶ To quote, Tucson Medical's conclusion was, "IBM delivers cost savings and improved availability."



IMS Business Intelligence

Extend the reach and value of your IMS data!



IMS data includes "implicit" spatial information




Challenge: Provide IMS customers with advanced data integration and analysis capabilities leveraging existing IMS data assets.

Solution: DataJoiner Classic Connect, DB2 Spatial Extender, DataPropagator technologies

Benefit: New forms of analysis possible utilizing IMS databases. Easily integrate IMS data with other business data in the enterprise.

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- ▶ IMS has been providing Business Intelligence solutions with Data Joiner's Classic Connect as well as with other data replication/propagation tools, such as the IMS DataPropagator. The IMS Data Propagator can provide IMS customers with advanced data integration and analysis capabilities, while leveraging their existing IMS data assets.
- ▶ Classic Connect 2.11 made available earlier this year provided enhanced communication, data access and data mapping functions for customers using relational queries to access IMS and VSAM data. In conjunction with DataJoiner, users can, from a variety of client platforms, submit a standard SQL query that accesses IMS and VSAM data consistently with DB2 data. A workstation end user can issue an SQL join across IMS, VSAM, DB2 and non-IBM databases as well. Additional enhancements are provided for performance, scalability, reliability, and security.

AGF-SI Group

First in EMEA in production!

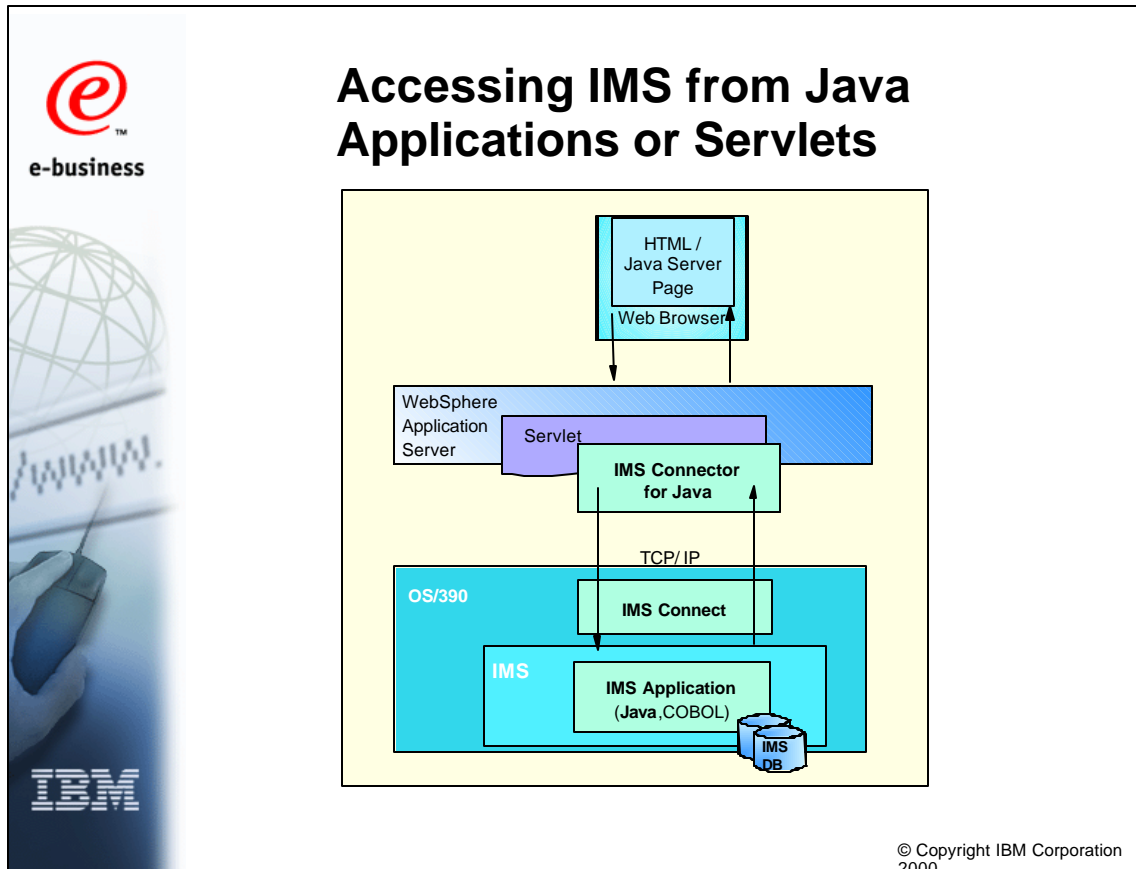
Challenge: Provide the quickest access to IMS transactions from Thin client (less middleware than possible)

Solution: TCP/IP client access and Intranet access to existing IMS transactions (2-tier implementation)

Benefits: Maximize value of existing S/390 investment in IMS/DB2 applications and data

