
Overview

IBM announces new features and functions for the 9672 Parallel Enterprise Server G5 and G6 models, assisting your enterprise with new: capacity planning options, PCI Cryptographic Coprocessor features, and Queued Direct Input/Output support for OSA-Express Fast Ethernet and 155 ATM Ethernet LAN emulation to reduce CPU cycle consumption and improve ease of use. Thirty-six FICON™ channels are now orderable on G6 models. For Parallel Sysplex® users, we offer new G5/G6 function and new software support in conjunction with OS/390® Version 2 Release 9.

S/390® Proof Points: Why You Want the G5/G6 Server

Mission-Critical Availability: S/390 availability is the envy of the server industry as the standard for "mainframe"-like qualities, providing a "highly available, manageable, shared resource." Today IBM announces enhanced Capacity Upgrade on Demand (CUoD) functions on G5 and G6 servers to further assist capacity planning for successful e-business workloads.

Data Protection: New G5/G6 PCI Cryptographic Coprocessor support, with new technology, continues IBM’s recognized legacy as the vendor with the most secure server technology. IBM’s Capacity BackUp capability, together with the Geographically Dispersed Parallel Sysplex™, further enhances recovery from disaster events.

Interoperability: DB2® and S/390 connect to everything, enabling e-business! S/390 users benefit from two- and three-tier solutions to leverage the strengths of the IBM server family. S/390’s ability to support diverse workloads (unpredictable volumes and application mixes), and S/390’s ability to operate at high levels of utilization with mixed workloads and yet continue to provide consistent response times. These strengths extend the life of existing traditional applications into the rapidly expanding world of e-business, Web-enabling existing applications without rewriting.

Query Responsiveness: The one-two punch of powerful S/390 G5/G6 servers along with IBM’s Enterprise Storage Server (ESS) offers fast disk access and contention-reducing features such as Parallel Access Volumes and Multiple Allegiance, and delivers data at blistering speeds. The IBM Enterprise Storage Server is the ultimate Storage Area Network (SAN) appliance, providing the information fuel that runs your e-business engine.

Tools to Leverage Your Investment: S/390 shops already have what they need: high ROI, rapid start-up, integration with the operational environment. We put people in the center of the business, by providing ease-of-use within the platform to make life easier for the end user, managing applications to achieve business goals through workload management, and offering support for leading-edge application areas like Customer Relationship Management (CRM). IBM’s Parallel Sysplex workload balancing with Cisco’s multi-node load balancing, routers, and switches provides an end-to-end solution for your environment.

Incremental Growth: Start small, and add capacity as you need it. S/390 scales "linearly" and provides scalability (within the platform range and Parallel Sysplex clusters) with increased availability and responsiveness.

At a Glance

Capacity Upgrade on Demand: One year’s experience with CUoD, new options to exploit all opportunities in the unpredictable world of e-business. CUoD-capable Model R06 Coupling Facility, even more enterprise value.

Cryptographic Coprocessor: New PCI Cryptographic Coprocessor provides new features with new function.

Parallel Sysplex: Announcing the option to integrate an automated Capacity BackUp (CBU) with IBM’s Geographically Dispersed Parallel Sysplex (GDPS™). IBM’s exclusive integration of GDPS and CBU option reduces disaster recovery times by automating the CBU process at a remote site. Parallel Sysplex Messaging CFCC support is enabled via new XES List Structure extensions in OS/390 Version 2 Release 9, with CFCC Level 9.

Enhanced Contention Analysis, ease of use enhancements, Shared HFS, WLM Multisystem enclaves, and XES enhancements are among the new software support for Parallel Sysplex.

Capacity BackUp: Enhancements with more options.

Connectivity Update for 2000: New QDIO support for OSA-Express options, up to 36 FICON channels now on G6.


Planned Availability Dates

June 30, 2000, except: OSA-Express new function (third quarter 2000)

Note: New function described within this announcement may require the latest level Licensed Internal Code, available June 30, 2000.

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.
Faced your worst fear?
How did you do this? The answer is simple. You used current operations when you wanted more horsepower. You knew you might need processing power to meet the demands of your success and you didn’t want to disrupt current operations when you wanted more horsepower. How did you do this? The answer is simple. You used IBM’s Capacity Upgrade on Demand (CUoD). It enabled you to start small, then increase processing capacity without disrupting any of your current operations. You’ve faced your worst fear — unsatisfied processing demand — and solved it with CUoD.

IBM’s Capacity Upgrade on Demand — One Year’s Experience: A series of recent announcements by other server vendors concerning their versions of processor capacity-on-demand have prompted comparisons to IBM’s Capacity Upgrade on Demand, announced early last year (January 1999). Your IBM representative can more fully describe how IBM’s basic CUoD is unparalleled in offering flexibility and latent capacity implementation, especially with the following benefits:

- Minimum system configuration
- No extra charge for reserve capacity (maximum or minimum)
- Highest availability
- Asset management
- ISV license management

All of IBM’s G5/G6 servers (installed and new shipments) support CUoD. There is no premium at initial purchase of the G5 or G6 server, or at subsequent activation via CUoD. Customers obtain the price at the time of the upgrade rather than being locked into a predetermined price at initial acquisition.

S/390’s Logical Partition manager, PR/SM™, permits reassignment of dedicated CPs between logical partitions by varying off a CP in one partition and reassigning it to another. In this case, the same physical CP resource is reassigned and there is no cost penalty for the flexibility. The IBM G5/G6 offline CPs also provide a hot and dynamic spare substitution benefit in case of an active CP failure.

IBM’s CUoD does not require the bureaucracy of tracking RTU licenses or a special maintenance contract for inactive CPUs. IBM has provided a special instruction that enables ISVs to monitor capacity increase and maintain the automated management of software licenses. CUoD upgrades use the standard upgrade order process. Required code for the upgrade can be delivered in as little as one day. IBM Service can install the code for concurrent and immediate activation (presence of a trained IBM Service Representative during the upgrade can further mitigate outage risks). We now have available exciting new customer options in the United States and Canada:

- Single-Step CUoD (RPQ #8P1998), which pre-approves your server to receive a concurrently installable, permanent LIC upgrade, to a preplanned target capacity. This RPQ eliminates order-process and logistics turnaround times. Your IBM Service Representative can download the necessary Licensed Internal Code for upgrade in minutes.

- Multi-Step CUoD (RPQ #8P1999), which pre-installs LIC on your server which can then be password activated to a preplanned target capacity. This upgrade requires a follow-on permanent LIC load, within 90 days, when a system outage is convenient.

These RPQs are administered as attachments to the “IBM Customer Agreement” and enable reduced implementation time of an enterprise’s activation request, from the former cycle of one to five days, to minutes. Contact your IBM representative for details, and for availability outside of North America.

Additional CUoD Enhancements

Reserved CP Support in LPAR Mode: S/390’s PR/SM has been enhanced to further take advantage of CUoD. A Logical Partition (LPAR) may now be defined with the number of logical CPs greater than the number of physical CPs. Reserved CPs can be specified for the logical partition definition beyond the number of physical CPs currently installed on the model. Therefore, an enterprise planning to do a nondisruptive upgrade (with an LPAR defined of logical CPs equal to the number of physical CPs) does not need to deactivate, redefine, then reactivate in order to take advantage of the new CPs that have been installed. The enterprise simply needs to have defined reserved CPs for the LPAR in advance. This enhancement ensures that any planned logical partition can be as large as the possible physical machine configuration, nondisruptively.

