IBM®

OS/390 Version 2 Release 4 Availability and Release 5

Overview

OS/390™ has fulfilled its initial objectives of transforming MVS®. We are expanding the original goals, going beyond the limits with a renewed vision and enriched set of objectives with the releases of Version 2 of OS/390. The availability of OS/390 Version 2 Release 4, the first release of Version 2, and the announcement of function and value of Release 5 mark S/390's first delivery against these new objectives previously announced on June 9, 1997. Refer to Software Announcement 297-194, dated June 9, 1997. ServerPac for OS/390 and the significantly reorganized installation documentation for Version 2 Release 4 maintain an improved and easier release-to-release transition.

OS/390 Version 2 Release 4 is the ideal e-business network application server. Domino™ Go Webserver for OS/390, along with key e-business Enterprise Connectors, such as Net.Data™ for OS/390, provide Web access to DB2®, IMS™, and CICS® data. S/390 Parallel Sysplex™ and OS/390 with Workload Manager (WLM) deliver e-business mandatory availability, scalability, and security.

UNIX® branded and ITAA-certified-Year-2000-ready, OS/390 has become a platform of choice for protecting user investments in existing applications and for deploying new applications. The OS/390 Partners in Development program now exceeds 1,200 Independent Software Vendors (ISVs). Hot industry applications such as Lotus® Domino, SAP R/3, PeopleSoft, JD Edward's OneWorld, and many many more are delivering and exploiting OS/390 technology as a result of this program.

With OS/390 Version 2 Release 5, IBM will deliver the beta level of its strategic object-oriented application development environment on S/390. Component Broker for OS/390 provides the ability to develop and

deploy mission-critical business applications using the latest technology and leveraging the traditional strengths of the S/390® platform.

OS/390 Version 2 Release 4 delivers enhanced technology, function, and performance to integrate multiple LAN, UNIX, and multimedia servers. Server integration may help reduce the rising system and operating costs of these platforms, while improving management control, enterprise security, availability, and access to centralized corporate data.

Intended Customers

OS/390 Version 2 should be considered by all existing OS/390 and MVS customers. Current OS/390 installations will find substantial value in Version 2 Release 4, with the migration equivalent to a release upgrade. MVS customers can migrate directly to this new version. VSE and VM customers who have a need to grow their transaction processing or deploy a wide selection of UNIX applications have OS/390 Version 2 as a logical growth path.

Installations wanting to Web-enable their I/T or deploy UNIX applications on a scalable and secure platform, while helping to reduce growing enterprise management costs, should consider OS/390 Version 2 releases.

Planned Availability Dates

- September 26, 1997, Version 2 Release 4

- March 27, 1998, Version 2 Release 5

This announcement is provided for your information only. For additional information, contact your IBM representative, call 800-IBM-4YOU, or visit the IBM home page at: http://www.ibm.com.

Introduction

Version 2's family of releases inherits all the value that Version 1 offered and builds on that value to respond to the industry trends of network computing, application enablement, server integration, business intelligence, with technology leadership. System integration testing, ServerPac delivery and installation, and over 70 elements and features define the essence of OS/390 Version 2 — a comprehensive network application server operating system for the entire range of S/390 customers. Release 4 is the initial release in OS/390 Version 2. The availability of OS/390 Version 2 Release 4 and the function and value of Release 5, mark S/390's first delivery against the new objectives announced this past June. Refer to Software Announce 297-194, dated June 9, 1997.

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OS/390 Version 2 Release 4 Overview

Network Computing Initiative

This initiative's goal is to continue the evolution of S/390 as the platform of choice for highly available, scalable, and secure e-business. This evolution, for OS/390 Version 2 Release 4, includes:

- Domino Go Webserver 4.6 for OS/390, integrated into OS/390 Version 2 Release 4

  – Includes NetQuestion, a robust text search engine
  – Includes Internet Connection Secure Server

- eNetwork Communications Server Improvement

  – Improved multiprotocol performance

  – New Domain Name Server (DNS) enabled for parallel sysplex technology (available in a kit)

  – Host on Demand for S/390

  – TCP/IP performance improvements for OS/390 UNIX System Services (formerly called OpenEdition®)

- Integrated Cryptographic Services Facility/MVS (ICSF/MVS) is integrated as a new OS/390 Version 2 Release 4 base element

  – Trusted Key Entry (TKE)
  – Commercial Data Masking Facility (CDMF)
  – Public Key API (PKA support)

- BookManager BookServer for World Wide Web for MVS/ESA™ is integrated as a new OS/390 Version 2 Release 4 base element

Application Enablement Initiative

The primary goal of this initiative is to enhance customer use of the S/390 by fostering the movement of attractive new applications to this platform while expanding the platform's support for the growth required by existing applications. Application Enablement upgrades include:

- OS/390 UNIX Services enhancements

- Language Environment performance and RAS enhancements

- C/C++ performance enhancements, new options, and new GUI debugging capability

- Runtime Library Services (RTLS)

Server Integration Initiative

The goal of this initiative is to assist S/390 customers to realize better and have easier access and control of their enterprise computer resources. S/390 and OS/390 continue to provide new improvements so that customers have capabilities to consolidate workloads to S/390 while having better systems management, security, availability, scalability, and overall control of critical business data. Upgrades to OS/390 Version 2 Release 4 in support of this initiative's goals include:

Consolidation

- DCE base services enhancements
- New DCE Application Support (DCE AS) functions for OS/390
- New LDAP Client Support

Systems Management and Security

- Security Server enhancements for:

  – DB2 support
  – Digital certificates
  – Program control by system ID
  – RACF™ administration
    -- Password history and Default OMVS segments
  – DCE Security Server DB2 based-registry

- HCM — new optional feature of OS/390

  – Support for Import and Export of configuration data

- RMF enhancements for:

  – WLM
  – Overall reporting (for example, dataset level and cache enhancements)
  – Performance monitoring
  – Support for TCP/IP and Network Computing

- SDSF support for WLM Batch Management

Business Process Automation and Distributed Transaction Processing

- Transaction processing extensions to OS/390
- Encina Toolkit Executive ported to OS/390

Business Intelligence Initiative

The goal of this initiative is to have S/390 deliver end-to-end solutions that include the business applications, required tools and utilities, and the database server. Along with these entities, IBM will provide the services to help customers implement their solution quickly and successfully. OS/390 Version 2 Release 4, in support of this initiative, delivers:

- Enhancements to WLM to support data mining in a sysplex
- OS/390 UNIX System Services Parallel Edition, a new component which includes:

  - A Message Passing Interface (MPI)
  - A Parallel Operating Environment (POE)

  With this component, parallel applications on OS/390, such as Intelligent Miner™ for parallel data mining, can now invoke these new UNIX services for inter-process communication. This inter-process communication is achieved by using High Performance Data Transfer protocol (HPDT) for User Datagram Protocol (UDP).

Technology Leadership Initiative

This initiative's goal is to deliver open, cost-effective enterprise servers. IBM continues to enhance S/390 and OS/390 architectures to better support Network Computing, new application workloads including improved support for UNIX applications, improved performance with reduced total cost to S/390 customers. OS/390 Version 2 Release 4 upgrades in support of this initiative's goals include:

- BCP Base enhancements to Dynamic Link Library, DASD Logger, and Standalone Dump performance
- WLM Base enhancements

  - Less disruptive policy activation
  - Control of system service classes
  - Adaptive resource management enhancements

- WLM Batch Management enhancements (fourth quarter 1997)

  - JES2 initiator address space management
  - JES2 resource affinity scheduling

- TSO/E enhancements for the Parallel Sysplex environment
- New DFSMS/MVS V1.4 functions for OS/390 including Program Management enhancements
- JES3 enhancements

  - 64K job number support
  - Configuration improvement
    -- Dynamic update support
    -- HOTSTART with REFRESH
    -- Faster restart

- New Softcopy Print support for DBCS languages

OS/390 Version 2 Release 5 Overview

Network Computing Initiative

Upgrades in OS/390 Version 2 Release 5 in support of the Network Computing initiative will include:

- Domino Go Webserver 4.6.1
- New enterprise-class TCP/IP service for OS/390 applications
- A new Telnet server will provide "TN3270E" and more
- DNS with WLM capability fully integrated into CS OS/390
- Full Dynamic IP support automates registration of clients to DNS
- Native ATM support for TCP/IP

Application Enablement Initiative

Upgrades in OS/390 Version 2 Release 5 in support of the Application Enablement Initiative will include:

- Component Broker for OS/390 (Beta level)
- OS/390 Application Enabling Technology™

  - Domino Go Webserver support
  - IBM Network Station support

- High Level Assembler Toolkit enhancements
- ISPF

  - Web access to ISPF applications
    -- Java™ workstation agent applet for ISPF Client/Server
    -- ISPF application server
  - Customized VisualAge® workstation composition editor to create/modify ISPF panels
  - Performance improvements

Server Integration Initiative

Upgrades in OS/390 Version 2 Release 5 in support of the Server Integration initiative will include:

Consolidation

- DCE Base services enhancements

  - Kerberos Version 5 and performance improvement

- DCE Distributed File Service enhancements

Systems Management and Security

- DCE Security Server enhancements — Kerberos Version 5
- Firewall Technologies functions
- HCD configuration enhancements
- Numerous SMP/E enhancements

Distributed Transaction Processing

- Transaction processing extensions

Year 2000

This product is Year 2000 Ready. When used in accordance with its associated documentation, it is capable of correctly processing, providing, and/or

receiving date data within and between the twentieth and twenty-first centuries, provided all other products, (for example, software, hardware, and firmware) used with the product properly exchange date data with it.

OS/390, beginning with Version 1 Release 2 (5645-001), is certified as a Year 2000 ready operating system by ITAA Services, Inc. (Information Technology Association of America).

Product Positioning

OS/390 continues to be well-received throughout the industry. Customers who are building their IT infrastructure on OS/390 demand more new and far-reaching function from IBM. To deliver this function, IBM has significantly increased the investment in OS/390. OS/390 Version 2 is enhanced with significant value-based function, beginning with delivery of OS/390 Version 2 Release 4 in September 1997. Version 2 will continue to be priced-to-value.

The new version takes the next steps in delivering on the S/390 strategic initiatives of network computing, application enablement, server integration and consolidation, and business intelligence. OS/390 Version 2 provides significant new technology and exclusive function. In Release 4, this includes: Integrated Cryptographic Support Facility, Encina Toolkit Executive, DCE Application Support, NetQuestion Search Engine, IBM BookManager BookServer for World Wide Web, and Hardware Configuration Manager (HCM). Release 5 includes integrated Firewall Technologies, significant enhancements to the eNetwork Communications Server, and the beta level of Component Broker for OS/390. It is IBM's intention to ship a new release every six months, as was done with Version 1.

Statement of General Direction

Tivoli® TME 10™ Support

It is IBM's intention to extend OS/390's Enterprise Systems Management capabilities. The integration of Tivoli's TME 10 Framework with OS/390 is the base for TME™ applications to provide Enterprise Systems Management from OS/390. Tivoli TME 10 is IBM's strategic network, systems, and application management solution and replaces SystemView®. TME 10 is based on an open, architected, object-oriented framework and provides an end-to-end, cross-system solution for managing network computing environments.

Tivoli support for S/390 will be delivered in three phases. Phase 1 was the delivery of a significant new release of TME 10 Netview for OS/390 and the Management Integration Services as part of the TME 10 Global Enterprise Manager™ in March 1997. Phase 2 will provide support for OS/390 as an endpoint for several TME 10 applications such as Security Management, User Administration, and the TME 10 management modules for key applications such as SAP R/3, MQ™ Series, and Domino/Notes™. Phase 3 will offer formal support for OS/390 as the enterprise managing server for selected TME 10 applications, such as TME 10 Software Distribution, TME 10 Inventory, TME 10 User Administration, and TME 10 Security Management. Over time, many existing S/390 systems management applications will be enhanced to exploit the TME 10 framework and applications, such as the enhancements delivered in June 1997 for System Automation for OS/390 (SA OS/390) support, that enables a TME administrator to monitor and manage enterprise-wide events, including the SA OS/390 specific events, from the TME 10 Enterprise Console.

OS/390 Security Server

It is IBM's intention to expand the OS/390 Security Server in OS/390 Version 2 to provide Lightweight Directory Access Protocol (LDAP) server support.

The LDAP server support will provide a new Directory Service on OS/390 based on the popular, emerging LDAP protocol, which will allow clients, including OS/390 Version 2 Release 4 LDAP clients, to be able to search, extract, add, and delete information from an LDAP server running on OS/390. By supporting the LDAP protocol, directory information stored in an LDAP server on OS/390 can be accessed throughout the enterprise. The OS/390 LDAP server will complement the recently announced DSSeries LDAP Server as well as enable enterprise-wide server integration on S/390.

ServerPac Installation Enhancements

IBM will continue to enhance the OS/390 installation process in future releases. ServerPac plans include an alternative to full system replacement and continued improvements to ServerPac documentation. Customers can also expect new information to support installation planning, and a simplified post-installation process.

Novell for OS/390

IBM and Novell, Inc., are in agreement to provide the Novell Directory Services (NDS) and NetWare File and Print services on OS/390. It is IBM's intent to begin delivering NDS in OS/390 Version 2. The Netware File and Print Services will be delivered on OS/390 in the future. These functions will reduce complexity of managing networks and lower costs in businesses with multiple enterprise server and LAN systems.

The above statements represent IBM's current intended plans. IBM will continue to monitor business conditions and requirements and may make changes to these plans as required.

Education Support

The appropriate curriculum will be updated, as necessary, to include the enhancements in this announcement. Details of the education support will be provided by product availability through a separate Education Announcement. Descriptions of all classroom and self-study courses are contained in the Catalog of IBM Education (G320-1244).

New offerings available (may vary by country) will include:

- Introduction to OS/390 — designed for the person new to OS/390

- Transition from MVS/ESA to OS/390 — designed for the experienced MVS systems programmer and subsystem administrators

- OS/390 Installation — designed for the experienced MVS person

Contact your local education coordinator for detailed availability and schedule information.

- U.S. Customers: Call 800-IBM-TEACH (426-8322)

- World Wide Web:

    http://www.training.ibm.com/usedu

Call IBM Education and Training at 800-IBM-TEACH (426-8322) for education catalogs, schedules, and enrollments.

Reference Information

Refer to Software Announcement 297-194, dated June 9, 1997.

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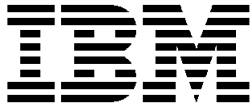
OS/390 Version 2 Release 4 Function Description

Network Computing Initiative

This initiative's goal is to continue the evolution of S/390® as the platform of choice for highly available, scalable and secure e-business. This evolution, for OS/390™ Version 2 Release 4, includes:

Domino™ Go Webserver 4.6 for OS/390: Domino Go Webserver (formerly called Lotus® Go Webserver) is defined by the IBM Network Computing Framework as a scalable, high-performance Web server including state-of-the art security, site indexing capabilities and advanced server statistics. It includes the function of the Internet Connection Secure Server, NetQuestion, and Web Usage Mining. OS/390 Version 2 Release 4 integrates all the components as part of the base product.

ICSS Version 2 Release 2, which is now integrated as a component of Domino Go WebServer 4.6 for OS/390, is IBM's premier Web server for business-critical electronic commerce. The S/390 platform affords the capability of large numbers of concurrent connections with dynamic management of workload response based upon customer installation policy.

The following key enhancements are included in this release:

- Exploitation of OS/390 Workload Manager (WLM) for policy-driven Web request serving

- HTTP 1.1 compliance

- Support for Java™ Common Gateway Interface (JGI), allowing for the development and execution of Java based applications

- Access to OS/390 sequential and partitioned data

- Security enhancements including Access Control List (ACL) enhancements, SSL Version 3, and exploitation of hardware cryptography (when installed)

- Console Command

  Additional OS/390 Console Support allows the server administrator to shut down the Internet Connection Secure Server in an orderly manner and use the OS/390 Modify Command to pass requests to the server. An example of this would be turning debug ON or OFF.

- SMF

  The Internet Connection Secure Server 2.2 writes two types of data to the OS/390 System Management Facilities (SMF) logs. At start-up configuration, data is written and, at intervals specified by the customer, performance information is written during operation.

- Web Usage Mining

  Web Usage Mining provides user-based statistics on path traversal, session data, and grouped pages per session. This capability "piggy-backs" on the Enhanced Logging and Reporting. Web Usage Mining might be used to help organize a Web site more efficiently, determine the relative value of pages, and target marketing based on page groupings.

- Support for DES encryption

  With the North America Secure feature, maximum encryption is DES 128-bit, and with the World Trade Secure feature, the maximum encryption is DES 56-bit.

- Path length reduction, throughput enhancements and other performance related improvements as compared to prior releases

NetQuestion is a powerful full-text search service that can be used globally, as a World Wide Web resource, or internally on a private intranet. It is designed and optimized to handle the large amount of information that is typically stored in Web sites. NetQuestion supports the full spectrum of Boolean search logic and free text search and also includes proximity search, phrase search, and front-middle-end masking of search terms. It offers sophisticated lexical affinities based ranking for free text and hybrid queries (probabilistic search). NetQuestion can also detect misspellings in documents and expand search requests accordingly. NetQuestion's abilities have made it IBM's choice for its corporate home page as well as the choice for more than 1,500 IBM intranet servers. IBM NetQuestion for OS/390 is integrated in the OS/390 Version 2 Release 4 base.

Customers who have committed themselves to OS/390 as the platform for highly secure, scalable transaction processing have their investment protected on this platform as they evolve into the dynamic world of e-business.

eNetwork Communications Server for OS/390 Version 2 Release 4 — An Enterprise Class Solution for e-Business Networking: IBM eNetwork Software is part of the IBM Network Computing Framework for e-Business. Providing leading-edge TCP/IP solutions and next-generation Advanced Peer-to-Peer Networking® (APPN®) and High Performance Routing (HPR) technology, eNetwork Communications Server for OS/390 (CS OS/390) provides the essential infrastructure for e-Business networks by delivering:

- Enterprise-class dependability
- End-to-end universal access
- Easy implementation and use
- Effective utilization of network assets

Among the significant improvements in CS OS/390 Version 2 Release 4 are:

- A new TCP/IP stack, for applications using OS/390 UNIX® System Services (formerly called OpenEdition®) sockets, added for substantially improved performance, reliability, and scalability (for example, S/390 Web serving nearly 4X previous capacity)

- New Domain Name Server (DNS) enabled for Parallel Sysplex™ WLM allows TCP/IP sysplex users to enjoy the benefits of WLM

- Easy access to host applications from Java-enabled Web Browser (Host on Demand for S/390)

- Greater performance and usability for CICS® Sockets users

- IMS™ Open Transaction Manager Access (OTMA) added for easier access to IMS applications from a TCP/IP IMS client

- Support for IBM Network Station with S/390 as server

- Routing Information Protocol Version 2 (RIPv2) improves routing around network failures and reduces network overhead and maintenance

- High Performance Routing (HPR) performance and high availability benefits extend to devices using the External Communications Adapter (XCA) interface (for example, OSA-2, 2216, 3746 MAE, and 3172)

- High Performance Data Transfer (HPDT) benefits extend to VTAM® Record API (RAPI)-based applications such as CICS and IMS

- Performance improvements added for SAP R/3 applications communicating over TCP/IP connections with S/390 DB2® Server (refer to HPDT for UDP)

- Performance and usability improved for APPN, HPR, and SNA subarea

New High Performance TCP/IP Stack for OS/390 UNIX System Services: CS OS/390 adds a new, completely redesigned TCP/IP stack, which exploits native OS/390 services and multiprocessing capability, for significantly improved performance, reliability, availability, serviceability, and scalability.

IBM tests comparing the new and old stacks running IBM Internet Connection Secure Server (ICSS) show Web server capacity on S/390 improved to nearly four times as many connections per second. The level of improvement for other OS/390 UNIX System Services applications is dependent on their individual design and code characteristics. However, all applications written to OS/390 UNIX System Services sockets are expected to experience improved performance with the new stack.

Exploiting S/390 multiprocessing, the new stack provides a nearly 1:1 return in throughput for added processors — providing outstanding scalability for growing networks.

Interim to Version 2 Release 5 availability, IP stack support for applications not running on OS/390 UNIX System Services will continue to be provided by the TCP/IP Version 3 Release 2 function of CS OS/390 Version 2 Release 4. Both stacks can run concurrently on the same MVS® image.

New Domain Name Server (DNS) Exploits Sysplex Workload Manager (WLM): DNS/WLM provides intelligent sysplex distribution of requests through cooperation between WLM and the DNS server. For customers that elect to place a DNS in an OS/390 sysplex, DNS will invoke WLM sysplex routing services to determine the "best" system to service a given client request. This provides functional equivalence with VTAM Generic Resources support that is currently available for SNA networks in the Parallel Sysplex environment.

Though this new DNS will be an integral part of Version 2 Release 5, it is being made available early to Version 2 Release 4 users as a separately ordered, no-charge kit. Refer to the **Ordering Information** section for specific feature numbers.

At general availability of Version 2 Release 4, TN3270, DB2, and the TCP/IP V3R2 stack will register with WLM. Additional stacks and servers will exploit WLM in the Version 2 Release 5 time frame.

Easy Access to Host Applications from a Java-Enabled Web Browser: Host On-Demand (HOD) is a Java-based solution that incorporates industry-standard Telnet 3270 (TN3270) protocols to allow any JAVA-enabled Web browser (for example, Netscape) user to quickly and easily connect, "on-demand," to an OS/390 3270 host application.

The value of centralized host information is maximized by extending access to many more users. Access is as simple as pointing and clicking on an SNA application hot link from within the user's Java-enabled Web browser. No programming or additional hardware is required.

Additional information about Host On-Demand can be found on the following URLs:

http://www.raleigh.ibm.com/hex/hexprod_en.html

http://www.networking.ibm.com/enetwork/ ondemand/hod.html

Improved TCP/IP CICS Sockets Services: TCP/IP CICS Sockets, an integrated function of CS OS/390, has improved performance and usability. Among the key enhancements are:

- The tasking mechanism has been changed to significantly reduce the path length.

- The listener has been redesigned, providing the choice of running more than one listener, no listener, or writing a customized listener. There are a number of new specifiable options for the listener, such as backlog, number of in-process connections, timeout values, translation options, and length of the initial message and statistical information to provide more programming flexibility using CICS Sockets services.

- Configuration information is now stored in a configuration dataset which is modifiable via a transaction. New operational transactions for startup and shutdown are modeled after the CICS Master Terminal transaction.

- Initialization and termination can now be initiated via PLT processing, invoking the operational transaction, or a CICS LINK to the initialization/termination module.

National Language Support (NLS) for messages has also been added.

Support for the IMS Open Transaction Manager Access (OTMA): OTMA provides IMS TCP/IP clients access to host IMS applications without modifying the applications. Both RACF™ and MSC transactions are supported. The TCP/IP client GIVESOCKET/TAKESOCKET logic is eliminated, improving performance and reliability.

IBM Network Station Support: The IBM Network Station is a compact desktop network computer that offers low-cost network computing. The software is stored on the server and downloaded when the IBM Network Station is powered on or when the user activates new functions. Because the software is stored on the server, it is easy to manage and updated from the central site —potentially reducing support costs for client workstations. CS OS/390 support for IBM Network Station includes the following:

Network Station Client: Provides the base operating system for the Network Station (kernel), 5250 and 3270 terminal emulators, and the Java virtual machine.

Network Station Manager for OS/390 includes:

- Management and retrieval of terminal applications and user preferences so that each user can tailor the Network Station capabilities rather than using a common configuration set up by the administrator.

- Enhanced TFTP provides the basic capability needed to download to IBM Network Station.

- BootP establishes the connection between the client and the server which enables a client to boot from the network.

- Dynamic Host Configuration Protocol (DHCP) extends the capability provided with BootP by providing for reusable IP addresses and the ability to support client specific configuration options.

- TimeD provides the capability to set the time for the IBM Network Station from the server.

Additional information about the IBM Network Station is available at the following URL:

http://www.internet.ibm.com/networkstation/

Routing Information Protocol V2 Enhances Routing and Availability: RIPv2 for RouteD and NCPROUTE applications provides multicasting which improves performance by reducing the network load produced by broadcasting routing information. Variable-length subnet masks and supernetting improve usability and maintenance by allowing smaller routing tables. Dynamic reconfiguration of interfaces and automatic clearing of IP routing tables have been added to RouteD to improve usability. RIPv2 improves availability by allowing users to more efficiently route around network failures. RIPv2 is supported for the original stack (TCP/IP 3.2) in Version 2 Release 4. It will be provided for the new stack in Version 2 Release 5.

HPDT MPC (MPC+) Adds Multiprotocol and Improved IP-IP Performance: High Performance Data Transfer (HPDT) MultiPath Channel (MPC), also referred to as MPC+, adds IP-IP support for improved performance of TCP/IP connections. It provides significantly improved channel utilization and fewer data copies, resulting in overall better communications throughput.

Originally for HPR connections only, now IP-IP connections benefit from HPDT MPC (MPC+) for traffic between HPDT MPC (MPC+)-capable devices such as S/390 OSA-2, 2216, and 3746/950 MAE.

Furthermore, HPDT MPC allows IP and HPR traffic to share the same set of channels, potentially reducing hardware costs in mixed SNA and IP network environments.

TCP/IP Capitalizes on XCF in S/390 Parallel Sysplex Configuration: CS OS/390 Version 2 Release 4 allows IP to IP communications via the Cross Coupling Facility (XCF) in a Parallel Sysplex configuration. Also, XCF IP support allows IP and HPR traffic to share the same set of channels, potentially reducing hardware costs in mixed SNA and IP network environments.

HPR for External Communications Adapter (XCA): External Communications Adapter (XCA) is the means that CS OS/390 uses to connect to LAN-attached devices in APPN/SNA networks. High Performance Routing (HPR) is the way that APPN provides for improved availability through nondisruptive network connections.

CS OS/390 now allows APPN/HPR routes to be established over XCA connections. As a result, both throughput and performance for LAN devices are improved. Devices that can take advantage of HPR for XCA are OSA-2, 2216, 3746 MAE, and 3172. Initial testing indicates throughput will be increased significantly as a result of this enhancement.

HPDT Services for Record API (RAPI): To better capitalize on high-speed networking, the existing HPDT services capability in CS OS/390 Version 2 Release 4 is extended to include applications written to the VTAM RAPI. This capability has previously been available to applications written in VTAM/APPC. HPDT improves performance particularly for applications that transfer larger data objects and *no changes to the application are required*.

Performance improvements are achieved through the use of HPDT communications storage manager, reduction in the number of data moves, and exploitation of HPDT MPC (also known as MPC+) technology. HPDT services reduce CPU utilization for a given workload and increase throughput. These performance improvements scale up as message size increases.

HPDT UDP Improves Performance for SAP R/3 Accessing DB2 on S/390: This extends the efficiencies of HPDT services to applications using OS/390 UNIX System Services UDP interface. HPDT reduces CPU cycle consumption and achieves a more efficient transfer of data. Currently the support is exploiting communications between DB2 on the S/390 and SAP R/3 application servers on AIX® or NT.

UDP traffic can use HPDT services over ESCON® or OSA-2 FDDI connections. For OSA-2 connections, the attached node can be any device supporting standard TCP/IP communications over a FDDI LAN. For ESCON connections, the attached node can be AIX or OS/390.

Additional Enhancements for SNA, APPN, and HPR

- CS OS/390 Version 2 Release 4 VTAM function reduces definitions for switched resources in a network with multiple VTAMs. CS OS/390 locates the active LU after a dial to a connectable LU fails. CDRSC definitions for the switched LUs are no longer required in every VTAM to assure a session can be established.

- CS OS/390 VTAM function now detects certain channel or device problems that previously were not detected. VTAM generates a nominal channel program if no other I/O has been sent in the past minute. This allows VTAM to detect the error and INOP the device and attempt recovery.

- A new VTAM function can help reduce line charges in situations where a switched connection is established but the LU-LU session fails. VTAM will now disconnect if an LU-LU session is not established within a period of time.

- VTAM message IST605I provides enhanced diagnostic information to help clarify the nature and cause of the problem without further documentation. Additional messages will be provided along with IST605I to clarify the error information.

- A new VTAM function enables the user to filter certain Session Awareness data in VTAM and not have it be passed to a network management application for processing.

Refer to the **Preview** section of Software Announcement 297-040, dated March 11, 1997, for more about CS OS/390 Version 2 Release 4.

Information about IBM eNetwork Communications Servers can also be found at the following URLs:

>**http://www.networking.ibm.com/cms/commserv.html**

>**http://www.networking.ibm.com/cms/cs3abt.html**

Performance information is available at the following URLs:

>**http://www.networking.ibm.com/tcm/tcmperf.html**

>**http://www.networking.ibm.com/vta/vtaperf.html**

ICSF/MVS Version 2.1: ICSF/MVS Version 2.1 provides the software interface to the hardware Cryptographic Coprocessor Feature on the S/390 Parallel Enterprise Server™ ─ Generation 3 or 4, or the S/390 Multiprise 2000 models. This enhanced software provides Application Programming Interfaces for a variety of cryptographic functions for data integrity and digital signature. Business applications can use ICSF/MVS Version 2.1 to provide the higher levels of security to both in-house and networked business information. Whether the application is EDI, e-commerce, or simply interfaces with the Internet, the data that supports the business can have the protection you need.

The software adheres to all the current standards and requirements of the previous releases. The current exploiters, SDM and CONNEX, are joined by the BSAFE Toolkit, a widely licensed product of RSA DSI, Inc. These products use the Common Cryptographic Architecture APIs used by ICSF/MVS Version 2.1 for the activation of cryptographic processes.

Some of the additional features and options available with ICSF/MVS Version 2.1 include:

Trusted Key Entry (TKE): The previous key entry unit for master keys has been replaced by a secure channel version implemented on a workstation known as the Trusted Key Entry unit, or TKE. Master Key entry can be performed in one of three ways. First, through the use of this TKE unit using a logically secure channel. A second method is to enter master keys in the clear (in parts) using an enhanced set of ISPF panels. The third method is to generate master keys from a user-supplied passphrase.

The security of the TKE is considered equal or superior to the previous key entry unit, and the usability is greatly enhanced. It will be possible for a single workstation to set up master keys in all cryptographic processors within an enterprise with no manual intervention. In particular, the same can be done in the event of an error.

The TKE Workstation is an optional cost feature and may be ordered as three different feature numbers based on a customers requirements. In addition to entering master keys, it also provides support for the loading of key encrypting keys, Personal Identification Number (PIN) protect keys, PIN generation, and PIN verification keys.

Commercial Data Masking Facility (CDMF): Support for privacy functions is provided by CDMF. The interface to CDMF functions can be transparent to existing users of ICSF/MVS Version 2.1 privacy functions, including users of PCF/CUSP compatibility macros. In particular, no changes are anticipated for VTAM SLE users of CDMF privacy functions.

ICSF/MVS Version 2.1 CDMF support is structured so that an application developed to provide DES privacy function can also support an exportable CDMF environment. The application interfaces can be identical.

Public Key API (PKA Support): ICSF/MVS Version 2.1 is structured to support additional formatting or message digest standards in an easy way. The ICSF/MVS Version 2.1 PKA support includes the following:

- ICSF/MVS Version 2.1 provides CALLable services to generate and verify digital signatures using RSA and DSS.

- ICSF/MVS Version 2.1 provides CALLable services to generate a DES DATA key encrypted both under an RSA public key and under the host master key for protection while in transit. CALLable services are also supplied to import (receive) or export (transmit) a DES DATA key encrypted under a RSA public key.

- A variety of formatting algorithms (ISO9796, PKCS 1.1, and PKCS 1.2) and hash algorithms (SHA1 and MD5) are provided. ICSF/MVS Version 2.1 provides support for ANSI, ISO, and for PKCS from RSA Data Security, Inc., formatting standards.

- ICSF/MVS Version 2.1 provides a CALLable service that imports a clear RSA private key, or an RSA or DSS private key encrypted under a CCA DES importer KEK.

- ICSF/MVS Version 2.1 provides the capability to securely receive RSA PKA keys from TSS. The TSS family of products is being enhanced to provide secure generation of RSA keys and secure transfer of the keys to ICSF.

- ICSF/MVS Version 2.1 provides a CALLable service that generates a DSS private key encrypted under a host Master Key.

Note: ICSF/MVS Version 2.1 requires the Cryptographic Coprocessor Feature. This product can be used with written applications that manipulate business data having critical data privacy issues or that require some level of authenticity and/or indication of data integrity. ICSF can also be used in applications that provide EDI functions crucial to the business or electronic delivery of data having legal implications, as well as Internet and e-commerce applications.

For additional information on ICSF/MVS Version 2.1, refer to Software Announcement 296-341, dated September 10, 1996.

BookManager® BookServer for World Wide Web for MVS/ESA™, Version 2.1: This product has been integrated as a new base element of OS/390 Version 2 Release 4. BookManager BookServer makes IBM electronic documents, created with BookManager Build, available on the Web. BookManager BookServer has enormous strengths, particularly for companies that want to publish their softcopy material on the Web or on intranets to large numbers of users. Large volumes of existing information can be moved quickly to the Web because BookManager BookServer does not require a prior HTML conversion step. Instead, the program translates the information to HTML on the fly, topic by topic, as it is requested by the user. Further, users can access the softcopy information with any Web browser and without the need for any additional software such as plug-in viewers. Finally, BookManager BookServer preserves most of the same navigational and search advantages of the BookManager READ products while leveraging the capabilities of existing browser technology.

To learn more about IBM BookManager BookServer for World Wide Web for MVS/ESA, refer to Software Announcement 297-046, dated March 11, 1997.

IP Forwarding on the ATM S/390 Open Systems Adapter 2: Asynchronous Transfer Mode (ATM) IP Forwarding on the ATM S/390 Open Systems Adapter 2 (OSA-2) feature can provide faster, less expensive network access to data in an OS/390 or MVS/ESA TCP/IP environment.

Application Enablement Initiative

The primary goal of this initiative is to enhance customer use of the S/390 by fostering the movement of attractive new applications to this platform while expanding the platform's support for the growth required by existing applications. Application Enablement upgrades include:

OS/390 UNIX System Services Enhancements: OS/390 Version 2 Release 4 provides new enhancements for OS/390 UNIX System Services which include:

- File Caching

  This new capability allows selected files to be cached in virtual storage. Expected performance benefits are reduced path length, multiple concurrent users and faster access for frequently used read-only files. Many files that are read-only and are accessed with high frequency, such as C header files, should benefit. Internet and intranet applications benefit because numerous files are frequently accessed but rarely updated.

- OS/390 UNIX System Services fork and spawn performance

  The WLM, instead of APPC, is called to create and schedule work for fork and spawn callable services. Performance may improve and goal-oriented WLM services are used for resource control.

- File System Converged Sockets

  With OS/390 Version 2 Release 4, all the sockets CALLable services are enabled for SRB mode callers and the asyncio callable service is extended to support asynchronous I/O for general users. The objective is to improve programmer efficiency when they use the OS/390 UNIX System Services converged sockets.