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- ▶ AGF-SI, a service company for the French Insurance group, AGF, which operates in 36 countries worldwide. Besides the continuous development of all information systems, AGF-SI is also responsible for implementing advanced technologies that are based on the network computing architecture. These projects have strengthened the company's position in its industry. AGF-SI's online activity is around 1.8 million transactions per day (an average of 35 DL/I and 5 DB2 calls per transactions). AGF-SI decided to minimize the number of software layers and hardware platforms between the client and the IMS server using the IMS TCP/IP support in a predecessor to the new IMS V7 Connect facility.
- ▶ The IMS TCP/IP support provides enhanced communication linkages between remote workstations and IMS. It supports multiple TCP/IP clients accessing multiple IMS systems. This support utilizes OTMA.
- ▶ 40% of online activity at AGF today is processed through the IMS TCP/IP support to windows clients.
- ▶ Another domain of investigation at AGF today, is the use of servlets provided by VAJava and its IMS Connector for Java.



- ▶ IMS is exploiting 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 in the VA Java Enterprise Edition Version 2.0. 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.
- ▶ This shows the runtime environment of a Java Servlet Application. When a user executes the application and provides the appropriate input data, IMS Connector for Java within the Java Applications will establish a TCP/IP connection with IMS Connect (or its predecessor IMS TOC) on the host. IMS Connect will then forward the transaction request to IMS OTMA (the Open Transaction Manager Access Facility provided initially with IMS V5), using XCF (Cross-system Coupling Facility) and sends the output back to the IMS Connector for Java.
- ▶ In the servlet runtime environment, 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.



Sanlam South Africa

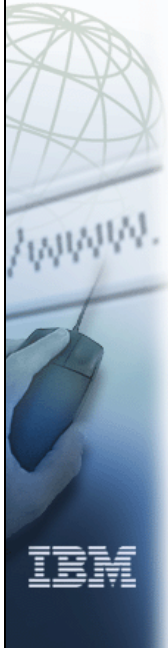


First in Insurance South Africa to implement Java Servlets on S/390

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.



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- ▶ The Sanlam Group is one of the most well established financial services groups in South Africa. It is the second largest life assurer and asset manager in South Africa with more than two million policyholders. Ninety percent of the work Sanlam processes is in life administration, and the remaining ten percent is in fund management, human resources, and health insurance administration.
- ▶ Sanlam needed a cost-effective and secure solution to provide its insurance brokers with access to its IMS legacy application. Initial implementations via Microsoft Windows NT platforms proved to be problematic, complex, and unreliable. Furthermore, Sanlam needed a solution for smaller banks that did not want to invest in network infrastructures. These banks did not have a network infrastructure with Sanlam, but needed to perform policy administration functions, such as the ceding of policies, enquiry of policy holder details, and normal policy administration, such as change of address. This function had previously been done manually, but was error-prone and time-intensive. Larger banks with a network infrastructure in place with Sanlam had an advantage over the smaller banks by providing better service to their clients. Having online access at a significantly reduced cost via the Internet would enable the smaller banks to provide the same level of service to clients as the larger banks. Sanlam also needed a way for policy holders to view their own policies.
- ▶ Sanlam adopted IBM's Application Framework for e-business to simplify connectivity to its S/390 and existing systems. It implemented the S/390 Domino Go Webserver to provide secure internet access to existing IMS/ESA applications and a back-end DB2 database. Together with RACF and SSL, this solution provides secure Internet access to the existing IMS/ESA applications.
- ▶ By implementing the S/390 Web server, Sanlam has been able to provide a more cost-effective service to the broker community. This efficient solution allows the broker to use standard Web browsers to serve clients, without incurring heavy infrastructure costs. Internet access to the S/390 is a quick, cost-effective solution, and it allows for further Java development. All Sanlam brokers, policy owners, and smaller banks will have secure access to the S/390 existing applications from the Internet.



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 (eg. 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

