

Network Connection

IBM

SPECIAL
EDITION 1997:
Networking Your
System/390 Server

THE IBM NETWORKING SOFTWARE NEWSLETTER

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Electronic Commerce on the S/390

by Linda Sanford, general manager of IBM's System/390 Division

A few weeks ago, management guru Peter Drucker was asked whether he really thought the information revolution would change the world as profoundly as the industrial revolution did. He replied that he thought it would change the world more profoundly—as profoundly as the printing press did 500 years ago. Including the world of business.

At IBM, we think Peter Drucker is right. We're also betting that the next era of the information revolution will be Network Computing, on a global scale. IBM is not fighting the browser wars. We're concentrating on the end-to-end infrastructure that will make truly global Network Computing possible—and with it, global electronic business.

S/390® is a vital part of this strategy, and this year, we are making a whole series of product announcements to implement that strategy.

NEW PRODUCTS IN 1997

In January, we announced S/390 support for Lotus Domino, the world's premier groupware software. At Internet World in February, we announced a new Internet Connection Secure Server (ICSS), which makes S/390 a bullet-proof launching pad for electronic business; cryptography implemented in hardware, which is faster than software; Net.Commerce, which simplifies setting up electronic storefronts on the Web; and new workload management software, which capitalizes on the S/390's ability to handle multiple workloads dynamically, according to customers' predetermined rules.

S/390 support for Java™, which allows applications to be written once and run on any platform, is in beta test now.

With these products and other new products we'll be announcing over the coming months, S/390 customers will be able to integrate billions of dollars worth of applications and data—including interaction with DB2® and existing applications—with their activities on intranets and the Internet.

A NEW COMPUTING PARADIGM

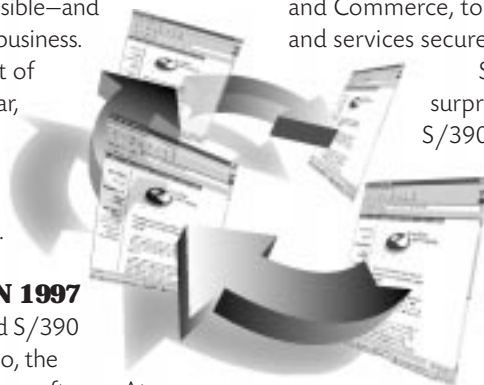
All of this is part of our focus on a new computing paradigm: one based on Content, Collaboration, and Commerce. Content, to provide secure access to information; Collaboration, to handle interactive relationships; and Commerce, to allow people to buy goods and services securely over the Web.

Some people are surprised when we talk about S/390 as an Internet server—an enabler of industrial-strength electronic business applications. But in fact, S/390 customers are already using S/390 this way, including utilities, banks, and a large healthcare provider.

The reason is that more and more of today's users are realizing that in the most demanding new applications—including virtually everything involving the Internet and intranets—the real action happens not on the client side, but on the server side. And S/390 provides the continuous computing environment that makes these demanding applications possible.

Today, customers are seeing that new networked applications, which may involve thousands of connected users, require the continuous availability, horsepower, rock-solid

Continued on page 8



IBM's S/390—The Foundation For Your Network Computing Solution

Whatever size it is, whatever combination of networking protocols it uses, your business can operate faster and more efficiently with Network Computing. A key part of your Network Computing solution, IBM's recently announced S/390 product enhancements offer you:

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

In this special issue of *Network Connection*, we'll show you how IBM's S/390 answers your business's Network Computing challenges. Among our major announcements in March 1997 were:

Exciting new enhancements for S/390 that extend its lead as the "server-of-choice" for e-business.

IBM Communications Server for OS/390™, Release 3, a powerful communications infrastructure, connecting LAN, mainframe, IP- and SNA-based networks for fast, easy, reliable access to data and applications from anywhere.

S/390 server access products including the IBM 3746 Nways™ Multiprotocol Controller Models 900 and 950 and the IBM 2216 Nways Multiaccess Connector Model 400. They deliver private, public, intranet, and Internet solutions that enable you to build performance and reliability into your network while erasing the boundaries between network protocols.

IBM eNetwork Software, offering a full range of client and server networking software, provides the availability, scalability, security, performance, and open standards you need to support your information access, collaboration, and electronic commerce applications.