R06 — Now CUoD-Capable: New Licensed Internal Code (LIC) allows engines to be added dynamically to the R06 and to the LPARs that are running the CFC Code. Prior to the latest Licensed Internal Code, CUoD for R06 models was not supported. One point to remember: more horsepower will also need more link bandwidth. Coupling Facility receiver channels cannot be dynamically added to the system. Therefore, they must be pre-installed (all the receiver links the installation would require in support of more engines).

CUoD Planning Guide: One year’s experience with leading-edge customers has helped our account teams to identify the primary planning issues when planning ahead for nondisruptive capacity upgrades. IBM’s Account Planning Guide provides S/390 installations with a roadmap to implement Capacity Upgrade on Demand (CUoD). The guide describes model capacity decisions within IBM’s G5 and G6 server “tower” philosophy, necessary Licensed Internal Code requirements, PR/SM configuration tips, and many other planning considerations derived from customer “hands-on” planning of CUoD. Be sure to use the Guide’s “Summary Final Checklist” as a cross check to your plan. The latest revision of the popular Account Planning Guide for S/390: Capacity Upgrade on Demand may be found at:

http://www.s390.ibm.com/pes/apg/

New Cryptographic Security Options

Introducing the IBM PCI Cryptographic Coprocessor (PCICC): Events in IBM’s support of cryptographic requirements include:

- September 1997 — OS/390 Version 2 Release 4 integrates ICSF V2.1 into Base functions.
• October 1997 — Generation 4 servers ship IBM S/390 CMOS Cryptographic Coprocessors as a standard, no-charge function.

• February 1998 — OS/390 V2 (and OS/390 V1 with ICSF) add support for SET, CVV, and CVC (Visa/MasterCard verification code support), PKDS, and T-DES on Generation 4 servers (implemented in Licensed Internal Code).

• September 1998 — OS/390 V2 adds support for Double Key Mac, SSL, enhanced CKDS panel, and RSA Key Generation (imported from TKE only).

• September 1998 — Generation 5 servers support T-DES implemented in hardware.

• January 1999 — IBM S/390 CMOS Cryptographic Coprocessors on all generations of S/390 Parallel Enterprise Servers receive U.S. Government FIPS 140-1 Level 4 certification — the highest rating available.

• February 2000 — IBM’s PCI Cryptographic Coprocessor (PCICC) is introduced on G5 and G6 servers.

New for 2000, the IBM PCI Cryptographic Coprocessor (PCICC) is an orderable feature that adds additional cryptographic function and cryptographic performance to G5/G6 servers. A fully configured PCICC implementation on the G5 or G6 server can process up to one thousand 1024-bit RSA Private Key Decryptions per second. Each PCICC feature is built around an IBM 4758-2 PCI Cryptographic Coprocessor card embedded in an adapter package for installing within a G5 or G6 server. Support for PCICC will be provided by OS/390 V2R9 with new ICSF functions. The IBM PCI Cryptographic Coprocessor feature coexists with and augments the IBM CMOS Cryptographic Coprocessor, standard on G5 and G6 servers. ICSF will transparently route application requests for cryptographic services. Either a CMOS Cryptographic Coprocessor or a PCICC will be invoked (depending on performance or cryptographic function) to perform the cryptographic operation. For example, the IBM CMOS Cryptographic Coprocessor performs synchronous functions (such as those used in the Triple DES standard) but does not execute certain asynchronous functions such as RSA Key Generation — which will be performed on the PCICC. Up to eight PCICC features can be ordered to provide increasing cryptographic processing capacity as customers expand their usage of e-business applications requiring cryptographic processing.

New Functions: PCICC provides several additional functions to enhance the security of public/private key encryption processing:

• RSA Key generation for public/private key pair generation

• 2048-bit RSA signature generation

• Retained Key support (RSA private keys generated and kept stored within the secure hardware boundary)

Refer to the Supplemental Information section of this announcement for a content description of the automated order process information.

Capacity BackUp: Enhancements for 2000

The G5/G6 Capacity BackUp capability enables enterprises to provide flexible, cost-effective Disaster Recovery on their S/390 servers. Additional refinements in the CBU verification process, via IBM’s Remote Service Facility (RSF), have significantly shortened the CBU Activation time. Where applicable, the CBU authorization turnaround should take approximately five minutes. This process is called CBU Automatic Password Authentication. Upon operator request, the G5/G6 server will call home via RSF, verify authorization, and automatically unlock the increased server capacity. CBU Smart Reactivation reduces potential outage duration, during a disaster event, if an McM needs to be changed (while CBU is activated). Expedited Install/Bringup Time for CBU Implementation enables installations to copy Activation and SAD profiles at any time and restore them at any time. CBU Licensed Internal Code is now associated to a specific server serial number (to protect the installation from erroneous CBU activation on the wrong server).

New CBU Customer Reference Document: The publication Emergency Backup/Capacity Backup User’s Guide (GC38-0612) is an aid for personnel involved in the planning of Emergency Backup (EBU)/Capacity Backup (CBU) function. The document is comprised of two sections: Main and Appendix. The Main section is oriented to IBM’s support personnel. The Appendix is provided to IBM customers for EBU/CBU ordering and planning activities. Copies may be ordered through your IBM representative.

Greater than 3X Increase in Subchannel Addresses for G5/G6 Servers

Another proof point of IBM’s balanced system design: Larger disks such as the industry-leading IBM ESS disk subsystem and new disk functions coupled with bigger and faster processors will rapidly utilize all 80 K HSA subchannel addresses that are currently allowed in S/390 systems. To address this potential limit to efficient utilization of the IBM S/390 CMOS servers’ power and end-to-end bandwidth capabilities, the current subchannel capability is being increased to 288 K subchannels. This increase will be good news to those customers that are actively engaged in fully exploiting ESS disk subsystems, remote copy technology, “snap” technology (snap copy on RVA and flash copy on ESS), the Parallel Access Volume feature on the ESS disk subsystem, or server consolidation through the use of LPARs. The 288 K HSA subchannel support will provide immediate relief to those customers who are increasing the number of applications within a single system and were previously constrained by the number of subchannels. This increase will also benefit the sharing of channels across LPARs using MIF, which comes into play in Sysplex, GDPS, and ESS — almost 4X the previous limit. (The 36K subchannel/LPAR limit remains.) Customers need to consider that when device addressing capabilities are significantly expanded, there may be additional HSA storage required to accommodate the increase in the associated configuration tables. In some instances where the current HSA requirement is near a storage boundary, additional memory may need to be allocated.

FICON Channel Capacity Increased to 36 on G6 Enterprise Servers

Channel requirements for Enterprise Server class systems are driven by several considerations. While an enterprise has historically focused on “channel count,” the primary issue is adequate connectivity to provide acceptable performance and availability. Moreover, today’s e-business environment (in which workloads may radically deviate from a legacy design concept) may actually exceed the original design point of older channel architectures. Connectivity options then, are:

• Increase the total channel count
• Better utilize existing channels
• Provide new channel types with more throughput and connectivity capability

Increasing the total channel count requires more infrastructure, both within the system and within the data center; this includes power, footprint, cables, patch panels, switch ports, systems management, and configuration management. Moreover, exploitation of new technology, such as link speeds or I/O device capacities, cannot be fully leveraged by new workloads in an old design point environment.