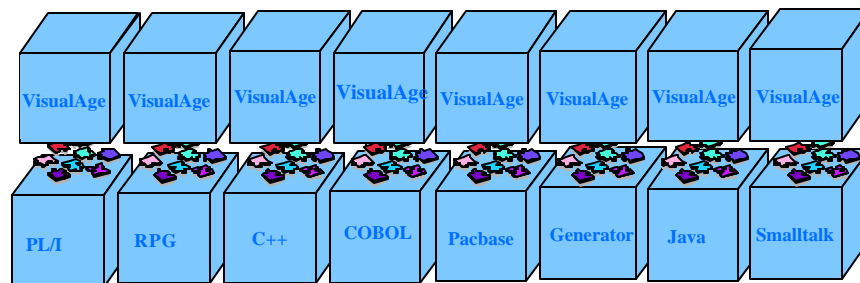
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- A US based Utility Company supplies, markets and delivers energy to hundreds of thousands of customers across many US states. They are establishing an e-business vision to address a number of Business-to-Business(B2B) and Business-to-Consumer(B2C) application needs. They need an infrastructure that will enable it to achieve device independence with respect to the client and to leverage its existing investment in IMS transaction systems. Their environment is heterogeneous, consisting of OS/390, AIX, Solaris, and Windows NT servers with Windows NT, Windows 98, Solaris, and AIX clients. To cost effectively build applications that will run in this environment, they have been evaluating the Java technology for run-time independence and XML for platform-independent data and the proliferation of Customer Data in the wake of Y2K. As they embark upon the deregulation of the utility industry, the ability to provide information to energy traders, providers, producers and consumers is becoming the differentiating factor among utility companies. In response to the growing need to proliferate information and to address Y2K concerns relative to energy usage monitoring systems, they decided to provide customers with the ability to view their account history online. Since they do not always play the role of provider to all consumers, it is important that a residential customer could compare its meter usage records against billing invoices from the customer's provider. Thus, such a tool would enable users to perform some reconciliation checks against bills from energy providers after the Y2K issue.
- Building an e-Business Infrastructure they used this business need to establish a generic e-business infrastructure based on a thin-client architecture. The vehicle for achieving the project objectives included a combination of products and code supplied by IBM. The end-to-end operation of the Customer Account History application was an exercise in transaction processing between an Internet client and an existing system through a middle-tier server. A client submits a Customer/Meter value pair, which invokes the sending of an XML based request message from a WebSphere Application Server to an existing backend MQSeries server. MQSeries then triggers a Parser/generator program, which handles the parsing of the XML request into a formatted IMS transaction. The result from the IMS transaction is then converted into an XML response and sent back to a servlet on the WebSphere Application Server via connected MQSeries queues. Additionally, Java technology would then create the appropriate HTML for presentation of the Customers' bill and usage history as well as payment data.
- Since the WebSphere Application Server and the legacy IMS Application communicate over MQSeries message queues, this application used an Enterprise JavaBean (EJB) to address session management of the request and response queues. This EJB was a critical component of the system since it not only addressed session management of the application, but it also provided the same generic function required by any future applications.



VisualAge Family

- ✓ Choice of language - IBM has what you need
- ✓ Common technology - Visual development environment
- ✓ Best tools for IBM middleware
- ✓ Productivity
- ✓ Enterprise Scalability



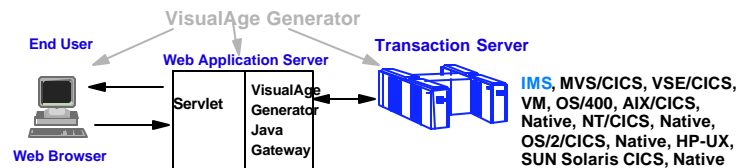
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- ▶ IBM provides the broadest suite of languages in the industry. You have a choice of languages (e.g. PL/I, COBOL, VisualAge Generator for high productivity, Java, etc.)
- ▶ We have re-used common technology across many of the products in the VisualAge family. This enables IT organizations to avoid "skill islands" because it is easy to transition from one VisualAge product to another.
- ▶ The VisualAge development organizations are focused on optimizing our tools for IBM middleware - for IMS, as well as CICS, DB2, MQ Series, WebSphere, etc.
- ▶ The VisualAge tools provide very high productivity, through such features as visual development environments and highly productive testing capabilities
- ▶ The VisualAge tools enable you to create scalable, enterprise applications -- through high performing optimized source code for high volume transaction systems, support for the most scalable environments, and robust team development support for the development team.



VisualAge brings your IMS business to the Web

- ✓ VisualAge Generator Version 4 - fully integrated into VisualAge for Java Version 3
 - ▶ Rapid Application Development
 - ▶ Eases the skills transition to Java - your pace
- ✓ Access existing IMS transactions
 - ▶ VisualAge for Java Enterprise Access Builders
- ✓ Create new n-tier Web applications with IMS transactions and access to DL/I data
 - ▶ VisualAge Generator generates the code
- ✓ Bring your investment in IMS to the Web - easily!