This edition begins with an article by IBM S/390 Division's General Manager articulating S/390's pivotal role in IBM's support for e-business. Other articles highlight our March 11th networking product announcements that are essential complements to that role.

Further, we provide insight into the recent announcement of IBM's eNetwork™ products and initiatives clearly illustrating IBM's commitment to leadership in the key network technologies required for the successful implementation of Network Computing.

To learn even more, accept the invitation—enclosed with this special edition of *Network Connection*—to attend our one day seminar titled "Networking Your S/390 Server."

I look forward to seeing you there!

Sincerely,



George Brocco
Brand Manager
Communications Server for OS/390

eNetwork delivers...

"With **Communications Server**, our existing SNA application remained accessible to end users over our IP router network, with no modification to the application," says Juan Miqueli, a technical specialist with **Turner Broadcasting System**. "Routing traffic, rather than bridging it, resulted in easier management and more control," Miqueli adds. "And our line costs are significantly reduced as the result of our network consolidation."



Drogerie markt, and its IT service center, **Filiadata**, were able to introduce a new IP-based application, **SAP R/3™**, on top of their existing SNA network without influencing the existing operation of the SNA network. "Without AnyNet®, it would have taken much longer to introduce SAP R/3 because we had no IP skill available. Also, we are convinced that there is better line utilization with SNA protocols, compared to an IP router network," says Filiadata's network administrator of his shop's implementation.



Royal Bank of Trinidad and Tobago (RBTT) offers unique products that blend the best of banking and insurance. Regular and vacationing customers can visit its branch offices and conduct financial transactions with VISA/PLUS, MasterCard/CIRRUS, and the Trinidad/Tobago-based LINX Debit Network. RBTT chose applications that worked best for customers, partners, and day-to-day operations at their branches. That meant three completely different types of applications, running on separate platforms and networks.

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Enterprise-class Universal Connectivity and Information Access



The **IBM eNetwork Software family**, with its rich history of enterprise-class communications, is clearly poised to significantly expand its universal connectivity capabilities. Customers looking for a leg up on their competition will be able to exploit the new, unfolding Network Computing model through the use of IBM eNetwork Software. It will help customers build, maintain, and manage distributed networks of interconnected LANs, as well as provide the infrastructure needed for host access, Network Computing, and network integration.

IBM is widely known as the originator and leader in SNA networking, which is the basis for thousands of mission-critical business networks around the world. IBM is emphasizing leadership in TCP/IP communications as well so that network users can be assured of enterprise-class connectivity regardless of network protocol selection. SNA networking has evolved into an open standard with Advanced Peer-to-Peer Networking® (APPN®) and High Performance Routing (HPR), and IBM is committed to enhancing APPN/HPR.

With the integration of TCP/IP and SNA and continuous advances in APPN/HPR, eNetwork Software provides access to existing applications and data, along with the freedom to choose applications based on your business need, not on your network.

IBM eNetwork Software is focused on providing cost-effective solutions for:

Universal communication: IBM eNetwork Software offers end-to-end connectivity for accessing applications and data on your local or wide area network, host, corporate intranet, and the Internet—from any location. With eNetwork Software, you can leverage the value of information by more efficiently placing it in the hands of those who need it, when they need it.

Network Computing: Through IBM eNetwork Software you get a networking infrastructure that lets you realize the cost-saving benefits of Network Computing. As new demands are placed on networks by "thin clients" and Java-based applications, eNetwork Software solutions ensure effective use of your network resources.

Mobile communication: IBM eNetwork Software leverages your existing applications and data by connecting your mobile workforce to the enterprise. eNetwork Software addresses

IBM eNetwork Software offers a full range of client and server networking software providing the availability, scalability, security, performance, and open standards you need to support your information access, collaboration, and electronic commerce applications.

the unique requirements of mobile employees by supporting continuous and disconnected computing environments, making information available when and where it's needed.

Networking technology: IBM eNetwork Software delivers enterprise-class TCP/IP solutions for the real business networks of today, along with next-generation technology as a foundation for future growth. And with the integration of TCP/IP and SNA and continuous advances in APPN and HPR, eNetwork Software provides access to existing applications and data, along with the freedom to choose applications based on your business need, not on your network.

IBM eNetwork Software delivers solutions for the most cost-effective networking computing by providing:

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

IBM eNetwork Software combines IBM's expertise in providing industrial-strength solutions for the enterprise environment with the latest networking technologies of today and tomorrow.