The other two options, more throughput capability and better utilization of existing channels, are the foundation of the FICON strategy. The FICON connectivity solution is based on industry-standard Fibre Channel technology and leverages our exclusive native FICON architecture. FICON has been submitted to the National Committee for Information Technology Standards (NCITS) for consideration and potential adoption as a new industry standard for large-scale data transfer. FICON was specifically created to meet the I/O bandwidth and connectivity demands of today’s e-business workloads while also providing significant benefit to more traditional business applications. A quick technology fix may be expedient, but Enterprise Server class customers demand a total solution. IBM is aware of this requirement and has created a complete migration offering with the FICON Bridge feature on the 9032-005 ESCON® Director to allow customers to begin the migration to this new environment, and has introduced leading-edge storage function and performance capabilities with the Enterprise Storage System with more to come! World-class Enterprise Server technology (G5/G6) and storage (ESS) demand a robust I/O connectivity solution that supports fast devices and link speeds, greater addressability, extended distance topology, and increased control unit intelligence. The response to that demand for a more capable channel is FICON.

More capable channels require less physical channels and ease demands on the infrastructure. This can translate into real cost savings, which can be re-allocated from infrastructure overhead to productive, leading-edge application development. In the final analysis, what type of I/O channel technology do you want supporting your mission-critical enterprise business applications now and into the future — many “skinny” channels with limited architectural capabilities, or fewer high-capacity channels with robust architecture? Your IBM representative can assist you with your decision.

G5/G6 SAP Measurements Update: The Best Performer — Industry-Wide

In a laboratory capacity benchmarking environment where there is no contention for channels, ESCON Director, control units, or devices, a G5 SAP has the capacity to process 37,000 start subchannels/second (ssch/sec); a G6 SAP in Xn7 models has the capacity to process 50,000 ssch/sec; and a G6 Turbo SAP in Zn7 models has the capacity to process 56,000 ssch/sec. As most G5 models have two SAPs standard and all G6 models have two SAPs standard, they will have two times the capacity, or up to 74,000 ssch/sec for G5s and up to 112,000 ssch/sec for G6.

TPF environments where requests may get queued at the channel instead of the SAP have a SAP capacity for G5 of 20,000 to 24,000 ssch/sec and G6 of 25,000 to 34,000 ssch/sec. As most G5 models have two SAPs standard and all G6 models have two SAPs standard, they will have two times the capacity, or up to 40,000 to 48,000 ssch/sec for G5 and 50,000 to 68,000 ssch/sec for G6 models.

Higher I/O rates are possible with better tuned configurations and if additional SAPs are added. Conversely, lower rates are also possible with poorly tuned environments. Additional SAPs can be added if spare PUs are available and if the number of SAPs does not exceed the number of CPs. On all G6 models the addition of SAPs is a code-only change (no additional hardware required).

S/390 Network Connectivity Update for 2000

e-business Applications May Become Bandwidth-Hungry:
To ensure that the G5 and G6 servers can deliver the bandwidth required without requiring an increase in I/O resources, IBM introduced the third generation of the S/390 Open Systems Adapter, OSA-Express. OSA-Express Gigabit Ethernet (GbE) became available in June 1999, and OSA-Express Fast Ethernet, 155 ATM single mode, and 155 ATM multimode became available January 31, 2000.


The new OSA-Express features help ensure that the increasing high volumes of data traversing the Local Area Network (LAN) do not encounter a bandwidth bottleneck, whether data is exchanged via intranet Web servers, centralized file servers, the Internet, or extranets. The new OSA-Express Fast Ethernet and 155 ATM features are capable of achieving line speed (100 Mbps and 155 Mbps respectively), while functionally equivalent to OSA-2.

Note: Actual throughput is dependent upon many factors, including traffic direction, the pattern of acknowledgment traffic, packet size, the application, TCP/IP, the network, disk subsystems, and number of clients being served. IBM cannot confirm the accuracy of performance, compatibility, or any other claims related to non-IBM products. Questions regarding the performance, compatibility, and attachment capabilities of non-IBM products to the OSA features should be addressed to the suppliers of those products.

The OSA-Express Fast Ethernet and 155 ATM features:
• Help to reduce the total cost of connectivity by permitting direct attachment of S/390 servers to industry-standard LAN interfaces, simplifying enterprise networks, and reducing the number of intermediate devices that must be managed.
• Bring the strengths of the S/390 server to the LAN environment: security, backup/recovery, and centralized access to data.
• Expand the connectivity alternatives available, allowing you to maintain your current network infrastructure and directly connect to LANs, LAN backbones, high-speed workstations, intelligent hubs, repeaters, switches, and routers. The OSA-Express Fast Ethernet and 155 ATM features may also be used for server-to-server communication.
IBM Resource Measurement Facility RMF™ (5655-084), an OS/390 optional priced feature, has been enhanced in support of the OSA-Express Fast Ethernet and 155 ATM features. This allows the installation to better understand what is occurring within a feature for:

1. Microprocessor utilization (per LPAR image if it applies)
2. Physical Peripheral Component Interconnect (PCI) bus utilization
3. Bandwidth per port (both read and write directions) (per LPAR image if it applies)

With this enhanced support, a user can now better understand the possible bandwidth bottlenecks, and can perform root cause analysis. Additional details may be found in the document OS/390 Resource Measurement Facility Report Analysis (SC28-1950-04).

Tivoli® Storage Manager and OSA-Express, the replacement for ADSTAR® Distributed Storage Manager (ADSM), is an advanced storage management solution. It integrates unattended network backup and archive capabilities with storage management and powerful disaster recovery functions. As a client/server storage management product, Tivoli Storage Manager provides administrator-controlled, highly automated, centrally scheduled, network-based backup and archive functions for workstations or LAN file servers.

With recent enhancements to Tivoli Storage Manager on S/390, the advent of the OSA-Express GbE features, and the new Queued Direct I/O (QDIO) architecture available on IBM G5/G6 servers and OS/390 Version 2 Release 7 with PTFs, significant improvements have been observed.

Simulated backup measurements, in a controlled environment, have yielded a throughput of 25 MB/sec per OSA-Express GbE feature, and a throughput of 150 MB/sec using six OSA-Express GbE features. In a separate set of tests, using an RS/6000® S70 as a Tivoli Storage Manager client running 10 Tivoli Storage Manager client sessions to a G5 server backing up to an S/390 Enterprise Storage System over a single OSA-Express GbE feature, a throughput of 68 MB/sec was measured. These rates demonstrate the potential of Tivoli Storage Manager and the underlying software and hardware. These are lab tests in a controlled environment and actual customer results may vary depending on applications, data sizes, storage and network devices, and other factors. A white paper is available from your IBM representative.

Enhancements to Tivoli Storage Manager include the exploitation of OpenEdition® sockets enabling the performance improvements in TCP/IP, a multi-threaded design, asynchronous I/O, and self-tuning algorithms. S/390 G5/G6 servers are excellent performing Tivoli Storage Manager servers.

OSA-Express GbE, New Function for ESS Data Sharing: OSA-Express GbE is now moving to the forefront of the IBM Enterprise Storage Server’s data sharing strategy, as a replacement of the IBM InfoSpeed Data Gateway. OSA-Express GbE provides high-speed inter-systems connectivity and data sharing between host and client resources. Since OSA-Express GbE is an industry-standard open interface, the current infrastructure of hubs, switches, and routers can be used. No additional TCP/IP skills are required, since standard TCP/IP and File Transfer Program (FTP) are used. The result: a nondisruptive transition to an industry-standard interface that can deliver significant performance improvements over currently available TCP/IP solutions.