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- ▶ VisualAge helps you bring your business to the Web. Let's find out how.
- ▶ VisualAge Generator Version 4 is a significant extension and value add to the power of VisualAge for Java Enterprise Edition Version 3, which is in itself the best Java Integrated Development Environment (IDE) in the industry. The high level specification language of VisualAge Generator, now added to the Java workbench, significantly reduces the skill required to create Java programs. This provides an excellent way to transition programmers and make them productive faster in delivering Java based solutions.
- ▶ VisualAge Generator provides a rapid application development (RAD) environment, which allows for rapid prototyping, development and testing, all on the developer's workstation, before generation and compilation. With VisualAge Generator, programmers can use the high level specification language (which is neutral of the target runtime platforms), or Java, or both for writing code.
- ▶ What if you have an existing IMS application and want to turn that into a web application? How can you do this easily? VisualAge for Java (which is part of VisualAge Generator Version 4) provides an Enterprise Access Builder (EAB) for IMS. Essentially, the EAB creates the Java code to "wrapper" the IMS transaction and make it accessible to the Java client (applet, application or servlet). You don't have to code the low-level Java to make this work.
- ▶ OK, that's great! But what if I need to write a new program that will run on IMS, or I need to add significant modules to an existing application, and still deliver it for the web? Use VisualAge Generator to specify the new code (and the Java client), and then VisualAge Generator automatically generates the IMS transaction code, the DL/I access code, and the Java code (applet, application, servlet) for the web application server and the user interface. And, with VisualAge Generator, it's easy to call out to an existing application (such as COBOL or PL/I) and to be called by an existing application. The ability to create end-to-end Java systems that include tier-3 transactions provides a unique Rapid Development option for new e-business systems that allow to leverage legacy assets.



e-business

Caja Madrid

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

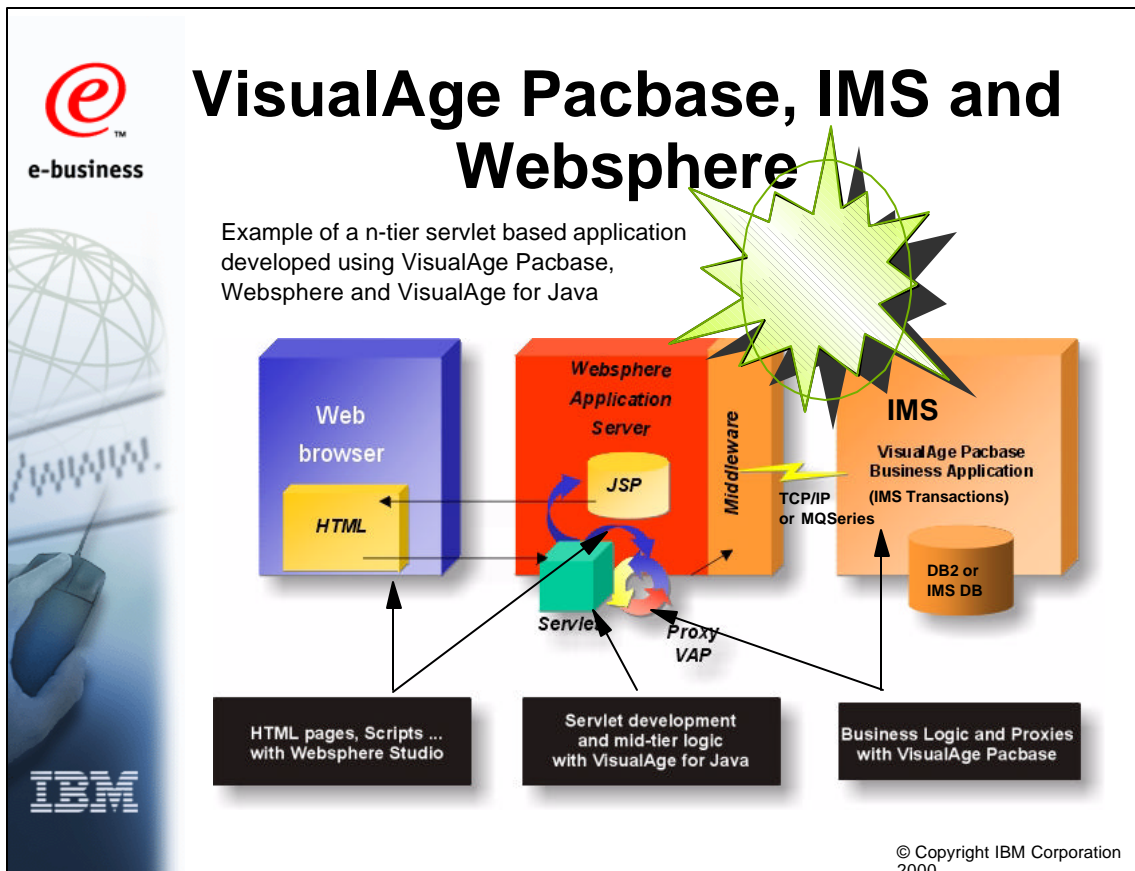
Challenge Build the new insurance and customer relationship management systems, deploy them on the branch network for over 9000 users

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


Benefits Investment protection
Smooth professional evolution of development staff