For more information

Visit <http://www.networking.ibm.com/nethome.html> and <http://www.networking.ibm.com/enetwork/whitepaper.html>

Communications Server for OS/390

A new release provides a high-performance communications infrastructure for electronic commerce and other key applications

Communications Server (CS) for OS/390 provides a powerful networking foundation for universal connectivity and information access for S/390 servers. Embedded in the OS/390 operating system, it connects diverse application and network environments to S/390s, providing the highest capacity, fastest and most reliable infrastructure for Network Computing.

Universal connectivity and rock-solid availability provided by CS for OS/390 overcome many of the limitations of today's networks, giving IT professionals and users the freedom to choose the best applications independent of the installed network infrastructure. The results are faster development of superior applications and lower costs.

In addition, new rerouting and session-preserving enhancements to CS for OS/390 help you to bulletproof your infrastructure for electronic commerce and other applications requiring uninterrupted network and system availability (see figure).

UNIVERSAL INFORMATION ACCESS

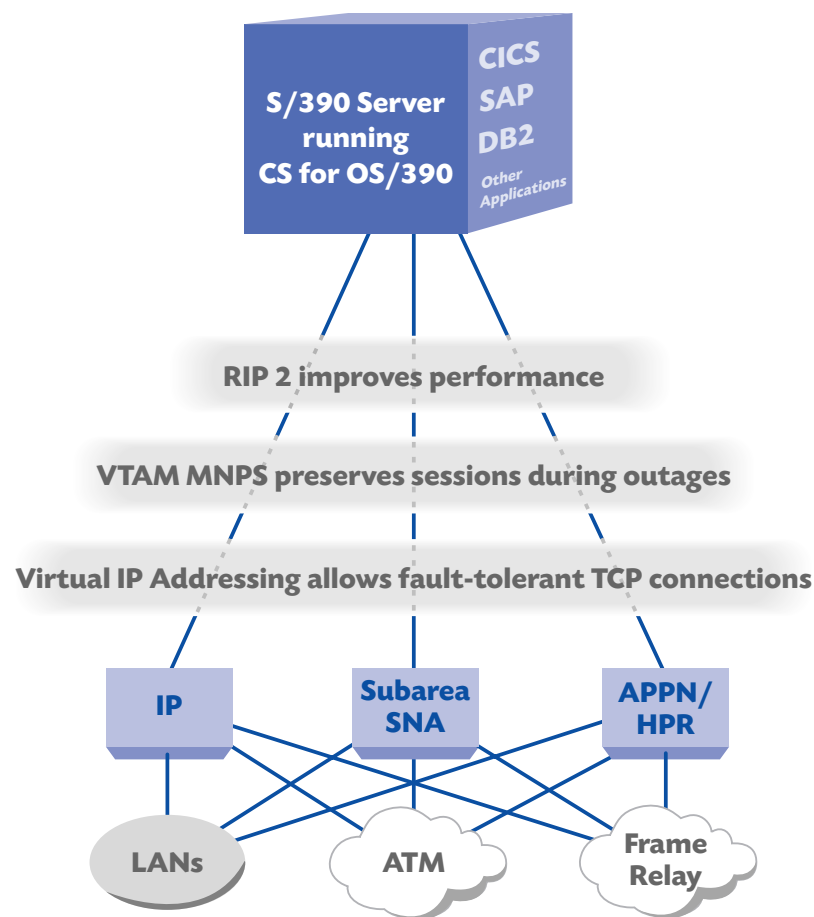
CS for OS/390 Release 3 provides the widest range of open connectivity of any single server system in the industry. With its leading-edge IP and SNA services, CS for OS/390 connects S/390 servers to nearly all types of LANs and WANs, as well as to intranets and the Internet.

CS for OS/390 enables Internet users with Sockets applications such as Web browsers to access S/390 applications and data. S/390 servers running the IBM Internet Connection Server software are excellent Internet and intranet sites because of their scalability, reliability, performance, and access to business information.

Multiprotocol capabilities enable network administrators to optimize their existing network and application environments. TCP/IP applications can be accessed over

existing SNA networks, so network administrators do not have to create a separate IP network to handle Internet traffic. Enterprises with large SNA networks can also save the cost and manpower of rewriting SNA applications to access the Internet since this connectivity is provided by CS for OS/390.