New: QDIO Support for OSA-Express Fast Ethernet and 155 ATM Ethernet LAN Emulation: (Planned Availability: Third Quarter 2000.) Queued Direct Input/Output (QDIO) was implemented and supported by Communications Server for OS/390 Version 2 Release 7 with PTFs (CS OS/390) and OSA-Express GbE. QDIO is now being offered for the OSA-Express Fast Ethernet feature and the OSA-Express 155 ATM features (multimode and single-mode fiber) when configured for Ethernet LAN Emulation.

QDIO is a new, highly efficient data transfer architecture introduced to satisfy the increasing volume of TCP/IP applications and the increasing demands for bandwidth. QDIO returns CPU cycles for applications’ use, avoids host interrupts by sharing a common storage area with CS OS/390, and minimizes the movement of data. This improves ease-of-use by dynamically defining the address table of the OSA-Express feature, eliminating data entry errors and incompatible tables, and making possible LPAR-to-LPAR communication.

QDIO has three key components:

1. Internet Protocol (IP) Assist. Compute-intensive functions are moved from the S/390 server to the OSA-Express feature to reduce CPU cycles. The OSA-Express feature performs functions previously performed by the TCP/IP stack.
   a. Media Access Control (MAC) handling/Address Resolution Protocol (ARP) function
   b. Packet filtering
   c. Building and maintaining a table of IP addresses to be used for packet routing
   d. IP Multicast
2. Direct Memory Access (DMA). OSA-Express and CS OS/390 now share a common storage area for memory-to-memory communication, reducing system overhead and improving performance. Data can move directly from the OSA-Express microprocessor to S/390 memory.
3. Dynamic OSA Address Table (OAT) build, for simplified installation and configuration setup. The definition of IP addresses is done in one place, CS OS/390, removing the requirement for the information to be entered into the OSA Address Table (OAT) using the OSA Support Facility (OSA/SF) or a TSO/E command line interface.

The TCP/IP profile information is entered once, avoiding duplicate data entry. A dynamic OAT is key for TCP/IP Virtual Internet Protocol Address (VIPA) Takeover, which became available in OS/390 Version 2 Release 8. With VIPA Takeover, when a TCP/IP stack fails, the IP addresses registered to the OSA-Express feature are dynamically changed; thus one TCP/IP stack can take over the work of the failed TCP/IP stack; the IP client is unaware of the activity.

With the introduction of QDIO support for OSA-Express Fast Ethernet and OSA-Express 155 ATM, when configured for Ethernet LAN Emulation, the features now support two Channel Path Identifiers (CHPIDs) types which are mutually exclusive. If the feature is defined in the Hardware Configuration Definition (HCD) as a CHPID type of “OSE,” SNA and IP traffic can flow through the port. This requires the OSA Address Table to be built manually and File the S/390 Open Systems Adapter Support Facility (OSA/SF). If the feature is defined in the HCD as a CHPID type of “OSD,” only IP traffic will flow through the port, and the OAT is built dynamically.
Note: OSA/SF is still needed for the definition of the emulated/logical ports on the OSA-Express 155 ATM feature.

QDIO support for OSA-Express Fast Ethernet and 155 ATM Ethernet LAN Emulation is available via a Licensed Internal Code update, and is enabled in CS OS/390 Version 2 Release 8 via a Program Temporary Fix (PTF). Contact your IBM representative for further information.

LPAR-to-LPAR Communication — News: Like the OSA-Express GbE features, the OSA-Express Fast Ethernet feature has the ability to send and receive IP traffic between Logical Partitions (LPARs) without sending the IP packets out to the LAN and then back in to the destination LPAR. LPAR-to-LPAR communication makes possible routing of IP packets within the same host system. The OSA-Express Fast Ethernet feature will examine the destination IP address; if the destination is on the same host system, the IP packets will be routed to that IP address without sending the IP packets out to the LAN and then back in again (ignoring the fact that the source and destination hardware address are the same). Any application that requires traffic to flow LPAR-to-LPAR on the same system can benefit from this support. This support became available on the availability date of the OSA-Express Fast Ethernet feature, January 31, 2000.

Fast Sync/DataMover

The S/390 Asynchronous Data Mover Facility, ADMF, was invented to improve storage-to-storage movement of large blocks of data in bipolar machines. It is exploited by DB2 Hiperpools. The continued evolution of CMOS processor and memory technology in G5/G6 has improved synchronous data movement using the Move Page instruction to the point where its performance is on a par with ADMF.

The Fast Sync Data Mover Facility will be implemented on G5/G6 and future processors as an indicator to DB2 that Move Page should be used in place of ADMF. DB2 will be issuing a PTF to check for this indicator and use Move Page instead of ADMF. DB2 will continue to use ADMF on pre-G5 machines. DB2 without the PTF will also continue to use ADMF on G5/G6. IBM however plans to remove ADMF from future servers.

IBM Classes for Unicode for OS/390

On June 18, 1999, IBM made it easier for developers to create multilingual applications by offering free and public access to the source code for software that enables applications to work in different languages and countries. The IBM Classes for Unicode, based on the Unicode industry standard, is the first software package available under a new IBM Public Source License. The license, a direct result of collaboration with the open-source community, allows source code to be downloaded freely off the Web. Developers can use the software, change it, and share their improvements with others.

Using the Unicode classes, developers using a range of operating systems can write applications that support a wide variety of global languages. Applications can be easily localized by changing simple data files to automatically adapt dates, currencies, numbering schemes, and characters to fit an individual country’s language format. The Unicode classes will automatically format currencies into yen for Japanese usage, for example, or change date fields to correspond to German formats.

The IBM Classes for Unicode are currently available for the AIX®, Linux, Solaris, and Windows™ NT operating systems. OS/390 will soon be added to that list. IBM Classes for Unicode for OS/390, including source code, will be available for download from the Web site:

http://www.ibm.com/developer/

with availability planned for March 31, 2000. (Monitor the developerWorks Web site for further details.)

VS FORTRAN Update

VS FORTRAN Now Optimizes Extended Precision Calculations for Improved Execution Performance on G5 and G6 S/390 Parallel Enterprise Servers: (Available Second Quarter 2000.) APAR PQ29366 extends the usage of the Additional Floating Point Registers to calculations that use Extended Precision Floating Point numbers. This new capability also for the first time includes the ability for the VS FORTRAN compiler to optimize computations involving Extended Precision Floating Point operands. This enhancement will provide performance improvement for programs using Extended Precision Floating Point operands. The amount of such improvement will vary and is dependent on the application program, particularly the intensity of such computations in any specific program.

Customers who have FORTRAN programs that use Extended Precision Floating Point computations may wish to consider the benefits of using the Additional Floating Point Registers feature offered by the G5 and G6 servers in conjunction with this enhancement to VS FORTRAN to improve the execution efficiency of these programs.

Customers who have been prevented from using the improved accuracy obtained when using Extended Precision Floating Point calculations because of the lack of optimization available in prior levels of VS FORTRAN may wish to consider potential accuracy improvements in their FORTRAN programs by changing to use this capability now that VS FORTRAN will provide its world-class optimization support for Extended Precision Floating Point calculations for use on the G5 and G6 servers. Recompilation is required to take advantage of these new capabilities.