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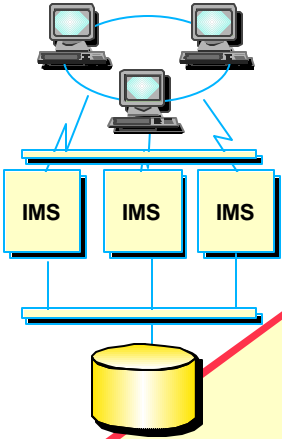
- ▶ VisualAge Pacbase is a repository-based application development environment. It offers life-cycle coverage of AD needs from analysis and design to production. It produces web-based e-business applications as well as Batch and Online across 30+ platforms This slide sums up here in key points and in three categories everything you have to know about the product: The development, runtime, and in maintenance of the applications. VisualAge Pacbase is used by other customers in other ways as well.
- ▶ Caja Madrid is a large banking customer, who was challenged with building a new insurance and customer relationship management system, to be deployed on the branch network for over 9000 users. Their solution was to use VAPacbase and VisualAge for Java in conjunction with IMS and MQSeries to build their new systems. Using these tool, they now have 45,000 programs in production and have protected their investment, providing a smooth professional evolution of their development staff.



- ▶ Here is another example of application architecture around WebSphere Application Server, in which components developed using various tools of the e-business application framework have been installed.
- ▶ We can thus identify who does what in the development of such an application, and demonstrate the complementarity of the tools:
 - ▶ - WebSphere Studio for the development of scripts and HTML pages
 - ▶ - VisualAge for Java for the development of the servlets and of the application logic
 - ▶ - VisualAge Pacbase for the business logic and the proxies that allow to link and automate exchanges between the servlets and the business logic
- ▶ Other application models based on applet or EJB technologies can be built with VisualAge Pacbase and WebSphere



IMS - Version 7

**Strategic Open Access
S/390 Enterprise Server**

...the world depends on it

Ideal for e-business

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

Enhancements

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

Benefits

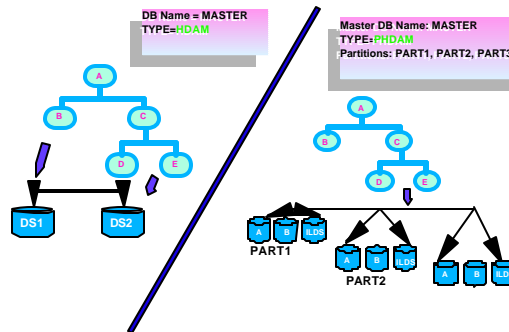
- ✓ Enable Customer Growth
- ✓ Enhance Workload Balancing
- ✓ Increase Availability; Ease of Use
- ✓ Preserve Current Application Investment
- ✓ Enable New Applications

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- ▶ To help all our customer with growth, availability, and systems management, today I am announcing IMS Version 7. It includes the new Rapid Network Reconnect facility, providing faster reconnect, utilizing the facilities of VTAM's Multinode Persistent Sessions. IMS is also providing enhanced support for database recovery, providing a new Online Recovery Service facility. And IMS is extending its large database support and extending partitioning to other database types. Also provided for IMS is IMS Connect, a new facility for enhanced access to IMS through TCP/IP. Other support is also being provided to enhance operations across the Sysplex, and to improve workload balancing, single system image, and backup and recovery. These enhancements, as well as additional items, would be provided to continue improvement in availability, systems management, performance/capacity, and for optimizing use of IMS in enterprise and network computing environments. Let me talk to you now more specifically about some of these functions.




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

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- ▶ 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.




IMS V7 Java for Integrated e-business Application Development

✓ Application programmer productivity

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

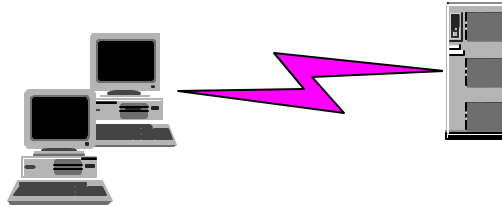


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- ▶ Also including in the base of IMS Version 7 is our IMS Java application support to enhance the ability of our customers and business partners to provide integrated e-business application development with IMS.
- ▶ The object of this function is 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 will be provided through the High Performance Java compiler.
- ▶ We will be providing access to IMS TM message queues
- ▶ We will also be providing access to IMS DB and DB2 data through JDBC.



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

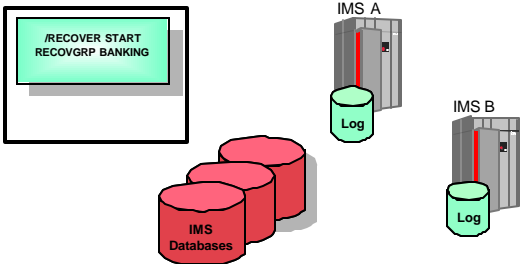
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- ▶ Rapid Network Reconnect improves system availability by allowing IMS TM to automatically reconnect terminal sessions following any kind of IMS failure and subsequent restart -- reduces network reconnect time after IMS, MVS, or VTAM failure in a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