- Tailored Dump Exploitation

  The OS/390 UNIX System Services CTRACE is now automatically added to system dumps when needed. This enhancement improves debugging effort for programmers who solve problems that involve non-UNIX services programs that call and use OS/390 UNIX System Services functions.

- Extended Locations for Executable Files

  OS/390 UNIX System Services now allows HFS executable files to be marked as able to run APF authorized or as program controlled executable. An extended file attribute is available to prevent newly spawned processes from running in a shared address space. This enhancement benefits programmers by giving them more flexibility because they can now store their programs in the HFS file system.

- High Performance Data Transfer (HPDT) for User Datagram Protocol (UDP)

  HPDT for UDP extends the existing HPDT services introduced in VTAM Version 4 Release 4 to now include support for applications that exploit the UDP of the TCP/IP protocol suite. HPDT UDP significantly reduces CPU cycle consumption, while providing fully compliant XPG4.2 interfaces. HPDT UDP is initially targeted for communications between DB2 on a OS/390, and SAP R/3 application servers residing on AIX or NT. Other UNIX System Services socket applications using UDP, such as NFS and DCE, can also transparently take advantage of HPDT UDP services, assuming they access the network through a high-bandwidth HPDT UDP configuration.

  Two HPDT UDP configurations are currently supported — OSA2 FDDI, and ESCON. For OSA2, the LAN-attached nodes can be any device that supports standard IP communications over an FDDI LAN. For ESCON connections, the attached node can be either AIX or another OS/390.

- OS/390 UNIX System Services Kernel Performance Enhancements

  The syscall entry/exit linkage for high-frequency calls to the kernel has been reduced by approximately 80%.

- UMASK/CMD Scalable Web Server Support

  This function enhancement enables the invoker to dynamically assign process and address space level attributes to the environment where the spawned program image runs.

Language Environment® (LE)

- LE Enabling Support for Contents

  This RAS improvement in OS/390 Version 2 Release 4 provides a new function called run-time library services (RTLS). This function allows customers to use multiple levels of the LE run-time library during application execution. Customers will no longer need to STEPLIB and maintain their JCL to access different levels of LE run-time libraries. Instead, with the use of new system parameters (PARMLIB) and new run-time options, customers can dynamically control which level of LE run-time libraries are to be used on an individual application basis. This function also provides an alternative to placing the LE run-time library in the linklist concatenation.

- Serviceability Improvements

  New IPCS routines help programmers by reducing the amount of effort that was formally required to debug their applications. Expanded CEEDUMP formatting reduces the need for problem recreation during the debugging cycle.

- Performance Enhancements

  LE storage utilization enhancements reduces the overall application path length.

C/C++: The C/C++ feature of OS/390 Version 2 Release 4 includes the following enhancements:

- Performance improvements in the handling of Dynamic Link Libraries (DLLs)

  DLLs can be used to split applications into smaller modules and improve system memory usage. DLLs also offer more flexibility for building, packaging, and re-distributing applications.

- A new option for changing the assumed codepage for character string literals

  With this option, literal source program character strings can automatically be converted to a specified codepage. For example, programmer-supplied EBCDIC literals can be converted, at compile time, to ASCII for use with ASCII clients.

- Enhancements to procedures and REXX execs to take advantage of the new facilities offered in OS/390 Version 2 Release 4 by the DFSMS/MVSdfp Program Management Binder (Binder)

  The Binder combines object modules, load modules, or program objects comprising a C/C++ application and produces a single program object that can then be loaded for execution. Longname usability has also been improved. Longnames appear in the binder maps allowing for full cross-referencing.

- The introduction of a graphical, interactive source level C/C++ Remote Debugger

  The Remote Debugger includes a graphical interface that provides developers with remote access to debugger support from a workstation. OS/390 C/C++ customers will have an opportunity to evaluate this function on a trial basis. For additional details and registration information, visit the Web site located at:

  http://www.ibm.software.com/ad/c370

- The introduction of a C/C++ Performance Analyzer

  The Performance Analyzer is a tool that helps users profile their applications to aid in understanding and improving the performance of their programs. This tool traces the execution of a program on the host and creates a trace file. The trace file contains data that can be displayed in diagrams on a workstation to assist the user in performance tuning, examining occurrences that produce faults and in general, understanding what happens when a program runs.

  This graphical interface provides users with remote access to profiling support from a workstation. OS/390 C/C++ customers will have an opportunity to evaluate this function on a trial basis. For additional details and registration information, visit the Web site located at:

  http://www.ibm.software.com/ad/c370

The C/C++ compiler no longer supports Interface Definition Language (IDL) generation through the IDL compile-time option. This option instructed the compiler to generate IDL, which is required for mixed-language or distributed object applications. If you continue to require IDL for your applications, new IDL or IDL modifications must be coded by hand.

Support for the Database Access Class Library Utility has been removed.

Server Integration Initiative

Distributed, client/server customers are realizing that along with benefits of ease of access of information come problems of systems management, security, availability, and scalability. These problems are being solved by the market trend called many different names — "server consolidation," "server re-integration," "centralization," and "server integration." In order to address the entire problem, IBM is focusing on an integrated approach, Server Integration, to provide the customer with an efficient, integrated global enterprise to help reduce computing costs and to help gain control over data and application integrity.

The S/390 Server Integration strategy is two-fold:

1. Re-host work to S/390 to achieve consolidation of servers and workloads

   and

2. Interoperate with IBM, UNIX, and NT platforms to achieve enterprise data/application access and global enterprise.

To achieve these objectives, S/390 Server Integration encompasses:

1. Consolidation of servers and server locations — customers need to reduce the complexity of their server network by reducing the number of physical locations and the number of servers. S/390 provides an open platform for centralizing workload for gains in cost and operations efficiency, security, availability, and scalability.

2. Systems Management and Security — customers require an end-to-end view of their enterprise infrastructure to achieve better control over their resources and applications. To manage this infrastructure, System Management and Security products must provide that end-to-end view capable of managing the disciplines of deployment, administration, security, and distribution.

3. Business Process Automation with Distributed Transaction Processing — customers can further exploit cost-effective measures by integrating existing core applications, new applications, and data throughout the enterprise. Instead of rewriting or re-engineering vital, core applications, S/390 provides the capability to define automated business processes that execute applications/data from anywhere in the enterprise through distributed transaction processing.

Consolidation

Distributed Computing Environment (DCE): The DCE base services are based on the DCE technology, an integrated set of open, industry-leading, distributed computing technologies licensed from **The Open Group**. DCE currently consists of a base set of services, including security and directory services, and a distributed file system component.

DCE Base Services: With OS/390 Version 2 Release 4, UNIX System Services DCE Base Services is introducing a Cell Directory Server on OS/390. Customers now have a complete set of DCE services at their disposal on OS/390. This helps to reduce the number of systems requiring administration and reduces administrative cost. Further, OS/390 customers have the option of keeping all their critical DCE cell servers on the OS/390 platform. This is important for customers who want to run middle-tier support servers on their S/390.

Statement of Direction Update: Availability of the aforementioned OS/390 DCE Cell Directory Server satisfies the OS/390 DCE Cell Directory Server Statement of Direction in Software Announcement 296-339, dated September 10, 1996.

OS/390 UNIX System Services DCE Base Services will provide the following additional support and enhancements in OS/390 Version 2 Release 4:

- Exploitation of current C/C++ compiler features and optimization is provided by DCE, while allowing existing customer applications to run without modification.

- Improvements to the reliability, availability, and serviceability characteristics of DCE have been made. One example, is enhancements to the error-checking code which improves the user's ability to determine what actions are required in the event of a problem.

- Performance Improvements

  Several performance improvements were completed for DCE in OS/390 Version 2 Release 4. These changes address response time, uniprocessor (UP) throughput, multiprocessor (MP) scalability, and resource consumption for a variety of environments. Response time for RPCs using the TCP protocol was improved by removal of a wait. UP throughput and processor consumption were improved by a number of path length reductions. MP scalability was improved by a reduction in lock contentions, a redistribution of thread priorities, and OS/390 UNIX System Services socket batching. The actual benefit will vary by workload and environment.

  Additional significant performance improvement is achieved by a variety of enhancements including, for example, reducing the path length of routines that convert data from ASCII to EBCDIC.

- The number of languages that are National Language Support (NLS) enabled is increased to 32. Messages are translated into Japanese. OSF DCE 1.1 Internationalization Support is activated in OS/390 DCE, which allows customers to write applications that contain clients that can interoperate with servers running in different locales. These NLS items make OS/390 UNIX System Services DCE more usable on an international scale.

- Parallel Sysplex system enablement is provided as a first step to allow clients to exploit DCE in a Parallel Sysplex system environment. Changes are made to the client runtime support so that applications can be developed that will run without change once server support is provided.

- Introduction of Hardware Crypto Support provides better performance over the current software encryption/decryption, if the ICSF software and Integrated Cryptographic Feature (ICRF) hardware are installed. This support allows DCE to take advantage of the hardware encryption/decryption function, and improved performance is realized, particularly when dealing with packets of greater than 60 bytes.

- Lightweight Directory Access Protocol (LDAP) Client Support introduced in this release.

  LDAP allows programs that run on OS/390 to enter and extract information into and from an LDAP Version 2 Directory Service on another platform.

Performance Improvements: Several performance improvements were completed for DCE in OS/390 Version 2 Release 4. These changes address response time, UP throughput, MP scalability, and resource consumption for a variety of environments. Response time for RPCs using the TCP protocol was improved by removal of a wait. UP throughput and processor consumption were improved by a number of path length reductions. MP scalability was improved by a reduction in lock contentions, a redistribution of thread priorities, and UNIX System Services socket batching. The actual benefit will vary by workload and environment.

Distributed Computing Environment Application Support (DCE AS): DCE Application Support (DEC AS) brings IMS and CICS into the open environment. It provides the ability to:

- Use existing IMS or CICS transaction programs with few changes

- Integrate IMS or CICS enterprise environments while preserving the company's investment in hardware and software

- Achieve portability of application development skills (programmers can still write programs in a familiar language)

- Reduce administration costs by exploiting DCE Directory Services and Security Services

DCE Application Support provides an easy path to enable customers to make IMS and CICS applications available to heterogeneous clients in the network. AS IMS Transactional RPC support extends IMS and OS/390 Recoverable Resource Management Services (RRMS) coordinated commit capabilities into the arena of distributed transaction processing.

Adding ENCINA® transactional RPC to AS IMS enables customers to coordinate IMS transaction processing with updates to other types of resources that Encina supports on other platforms, including XA-compliant databases.

New Function and Enhancements: DCE Application Support (AS) enables a Distributed Computing Environment (DCE) client application located anywhere in the DCE environment to access the resources of the Customer Information Control System (CICS) and the Information Management System (IMS) by using a DCE Remote Procedure Call (RPC).

In addition, an Encina client can now update IMS data using transactional RPC, due to the enablement of Encina-based two-phase commit protocols in OS/390.

Summary of Customer Value: The transactional RPC support provided by AS and the OS/390 Encina Toolkit Executive extends the reach of DCE applications to distributed applications containing IMS transactions that must be either completed successfully or backed out. This solution enables customers to incorporate OS/390 and their IMS transactions into their Encina transactions.

Additional enhancements have also been made to simplify the application development and administration processes; for example, C language programmers can now write extended Interface Definition Language (IDL) for AS applications using popular C syntax.

OS/390 LAN Services: OS/390 Version 2 Release 4 LAN Services includes both the OS/390 Version 2 Release 4 LANRES and the OS/390 Version 2 Release 4 LAN Server elements. OS/390 Version 2 Release 4 LAN Server has added a new feature, OS/2® File Level Permissions. OS/390 Version 2 Release 4 LANRES now supports Novell NetWare for SAA® 2.2.

File Level Permissions: The file level access permissions capability announced with this release provides customers added security for the data that is stored on the S/390 Server DASD. The security of the data is now at the same level as stored locally by the OS/2 LAN Server. This removes the security concern of not having file level access permissions.

Systems Management and Security

Security Server

RACF Support for DB2: The Security Server for OS/390 Version 2 Release 4 provides new function which gives customers the ability to control access to DB2 objects using RACF profiles. This function will be provided via a fully supported exit module called the RACF/DB2 External Security Module. For customers who choose to take advantage of this new support, the module is designed to receive control from the DB2 Access Control Authorization Exit point, a new function provided by DB2 for OS/390 Version 5. The benefits provided allow for the:

- Administration and auditing of access control from a single point of control

- Ability to define security rules before a DB2 object is created

- Ability to have security rules persist when a DB2 object is dropped

- Ability to control access to DB2 objects with generic profiles

- Flexibility to control access to DB2 objects for single or multiple subsystems with a single set of RACF profiles

- Ability to validate a userid before permitting it access to a DB2 object

- Elimination of DB2 cascading revoke

RACF Support For Digital Certificates: Currently, customers can access information on an OS/390 server via the Internet using the Domino Go Webserver for OS/390. It uses a digital certificate, which contains information that uniquely identifies the user (client), to authenticate the user. With OS/390 Version 2 Release 4, it will be possible for RACF to accept the digital certificate authenticated by ICSS without requiring a RACF userid and password for each client when Web pages are accessed.

Digital certificate security technology can uniquely and efficiently address problems of user and server authentication and data privacy that are encountered when designing Internet and Web server applications.

Program Control By System ID With RACF: In OS/390 Version 2 Release 4, the program control function of RACF has been enhanced so that program control by system ID is also possible. This function will allow installations to easily restrict access to programs by system image. A new keyword, WHEN(SYSID(..)) has been added to the PERMIT command so that users and groups can be added to a conditional access list. Installations will now have the ability, for instance, to restrict use of a licensed product to a single system image even in a sysplex environment where it could be difficult to isolate DASD or programs.

RACF Administration Enhancements:

- Password History Enhancement

  It will now be easier for installations to prevent end users from circumventing password history security policy. In OS/390 Version 2 Release 4, RACF will save an expired or revoked password in the password history list when the user's password is reset by an administrator. Using a SETROPTS option, installations can have RACF maintain a list of previously used passwords. Then when a user changes their password, RACF will check to make sure the proposed password is not the same as the current password or as one of the previously used passwords in the list.

- Support for Default OMVS Segment

  With OS/390 Version 2 Release 4, it will be possible for OS/390 UNIX System Services to be accessed without requiring the definition of an OMVS segment. Two new SETROPTS options (for UID and GID) are now available so that a default OMVS segment for users and groups can be implemented. This support will simplify migration of existing sockets applications to the OS/390 UNIX System Services environment and make it easier to exploit OS/390 UNIX System Services.

DCE Security Server DB2 Based Registry: In OS/390 Version 2 Release 4, a DB2-based security registry will be introduced for the DCE Security Server. This enhancement offers an optional replacement for both the in-storage registry and the HFS registry files. It will allow commit and backout of updates to the registry, transaction logging, and log recovery. Customers will be able to migrate an HFS registry to a DB2 registry and vice versa.

OS/390 Version 2 Release 4 Hardware Configuration Manager: With OS/390 Version 2 Release 4, HCM has been added to OS/390 as an optionally priced feature. HCM supports the definition of both logical and physical, hardware and OS/390 operating system configurations from a single graphical user interface. HCM, in conjunction with HCD, provides a rich set of graphical and text configuration reports that document the current system configuration. Because HCM is a client/server extension to HCD, it automatically updates the host HCD Input/Output Definition File (IODF).

The combination of both products provides the S/390 Hardware Configuration Solution for OS/390.

Enhancements in HCM for OS/390 Version 2 Release 4: With OS/390 Version 2 Release 4, HCM is enhanced by the following new function:

- Import and Export Facility

  The HCM Import and Export facility allows the exchange of data between non-HCM processes, applications and databases and HCM configuration data. The import and export data format, used by HCM, is designed to be compatible with relational databases. It is conceptually organized as tables, and the data exchange is done via data stored in tables as text files.

  With the **Import Data** function, existing physical configuration data of a non-HCM application can be used to update existing configuration data in HCM as well as to setup a new configuration file for HCM. Imported data overwrites existing HCM configuration data. In addition, import provides a method to build a configuration from the combination of a text file and an IODF.

  The import function performs the following types of actions:

  - Creating physical objects

  - If necessary, resynchronizing the PWS file and the IODF

  - Updating descriptive fields in both the PWS file and the IODF

  - Creating or changing physical and some logical connectivity

With the **Export Data** function, HCM work and production file configuration data is used with non-HCM applications and databases (for example, asset management). HCM configuration data can be stored in an external database to create reports that are tailored to one's needs. It is also possible to create a list of devices, including its VOLSERs.

RMF™ *Enhancements:* **WLM Support:** RMF has been enhanced to provide a detailed breakdown of response times for Batch workload, based on a new functionality introduced by Workload Manager and JES2 when running in an environment with WLM-managed initiator address spaces.

The Workload Activity reports for goal and compatibility mode now provide non-paging DASD I/O measurements that give feedback about I/O performance on a service class or performance group period level.

Data Set Level Reporting: As an extension of the current spectrum of resource oriented reports, RMF offers reporting of data set usage. This new capability is one of the key requirements of many RMF users to help them identify device problems on a data set level. Three new Monitor III reports provide information on how individual data sets on a specific device are being utilized. By using this data, the customer can easily identify data sets that should be moved to another device to avoid contentions or bottlenecks.

Cache Reporting Enhancements: Cache reporting has been enhanced by a new Subsystem Summary report that gives a one-page overview of all 3990-family/RAMAC™ storage subsystems connected to a host. A huge set of exception criteria on subsystem level as well as on device level provide reporting of customer-selected key performance data by using the RMF Postprocessor Overview report.

IMS Long Lock Detection: Services of the IMS/VS Resource Lock Manager (IRLM) are used by IMS to serialize application program requests for data base records to ensure that two programs do not access the same record for update at the same time.

The new Monitor II ILOCK report helps to identify locking situations when sharing data among several IMS instances in a sysplex environment.

Performance Monitoring of OS/390 ─ Analysis Support: Performance Monitoring of OS/390 (PM of OS/390) offers an easy-to-use navigation capability for analyzing OS/390 performance, making full use of the superior instrumentation of OS/390.

A rich set of metrics can be explored. It ranges from sysplex-wide, business-oriented indicators down to detailed data on a job and to sysplex-wide contention of shared resources. Predefined context information and drill-down steps are provided.

Performance Monitoring of OS/390 ─ TCP/IP Support: TCP/IP support is available as an alternative host connection to APPC. This item addresses the customer concerns regarding APPC installation complexity and positions RMF for NC and Open (TME10).

Spreadsheet Reporter: The Spreadsheet Reporter is a PWS interface based on Windows 95 or Windows NT for analyzing RMF data with Lotus 1-2-3 and Excel spreadsheets. This extension to the existing RMF Spreadsheet Converter enables users to integrate RMF data into their business processes. It also means they can easily produce presentation graphics which illustrate performance analysis results.

Storage Utilization Fields: RMF collects additional storage data to be used for main-storage related capacity planning. They are available in SMF records type 71 and can be shown in the Postprocessor Exception and Overview reports.

SDSF Support for WLM Batch Management: SDSF adds support to complement the resource affinity scheduling function that has been added by JES2 and WLM. New displays and columns on existing Input and Status displays simplify the management of resources and jobs for which resource affinities have been defined.

Business Process Automation and Distributed Transaction Processing

Transactional Processing Extensions: IBM provides, in OS/390 Version 2 Release 4, distributed transaction processing capabilities for inbound Transactional RPCs (TRPCs) as defined by Transarc's Encina TRPC. IBM is providing an OS/390 Encina Toolkit based on Transarc's Encina Toolkit Executive. IBM's transactional RPC supports the OS/390 IMS Version 6 Transaction Server so that it may participate in DCE-based distributed transaction processing. Changes to Application Support IMS to work with TRPCs through the OS/390 Encina Toolkit and the OS/390 IMS Version 6 Transaction Server, allow clients who use Encina TRPC protocols to participate with IMS applications in a distributed transaction process.

Encina Toolkit Executive

- OS/390 Base Element Adaptation*:* The Encina Toolkit Executive, a very widely used set of tools for developing client components of distributed transactional applications, has been ported to OS/390 with modifications for RAS and NLS enablement and is now part of the OS/390 base.

- Ephemeral Client Support

  The Encina Toolkit Executive provides tools for the building of reliable, distributed, transactional applications. Apart from TRPC support, it allows ephemeral (non-recoverable) client applications to be written.

  Encina Ephemeral Client support in OS/390 allows customers to begin re-integrating middle-tier applications to the OS/390 UNIX System Services environment.

- Transactional RPC Support

  The Encina Toolkit Executive has been changed so that it uses certain OS/390 services while performing two-phase commits in support of Transactional RPC (TRPC).

  TRPC promotes the development and execution of distributed transaction processing applications, including IMS, on S/390. It also promotes Network Computing by supporting Encina clients on a variety of platforms and the Internet.

Business Intelligence Initiative

The goal of this initiative is to have S/390 deliver end-to-end solutions that include the business applications, required tools and utilities and the database server. Along with these entities, IBM will provide the services to help customers implement their solution quickly and successfully. OS/390 Version 2 Release 4, in support of this initiative, delivers:

OS/390 UNIX System Services Parallel Environment: The OS/390 UNIX System Services Parallel Environment introduces new capabilities enabling parallel data mining capabilities. OS/390 UNIX System Services Parallel Environment is based on the AIX Parallel Environment product which enables user level parallel processing in application programs through the implementation of the Message Passing Interface (MPI) standard as released by the Message Passing Interface Forum in June 1995. OS/390 UNIX System Services Parallel Environment incorporates MPI and a Parallel Operating Environment (POE) which collectively enable the creation, run-time management, and inter-communication of parallel processes working on a single task.

Parallel data mining applications, such as Intelligent Miner™ can use POE to establish and manage the parallel processes. A given data mining task that uses one parallel data mining kernel can run the same kernel in multiple processes across one or more OS/390 system images. The data mining kernels use the MPI component to communicate directly among the mining processes. MPI uses TCP/IP's User Datagram Protocol (UDP) as well as High Performance Data Transfer (HPDT) for UDP for its underlying communication protocol.

The OS/390 UNIX System Services Parallel Environment includes support for using Workload Manager (WLM), thereby placing parallel processes on the best candidate systems within a Parallel Sysplex system. This enables data mining activities to utilize Parallel Sysplex systems that have available capacity and enables the use of WLM's management and policy definition facilities workloads.

Technology Leadership Initiative

This initiative's goal is to deliver open, cost-effective enterprise servers. IBM continues to enhance S/390 and OS/390 architectures to better support Network Computing, new application workloads including improved support for UNIX applications, improved performance with reduced total cost to S/390 customers. OS/390 Version 2 Release 4 upgrades in support of this initiative's goals include:

WLM Base Enhancements: These WLM functional enhancements satisfy WLM goal-mode migration factors that were recently identified by customers and industry performance management consultants.

• Less Disruptive Policy Activation

When a WLM policy is activated, either by an operator command or through the WLM administrative application, all accumulated historical information is discarded. Data structures are created that describe the newly established goals, and then data accumulation begins in the context of the new service classes, service class periods, and service class period goals. Significant algorithmic adjustments are not made until sufficient information is accumulated. Now, with this WLM Base enhancement, as much information as is easily possible is retained across a policy activation, thereby, minimizing the extent of policy activation disruption.

• Control of System Service Classes

This enhancement provides more customer control over the "system" service classes that are internally created by WLM. It allows the definition of WLM work classification rules that reference the SYSSTC service class, and enables reference to SYSTEM and SYSSTC service classes via the RESET operator command. Some restrictions are enforced to prevent total chaos, however, this new capability permits operational correction of errant classification rules that currently require an IPL to correct.

Adaptive Resource Management Enhancement: This functional enhancement to the OS/390 workload management algorithms, expands the scope and/or quality of WLM decision making.

Local Performance Index (PI) Evaluation: Prior to this release, a high importance service class, that was meeting its goals sysplex-wide, might not receive adequate attention from WLM on an individual system where it was missing its goal. New logic avoids having high importance service classes miss goals on specific systems, thereby meeting sysplex wide goals.

WLM Batch Management Enhancement: Goal-oriented management of JES2 batch is implemented in the following functional areas.

• JES2 initiator address space management

WLM now manages the quantity of batch initiator address spaces on behalf of JES2. Address spaces are created and destroyed based on the amount of work in the backlog, the availability of system resources (such as CPU and storage), the existence of system constraints (such as auxiliary storage and ASIDs), the mix of work in progress, and the ability of the system to achieve the WLM-defined goals for various workloads being managed. Job scheduling enhancements compensates for loss of manual control mechanisms.

With this improvement, operators are required to make fewer decisions on complex situations.

• JES2 Resource Affinity Scheduling

WLM improves the managing of scheduling of batch jobs, thereby, ensuring that jobs are only initiated on systems that have the necessary resources. This removes the need for explicit end user declaration (in JCL) of the specific system(s) that have the resources needed for each job. Through this new capability, an end user specifies the required scheduling environment, leaving it to OS/390 to identify where those resources are available.

• Migration features are provided to simplify and ease transition. There is a Sample Exit 5 that provides JES2 Command Migration support to translate old syntax to new syntax. Refer to JES2 Migration Considerations.

Batch Management capability for JES2 will be available on OS/390 Version 2 Release 4 in fourth quarter 1997. An early customer program is underway and customers with a requirement to activate the function immediately may do so through this program. For additional details and to express your interest in participating in the early program, visit the Web site located at:

http://www.s390.ibm.com/products/mvs/wlm/

or contact your IBM representative. This site will be updated with results of the program and notice of function general availability.

DFSMS/MVS® Version 1 Release 4 New Function: In addition to the Program Management Enhancements, described in further detail in the next section, DFSMS/MVS Version 1 Release 4 includes the following new function:

• Space Allocation Failure Reduction

This is accomplished on system managed storage through the removal of DADSM 5-extent limit, by spreading the requested quantity on multiple volumes for multivolume eligible data sets, and by reducing the requested quantity by a percentage. A component of a VSAM data set can now grow up to 255 extents (current limit is 123); however, a volume can only have up to 123 extents.

- DFSMShsm™ Duplex Tape

  This is performed on backup and migration as an alternative to TAPECOPY processing thus eliminating the additional tape mount used by TAPECOPY.

- DFM DataAgent

  This extends the function of the Distributed FileManager (DFM) component of DFSMSdfp™ by providing the ability to invoke routines that run as extensions of DFM/MVS from remote SmartData Utilities (SdU) clients to expand the way client applications can access data on MVS beyond predefined remote transactions.

- DFSMShsm Use of Coupling Facility for CDS Access

  This capability reduces contention of control datasets in a multihost environment.

- Compression Tailored for SAM data sets

  This capability optimizes compression ratios.

- VSAM System-Managed Buffering for Extended Format Datasets

  This function selects the buffering algorithms and the number of buffers based on the data set's storage class sequential and direct Bias specification and the MACRF specifications (DIR, SEQ, SKP) at open with JCL override capability when required.

- Catalog Search Interface

  This function provides a fast read-only interface callable from programs written in a high level language or from REXX EXECs to extract data from system catalogs using filterable selection criteria thus avoiding usage of SVC 26 or IDCAMS LISTCAT.

- DFSMShsm ABARS Enhancements

  Enhancements include stacking all the output files onto a single tape stream, new 32-character accounting information and CPU time consumed during ABACKUP and ARECOVER activity, and execution of up to 64 concurrent active ABARS requests.

- Allow IDCAMS ALTER of Storage Class and Management Class for Migrated Data Sets Without Recall

  This function eliminates unnecessary recall processing and tape mounts (for ML2 tape data).

- New OAM (Object Access Method) SMF

  This function writes an SMF type 85 SMF record for virtually every activity performed by OAM.

- Update VSAM Last Reference Date (LRD) at Close

  This function updates LRD at close if it is different from that at open. This ensures that data sets do not automatically get migrated based on the last reference date at open, in the DFSMShsm space management cycle, after a subsystem is brought down after many days.

- Enhancements to Data Class

  These enhancements allow VSAM data sets to be defined using JCL and dynamic allocation with BWO, LOG, LOGSTREAMID, and SPANNED/NONSPANNED attributes.

- VSAM RLS (Record Level Sharing)

  This function provides access to extended format VSAM KSDSs (key-sequenced data sets) that are larger than 4 gigabytes.

- DFSMSdss™ Enhanced Protection of Checkpointed Data Sets

  This function allows DFSMSdss and DFSMShsm operations to distinguish between IMS GSAM data sets and SMS sequential data sets accessed during OS/390 (MVS) checkpoint/restart and prevents them from becoming unusable.

- Batch Testing and Maintenance of DFSMS™ Configuration

  This function enables batch ACS testing and creation and maintenance of selected DFSMS management class values and "pool type" and "tape type" storage groups.

Following functions shipped via the service stream have been rolled into DFSMS/MVS 1.4:

- SMS Volume Selection Enhancements

  These enhancements address secondary volume selection improvements in support of data bases.

- IDCAMS Setcache Enhancements

- DFSMSrmm™ Enhancements to CDS Backup and Journaling

  This function uses DFSMSdss concurrent copy to backup the CDS and allows update activity to continue during the backup and notifies user when the journal has reached the installation-defined threshold to allow CDS backups to be started.

- Suppression of secondary file tracking by DFSMSrmm

  This function may be selected when the first file is created.

- DFSMSrmm Trial-Run Capability

  This function (VERIFY) allows policy (VRS) changes to be tested before being used in production.

- Additional DCME Enhancements

- Extended Format Data Set support for IBM RAMAC Virtual Array (RVA) Products

Refer to Software Announcement 297-192, dated June 9, 1997, for additional details.

Summary of Program Management Enhancements for DFSMS/MVS Version 1.4

Note: While the Program Management (PM) component is installed as part of the DFSMS/MVS Version 1.4 product, these enhancements functionally require parallel enhancements in the Language Environment and C Run-time Library which are part of OS/390 Version 2 Release 4.

The basic functions of PM are not modified for this release. The Binder binds sections to create modules, the Binder API provides support for calling programs to access data and bind, or copy modules, and the Loader loads programs from PDSs, PDSEs, and OS/390 UNIX System Services (HFS) files.

Program Management enhancements in this release address some current problems in the support of the C and C++ programming languages. It simplifies the creation of an executable module and extends support for OS/390 UNIX System Services. Specifically this release includes the following:

- A conversion function has been added to the Binder to process XOBJ structures built by the C/C++ compilers. The output from the Binder on this path is a program object which must be stored in a PDSE. This removes the need for the LE/370 Prelinker *in those cases where a PDSE is specified as the target load library* (for example, SYSLMOD).

- The Binder and Loader have been enhanced to support OS/390 dynamic linking and DLLs (Dynamic Load Libraries). This provides for user-controlled special handling of external references in modules, to allow their resolution when loading the referenced module explicitly or at the time the module is referenced, for example, it supports forms of dynamic loading.

- Support for the two above enhancements have also been included in OS/390 UNIX System Services and the c89 shell command.

- The Loader was enhanced to support DLLs and deferred loading, as well as the OS/390 Version 2 Release 4 Dynamic LPA functions, **extending LPA support to PDSEs and all program objects**, including DLLs. This applies when done after an IPL because PDSEs cannot be put into LPA during an IPL.

Program Object Enhancements: The program object, an alternative executable unit introduced in PM in DFSMS 1.1, was enhanced in DFSMS Version 1.3 and was further extended in this release as follows:

- Program objects support long names (up to 1K).

- Program objects contain many of the same enhancements supported in the new object file, GOFF (Generalized Object File Format), which is currently created by the High Level Assembler (as well as the Binder as an intermediate structure). This includes support for C/C++ writable static.

- Program objects contain multiple *classes* of text, distinguished by attributes which control binding and loading characteristics and behavior. Classes are central to C and DLL support.

  – There are two types of classes — text (byte-stream) and non-text (record-like, IDR, ADATA)

  – The separate attributes assigned to each class include:

    -- LOAD — The class is brought into memory at the time the module is loaded (typical case today).

    -- DEFERRED LOAD — The class is prepared for loading, but not instantiated until requested (new in this release).

    -- NOLOAD — The class is not loaded with the program, for example, it is non-text.

    -- RMODE 24/ANY — Indicates placement of segments within virtual storage.

  – Classes are bound into independently loadable *segments*, with loading characteristics which determine the placement of the segment in virtual storage. Multi-segment program objects can be loaded into non-contiguous areas of virtual storage, for example, when bound with the RMODE(SPLIT) option.

– Program objects contain a class of data specifically intended for users to save associated or application data (ADATA). It is not loadable (NOLOAD). This data may be source statements, debugging tables, user information, history data, documentation, etc. It is accessible via the Binder API.

Enhancing the Binder to Incorporate LE/370 Prelinker Functions: The Binder in this release has been extended to accept not only traditional object modules, but XOBJ (which is C/C++ and OO/COBOL compiler output), as well as GOFF (High Level Assembler output). In addition, the Binder still accepts load modules, program objects and HFS files, as earlier, but also HFS archive files and C370LIBs for autocall functions. It also accepts all Prelinker control statements. It includes support for long names and C WSA (Writable Static Area) as a newly defined "deferred" class. The result is that the Prelinker step can be eliminated when SYSLMOD specifies a PDSE program library because all the work previously performed by the Prelinker can now be done by the Binder.

Eliminating the Prelinker step has several advantages:

- Easier incorporation of new functions, released from the format restrictions imposed by an intermediate data structure
- Rebindable module as output, for example, it is not necessary to return to object files to rebind
- More efficient code distribution and servicing since single object files can be shipped in PTFs rather than the fully bound C module

Support for Dynamic Link Libraries (DLLs): This new function introduced in OS390 Version 2 Release 4 includes support in the Language Environment (LE), the C RTL (C Run-time Library) and Contents Supervision, as well as Program Management. Dynamic linking provides the ability to defer the binding of functions and variables (in DLLs) until execution. (Until now in MVS the entire application had to be statically bound or the application had to include linking via LINK, LOAD or XCTL.) While "deferred" classes are bound as a class with the program object during static bind, DLLs are separately bound program objects with the DLL attribute. They reside in Dynamic Link Libraries and are invoked during execution by DLL-enabled applications. Program objects with the DLL attribute can "export" variables and functions. DLL-enabled applications, also with this attribute, can "import" variables and functions belonging to DLLs.

Note: Limited support for dynamic linking was first made available on the MVS platform in 1995 to provide DLL capability for C applications. Only now, with OS/390 Version 2 Release 4 and DFSMS/MVS Version 1.4, is a generalized DLL capability available to all languages, transparent to the application, and independent of the Prelinker.

Extensions are added to the PDSE directory entry and program object in support of C reentrant programs, C++ programs, and Dynamic Link Libraries.

Extensions to the PM Loader to support C Reentrancy and DLLs

- The Loader adds to its current functions with new invoKable functions to load and delete **deferred classes** of a program object. In this release deferred classes refer specifically to C′s WSA (Writeable Static Area). These new functions resulted in the establishment of interfaces with LE/370 to support C-constructed reentrancy, which requires the ability to load and delete WSAs as a class (deferred) of program object. A new set of control structures (including a template for WSA) are maintained in storage after load time.