Parallel Sysplex Update

IBM continues its leadership in technology, software, and services to provide highly scalable capacity, workload balancing, resource sharing, and maximum availability via its Parallel Sysplex technology. IBM’s Internal Coupling channels (ICs) and Integrated Cluster Bus (ICB) are exclusives within IBM’s G5 and G6 servers, and provide up to 4% better coupling efficiency over HiPerLinks while at the same time reducing the hardware requirements and simplifying the configuration. G5 and G6 ICB technology can provide up to 50% savings for coupling facility operations, when compared to HiPerLinks. The value of these IBM exclusives has not been overlooked by enterprises. Whether the need is to run a Parallel Sysplex cluster in support of e-business, an ERP application, or a data warehouse or online workloads running tens of millions of transactions per day, IBM Parallel Sysplex clustering provides superior technology to handle capacity growth, availability, and system management in the market today. Customer acceptance continues to grow with over 300 new resource sharing and over 100 new data sharing implementations in 1999.
Automatic Enablement of Capacity BackUp (CBU) for the Geographically Dispersed Parallel Sysplex (GDPS): GDPS-CBU enables automatic management of the reserved Central Processors (CPs), provided by the CBU feature. In the event of a server failure and/or a site failure, GDPS automation will:

- Perform the analysis required to determine the scope of the failure; this minimizes operator intervention.
- Automatically authenticate and activation of reserved CPs.
- Automatically restart critical applications after reserved CP activation.
- Reduce the potential outage time from several hours, to minutes.

In the event of a server or site failure, GDPS requires available standby server resources that can be immediately displaced and acquired to restart the mission-critical workloads. Standby server resources are typically used to execute discretionary workloads, such as systems test, or applications development. However, production workload system requirements usually exceed the discretionary workload system requirements; an enterprise without CBU may therefore incur cost of spare processor resources, with associated software license charges. IBM software license temporary transfer feature allows the software licenses to be temporarily transferred from the production systems to the newly expanded systems. Given the flexibility of the GDPS-CBU implementation, the enterprise has full restart capability, or restart of a critical subset within the production workload — whichever best responds to the situation.

Upon detection of a server, or site failure or planned disaster test, GDPS will “call-home” to IBM via IBM’s Remote Support Facility (RSF). The call-home will automatically confirm CBU participation, and unlock the target configuration; the reserved CPs are then varied online.

Once the necessary resources have been acquired, the enterprises’ critical applications are automatically restarted. This automated recovery process is especially critical in today’s competitive e-business world.

IBM’s Fiber Saver is another key technology to the GDPS solution. The IBM Fiber Saver (Machine Type 2029) is a Dense Wavelength Division Multiplexer (DWDM) which transports multiple protocols over a single fiber optic cable up to 50 km. Multiple protocols may be multiplexed over a full-duplex cable at up to 1.2 GB/second per channel. Since IBM’s Fiber Saver substantially reduces the quantity of cross-site fiber optic cables, fiber lease costs and additional fiber optic runs can be greatly reduced. Moreover, Fiber Saver may obviate additional cable runs to install GDPS. Refer to Hardware Announcement 199-305, dated November 23, 1999.

S/390 Parallel Sysplex Messaging CFCC Support: IBM’s Coupling Facility Control Code has been enhanced to support extensions to the list structure. These enhancements in CFCC Level 9 will support messaging architecture. Message passing is critical for applications that run across multiple systems in a Parallel Sysplex cluster. With the appropriate exploitation, the new list structure enhancements will enable messaging across the Parallel Sysplex cluster transparent to applications (providing improved capacity, availability, and dynamic workload balancing for application servers).

MQSeries® will be looking to exploit these new functions in future releases of the MQSeries for OS/390 product. Refer to the XES Parallel Sysplex Enhancements section of this announcement — XES CF List Structure Architecture Extensions.

Model R06 Enhancements — More Connectivity: IBM’s Order Process system now automatically installs a larger (four bus) Multichip Module (MCM), on 1-ICF through 4-ICF models, if the configuration requires additional connectivity; these models now offer up to 24 ICBs.

Note: Model R06 options available for a 9672 server upgrade are determined by the MCM configuration that is shipped from IBM.

Software Enhancements for Parallel Sysplex Cluster

Enhanced Contention Analysis (ECA) is available now and is designed to significantly improve multi-system availability and serviceability for both base and Parallel Sysplex cluster environments with commands to provide diagnostic information in the event of a multi-system “hang” condition. ECA is available only with GRS in a Sysplex. Without ECA, if an operator is faced with a multi-system “hang” condition, there is little or no problem determination information, and therefore problem elimination can be questionable.

Today, clusters can only detect hard failures, that is, when a system is already down. Many system failures do not manifest themselves as a hard failure; the system does not actually fail but it ceases processing useful work. These type of failures are the most difficult to detect and can at times cause multi-system outages. Only in a Sysplex with Enhanced Contention Analysis can clusters detect this type of failure and allow actions to be taken before a hard failure or multi-system outage occurs. With ECA, commands can be entered to retrieve and analyze information kept by GRS, to pinpoint the problem task, address space, or system and remove it from the configuration (for example, cancel a job, recycle a subsystem, or partition an image), to avoid a potential multi-system outage condition. ECA is valuable in detecting multi-system “hang” conditions involving components such as Automatic Tape Sharing, JES2, consoles, and RACF®.

The new commands will allow different displays of data:

- **Long waiter** returns a sorted list of the units of work waiting for GRS managed resources.
- **Long blocker** returns a sorted list of the units of work blocking requests for GRS managed resources.
- **Dependency analysis** returns the dependencies between the units of work requesting GRS ENQ resources and whether or not a resource allocation deadlock has occurred.

These command responses can help identify a problem and allow appropriate action to be taken, enabling the Sysplex to continue processing and meet its high availability design objective.

ECA is available now via the PTFs for OW38979, on OS/390 R3 and higher. For more detailed information, visit IBM’s Parallel Sysplex Web site:

http://www.ibm.com/s390/ps0/

Shared Hierarchical File Systems (HFS): In OS/390 Version 2 Release 3, Shared HFS support for the Parallel Sysplex environment adds support to the UNIX® System Services file system for simultaneous Read/Write (R/W) access of the same HFS running on different OS/390 images in the Parallel Sysplex cluster. Currently, read-only concurrent access is allowed. This Shared HFS support benefits Web-server applications, Lotus®, the
Manufacturing suite, the Content Management Strategy (digital data, multimedia) and others who access the hierarchical file system (HFS). This new support can make data and information residing on the HFS available to your enterprise at any time, no matter where the applications are running in the Parallel Sysplex cluster. For more information, refer to:

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

**Ease of Use:** IBM/390 Parallel Sysplex technology continues to provide enhancements to simplify systems management, reduce costs, and improve overall system performance with such items as:

- S/390 Resource Sharing
- Systems Automation for OS/390 Release 1.3 SPE
- Systems-managed rebuild
- Enhancements to Dynamic ICF expansion
- Availability of Internal Coupling channel
- Increased number of Internal CFs, ICBs, and more

Two Web-based tools (wizards) have also been recently made available:

- S/390 Parallel Sysplex Configuration Assistant
- S/390 CF Structure Sizer

Internet-based wizards are innovative approaches used to simplify some of the planning and configuration tasks necessary for OS/390. The **Parallel Sysplex Configuration Assistant** exploits recommended parameters to guide a systems programmer through the process to define dataset naming conventions and control datasets, for example, to assist creating Parallel Sysplex CFRM, ARM, SFM, and other policies. Moreover, Coupling Facility structure sizes for all resource sharing exploiters may be calculated, based upon built-in recommendations. Finally, the Parallel Sysplex Configuration Assistant will build JCL for parmib members, and more. The Parallel Sysplex Configuration Assistant allows sessions to be saved, enabling multiple configuration definitions. Sessions can be easily copied into the respective parmib members and policies that exist on the OS/390 system. The S/390 Parallel Sysplex Configuration Assistant is available at:

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

**S/390 Coupling Facility Structure Sizer** can be used to help you estimate your IBM CF structure storage requirements. Without the CF Structure Sizer, S/390 Parallel Sysplex users would need to manually size their Coupling Facility storage consumption. The algorithm to determine storage for each exploiter of the Coupling Facility may vary significantly, from exploiter to exploiter. Although the algorithms and process are well documented, the potential for human error leading to poor system performance (in some cases, outages) does exist. The IBM S/390 Coupling Facility (CF) Structure Sizer provides “one-stop shopping” for any of IBM CF structures’ sizing. The S/390 Coupling Facility Structure Sizer uses selected inputs and respective calculations to generate the initial and maximum structure size values for the CFRM policy. The sample CFRM statements that are generated by the tool can then be easily copied into the CFRM policy on the OS/390 system. This Web-based tool supports all IBM structures, (CICS®, DB2, IMS™, and S/390 Resource Sharing structures); it can be found at the Parallel Sysplex Web site:

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

**System Automation for OS/390 Release 1.3 SPE — Available Now:** Parallel Sysplex automation needs to deal with the resources that are critical to the Parallel Sysplex cluster and application availability. This SPE can help operators to manage critical Sysplex resources like Coupling Facilities and CF structures, coupling data sets, Sysplex messages, and more. Operators will benefit from reduced Sysplex operations complexity. Also, automation routines exist to automate various XCF messages. Routines are available to take Coupling Facilities in and out of the Parallel Sysplex cluster and rebuild structures. In addition, some Parallel Sysplex resources are highlighted if they appear to be in an exception state (to help identify a problem before it becomes severe). This SPE is available via APAR OW39485/PTF UW99278. More information can be found on the System Automation Web site:


Today, System Automation for OS/390 already helps you automate a Sysplex by offering a broad range of functions. Marion Diederichs from Victoria Insurance says, “Without System Automation for OS/390, we would be not able to manage our Parallel Sysplexes.”

System Automation for OS/390 also is the automation platform for GDPS; refer to the GDPS-CBU section in this announcement.

**System-Managed Rebuild — Available with OS/390 Version 2 Release 8 and Higher:** Prior to OS/390 R8, only “user-managed” structure rebuilds have been available. The challenge for the “user,” that is, the active connector set, was that it needed to be involved directly in rebuilding of the structure (participate in event exit protocols, explicitly allow or disallow XES rebuild process depending on code to support the necessary protocols). When the rebuild is system-managed instead of user-managed, the system performs all of the significant steps in the overall rebuild process on behalf of the connectors, with minimal participation by the connectors. System-Managed Rebuild provides to system operations:

- A consistent process for OS/390 to manage the rebuild of its user’s structures
- An API to allow an user application to determine optimum structure sizes (eliminating the need for manual calculations)

Early exploiters of System-Managed Rebuild include the JES2 Checkpoint and WLM multisystem enclaves, as described later. Other exploiters are planned and will use the new API/protocols, to provide rebuild process, and further minimize Parallel Sysplex operations complexity. Software vendors who do not presently support rebuild for their structures may also exploit this improvement. To benefit from System-Managed Rebuild, at least two Coupling Facilities must be at CF level 8 or higher (the one in which it exists prior to rebuild, and the one in which it exists after the rebuild). All systems in the Sysplex must be running at least OS/390 R8 or later releases.

**Workload Manager (WLM) Multisystem Enclaves** support in OS/390 Release 9 provides the capability to manage and report on parallel work requests that are executed on multiple OS/390 images (for example, span a Parallel Sysplex cluster) as a single entity. This support extends the scope of an WLM enclave to include dispatchable units running on different OS/390 images in a Parallel Sysplex cluster, perform period switch based on a transaction’s overall consumption of resources on all systems, and report a single completed transaction per parallel unit-of-work.

For example, work that begins as a part of a job on one system can be split into parallel tasks that can then be...
exported to other systems for parallel processing. This function will simplify customer exploitation of applications/subsystem function in a Parallel Sysplex cluster such as DB2 Intelligent Miner™ for Data for OS/390 V6.1 (available September 1999). This WLM enhancement:

- Eliminates customer-defined rules used to categorize split work requests.
- Results in consistent goal-oriented management and reporting of large work requests. You are now able to report a single completed transaction per parallel unit of work.
- Takes full and efficient advantage of all the systems resources in the Parallel Sysplex cluster.

Enclaves can be managed across the Sysplex with the new function. Workload Manager is able to change the resource allocations as the units of work change. You can ensure the work receives appropriate resources no matter where it is running. OS/390 V2R7 Resource Measurement Facility (RMF) offers this support through an APAR (OW41317). This support requires CFCC Level 9 with OS/390 Release 9 and introduces a Workload Manager structure.

OS/390 XES Parallel Sysplex Enhancements: The following Parallel Sysplex enhancements are available in OS/390 Version Release 9, or SPE, and will aid IT staff to trouble-shoot, as well as run a more efficient Parallel Sysplex configuration.

- **XES Structure Full Monitoring** provides a consistent framework with externals for monitoring coupling facility structure utilization for all structures. XES will issue an operator message to inform the installation that the percentage utilization of structure resources has exceeded a threshold. The installation can take actions to determine why a structure is becoming full or to avoid the structure becoming full. APAR OW34514 provides the required compatibility PTFs for migration/coexistence on OS/390 R6 and higher. Pre-OS/390 R9 systems cannot perform monitoring but must be able to discontinue monitoring for a structure (IXC587I) and participate in cleanup for CF-based monitoring ownership. PTFs must be installed on all systems in the Parallel Sysplex cluster before any OS/390 R9 systems join the cluster.

- **XES Event Suppression** may provide improved performance and throughput in certain Parallel Sysplex environments. XES Event Suppression allows coupling facility structure exploiters to optionally suppress certain XES events associated with connecting to, disconnecting from, and rebuilding coupling facility structures. In environments which have large numbers of connectors to a structure and/or frequent connections/disconnections, such as an IMS Batch environment, the overhead caused by the presentation of these XES events can be quite significant. Reduced performance and throughput often result, causing delays in connect, disconnect, and cleanup of coupling facility resources. With this new support in OS/390 R9 (or PTFs available now on OS/390 R6 and higher), and with exploitation by structure exploiters (such as IMS), overhead and delay can be avoided. The OS/390 APAR for this is OW38840. The IMS APARs are P26416 and P26491.

- **XES Coupling Facility (CF) List Structure Architecture Enhancements** improve the data sharing capabilities of coupling facility list structures. They enable new and improved coupling by Sysplex-aware products and subsystems. The support includes:
  - New ways to identify and name data in a list structure (program-specified list entry IDs).
  - New methods of organizing and manipulating the data contained in a list structure (secondary keys, additional key comparison functions).
  - New CF request types for operating on the data in a list structure (Move_EntryList and Delete_List commands), and powerful new techniques for monitoring data in a list structure (list and key-range monitoring and thresholding, sublist monitoring enhancements).


- **Better Management of CF Structure Resources:** Management of allocation of coupling facility structure resources among the several coupling facilities which may be available in a Parallel Sysplex configuration is now improved. Coupling facility structure exploiters can specify a hard, minimum CFLEVEL requirement for the coupling facility in which their structure must be allocated. This function, in OS/390 Release 9, allows exploiters to guarantee that their structure will always get allocated in a coupling facility at the appropriate CFCC level which provides the features and functions they require.