IMS Online Recovery Service for IMPROVED AVAILABILITY



- ✓ **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

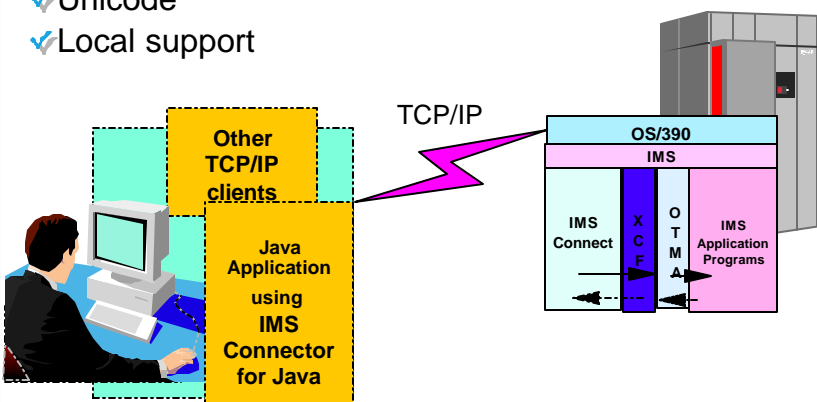
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- ▶ The Online Recovery Service (ORS) is a separately orderable/priced facility for use with IMS V7. ORS gives a customer the ability to recover multiple database datasets by reading log volumes in parallel and applying the database changes to multiple database datasets simultaneously. Recovery-related processing takes place only when recovery is required. In addition, I/O overhead for recovery is reduced. ORS also gives a customer the ability to recover data bases to a 'point in time' which is earlier than the last committed updates.




IMS Connect for High Performance access to IMS

- ✓ Improved performance with persistent sockets
- ✓ Enhanced usability with user exits and asynchronous output support
- ✓ Increased serviceability with Dump formatting enhancements
- ✓ Enhanced manageability with SMP installability
- ✓ Unicode
- ✓ Local support



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- ▶ IMS Connect, a new separately priced facility for IMS provides enhanced IMS TCP/IP support. Enhancements include SMP installability, as well as enhancements for performance, usability, and serviceability. Additional enhancements to TCP/IP support will be provided through IMS Connect.
- ▶ 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 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 and the IMS Connector for Java have demonstrated very high transactions rates.
- ▶ Early IMS Connect performance data resulted in over 4000 trans/second on a G6 with a single IMS. Early performance work on IMS Connect shows potential for some additional growth in this transaction rate as well.



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
- Fast Path Monitor support

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

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- ▶ IMS V7 itself also includes numerous other availability, performance and systems management enhancements. In addition we are focusing on Application Development enhancements for IMS. 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 and miscellaneous enhancements to shared Fast Path Expedited Message Handler (EMH) and Sequential Dependent Segments (SDEPs).
- ▶ 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 Database Recovery Control (DBRC) enhancements improve diagnostics information, improve Database integrity protection, eliminate abends, provide large Recon record support, Recon loss notification, and migration/coexistence.
- ▶ IMS is also supporting XML through interoperation with the OS/390 XML Parser, Java edition.



IMS Version 7 Status

Quality Partnership Program

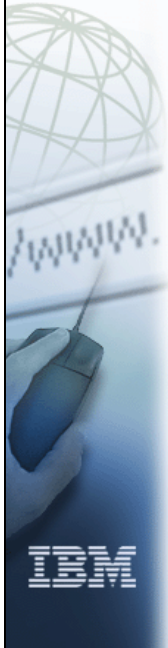
April 1998 WW Customer involvement began
Nov 1999 Customers start V7 on Test Systems
Mar 2000 Customers start V7 on Appl Devt Systems
July 2000 Customers start V7 on Production Systems
Major Vendors participating in QPP with customers

Early Redbooks

IMS V7 Release Guide (with Java section)
IMS V7 High Availability Large Database
IMS Online Recovery Service


Services Offerings Available

IMS V7 General Availability October 27, 2000




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- ▶ IMS Version 7 has already begun its Quality Partnership Program (QPP). Customers were initially involved in the design reviews in April of 1998. Customers received the code and began using it on their test systems in November 1999, They have already begun putting it on their application development systems in February 2000 and expect to begin running it on their production systems early this summer. Major Vendors are participating in the QPP program to ensure their tools are ready for our customers production use.
- ▶ In addition a number of redbooks are planned and being prepared, bringing in IBM field and customer personnel to provide hands on experience for installation and use of IMS V7, Java, HALDB, and ORS.
- ▶ We are also preparing education classes and services offerings to help all our customers prepare and more readily migrate to IMS V7.