If you have an in-place IP network, SNA applications can run on it, while still retaining the benefits of the SNA protocol. For example, SNA provides consistent performance even when interactive and batch applications coexist on the same network. Large batch file jobs will not interrupt



The new release of Communications Server for OS/390 adds features for fault tolerance and connectivity, providing industrial-strength support for commerce and other mission-critical applications

the consistent response time needed by the interactive applications.

A wide variety of programming interfaces are supported by CS for OS/390. Supported applications include those written to use APPC, CPI-C, OpenEdition® DCE remote procedure calls, and BSD Sockets interfaces, including ported UNIX® applications through MVS/OpenEdition. The CS for OS/390 Information Management System (IMS) Sockets Interface is enhanced in CS for OS/390 Release 3 to support the Open Transaction Manager Access Facility (OTMA). This makes it easier to deploy IMS/OTMA applications across TCP/IP networks, because the same application commands talk to a client or a server.

ENTERPRISE-CLASS AVAILABILITY AND PERFORMANCE FOR TCP/IP TRAFFIC

CS for OS/390 now includes several features that contribute to your network's performance and uptime. High-performance Native Sockets (HPNS) reduces CPU utilization for TCP/IP users. HPNS exploits MVS® functions to improve cross-memory communication, reduce context switches, decrease data movements, and improve reliability and recovery. This leads to less CPU utilization for the Sockets layer, transport medium, and TCP/IP stack protocols. All new applications written to any one of the existing Sockets application programming interfaces can benefit.

In a test environment, 16,000 concurrent TN3270 sessions have run on a single MVS TCP/IP system.

CS for OS/390 now also supports Routing Information Protocol (RIP), Version 2, which enables administrators to more efficiently route traffic around network failures. It accelerates network performance and improves routing control with multicasting, variable subnetting, immediate next hop, and packet authentication functions.

Virtual IP Addressing (VIPA) is also part of CS for OS/390. VIPA, with the dynamic route update server Route D, can be used to implement fault-tolerant TCP connections by defining an IP interface and address that is not associated with any physical network interface. It defines primary and alternative interfaces for the same subnet and switches dynamically to the alternative if the primary interface fails.

HIGH AVAILABILITY USING THE S/390 PARALLEL SYSPLEX

With VTAM® Multinode Persistent Sessions (MNPS), CS for OS/390 can now preserve sessions across application outages where hosts are connected through the S/390 coupling facility. Because session information is preserved, the workload and extra network traffic to reestablish connections is avoided. Network availability is increased to 100 percent with High Performance Routing's ability to route around any failing component in the network. Together, HPR and MNPS enable you to build networks and applications that are fault tolerant.

TSO users can now easily take advantage of the high availability of the S/390 Parallel Sysplex. CS for OS/390 VTAM generic resource support has been extended to support

TSO/E. The Sysplex appears as a single system to the TSO user. Multiple TSO instances can be accessed using the generic name, making it possible for one processor to take over for another failed processor without affecting users.

NATIVE ATM CONNECTIVITY ON S/390

Now you can add an Asynchronous Transfer Mode (ATM) network without affecting applications. CS for OS/390 Release 3, including the new VTAM, Version 4 Release 4, along with Open System Adapter-2 (OSA-2), supports native ATM communication for S/390. Two features—best-effort virtual circuits and reserved-bandwidth virtual circuits—optimize link capacity and bandwidth utilization.

IMPROVED USE OF HIGH-SPEED NETWORKS

To better capitalize on high-speed networking, CS for OS/390 Release 3 includes High-Performance Data Transfer (HPDT) services and new interfaces to optimize performance for VTAM APPC applications, especially those that transfer large data objects.

HPDT services are available to applications written to the VTAM APPC COMMAND (APPCCMD) interface without modification. A session can connect two intra-host applications or applications connected over high-speed networks such as ATM via OSA-2 attachments. Other attachments include the cross-system coupling facility in a Parallel Sysplex, the 3746 Nways Multiprotocol Controller Model 900 or 950, and the 2216 Multiaccess Connector Model 400.

VTAM contains a new channel protocol, Multipath Channel (MPC), which has been enhanced to include HPDT MPC (also referred to as MPC+) connections. This provides a more efficient data transfer because HPDT services enable data packing without data movement and improved scheduling of channel programs. Both data packing without data movement and improved scheduling of channel programs reduce CPU cycles used for communication by as much as two-thirds.