- The Loader extends its support for staging of program objects with the inclusion of deferred classes and DLLs in LLA (Library Lookaside).

Extensions to the PM Binder for C++ and Object Oriented Programs: Additional C++ support, beyond what is provided for DLLs and C-constructed reentrancy, is included in PM as follows:

- A C renaming routine is added to the existing interface validation logic in the Binder.

- The Binder recognizes certain CSECTs in the XOBJ object module as "concatenated objects" and performs special processing for them.

- Support has been added to the Binder for C++ long function names which have been encoded as "mangled names." The mangled names will be "demangled" before displaying on end-user reports, listings, and displays. (This function will be added via PTF in fourth quarter 1997.)

- The Binder also supports C++-generated "template" functions.

PM Extends Support for OS/390 UNIX System Services: The Binder extended its support for OS/390 UNIX System Services and the c89 command, as follows:

- A new OS/390 UNIX System Services control statement and API function, AUTOCALL, allows incremental autocall by the c89 command processor. This differs from the regular autocall in that it is not followed by binding.

- The Binder is extended to accept HFS archive libraries in place of conventional library concatenations for autocall. They can not be concatenated with other archive files or libraries of any kind.

- The Binder accepts an HFS file name in place of a ddname on some API calls and control statements. This eliminates the need for c89 to dynamically allocate files which will never be opened. All Binder files, except options files and diagnostic files, may be allocated to HFS files.

The Loader is extended to fully support the loading of PM program objects from HFS files, propagating program objects during a fork operation and for taking checkpoints.

PM Supports and Exploits OS390 Version 2 Release 4 Dynamic LPA: This function allows the addition and replacement of libraries and modules in LPA dynamically after the system has been initialized, which means PDSEs can now be candidates for LPA as well. (PDSEs have never been supported in LPA before because LPA was loaded before the environment required by PDSEs was initialized.) Now that PDSEs can be included in LPA, all program objects and more specifically, DLLs, can also be loaded into LPA.

Contents Support for Dynamic Link Library (DLL): Binder DLLs and any other PM3 level program objects are a new form of load module that require changes within contents supervision to provide full support of these load modules. The changes required enable the use of LLA caching for these new load modules and allow these load modules to be propagated on an OS/390 UNIX System Services fork.

Dynamic Link Pack Area (LPA): Dynamic LPA increases system availability by allowing customers to install products into the system's LPA without requiring an IPL to do so.

- Replacing modules in LPA when the module address is determined by a subsequent operation, such as LINK, LOAD, or ATTACH.

- Allowing modules in PDSEs to be treated as LPA modules.

- Giving optional products a mechanism to package their common-area code, such that it does not occupy system storage unless the product is enabled.

Modules can be added to LPA by name, or by providing a mask that is applied to each member of a data set (or concatenation of data sets) such that the system only processes the matching members.

Operator command and programming interfaces are provided.

TSO/E Enhancements: With OS/390 Version 2 Release 4, TSO/E support for Parallel Sysplex system environments is enhanced as follows:

- TSO/E SEND Command is enhanced to allow the TSO user to send messages to other users independent of the system within the susplex to which the receiving user is connected. The message can also be sent to a specific operator, the master console operator or a specific operator console.

- Likewise, the TPUT interface is enhanced to forward any message, issued via the TPUT, to the proper system where the user is logged on in the sysplex.

- Operator SEND Command is able to send a message to all users in the sysplex and to all users on a specific system in the sysplex or to all users logged on to a subset of the sysplex system.

- PARMLIB Command is enhanced to allow the user to direct the PARMLIB command to all systems in the sysplex, a single system or a subset of the systems.

- A new parameter on the SEND statement of the IKJTSOxx PARMLIB member allows the specification of the userlog data set size. This eliminates the need to code a user exit.

- CALL and TEST command is enhanced to use the standard load module search sequence, if no dataset name is specified.

- The PARMLIB Command Processor is enhanced by using the new Logical Parmlib Service (IEFPRMLB) to dynamically allocate, read, and unallocate the logical parmlib. This allows the installation to place IKJTSOxx members in a data set other than SYS1.PARMLIB.

JES3

- JES3 64K Job Number Support*:* This function provides support to increase the maximum number of jobs in a JES3 complex from the current limit of 32,767 to 65,534.

- JES3 Configuration Improvements

   Provide support to improve system availability in an OS/390 Parallel Sysplex system by reducing/shortening outages needed to make JES3 Configuration changes.

This support consists of three parts: Dynamic Update Support, HOTSTART with REFRESH support and Faster Restart support.

- Dynamic Update Support

  In OS/390 Version 2 Release 4, JES3 supports dynamic update via an operator command to add initialization statements for:

  SNA RJP ─ SNA RJP workstation characteristics (RJPWS), SNA RJP consoles (CONSOLE), and SNA RJP devices (readers, printers and punches) (DEVICE)

  VTAM Attached FSS printers

  -- FSSDEF ─ Functional Subsystem Definition
  -- DEVICE ─ for VTAM attached FSS printers

- HOTSTART with REFRESH

  One of the major JES3 problems customers have is the fact that it takes a warm start to change many of the JES3 initialization parameters. The warm start is very disruptive because not only must the JES3 global address space be brought down, but all processors in the JES3 complex must be IPLed.

  In OS/390 Version 2 Release 4, JES3 is changed to read the initialization stream during a hotstart without IPL to allow many of the parameters to be changed. A new start type, called HOTSTART with REFRESH, is created to read the initialization stream and process many (but not all) initialization statements.

- FASTER RESTART

  There are occasions when you must restart the global processor, such as when you need to implement certain configuration changes or to apply service. While the global is down, jobs in execution may experience delays when they request global services such as spool space allocation, opening SYSOUT data sets etc.

  JES3 RESTART processing is enhanced to reduce the time it takes the JES3 global to reinitialize.

DASD Logger: The System Logger is enhanced to provide a DASD Logger facility. This new facility provides support for a new type of log stream that is written directly to DASD without the need for having a coupling facility. Log blocks written to this new type of log stream are written only to DASD from a single system in a Sysplex. Only that system can have active connections to the log stream.

The DASD Logger facility makes it possible for subsystems, such as CICS, to continue to use the System Logger without change on non-coupled S/390 systems. OS/390 Version 2 Release 4 is the recommended MVS level for non-Sysplex CICS customers. This function fulfills the statement of direction on the CICS Logging Enhancement in Software Announcment 266-349, dated September 10, 1996.

Type 6 SVC: The Type 6 SVC enhancement provides function to improve the performance of the VSAM path taken by CICS.

Stand-Alone Dump (SADMP) Performance Enhancements: SADMP performance improvements, in laboratory tests, yield as much as 50% improvement in the virtual phase of the dump, and provide relief for some commonly reported problems and usability issues.

Additional Information ─ OS/390 Version 2 Release 4

Consolidated and Reorganized ServerPac Installation Information: In OS/390 Version 2 Release 4, the information for the installer of a ServerPac is now consolidated and reorganized into two information units.

- **ServerPac: Using the Dialog (SC28-1244)**

  This book describes how to install and use the panels on the CustomPac dialog. It merges the information previously contained in three books:

  - ServerPac Guide and Worksheet (SC28-144)
  - CustomPac: Installation Dialog Reference (SA22-7240)
  - CustomPac: Dialog Messages (SA22-7241)

  Using a task mapping approach and careful user analysis, almost 50% of redundant installation information has been removed.

- The custom-built installation guide, now called *ServerPac: Installing Your Order*

  This book describes the particular customer's order and takes the customer from the point where the code is loaded into the libraries to the point where the customer has verified successful installation of the basic system. Information in this book more closely reflects the sequence in which a customer installs a ServerPac. The book may now be browsed in LIST1403 format and as a BookManager built book.

  Also, IBM now provides an index to the program directories for the particular customer's order in the $INDEXPD member of the data set CPAC.PGMDIR on the RIM tape.

Enhanced Indirect Volume Serial Support: Indirect volume serial support allows the system to dynamically resolve volume and device type information for non-VSAM data sets that reside on the system residence volume (SYSRES) when accessed through the catalog. This allows you to change the volume serial number or device type of the system residence volume without also having to recatalog the non-VSAM data sets on that volume.

In OS/390 Release 3 (as a result of service integrated in OS/390 Release 3), indirect volume serial support was extended to allow system symbols to be specified in place of the volume serial when cataloging data sets that are to reside on the SYSRES volume or logical extension volumes to SYSRES. This allows you to define symbols in parmlib member IEASYMxx and then use those symbols to make indirect reference to one or more logical extension volumes to SYSRES. In this way you can manage the cataloging of

In OS/390 Version 2 Release 4, this support is extended further to create a new system defined static symbol, &SYSR1, whose value is the IPL volume. If you name your SYSRES volumes and the logical extension volumes to SYSRES according to a pattern, you can use substrings of the new &SYSR1 symbol to assign substitution text to symbols for the other volumes. A single SYMDEF could then be used for multiple SYSRES volumes and multiple images.

Recommended Data Set Placements: Recognizing that OS/390 and program products target libraries were becoming more difficult to fit on a 3390-3 SYSRES volume, IBM is documenting a recommended data set placement in OS/390 Version 2 Release 4. This recommended layout includes more than just the SYSRES volume, as it encompasses all the system libraries that are needed for the OS/390 platform.

This layout is meant to assist customers in deciding which datasets to assign to which volumes. Certain install enhancements (such as Extended Indirect Cataloging) are incorporated into this recommendation. This information can be found in the *Planning for Installation* (GC28-1726) publication.

Documentation Information — What's New for OS/390 Version 2

The Right Information: OS/390 Version 2 Release 4 has the right information at the right time — it's what drives the success of a business. It is why IBM continually strives to provide customers with the right information at the right time about how to use and manage IBM products. IBM's strategy is to provide customers with the information they need when they need it, and in the most appropriate and easily accessible ways. And, therefore, the information that supports the use and management of OS/390 continues to be enhanced, in content, distribution, and delivery. Take a look at some examples!

The OS/390 Web Site — Give it a Look: Yes, IBM still provides customers with some hardcopy books. But over the last several years, IBM's focus on softcopy delivery and distribution of information has really sharpened. And now IBM is on the Internet in a big way — which is about giving customers access to all OS/390 information through a browser on the World Wide Web. Visit IBM's site at:

http://www.s390.ibm.com/os390

And bookmark it for easy future access. Simply click on:

- "What's New" to read information about the latest release of OS/390
- "About OS/390" for overview information about the product
- "Elements" and "Features" to show you lists of the components of OS/390

Open "The Library": And click on "The Library" to list or search all books that support the management and use of OS/390, as well as other bookshelves. Customers may be particularly interested in IBM's Message Database, which contains the **Summary of Message Changes** for all OS/390 releases, as well as all "messages and codes" books.

When Customers get to a book, they can click on the printer icon to print all or selected topics in the book on a PostScript printer or any other printer defined to their browser. Because IBM BookManager BookServer is a new element of OS/390 for Version 2, customers can use it on their own intranet to serve and display books in their enterprise. Finally, if customers need to get a copy of a book, click on "The Bookstore," which gives them the opportunity to order books.

Visit Other Pages: The OS/390 Web site also gives customers several additional choices. For instance, customers can find out how to implement a full-fledged UNIX system, get Java for OS/390, check out vendor application compatibility, read the OS/390 Newsletter for Solution Developers, and other interesting topics.

The site also includes two brand-new features — the ability to invoke:

- **A Search Tool for Terms:** Customers can enter a term they are not familiar with and IBM will search a list of dictionaries and product glossaries to give a definition.

- **Cross-book Navigation on the Web:** This function introduces a new kind of online "book" called a Task Atlas. From the Atlas, customers can do contextual searches for retrieving task maps from the Atlas. And task maps provide links to topics in the OS/390 library. Version 2 of OS/390 provides a special focus on task maps for migration information across OS/390 libraries.

Restrictions Removed!: Customers will be happy to know that IBM has reclassified a significant number of books which were formally restricted, and made them part of the regular collection kit. With the exception of books in the VTAM and DFSMS libraries, all previously restricted books are no longer restricted. This gives customers easier access to formerly restricted materials.

Softcopy Print Enhancements: OS/390 Softcopy Print includes the following updates:

- Support for DBCS Languages

  OS/390 Softcopy Print for DBCS is an extension of the Softcopy Print function that allows customers to print softcopy BookManager Books that are written in these double-byte character set (DBCS) languages:

  - Japanese
  - Korean
  - Simplified Chinese
  - Traditional Chinese

  To obtain OS/390 Softcopy Print for DBCS, order the appropriate national language version of OS/390 Release 4. OS/390 Softcopy Print for DBCS supports most 240 dpi printers. In addition to the supported DBCS languages, users of the BookManager DBCS Print Utility can print English books as well.

For details, refer to *OS/390 Printing Softcopy Books*, (S544-5354).

Enhanced Physical Packaging of Getting Started Information: To further enhance customer ability to install OS/390, IBM provides, with your order, at no additional charge, a clearly-marked Installation Planning Kit that collects in one place introductory and installation information for OS/390. It will contain:

- OS/390 Planning for Installation (GC28-1726)
- OS/390 Introduction and Release Guide (GC28-1725)
- OS/390 Information Roadmap (GC28-1727)
- OS/390 Information — What's New for OS/390 Version 2 (GC28-1985)

At planned availability, additional copies can be ordered using kit number GK2T-6710. These books can be ordered individually, for a charge, at the announce date, except the *Introduction and Release Guide*, which will be available shortly after the announce date. Customers should be sure to order these books at the -3 level, so that they get the Version 2 Release 4 editions.

Order Numbers: Except for the licensed books which are now unlicensed for OS/390 Version 2 Release 4, the order numbers for the OS/390 documentation will remain the same for Version 2 as they were for Version 1. Customers with OS/390 Version 1 can continue to get updates to their books (through individual orders or their SLSS subscriptions), although the books will be OS/390 Version 2 books.

Elimination of 7xxx Feature Numbers: IBM eliminated the 7023 and 7024 feature numbers. These unpriced feature numbers previously contained hardcopy books helpful in installing and migrating to OS/390. All of the books required for installation and migration will automatically ship with orders. Customers will not have to order the 7xxx feature numbers for optional free documentation.

OS/390 Version 2 Release 4 Product Content

OS/390 Version 2 Release 4 contains the elements listed below. Only those elements that are also available as stand-alone products are listed with the release level used in OS/390. For a list of the release levels originally incorporated into OS/390 Version 1 Release 1, refer to Software Announcement 296-018, dated February 20, 1996.

Functional enhancements in the MVS environment for products or features marked with an * (in the following list) have already or will be made available only through OS/390 and not through additional releases or versions of these products or features.

Elements marked with an @ are new additions to OS/390 Version 2 Release 4.

- System Services

  - MVS/ESA SP™ *
    -- Base Control Program (BCP)
    -- JES2
    -- OS/390 Base UNIX System Services
  - ESCON Director support *
  - MICR/OCR support*
  - Bulk Data Transfer (BDT) base *, ¹
  - DFSMSdfp Version 1 Release 4 *
  - EREP/MVS Version 3 Release 5
  - High Level Assembler Version 1 Release 2
  - ICKDSF Release 16
  - ISPF *
  - TSO/E *
  - 3270 PC File Transfer Program Version 1.1.1

- Systems Management

  - HCD *
  - ICSF Version 2.1 @
  - SMP/E *
  - SystemView® for MVS Base Version 1.1

- Application Enablement

  - Language Environment *
  - SOMobjects™ for MVS Runtime Library *
  - VisualLift™ RTE *
  - DCE AS * @
  - Encina Executive Toolkit * @
  - OS/390 Application Enabling Technology™ *

- Distributed Computing

  - DFSMS/MVS Version 1 Release 4 Network File System Feature *
  - DCE Base Services (OSF DCE level 1.1) *
  - DCE Distributed File Service (DFS™) * (OSF DCE level 1.1.1)

- Communications Server

  - FFST™/ESA Version 1 Release 2
  - VTAM Version 4 Release 4
  - TIOC *
  - TCP/IP Version 3 Release 2
    -- TCP/IP CICS Sockets
    -- TCP/IP IMS Sockets
  - TCP/IP for OS/390 UNIX System Services *

- Network Computing Services

  - Domino Go Webserver 4.6 for OS/390
    -- NetQuestion * @
    -- ICSS 2.2

- LAN Services
    -- LANRES/MVS *
    -- LAN Server for MVS *
    -- OSA Support Facility Release 1.2

- UNIX System Services

  - OS/390 UNIX System Services Application Services *
  - OS/390 UNIX System Services Shell & Utilities *
  - OS/390 UNIX System Services Debugger *

- Softcopy Publications Support

  - BookManager READ R3 *
  - Softcopy Print Solutions and Fonts *
  - BookManager BookServer Version 2.1 @
  - GDDM® Version 3 Release 2 (including PCLK and OS/2 Link)

¹ One or both of the BDT optional features (File-to-file or JES3 SNA NJE) must be ordered and installed in order to use the BDT function shipped with the base.

Customers will have the ability to replace a OS/390 base function with a commercially available product which provides a similar function. Contact an IBM representative for qualification and pricing information. All OS/390 integrated testing results and performance claims will be voided with such replacement.

OS/390 delivers optional features that have a high affinity to the base OS/390 system. The list of optional features is:

- System Services

  - JES3 *
  - Bulk Data Transfer (BDT) Version 2 File-to-File *
  - Bulk Data Transfer (BDT) JES3 SNA NJE *

- Systems Management

  Note: The DFSMS features are packaged in combinations. Refer to the **Ordering Information** section for the available combinations.

  - DFSMSdss Version 1 Release 4 *
  - DFSMShsm Version 1 Release 4 *
  - DFSMSrmm Version 1 Release 4 *
  - RMF *
  - SDSF *
  - HCM * @

- Security Server *

  - DCE Security Server at OSF DCE level 1.1 *
  - RACF *

- Application Enablement

  - C/C++ (with Debug Tool) *

  - C/C++ (without Debug Tool) *

  - DFSORT™ Release 13

  - GDDM-PGF Version 2 Release 1.3

  - GDDM Rexx Version 3 Release 2

  - HLASM Toolkit Version 1 Release 2

  - Language Environment Data Decryption (DES) * ²

  - SOMobjects for MVS Application Development Environment (ADE) *

  - VisualLift ADE Version 1.1.2 *

  - IP PrintWay™/NetSpool™ (PSF™/MVS Version 2.2)

- Distributed Computing

    - DCE User Data Privacy (DES) * [2]
    - DCE Data Privacy (CDMF) * [2]

- Communications Server

    - TCP/IP Kerberos DES Version 3 Release 2[2]
    - TCP/IP Kerberos non-DES Version 3 Release 2[2]
    - TCP/IP Network Print Facility Version 3 Release 2
    - TCP/IP Offload to OS/2 Version 3 Release 2

- Network Computing Services

    - Domino Go Webserver 4.6 for OS/390
      -- ICSS 2.2

        N.A. Secure[2]

        Export Security[2]

- Softcopy Publications Support

    - BookManager BUILD Release 3 *

- RS/6000™ and PC Server with S/390 Server-on-Board Preconfigured System for OS/390 Version 2.4.0 CD

[2]   Export considerations

Preconfigured CD: As part of the OS/390 software order, PC Server S/390 and RS/6000 with S/390 Server-on-Board customers can request a CD with a preconfigured OS/390 base image that provides a "load and go" system. This CD takes advantage of the unique dual operating system environment of the PC Server S/390 and the RS/6000 with S/390 Server-on-Board. It is available as a feature of OS/390 for no additional charge to Entry Support Licenses (ESL) of the base. First time OS/390 customers who order this CD will receive the OS/390 Version 1 Release 3 level CD for all shipments that are made before November 14, 1997. A memo will be included in this shipment stating that these customers will automatically have the OS/390 Version 2 Release 4 CD shipped to them starting on November 14, 1997. Refer to Hardware Announcement 195-147, dated May 23, 1995, for additional information.

Integration Testing: To further reduce migration time, the OS/390 product is system integration tested using a production-like environment. This environment includes subsystems, such as CICS, IMS and DB2. This additional testing supplements existing functional test, with a focus on tasks performed by customers in the production environment, thus helping establishments move more quickly to new function. System integration testing is provided for all OS/390 releases.

Enabling OS/390 Optional Priced Features

OS/390 optional priced features use an OS/390 product registration service, together with product policy statements, to determine whether or not the OS/390 priced feature has been ordered and should run.

Those OS/390 optional priced features that are ordered concurrently with OS/390 will be shipped by IBM together with policy statements in PARMLIB which enable the ordered priced features. OS/390 priced features, which have not been ordered, will also be shipped with OS/390 but with policy statements which disable the unordered features. If the customer subsequently enables any of the optional priced features, those features also become subject to the payment terms of the customer's existing OS/390 license as described in *OS/390 Program Licensed Specifications* (GC28-1728). Customers must notify IBM when they enable an optional feature that was shipped disabled from IBM. A detailed description of the enablement support for OS/390 features is available in *OS/390 Planning for Installation* (GC28-1726).

The OS/390 priced features which support this enablement capability in OS/390 Version 2 Release 4 are:

- BookManager Build
- BDT File to File
- BDT JES3 SNA NJE
- C/C++ (with Debug Tool)
- C/C++ (without Debug Tool)
- DFSMSdss
- DFSMShsm
- DFSMSrmm
- DFSORT
- GDDM PGF
- GDDM REXX
- HCM
- High Level Assembler Toolkit
- IP PrintWay™ /NetSpool
- JES3
- RMF
- SDSF
- Security Server
- SOMobjects ADE
- VisualLift ADE

Service Policy

It is IBM's current intention to consider each release of OS/390 as current for three years following its general availability date, and to provide maintenance during that period.

Recognizing the workload customers have ahead of them for year 2000, OS/390 Version 1 Releases 1, 2, and 3 will deviate from this service policy. OS/390 Version 1 releases will be considered as current until at least December 2000, with IBM providing maintenance during this period.

PTF distributions, including Recommended Service Upgrades (RSUs), will continue to be available monthly through the period the release is current. RSU integration testing for a release will be performed for five quarters after the general availability date for that release.

Service on the last release of a version may be extended beyond the intended three year period. In all cases, the current practice of providing at least twelve months notice prior to the withdrawal of service for a version or release, will continue for OS/390.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice and represent goals and objectives only.

S/390 Service Update Facility

The S/390 Service Update Facility provides an Internet-based, GUI interface tool to help S/390 Customers (VM, VSE, and OS/390) obtain corrective and preventive service. Use of Web Browser technology offers a common interface independent of the S/390 operating system. In most cases the use of the S/390 Service Update Facility will enable customers to:

- Obtain an IBM recommended level of preventive service

- Obtain corrective service by PTF number

- Order, receive and install this service in a more effective manner

The S/390 Service Update Facility will also allow ServiceLink customers to gain additional synergies when OS/390 service orders are initiated using this Facility.

Value to customers:

- Simplification of the S/390 software service maintenance process

- Increased system stability (using recommended service levels)

- Support staff productivity gains

- Reduction of required operating system skills

- Reduction of resources/time to maintain systems, hence reducing cost of service and allowing for use of programming skills to enhance (not maintain) systems

- Increased Customer satisfaction with IBM Service including reduction in size of preventive maintenance

The S/390 Service Update Facility will be available in December 1997. Support will be provided for OS/390 Version 1 Release 3 and Version 2 Release 4 (and beyond) with TCP/IP installed. A minor modification, required for SMP/E support, will be made available through the IBM service stream (refer to PTF generated for APAR #IR35192) for OS/390 Release 3 and Release 4. This function will be integrated into SMP/E with OS/390 Version 2 Release 5. Additionally, an OS/2 application (referred to as our "customer application server") will be made available via an FTP site. This application server needs to be installed on an OS/2 workstation running OS/2 Warp Version 4.0 and IBM Internet Connection Server for OS/2 Version 1.0. End-user (system support) workstations require Netscape 3.0, or higher. IBM also strongly recommends a firewall implementation for the Customer Internet connection.

Additional information is available on the S/390 Technical Support home page, found at the following URL:

http://service.software.ibm.com/390launch.html

Entitlement: OS/390 customers meeting all software and hardware requirements must also possess a current S/390 Processor Maintenance Agreement to be entitled to this Facility.

OS/390 Enhanced HOLDDATA in Report ERRSYSMODS

The SMP/E function's Report ERRSYSMODS has been updated to display Enhanced HOLDDATA. Enhanced HOLDDATA is HOLDDATA with additional information to identify the reason for the HOLD and identify a fixing PTF. This report when used with Enhanced HOLDDATA will identify missing critical service that is applicable to the customer's specific system. This allows customers to identify any missing PE and/or HIPER fixes for any target zone. Additionally, the report will identify if a fixing PTF is available, if the fixing PTF is already in RECEIVE status, and the reason indicator for a HIPER.

The updated report along with Enhanced HOLDDATA will ease service management of OS/390. Missing critical fixes can be easily identified and initial analysis of the impact and identification of available fixes can be performed from just the report itself.

Value to customers:

- Increased system stability by early identification of critical service

- Support staff productivity gains by a simplified process to identify applicable critical service for a specified system

- Reduction of resources and time to maintain systems

The report will be reformatted so that it is arranged by FMID within each requested zone. Today, the report is arranged by SYSMOD within each zone. A summary section will be placed at the end of the report.

The Enhanced HOLDDATA will allow the Report ERRSYSMODS command to generate SMPPUNCH output that includes all resolving SYSMODS, including SYSMODs that resolve held, uninstalled SYSMODs, and resolving SYSMODs that are not yet received. Today, only received resolving SYSMODs for held, installed SYSMODs are in the output. If the resolving SYSMOD is held, the customer must rerun the Report ERRSYSMODS command against the GLOBAL zone to determine if it has an available resolving SYSMOD. The new Report ERRSYSMODS with Enhanced HOLDDATA will do this research for the customer, and produce one SMPPUNCH output.

The overall objective of the function is to provide consistency regarding HOLDDATA with one worldwide source and process. Initially Enhanced HOLDDATA will be provided on ESO's and corrective service orders replacing the existing HOLDDATA. It is IBM's direction to provide Enhanced HOLDDATA on all deliverables. Updated Enhanced HOLDDATA will be available electronically daily.

The updated Report ERRSYSMODS continues to support non-Enhanced HOLDDATA.

The updated Report ERRSYSMODS and Enhanced HOLDDATA will be available fourth quarter 1997.

Fee-Based Software Services Offerings

Note: OS/390 is available through the IBM ServerPac for OS/390 and CBPDO™ entitled customized offerings, as well as the SystemPac® and SoftwareXcel Installation Express (SIE) fee-based offering. No stand-alone product tape is available for OS/390.

- SoftwareXcel Installation Express (SIE)

  SoftwareXcel Installation Express (SIE) is a fee-based, software services offering that provides prebuilt MVS and OS/390 system packages tailored to customer hardware and software configurations. The prebuilt system contains installed IBM and eligible S/390 Solution Developer products with integrated service. Also, SIE includes on-site planning, installation, and research requirements for up to 70 S/390 Solution Developer products not able to be included in the prebuilt system package. Post-installation support services are provided for 30 days after installation. This system replacement services offering provides assistance to the customer to migrate quickly and efficiently.

  SIE provides:

  - A customized package Installation Guide

  - System package tapes in an IPL-able format

  - Conversion of PARMLIB, PROCLIB, and VTAMLST parameters for the new system image being built

  - SoftwareXcel Vendor Product Information Report

  - Assistance from an on-site IBM representative

For more information on SIE, contact IBM at 800-IBM-4YOU (426-4968), or IBM representatives can send a note to PKEDVM9(SIE).

- SoftwareXcel SystemPac/MVS

SystemPac is a fee-based software system installation offering that provides prebuilt MVS and OS/390 system packages tailored to customer hardware and software configurations. The prebuilt system contains installed IBM and eligible S/390 Solution Developer software products with integrated service. This system replacement offering provides a quicker method to implement a new system on the customer's system.

The OS/390 SystemPac provides:

- A customized package Installation Guide
- System package tapes in an IPLable format or dump-by-data set format

For more information on SystemPac, contact IBM at 800-IBM-4YOU (426-4968), or IBM representatives can send a note to PKEDVM9(SIE).

- Enhanced Parallel Sysplex Offerings (EPSO)

The System and Application Enablement services are a set of services which enable the customer to establish and migrate an application to a Parallel Sysplex system environment. The services provide assistance in implementing a Parallel Sysplex in two phases:

- System Enablement (Phase 1): Establish a S/390 Parallel Sysplex environment

- Application Enablement (Phase 2): Enable one application for Parallel Sysplex exploitation

These services provide specific deliverables and assistance to enable the customer to successfully implement each phase with the primary benefit of an accelerated migration to Parallel Sysplex. The IBM Project Management and technical skills provided help ensure the project is completed within the time frames targeted, enabling the customer to achieve the benefits of Parallel Sysplex. Throughout the migration, the IBM project team provides skills transfer to the customer's systems and applications programmers. This support and skills building means at the end of the project, the customer has the experience and knowledge to complete the migration to Parallel Sysplex for other applications and environments.

- Parallel Sysplex Exploitation Services

The Exploitation Services are a set of services which enable a customer to exploit their established Parallel Sysplex environment. The services provide assistance in implementing new features of Parallel Sysplex or refining the current installation. These enhancements will continue the customer's exploitation of Parallel Sysplex increasing their value and benefits from the environment.

Each of the services provides the tasks and deliverables to assist in implementing the specified component or enhancement to the Parallel Sysplex environment. A menu of potential services enables the customer to select those services that will maximize their Parallel Sysplex environment. This menu allows them to customize the set of Exploitation Services to fit their environment and current implementation. The technical skills provided will guide and assist the customer in implementing the tasks to achieve the objective of the service.

Throughout the service, IBM experts provide skills transfer to the customer's technical professionals. This support and skills building ensure that as a result of the service, their people have the experience and knowledge to continue their exploitation of Parallel Sysplex. An IBM Project Leader is assigned to coordinate the services to ensure satisfactory results and a successful completion. The IBM Project Leader works with the customer to establish dates and secure the appropriate expert resources.

For more information and availability dates of the Parallel Sysplex offerings, IBM representatives should contact the IBM EPSO Project Office at tie line 372-8268 or send a note to HQVMIC1(EPSO).

- SmoothStart™ Services for S/390

SmoothStart Services are fee-based, on-site implementation and training services designed to accelerate a customer's productive use of their IBM solution. These services may be for IBM or non-IBM hardware/software or just software. SmoothStart services normally include installation of the software, hardware (where needed), configuration, operational customization, and integration where multiple components are involved. SmoothStart Services will consistently deliver options ranging from:

- Project management
- Installation
- Software configuration and
- Skills transfer

OS/390 services under the SmoothStart architecture include:

- SmoothStart Services for S/390 Open Server

With OS/390 installed (Version 1 Release 2 at a minimum), this service will enable an operating system to a S/390 OS/390 UNIX System Services environment with an interface conforming to the single UNIX specification standard.

- SmoothStart Services for Lotus Domino for S/390

This service allows the customer to take advantage of integrating mission-critical S/390 data with Domino, Global Services will provide a SmoothStart for Lotus Domino S/390.

Lotus Domino for S/390 delivers open, cross platform, scalable, solutions to help realize the promise of enterprise, client/server computing and the emerging world of network and collaborative computing.

- SmoothStart Services for OS/390 Internet Enablement

This service assists OS/390 customers to implement a test Intranet (or Internet) environment which demonstrates an advanced application deployment of the WWW. It extends a customer's reach to new clients using the Internet to conduct business through links to existing OS/390 CICS, DB2, IMS, and VSAM databases.

- SmoothStart Services for S/390 Net.Commerce

With OS/390 (Version 1 Release 3) and the Domino Go Webserver installed, this service will enable a mall utilizing customer data. The Network Commerce capability reduces computing costs, manages data bases, and offers security for the customer offerings.

– SmoothStart Services for S/390 LANRES

LANRES/MVS integrate Netware LANs and S/390 environment by allowing Netware clients to use host DASD for file storage (Disk Serving), and host fast printers (Print Serving). LANRES also allows host users to perform LAN Administration tasks and data management on the Netware server.

This offering provides the installation and customization of LANRES both on the Host and one Netware server with the enablement of both Disk and Print Serving capabilities, and skills transfer to enable the customer to manage the LANRES environment.

For more information and availability dates of the above SmoothStart Services, contact IBM at 800-IBM-4YOU (426-4968), or IBM representatives can send a note to PKEDVM9(S390SVCS).

- Lotus Domino Services

  IBM Global Services, Product Support Services will also offer installation services to help the customer migrate to the Lotus Domino environment.

  – IBM Installation Service for OfficeVision® Migration Tool

  Provides installation, implementation, and testing of the Migration Tool on the customer's system. An IBM project manager will also provide instruction on tool usage to customer personnel.

  – IBM Installation Service for Lotus Calendar Connector for OfficeVision (LCCOV)

  Provides installation and implementation of LCCOV, along with instruction on usage.

  For more information and availability dates of the above Lotus Domino offerings, contact IBM at 800-IBM-4YOU (426-4968), or IBM representatives can send a note to PKEDVM9(S390SVCS).

- IBM Planning Service for OS/390 UNIX Application Porting Assessment

  IBM Planning Service for OS/390 UNIX Application Porting Assessment allows customers to port UNIX applications from non-S/390 UNIX environments to OS/390. This Service will help customers evaluate feasibility and amount of work required to complete a successful porting project by analyzing the application source code with a code checker tool.

  As a result, the customer receives a report listing issues and dependencies for porting the application, and an indication about the size of the port.

  For more information and availability date of IBM Planning Service for OS/390 UNIX Application Porting Assessment, contact IBM at 800-IBM-4YOU (426-4968), or IBM representatives can send a note to PKEDVM9(S390SVCS).

OS/390 Version 2 Release 5 Function Description

Network Computing Initiative

Domino Go Webserver 4.6.1 for OS/390

Support of Rebranding to Lotus: The IBM Internet Connection Secure Server will be rebranded to a Lotus branded product in OS/390 Version 2 Release 5. All externals will be changed from "ICSS" to "Domino Go Webserver." This will define consistent functions across all platforms (OS/390, OS/2, HP-UX, Sun, Windows NT, Windows 95, and AIX) where applicable.

%%CERTIF%% Support: OS/390 UNIX System Services will receive a certificate from the Domino Go Webserver and will be able to copy the certificate to system storage. If the server (Domino Go Webserver) has read or update access to BPX.SERVER, it will be assumed that the server has verified that the certificate is genuine, the validity dates are current, and the client is the owner of the certificate (that is, the SSL protocol). The server will use the certificate in place of a userid and password.

OS/390 UNIX System Services will recognize that a certificate has been passed and invoke RACF's InitACEE callable service by passing the certificate itself (fullword length plus certificate) and a new flag that says "certificate being passed."

The InitACEE service will decode the certificate, do the profile lookup, and extract the userid. From this point, InitACEE will function as it does today. It will check the cache for a previously created ACEE and do a RACINIT if an ACEE is not found.