Next Steps in IMS Providing Integrated e-business Solutions



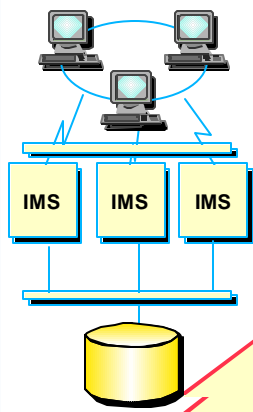
the world depends on it

Ideal for e-business

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

Enhancements

- Online Reorganization of DBs
- Sysplex Terminal Management
- Sysplex-wide Resource Mgmt
- Sysplex-wide Operations with Single Point of Control
- Enhanced DB Recovery Ctrl
- Simplified Installation Process
- Enhanced Systems Mgmt Tools
- XML



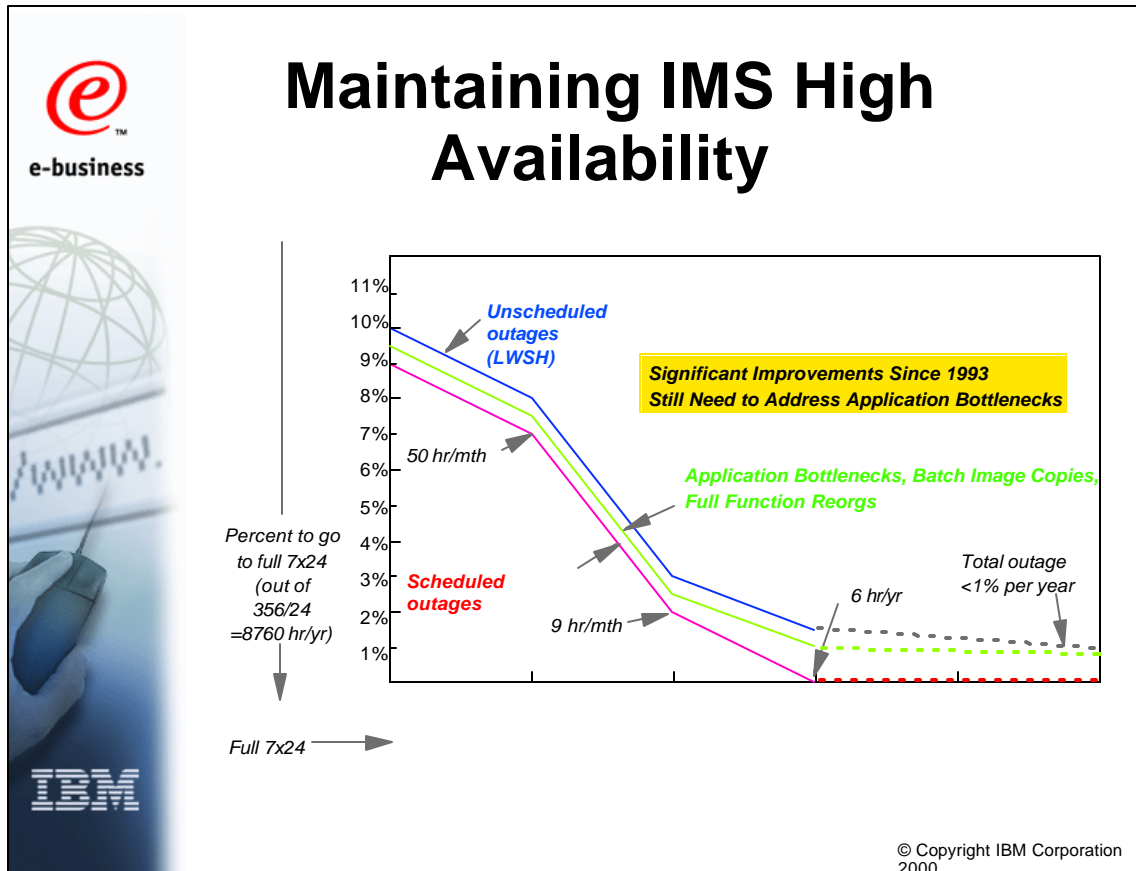
Strategic Open Access S/390 Enterprise Server