The amount of improvement will vary, depending on system configuration, size, and type of data objects. Measurements in some configurations have shown S/390 throughput increased by as much as 40.7 percent and CPU utilization reduced by as much as 63.2 percent.

CS FOR OS/390: THE ESSENTIAL FOUNDATION

The features in CS for OS/390 Release 3 provide enterprise-class performance and networking capability. They demonstrate why the S/390 is considered by many to be the premier foundation for Network Computing and electronic commerce. You can expect the capabilities of CS on S/390 will continue to grow to meet expanding needs for enterprise-class solutions, universal network access, and premier support for e-business solutions.

For more information

Visit <http://www.networking.ibm.com/nethome.html> and <http://www.networking.ibm.com/cs3/cs3prod.html>

Simple Migration to a Multiprotocol Landscape

High-speed connectivity and backup enhancements to the IBM Nways 3746 controller and 2216 connector simplify blending SNA, IP, and other key protocols onto a single platform

The success of the Internet and corporate intranets probably means that IP is becoming a strategic component in your enterprise network. But while you must give IP the priority it deserves, you don't want to jeopardize the performance of your other key protocols.

Your SNA applications, for example, are most likely alive and well, and you must maintain their high performance and reliability. But you might also want to speed up LAN server links using Asynchronous Transfer Mode (ATM), enjoy the cost benefits of using frame relay for wide-area traffic, or economically back up WAN links over ISDN's generous, dial-up bandwidth.

This is where IBM 3746 Nways controllers and 2216 Nways connectors come in: In addition to providing the world's best SNA support, they create a high-performance, high-reliability TCP/IP gateway into your data center from

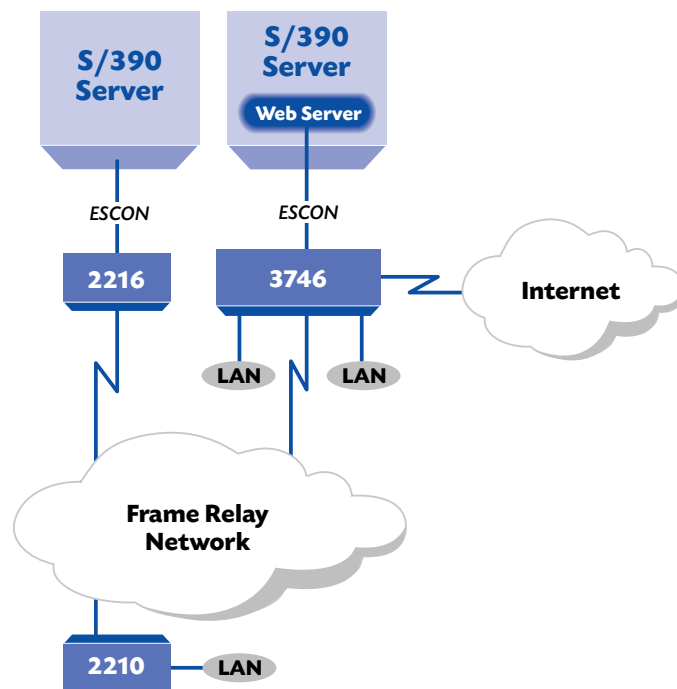


Figure 1. The enhanced Nways 3746 connects many types of LANs and WANs to the host environment, while the 2216 does the job at smaller host sites

the myriad access networks you might need to accommodate the specific communications needs of your various sites (see Figure 1).

To do the job of melding your networks thoroughly, IBM has enhanced its 3746 Nways Multiprotocol Controller Models 900 and 950 and its 2216 Nways Multiaccess Connector Model 400. The new features give you more options for high-speed connectivity to help you accommodate burgeoning network traffic loads traveling among multiple, dispersed locations. The products also have backup and congestion control features to help keep network uptime at its peak.

Doubling as an APPN/High-Performance Routing (HPR) network node, the 3746, when combined with the new Multi-Access Enclosure (MAE), enhances scalability and provides a wealth of connectivity to ATM, Ethernet™ and Token-Ring networks, as well as to various types of WANs. IBM plans to eventually support other high-speed networks—HSSI at speeds to T3/E3, FDDI, and Fast Ethernet—as well as TN3270 connections. In addition, the stand-alone 3746 has been enhanced to support IP routing over Point-to-Point Protocol (PPP) leased lines.