Java Servlet Support: Java servlet (internal and external process) support will be enabled under OS/390 using the JDK 1.1 driver.

Performance Enhancements: Improvements will be made to the processing of base server requests, yielding an expected overall increase in request throughput.

Proxy Enhancements: Numerous changes will be implemented and tested that are based on actual customer environments. These changes will also be field tested and are expected to result in overall server RAS improvements.

eNetwork Communications Server for OS/390 Version 2 Release 5 — An Enterprise Class Solution for e-Business Networking: In Version 2 Release 5, IBM continues to deliver on it's commitment to provide world-class TCP/IP solutions for e-business networks, while increasing the linkage between SNA and TCP/IP function.

The highlights are:

- New enterprise-class TCP/IP service for OS/390 applications

- A new Telnet server will provide "TN3270E" and more

- DNS with WLM capability fully integrated into CS OS/390

- Full Dynamic IP support automates registration of clients to DNS

- Security Improvements for Internet and intranets

- Multiprotocol performance improvements

- Native ATM support for TCP/IP

- Additional enhancements for TCP/IP, SNA, APPN, and HPR users

New Enterprise-Class TCP/IP Service for OS/390 Applications: CS OS/390 Version 2 Release 4, includes an entirely new IP communications stack that provides dramatically improved performance, scalability and RAS for OS/390 UNIX System Services (formerly called OpenEdition) applications.

In Version 2 Release 5, the use of this improved TCP/IP stack will be extended to all remaining popular OS/390 TCP/IP APIs and applications. Also, a common storage manager and shared device drivers are employed for increased synergy and efficiency for CS OS/390's SNA and TCP/IP services.

With this, CS OS/390 Version 2 Release 5 provides a single high-performance, high-RAS TCP/IP service for the OS/390 platform.

Sockets related APIs that will exploit the new stack, typically with no change to applications, include:

- REXX Sockets
- TCP/IP C Sockets
- TCP/IP Macro API
- TCP/IP CALL Instruction API
- X/Open Transport Interface
- Pascal

Note: In TCP/IP Version 3 for MVS, the TCP/IP Macro and Call instruction APIs (TCP/IP Sockets Extended) were enhanced to provide a more usable and reliable alternative to VMCF and IUCV. These improvements will be included in OS/390 UNIX System Services sockets beginning with Version 2 Release 5. Owners of VMCF/IUCV based applications should convert them to OS/390 UNIX System Services sockets. TCP/IP Version 3 Release 2 and CS OS/390 Version 2 Release 4 are the final releases to support IUCV and VMCF application communications over the TCP/IP stack.

New and Improved TN3270E Telnet Server: The new Telnet server will use OS/390 UNIX System Services sockets to communicate with the TCP/IP stack for improved performance and reliability. Other enhancements to the Telnet Server function include:

- RFC1647 (TN3270E) support

- Dynamic updating of Telnet configuration statements

- New Telnet Server operator commands for displaying status and configuration information, and modifying the state of the server

- Improved Telnet server performance and scalability characteristics

- Common SNA and TCP/IP Message 10 support

- TN3270E exploits Workload Manager (WLM) to balance TN3270 client connections across a Sysplex

- Improved OS/390 RAS characteristics

- Common SNA and TCP/IP Message 10 support

Domain Name Server (DNS) with WLM Capability Integrated: The new DNS with WLM capability is available early to Version 2 Release 4 users as a separately ordered, no-charge, kit. In Version 2 Release 5, DNS/WLM is fully integration tested and incorporated into CS OS/390 and further improved by the addition of Dynamic IP.

DNS/WLM provides intelligent sysplex distribution of requests through cooperation between WLM and the DNS server. For customers that elect to place a DNS in an OS/390 sysplex, DNS will invoke WLM sysplex routing services to determine the "best" system to service a given client request. This provides functional equivalence with VTAM Generic Resources support that is currently available for SNA networks in the Parallel Sysplex environment.

In Version 2 Release 4, the Telnet Server, DB2, and the TCP/IP Version 3 Release 2 stack register with WLM. Other functions that plan to register with WLM by, or near, general availability of Version 2 Release 5 are:

- The new converged TCP/IP stack
- The new TN3270E server
- CICS Sockets
- IMS Sockets
- IMS
- FTP Server

User or vendor applications can also register with WLM for purposes of DNS load balancing.

Note: To provide customers with time to migrate to the new DNS, both versions will be shipped in CS OS/390 Version 2 Release 5. The older version of DNS will not be included in subsequent releases.

Full Dynamic IP Automates Registration of Clients to DNS: CS OS/390 will add an implementation of full Dynamic IP on S/390 to enable cooperation between the Dynamic Host Configuration Protocol (DHCP) and DNS to dynamically and directly register their name and address mappings in the DNS tables, rather than require manual update by an administrator.

Optimal Segment Size: For data transfers to other hosts one hop away, a formula is used to optimize the TCP segment size value resulting in reduced CPU utilization.

Security Improvements for Internet and Intranets: Essential for commerce over the Internet and intranets is the ability to control and authenticate access as well as encrypt/decrypt sensitive data. CS OS/390 Version 2 Release 5 provides:

- IP Packet Filtering for intranet/Internet Access Control

  Packet filtering uses a set of administrator-defined rules to determine if a packet arriving at or departing from the TCP/IP stack should be allowed to pass. The system administrator can, then, control access to intranet resources from the Internet, and vice versa.

- IPSec

  Supports the defining of secure pathway across the Internet or an intranet to another host running IPSec code. The data across this pathway can be encrypted and provided with authentication information at the source, and decrypted and authenticated at the destination.

- Network Address Translation

  Allows internal IP addresses to be hidden from the network, either for security reasons or because an intranet is using non-registered IP addresses. NAT maps the internal IP addresses to registered addresses, allowing traffic to flow freely.

Improved SNMP Network Management

- SNMPv2 agent with security In addition to community-based security, the SNMP agent will support SNMPv2u security, which provides user-based security with authentication via MD5. Encryption is not supported.

- Enhanced remote configurability and management data The SNMP subagent provides SET support to better enable remote configurability of the TCP/IP address space. Additionally, support for new MIB objects related to ATM and TCP/IP configuration and protocol operations provide enhanced management data.

- SNMP (SNMPv2) supports both Version 1 and Version 2 service requests

- All SNMP commands that functioned for TCP/IP for UNIX System Services or TCP/IP Version 3 Release 2 function will continue to be supported unchanged by the new single TCP/IP service in Version 2 Release 5.

New Converged C FTP Client: An new FTP Client will be included that can be used for both native MVS file transfers and OS/390 UNIX System Services Hierarchical File System (HFS) file transfers. It can be utilized from TSO, Batch, REXX, the OS/390 UNIX System Services shell, and OS/390 UNIX System Services REXX.

SourceVIPA (Virtual Internet Protocol Addressing): VIPA was first made available in IBM TCP/IP Version 3 for MVS. It provided fault tolerance for inbound TCP connections to VIPA addresses at the MVS hosts. (Note: VIPA essentially allows failed connections to be routed around transparently to the user).

With SourceVIPA, OS/390 Version 2 Release 5 hosts in networks can be configured to use VIPA addresses for both inbound and outbound datagrams for TCP connections, further enhancing it's fault tolerant capability.

NLS Enhancements for CS OS/390 Version 2 Release 5 Include:

- NLS Conversions for Line-Mode MVS Telnet
- Unicode support for FTP

TCP/IP Network Access Performance Improved: CS OS/390 Version 2 Release 5 provides improvements to the following:

- Open Systems Adapter-2 "Classical IP over ATM" (RFC1577) support for TCP/IP networks

  S/390 Server users connecting to TCP/IP networks through OSA-2 can now use ATM natively to improve network speed and eliminate overhead attributed to LAN emulation.

- Performance for TCP/IP connections over X.25, CDLC, Hyperchannel, and SNALINK

Note: CS OS/390 Version 2 Release 5 will not support the following:

- Continuously Executing Transfer Interface (CETI) Current OEM vendors that use CETI should move to an LCS I/O interface.

- High Performance Parallel Interface (HiPPI)

- 3172/OS2 Offload

The improved performance provided by the new TCP/IP stack in Version 2 Release 5 should substantially reduce or eliminate the benefit of offload for most users.

Application Enablement Initiative

Component Broker on OS/390: In May of 1997, IBM announced the plan to deliver its strategic object-oriented application development environment. Component Broker was announced as rolling out over time on multiple platforms.

With OS/390 Version 2, IBM will follow through on that announcement and deliver Component Broker on the S/390 platform. Initially, this will be done for a limited set of customers participating in concept validation on OS/390 Version 2 Release 5.

Component Broker for OS/390 provides an environment for the hosting of new business applications on S/390 that, using a new programming model, allows customers to rapidly design and develop their applications. This programming model is the same across platforms.

Component Broker for OS/390 leverages S/390 strengths such as parallel sysplex technology for scale and availability and exploits the OS/390 Workload Manager for proper workload balancing and management. This allows Component Broker work to run along with traditional workloads such as IMS and CICS.

Additional information concerning Component Broker for OS/390, can be found on the WWW at the OS/390 Home Page and the Component Broker Home page at the following URL:

http:/www.software.ibm.com/ad/cb

OS/390 Application Enabling Technology Enhancements: A new element, Application Enabling Technology, was introduced in OS/390 Version 1 Release 3. Refer to Software Announcement 297-040, dated March 11, 1997. This new element provides the system programming definitions for a standard, simple OS/390 that includes all the definitions and policies needed to IPL the system without operator intervention and provide the UNIX System Services shell to the TCP/IP network. It is the intent of this set of definitions and policies to make OS/390 a very attractive, easy to use and own system, on which to run the application needed by medium and small business units.

OS/390 Application Enabling Technology (OS/390 AET) will be enhanced to provide Network Computing Support. Customers will be able to easily customize and create stand-alone or distributed Domino Go Webserver and Network Station solutions for their Internet/intranet requirements. The business advantages and cost savings such solutions provide can be quickly realized (measured in "Web years") while still retaining the OS/390 platform strengths.

Highlights

- Domino Go Webserver

  − The Domino Go Webserver for OS/390 will be integrated into the OS/390 AET samples, so that users with UNIX and Web serving skills and documentation for Domino Go Webserver, will be able to customize their system to serve Web pages. The automation policies will be enhanced to allow the Webserver administrator to specify when automation should be started and stopped.

- IBM Network Station Support

  − The OS/390 Network Station server and client code references will be integrated into the OS/390 Application Enabling Technology samples. When customized, this will allow the Network Station Administrator to provide boot and target support from OS/390 Application Enabling Technology for IBM Network Stations in the TCP/IP network.

High Level Assembler Toolkit (HLASM Toolkit): The OS/390 Version 2 Release 5 optional priced HLASM Toolkit Feature will be enhanced to include a flexible source cross reference tool that locates uses of symbols, macros, and arbitrary character strings, and a workstation-based Program Understanding tool that provides graphic displays of control flows within single programs and across "linked" modules. These new tools, in combination with currently available Toolkit components, will provide flexible and powerful support for migrating applications to support year 2000 requirements.

OS/390 Version 2 Release 5 will include further enhancements to the cross reference tool to support other widely used programming languages, and a dataset comparison utility to help validate application modifications made for year 2000 support.

ISPF

- Web access to ISPF applications will provide the capability for an ISPF application to run on a network computer when referenced in an HTML Web page.

    − Java Workstation Agent Applet for ISPF Client/Server

        The ISPF Workstation Agent component will be ported to run as an applet on a JAVA 1.1 Virtual Machine. This applet will request an application to be displayed in the web browser environment. The applet makes the request to the ISPF Application Server.

    − ISPF Application Server

        This constitutes a server that is written as a JAVA application and receives requests for ISPF applications. These requests are paired with JCL and start ISPF as a batch GUI job. They are customized for the request as defined in the configuration and are submitted to OS/390. The result is an ISPF distributed GUI display of the application.

    For additional information, visit the ISPF Web page found at the following Internet URL:

    http://www.software.ibm.com/ad/ispf/

- VisualAge® for ISPF

    A customized VisualAge composition (WYSIWYG) editor that contains "parts" for creating and modifying ISPF panels will be provided. This workstation productivity application development utility will generate code for ISPF panels in the ISPF panel language. An OS/390 license will allow unlimited downloads of VisualAge for ISPF.

- ISPF Client/Server Performance Improvements

    Performance improvements will be made to cache strings and to optimize menu bar transmission between the ISPF Dialog Manager (DM) and the ISPF Workstation Agent. These performance improvements have an effect when running ISPF in GUI mode.

- Dialog Tag Language Enhancements

    The ISPF Dialog Tag Language (DTL) and compiler have added enhancements in the handling of: scrollable areas, indenting and formatting, image support, environment variable processing, DBCS field alignment, debug options, and table display.

- SCLM Storage Optimization

    Performance and storage optimizations will be made in the ISPF Software Configuration and Library Manager (SCLM) component for handling very large applications.

- SCLM Sample Project Setup

    A utility will be provided to create a sample Software Configuration and Library Manager (SCLM) project. The sample project can be used as the basis for a tutorial to teach a new user the basic functions and facilities of SCLM. The sample project can also be used as a starting point for a customer SCLM project.

- PDF Move/Copy Performance Improvements

    Enhancements will lead to more efficient utilization of IEBCOPY services and strengths for copying load and non-load data via a redesign of the ISPF Program Development Facility (PDF) Move/Copy interface.

- High Priority Customer Requirements and FIN APARs

    Customer satisfaction requirements and Fixed-If-Next APARs primarily across the ISPF PDF and DM components will drive this effort. This includes the modification of messages, tailoring of options, addition of z-variables, and product integration items.

Server Integration Initiative

Consolidation

DCE Base Services

- DCE Kerberos Version 5 Support

    − Support for OS/390 Kerberos Version 5 Applications

    − Support for DCE 1.1 and Kerberos Version 5 clients on workstations who use the Security Server on OS/390

    − Will provide GSS-AP Support for OS/390 Applications

- DCE performance

OS/390 Security Services (DCE Security Server Component)

- Kerberos Version 5 Support

    Enhancements will be made for the Kerberos function in DCE and the Security Server to support Kerberos Version 5 clients on workstations using the OS/390 Security Server. It will also support native Kerberos Version 5 applications on OS/390 and provides them with GSSAPI support. This enhancement will provide an integrated Security Registry for both DCE and Kerberos Version 5 applications. It also will provide the ability to obtain Kerberos tickets without the overhead of DCE when DCE function is not otherwise needed.

DCE Distributed File Service Enhancements: With OS/390 Version 2 Release 5, the IBM OS/390 UNIX System Services DCE Distributed File Service will include the following enhancements:

- OSF DCE 1.2.1 Enhancements

    DFS will include Replication™ Enhancements (RFC76), Bulk Status RPC for DFS (RFC89), and Set Server Preference (RFC74) support. Other aspects of the OSF DCE 1.2.1 DFS-related support was either already implemented in DFS for OS/390 or is not applicable to the OS/390 environment. This support will provide OS/390 customers with the Open Group's OSF 1.2.1 function or its equivalent.

- Performance Enhancements

    DFS for OS/390 will include enhancements that improve DFS™ server performance by increasing HFS and OS/390 record file data caching. Also to be included are enhancements that eliminate unnecessary DCE RPC overhead and avoid caching of DFS directory information with no loss of function or increase in DCE RPC communication with DFS servers. This will reduce DASD I/O for an OS/390 DFS client disk cache. This support will improve overall OS/390 DCE DFS performance that facilitates the implementation of new distributed applications on S/390. It also will allow the OS/390 DFS client to provide faster OS/390 application server access to file data exported by DFS servers.

- RAS/NLS/Message Enhancements

  General improvements to DFS messages and expanded NLS support will be provided. This support will improve overall DCE DFS RAS to facilitate the development of new distributed applications on S/390 that use DFS. The support will also complete the DFS for OS/390 upgrade to meet the NLS requirements and message/return code standards customers expect from S/390 products.

- AIX Compatibility Enhancements

  Miscellaneous improvements will be included based on the experiences of DFS users on other platforms. This will include the ability to limit the use of DFS client cache area by a user to a fair percentage of the available cache when the user is sequentially reading a large file. This support will improve overall DCE DFS for OS/390 quality by avoiding known DFS problems already detected by DFS customers on other system platforms and provides the latest DCE compatible function to OS/390 customers.

- Deliverable and Configuration Enhancements

  Installation improvements will further eliminate the exposure to overlaying existing customer modified configuration files when installing DFS using CBPDO. This support will make the DFS installation and configuration easier and more compatible with the OS/390 installation process.

- DFS Record File System Support Enhancements

  Improvements to the DFS record file (for example, Sequential, PDS(E), VSAM files) support will be provided which include the support for record file attributes to be specified on a file basis and the capability for a user to initiate a request to cause DFS to immediately release control of a record file. This support will enhance the DFS server support for OS/390 record file data which allows applications running on workstations to access file data stored on S/390 to take advantage of the S/390 data management strengths. Also, this support will continue to enhance the DFS server support for access to OS/390 file data by DFS clients running on other S/390 systems.

- DFS Client Configuration Enhancements

  This support will make DFS configuration more compatible with DCE configuration. It also will allow a separate configuration of the DFS Servers and DFS Client. The task of configuring DCE and DFS will be made easier. The new option to configure only the DFS servers on a S/390 system will promote the use of S/390 as the platform for running DFS servers to support workstation users and applications.

- DFS API to Support Mount Point Data R/W

  This support will be added to allow backup products, such as ADSM, to backup and restore DCE DFS mount point data on OS/390. A new w_pioctl option will be added to support reading and writing of the mount point data. Enabling additional backup support will also promote the use of S/390 as the platform for running DFS servers that provide file access for workstation users and applications.

Systems Management and Security

Security Server

Security Server Firewall Technology Enhancements: The following items are added to the Security Server to provide functions that are commonly associated with firewalls. This support enables the security server to provide additional security in a network computing environment.

- ftp proxy

  The ftp proxy server resides on the OS/390 system and authenticates users from the Internet attempting to access an ftp server on the intranet, as well as intranet users attempting to access Internet ftp servers.

- socks daemon

  The socks daemon is a generic proxy server that allows the administrator to control access to intranet or Internet resources by application of rules.

- Logging

  An enhanced version of the SYSLOG daemon collects log information from the firewall technology servers and records it to a file or to SMF.

- Configuration and administration

  Configuring and administering all of the firewall technologies is made easier by using these commands. For example, you can set up adapters, create filter rules for packet filtering and socks, define tunnels and set logging parameters.

DCE Security Server Support of Kerberos Version 5: In OS/390 Version 2 Release 5, enhancements will be made for the Kerberos function in the DCE Security Server to support Kerberos Version 5 clients on the workstations using the OS/390 Security Server. In addition, native Kerberos Version 5 applications on OS/390 will be supported with GSSAPI. This enhancement will provide an integrated Security Registry for both DCE and Kerberos Version 5 applications. It will also provide the ability to obtain Kerberos tickets without the overhead of DCE when DCE function is not otherwise needed.

Enhancements in HCD: For OS/390 Version 2 Release 5, HCD will have the following enhancements:

- Verification and priming of I/O configuration (Stage II)

  This is the second stage of support introduced in OS/390 Version 1 Release 3. It supports the priming of device self-description data, such as serial numbers and ESCON director port connections, not only as a separate step but also during the definition of new configuration elements. Furthermore it supports creating and updating the CONFIGxx member from the definition in the IODF.

- Large IODF and distributed configuration enhancements

  This function will allow the distribution of single configurations out of an IODF to a target system, and also the merging of distributed IODFs to a master IODF. This function includes:

  - Keeping the processor token in sync within a sysplex
  - Provision of distribution lists

  This function will provide relief for the primary user address space by accessing the IODF data via a separate data space.

SMP/E Enhancements: This release of the SMP/E element of OS/390 focuses on performance, usability, and application growth capability. All of the following line items have been designed to execute as a part of OS/390 Version 2 Release 5.

Client Code Installation: This capability will enable and/or provides facilities to make the installation of cooperative or client/server products (MVS — OS/2) more seamless from the user's perspective. This will be accomplished by means of a common SMP/E packaging structure, a common S/390 server repository for client components, and a server repository that will be accessible from any client platform. For example, the client parts will be stored in an HFS and, therefore, packaged and installed with the host parts.

Improved Load Module Build (LMB) Processing: This capability will reduce the likelihood of SMP/E incorrectly building a new load module during APPLY processing. LMB does not allow SMP/E to build a load module without including all of its component modules that have been installed or are being installed. If such a load module cannot be completely built, APPLY processing will terminate for all affected SYSMODs. More importantly, LMB will reduce the likelihood of termination because of incomplete load modules by expanding SMP/E's search for the component modules. This expanded search will use copies of modules from within previously installed SYSMODs that reside in the SMPPTS data set.

Global Zone Merge: This capability will provide a method for merging information from one Global zone into another Global zone. This includes:

- SYSMOD and HOLDDATA entries
- SYSMOD members in the SMPPTS data set
- OPTIONS, UTILITY, DDDEF, ZONESET, and FMIDSET entries
- Global Zone Entry information such as Zone Indices, FMID list, and SRELs

This function is particularly useful to ServerPac customers.

Performance Enhancements: The Performance line item will allow multiple link-edit operations to occur in parallel when the link-edit utility is reentrant and certain utility files can be dynamically allocated based on previous allocations. This parallelism should shorten elapsed time of an SMP/E APPLY, ACCEPT, or RESTORE when a large number of SYSMODs are being processed and several libraries are being updated by the link-edit utility. These enhancements will benefit customers who use Custom-Built processes, such as ServerPac and CBPDO.

Enhanced RECEIVE Command: This capability will enable SMP/E to optionally not RECEIVE SYSMODs that are already APPLIED and/or ACCEPTED. This will provide relief because the customer will not have to manually manage the SMPPTS using REJECT processing.

Reduce and Simplify SMP/E Messages: This function will allow easier identification of potential problems by reducing the number of messages issued during APPLY, ACCEPT, and RESTORE processing. In addition, this capability will modify SMPOUT 120 character width messages to an 80 character screen width.

Library Change Interface: This capability will provide a general-use programming interface that contains a synopsis of the processing done via SMP/E APPLY/RESTORE at the library/member level. This information will serve as input to a multi-system software distribution application/process (cloning/propagation).

API Asterisk (*) Subentry Support: This capability will introduce the support for the "*" in the entry and subentry parameters of the QUERY command.

API Version Support: This capability will supply the user with the version of the API that is being executed to retrieve information from the CSI. This will indicate if the information stored in the CSI is supported with the level of QUERY program that is being executed.

Load Module Return Code: This function will provide additional granularity for the highest acceptable return code values that are used for all link edit operations during SMP/E command processing. By providing additional granularity for the highest acceptable return code values, SMP/E will more accurately determine the success or failure of link edit operations on a load module by load module basis.

Distributed Transaction Processing

Transactional Processing Extensions

Object Transaction Service (OTS): In OS/390 Version 2 Release 5, Object Transaction Service (OTS) will use OS/390 Recoverable Resource Management Services to provide distributed transaction capabilities for OS/390 Component Broker's object based applications. The OS/390 Component Broker's object-based applications will be able to include both object-oriented resource managers as well as procedural resource managers as participants in a transaction. Existing transaction monitors, such as IMS, will participate as resource managers thus extending OO capabilities to existing procedural transaction applications as well as to database managers, such as DB2 and IMS DB.

S/390 Network Computing Progress Report

S/390 End-End Performance

Laboratory tests within IBM have demonstrated that business and database logic executed on OS/390 and launched from the Domino Go Webserver on the same system can have similar performance to applications launched via a transaction manager using 3270 data stream input. With this type of performance, new channels for business solutions can be launched directly from OS/390 at costs similar to existing OS/390 business solutions. This can help reduce or eliminate the need for adding web servers on alternative processors to front-end the business logic executing on S/390. This avoids the cost of additional security management and increased networking bandwidth while increasing simplicity in software migration and satisfying new demands for workload growth. Additional studies are being planned to measure local web transaction processing within a single OS/390 processor complex. This will be compared against alternative implementations of business transactions utilizing web servers on alternative platforms that front end OS/390 business logic. It is expected that in larger scale e-business environments, web servers that are not operating on OS/390 will need to be replicated across multiple servers and result in additional management complexity and costs versus a business solution that incorporates both the Web server and business logic in a single OS/390 processor complex.

Domino Go Webserver 4.6 for OS/390 — Integrated into Version 2 Release 4

DominoGo Webserver (formerly called Lotus Go Webserver) is defined by the IBM Network Computing Framework as a scalable high performance web server including state-of-the art security, site indexing capabilities and advanced server statistics. It includes the function of the Internet Connection Secure Server, NetQuestion, and Web Usage Mining.

For S/390 users, many of the capabilities are available for OS/390 Version 1 Release 3. OS/390 Version 2 Release 4 integrates all the components as part of the base product.

Customers who have committed themselves to OS/390 as the platform for highly secure, scalable transaction processing have their investment protected on this platform as they evolve into the dynamic world of e-business.

Domino Go Webserver Pro, a separate product from OS/390, adds two workstation-based content creation tools — NetObjects Fusion and the Lotus BeanMachine. NetObjects Fusion is a desktop front-end for creating web content. As Web content is created, it can be housed/stored natively in a S/390 file system and accessed via the Domino Go Webserver or the IBM Internet Connection Secure Server for OS/390 to provide the traditional S/390 strengths of high availability, security, and scalability. Using the Lotus BeanMachine, Java applets can be developed and tested on desktops, then stored and targeted for deployment natively on an S/390 server. S/390 can eliminate the need to set up an intermediate server to deploy either applications or web content.

Domino Go Webserver 4.6.1 for OS/390 Integrated into Version 2 Release 5

IBM plans to deliver this release as a separately orderable product in fourth quarter 1997, with the following functional extensions:

- %%CERTIF%% Support: This support allows the OS/390 Security Server to receive a certificate from the Domino Go Webserver and use the certificate in place of a userid and password.

- JAVA Servlet Support: JAVA Servlet (internal and external process) support will be enabled under OS/390 based on the latest available JDK 1.1 driver.

- Performance Enhancements: Improvements have been made to the processing of base server requests, yielding overall increase in request throughput.

- Proxy Enhancements: Numerous changes have been implemented and tested based on customer environments. These changes have also been field tested and resulted in overall RAS improvements to the Web server.

- Security: Upgrading Certificate Roots & Request Process — "certutil" will be enhanced or replaced to issue online and off-line certificates to Domino Go Webserver servers, other vendor servers and client certificates for Netscape browsers. One will be able to import certutil generated CA roots into the Netscape and MSIE browsers. Support for other vendor CA roots will be available in addition to Verisign.

Firewall Technology

In order to continue to keep OS/390 on the leading edge of security technology, IBM is delivering in December 1997, firewall technologies for OS/390 Version 2 Release 4, installable on both the Communication and Security servers. IBM plans to integrate these firewall technologies into OS/390 Version 2 Release 5. Both the Communications Server and Security Server firewall technologies will be integrated into their respective servers.

1. Communications Server Enhancements: TCP/IP is enhanced to include support for IP packet filtering, IPSec, and Network Address Translation. For more information, refer to the **OS/390 Version 2 Release 5 Functional Description — Network Computing Initiative** section.

2. Security Server Enhancements: FTP proxy support, socks daemon support, logging, and configuration enhancements have been added to the Security Server to complement the Communications Server enhancements. For more information, refer to the **OS/390 Version 2 Release 5 Functional Description — Systems Management and Security** section.

IBM Digital Library for OS/390

IBM intends to extend its platform support for IBM Digital Library to include OS/390. This will expand a customer's choice of client and server platforms and of hardware and software which best suits their development needs. The security, scalability, and ability to support large volumes of data as well as very large objects make OS/390 an ideal environment for IBM Digital Library customers who need to support large numbers of concurrent users.

For more information about IBM's Digital Library for OS/390, refer to Software Announcement 297-312, dated August 12, 1997.

BookManager BookServer for World Wide Web for MVS/ESA, V2.1

This product has been integrated as a new base element of OS/390 Version 2 Release 4. To learn more about IBM BookManager BookServer for World Wide Web for MVS/ESA, refer to Software Announcement 297-046, dated March 11, 1997.

Java for OS/390

Java for OS/390, at the JDK 1.1.1 level, is available from the Internet this month. It is certified as a fully compliant Java product. With this announcement, OS/390 becomes a Java execution environment with function equivalent to that available on any other server platform.

To achieve optimal performance, a **Just-In-Time** (JIT) compiler built specifically for OS/390 will be included. The JIT compiler provides execution time improvements over the interpreter. In addition to improving the JIT, IBM plans to make a Java static compiler available to a limited audience early in 1998. This is intended to introduce the technology to our customers with the goal of making a product available later in 1998.

Java can be used to build traditional commercial, as well as Internet/intranet applications using standard interfaces such as CGI and IC-API. In addition to the normal means of invoking a Java application, a Java object can be invoked by a business application running under the management of the Component Broker for OS/390.

Java for OS/390 will enable applications access to transactions, databases, and other S/390 subsystem assets. By year end, IBM plans to make class library support available that will allow OS/390 Java applications to access relational data, invoke IMS and CICS transactions, and access record structured data via these subsystems, as well as the invocation of MQSeries™.

Access to local or remote relational data will be provided via the DB2 for OS/390 Java DataBase Connectivity (JDBC) application support, also known as JDBC support

for DB2. This support will be provided as a separate feature, at no additional charge, to all DB2 for OS/390 Version 5 Release 1 customers. JDBC Support for DB2 is available coincident with the availability of JDK 1.1.1 and may be ordered via normal DB2 fulfillment channels. Additional information about this free feature is available from the following URL:

http://www.s390.ibm.com/java

Access to IMS for Java applications is available today through the IMS Client for Java. For additional details, refer to the **"e-business Enterprise Connectors and S/390"** section.

Access to CICS/ESA® from Java workstations is available via the CICS Gateway for Java which has been ported to OS/390. The CICS Gateway for Java on MVS will be packaged on the CICS Client Version 2.0.2 CD-ROM. Later levels of the gateway will be available for download from the Web via the CICS internet home page:

http://www.hursley.ibm.com/cics/internet/

Java for OS/390 is available to OS/390 licensees at no additional charge. It will be available through two mediums: Tape and the Internet. To get the product on tape, the normal PID ordering process must be used. Ordering information for Java for OS/390 and the DB2 for OS/390 JDBC support will be available within 45 days. To get the product from the Internet, there are two options: FTP download and via a Web browser. To get the product via an FTP download, the exec **AJVBOOT** is provided in SYS1.SAMPLIB in OS/390 Version 2 Release 4. This executable script allows you to download the product directly to the operating system. To get the product via Web browser from the Internet, go to the home page listed below. Besides getting the product, the following URL provides information about subsystem support (CICS, IMS, DB2, MQ™, and record-oriented data), documentation, service, frequently asked questions, and links to related Web sites:

http://www.s390.ibm.com/java

e-business Enhancers and S/390 — 2216 Nways™ Multiaccess Connector Exploitation of the S/390 Parallel Sysplex

The Interactive Network Dispatcher, part of the IBM Network Computing Framework is a key e-business Enhancer, enabling building and management of scalable Web servers. It is a TCP/IP connection router and load management software that supports multiple back-end servers and allows busy Web sites to increase capacity by linking many individual servers connected to a single server. It provides scalable intelligent load balancing; high availability; easy installation and configuration; and customizable metrics.

With the integrated Interactive Network Dispatcher, the 2216 and/or the 2210 router provides high-capacity load balancing and high availability for IP applications on S/390 servers — helping companies gain competitive advantages by making information available via the Internet, intranets, and extranets to their customers, employees, and business partners.

The Network Dispatcher function provides load balancing among a set of IP servers adjacent to the router running this function. The load-balancing mechanism uses technology from IBM's Research Division to determine the most appropriate server to receive each new connection. Subsequent traffic for that connection is then forwarded to the same server. The routing is transparent

to users and other applications. The load information is obtained from a set of weights based upon number of connections active per server, number of new connections since the last interval, feedback from response time of individual HTTP, FTP, SSL servers, and configurable policy information.

For more information about the 2216 router, refer to Hardware Announcement 197-340, dated September 9, 1997.

For more information about the 2210 router, refer to Hardware Announcement 197-354, dated September 9, 1997.

DNS Connection balancing to a Parallel Sysplex

The benefits of the Parallel Sysplex (scalability, availability, and performance) are brought to TCP/IP applications via this enhancement. For example, customers can elect to have the OS/390 Workload Manager (WLM) allocate web requests within a Parallel Sysplex based upon user defined policies.

For more information, refer to the **OS/390 Version 2 Release 4 Function Description — eNetwork Communication Server Enhancements** section.

e-business Enterprise Connectors and S/390

IBM e-business Enterprise Connectors connect the data in your entire enterprise to the Web. Leverage your existing data and transactions in your Web applications and quickly deploy secure, scalable, and reliable Web applications. Connect to data and transactions in DB2, IMS, and MQ Series with this suite of connectors. Choose from Net.Data™, IMS Connectors for S/390, AIF Internet Gateway connectors, CICS connectors for S/390, and MQ Internet Gateway connectors.

The IMS Connectors consist of four recently-made available solutions, plus a new object solution, which provide connectivity from the Web to transactions and data in IMS. These solutions allow a customer to match their communications infrastructures, used with IMS, to their Web server configuration. The IMS WWW Templates contain templates for providing Web access to IMS TM that accept APPC connections. The IMS Web uses a TCP/IP communication infrastructure and middle-tier Web servers to make IMS transactions available on the Web. The IMS TCP/IP OTMA Connection provides enhanced communication linkages between remote workstations and IMS. The IMS Client for Java provides code for preparing a Java program to access IMS applications and data running in a S/390. These solutions are now all generally available and downloadable free from the Internet accessible through the IBM Connectors home page:

http://www.ics.raleigh.ibm.com/ibmconnectors

or the IMS home page:

http://www.software.ibm.com/data/ims

Additional enhancements are being provided for these connectors throughout the rest of 1997. In addition, a new IMS Object Connector is also being provided for object access to IMS data.

- The IMS WWW Templates: Additional enhancements available September 30, 1997, include:

  - Extended template language for MFS based transactions. The HTML page template language is also available for defining IMS input and output.

- Additional definition language capabilities. 3270 attributes are also supported.

- Two dimensional arrays are supported for template data.

- Conversational IMS transactions are supported for ICAPI programs. Multiple IMS transactions (or multiple output pages from one or more transactions) are accessible from a single HTML page. This allows consolidating data for web presentation, or implementing compound transactions in the ICAPI or CGI program (appearing as a single transaction to the web browser).

For use in an OS/390 environment, these are also available along with a number of other samples and tools, through the OS/390 BonusPakII and through its home page at:

http://www.s390.ibm.com/nc/bonuspak

- IMS TCP/IP OTMA Connection: Additional enhancement available December 31, 1997, with IMS ITOC Version 2 include Java classes which can be used to interface with IMS, making IMS access simpler to use in a Java environment. These classes take messages from a Java client and send an OTMA message to the host IMS via TCP/IP and return output to the Java application.