Benefits

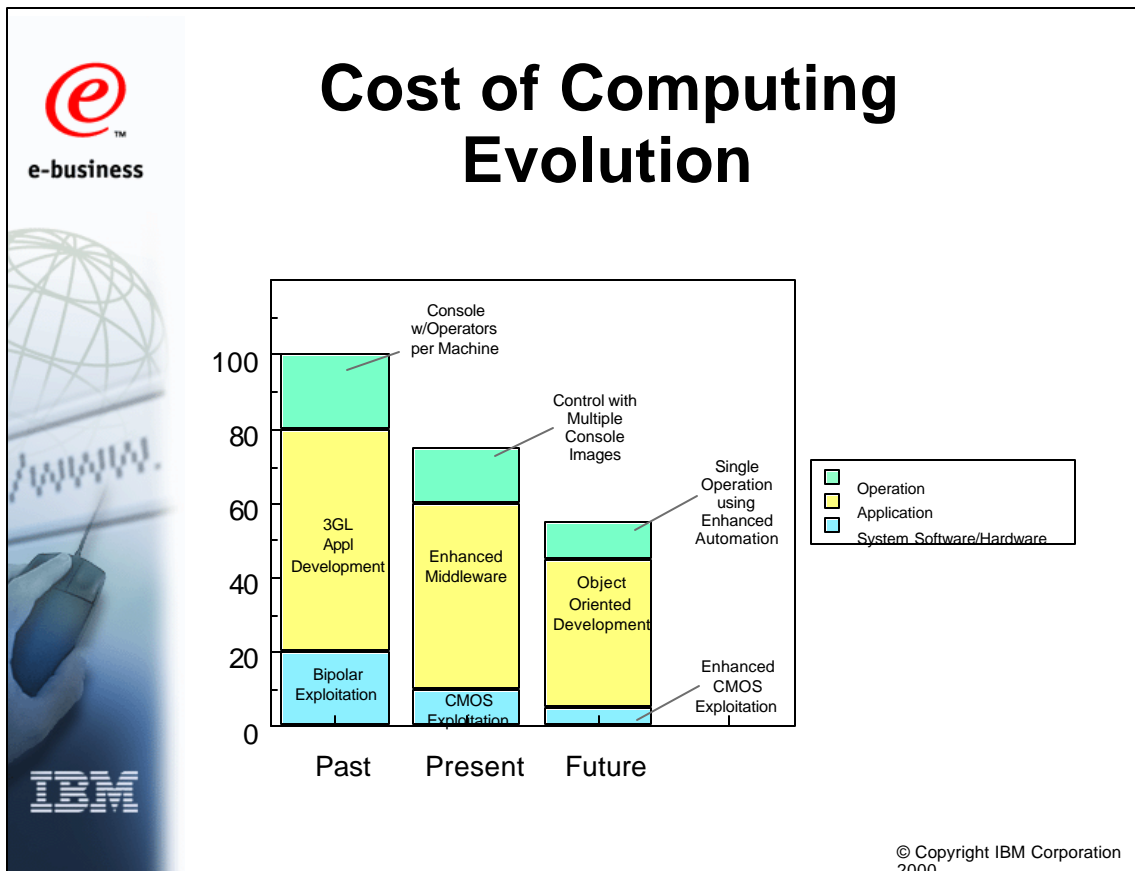
- ✓ Enable Customer Growth
- ✓ Enhance Workload Balancing
- ✓ Increase Availability; Ease of Use
- ✓ Preserve Current Application Investment
- ✓ Enable New Applications

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- 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 continually improving performance/capacity, availability, systems management/usability, open access, and supporting tools for the e-business environment. The goal is to deliver 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 would provide more transparent Sysplex Terminal Management and Online Reorganization of partitioned databases 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 would provide 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 VJava development tools. IMS would provide enhanced performance for this environment, and provide better integration with the VisualAge and WebSphere development tool set. New Technology as it evolves with XML would 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 and connectivity to the Internet.
- Additional Systems/Data Management and Business Intelligence tools would also be 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. We are also, as a company, moving our customers away from BookManager and toward PDF as a long-term, online book solution.



- ▶ In looking at what IMS has offered its customers, high availability has always been very key to IMS customers. Since 1993, one customer has been driving down their planned and unplanned outage to less than 1% per year. Most of the scheduled outages have been taken care of. The bulk of what remains in scheduled outages is from application bottlenecks, batch image copies, and full function transaction reorganization activity.



- ▶ IMS has significantly helped contribute to bringing down the Cost of Computing. IMS operational and other systems management improvements have continued to bring down the costs of Operations. Enhanced IMS Middleware and Object Oriented Programming has helped lower the application costs. And by exploiting the new CMOS technology and other advances in technology in the hardware and operating systems, IMS has helped lower the systems software/hardware costs.



**IMS: Serving the 21st Century
with Information**

Transformation and Integration
Supporting new business models with performance, availability, scalability, speed of deployment, and enterprise application integration

Leveraging Information
Perform/available/scale, content creation/management, turning data into intelligence, and access technology

Managing Technology
Intelligent connections, directories, security, end-to-end management

Organizational Efficiency
Unified messaging, real time collaboration, distributed, simplified access

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- Significant ongoing work to reduce defects has been going on to improve the unscheduled outages and improve availability. That work has included continuous review of defects escaping test, early vendor involvement, integrated system evaluation test in POK before GA, ongoing integrated test in their Parallel Enablement Lab after GA, and expanded regression testing of fixes. This reduces any customer-seen problems and speeds up their installation process, as well as ensures continued improvement of availability in production.
- IMS has significantly helped contribute to bringing down the Cost of Computing. IMS operational and other systems management improvements have continued to bring down the costs of Operations. Enhanced IMS Middleware and Object Oriented Programming has helped lower the application costs. And by exploiting the new CMOS technology and other advances in technology in the hardware and operating systems, IMS has helped lower the systems software/hardware costs.
- You enter the e-business cycle at any point -- focusing on leveraging your existing knowledge and information, 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.