All this paves the way for protecting your network investments for the future.

The 3746 and 2216 also support Data Link Switching (DLSw) for transporting SNA across IP and Dependent LU Requester (DLUR) for optimum routing of SNA across APPN/HPR networks. The 2216 adds routing and bridging of all commonly used network-layer protocols, such as IP, Novell® IPX, DECnet®, Banyan VINES®, and AppleTalk®.

ESCON, ATM, AND OTHER FAST LINKS PUT YOUR NETWORK IN OVERDRIVE

The 2216 now supports lightning-fast ESCON® channel attachments, already supported by the 3746. When installed with Parallel Sysplex Processors, the ESCON support allows sites to send traffic at a maximum of 17 MB per second over the fiber-based, point-to-point channel.

IBM has taken other steps to tune your network's performance, as well: New Multi-Path Channel+ protocol support combined with VTAM enhancements reduces S/390 cycles for HPR over ESCON by up to 60 percent.

In addition, the Nways products allow IP routing across 155 Mbps ATM adapters by supporting the IETF-standard

Classical IP scheme for mapping IP addresses directly into ATM addresses. The products also provide ATM Forum-compliant LAN Emulation clients, allowing you to run APPN/HPR over ATM networks.

The 3746 and 2216 now also support frame relay, ISDN Primary Rate Interface (1.5/2.0 Mbps), X.25, and PPP links across the wide area.

SIDESTEPPING WAN OUTAGES AND CONGESTION

Complementing a raft of recently announced services from U.S. frame relay carriers to optimize SNA delivery, IBM has done its part in keeping traffic running smoothly with frame relay enhancements of its own. Like the 2216, the 3746 with MAE, for example, will now automatically redirect frame relay traffic over alternate ISDN routes if there is a network failure. This gives you extra insurance that your WAN will stay up and running.

The Nways products take advantage of ISDN's high-speed dial-up nature as a backup alternative. The 3746 and the 2216 can automatically divert failed SNA traffic between a 3746 and a 2216 or a 2210 Nways router to predefined 64 Kbps ISDN B channels (see Figure 2). The 2216 can reroute most network-layer LAN protocols over ISDN, as well. And you pay ISDN usage only in the rare event of a failure.

To avoid throughput-degrading re-transmissions, the 3746 with MAE and 2216 can manage network congestion when sending IP over a frame relay network, in the way the 3746 has been able to do with SNA. The products detect congestion through frame headers. If packets start backing up, the products automatically throttle back transmissions to the Committed Information Rate (CIR) of each frame relay Permanent Virtual Circuit (PVC).

Also enhancing network performance is a bandwidth reservation function. This allows network managers to assign a portion of frame relay bandwidth to each protocol—such as IP or SNA—within a single PVC to accommodate the performance characteristics of that protocol. Nailing up network capacity ahead of time ensures that applications will get the bandwidth they need to perform efficiently, should network congestion occur.

In addition, the 3746 Models 900 and 950, as well as the 2216, can also designate portions of bandwidth on a given circuit to serve particular IP applications, such as IP file transfers. This bandwidth reservation feature works over PPP leased lines.

MANAGEMENT IS A SNAP

Both Nways products can be configured by a special graphical configuration tool running on AIX®, OS/2®, or Windows™ operating systems. They can be managed by any SNMP management system. IBM supplies its own graphical administration software as a component of its Nways Managers, which you can plug into centralized graphical network management systems such as Hewlett-Packard® OpenView™ or IBM/Tivoli TME 10, formerly called NetView®.