- IMS Web: Additional enhancements available September 30, 1997, with IMS Web V1.2 include:

  - Net.Data Support: This provides the capability to generate the Net.Data Web macro. With this generated macro, a user can then run IMS transactions from a Net.Data environment.

  - OS/390 and Webserver support: provides the OS/390 runtime components and the ability to generate the files and access IMS from the S/390 Webserver (either the Internet Connection Secure Server for OS/390 or the Domino Go Webserver for OS/390).

Additional IBM Web V2.1 enhancements available December 31, 1997, include:

  - Conversational Support: supports IMS conversational transactions on the Web from TCP/IP environments, allowing the end user to retain message continuity from a given device.

  - Security Enhancements: allows an IMS Web client to pass the passticket and userid in the prefix userdata section through the IMS TCP/IP OTMA Connection.

- IMS Client for Java: Additional enhancement available December 31, 1997, includes support for IMS conversational transactions, allowing the end user to retain message continuity from a given device.

- IMS Object Connector: The IMS Object Connector provides a new, easier way to access IMS DB data. This solution begins beta on December 31, 1997, and is downloadable free from the Internet, accessible through the IBM IMS home page:

http://www.software.ibm.com/data/ims

The IMS Object Connector deploys new OO application programs to access IMS DB data. The OO applications are either IMS DB batch or IMS TM applications. These applications can also be invoked from an Internet Web browser. The IMS Object Connector generates C++ classes which wrap IMS DB

segments. And with its runtime support, OO application programs can access IMS DB data through these generated classes. This offers improved application programmer productivity by supporting OO programming, eliminating DL/I coding, and supporting use of OO programming tools.

CICS Connectors Extensions for S/390

- Bridge for running 3270-based CICS transactions: All CICS clients now have direct access to 3270 applications running on S/390. Clients could be web browsers or program calls like RPC or MQ. Additionally, the existing CICS Web Interface now provides a dynamic link library (DLL) application that uses the IC-API function of either the Domino Go Webserver or the IBM Internet Connection Secure Server (ICSS) to provide key Web server functions like security, availability, and scalability. Existing CICS Web Interface applications can run unchanged. Tools are provided to create HTML pages from existing Basic Mapping Support (BMS) definitions.

- Java Client support: The CICS Gateway for Java on MVS will be packaged on the CICS Clients Version 2.0.2 CD-ROM. Later levels of the gateway will be available for download from the Web via the CICS internet home page:

http://www.hursley.ibm.com/cics/internet/

For more information about these CICS Connectors extensions, refer to Software Announcement 297-353, dated September 9, 1997.

ICSF/MVS

A new version of Integrated Cryptographic Services Facility/MVS (ICSF/MVS) was made made available on June 30, 1997. This functional level of ICSF is also available as an element of OS/390 with OS/390 Version 2 Release 4.

ICSF Version 2 Release 1 provides the software interface to the hardware Cryptographic Coprocessor Feature of the S/390 Parallel Enterprise Server™ Generation 3 or 4, or the S/390 Multiprise 2000 models. ICSF Version 2 Release 1, along with the Cryptographic Coprocessor Feature, extends the capabilities of the new CMOS machines with new exportable data encryption, Public Key and Hashing algorithms.

For more information, refer to the **OS/390 Version 2 Release 4 Function Description — ICSF/MVS Version 2.1** section, or Software Announcement 296-341, dated September 10, 1996.

Net.Commerce for OS/390

IBM plans to provide support for the newest release of Net.Commerce Version 3 on the S/390 platform in first half 1998. Net.Commerce Version 3 provides significant new enhancements with the introduction of Catalog Assistant — a powerful new technology designed to help customers make complex purchasing decisions, support for payment transactions using the Secure Electronic Transaction (SET) protocol, and CommercePoint™ eTill — a merchants electronic cash register for Internet purchases and performance/scalability improvements utilizing the inherent strengths of the S/390 platform.

A beta version of Net.Commerce Version 3 with SET based on Visa/MasterCards final specifications, and CommercePOINT eTill will be available in the fourth quarter 1997 timeframe for selected customers.

IBM CommercePOINT Gateway

IBM plans to provide support for the CommercePOINT Gateway on S/390 in the first quarter 1998 timeframe. A beta test of the S/390 function will begin in the fourth quarter 1997 timeframe to selected customers. CommercePOINT Gateway is the interface between a merchant's Web site and current credit card processing systems over proprietary networks. Refer to Software Announcement 297-359, dated September 9, 1997, for additional details on IBM CommercePOINT Gateway.

IBM CommercePOINT eTill

IBM plans to provide support for the CommercePOINT eTill on S/390 in the first quarter 1998 timeframe. A beta test of the S/390 function will begin in the fourth quarter 1997 timeframe to selected customers. CommercePoint eTill accepts payments from the cardholder via the Internet and passes information along to financial institutions for approval. Refer to Software Announcement 297-361, dated September 9, 1997 for additional details on IBM CommercePOINT eTill.

Fee-Based Software Services Offerings: SmoothStart Services for OS/390: Refer to the **Additional Information — OS/390 Version 2 Release 4 — Fee-Based Software Services Offerings** section for additional information, or contact IBM at 800-IBM-4YOU (426-4968).

Service Update Facility/390

The S/390 Service Update Facility provides an Internet-based GUI interface tool to help S/390 Customers (VM, VSE, and OS/390) obtain corrective and preventive service.

Refer to the **Additional Information — OS/390 Version 2 Release 4 — Fee-Based Software Services Offerings** section for additional information, or refer to the S/390 Technical Support home page, found at:

http://service.software.ibm.com/390launch.html

OS/390 Transaction Processing Services Progress Report

IBM provides the world's leading Transaction and Database Servers — IMS TM, CICS, and DB2, on its OS/390 systems. These Online Transaction Processing Systems (OLTP) or Transaction Monitors, are the transaction processing systems of choice for business applications of the world's largest enterprises and for small and medium sized customers as well. These OLTP products and their database products — IMS DB, CICS VSAM File Control, and DB2, are continually extended and enhanced to exploit new technology for the customer's advantage and have maintained and protected the customer's investment in applications and data managed by these products.

Already, OS/390 provides, as an integral part of the system, commit coordination or syncpoint management as part of OS/390 Recoverable Resource Management Services (RRMS). The transactional capabilities provided by RRMS and APPC/MVS were enabled in OS/390 through the service stream via PTF for APAR OW23450. These services, called Recoverable Resource Management Services (RRMS), provide transactional processing capabilities to all of OS/390's application environments and support both local and distributed commit scopes.

Recoverable Resource Management Services consists of three parts for managing transactional work in OS/390:

1. Context Services for the identification and management of work requests

2. Registration Services for identifying a Resource Manager to the system

3. Resource Recovery Services or RRS to provide services and commit coordination for all protected resource managers that participate in a work request's transactional scope in many of OS/390 application environments

These services provide transactional coordination of two phase commit and, together with participating communication managers, provide distributed transactional capabilities for work requests in OS/390 application environments. New OS/390 transaction servers and resource managers can use these services to introduce or extend their distributed transactional processing capabilities. Because IMS TM, CICS, and DB2 provide their own transaction management services, they do not require these services but can use these services to extend the transactional scope of their commit processing. These services provide heterogeneous communication managers, database managers, transaction monitors, and servers the means to participate in a local commit scope within one or more OS/390 application environments or as part of a distributed commit scope supported by a participating communication manager.

Where existing distributed processing capabilities do not exist, these new system services can enable OS/390's existing OLTP information systems, IMS and CICS, to extend their distributed processing capabilities so that clients and distributed servers have transactional access to IMS and CICS through the protocol that is appropriate for the distributed environment. Multiple client/server platforms can have distributed transactional access to new or existing OS/390 Transaction and Database servers through one of the following distributed communication protocols:

- APPC/MVS support for SNA's LU6.2 Syncpoint architecture (already in the OS/390)
- Transactional RPC support on OS/390
- Object Transaction Service (OTS) based on OMG's COBRA specification (available with Component Broker for OS/390)

Both OS/390's traditional transaction server environments, new servers, and application execution environments, such as:

- DB2 Stored Procedures
- Component Broker for OS/390
- BATCH
- TSO/E
- APPC/MVS

will have transactional access to one or more resource managers, transaction managers and communication protocols, such as the following:

- DB2
- MQ Series for MVS/ESA
- IMS
- CICS
- APPC LU 6.2 Protected Conversations
- Transactional RPC
- OTS

They will enable the creation of new transactional applications and combinations of new and existing transactional applications.

Resource managers, such as DB2, MQ Series for MVS/ESA, transaction monitors, such as IMS and CICS, and multiple communications protocols, such as APPC Protected Conversations, Transactional RPC and OTS, can use these services to provide new transactional applications as well as combinations of new and existing transactional applications. These new capabilities will allow applications to take advantage of existing investments in business applications, new application technologies, distributed protocols of choice, the parallel sysplex, and the strengths of OS/390 for scalability, reliability, availability, security, integrity, and the system management of a distributed enterprise environment.

Already enabled for OS/390, DB2 Version 5 provides a new OS/390 RRS Attach Facility that uses the Recoverable Resource Management Services. This enables DB2 to participate in commit scopes with other participating resource managers for most OS/390 application environments. DB2 Stored Procedures also use the Recoverable Resource Management Services to participate in commit scopes with other participating resource managers as well as the commit scope of other transaction servers.

The following describes products and functions being introduced beginning with OS/390 Version 2 Release 4 that can use the Recoverable Resource Management Services to extend transaction processing on OS/390.

Beginning with OS/390 Version 2 Release 4 time frame, Recoverable Resources Management Services provide the means for the OS/390 Encina Toolkit Executive to support the distributed transactional protocol, Transactional RPC (TRPC) for OS/390 IMS/ESA® Transaction Server. Through similar extensions, DCE servers and any OS/390 participating resource manager or transaction monitor will have the capability to participate in TRPC initiated transactions. This will allow clients on heterogeneous platforms and workstations TRPC access to existing IMS transaction processing environments for new and existing applications. Because IMS participates as a resource manager, the Transactional RPC scope will be extended to existing transaction applications and, potentially, to any database or resource managers that are currently accessible to IMS.

Beginning in the Component Broker for OS/390 beta, Object Transaction Service (OTS) will use these same base system services to provide distributed transaction capabilities for OS/390 Component Broker Series' object-based application server. The Component Broker's object-based server applications include both OO resource managers and procedural resource managers as participants in a transaction. Existing transaction monitors, such as IMS, can participate as resource managers thus extending OO capabilities to existing procedural transaction applications as well as to database managers, such as DB2 and IMS DB.

The integration of WLM and Parallel Sysplex technology with DB2, IMS, CICS, the Component Broker object-based application servers, RRMS, and the work routing capabilities of APPC/MVS, CICS, DCE, IMS, TCP/IP, and VTAM, gives installations more control and management of their business applications and the total resources of the sysplex, consistent with the priorities and policies of their business objectives.

In summary, these capabilities, over time, allow new and existing applications to take advantage of existing investments in business applications, new application technologies, distributed protocols of choice, Parallel Sysplex technology, and the strengths of OS/390 for scalability, reliability, availability, security, integrity, and the system management of a distributed enterprise environment for their transaction processing requirements.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Technical Information

Specified Operating Environment

Hardware Requirements

- All models of the S/390 Parallel Enterprise Servers or S/390 Parallel Transaction Servers (IBM 9672).

- All models of the S/390 Multiprise™ 2000.

- All models of the ES/9000® Processor Unit 9021, the 9121, or the 9221.

- An ES/3090™-9000T processor (Models 15T, 17T, 18T, 25T, 28T) that supports Enterprise Systems Architecture/370™ (ESA/370™) and can have optional ESA/390™ facilities.

- An ES/3090 Model E, S, J, or JH processor at the appropriate engineering change (EC) level that supports the Enterprise Systems Architecture/370.

- An ES/4381™ Model Group 90E, 91E or 92E processor that supports the Enterprise Systems Architecture/370.

- Enhanced LPAR mode operation is supported on all PR/SM™-capable IBM processors in hardware configurations of two or more CPs with the exception of the ES/9000 Processor Unit 9221 Model 200.

- PC Server System/390® or RS/6000 with S/390 Server-on-Board.

- Coupling Facility — A production coupling facility can be an IBM 9674 running the coupling facility control code in a PR/SM LPAR. The coupling facility control code can also run in a 9021 711-based model, or a S/390 Parallel Enterprise Server or S/390 Parallel Transaction Server (IBM 9672) in a PR/SM LPAR. For additional information, refer to Hardware Announcement 194-082, dated April 6, 1994, and Hardware Announcement 194-281, dated September 13, 1994.

- Coupling Facility Channels: Coupling facility channels (also referred to as coupling links), are high-bandwidth fiber optic links that provide high-speed connectivity between the coupling facility control code and the MVS/ESA or OS/390 systems running in CEC's (also referred to as CPC's) which use the services of the coupling facility control code. These channels are supported on all 9021 711-based models, 9121 511-based models, and the S/390 Parallel Enterprise Server or S/390 Parallel Transaction Server (IBM 9672).

- Sysplex Timer®: A Sysplex Timer is required to synchronize the time-of-day (TOD) clocks in all the CPCs attached to the coupling facility.

RMF Performance Monitoring of OS/390

- Workstation with a Pentium® processor with more than 90MHz

- At least 32MB RAM, more than 40MB disk space

- Network adapter

- SVGA graphic card

- 17-inch display with a resolution of 1024 x 768, or more, recommended

OS/390 Application Enabling Technology Element (OS/390 AET): OS/390 AET runs on all hardware that is supported by OS/390 with the following exceptions. The Control Center support for the OS/390 Application Enabling Technology element is based upon OS/2 and runs on either the PC Server S/390 or the Hardware Management Console (HMC) when the HMC is attached to any model of the Multiprise 2000 or to any 9672 model, via channel attached 3174. The HMC must be exclusively attached to the processor by coax cable. The Control Center, at this time, only supports OS/390 AET when it is running in basic mode (not in a logical partition).

Additional assistance comes with OS/390 AET. An HCD I/O Definition File is included that contains configurations for all models of the S/390 Multiprise 2000. These configuration examples may be changed to fit individual needs.

HCM GUI: The HCM GUI requires at least the following:

- Workstation with at least 50 MHz processor speed
- 16MB of memory
- 30MB hard disk space
- VGA resolution screen
- Mouse or other pointing device
- OS/2 Version 2.1 (or later) with Communication Manager/2 1.0
  or
- Windows® Version 3.1 with PCOM 4.1 for Windows

Software Requirements

The OS/390 base is an IPL-able system. There are no hard requirements in order to IPL. Specific functions may require additional products not included in OS/390 base, or in the optional features of OS/390. Refer to information provided below, as well as *OS/390 Planning for Installation* (GC28-1726) for a listing of specific PTF numbers.

Minimum Levels of Related Products: The following, or equivalent, must be installed at, or above, the release levels specified below to operate with OS/390:

- ACF/TCAM Version 2 Release 4 (5735-RC3) with PTFs or ACF/TCAM Version 3 Release 1 (5665-314) with PTFs

- Application System (AS) Version 2 Release 2 (5688-108) with PTF

- BTAM/SP (5665-279)

- CICS/ESA Version 4 Release 1 (5655-018)

  (Also refer to, in OS/390 Migration Considerations section, CICS/ESA Migration Consideration for information about CICS/ESA Version 3.3.)

- CICSPlex® System Manager/ESA (CICSPlex SM) (5695-081) Version 1 Release 2

- DATABASE 2™ (DB2) Version 3 Release 1 (5685-DB2)

- DITTO/ESA Version 1 Release 1 (5655-103)

- ESCON Manager Version 1 Release 3 (5688-008) with PTF

- GAM/SP Release 3.1 (5668-978) with PTF

- IMS/ESA Version 4 Release 1 Database Manager (5685-012) with PTFs

- IMS/ESA Version 4 Release 1 Transaction Manager (5685-013) with PTFs

- NetView® Version 1 Release 3 MVS/XA™ (5665-362) with PTFs (in compatibility mode) or Version 1 Release 3 for MVS/ESA (5685-152) with PTFs

- Operations Planning and Control/ESA (OPC™/ESA) Version 1 Release 2 (5695-007) with PTFs

- PSF/MVS Version 2 Release 2 (5695-040) with PTFs

- Service Level Reporter (SLR) Version 3 Release 3 (5665-397) with PTF

- System Automation for OS/390 Version 1 Release 2 (5645-005)

- SystemView Enterprise Performance Data Manager/MVS (EPDM) Version 1 Release 1.0 (5695-101) or Performance Reporter for MVS Version 1 Release 2 (5695-101)

- VM/ESA® feature (5684-112), or later

- VPSS Version 1 Release 1 (5665-301) with PTFs

Functional Requirements

ISPF Client/Server: The following are software requirements for an optional ISPF Client/Server implementation. The ISPF Client/Server runs on a variety of workstation environments and runs connected with a variety of TCP/IP and APPC communication products.

- Operating system environments

  The following workstation operating systems are used in various supported combinations; any implementation must minimally be at the levels specified:

  - OS/2 Version 2.0

  - Microsoft® Windows Version 3.1 and DOS Version 5.0

  - Microsoft Windows for Workgroups Version 3.11

  - AIX Version 4.1.4 with X Release 5 Motif Version 1.2

  - HP-UX Version 9.03 with X Release 5 Motif Version 1.2

  - Solaris Version 2.5 with X Release 5 Motif Version 1.2

- TCP/IP environments

  - If the presentation interface is OS/2 or Microsoft Windows Version 3.1 running under OS/2, one of the following is required:

    -- IBM TCP/IP for OS/2 Version 1.2.1 (for OS/2 Version 2.0)
    -- IBM TCP/IP for OS/2 Version 2.0 (for OS/2 Version 2.0 or Version 2.1)
    -- Novell LAN Workplace™ for OS/2 Version 3.0 (for OS/2 Version 2.1)

  - If the presentation interface is Microsoft Windows 3.1 running on DOS, one of the following is required:

    -- IBM TCP/IP for DOS Version 2.1.0 with Corrective Service Diskette (CSD) Version 2.1.0.4, or later version, for TCP/IP for DOS

    -- Novell LAN Workplace for DOS Version 4.2

    -- FTP Software PC/TCP for DOS/Windows Version 2.3

    -- NetManage Chameleon TCP/IP for Windows Version 4.01

    -- Wollongong Pathway Runtime for DOS/Windows Release 2.0

    -- WRQ Reflection Suite for TCP for Windows Version 5.6

- If your presentation interface is Microsoft Windows for Workgroups Version 3.11 running on DOS, the following is required:

  -- Microsoft TCP/IP-32 for Windows for Workgroups Version 3.11

- If the presentation interface is AIX, HP-UX, or Solaris, TCP/IP should already be included in the base operating system.

- APPC environments

  - If the presentation interface is OS/2 or Microsoft Windows running on OS/2, one of the following is required:

    -- OS/2 Communications Manager/2 Version 1.1 or Version 1.11

    -- OS/2 Access Feature of Communications Server for OS/2 Warp, Version 4

  - If the presentation interface is Microsoft Windows running on DOS, the following is required:

    -- APPC Networking Services for Windows Version 1.00.02 (base product with CSD #2)

OS/390 Application Enabling Technology

The OS/390 Application Enabling Technology element requires the following products or equivalents.

- OS/390 Version 2 Release 4 Base Elements

- OS/390 Version 2 Release 4 Optional Features

  - C/C++ with Debug Tool
  - DFSMSdss
  - Resource Measurement Facility™ (RMF)
  - System Display and Search Facility (SDSF)
  - Security Server

- Non-OS/390 Version 2 Release 4 Products

  - IBM System Automation for OS/390 Version 1 Release 2 (5645-005)

  - IBM PL/1 Runtime Library Version 2 Release 3 (5668-911)

  - IBM NetView for MVS/ESA Version 3 Release 1 (5655-007)

  - IBM Library for SAA REXX/370 Version 1 Release 3 (5695-014)

RMF performance monitoring: RMF functions require the following software on the workstation:

- OS/2 Warp Version 3.x (family) with FixPak XR_W022 or OS/2 Warp Version 4 with FixPak 1
- CM/2 Version 1.11 with APPC support or Communication Server Version 4.1 for OS/2

Virtual Storage Requirements

Virtual storage requirements will be provided at general availability. This information will be available in OS390PRF.Package on MKTOOLS. Consult your marketing representative at general availability.

Compatibility

Products previously supported on the existing functions integrated into OS/390 will continue to be supported by OS/390.

Migration Flexibility: In a multisystem complex or sysplex configuration, three consecutive releases of OS/390 can coexist (Releases 1, 2, and 3 or Releases 2, 3, and 4, for example), thereby providing migration compatibility and flexibility. All OS/390 releases can also coexist with supported MVS systems in a multisystem complex or sysplex.

Two consecutive releases of key subsystems running on OS/390, such as DB2, CICS, and IMS, can coexist within a multisystem complex or sysplex.

Within a sysplex, the following chart illustrates the JES2 release levels that can all coexist in the same multi-access spool (MAS):

JES2 Level	FMID
Version 5.1	HJE5510
Version 5.2	HJE5520
OS/390 Version 1 Releases 1 and 2[3]	HJE6601
OS/390 Version 1 Release 3	HJE6603
OS/390 Version 2 Release 4	HJE6604

[3] The JES2 functional level is the same.

Within a sysplex, the following chart illustrates the JES3 release levels that can all coexist in the same JES3 complex:

JES3 Level	FMID
Version 5.2.1	HJS5521
OS/390 Version 1 Releases 1 and 2[4]	HJS6601
OS/390 Version 1 Release 3	HJS6603
OS/390 Version 2 Release 4	HJS6604

[4] The JES3 functional level is the same.

Specific functions, such as WLM Batch Management may only be available on the up-level systems, or it may be necessary to up-level all systems to enable some functions.

JES Compatibility: OS/390 Version 2 Release 4 is upwardly compatible with MVS/ESA Version 5 Release 2.2, OS/390 Release 1, OS/390 Release 2 and OS/390 Release 3.

OS/390 Version 2 Release 4 will run with the JES component shipped with the following versions and releases:

JES2	JES3
MVS/ESA SP-JES2 4.2 + PTF	
MVS/ESA SP-JES2 4.3 + PTF	MVS/ESA SP-JES3 4.2.2 (FMID HJS4421) (shipped after December 27, 1991) + PTF
MVS/ESA SP-JES2 5.1 + PTF	MVS/ESA SP-JES3 5.1.1 + PTF
MVS/ESA SP-JES2 5.2 + PTF	MVS/ESA SP-JES3 5.2.2
OS/390 Release 1 JES2	OS/390 Release 1 JES3
OS/390 Release 2 JES2	OS/390 Release 2 JES3
OS/390 Release 3 JES2	OS/390 Release 3 JES3
OS/390 Version 2 Release 4 JES2	OS/390 Version 2 Release 4 JES3

JES2 and Sysplex

Single MVS Image: Customers will be required to build a sysplex when OS/390 is installed. In a single system sysplex, XCF can be configured in local mode, so there is no requirement for a sysplex couple dataset.

Multi-Access Spool with Multiple MVS Images Using One CPC: Customers will be required to use a sysplex when OS/390 is installed. XCF must be configured with a sysplex couple dataset so that JES2 can keep track of member status.

If a JES2 release prior to MVS/ESA SP-JES2 Version 5 Release 1 is used in conjunction with OS/390, a sysplex is not required. For this type of configuration, the JES2 multi-access spool (MAS) must have seven or fewer MVS images.

For customers using multiple MVS images, the JES2 element of OS/390 cannot be mixed with other pre-Version 5 levels of JES2 in the same JES2 MAS.

Multi-Access Spool with Multiple MVS Images Using Multiple CPCs: Customers will be required to use a sysplex when OS/390 is installed. A Sysplex Timer is required to synchronize time across the CPCs.

If a customer chooses to use a JES2 release prior to MVS/ESA SP-JES2 Version 5 Release 1, a sysplex is not required. However, the JES2 MAS that is implemented cannot contain more than seven MVS images.

For customers using multiple MVS images, the JES2 element of OS/390 cannot be mixed with other pre-Version 5 levels of JES2 in the same JES2 MAS.

Customers intending to mix the OS/390 Version 2 Release 4 level of JES2 with other levels in the same JES2 MAS should consult the JES2 Migration Notebook for precautions to be taken in connection with cold starts.

JES3 and Sysplex

Single MVS Image: Customers will be required to build a sysplex when OS/390 is installed. In building a single system sysplex, XCF can be configured in local mode, so there is no requirement for a sysplex couple dataset.

Multiple MVS Images Using One CPC: Customers will be required to use a sysplex when OS/390 is installed. The sysplex couple dataset required by XCF must be allocated and used.

If a JES3 release prior to MVS/ESA SP-JES3 Version 5 Release 1.1 is used in conjunction with OS/390, a sysplex is not required. For this type of configuration the JES3 complex must have eight or fewer MVS images.

For customers using multiple MVS images, the JES3 optional feature of OS/390 cannot be mixed with levels of JES3 prior to JES3 5.2.1 in the same JES3 complex. When migrating to OS/390 JES3, the JES3 feature must be migrated to the global processor before it is migrated to any local processor.

Multiple MVS Images Using Multiple CPCs: Customers will be required to use a sysplex when OS/390 is installed. A Sysplex Timer is required to synchronize time across the CPCs.

If a customer chooses to use a JES3 release prior to MVS/ESA SP-JES3 Version 5 Release 1.1, a sysplex is not required. However, the JES3 complex that is implemented cannot contain more than eight MVS images.

For customers using multiple MVS images, the JES3 element of OS/390 cannot be mixed with levels of JES3 prior to JES3 5.2.1 in the same JES3 complex. When migrating to OS/390 JES3, the JES3 feature of OS/390 must be migrated to the global processor before it is migrated to any local processors.

OS/390 Migration Considerations

Because the components of OS/390 are integrated into a single package with compatible service levels, it is required that customers install and migrate to an OS/390 release in its entirety before entering into production on that release. For the JES2 or JES3 component, the migration can be staged to remain compatible with other systems.

Customers using the CBPDO delivery option, will only have to install those elements and features of OS/390 which are at a higher level than their existing system. For example, MVS/ESA SP V5.2.2 customers with DFSMS/MVS 1.4 installed will have to install the new OS/390 level of the Base Control Program (BCP), but would not have to reinstall DFSMS/MVS.

Note: Customers will need to perform "normal" release-to-release migration activities for any element that they install.

JES2 Migration Considerations

JES2 commands are added as well as changed to provide additional enhancements in support of JES2 batch sysplex workload management in OS/390 Version 2 Release 4. For a description of this capability, refer to the section, "WLM Batch Management Enhancement." These changes, although satisfying many User Group requirements, result in some incompatible command changes. Customers should consult the JES2 Migration Notebook and the JES2 Commands publications for details prior to migrating to OS/390 Version 2 Release 4 JES2.

This new function also results in JES2 message changes to popular messages. The command changes create significant differences in message formats with new message IDs being assigned. Refer to the **JES2 Messages** publication for details.

The JES2 Command Migration Aid is provided, in the form of a sample Exit 5 (HASX05C), to translate old command syntax to new command syntax. This is provided via APAR OW27715. Message $HASP006 shows old and new command forms. The first 8 characters of the original command are translated by HASX05C to the full text of translated command, up to the maximum length of message. The migration aid is automatically invoked if no EXIT(5) initialization parameters. It can be disabled via EXIT(5) STATUS=DISABLED. The customer can add it to the existing EXIT(5) ROUTINE using initialization parameters. The order of routines depends on old/new format, and functions in other routines.

Migration actions will be required to move to this new level of JES2:

- Show operators new commands and syntax

- Update automation scripts with new commands

- Existing Exit 5 routines may need re-work

- Translate Old Command Syntax to New ... via JES2 Exit 5

CICS/ESA Migration Considerations

For customers migrating to OS/390 Version 2 Release 4 from a system running CICS/ESA Version 3 Release 3, this earlier level of CICS can be used but is not recommended because CICS/ESA Version 3 Release 3 is not Year 2000 Ready. Customers who choose this migration step should plan to migrate to CICS/ESA Version 4 Release 1 or CICS Transaction Server for OS/390 Release 2.

Customers should note that CICS/ESA Version 3 Release 3 was withdrawn from marketing effective July 31, 1996. Refer to Software Announcement 996-095, dated April 16, 1996. Program services for CICS/ESA Version 3 Release 3 will be terminated effective December 31, 1998. Refer to Software Withdrawal 996-250, dated September 24, 1996.

Language Environment Migration Considerations

OS/390 Version 2 Release 4 introduces a new function called Runtime Library Services (RTLS). The RTLS function allows you to access different levels of the Language Environment run-time libraries, controlled by run-time options. These run-time options allow you to control an application or your entire application environment.

Customers can use the BUILDMCS SMP/E command to save old levels of the Language Environment libraries and use them during execution of applications. The lowest level of Language Environment that is supported via RTLS is Language Environment 1.5. Appropriate APARS on previous levels of Language Environment will be provided to enable this support. Service for all RTLS supported levels of Language Environment will ship with OS/390 Version 2 Release 4.

However, elements and features of OS/390 that require Language Environment must use the level of the run-time library available with the current release of OS/390. Use of earlier levels of Language Environment is not supported for these programs.

Performance Considerations: Information on OS/390 performance will be available at general availability. Information will be available in OS390PRF.Package on MKTOOLS. Consult your IBM representative at or after general availability.

User Group Requirements: This announcement satisfies or partially satisfies 87 requirements from one or more of the worldwide user group communities, which include Australasian SHARE/GUIDE (ASG), COMMON, COMMON Europe, GUIDE International, G.U.I.D.E. Europe, Japan GUIDE/SHARE (JGS), Guide Latin American (LAG), SHARE EUROPE, and SHARE Incorporated.

OS/390 Version 2 Release 4

The following are addressed in OS/390 Version 2 Release 4:

OS/390

- REQ00055147 (SSMVSE95202) — Volume masking for multivol sysres
- REQ00059089 — Flow diagram of installation required
- REQ00059092 — Remove "usermods" from IBM libraries such as Linklib.
- REQ00059242 — Additional global variables
- REQ00059244 — Identify datasets required on SYSRES

- REQ00059262 — ServerPac should enhance documentation
- REQ00059263 — Provide MSTJCLEX member in PARMLIB
- REQ00059266 — Incorporate IPO data set info and remove data sets
- REQ00059268 — Provide job to print program directories
- REQ00059271 — Assembler default should be ASMA90
- REQ00059393 — Indirect catalog support for multivol sysres
- REQ00062291 — Viewable version of the Installation Guide is needed
- REQ00062528 — OS/390 ServerPac Program Directories

TSO/E

- REQ00047141 — Support for parallel sysplex
- REQ00056360 — TSO SEND command requires LISTBC across SYSPLEX
- REQ00054314 — IKJEFT1B needs disposition processing of SVC99 allocations
- REQ00057418 — TSO/E ISPF panels should not refer to MVS/XA
- REQ00059149 — Inflexibility with TSO/E commands
- REQ00006667, REQ00003332 — Enhance TSO/E CALL command
- REQ00058968 — Enhance IKJTSOxx PARMLIB member to allow space allocation of user log

JES2

- REQ00024797 (SOJES293004) — JES2: Mass Purge Output by Jobname
- REQ00024809 (SOJES293005) — JES2: Mass Purge Jobs From Any JES2 Queue
- REQ00028133 (SBJES282207) — JES2 Exit5 And HASPCOMM Services
- REQ00031087 (SBJES277107) — Scheduling Abstract Resources
- REQ00031106 (SBJES283205) — Displaying Sysout Data Sets With Given Characteristics
- REQ00031109 (SBJES283254) — $CFJMSG Exit from HASPCOMM
- REQ00031110 (SBJES283255) — Execution Job Selection Exits
- REQ00031113 (SBJES284203) — Resource Scheduling: Common Functions
- REQ00031114 (SBJES284204) — Abstract Resource Scheduling
- REQ00031304 (SOJES285209) — JES2 — Display and Control of Output by Remote
- REQ00031306 (SOJES285213) — JES2 — Purging Aged Jobs on the Queue
- REQ00031314 (SOJES286202) — JES2 — Symbolic System Affinity
- REQ00031345 (SOJES288202) — $HASP165 Notify Msg Should Include the Max Cond/Abend Code

- REQ00031407 (SOJES291262) — JES2: Remove restriction on maximum number of route codes

- REQ00032083 (GO1JS280013) — JES2 Remote Queue Display

- REQ00032084 (GO1JS280014) — Display JES2 Output Queue By Selection Criteria

- REQ00032132 (GO1JS285019) — JES2 — Should provide Job Routing based on Logical Resource Names

- REQ00046394 — Need additional selection criteria for JOB xmittters

- REQ00051174 — JES2 V5 NEEDS WORKFLOW MANAGEMENT CONTROLS

- REQ00059429 — Remote job ownership verification

- REQ00060990 — More remote printers in JES2

- REQ00061673 — $DF command can flood console with messages

- REQ00062213 (SSJES293253) — JES2: Allow use of sysout size as a criteria for purge command

- REQ00062224 (SSJES294200) — Batch workload management across parallel MVS systems

- REQ00063979 — Increase maximum allowed value of LOCALNUM

JES3

- REQ00023839 (GO1JS393004) — Expand the JES3 job numbers

- REQ00023840 (GO1JS393005) — IAT8562 Information for SNA/RJP and BSC/RJP I/O Devices

- REQ00024812 (SOJES393301) — JES3 support of Dynamic Reconfiguration and Continuous Operation

- REQ00030998 (ESMVSI87004) — No IPL in front of every JES3 init-deck modification

- REQ00031176 (SBJES381355) — JES3 Initialization Enhancements

- REQ00031186 (SBJES382308) — Dynamic Configuration of RJP/NJE Without Restart

- REQ00032198 (GO1JS379035) — Change JES3 To Allow INISH Deck Options

- REQ00032216 (GO1JS381007) — RJP/SNARJP Declaration Of Independence

- REQ00032257 (GO1JS384005) — Provide the Capability to Cause a New Copy of JES3 Module

- REQ00032315 (GO1JS391001) — Provide Dynamic Device Support in JES3

- REQ00042891 — JES/3 support of MVS dynamic I/O reconfiguration

- REQ00049006 (CSMVS194011) — JES3 initialization deck refresh

- REQ00054411 (ESMV2F95017) — JES3 Deconnect the warm start and the IPL

Security Server

- REQ00011779 — (RKK7626) DB2 choice of security authorization

- REQ00029958 (CSMVS190030) — RACF password history loophole

- REQ00048943 (ECRACU93004) — Password reset to update password history

- REQ00050641 — Update password history table when using ALTUSER

- REQ00054739 — Program control in a sysplex environment

- REQ00058248 — Update password history table when using ALTUSER

- RUGR94008 — Control DB2 security with RACF

- RUGR95031 — Program control in a sysplex environment

HCD

- REQ00047705 — Management of large IODF

HCM

- REQ0057041 — Support for Import
- REQ0058355 — Support for Export

ISPF

- REQ00052985 — VisualAge
- REQ00053744 — VisualAge
- REQ00062064 — Application Server
- REQ00063847 — SCLM Sample Project Setup

SMP/E

- REQ00002295 — Global Zone Merge
- REQ00009846 — Receive Enhancements
- REQ00009850 — Receive Enhancements
- REQ00023024 — Receive Enhancements
- REQ00029957 — Message Improvements
- REQ00030696 — Receive Enhancements
- REQ00031019 — Message Improvements
- REQ00048668 — Message Improvements
- REQ00059519 — Global Zone Merge
- REQ00060421 — PTS Dataset Reduction

Software Manufacturing

- REQ00059274 — For OS/390 Release 1 PI customer
- REQ00062292 — For Boeing

OS/390 Version 2 Release 5

HCD

- REQ0047705 — Facilitate large IODF data set manipulation
- REQ0058014 — Allow building a work IODF from a production IODF via an HCD batch utility

Planning Information

Packaging

Network Computing: OS/390 Version 2 Release 4 contains the Domino Go Webserver OS/390. THE SPECIFICATION OF A SECURITY FEATURE IS REQUIRED — IT IS STRONGLY RECOMMENDED THAT THE FEATURE WITH THE HIGHEST ALLOWABLE SECURITY LEVEL BE ORDERED AND INSTALLED. A system installed with Domino Go Webserver for OS/390 's North America Secure feature must NOT be exported outside the U.S. and Canada to any entities. Systems installed outside the U.S. and Canada should be ordered with Domino Go Webserver for OS/390's Export Security feature. For further information, contact your Export Regulation Coordinator (ERC) or Export Regulations Executive (ERE).