- **512 Structures in CFRM Policy:** Constraint relief for coupling facility structure definition in large Parallel Sysplex configurations is now available. Current support in the CFRM couple dataset format utility and administrative data utility limits the number of CF structures per CFRM policy to at most 255. This limit poses a constraint in some very large Parallel Sysplex configurations. With support in OS/390 Version 2 Release 9 (or PTFs available now on OS/390 R3 and higher), CFRM couple datasets may be formatted, and CFRM policies defined, with up to 512 CF structures. The OS/390 APAR number is OW19974.

- **ICF Recovery Enhancements:** Several improvements are combined in this enhancement, which are relevant to the configurations that include Independent Coupling Facilities (ICFs), or other non-standalone coupling facility images. Recovery from failures involving loss of connectivity to coupling facilities by one or more systems in the Sysplex can be greatly simplified, often with no operator intervention. CF structure availability improvements and operational simplifications are also achieved through support which automatically cleans up CF structures (allocated in CFs which are inaccessible to structure exploiters trying to connect to them). Previously, manual intervention was often required to perform such cleanup. Improved reliability and operational simplification are also provided through support to internally retry certain “transient” failures that today can cause CF structure exploiters to be unable to connect to their structure. The installation may also take greater control over the placement of CF structures among the CFs in the configuration through the use of a new CFRM policy option, ENFORCEORDER. This option allows the installation to indicate that a structure’s defined preference list ordering of CFs for structure allocation purposes is to be strictly enforced, rather than potentially being reordered to try to “optimize” structure placement. This support is available in OS/390 Release 9 (or via PTFs available now on OS/390 R3 and higher). The APAR number is OW33615.
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) properly exchange accurate date data with it.

This statement of Year 2000 Ready status applies only to the IBM hardware content and does not apply to any software (system software or application software) content that may be pre-installed or otherwise provided by IBM with the purchase of the IBM hardware product. For non-IBM products, whether or not obtained from IBM, consult directly with the third-party product developer for information about how its products will handle the Year 2000 translation. In some cases IBM may pass along information that third parties have provided us about the status of their products. However, IBM is not in a position to independently verify, or accept any responsibility for, the accuracy of such information.

Euro Currency

This product is not impacted by euro currency.

Data Warehousing Solutions

Using S/390 G5/G6 Servers and the Enterprise Storage Server: As we move into the twenty-first century, businesses facing the challenges of e-business and competing in a global marketplace are increasingly turning to business intelligence technologies to help them gain a competitive edge. The powerful combination of IBM’s S/390 G5/G6 servers with DB2 for OS/390, and the newly announced Enterprise Storage Server (ESS), is unsurpassed for delivering fully integrated business intelligence/data warehousing solutions across all industries. The cornerstones of how these solutions drive business value are:

1. Acceptable Response Times: Managing and ensuring acceptable response times to users’ requests is fundamental to the success of any business intelligence system. S/390’s exclusive workload management and prioritization capabilities provide dynamic management of system resources to help ensure that business priorities are met in a constantly changing global e-business environment.

2. Fast Access to the Data with Minimal Contention: The one-two punch of powerful S/390 G5/G6 servers along with the ESS’s fast disk access and contention-reducing features such as Parallel Access Volumes and Multiple Allegiance delivers data at blistering speeds. For example, typical query workloads have shown that a single ESS delivers data at more than 15 times the rate of a single 3990 controller and more than six times the rate of a single RVA T82.

3. Rapid, Nondisruptive Expansion: The S/390 G5/G6 servers’ Capacity Upgrade on Demand feature and nondisruptive upgrades, combined with ESS’s nondisruptive upgrades and hot pluggable disks, give you the ability to grow your warehouse’s capacity to meet your business needs, while business users and decision-makers continue to access the data they need.

4. Continuous Availability: Unsurpassed reliability, availability, and serviceability are built into both the S/390 server family and the Enterprise Storage Server. High-quality components and designs architected to eliminate single points of failure minimize the susceptibility of your data warehouse to unplanned outages. This, in turn, provides unprecedented system and application availability. Parallel Sysplex virtually eliminates planned maintenance and upgrade outages. Parallel Access Volumes and Multiple Allegiance give you more flexibility to perform data warehouse refreshes as often as needed without interfering with online processes. DB2’s Online Reorg capabilities allow tables to be reorganized without taking them offline.

5. Virtually Limitless Boundaries: The unprecedented growth potential of S/390 Parallel Sysplex coupled with the availability of hundreds of terabytes of storage across multiple Enterprise Storage Servers clearly outpaces the projected growth of any data warehouse for the foreseeable future. A single ESS can hold up to 11 terabytes, and S/390’s exclusive hardware compression can significantly expand effective storage capacity even further!

6. Reduced Operating Costs: The Enterprise Storage Server has been designed to reduce system administration costs with such new features as Parallel Access Volumes and Multiple Allegiance, which minimize the need for manual placement of data, and the StorWatch™ ESS Specialist, which enables a single user (via a Web interface) to manage many ESSs located throughout your enterprise. The ESS can store 11 terabytes in a mere 24 square feet of floor space, 1/12th the floor space requirement to house equivalent capacity on the prior-generation disk!

In Review: IBM’s S/390 Solution for e-business

Companies today are no longer asking if they should have an e-business strategy, but rather how to make all of the pieces of their strategy fit together in the most cost-effective and intelligent manner. The IBM S/390 Solution for e-business will solve this challenge with an integrated e-business services solution approach.

The three major areas of e-business are: content hosting and Web integration, collaborative groupware computing, and e-commerce.

1. The first area of e-business is content hosting and Web integration. This means the delivery of, or the Web-enablement of, existing business applications and data. S/390 supports a wide range of integrated middleware functions, defined by the IBM Network Computing Framework as “plug-ins,” to link incoming requests for service from the Internet or intranets to the commerce, collaborative, and content management services.

Once these critical business assets become available on the Web, security becomes critical. Three elements are involved here: network security, system security, and transaction security.

a. Network security provides a line of defense against unauthorized users who try to gain access to information or even control machines on a private network. A common form of protection in this case is a firewall, which allows communications between private and public networks to be monitored and secured. Native OS/390 firewall technology will provide Secure IP
The second area of e-business is collaboration. Groupware applications enhance a team’s ability to communicate, collaborate, and coordinate.

Lotus Domino® for S/390 gives customers unprecedented flexibility, reliability, and scalability for supporting mission-critical groupware applications. Customers are able to tie their S/390 enterprise data and applications with their Domino network, providing secure and cost-effective collaborative Web applications.

Lotus Domino for S/390 also provides an ideal replacement for existing host-based office systems, with scalable mail routing, directory, calendaring, and scheduling services.

Further deployment of Domino on S/390 could provide a secure gateway to existing current enterprise applications and data from any Notes client or Web browser.

3. The third area of e-business is e-commerce. Commerce services on S/390 are provided by Net.Commerce for OS/390, a software product that enables businesses to open up a virtual storefront on the Web to merchandise products and services, and accept payments via the secure payment system that will utilize the Secure Electronic Transaction (SET) protocol. SET is a technical specification, developed by Visa and MasterCard, for securing payment card transactions over open networks such as the Internet.

In addition to preconfigured solutions, it makes sense in an e-business environment to develop new, dynamic applications that can be accessed by any network client. On S/390, this is accomplished through the use of the Java™ programming language developed by Sun Microsystems, Inc.

The true value of Java for OS/390 is in the application execution. A commercial application typically involves the access of data, the transaction, and the processing of the resulting data. OS/390 is positioned to perform this end-to-end processing better than alternative platforms.