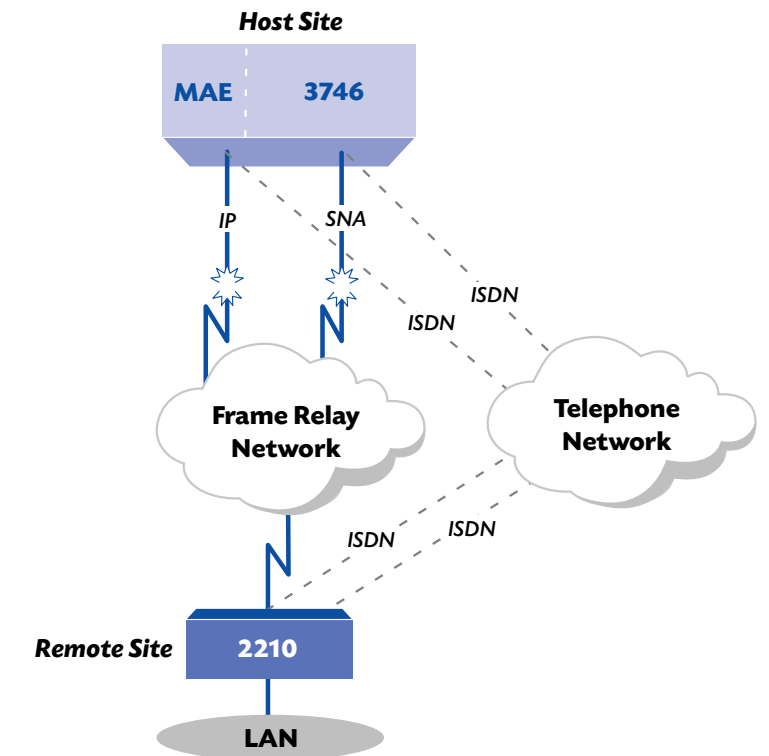


Figure 2. Frame relay traffic can ride over high-speed backup ISDN links in the event of an outage

WHICH SIZE IS RIGHT?

The 3746 is IBM's high-end product for host gateway services. The 2216 serves a similar function while supporting a smaller number of adapters and ports. The 2216, then, is appropriate for smaller locations that require fewer connections than those that can make full use of a 3746.

The 2216, for example, allows connections across as many as four ESCON channels, while the 3746 supports up to 16.

With the capacity to hold up to eight adapters, each with up to eight interfaces, the 2216 can attach up to 64 devices, serving, for example, as a concentrator for delivering frame relay, leased-line, and other WAN traffic onto a corporate backbone. The 3746 with MAE currently has a capacity of 23 adapters and 176 lines, though IBM is targeting support for 240 lines within the stand-alone 3746 controller. The 3746 supports 15,000 concurrent sessions, while the 2216 supports 6,400—and even more when acting as an HPR routing node.

Whatever the size or your connectivity needs, the Nways family provides you with an affordable, integrated platform for accessing SNA and TCP/IP MVS/ESA™ server environments in an era of myriad communications protocol choices.

The products can turn an existing SNA network into a transport for both intranet and Internet applications, while preserving your existing network topology and application investment.

For more information

Visit <http://www.networking.ibm.com/nethome.html> and click on "Hardware Products"

Continued from page 1

security and scalability that S/390 has been providing to the commercial world for more than 30 years.

Increasingly, they're also realizing that it's the groupware layer—Lotus Domino—that will launch many of these new networked applications.

At the IBM S/390 Division, we began piloting Domino on S/390 last November. By June, we will have more than 3,000 people involved. Also by June, we'll have shipped code to several dozen beta customers around the world. And in September, we'll make the product generally available.

Right now, not even Peter Drucker can predict where the information revolution will take us. But it's IBM's plan to be at the crest of the wave. I hope you'll join us. It promises to be quite a ride!



For more information

Visit <http://www.s390.ibm.com/> and click on "S/390 Site Map"

What customers using the S/390 as a Web server have to say:

Frank Robb, executive vice president, Wachovia Operational Services Corp., Winston-Salem, N.C.: "The System/390 is a vital part of our networking strategy. The OS/390 Web server and Parallel Sysplex architecture will allow us to meet the tidal wave of transactions head on. S/390 ensures that five years from now, Wachovia will remain ahead of the technology curve."

Mark Krause, senior systems analyst, Commonwealth Edison, Chicago: "The Information Technology department at ComEd is taking the lead in demonstrating the advantages of an intranet service. Based on a successful five-month pilot of an S/390-based Web server, we intend to move to full-scale production, and leverage the high performance, availability, and scalability that the S/390 platform offers. We will also take advantage of S/390's Parallel Sysplex clustering technology."

Paolo Fabbri, systems manager for Regione Emilia-Romagna, the local regional government, north of Tuscany, Italy: "We've built a revolutionary information network based on the System/390 [for Internet access to local government data]. We can present data in a graphical format that's easy for users to understand without losing any of the safety and security features that we need and rely on from the System/390."



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