Refer to the **Ordering Information** section for specific details on feature codes.

As the cryptographic export regulations are changing, refer to the following Web page for the most current export regulations:

http://www.ics.raleigh.ibm.com

System Integrity

IBM will accept APARs where the installation of OS/390 introduces an exposure to system integrity. Refer to Programming Announcement P81-174, dated October 21, 1981.

Security, Auditability, and Control

Data security and auditability in the OS/390 environment are enhanced by the functions available in the RACF part of the optional OS/390 Security Server feature.

B1/C2 Security: The critical operating system components of the OS/390 base and security server and optional features, such as MVS/ESA and the optional Security Server feature (includes RACF), continue to be designed to meet the NSA's C2/B1 Trusted Computer Systems Evaluation Criteria. However, some OS/390 functions have not been designed to meet C2 or B1 and when used in conjunction with the above components may have an impact on the C2 or B1 capability of the total system. The impact can only be assessed on an installation-by-installation basis. Consequently, no formal claims about the C2/B1 security of OS/390 can be made. However, the C2/B1 capability of the OS/390 base and security server may be useful in securing certification of some C2/B1 application systems based on OS/390.

Security APARs: IBM will accept Security APARs for OS/390. Security APARs are for reporting problems in existing security mechanisms where the problem descriptions do not meet the precise definition of system integrity, but do constitute an exposure to the security of the system as a whole or to an IBM product which runs on the system (originally announced in Software Announcement 289-581, dated October 24, 1989).

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

Ordering Information

The following ordering information provides new ordering information for OS/390 Version 2 Release 4 only. Any new or changed ordering information for OS/390 Version 2 Release 5 will be made available by the general availability date of OS/390 Version 2 Release 5. The following publications are available now. To order, contact your IBM representative.

- OS/390 Planning for Installation (GC28-1726)
- OS/390 Introduction and Release Guide (GC28-1725)
- OS/390 Information Roadmap (GC28-1727)
- OS/390 Information What's New (GC28-1985)

Note: The above publications will be available at General Availability as *OS/390 Installation Planning Kit* (GK2T-6710) for inclusion in the OS/390 Version 2 Release 4 basic package that is to be sent to all licensees.

The following publications are available now. To order, contact your IBM representative.

- Technology Leadership Whitepaper (GF22-5008)
- Technology Leadership Reference Guide (G326-3020)
- OS/390 Proposal Insert (G221-4489)

New Licensees

OS/390 media is only shipped via OS/390 Customized Offerings (ServerPac, SystemPac and CBPDO). CFPROGS configuration and order entry capability for ServerPac, SystemPac, and CBPDO for OS/390 Version 2 Release 4 will be available beginning September 12, 1997, and continue until Version 2 Release 5 becomes orderable during March 1998.

The last day to place orders for OS/390 Version 1 Release 3 (5645-001) for delivery in a ServerPac or SystemPac is September 11, 1997. Orders for OS/390 Version 1 Release 3 (5645-001) for delivery in a CBPDO can be placed until December 31, 1998. For a further description of the withdrawal from marketing of OS/390 Version 1, refer to Software Withdrawal 997-145, dated June 9, 1997.

Production of OS/390 Version 2 Release 4 orders will begin on September 26, 1997. Due to the amount of customization of ServerPac orders, shipment will begin approximately three weeks after general availability. Due to the amount of customization of SystemPac orders, shipment will begin approximately four weeks after order and data input verification. Shipment dates for ServerPac and SystemPac orders will be based on order sequence, production capacity, and customer-requested arrival dates. No delivery commitments are to be made to the customer until confirmed arrival dates are in AAS. For CBPDO orders, shipment will begin one week after general availability.

Note for All OS/390 Orders: The current customer install base of the OS/390 Customized Offering 5751-CSx (not the install base of 5645-001 or 5647-A01) must be retained to determine the OS/390 version/release level most recently ordered.

New users of OS/390 Version 2 Release 4 should specify:

Type	Model
5647	A01

Basic License: To order a basic license, specify the program number and feature 9001 for asset registration. For a graduated one-time charge (OTC) or graduated monthly license charge (MLC), specify one of the following feature numbers as applicable and corresponding to the group that contains the designated machine.

Also, specify the feature number of the desired distribution medium.

OS/390 Base

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	0018	0001
20	0019	0002
25	0020	0003
28	0021	0004
29	0022	0005
30	0023	0006
31	0024	0007
32	0025	0008
35	0026	0009
38	0027	0010
40	0028	0011
50	0029	0012
60	0030	0013
70	0031	0014
80	0032	0015

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	0120	0103
20	0121	0104
25	0122	0105
28	0123	0106
29	0124	0107
30	0125	0108
31	0126	0109
32	0127	0110
35	0128	0111
38	0129	0112
40	0130	0113
50	0131	0114
60	0132	0115
70	0133	0116
80	0134	0117

BDT File-to-File

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	0048	0033
20	0049	0034
25	0050	0035
28	0051	0036
29	0052	0037
30	0053	0038
31	0054	0039
32	0055	0040
35	0056	0041
38	0057	0042
40	0058	0043
50	0059	0044
60	0060	0045
70	0061	0046
80	0062	0047

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	0078	0063
20	0079	0064
25	0080	0065
28	0081	0066
29	0082	0067
30	0083	0068
31	0084	0069
32	0085	0070
35	0086	0071
38	0087	0072
40	0088	0073
50	0089	0074
60	0090	0075
70	0091	0076
80	0092	0077

BDT JES3 SNA NJE

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	0252	0237
20	0253	0238
25	0254	0239
28	0255	0240
29	0256	0241
30	0257	0242
31	0258	0243
32	0259	0244
35	0260	0245
38	0261	0246
40	0262	0247
50	0263	0248
60	0264	0249
70	0265	0250
80	0266	0251

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	0282	0267
20	0283	0268
25	0284	0269
28	0285	0270
29	0286	0271
30	0287	0272
31	0288	0273
32	0289	0274
35	0290	0275
38	0291	0276
40	0292	0277
50	0293	0278
60	0294	0279
70	0295	0280
80	0296	0281

BookManager BUILD

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	0433	0418
20	0434	0419
25	0435	0420
28	0436	0421
29	0437	0422
30	0438	0423
31	0439	0424
32	0440	0425
35	0441	0426
38	0442	0427
40	0443	0428
50	0444	0429
60	0445	0430
70	0446	0431
80	0447	0432

Multiple Operating System ― PR/SM (MOSP) : For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	0463	0448
20	0464	0449
25	0465	0450
28	0466	0451
29	0467	0452
30	0468	0453
31	0469	0454
32	0470	0455
35	0471	0456
38	0472	0457
40	0473	0458
50	0474	0459
60	0475	0460
70	0476	0461
80	0477	0462

C/C++ (with Debug Tool)

Group	Basic Graduated OTC Feature Number	Basic Graduated Feature Number
18	0687	0672
20	0688	0673
25	0689	0674
28	0690	0675
29	0691	0676
30	0692	0677
31	0693	0678
32	0694	0679
35	0695	0680
38	0696	0681
40	0697	0682
50	0698	0683
60	0699	0684
70	0700	0685
80	0701	0686

Multiple Operating System ― PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	0717	0702
20	0718	0703
25	0719	0704
28	0720	0705
29	0721	0706
30	0722	0707
31	0723	0708
32	0724	0709
35	0725	0710
38	0726	0711
40	0727	0712
50	0728	0713
60	0729	0714
70	0730	0715
80	0731	0716

C/C++ (without Debug Tool)

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	3381	3366
20	3382	3367
25	3383	3368
28	3384	3369
29	3385	3370
30	3386	3371
31	3387	3372
32	3388	3373
35	3389	3374
38	3390	3375
40	3391	3376
50	3392	3377
60	3393	3378
70	3394	3379
80	3395	3380

Multiple Operating System ― PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	3615	3600
20	3616	3601
25	3617	3602
28	3618	3603
29	3619	3604
30	3620	3605
31	3621	3606
32	3622	3607
35	3623	3608
38	3624	3609
40	3625	3610
50	3626	3611
60	3627	3612
70	3628	3613
80	3629	3614

GDDM PGF

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	1980	1965
20	1981	1966
25	1982	1967
28	1983	1968
29	1984	1969
30	1985	1970
31	1986	1971
32	1987	1972
35	1988	1973
38	1989	1974
40	1990	1975
50	1991	1976
60	1992	1977
70	1993	1978
80	1994	1979

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	3975	1995
20	2010	1996
25	2011	1997
28	2012	1998
29	2013	1999
30	2014	2000
31	2015	2001
32	2016	2002
35	2017	2003
38	2018	2004
40	2019	2005
50	2020	2006
60	2021	2007
70	2022	2008
80	2023	2009

GDDM REXX

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	0941	0926
20	0942	0927
25	0943	0928
28	0944	0929
29	0945	0930
30	0946	0931
31	0947	0932
32	0948	0933
35	0949	0934
38	0950	0935
40	0951	0936
50	0952	0937
60	0953	0938
70	0954	0939
80	0955	0940

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	0971	0956
20	0972	0957
25	0973	0958
28	0974	0959
29	0975	0960
30	0976	0961
31	0977	0962
32	0978	0963
35	0979	0964
38	0980	0965
40	0981	0966
50	0982	0967
60	0983	0968
70	0984	0969
80	0985	0970

JES3

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	1068	1053
20	1069	1054
25	1070	1055
28	1071	1056
29	1072	1057
30	1073	1058
31	1074	1059
32	1075	1060
35	1076	1061
38	1077	1062
40	1078	1063
50	1079	1064
60	1080	1065
70	1081	1066
80	1082	1067

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	1098	1083
20	1099	1084
25	1100	1085
28	1101	1086
29	1102	1087
30	1103	1088
31	1104	1089
32	1105	1090
35	1106	1091
38	1107	1092
40	1108	1093
50	1109	1094
60	1110	1095
70	1111	1096
80	1112	1097

VisualLift ADE

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	1852	1837
20	1853	1838
25	1854	1839
28	1855	1840
29	1856	1841
30	1857	1842
31	1858	1843
32	1859	1844
35	1860	1845
38	1861	1846
40	1862	1847
50	1863	1848
60	1864	1849
70	1865	1850
80	1866	1851

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	1882	1867
20	1883	1868
25	1884	1869
28	1885	1870
29	1886	1871
30	1887	1872
31	1888	1873
32	1889	1874
35	1890	1875
38	1891	1876
40	1892	1877
50	1893	1878
60	1894	1879
70	1895	1880
80	1896	1881

SOMobjects ADE

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	2490	1180
20	2491	1181
25	2492	1182
28	2493	1183
29	2494	1184
30	2495	1185
31	2496	1186
32	2497	1187
35	2498	1188
38	2499	1189
40	2500	1190
50	2501	1191
60	2502	1192
70	2503	1193
80	2504	1194

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	1220	1205
20	1221	1206
25	1222	1207
28	1223	1208
29	1224	1209
30	1225	1210
31	1226	1211
32	1227	1212
35	1228	1213
38	1229	1214
40	1230	1215
50	1231	1216
60	1232	1217
70	1233	1218
80	1234	1219

RMF

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	3249	3234
20	3250	3235
25	3251	3236
28	3252	3237
29	3253	3238
30	3254	3239
31	3255	3240
32	3256	3241
35	3257	3242
38	3258	3243
40	3259	3244
50	3260	3245
60	3261	3246
70	3262	3247
80	3263	3248

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	3279	3264
20	3280	3265
25	3281	3266
28	3282	3267
29	3283	3268
30	3284	3269
31	3285	3270
32	3286	3271
35	3287	3272
38	3288	3273
40	3289	3274
50	3290	3275
60	3291	3276
70	3292	3277
80	3293	3278

Security Server

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	2880	2865
20	2881	2866
25	2882	2867
28	2883	2868
29	2884	2869
30	2885	2870
31	2886	2871
32	2887	2872
35	2888	2873
38	2889	2874
40	2890	2875
50	2891	2876
60	2892	2877
70	2893	2878
80	2894	2879

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	3015	3000
20	3016	3001
25	3017	3002
28	3018	3003
29	3019	3004
30	3020	3005
31	3021	3006
32	3022	3007
35	3023	3008
38	3024	3009
40	3025	3010
50	3026	3011
60	3027	3012
70	3028	3013
80	3029	3014

DFSMSdss, DFSMShsm, DFSMSrmm

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	0814	0799
20	0815	0800
25	0816	0801
28	0817	0802
29	0818	0803
30	0819	0804
31	0820	0805
32	0821	0806
35	0822	0807
38	0823	0808
40	0824	0809
50	0825	0810
60	0826	0811
70	0827	0812
80	0828	0813

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	0844	0829
20	0845	0830
25	0846	0831
28	0847	0832
29	0848	0833
30	0849	0834
31	0850	0835
32	0851	0836
35	0852	0837
38	0853	0838
40	0854	0839
50	0855	0840
60	0856	0841
70	0857	0842
80	0858	0843

DFSMSdss

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	2645	2630
20	2646	2631
25	2647	2632
28	2648	2633
29	2649	2634
30	2650	2635
31	2651	2636
32	2652	2637
35	2653	2638
38	2654	2639
40	2655	2640
50	2656	2641
60	2657	2642
70	2658	2643
80	2659	2644

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	2675	2660
20	2676	2661
25	2677	2662
28	2678	2663
29	2679	2664
30	2680	2665
31	2681	2666
32	2682	2667
35	2683	2668
38	2684	2669
40	2685	2670
50	2686	2671
60	2687	2672
70	2688	2673
80	2689	2674

DFSMSdss, DFSMhsm

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	2377	2362
20	2378	2363
25	2379	2364
28	2380	2365
29	2381	2366
30	2382	2367
31	2383	2368
32	2384	2369
35	2385	2370
38	2386	2371
40	2387	2372
50	2388	2373
60	2389	2374
70	2390	2375
80	2391	2376

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	2407	2392
20	2408	2393
25	2409	2394
28	2410	2395
29	2411	2396
30	2412	2397
31	2413	2398
32	2414	2399
35	2415	2400
38	2416	2401
40	2417	2402
50	2418	2403
60	2419	2404
70	2420	2405
80	2421	2406

DFSMSrmm

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	2520	2505
20	2521	2506
25	2522	2507
28	2523	2508
29	2524	2509
30	2525	2510
31	2526	2511
32	2527	2512
35	2528	2513
38	2529	2514
40	2530	2515
50	2531	2516
60	2532	2517
70	2533	2518
80	2534	2519

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	2550	2535
20	2551	2536
25	2552	2537
28	2553	2538
29	2554	2539
30	2555	2540
31	2556	2541
32	2557	2542
35	2558	2543
38	2559	2544
40	2560	2545
50	2561	2546
60	2562	2547
70	2563	2548
80	2564	2549

DFSMSdss, DFSMSrmm

Group	Basic Graduated OTC Feature Number	Basic Graduated Feature Number
18	2250	2235
20	2251	2236
25	2252	2237
28	2253	2238
29	2254	2239
30	2255	2240
31	2256	2241
32	2257	2242
35	2258	2243
38	2259	2244
40	2260	2245
50	2261	2246
60	2262	2247
70	2263	2248
80	2264	2249

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	2280	2265
20	2281	2266
25	2282	2267
28	2283	2268
29	2284	2269
30	2285	2270
31	2286	2271
32	2287	2272
35	2288	2273
38	2289	2274
40	2290	2275
50	2291	2276
60	2292	2277
70	2293	2278
80	2294	2279

SDSF

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	1598	1583
20	1599	1584
25	1600	1585
28	1601	1586
29	1602	1587
30	1603	1588
31	1604	1589
32	1605	1590
35	1606	1591
38	1607	1592
40	1608	1593
50	1609	1594
60	1610	1595
70	1611	1596
80	1612	1597

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	1628	1613
20	1629	1614
25	1630	1615
28	1631	1616
29	1632	1617
30	1633	1618
31	1634	1619
32	1635	1620
35	1636	1621
38	1637	1622
40	1638	1623
50	1639	1624
60	1640	1625
70	1641	1626
80	1642	1627

DFSORT

Group	Basic Graduated OTC Feature Number	Basic Graduated MLC Feature Number
18	0560	0545
20	0561	0546
25	0562	0547
28	0563	0548
29	0564	0549
30	0565	0550
31	0566	0551
32	0567	0552
35	0568	0553
38	0569	0554
40	0570	0555
50	0571	0556
60	0572	0557
70	0573	0558
80	0574	0559

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP Basic Graduated OTC Feature Number	MOSP Basic Graduated MLC Feature Number
18	0590	0575
20	0591	0576
25	0592	0577
28	0693	0578
29	0594	0579
30	0595	0580
31	0596	0581
32	0597	0582
35	0598	0583
38	0599	0584
40	0600	0585
50	0601	0586
60	0602	0587
70	0603	0588
80	0604	0589

Basic Non-Graduated Charges

High Level Assembler Toolkit

OTC Feature Number	MLC Feature Number
3983	3982

Printway/NetSpool

OTC Feature Number	MLC Feature Number
4201	4200

HCM

Tier Charges Feature Numbers

Usage Levels (Registered Users Per Designated Machine)	OTC Feature Number	MLC Feature Number
Level 1 to 3	4405	4401
Level 4 to 6	4406	4402
Level 7 to 10	4407	4403
Level above 10	4408	4404

HCM Ordering Guidelines

- If MLC:
  - 4402 must have QTY = 3 of 4401
  - 4403 must have QTY = 3 of 4402
  - 4404 must have QTY = 4 of 4403

  - 4401 Maximum QTY = 3
  - 4402 Maximum QTY = 3
  - 4403 Maximum QTY = 4
  - 4404 Maximum QTY = unlimited

- If OTC:
  - 4406 must have QTY = 3 of 4405
  - 4407 must have QTY = 3 of 4406
  - 4408 must have QTY = 4 of 4407

  - 4405 Maximum QTY = 3
  - 4406 Maximum QTY = 3
  - 4407 Maximum QTY = 4
  - 4408 Maximum QTY = unlimited

Sample Configuration: If an OS/390 licensee has 12 registered users of HCM, the MLC billing will be:

Feature Number	Quantity
4401	3
4402	3
4403	4
4404	2

Note: The group can be determined by referring to the Exhibit for IBM System/370™ and System/390 Machines (Z125-3901) or the Exhibit for Non-IBM Machines (Z125-3902)) that are associated with the IBM Customer Agreement (Z125-4575).

Entry Support License (ESL): To order an ESL license, specify the program number, feature number 9001 for asset registration, and the applicable ESL OTC feature number. Also specify the feature number of the desired distribution medium.

Description	ESL OTC Feature Number
OS/390 base	2757
BDT File-to-File	2762
BDT JES3 SNA NJE	2767
BookManager Build	2772
C/C++ (with Debug Tool)	2782
C/C++ (without Debug Tool)	3365
GDDM PGF	2832
GDDM REXX	2792
JES3	2797
HLASM Toolkit	3981
SOM™ ADE	2802
VisualLift ADE	2827
DFSMSdss, hsm, rmm	2787
DFSMSdss	2857
DFSMSdss, hsm	2847
DFSMSrmm	2852
DFSMSdss, rmm	2842
RMF	3233
SDSF	2817
DFSORT	2777
Security Server	2864
Printway/NetSpool	3976

Note: ESL machines can be determined by referring to the IBM Entry End User/390 Attachment (Z125-4379).

Parallel Sysplex License Charge (PSLC) Basic License: To order a basic license, specify the program number and feature number 9001 for asset registration. Specify the PSLC Base feature. If applicable, specify the PSLC Level A and PSLC Level B features and quantity.

If there is more than one program copy in a Parallel Sysplex, the charge for all copies is associated to one license by specifying the applicable PSLC feature numbers and quantity represented by the sum of the Service Units in Millions (MSUs) in your Parallel Sysplex. For all other program copies, specify the PSLC No-Charge (NC) Identifier feature on the licenses.

Also, specify the feature number of the desired distribution medium.

PSLC FEATURE NUMBERS									
OS/390 Function	TIER 1 1 MSU	TIER 2 2 MSU	BASE 3 MSU	LEVEL A 1 MSU	LEVEL A 42 MSU	LEVEL B 1 MSU	LEVEL B 10 MSU	LEVEL B 50 MSU	N/C ID
OS/390 Base	4144	4145	0411	0412	0413	0414	0415	0416	0417
BDT File-to-File	4140	4141	0093	0094	0095	0096	0097	0098	0099
BDT J3 SNA/NJE	4142	4143	0297	0298	0299	0300	0301	0302	0303
BookManager BLD	4146	4147	0478	0479	0480	0481	0482	0483	0484
C/C++ (with Debug Tool)	4150	4151	0732	0733	0734	0735	0736	0737	0738
C/C++ (without Debug Tool)	4182	4183	3634	3635	3636	3637	3638	3639	3640
GDDM PGF	4168	4169	2024	2025	2026	2027	2028	2029	2030
GDDM REXX	4154	4155	0986	0987	0988	0989	0990	0991	0992
JES3	4156	4157	1113	1114	1115	1116	1117	1118	1119
VisualLift ADE	4166	4167	1897	1898	1899	1901	1902	1903	1904
SOMobjects ADE	4158	4159	1235	1236	1237	1238	1239	1240	1241
RMF	4180	4181	3298	3299	3300	3301	3302	3303	3304
Security Server (RACF UNIX Svc DCE Security Srv)	4178	4179	3034	3035	3036	3037	3038	3039	3040
DFSMSdss, hsm, rmm	4152	4153	0859	0860	0861	0862	0863	0864	0865
DFSMSdss	4174	4175	2690	2691	2692	2693	2694	2695	2696
DFSMSdss, hsm	4172	4173	2422	2423	2424	2425	2426	2427	2428
DFSMSrmm	4176	4177	2862	2565	2566	2567	2568	2569	2863
DFSMSdss, rmm	4170	4171	2295	2296	2297	2298	2299	2300	2301
SDSF	4164	4165	1643	1644	1645	1646	1647	1648	1649
DFSORT	4148	4149	0665	0666	0667	0668	0669	0670	0671

Indexed Monthly License Charge (IMLC) Basic License: To order a basic license, specify the program number and feature number 9001 for asset registration. Specify the IMLC Base 80 MSU feature and the applicable additional IMLC MSU features and quantity corresponding to the MSU rating of the designated machine.

Also, specify the feature number of the desired distribution medium.

IMLC Feature Numbers

OS/390 Function	Base 80 MSU	Additional MSUs 1 MSU	10 MSU	50 MSU
OS/390 Base	2758	2759	2760	2761
BDT File-to-File	2763	2764	2765	2766
BDT J3 SNA/NJE	2768	2769	2770	2771
BookManager BUILD	2773	2774	2775	2776
C/C++ (with Debug Tool)	2783	2784	2785	2786
C/C++ (without Debug Tool)	3630	3631	3632	3633
GDDM PGF	2833	2834	2835	2836
GDDM REXX	2793	2794	2795	2796
JES3	2798	2799	2800	2801
VisualLift ADE	2828	2829	2830	2831
SOMobjects ADE	2803	2804	2805	2806
RMF	3294	3295	3296	3297
Security Server	3030	3031	3032	3033

IMLC Feature Numbers

OS/390 Function	Base 80 MSU	Additional MSUs 1 MSU	10 MSU	50 MSU
DFSMSdss, hsm, rmm	2788	2789	2790	2791
DFSMSdss	2858	2859	2860	2861
DFSMSdss, hsm	2848	2849	2850	2851
DFSMSrmm	2853	2854	2855	2856
DFSMSdss, rmm	2843	2844	2845	2846
SDSF	2818	2819	2820	2821
DFSORT	2778	2779	2780	2781

Single Version Charging: To elect single version charging, the customer must notify and identify to IBM the prior program and replacement program and the designated machine the programs are operating on.

Version-to-Version Upgrade Credit: To upgrade from a prior program acquired for a one-time charge to a replacement program using a version-to-version upgrade credit, the customer must notify and identify to IBM the applicable prior program and replacement program participating in the upgrade credit.

Basic Machine-Readable Material: To order, select the feature number of the desired distribution medium:

Distribution Medium for OS/390 Base and OS/390 No Charge Optional Features

OS/390 Function	9/6250 Tape	3480 Cartridge	4MM DAT	3.5-inch B/S 512
OS/390 Base	5801[6]	5802[6]	5700[6]	—
Language Env. Data Decrpytion[5]	5821[6]	5822[6]	5703[6]	—
OpenEdition DCE User Privacy (DES and CDMF)[5]	5831[6]	5832[6]	5704[6]	—
OpenEdition DCE User Privacy (CDMF)[5]	5018[6]	5019[6]	5724[6]	—
TCP/IP Offload to OS/2	—	—	—	5835[6]
TCP/IP Kerberos (non-DES)	5841[6]	5842[6]	5705[6]	—
TCP/IP Kerberos (DES)[5]	5861[6]	5862[6]	5707[6]	—
TCP/IP Network Print Facility	5851[6]	5852[6]	5706[6]	—
ICSS 2.2 NA Secure	5738[6]	5739[6]	5740[6]	—
ICSS 2.2 Export Security	5750[6]	5751[6]	5752[6]	—

[5] This feature subject to export restriction.
[6] Contains Restricted Material of IBM.

Note: The above OS/390 No Charge Optional Media Feature codes are elements that are integrated into ServerPac when ordered.

OS/390 Function	9/6250 Tape	3480 Cartridge	4MM DAT	CD-ROM
Preconfigured CD for RS/6000 and PC Server with S/390 Server-on-Board System for OS/390 V2.4.0 (Available 11/14/97)	—	—	—	5819

ICSS 2.2 is now part of Domino Go Webserver 4.6 for OS/390.

Distribution Medium for OS/390 Chargeable Optional Features

OS/390 Function	9/6250 Tape	3480 Cartridge	4MM DAT	3.5-inch B/S 512
BDT File-to-file	5871[6]	5872[6]	5708[6]	—
BDT SNA NJE	5881[6]	5882[6]	5709[6]	—
BookManager BUILD	5891	5892	5710	—
C/C++ (with Debug Tool) (Class Library Source feature included)	5962[6]	5963[6]	5712[6]	—
C/C++ (without Debug Tool) (Class Library Source feature included)	5036[6]	5037[6]	5733[6]	—
GDDM PGF	5012	5013	5721	—
GDDM REXX	5988[6]	5989[6]	5714[6]	—
High Level Assembler Tool Kit	5503	5504	5505	—
JES3	5000[6]	5001[6]	5715	—
VisualLift ADE	—	—	—	5010[6]
SOMobjects ADE	5002[6]	5003[6]	5716[6]	—
RMF	5034[6]	5035[6]	5732[6]	—
Security Server (RACF + OpenEdition DCE Security Server)	5030	5031	5730	—
DFSMSdss, DFSMShsm, DFSMSrmm	5975[6]	5976[6]	5713[6]	—
DFSMSdss	5028[6]	5029[6]	5729[6]	—
DFSMSdss, DFSMShsm	5024[6]	5025[6]	5727[6]	—
DFSMSrmm	5026[6]	5027[6]	5728[6]	—
DFSMSdss, DFSMSrmm	5016[6]	5017[6]	5723[6]	—
SDSF	5735	5736	5737	—
DFSORT	5949	5950	5711	—
Printway/NetSpool	5741[6]	5742[6]	5743[6]	—
HCM	5754[6]	5755[6]	5756[6]	—

Note: All Chargeable Optional Features ship with an OS/390 order. They are shipped disabled unless specifically ordered, in which case, they are shipped enabled and the order will include the related hardcopy publications that normally ship with the enabled elements.

NLS features

Media feature code information remains unchanged from the previous announcement of OS/390 Version 1 Release 3. Specify the desired distribution medium feature to order the base function components in the listed language. Base function components not listed are automatically included in English.

Customization Options: Select the appropriate feature numbers to customize your order to specify the delivery options desired. These features can be specified on the initial or MES orders.

Example: If publications are not desired for the initial order, specify feature number 3470 to ship media only. For future updates, specify feature number 3480 to ship media updates only. If, in the future, publication updates are required, order an MES to remove feature number 3480; then, the publications will ship with the next release of the program.

Description	Feature Number
Initial Shipments	
Serial Number Only (suppresses shipment of media and documentation)	3444
Ship Media Only (suppresses initial shipment of documentation)	3470
Ship Documentation Only (suppresses initial shipment of media)	3471
Update Shipments	
Ship Media Updates Only (suppresses update shipment of documentation)	3480
Ship Documentation Only (suppresses update shipment of media)	3481
Suppress Updates (suppresses update shipment of media and documentation)	3482
ESO registration	3490

Expedite shipments will be processed to receive 72-hour delivery from the time IBM Software Manufacturing Solutions (SMS) receives the order. SMS will then ship the order via overnight air transportation.

Optional Machine-Readable Material: To order, select the feature number for the desired distribution medium:

Environment	9/6250	3480	4MM
OS/390 Base Source	7031[6]	7081[6]	7074[6]
RACF optional source	7038[6]	7039[6]	7040[6]
Communications Server —DNS W/WLM Kit[7]	5757[6]	5757[6]	

[7] The kit contains 3480 and 4MM media. The kit contains a preview of functional elements that will be available for integration in OS/390 Version 2 Release 5.

DSLO License: To order a DSLO license, specify the program number, feature number 9901 for asset registration, and the feature number below for a graduated one-time charge or graduated monthly license charge that corresponds to the group containing the designated machine.