IBM’s first network computer, the IBM Network Station™, combines the simplicity and low cost of nonprogrammable terminals with leading-edge application technologies by attaching to any type of IBM server. It is ideal for multi-platform computing environments. You have access to all kinds of applications running on one server or many servers, to the worldwide resources of the Internet (or a private intranet), and to the fast-emerging world of Java applets and applications downloaded on demand from Internet or intranet servers.

The IBM Network Station Series 1000 extends the IBM Network Station family of network computers by delivering robust support for business applications written in Java while effectively meeting all of your other desktop computing demands, from accessing traditional business applications to accessing your corporate intranet and the Internet.

The IBM S/390 Solution for e-business (formerly the e-business Server Offering [ebSO]), has been created to provide an attractively priced services package to migrate S/390 customers to an e-business environment. IBM’s implementation services will help customers identify and plan for the right e-business solution, perform product installation, and provide skills transfer to the customer’s support staff. It is the intent of the services to enable and integrate the selected e-business application into a production environment within one year. For details, see your IBM representative.
Statement of General Direction

S/390 Asynchronous Data Mover Facility (ADMF): IBM intends to remove ADMF from future servers.

PCI Cryptographic Coprocessor: IBM will provide support for a form of User Defined Extensions (UDX), a facility allowing creation of customized application-specific cryptographic functions. This will enable enterprises to convert their S/390 cryptographic applications from channel-attached 4753 cryptographic processor products to S/390 cryptographic coprocessor applications, with customized functions.

Trademarks

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Feature Descriptions

10 Meter ICB Cable (#0226): This feature is the 10 meter Internal Cluster Bus connection cable, which can be attached between Model G5 and G6 servers and Model R06 Coupling Facility, in a Parallel Sysplex environment. The cable has an effective length of seven meters between frames (allowing for installation requirements).

PCI Cryptographic Coprocessor Features: IBM Servers offer three choices for cryptographic support:
- No cryptographic support (hardware is inactive)
- CMOS Cryptographic Coprocessor(s) — standard with 9672 G5 and G6 servers
- PCI Cryptographic Coprocessor (PCICC) support (as an optional feature)

The following features have been available with the Integrated Cryptographic Coprocessor, prior to this announcement:
- 0806* TKE Hardware (for Token Ring)
- 0807** Smart Card
- 0809* TKE Hardware (for Ethernet)
- 0811* CDMF w/Exportable PKA
- 0812* DES w/Exportable PKA
- 0813* DES w/Exportable PKA & TKE
- 0814 DES w/PKA
- 0815 DES w/PKA & TKE
- 0832* TDES w/Exportable PKA
- 0833* TDES w/Exportable PKA & TKE
- 0834 TDES w/PKA (U.S., Canada)
- 0835 TDES w/PKA & TKE (U.S., Canada)

Note: Effective May 15, 2000, *features 0806, 0809, 0811, 0812, 0813, 0832, and 0833 are no longer orderable. Feature 0807 is “as available” status.

The PCI Cryptographic Coprocessor (PCICC) (orderable May 15, 2000) is optional and provides improved function over the CMOS Cryptographic Coprocessor. The following features apply:
- 0864 DES with PKA-enablement diskette (Worldwide)
- 0865 TDES with PKA enablement diskette (U.S., Canada)
- 0866 Improved TKE (Token-Ring version) Workstation
- 0869 Improved TKE (Ethernet version) Workstation
- 0860 PCICC hardware

The PCICC order process will automatically process the feature exchange policy for G5 and G6 servers as follows:

1. PCICC can be ordered in increments of one (minimum of zero, maximum eight).
2. The same level of encryption must be maintained on the server. For example, feature 0864 and 0865 cannot be mixed on the same machine.

For New Build 9672 G5 and G6 Servers:

1. Features 0814 and 0815 have additional functions over features 0812 and 0813. Features 0812, 0813, 0832, and 0833 are not orderable, effective with this announcement.
2. Feature 0814 or 0815 must be included for any order of feature 0864. Feature 0864 also has a prereq of feature 0860 (which will be automatically added to the order).
3. Feature 0834 or 0835 must be included for any order of feature 0865. Feature 0865 also has a prereq of feature 0860. Special export approvals may be necessary for certain export situations; contact your IBM representative.
4. Feature 0806 is replaced by 0866; feature 0809 is replaced by 0869. Features 0866 and 0869 are not compatible with feature 0807. Feature 0807 is “as available” effective with this announcement.

For G5 and G6 MES Orders: Due to recent changes to the U.S. export rules for cryptographic products, the following exchanges and conversions are necessary to the integrated cryptographic coprocessor features that have been supported until now.

1. Features 0811, 0812, 0813, 0832, and 0833 are not orderable, effective with this announcement. The following feature exchanges/conversions apply:
   - Features 0811 and 0812 will be exchanged to feature 0814.
   - Feature 0813 will be exchanged to feature 0815.
   - Feature 0832 will be exchanged to feature 0834.
   - Feature 0833 will be exchanged to feature 0835.
2. If TKE (#0806 or #0809) was installed on the 9672, prior to the MES order:
   - Feature 0806 will be exchanged to feature 0866.
   - Feature 0809 will be exchanged to feature 0869.
3. If SMART CARD feature 0807 was installed on the 9672, prior to the MES order:
   - Feature 0807 is removed (no replacement is orderable at this time).

The exchanges can be selected or are automatic when any change is ordered to the cryptographic configuration.

When the PCICC is ordered for the 9672 server, all integrated cryptographic coprocessor features will be exchanged/converted, as specified above.
Education Support

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

Publications

Information about the S/390® G5 and G6 Parallel Enterprise Server models can be found in the following publications:

- System Overview (GA22-7158) (G5)
- System Overview (GA22-1030) (G6)

The following publications are available to be ordered prior to shipment of the G5 and G6 models:

- Pre-Installation Configuration Workbook (G5/G6 Models) (GC38-3120)
- Learning to Use the S/390 CMOS Console: Video (SK2T-2512 with NTSC video, SK2T-2514 with PAL video, SK2T-2516 with SECAM video)
- Introduction to IBM S/390 FICON™ Implementation Guide (SG24-5176)
- IBM S/390 FICON Migration Guide (SG24-5169)

The following publications are shipped with the product:

- PR/SM™ Planning Guide (GA22-7236)
- IOCP User’s Guide (GC38-0401)
- Managing Your Processors (GC38-0452)
- Hardware Management Console Guide (GC38-0614)
- Operations Guide (GC38-0615)
- Standalone IOCP User’s Guide (GC38-0458)
- Pre-Installation Configuration Workbook (G5/G6 Models) (GC38-3120)
- Problem Analysis (PA) Guide (SY22-9876)
- API Guide (SC28-8141)

Technical Information

Planning Information

Cable Orders: Planning the required cable configuration, ordering cables, and insuring the arrangements for delivery as well as installation prior to system bring-up are customer responsibilities.

Security, Auditability, and Control

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

Terms and Conditions

This product is available for purchase under the terms of the IBM Customer Agreement.

IBM hardware products are manufactured from new parts and used parts. In some cases, the hardware product may have been previously installed. Regardless, IBM’s warranty terms apply.

MES Discount Applicable: No
Field-Installable Feature: Yes
Warranty Period: One year
Customer Setup: No

Licensed Internal Code: Same license terms and conditions as designated machine

Charges

Charges are available from IBM.

<table>
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<tr>
<th>Description</th>
<th>Machine Type</th>
<th>Model</th>
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<tr>
<td>S/390 Parallel Enterprise Server™</td>
<td>9672</td>
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S/390 Parallel Enterprise Server

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