OS/390 Base

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	0222	0205
20	0223	0206
25	0224	0207
28	0225	0208
29	0226	0209
30	0227	0210
31	0228	0211
32	0229	0212
35	0230	0213
38	0231	0214
40	0232	0215
50	0233	0216
60	0234	0217
70	0235	0218
80	0236	0219

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	0324	0307
20	0325	0308
25	0326	0309
28	0327	0310
29	0328	0311
30	0329	0312
31	0330	0313
32	0331	0314
35	0332	0315
38	0333	0316
40	0334	0317
50	0335	0318
60	0336	0319
70	0337	0320
80	0338	0321

BDT File-to-File

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	0150	0135
20	0151	0136
25	0152	0137
28	0153	0138
29	0154	0139
30	0155	0140
31	0156	0141
32	0157	0142
35	0158	0143
38	0159	0144
40	0160	0145
50	0161	0146
60	0162	0147
70	0163	0148
80	0164	0149

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	0180	0165
20	0181	0166
25	0182	0167
28	0183	0168
29	0184	0169
30	0185	0170
31	0186	0171
32	0187	0172
35	0188	0173
38	0189	0174
40	0190	0175
50	0191	0176
60	0192	0177
70	0193	0178
80	0194	0179

BDT JES3 SNA NJE

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	0354	0339
20	0355	0340
25	0356	0341
28	0357	0342
29	0358	0343
30	0359	0344
31	0360	0345
32	0361	0346
35	0362	0347
38	0363	0348
40	0364	0349
50	0365	0350
60	0366	0351
70	0367	0352
80	0368	0353

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	0384	0369
20	0385	0370
25	0386	0371
28	0387	0372
29	0388	0373
30	0389	0374
31	0390	0375
32	0391	0376
35	0392	0377
38	0393	0378
40	0394	0379
50	0395	0380
60	0396	0381
70	0397	0382
80	0398	0383

BookManager BUILD

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	0500	0485
20	0501	0486
25	0502	0487
28	0503	0488
29	0504	0489
30	0505	0490
31	0506	0491
32	0507	0492
35	0508	0493
38	0509	0494
40	0510	0495
50	0511	0496
60	0512	0497
70	0513	0498
80	0514	0499

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	0530	0515
20	0531	0516
25	0532	0517
28	0533	0518
29	0534	0519
30	0535	0520
31	0536	0521
32	0537	0522
35	0538	0523
38	0539	0524
40	0540	0525
50	0541	0526
60	0542	0527
70	0543	0528
80	0544	0529

C/C++ (with Debug Tool)

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	0754	0739
20	0755	0740
25	0756	0741
28	0757	0742
29	0758	0743
30	0759	0744
31	0760	0745
32	0761	0746
35	0762	0747
38	0763	0748
40	0764	0749
50	0765	0750
60	0766	0751
70	0767	0752
80	0768	0753

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC,specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	0784	0769
20	0785	0770
25	0786	0771
28	0787	0772
29	0788	0773
30	0789	0774
31	0790	0775
32	0791	0776
35	0792	0777
38	0793	0778
40	0794	0779
50	0795	0780
60	0796	0781
70	0797	0782
80	0798	0783

C/C++ (without Debug Tool)

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	3656	3641
20	3657	3642
25	3658	3643
28	3659	3644
29	3660	3645
30	3661	3646
31	3662	3647
32	3663	3648
35	3664	3649
38	3665	3650
40	3666	3651
50	3667	3652
60	3668	3653
70	3669	3654
80	3670	3655

Multiple Operating System ─ PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	3686	3671
20	3687	3672
25	3688	3673
28	3689	3674
29	3690	3675
30	3691	3676
31	3692	3677
32	3693	3678
35	3694	3679
38	3695	3680
40	3696	3681
50	3697	3682
60	3698	3683
70	3699	3684
80	3700	3685

GDDM PGF

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	2063	2048
20	2064	2049
25	2065	2050
28	2066	2051
29	2067	2052
30	2068	2053
31	2069	2054
32	2070	2055
35	2071	2056
38	2072	2057
40	2073	2058
50	2074	2059
60	2075	2060
70	2076	2061
80	2077	2062

Multiple Operating System ─ PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	2093	2078
20	2094	2079
25	2095	2080
28	2096	2081
29	2097	2082
30	2098	2083
31	2099	2084
32	2100	2085
35	2101	2086
38	2102	2087
40	2103	2088
50	2104	2089
60	2105	2090
70	2106	2091
80	2107	2092

GDDM REXX

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	1008	0993
20	1009	0994
25	1010	0995
28	1011	0996
29	1012	0997
30	1013	0998
31	1014	0999
32	1015	1000
35	1016	1001
38	1017	1002
40	1018	1003
50	1019	1004
60	1020	1005
70	1021	1006
80	1022	1007

Multiple Operating System ─ PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	1038	1023
20	1039	1024
25	1040	1025
28	1041	1026
29	1042	1027
30	1043	1028
31	1044	1029
32	1045	1030
35	1046	1031
38	1047	1032
40	1048	1033
50	1049	1034
60	1050	1035
70	1051	1036
80	1052	1037

JES3

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	1135	1120
20	1136	1121
25	1137	1122
28	1138	1123
29	1139	1124
30	1140	1125
31	1141	1126
32	1142	1127
35	1143	1128
38	1144	1129
40	1145	1130
50	1146	1131
60	1147	1132
70	1148	1133
80	1149	1134

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	1165	1150
20	1166	1151
25	1167	1152
28	1168	1153
29	1169	1154
30	1170	1155
31	1171	1156
32	1172	1157
35	1173	1158
38	1174	1159
40	1175	1160
50	1176	1161
60	1177	1162
70	1178	1163
80	1179	1164

VisualLift ADE

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	1920	1905
20	1921	1906
25	1922	1907
28	1923	1908
29	1924	1909
30	1925	1910
31	1926	1911
32	1927	1912
35	1928	1913
38	1929	1914
40	1930	1915
50	1931	1916
60	1932	1917
70	1933	1918
80	1934	1919

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	1950	1935
20	1951	1936
25	1952	1937
28	1953	1938
29	1954	1939
30	1955	1940
31	1956	1941
32	1957	1942
35	1958	1943
38	1959	1944
40	1960	1945
50	1961	1946
60	1962	1947
70	1963	1948
80	1964	1949

SOMobjects ADE

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	1257	1242
20	1258	1243
25	1259	1244
28	1260	1245
29	1261	1246
30	1262	1247
31	1263	1248
32	1264	1249
35	1265	1250
38	1266	1251
40	1267	1252
50	1268	1253
60	1269	1254
70	1270	1255
80	1271	1256

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	1314	1272
20	1315	1273
25	1316	1274
28	1317	1275
29	1318	1276
30	1319	1277
31	1320	1278
32	1321	1279
35	1322	1280
38	1323	1281
40	1324	1282
50	1325	1283
60	1326	1284
70	1327	1285
80	1328	1286

RMF

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	3320	3305
20	3321	3306
25	3322	3307
28	3323	3308
29	3324	3309
30	3325	3310
31	3326	3311
32	3327	3312
35	3328	3313
38	3329	3314
40	3330	3315
50	3331	3316
60	3332	3317
70	3333	3318
80	3334	3319

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	3350	3335
20	3351	3336
25	3352	3337
28	3353	3338
29	3354	3339
30	3355	3340
31	3356	3341
32	3357	3342
35	3358	3343
38	3359	3344
40	3360	3345
50	3361	3346
60	3362	3347
70	3363	3348
80	3364	3349

Security Server

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	3056	3041
20	3057	3042
25	3058	3043
28	3059	3044
29	3060	3045
30	3061	3046
31	3062	3047
32	3063	3048
35	3064	3049
38	3065	3050
40	3066	3051
50	3067	3052
60	3068	3053
70	3069	3054
80	3070	3055

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	3086	3071
20	3087	3072
25	3088	3073
28	3089	3074
29	3090	3075
30	3091	3076
31	3092	3077
32	3093	3078
35	3094	3079
38	3095	3080
40	3096	3081
50	3097	3082
60	3098	3083
70	3099	3084
80	3100	3085

DFSMSdss, hsm, rmm

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	0881	0866
20	0882	0867
25	0883	0868
28	0884	0869
29	0885	0870
30	0886	0871
31	0887	0872
32	0888	0873
35	0889	0874
38	0890	0875
40	0891	0876
50	0892	0877
60	0893	0878
70	0894	0879
80	0895	0880

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	0911	0896
20	0912	0897
25	0913	0898
28	0914	0899
29	0915	0900
30	0916	0901
31	0917	0902
32	0918	0903
35	0919	0904
38	0920	0905
40	0921	0906
50	0922	0907
60	0923	0908
70	0924	0909
80	0925	0910

DFSMSdss

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	2712	2697
20	2713	2698
25	2714	2699
28	2715	2700
29	2716	2701
30	2717	2702
31	2718	2703
32	2719	2704
35	2720	2705
38	2721	2706
40	2722	2707
50	2723	2708
60	2724	2709
70	2725	2710
80	2726	2711

Multiple Operating System ─ PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	2742	2727
20	2743	2728
25	2744	2729
28	2745	2730
29	2746	2731
30	2747	2732
31	2748	2733
32	2749	2734
35	2750	2735
38	2751	2736
40	2752	2737
50	2753	2738
60	2754	2739
70	2755	2740
80	2756	2741

DFSMSdss, hsm

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	2444	2429
20	2445	2430
25	2446	2431
28	2447	2432
29	2448	2433
30	2449	2434
31	2450	2435
32	2451	2436
35	2452	2437
38	2453	2438
40	2454	2439
50	2455	2440
60	2456	2441
70	2457	2442
80	2458	2443

Multiple Operating System ─ PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	2474	2459
20	2475	2460
25	2476	2461
28	2477	2462
29	2478	2463
30	2479	2464
31	2480	2465
32	2481	2466
35	2482	2467
38	2483	2468
40	2484	2469
50	2485	2470
60	2486	2471
70	2487	2472
80	2488	2473

DFSMSrmm

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	2585	2570
20	2586	2571
25	2587	2572
28	2588	2573
29	2589	2574
30	2590	2575
31	2591	2576
32	2592	2577
35	2593	2578
38	2594	2579
40	2595	2580
50	2596	2581
60	2597	2582
70	2598	2583
80	2599	2584

Multiple Operating System ─ PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	2615	2600
20	2616	2601
25	2617	2602
28	2618	2603
29	2619	2604
30	2620	2605
31	2621	2606
32	2622	2607
35	2623	2608
38	2624	2609
40	2625	2610
50	2626	2611
60	2627	2612
70	2628	2613
80	2629	2614

DFSMSdss, rmm

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	2317	2302
20	2318	2303
25	2319	2304
28	2320	2305
29	2321	2306
30	2322	2307
31	2323	2308
32	2324	2309
35	2325	2310
38	2326	2311
40	2327	2312
50	2328	2313
60	2329	2314
70	2330	2315
80	2331	2316

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	2347	2332
20	2348	2333
25	2349	2334
28	2350	2335
29	2351	2336
30	2352	2337
31	2353	2338
32	2354	2339
35	2355	2340
38	2356	2341
40	2357	2342
50	2358	2343
60	2359	2344
70	2360	2345
80	2361	2346

SDSF

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	1665	1650
20	1666	1651
25	1667	1652
28	1668	1653
29	1669	1654
30	1670	1655
31	1671	1656
32	1672	1657
35	1673	1658
38	1674	1659
40	1675	1660
50	1676	1661
60	1677	1662
70	1678	1663
80	1679	1664

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	1695	1680
20	1696	1681
25	1697	1682
28	1698	1683
29	1699	1684
30	1700	1685
31	1701	1686
32	1702	1687
35	1703	1688
38	1704	1689
40	1705	1690
50	1706	1691
60	1707	1692
70	1708	1693
80	1709	1694

DFSORT

Group	DSLO Graduated OTC Feature Number	DSLO Graduated MLC Feature Number
18	0620	0605
20	0621	0606
25	0622	0607
28	0623	0608
29	0624	0609
30	0625	0610
31	0626	0611
32	0627	0612
35	0628	0613
38	0629	0614
40	0630	0615
50	0631	0616
60	0632	0617
70	0633	0618
80	0634	0619

Multiple Operating System — PR/SM (MOSP): For a graduated OTC or graduated MLC, specify the following feature numbers, corresponding to the group that contains the designated machine.

Group	MOSP DSLO Graduated OTC Feature Number	MOSP DSLO Graduated MLC Feature Number
18	0650	0635
20	0651	0636
25	0652	0637
28	0653	0638
29	0654	0639
30	0655	0640
31	0656	0641
32	0657	0642
35	0658	0643
38	0659	0644
40	0660	0645
50	0661	0646
60	0662	0647
70	0663	0648
80	0664	0649

DSLO Non-Graduated Charges

High Level Assembler Toolkit

OTC	MLC
3985	3984

Printway/Netspool

OTC	MLC
4203	4202

Ordering a DSLO feature will result in IBM maintaining a record of this customer location as a DSLO user only. All material for the DSLO license will be provided through the basic license location. If a user selects DSLO, no other feature numbers are valid for this order and no program materials or updates will be shipped.

Unlicensed Documentation: A memo, program directories, and one copy of the following publications are supplied automatically with the basic machine-readable material:

Basic/Unlicensed Publications

Title	Order Number
OS/390 SOM Objects Getting Started	GA22-7248
OSA Planning	GC23-3870
HLASM Toolkit Installation and Customization	GC26-8711
OS/390 Licensed Program Specification	GC28-1728
OS/390 MVS Product Management	GC28-1730
LAN Server Installation Guide	GC28-1733
LANRES Installation Guide	GC28-1736
OS/390 MVS Conversion Notebook	GC28-1747
OS/390 MVS HCD Planning	GC28-1750
OS/390 V2R4 MVS JCL Reference	GC28-1757
OS/390 MVS Planning: Workload Management	GC28-1761
OS/390 MVS Routing and Description Codes	GC28-1778
OS/390 MVS System Codes	GC28-1780
OS/390 MVS System Commands	GC28-1781
OS/390 MVS System Messages, Volume 1	GC28-1784
OS/390 MVS System Messages, Volume 2	GC28-1785
OS/390 MVS System Messages, Volume 3	GC28-1786
OS/390 MVS System Messages, Volume 4	GC28-1787
OS/390 MVS System Messages, Volume 5	GC28-1788
OS/390 JES2 Commands	GC28-1790
OS/390 JES2 Messages	GC28-1796
OS/390 JES2 Migration Notebook	GC28-1797
OS/390 JES3 Commands	GC28-1798
OS/390 JES3 Conversion Notebook	GC28-1799
OS/390 JES3 Messages	GC28-1804
OS/390 HCD Messages	GC28-1849
OS/390 SOM Objects Configuration and Administration	GC28-1851
OS/390 Security Server (RACF) Plan/Inst/Mig	GC28-1920
OS/390 EZ Application Enabling Tech.Cust.Gd	GC28-1994
OS/390 NetQuestion Install and Admin.	GC31-8177
ICSS Planning for Installation	GC31-8312
VTAM V4R4 Installation and Migration Guide	GC31-8367
VTAM V4R4 Messages	GC31-8368
VTAM V4R4 Codes	GC31-8369
ICSS 2.2 Webmasters Guide	GC31-8490
OS/390 TCP/IP Messages and Code Supplement	GC31-8601
OS/390 Installation and Planning Kit	GK2T-6710

Title	Order Number
C/C++ Compiler Run-Time Migration Guide	SC09-2359
OS/390 ICSF Messages	SC23-3977
HLASM/MVS & VM Customization and Installation	SC26-3494
DFSMS/MVS Access Method Services ICF	SC26-4906
DFSMS/MVS Program Management	SC26-4916
DFSMS/MVS Planning for Installation	SC26-4919
DFSMSdfp Storage Administration Reference	SC26-4920
DFSMS/MVS Utilities	SC26-4926
DFSMS/MVS NFS Customization & Operations	SC26-7029
OS/390 ISPF Planning and Customizing	SC28-1298
OS/390 ISPF Users Guide	SC28-1239
OS/390 OpenEdition DCE Planning	SC28-1582
Open Edition DCE Config. Getting Started	SC28-1583
OS/390 OE DCE DFS Config. Getting Started	SC28-1722
OS/390 SMP/E Messages and Codes	SC28-1738
OS/390 BDT Installation	SC28-1742
OS/390 MVS Initialization Tuning Reference	SC28-1752
OS/390 JES2 Initialization Tuning Reference	SC28-1792
OS/390 JES3 Initialization Tuning Reference	SC28-1803
OS/390 SMP/E Commands	SC28-1805
OS/390 SMP/E Reference	SC28-1806
OS/390 HCD User's Guide	SC28-1848
OS/390 OpenEdition Planning	SC28-1890
OS/390 Language Environment Customization	SC28-1941
Language Environment Migration Guide	SC28-1944
OS/390 RMF User's Guide	SC28-1949
OS/390 SOMobjects Messages/Codes/ Diagnosis	SC28-1996
TCP/IP MVS Messages and Codes	SC31-7132
TCP/IP MVS Customization Admin. Guide	SC31-7134
TCP/IP MVS Planning and Migration Guide	SC31-7189
OS/390 TCP/IP OE Configuration Guide	SC31-8304
OS/390 TCP/IP OE Messages and Codes	SC31-8307
GDDM Customization and Administration	SC33-0871
DFSORT Installation and Customization	SC33-4034
Visuallift MVS,VM,VSE OS/390 Users Guide	SC33-6691
OS/390 Visuallift Run-Time Environment	SC33-6693
Bookmanager Read/MVS Install/Plan/Custom.	SC38-2035
Bookmanager Build/MVS Install/Plan/Custom.	SC38-2037
OS/390 Printing Softcopy Books	S544-5354

Note: The *OS/390 Installation Planning Kit* (GK2T-6710) will be available at general availability. Individual publications in the kit will be available to order on the announce date, except the *Introduction and Release Guide*, which will be available shortly after the announce date. The kit consists of:

- OS/390 Planning for Installation (GC28-1726)
- OS/390 Introduction and Release Guide (GC28-1725)
- OS/390 Information Roadmap (GC28-1727)
- OS/390 Information What's New (GC28-1985)

Optional Publications: Optional publications will be available at general availability.

Note: Specifying the 8xxx feature number will supply the publications library, in hardcopy, for the listed OS/390 element or optional feature. These libraries are supplied in softcopy displayable format as part of the basic softcopy publications. A complete list of the titles can be found in the *OS/390 Information Roadmap* (GC28-1727), and in the Sales Manual description for OS/390 on HONE.

Library Title	Feature Number	Title	Order Number
OS/390 Hardcopy Licensed Publications	8006	Language Environment Concepts	GC28-1945
OS/390 Hardcopy Unlicensed Publications	8007	OS/390 TSO/E General Information	GC28-1964
OS/390 HLA Toolkit Publications	8008	OS/390 TSO/E Messages	GC28-1978
OS/390 C/C++ Publications	8009	OS/390 EZ Application Tech. Admin.	GC28-1993
OS/390 DFSMSrmm Publications	8010	VTAM V4R4 Release Guide	GC31-6545
OS/390 DFSMShsm Publications	8011	OS/390 TCP/IP OE User's Guide	GC31-8305
OS/390 JES3 Publications	8012	OS/390 TCP/IP Update Guide	GC31-8553
OS/390 RMF Publications	8013	GDDM V3R2 General Information	GC33-0866
OS/390 Security Server Publications	8014	General Information Manual for VisualLift	GC33-6690
OS/390 TCP/IP NPF Publications	8016	ICKDSF R16 User's Guide	GC35-0033
OS/390 TCP/IP Offload Publications	8020	OS/390 MVS System Commands Summary	GX22-0040
OS/390 DFSORT Publications	8021	OS/390 JES2 Commands Summary	GX22-0041
OS/390 GDDM PGF Publications	8022	OS/390 ICSF System Programmer's Guide	SC23-3974
OS/390 SDSF Publications	8023	OS/390 ICSF Administrator's Guide	SC23-3975
OS/390 DFSMSdss Publications	8024	OS/390 ICSF Application Pgmr's Guide	SC23-3976
OS/390 Printway/NetSpool Publications	8028	OS/390 Encina Toolkit Executive Guide and Reference	SC24-5832
OS/390 HCM Publications	8029	OS/390 OE DCE AS Programming Guide	SC24-5833

Optional Unlicensed Publications: Specifying the 8xxx feature numbers below will supply the following optional unlicensed material, which will be available from IBM at product general availability for a fee.

**List of Hardcopy Unlicensed Publications
(Feature Number 8007) Price $1,669.73**

Title	Order Number	Title	Order Number
		OS/390 OE DCE AS Conf. and Admin. Guide	SC24-5834
		DFMSMS/MVS OAM PISA Tape Library	SC26-3051
		DFMSMS/MVS OAM PISA Object Support	SC26-4918
OS/390 ICSF Overview	GC23-3972	OS/390 Naviquest User's Guide	SC26-7194
DFSMS/MVS General Information	GC26-4900	OS/390 MVS Initialization and Tuning Guide	SC28-1751
HLASM MVS & VM General Information	GC26-4943	OS/390 JES2 Initialization and Tuning Guide	SC28-1791
OS/390 ISPF Messages and Codes	GC28-1326	OS/390 OSA/SF User's Guide	SC28-1855
OS/390 OpenEdition DCE Introduction	GC28-1581	OS/390 TSO/E Programming Services	SC28-1971
OS/390 MVS Progr: Product Registration	GC28-1729	VTAM V4R4 CMIP Srv & Topology Progr. Guide	SC31-8365
OS/390 MVS Progr: Resource Recovery	GC28-1739	VTAM Resource Definition Reference	SC31-8377
OS/390 MVS Dump Output Messages	GC28-1744	VTAM Resource Definition Samples	SC31-8378
OS/390 MVS IPCS Commands	GC28-1754	VTAM Programming for CSM	SC31-8420
OS/390 IPCS Customization	GC28-1755	MVS Packaging Rules	SC23-3695
OS/390 MVS IPCS User's Guide	GC28-1756	DFSMS Implementation Sys-Management Storage	SC26-3123
OS/390 MVS JCL User's Guide	GC28-1758	SML Managing Data	SC26-3124
OS/390 Planning: Global Resource Serial	GC28-1759	SML Managing Storage Groups	SC26-3125
OS/390 MVS Planning: Operations	GC28-1760	SML Leading a Storage Admin. Group	SC26-3126
OS/390 MVS Progr: Assembler Services Gde.	GC28-1762	DFSMS/MVS Access Method Cat.	SC26-4905
MVS Programming: Auth. Assem. Services Gde.	GC28-1763	DFSMS/MVS Checkpoint/Restart	SC26-4907
MVS Auth. Assem. Svcs. Ref., ALE-DYN	GC28-1764	DFSMS/MVS Install Exits	SC26-4908
MVS Auth. Assem. Svcs. Ref., ENF-ITT	GC28-1765	DFSMS/MVS Using ISMF	SC26-4911
MVS Auth. Assem. Svcs. Ref., LLA-SDU	GC28-1766	DFSMS/MVS Macro Instruction DS	SC26-4913
MVS Auth. Assem. Svcs. Ref., ENF-ITT	GC28-1767	DFSMS/MVS Managing Cat.	SC26-4914
MVS Callable Services High Level Language	GC28-1768	DFSMS/MVS DFM/MVS Guide Reference	SC26-4915
MVS Progr: Extended Addressability	GC28-1769	DFSMS/MVS DFSMSdfp Advanced Services	SC26-4921
MVS JES Common Coupling Services	GC28-1770	DFSMS/MVS Using Data Sets	SC26-4922
MVS Progr: Sysplex Services Guide	GC28-1771	DFSMS/MVS Using Magnetic Tapes	SC26-4923
OS/390 MVS Progr: Sysplex Services Ref.	GC28-1772	DFSMS/MVS Using Volume Mount Analyzer	SC26-4925
MVS Progr: Workload Management Services	GC28-1773	HLASM MVS & VM Language Reference	SC26-4940
MVS Writing Servers APPC/MVS	GC28-1774	HLASM MVS & VM Programming Guide	SC26-4941
MVS Writing TPS APPC/MVS	GC28-1775	DFSMS/MVS NFS Performance Tuning Guide	SC26-7019
Writing Trans. Sched. APPC/MVS	GC28-1776	DFSMS/MVS NFS User's Guide	SC26-7028
MVS Recovery Reconfiguration Guide	GC28-1777	OS/390 ISPF Dialog Tag Language Guide/Ref.	SC28-1219
MVS Setting Up a Sysplex	GC28-1779	OS/390 ISPF Reference Summary	SC28-1308
MVS System Data Set Definition	GC28-1782	OS/390 ISPF Edit and Edit Macros	SC28-1312
OS/390 MVS System Management Facility	GC28-1783	OS/390 ISPF Library Management Facility	SC28-1317
MVS Planning: APPC/MVS Management	GC28-1807	OS/390 ISPF SCLM Development Guide	SC28-1318
OS/390 Parallel Sysplex Overview	GC28-1860	OS/390 ISPF SCLM Proj. Manager's Guide	SC28-1319
Parallel Sysplex System Management	GC28-1861	OS/390 ISPF SCLM Reference	SC28-1320
Parallel Sysplex Hardware/Software Migr.	GC28-1862	OS/390 ISPF Services Guide	SC28-1272
Parallel Sysplex Application Migration	GC28-1863	OS/390 ISPF Dialog Development Guide/Ref.	SC28-1273
MVS Progr: Assembler Services Reference	GC28-1910	OS/390 ISPF Examples	SC28-1282
		OS/390 ISPF Getting Started	SC28-1294
		OS/390 OpenEdition DCE Admin. Guide	SC28-1584
		OS/390 OpenEdition DCE Command Ref.	SC28-1585
		OpenEdition DCE User's Guide	SC28-1586
		OpenEdition DCE ADG Intro. and Style	SC28-1587
		OpenEdition DCE ADG: Core Components	SC28-1588
		OpenEdition DCE ADG Directory Services	SC28-1589
		OpenEdition DCE Application Dev. Reference	SC28-1590
		OpenEdition DCE Messages and Codes	SC28-1591

Title	Order Number	Title	Order Number
OpenEdition DCE DFS Adm. Guide/Reference	SC28-1720	DFSMS/MVS DFSMSdfp Diagnosis	SY27-9605
OpenEdition DCE DFS Messages and Codes	SC28-1724	OS/390 BDT Diagnosis Reference	SY28-1081
LAN Server Configuration Files and Commands	SC28-1732	OS/390 MVS Diagnosis: Procedures	SY28-1082
LANRES Configuration Files and Commands	SC28-1735	OS/390 MVS Diagnosis: Reference	SY28-1084
OS/390 SMP/E Diagnosis Guide	SC28-1737	OS/390 MVS Diagnosis: Tools and Srv Aids	SY28-1085
OS/390 SMP/E User's Guide	SC28-1740	OS/390 JES2 Diagnosis	SY28-1086
OS/390 BDT Commands	SC28-1744		
OS/390 BDT Messages and Codes	SC28-1745	***List of HLA Tookkit Publications (Feature Number 8008)***	
OS/390 MVS Install Exits	SC28-1753	***Price $23.40***	
OS/390 JES2 Install Exits	SC28-1793		
OS/390 JES2 Macros	SC28-1795	HLASM Toolkit IDF Users Guide	GC26-8709
OS/390 OpenEdition User's Guide	SC28-1891	HLASM Toolkit Features User Guide	GC26-8710
OS/390 OpenEdition Command Reference	SC28-1892	HLASM Toolkit MVS&VM IDF Reference Summary	GC26-8712
OE Programming: Assem. Call Services Ref.	SC28-1899		
OE Programming Tools	SC28-1904	***List of C/C++ Publications (Feature Number 8009)***	
OE Using REXX and OpenEdition	SC28-1905	***Price $162.76***	
OE Communication Server Guide	SC28-1906		
OE Messages and Codes	SC28-1908	Debug Tool Users Guide and Reference	SC09-2137
OE File System Interface Reference	SC28-1909	C/C++ Users Guide	SC09-2361
Language Environment OS/390 and VM Prog. Gde.	SC28-1939	C/C++ IBM Open Class™ Library User's Guide	SC09-2363
Language Environment OS/390 and VM Prog. Ref.	SC28-1940	C/C++ Programming Guide	SC09-2362
		C/C++ Run-Time Library Reference	SC28-1663
Language Environment Debug Messages	SC28-1942	C Curses	SC28-1907
Language Environment Writing Applications	SC28-1943	C/C++ Reference Summary	SX09-1313
OS/390 TSO/E Customization	SC28-1965		
OS/390 TSO/E Administration	SC28-1966	***List of DFSMSrmm Publications (Feature Number 8010)***	
OS/390 TSO/E User's Guide	SC28-1968	***Price $17.33***	
OS/390 TSO/E Command Reference	SC28-1969		
OS/390 TSO/E Programming Guide	SC28-1970	DFSMS/MVS Guide and Reference	SC26-4931
TSO/E System Programming Command Reference	SC28-1972	DFMS DFSMSrmm Implementation/ Customization	SC26-4932
OS/390 TSO/E CLISTs	SC28-1973	DFMS DFSMSrmm Commands Reference Summary	SX26-6016
OS/390 TSO/E REXX User's Guide	SC28-1974	DFMS/MVS DFSMSrmm Diagnosis Guide	SY27-9615
OS/390 TSO/E REXX Reference	SC28-1975		
APPC Application Suite User's Guide	SC31-6532	***List of DFSMShsm Publications (Feature Number 8011)***	
APPC Application Suite Administration	SC31-6533	***Price $48.87***	
APPC Application Suite Programming	SC31-6534		
TCP/IP CICS Sockets Interface Guide and Ref.	SC31-7131	DFSMS DFSMShsm Storage Admin. Reference	SH21-1075
TCP/IP MVS Programming Reference	SC31-7135	DFSMS DFSMShsm Storage Admin. Guide	SH21-1076
TCP/IP for MVS User's Guide	SC31-7136	DFSMS DFSMShsm Managing Own Data	SH21-1077
TCP/IP MVS IMS Applic. Dev. Guide/Reference	SC31-7186	DFSMS DFSMShsm Implementation/ Customization	SH21-1078
TCP/IP MVS IMS Applic. Prog. Interface Ref.	SC31-7187	DFSMS DFSMShsm User Commands Ref. Summary	SX26-3806
TCP/IP Performance Tuning Guide	SC31-7188	DFSMS DFSMShsm Storage Admin. Ref. Summary	SX26-3808
OS/390 TCP/IP OE Planning/Rel. Guide	SC31-8303		
OS/390 TCP/IP OE Programmer's Reference	SC31-8308	***List of JES3 Publications (Feature Number 8012)***	
VTAM Network Implementation Guide	SC31-8370	***Price $15.08***	
VTAM AnyNet® Sockets over SNA	SC31-8371		
VTAM Operation	SC31-8372	OS/390 JES3 Commands Summary	GX22-0042
VTAM Programming	SC31-8373	OS/390 JES3 Initialization Tuning Guide	SC28-1802
VTAM Programming for LU 6.2 Guide	SC31-8374	S/390 JES3 Customization	SY28-1089
VTAM Programming for LU 6.2 Reference	SC31-8375	OS/390 JES3 Diagnosis	SY28-1090
VTAM ANYNET SNA Over TCP/IP	SC31-8376	OS/390 JES3 Diagnosis Reference	SY28-1092
OS/390 TCP/IP OE Diagnosis Guide	SC31-8492		
TCP/IP Network Station Manager	SC31-8546	***List of RMF Publications (Feature Number 8013)***	
GDDM Base Application Programming Guide	SC33-0867	***Price $57.83***	
GDDM Base Application Programming Reference	SC33-0868	OS/390 RMF Messages and Codes	GC28-1948
GDDM Messages	SC33-0869	OS/390 RMF Report Analysis	SC28-1950
GDDM Diagnosis	SC33-0870	OS/390 RMF Performance Management Guide	SC28-1951
GDDM User's Guide	SC33-0875		
GDDM Image Symbol Editor	SC33-0920	OS/390 RMF Programmers Guide	SC28-1952
DFSMS/MVS Remote Copy Guide/Reference	SC35-0169	OS/390 RMF Diagnosis Guide	SC33-6592
OS/390 R1 HCD Reference Summary	SX22-0043	OS/390 RMF Reference Summary	SX22-0044
DFSMS Summary of Access Method Svcs	SX26-3807		
VTAM V4R4 Operation Quick Reference for ICF	SX75-0208		

Title	Order Number
List of Security Server Publications (Feature Number 8014) Price $133.79	
OS/390 Security Server (RACF) Introduction	GC28-1912
OS/390 Security Interfaces	GC28-1922
OS/390 Security Server (OE) Overview	GC28-1938
Security Server (RACF) Syst. Pgmrs. Guide	SC28-1913
Security Server (RACF) Macros Interfaces	SC28-1914
OS/390 Security Server Admin. Guide	SC28-1915
OS/390 Security Server Auditor's Guide	SC28-1916
OS/390 Security Server User's Guide	SC28-1917
OS/390 Security Server Messages and Codes	SC28-1918
OS/390 Security Server (RACF) Cmd.Lang.Ref.	SC28-1919
OS/390 Security Server Command Syn. Summary	SX23-0027
OS/390 Security Server (RACF) Diagnosis	SY27-2639
List of TCP/IP NPF Publications (Feature Number 8016) Price $5.76	
TCP/IP MVS Network Print Facility	SC31-8074
List of TCP/IP Offload Publications (Feature Number 8020) Price $5.81	
TCP/IP MVS Offload Processing	SC31-7133
List of DFSORT Publications (Feature Number 8021) Price $44.24	
DFSORT R13 Panels Guide	GC26-7037
DFSORT R13 Brochure	GC33-4033
DFSORT R13 Tuning Guide	SC26-3111
DFSORT R13 Getting Started	SC26-4109
DFSORT Messages, Codes, Diagnosis	SC26-7050
DFSORT Application Programming Guide	SC33-4035
DFSORT R13 Reference Summary	SX33-8001
List of GDDM PGF Publications (Feature Number 8022) Price $121.10	
GDDM-PFG Interactive Chart Utility	SC33-0328
GDDM-PFG Vector Symbol Edit	SC33-0330
GDDM-PFG Programming Reference	SC33-0333
GDDM-PFG Application Programming Guide	SC33-0913
GDDM-PFG Operations Users Guide	SC33-1776
List of SDSF Publications (Feature Number 8023) Price $11.66	
SDSF Guide and Reference	SC28-1622
SDSF Customization and Security	SC28-1623
List of DFSMSdss Publications (Feature Number 8024) Price $12.38	
DFSMS/MVS DFSMSdss Storage Admin. Reference	SC26-4929
DFSMS/MVS DFSMSdss Storage Admin. Guide	SC26-4930
List of Printway/Netspool Publications (Feature Number 8028) Price $26.78	
IBM NetSpool Guide	G544-5301
IBM IP Printway Guide	S544-5379
List of HCM Publications (Feature Number 8029) Price $8.40	
OS/390 HCM User's Guide	SC33-6595

Additional copies of unlicensed publications will be available for a fee after product availability. These copies may be ordered from your IBM representative, through the system library subscription service (SLSS) or by direct order.

Displayable Softcopy Publications: OS/390 manuals are offered in displayable softcopy form. The displayable manuals are part of the basic machine-readable material. The files are automatically shipped on CD-ROM.

These displayable manuals can be used with the BookManager READ, an OS/390 element, in any of the supported environments or with the IBM Library Readers for DOS, OS/2, and Windows, which are included at no charge on the CD-ROMs. Terms and Conditions for use of the machine-readable files are shipped with the files on CD-ROM.

The Softcopy Print element in OS/390 enables hardcopies of these manuals to be printed. Terms and conditions for use of the machine-readable files are shipped with the files.

Basic Softcopy

Title	Order Number
OS/390 V2 Licensed Product Library	LK2T-2499
OS/390 Collection	SK2T-6700

Optional Softcopy Publications On Tape: This deliverable contains all OS/390 licensed and unlicensed publications for the base and optional features.

Specify the feature code for the media type desired.

Title	Media	Feature Number
Product Library on Tape	6250 Tape	7003
	3480 Cartridge	7004
	3480 Compressed	7005
	4mm	7006

Softcopy Optional Unlicensed Publications: Subscriptions to the following CD-ROMs may be ordered for a fee by specifying the feature numbers listed:

Title	Order Number	Feature Number	Price
S/390 Redbooks Collection	SK2T-2177	8005	$250
OS/390 Security Server (RACF) Information Package (available to users of the OS/390 Security Server optional feature)	SK2T-2180	8004	275 [8]

Note: When the S/390 Redbooks Collection and the OS/390 Security Server (RACF) Information Package are ordered as features of OS/390, the special subscription price includes automatic shipment of all updates made while the product version is in service.

[8] Will become generally available October 10, 1997.

The _S/390 Redbooks Collection_ contains over 300 technical bulletins, in BookManager format, that are related to the S/390 platform. The bulletins are "redbooks" produced by the International Technical Support Center (ITSO) and "orange and yellow books"

produced by the Washington Systems Center. The *OS/390 Security Server (RACF) Information Package* includes nearly 700 unlicensed online books from a wide variety of S/390 operating system and application product libraries that reference RACF and OS/390 Security Server, as well as ITSO redbooks (technical bulletins related to RACF system security), flyers, education course listings, sample code, and more.

Licensed Documentation: Specifying the 8006 feature number will supply the following optional licensed material, which will be available from IBM at product general availability. Price $120.20.

Optional Licensed Publications	Order Number
DFSMS/MVS DFSMSdfp Diagnosis Reference	LY27-9606
DFSMS/MVS DFSMShsm Diagnosis Guide	LY27-9607
DFSMS/MVS DFSMShsm Diagnosis Reference	LY27-9608
DFSMS/MVS DFSMSdss Diagnosis Guide	LY27-9609
VTAM Customization	LY43-0075
VTAM Diagnosis	LY43-0078
TCP/IP MVS Diagnosis Guide	LY43-0105

Subsequent updates (technical newsletters or revisions between releases) to the publications shipped with the product will be distributed to the user of record for as long as a license for this software remains in effect. A separate publication order or subscription is not needed.

Terms and Conditions

Licensing: IBM Customer Agreement

Variable Charges Apply: Yes.

Installation License or Location License Applies: No

Usage Restriction Applies: No

Educational Allowance: Yes, to qualified education customers.

Volume Discount: Not applicable

Version-To-Version Upgrade Credits Apply: Yes

All replaced programs listed refer to that program and all prior versions of that program.

Program Name	Replaced Program Number	Replacement Program Name	Replacement Program Number	Single Version Charging Applies
OS/390 V1	5645-001	OS/390 V2	5647-A01	Y
OS/390 Base				
MVS/ESAJ2	5655-068	OS/390	5647-A01	Y
VTAM	5695-117			Y
BookMgrRd	5695-046			Y
DFSMSdfp	5695-DF1			Y
DFSMS/MVS	5695-DF1			Y

Program Name	Replaced Program Number	Replacement Program Name	Replacement Program Number	Single Version Charging Applies
Network File System				
GDDM	5695-167	OS/390	5647-A01	Y
HLASM	5696-234			Y
ISPF	5655-042			Y
LANRES/MVS	5695-123			Y
LAN Server	5648-039			Y
LangEnv /MVS	5688-198			Y
OSA/SF	5655-104			Y
SMP/E	5668-949			Y
TCP/IP	5655-HAL			Y
TSO/E	5685-025			Y
ICSF/MVS	5695-051			Y
BDT	5665-264			Y
PCfiletrn	5665-311			Y
Communica- tions Server	5655-A29			Y
BookManager BookServer	5655-A20			Y
DCE AS	5655-064			Y
OS/390 V2	5647-A01	To a follow-on, if any		NA[9]
OS/390 Optional Features				
BDT File- to-File	5665-264	OS/390	5647-A01	Y
BDT SNA NJE	5665-264			Y
BookMgrBld	5695-045			Y
C / C + +	5655-121			Y
DFSORT	5740-SM1			Y
DFSMSdss	5695-DF1			Y
DFSMShsm	5695-DF1			Y
DFSMSrmm	5695-DF1			Y
GDDM-PGF	5668-812			Y
GDDM-REXX	5695-167			Y
HLASM TIKit	5696-234			Y
HCM	5697-119			Y
MVS/ESAJ3	5655-069			Y
RACF	5695-039			Y
SOMobjects ADE	5696-822			Y
VisualLift ADE	5648-109			Y
RMF	5655-084			Y
SDSF	5665-488			Y

[9] Not Applicable

This IBM program has separately charged features. Single Version Charging applicability or calculation of an upgrade credit to a designated replacement program or programs will be on a like for like feature/functional basis only. To accomplish this, features may be added to the replacement program or deleted from the replaced program. Credits are cumulative and calculated separately for each feature from the date charges were due. All features to be upgraded must be done in a single upgrade transaction to one or more replacements. Any features not upgraded in this single transaction cannot be used for a subsequent upgrade credit calculation unless designated by IBM.

Warranty Applies: Yes

Licensed Program Materials Availability

- Restricted Materials of IBM: Some
- Non-Restricted Source Materials: Some
- Object Code Only (OCO): Some

Not applicable

Testing Period: Two months (Basic License only)

OS/390 Optional Features: You are authorized to use only OS/390 base elements and optional priced features that you ordered or received enabled from IBM. You may also receive other optional features disabled for installation with OS/390.   Disabled optional features that you subsequently enable also become subject to the payment terms of the license for OS/390. Customers must notify IBM when they enable an optional feature that was shipped disabled from IBM.

You have a two-month no-fee testing period for OS/390. If you wish to evaluate any optional features after the initial two-month testing period, charges will apply. However, IBM provides a satisfaction guarantee of up to two months of such evaluation, and will credit any price paid for up to two months. If you do not wish to continue to use those optional features, you must disable the features and notify IBM. (For information about disabling OS/390 features see *OS/390 MVS Product Management* (GC28-1730).)   The license is terminated and any applicable credit issued.   No satisfaction guarantee is available for subsequent enabling of the same features.

DSLO Licenses: DSLO licenses for OS/390 may not contain any program features not also included in an OS/390 basic license. For example, the JES3 optional feature may not be contained in a OS/390 DSLO license unless it is also in an OS/390 basic license.

OS/390 does not qualify as a basic license for any DSLO licenses of the individual programs which are now included in OS/390. For example, there cannot be a DSLO license for MVS/ESA Version 5 with only a basic license for OS/390.   There must also be a basic license for MVS/ESA Version 5.

OS/390 and the Parallel Sysplex: PSLC selection is at the OS/390 product level, not at the feature level.

OS/390 features can be aggregated across a parallel sysplex provided they are the same features on each system.

VisualLift ADE Licensing: Only one license is required per designated machine (host processor or parallel sysplex complex) where the 3270 applications are developed and/or maintained.   IBM grants licensees of OS/390 permission to use the OS/390 VisualLift Application Development Environment optional feature on all suitably configured programmable workstations connected to the designated machine.

Network Station Client: Network Station Client operates on the IBM Network Station (8361). You are authorized to run an unlimited number of IBM Network Station Clients served by the licensed host product.

Host On-Demand: Host On-Demand operates on a client workstation.   You are authorized to run an unlimited number of Host on-Demand clients served by the licensed host product.

Program Services: Central Service, including the IBM Support Center, will be available until discontinued by IBM upon twelve months' written notice.

- Services for DSLO Licenses: Provided through Basic License location

Support Line: S/390

Charges

OS/390 Base (5647-A01)

| | Graduated OTC | | Graduated MLC | |
Group	Basic	DSLO	Basic	DSLO
18	$ 98,790	$ 74,090	$ 2,060	$ 1,545
20	143,250	107,450	2,985	2,240
25	186,250	139,700	3,880	2,910
28	255,150	191,350	5,315	3,985
29	331,700	248,800	6,910	5,185
30	431,200	323,400	8,985	6,740
31	530,350	397,750	11,050	8,290
32	678,850	509,150	14,140	10,610
35	780,650	585,500	16,260	12,200
38	897,750	673,300	18,700	14,030
40	1,032,400	774,300	21,510	16,130
50	1,290,500	967,900	26,890	20,170
60	1,613,100	1,209,800	33,610	25,210
70	2,016,400	1,512,300	42,010	31,510
80	2,520,500	1,890,400	52,510	39,380

| | MOSP Graduated OTC | | MOSP Graduated MLC | |
Group	Basic	DSLO	Basic	DSLO
18	$ 98,790	$ 74,090	$ 2,060	$ 1,545
20	121,000	90,750	2,525	1,895
25	164,750	123,550	3,435	2,575
28	220,700	165,550	4,600	3,450
29	293,450	220,100	6,115	4,585
30	381,450	286,100	7,950	5,965
31	480,800	360,600	10,020	7,515
32	604,600	453,450	12,600	9,450
35	729,750	547,300	15,200	11,400
38	839,200	629,400	17,480	13,110
40	965,100	723,850	20,110	15,080
50	1,161,500	871,150	24,200	18,150
60	1,451,800	1,088,900	30,250	22,690
70	1,814,800	1,361,100	37,810	28,360
80	2,268,500	1,701,400	47,260	35,450

BDT File-to-File

| | Graduated OTC | | Graduated MLC | |
Group	Basic	DSLO	Basic	DSLO
18	$ 26,660	$ 20,000	$ 555	$ 416
20	29,860	22,400	622	467
25	30,460	22,850	634	476
28	31,070	23,300	647	485
29	32,000	24,000	666	500
30	32,960	24,720	686	515
31	33,950	25,460	707	530
32	34,970	26,230	728	546
35	36,020	27,020	750	563
38	37,100	27,830	773	580
40	38,210	28,660	796	597
50	42,030	31,520	876	657
60	46,230	34,670	964	723
70	57,790	43,340	1,205	904
80	72,240	54,180	1,505	1,130

MOSP Graduated OTC / MOSP Graduated MLC

	MOSP Graduated OTC		MOSP Graduated MLC	
Group	Basic	DSLO	Basic	DSLO
18	$26,660	$ 20,000	$ 555	$ 416
20	28,260	21,200	589	442
25	30,160	22,620	628	471
28	30,770	23,080	641	481
29	31,540	23,660	657	493
30	32,480	24,360	676	507
31	33,460	25,100	697	523
32	34,460	25,850	718	539
35	35,500	26,630	739	554
38	36,560	27,420	762	572
40	37,660	28,250	785	589
50	40,120	30,090	836	627
60	44,130	33,100	920	690
70	52,010	39,010	1,085	814
80	65,020	48,770	1,355	1,015

BookManager BUILD

	Graduated OTC		Graduated MLC	
Group	Basic	DSLO	Basic	DSLO
18	$ 16,020	$12,020	$ 334	$ 251
20	18,900	14,180	394	296
25	29,290	21,970	610	458
28	29,290	21,970	610	458
29	29,290	21,970	610	458
30	29,290	21,970	610	458
31	45,980	34,490	958	719
32	45,980	34,490	958	719
35	45,980	34,490	958	719
38	45,980	34,490	958	719
40	45,980	34,490	958	719
50	54,720	41,040	1,140	855
60	73,870	55,400	1,540	1,155
70	96,030	72,020	2,000	1,500
80	110,450	82,840	2,300	1,725

BDT File-to-File SNA NJE

	Graduated OTC		Graduated MLC	
Group	Basic	DSLO	Basic	DSLO
18	$22,510	$16,880	$ 469	$352
20	25,210	18,910	525	394
25	25,710	19,280	535	401
28	26,200	19,670	546	410
29	27,010	20,260	562	422
30	27,820	20,870	579	434
31	28,650	21,490	596	447
32	29,510	22,130	614	461
35	30,400	22,800	632	474
38	31,310	23,480	651	488
40	32,250	24,190	671	503
50	35,470	26,600	738	554
60	39,020	29,270	812	609
70	48,770	36,580	1,015	761
80	60,960	45,720	1,270	953

MOSP Graduated OTC / MOSP Graduated MLC

	MOSP Graduated OTC		MOSP Graduated MLC	
Group	Basic	DSLO	Basic	DSLO
18	$ 16,020	$12,020	$ 334	$ 251
20	17,460	13,100	364	273
25	24,100	18,080	502	377
28	29,290	21,970	610	458
29	29,290	21,970	610	458
30	29,290	21,970	610	458
31	37,640	28,230	784	588
32	45,980	34,490	958	719
35	45,980	34,490	958	719
38	45,980	34,490	958	719
40	45,980	34,490	958	719
50	50,350	37,490	1,050	788
60	64,300	48,230	1,340	1,005
70	84,950	63,710	1,770	1,330
80	103,250	77,440	2,150	1,615

MOSP Graduated OTC / MOSP Graduated MLC

	MOSP Graduated OTC		MOSP Graduated MLC	
Group	Basic	DSLO	Basic	DSLO
18	$22,510	$16,880	$ 469	$352
20	23,860	17,900	497	373
25	25,460	19,100	530	398
28	25,970	19,480	541	406
29	26,620	19,970	554	416
30	27,420	20,570	571	428
31	28,240	21,180	588	441
32	29,080	21,810	605	454
35	29,960	22,470	623	467
38	30,860	23,150	642	482
40	31,780	23,840	661	496
50	33,860	25,400	705	529
60	37,250	27,940	775	581
70	43,900	32,930	914	686
80	54,870	41,150	1,145	859

C/C ++ (with Debug Tool)

	Graduated OTC		Graduated MLC	
Group	Basic	DSLO	Basic	DSLO
18	$ 5,285	$ 3,965	$ 110	$ 83
20	7,665	5,750	159	119
25	9,965	7,475	207	155
28	13,650	10,240	284	213
29	17,750	13,310	369	277
30	23,070	17,300	480	360
31	28,380	21,290	591	443
32	36,320	27,240	757	568
35	41,770	31,330	870	653
38	48,040	36,030	1,000	750
40	55,250	41,440	1,150	863
50	69,060	51,800	1,440	1,080
60	86,320	64,740	1,800	1,350
70	107,900	80,930	2,250	1,690
80	134,900	101,200	2,810	2,110

MOSP

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 5,285	$ 3,965	$ 110	$ 83
20	6,475	4,855	135	101
25	8,815	6,610	183	137
28	11,810	8,860	246	185
29	15,700	11,780	327	245
30	20,410	15,310	425	319
31	25,730	19,300	536	402
32	32,350	24,260	674	506
35	39,050	29,290	814	611
38	44,910	33,680	935	701
40	51,650	38,740	1,075	806
50	62,160	46,620	1,295	971
60	77,690	58,270	1,620	1,215
70	97,110	72,830	2,025	1,520
80	121,400	91,050	2,530	1,900

GDDM PGF

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 1,500	$ 1,125	$ 31	$ 23
20	2,175	1,630	45	34
25	2,830	2,125	59	44
28	3,875	2,905	81	61
29	5,040	3,780	105	79
30	6,555	4,915	137	103
31	8,065	6,050	168	126
32	10,320	7,740	215	161
35	11,870	8,905	247	185
38	13,650	10,240	284	213
40	15,700	11,780	327	245
50	19,630	14,720	409	307
60	24,540	18,410	511	383
70	30,680	23,010	639	479
80	38,350	28,760	799	599

C/C++ (without Debug Tool)

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 3,905	$ 2,930	$ 81	$ 61
20	5,660	4,245	118	89
25	7,360	5,520	154	116
28	10,080	7,560	211	158
29	13,100	9,825	274	206
30	17,030	12,770	356	267
31	20,950	15,710	438	329
32	26,820	20,120	560	420
35	30,840	23,130	644	483
38	35,470	26,600	741	556
40	40,790	30,590	852	639
50	50,990	38,240	1,065	779
60	63,740	47,810	1,330	998
70	79,680	59,760	1,660	1,245
80	99,600	74,700	2,075	1,555

MOSP

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 1,500	$ 1,125	$ 31	$ 23
20	1,840	1,380	38	29
25	2,505	1,880	52	39
28	3,355	2,515	70	53
29	4,460	3,345	93	70
30	5,800	4,350	121	91
31	7,310	5,485	153	115
32	9,195	6,895	192	144
35	11,100	8,325	231	173
38	12,760	9,570	266	200
40	14,680	11,010	306	230
50	17,670	13,250	368	276
60	22,090	16,570	460	345
70	27,610	20,710	575	431
80	34,520	25,890	719	539

MOSP

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 3,905	$ 2,930	$ 81	$ 61
20	4,785	3,590	100	75
25	6,510	4,885	136	102
28	8,720	6,540	183	137
29	11,590	8,695	243	182
30	15,070	11,300	315	236
31	18,990	14,240	397	298
32	23,890	17,920	499	374
35	28,830	21,620	602	452
38	33,160	24,870	693	520
40	38,130	28,600	797	598
50	45,890	34,420	959	719
60	57,370	43,030	1,200	900
70	71,710	53,780	1,495	1,120
80	89,640	67,230	1,870	1,405

GDDM REXX

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 512	$ 384	$ 10	$ 8
20	742	557	15	11
25	964	723	20	15
28	1,320	990	27	20
29	1,715	1,285	35	26
30	2,230	1,675	46	35
31	2,740	2,055	57	43
32	3,505	2,630	73	55
35	4,030	3,025	84	63
38	4,635	3,475	97	73
40	5,330	4,000	111	83
50	6,565	5,000	139	104
60	8,330	6,250	174	131
70	10,410	7,810	217	163
80	13,010	9,760	271	203

MOSP

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 512	$ 384	$ 10	$ 8
20	627	470	13	10
25	853	640	18	14
28	1,140	855	24	18
29	1,520	1,140	31	23
30	1,975	1,480	41	31
31	2,485	1,865	52	39
32	3,125	2,345	65	49
35	3,770	2,830	79	59
38	4,335	3,250	91	68
40	4,985	3,740	104	78
50	6,000	4,500	125	94
60	7,500	5,625	157	118
70	9,370	7,030	196	147
80	11,710	8,785	244	183

VisualLift ADE

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 2,615	$ 1,960	$ 54	$ 41
20	3,795	2,845	79	59
25	4,935	3,700	103	77
28	6,760	5,070	141	106
29	8,785	6,590	183	137
30	11,420	8,565	238	179
31	14,050	10,540	293	220
32	17,990	13,490	375	281
35	20,690	15,520	431	323
38	23,790	17,840	496	372
40	27,360	20,520	570	428
50	34,200	25,650	713	535
60	42,750	32,060	891	668
70	53,440	40,080	1,115	836
80	66,800	50,100	1,395	1,045

JES3

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 3,985	$ 2,990	$ 83	$ 62
20	5,775	4,330	120	90
25	7,505	5,630	156	117
28	10,280	7,710	214	161
29	13,360	10,020	278	209
30	17,370	13,030	361	271
31	21,360	16,020	444	333
32	27,340	20,510	568	426
35	31,440	23,580	653	490
38	36,160	27,120	751	563
40	41,580	31,190	864	648
50	51,970	38,980	1,080	810
60	64,960	48,720	1,350	1,015
70	81,200	60,900	1,690	1,270
80	101,500	76,130	2,115	1,585

MOSP

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 2,615	$ 1,960	$ 54	$ 41
20	3,205	2,405	67	50
25	4,365	3,275	91	68
28	5,850	4,390	122	92
29	7,775	5,830	162	122
30	10,100	7,575	211	158
31	12,740	9,555	266	200
32	16,020	12,020	334	251
35	19,340	14,510	403	302
38	22,240	16,680	464	348
40	25,580	19,190	533	400
50	30,780	23,090	642	482
60	38,480	28,860	802	602
70	48,100	36,080	1,005	754
80	60,120	45,090	1,255	941

MOSP

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 3,985	$ 2,990	$ 83	$ 62
20	4,880	3,660	102	77
25	6,640	4,980	138	104
28	8,895	6,670	185	139
29	11,820	8,865	246	185
30	15,370	11,530	320	240
31	19,370	14,530	403	302
32	24,350	18,260	506	380
35	29,390	22,040	611	458
38	33,800	25,350	702	527
40	38,870	29,150	808	606
50	46,780	35,090	972	729
60	58,470	43,850	1,215	911
70	73,080	54,810	1,520	1,140
80	91,350	68,510	1,905	1,430

SOMobjects ADE

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 6,200	$ 4,650	$ 129	$ 97
20	8,990	6,745	187	140
25	11,690	8,770	243	182
28	16,020	12,020	333	250
29	20,830	15,620	433	325
30	27,080	20,310	563	422
31	33,310	24,980	693	520
32	42,640	31,980	887	665
35	49,040	36,780	1,020	765
38	56,400	42,300	1,175	881
40	64,860	48,650	1,350	1,015
50	81,080	60,810	1,690	1,270
60	101,350	76,010	2,110	1,585
70	126,700	95,030	2,640	1,980
80	158,400	118,800	3,300	2,475

MOSP

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 6,200	$ 4,650	$ 129	$ 97
20	7,595	5,695	158	119
25	10,340	7,755	215	161
28	13,860	10,400	288	216
29	18,430	13,820	383	287
30	23,960	17,970	498	374
31	30,200	22,650	628	471
32	37,980	28,490	790	593
35	45,840	34,380	954	716
38	52,720	39,540	1,100	825
40	60,630	45,470	1,265	949
50	72,970	54,730	1,520	1,140
60	91,220	68,420	1,900	1,425
70	114,050	85,540	2,375	1,780
80	142,550	106,900	2,970	2,230

Security Server

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 5,740	$ 4,305	$ 119	$ 89
20	8,325	6,245	173	130
25	10,820	8,115	225	169
28	14,820	11,120	308	231
29	19,260	14,450	401	301
30	25,040	18,780	521	391
31	30,800	23,100	641	481
32	39,420	29,570	820	615
35	45,330	34,000	943	707
38	52,130	39,100	1,085	814
40	59,950	44,960	1,250	938
50	74,940	56,210	1,560	1,170
60	93,680	70,260	1,950	1,465
70	117,100	87,830	2,440	1,830
80	146,400	109,800	3,050	2,290

RMF

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 3,785	$ 2,840	$ 79	$ 59
20	5,490	4,120	115	86
25	7,140	5,355	149	112
28	9,785	7,340	204	153
29	12,720	9,540	265	199
30	16,540	12,410	344	258
31	20,350	15,260	423	317
32	26,050	19,540	542	407
35	29,960	22,470	623	467
38	34,450	25,840	717	538
40	39,620	29,720	824	618
50	49,520	37,140	1,030	773
60	61,900	46,430	1,290	968
70	77,380	58,040	1,610	1,210
80	96,720	72,540	2,015	1,510

MOSP

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 5,740	$ 4,305	$ 119	$ 89
20	7,035	5,275	146	110
25	9,575	7,180	199	149
28	12,820	9,615	267	200
29	17,040	12,780	355	266
30	22,150	16,610	461	346
31	27,920	20,940	581	436
32	35,110	26,330	731	548
35	42,380	31,790	882	662
38	48,730	36,550	1,015	761
40	56,040	42,030	1,170	878
50	67,450	50,590	1,405	1,055
60	84,310	63,230	1,755	1,315
70	105,400	79,050	2,195	1,645
80	131,750	98,810	2,745	2,060

MOSP

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 3,785	$ 2,840	$ 79	$ 59
20	4,640	3,480	97	73
25	6,315	4,735	132	99
28	8,465	6,350	177	133
29	11,250	8,440	235	176
30	14,630	10,970	305	229
31	18,450	13,840	384	288
32	23,200	17,400	483	362
35	28,010	21,010	583	437
38	32,210	24,160	670	503
40	37,040	27,780	771	578
50	44,570	33,430	927	695
60	55,710	41,780	1,160	870
70	69,640	52,230	1,450	1,090
80	87,050	65,290	1,815	1,360

DFSMSdss, DFSMShsm, DFSMSrmm

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 9,670	$ 7,255	$ 201	$ 151
20	14,020	10,520	292	219
25	18,230	13,670	379	284
28	24,970	18,730	519	389
29	32,460	24,350	675	506
30	42,200	31,650	878	659
31	51,910	38,930	1,080	810
32	66,440	49,830	1,385	1,040
35	76,410	57,310	1,590	1,195
38	87,870	65,900	1,830	1,375
40	101,050	75,790	2,105	1,580
50	126,300	94,730	2,630	1,975
60	157,900	118,450	3,290	2,470
70	197,400	148,050	4,115	3,085
80	246,750	185,050	5,145	3,860

MOSP

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 9,670	$ 7,255	$ 201	$ 151
20	11,850	8,890	247	185
25	16,130	12,100	336	252
28	21,600	16,200	449	337
29	28,720	21,540	597	448
30	37,330	28,000	777	583
31	47,060	35,300	979	734
32	59,180	44,390	1,235	926
35	71,430	53,570	1,490	1,120
38	82,140	61,610	1,710	1,285
40	94,460	70,850	1,970	1,480
50	113,700	85,280	2,370	1,780
60	142,100	106,600	2,960	2,220
70	177,650	133,250	3,705	2,780
80	222,100	166,600	4,630	3,475

DFSMSdss, DFSMShsm

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 6,200	$ 4,650	$ 129	$ 97
20	8,990	6,745	187	140
25	11,690	8,770	243	182
28	16,010	12,010	333	250
29	20,810	15,610	433	325
30	27,050	20,290	563	422
31	33,270	24,950	693	520
32	42,580	31,940	887	665
35	48,970	36,730	1,020	765
38	56,320	42,240	1,175	881
40	64,770	48,580	1,350	1,015
50	80,960	60,720	1,690	1,270
60	101,200	75,900	2,110	1,585
70	126,500	94,880	2,635	1,975
80	158,150	118,600	3,295	2,470

DFSMSdss

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 1,420	$ 1,065	$ 29	$ 22
20	2,060	1,545	42	32
25	2,680	2,010	55	41
28	3,675	2,755	76	57
29	4,780	3,585	99	74
30	6,215	4,660	129	97
31	7,645	5,735	159	119
32	9,785	7,340	204	153
35	11,250	8,440	235	176
38	12,940	9,705	270	203
40	14,880	11,160	310	233
50	18,600	13,950	388	291
60	23,250	17,440	485	364
70	29,060	21,800	606	455
80	36,330	27,250	758	569

MOSP

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 6,200	$ 4,650	$ 129	$ 97
20	7,595	5,695	158	119
25	10,340	7,755	215	161
28	13,850	10,390	288	216
29	18,410	13,810	383	287
30	23,930	17,950	498	374
31	30,160	22,620	628	471
32	37,930	28,450	790	593
35	45,780	34,340	954	716
38	52,650	39,490	1,100	825
40	60,550	45,410	1,265	949
50	72,870	54,650	1,520	1,140
60	91,080	68,310	1,900	1,425
70	113,850	85,390	2,375	1,780
80	142,350	106,750	2,965	2,225

MOSP

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 1,420	$ 1,065	$ 29	$ 22
20	1,740	1,305	36	27
25	2,370	1,780	49	37
28	3,180	2,385	66	50
29	4,230	3,175	88	66
30	5,500	4,125	114	86
31	6,930	5,200	144	108
32	8,715	6,535	182	137
35	10,520	7,890	220	165
38	12,100	9,075	253	190
40	13,910	10,430	290	218
50	16,740	12,560	349	262
60	20,930	15,700	437	328
70	26,160	19,620	546	410
80	32,700	24,530	682	512

DFSMSrmm

Group	Graduated OTC Basic	DSLO	Graduated MLC Basic	DSLO
18	$ 3,480	$ 2,610	$ 72	$ 54
20	5,045	3,785	105	79
25	6,560	4,920	136	102
28	8,985	6,740	187	140
29	11,680	8,760	243	182
30	15,190	11,390	316	237
31	18,680	14,010	389	292
32	23,910	17,930	498	374
35	27,500	20,630	573	430
38	31,630	23,720	659	494
40	36,370	27,280	758	569
50	45,460	34,100	948	711
60	56,830	42,620	1,185	889
70	71,040	53,280	1,480	1,110
80	88,800	66,600	1,850	1,390

	MOSP Graduated OTC		MOSP Graduated MLC				SDSF Graduated OTC		Graduated MLC	
Group	Basic	DSLO	Basic	DSLO		Group	Basic	DSLO	Basic	DSLO
18	$ 3,480	$ 2,610	$ 72	$ 54						
20	4,265	3,200	89	67		18	$ 1,950	$ 1,465	$ 41	$ 31
25	5,805	4,355	121	91		20	2,830	2,125	59	44
28	7,775	5,830	162	122		25	3,680	2,760	77	58
29	10,330	7,750	215	161		28	5,045	3,785	105	79
30	13,440	10,080	280	210		29	6,560	4,920	137	103
31	16,940	12,710	353	265		30	8,530	6,400	178	134
32	21,300	15,980	444	333		31	10,490	7,870	219	164
35	25,710	19,280	536	402		32	13,430	10,070	280	210
38	29,570	22,180	616	462		35	15,450	11,590	322	242
40	34,000	25,500	709	532		38	17,770	13,330	370	278
50	40,920	30,690	853	640		40	20,430	15,320	426	320
60	51,150	38,360	1,065	799		50	25,540	19,160	532	399
70	63,940	47,960	1,335	1,000		60	31,930	23,950	665	499
80	79,920	59,940	1,665	1,250		70	39,910	29,930	831	623
						80	49,890	37,420	1,040	780

DFSMSdss, DFSMSrmm

	Graduated OTC		Graduated MLC				MOSP Graduated OTC		MOSP Graduated MLC	
Group	Basic	DSLO	Basic	DSLO		Group	Basic	DSLO	Basic	DSLO
18	$ 4,900	$ 3,675	$ 102	$ 77		18	$ 1,950	$ 1,465	$ 41	$ 31
20	7,105	5,330	148	111		20	2,390	1,795	50	38
25	9,235	6,925	193	145		25	3,255	2,440	68	51
28	12,650	9,490	264	198		28	4,365	3,275	91	68
29	16,450	12,340	343	257		29	5,805	4,355	121	91
30	21,390	16,040	446	335		30	7,545	5,660	158	119
31	26,310	19,730	549	412		31	9,510	7,135	199	149
32	33,680	25,260	703	527		32	11,960	8,970	250	188
35	38,730	29,050	809	607		35	14,440	10,830	301	226
38	44,540	33,410	930	698		38	16,610	12,460	346	260
40	51,220	38,420	1,070	803		40	19,100	14,330	398	299
50	64,030	48,020	1,335	1,000		50	22,990	17,240	479	359
60	80,040	60,030	1,670	1,255		60	28,740	21,560	599	449
70	100,050	75,040	2,085	1,565		70	35,920	26,940	748	561
80	125,050	93,790	2,605	1,955		80	44,900	33,680	936	702

	MOSP Graduated OTC		MOSP Graduated MLC				DFSORT Graduated OTC		Graduated MLC	
Group	Basic	DSLO	Basic	DSLO		Group	Basic	DSLO	Basic	DSLO
18	$ 4,900	$ 3,675	$ 102	$ 77						
20	6,005	4,505	125	94		18	$10,610	$ 7,940	$309	232
25	8,170	6,130	171	128		20	10,610	7,940	309	232
28	10,940	8,205	229	172		25	10,610	7,940	309	232
29	14,550	10,910	304	228		28	10,610	7,940	309	232
30	18,920	14,190	395	296		29	10,610	7,940	309	232
31	23,850	17,890	498	374		30	10,610	7,940	309	232
32	30,000	22,500	626	470		31	16,840	12,630	309	232
35	36,210	27,160	756	567		32	16,840	12,630	309	232
38	41,640	31,230	870	653		35	16,840	12,630	309	232
40	47,880	35,910	1,000	750		38	16,840	12,630	309	232
50	57,630	43,220	1,205	904		40	16,840	12,630	309	232
60	72,040	54,030	1,505	1,130		50	21,730	16,280	309	232
70	90,050	67,540	1,880	1,410		60	24,840	18,630	309	232
80	112,550	84,410	2,345	1,760		70	31,050	23,290	309	232
						80	38,830	29,120	309	232

	MOSP Graduated OTC		MOSP Graduated MLC	
Group	**Basic**	**DSLO**	**Basic**	**DSLO**
18	$10,610	$ 7,940	$309	232
20	10,610	7,940	309	232
25	10,610	7,940	309	232
28	10,610	7,940	309	232
29	10,610	7,940	309	232
30	10,610	7,940	309	232
31	15,280	11,450	309	232
32	15,280	11,450	309	232
35	15,280	11,450	309	232
38	15,280	11,450	309	232
40	15,280	11,450	309	232
50	19,280	14,450	309	232
60	23,280	17,640	309	232
70	27,950	20,960	309	232
80	34,950	26,120	309	232

High Level Assembler Toolkit

Basic OTC	**DSLO OTC**	**Basic MLC**	**DSLO MLC**
$4,750	$3,565	$99	$74

Printway/NetSpool

Basic OTC	**DSLO OTC**	**Basic MLC**	**DSLO MLC**
$37,200	$27,936	$775	$582

HCM

Tier Charges

Usage Levels (Registered Users Per Designated Machine)	**OTC Per User**	**MLC Per User**
Level 1 to 3	$10,000	$210
Level 4 to 6	8,000	165
Level 7 to 10	5,000	105
Level above 10	2,000	40

A registered user is an HCM user with update authority on the host IODF file. HCM features must be ordered in the same quantity as the number of users.

ESL OTC

Description	**ESL OTC**
OS/390 Base	$32,930
BDT File-to-File	8,890
BDT JES3 SNA NJE	7,505
BookManager BUILD	5,340
C/C++ (with Debug Tool)	1,760
C/C++ (without Debug Tool)	1,295
GDDM PGF	495
GDDM REXX	170
HLASM Toolkit	727
JES3	1,330
SOM ADE	2,065
VisualLift ADE	863
DFSMSdss, hsm, rmm	3,215
DFSMSdss	475
DFSMSdss, hsm	2,055
DFSMSrmm	1,160
DFSMSdss, rmm	1,635
SDSF	655
DFSORT	3,535
RMF	1,265
Security Server	1,915
Printway/NetSpool	12,400

OS/390 Function	**Tier 1 1 MSU**	**Tier 2 2 MSU**	**Base 3 MSU**
OS/390 Base	$2,135	$2,935	$3,735
BDT File-to-File	566	580	594
BDT J3 SNA/NJE	476	488	500
BookManager BUILD	610	610	637
C / C + + (with Debug Tool)	284	480	756
C / C + + (without Debug Tool)	211	356	559
GDDM PGF	81	137	213
GDDM REXX	27	46	73
JES3	84	117	150
VisualLift ADE	141	238	375
SOMobjects ADE	333	563	890
RMF	85	116	147
Security Server (RACF + UNIX Svc DCE Security Svr)	127	174	221
DFSMSdss, hsm, rmm	519	878	1,390
DFSMSdss	76	129	207
DFSMSdss, hsm	333	563	895
DFSMSrmm	187	316	495
DFSMSdss, rmm	264	446	702
SDSF	105	178	280
DFSORT	309	309	309

PSLC Charges

OS/390 Function	Level A		Level B		
	1 MSU	42 MSU	1 MSU	10 MSU	50 MSU
OS/390 Base	$800	$33,600	$255	$2,550	$12,750
BDT File-to-File	14	588	8	80	400
BDT J3 SNA/NJE	12	504	6	60	300
BookManager BUILD	28	1,176	12	120	600
C/C++ (with Debug Tool)	34	1,428	14	140	700
C/C++ (without Debug Tool)	26	1,092	10	100	500
GDDM PGF	10	420	4	40	200
GDDM REXX	3	126	1	10	50
JES3	33	1,386	11	110	550
VisualLift ADE	17	714	7	70	350
SOMobjects ADE	40	1,680	20	200	1,000
RMF	31	1,302	10	100	500
Security Server (RACF + UNIX Svc DCE Security Svr)	47	1,974	15	150	750
DFSMSdss, hsm, rmm	63	2,646	26	260	1,300
DFSMSdss	9	378	4	40	200
DFSMSdss,hsm	40	1,680	17	170	850
DFSMSrmm	23	996	9	90	450
DFSMSdss, rmm	32	1,344	13	130	60
SDSF	13	546	5	50	250
DFSORT	0	0	0	0	0

IMLC Charges

OS/390 Function	Base	Additional MSUs		
	80 MSU	1 MSU	10 MSU	50 MSU
OS/390 Base	$46,260	$255	$2,550	$12,750
BDT File-to-File	1,462	8	80	400
BDT J3 SNA/NJE	1,214	6	60	300
BookManager BUILD	2,235	12	120	600
C/C++ (with Debug Tool)	2,675	14	140	700
C/C++ (without Debug Tool)	2,000	10	100	500
GDDM PGF	775	4	40	200
GDDM REXX	234	1	10	50
JES3	1,921	11	110	550
VisualLift ADE	1,335	7	70	350
SOMobjects ADE	3,270	20	200	1,000
RMF	1,799	10	100	500
Security Server	2,720	15	150	750
DFSMSdss, hsm rmm	4,946	26	260	1,300
DFSMSdss	725	4	40	200
DFSMSdss, hsm	3,170	17	170	850
DFSMSrmm	1,776	9	90	450
DFSMSdss, rmm	2,501	13	130	650
SDSF	1,001	5	50	250
DFSORT	309	0	0	0

OTC: Customers who pay an OTC for a licensed program receive enhancements and future releases, if any, at no additional charge. Significant new function may be offered as an optional feature and charged for separately. If a replacement program is announced and the customer elects to license the replacement program, a time-based upgrade credit may apply.

Variable Charges: The applicable graduated OTC or graduated MLC will be based on the group of the designated machine on which the licensed program is licensed for use. If the program is designated to a processor in a group for which no charge is listed above, the charge of the next higher group listed applies.

For upgrades of OTC licenses to a machine in a higher group, the upgrade charge will be the difference in the then current charges between the two groups. For downgrades of OTC licenses to a machine in a lower group, there will be no adjustment or refund of one-time charges paid.

For upgrades or downgrades of MLC licenses, the MLC applicable to the higher or lower group will apply.

Entry Support License OTC: OTC authorizes use only on IBM Entry End User/390 Machines.

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Note: Shipments will begin after the planned availability date.