IBM Networking Enterprise Overview Fact Sheet

Accelerating your move to network computing while protecting your investments

11 March 1997

Announcement Summary

Whether you're installing new LANs or WANs, moving to Frame Relay and ISDN, migrating to switching and ATM, using the Internet and intranets to leverage your investments in S/390 applications and data or consolidating separate data, voice and video networks, you can join a growing number of companies looking to IBM for dependable, high-performance, low-cost networking with global service and support. You'll find that IBM's innovative, award-winning products, coupled with IBM's business-like approach to networking, helps you bring the benefits of network computing, the Internet and intranets to your users at the lowest possible cost.

IBM networking solutions, based on IBM's Switched Virtual Networking (SVN) framework, extend your network, enable your users, customers and business partners with network computing and help you and your company win in today's networked world. As others have, you'll find IBM an important strategic partner.

IBM networking delivers industry-leading solutions for S/390 server access, switched LANs and WANs and expanded application access for anyone from anywhere–with management applications to keep it all running smoothly and efficiently. You'll be surprised at how aggressively priced IBM's solutions are, how easy they are to install and use and how well they fit into and enhance your network.

Announcement Highlights

S/390 server access that delivers Internet and intranet solutions and meets key data-center and SNA network needs:

- The new Multiaccess Enclosure for the IBM 3746 Nways Multiprotocol Controller Models 900 and 950 provides impressive price-performance improvements for WAN, LAN and ESCON connectivity, making the 3746 the premier gateway. With this enclosure the 3746 provides:
  - Leverage of the IBM products you rely on for efficient control of your SNA network
  - A gateway capable of providing efficient TCP/IP and SNA application access for all transport protocols
  - New connectivity options including: ATM with LAN Emulation Client and Classical IP routing, and worldwide ISDN PRI
  - A platform for future adapters: FDDI, HSSI and Fast Ethernet
  - Improved adapter connectivity and throughput for APPN/HPR

- A high-performance ESCON adapter on the IBM 2216 Nways Multiaccess Connector Model 400 creates an industry-leading gateway to business-critical S/390 TCP/IP and SNA applications. This high-availability 2216 provides the industry's highest-projected performing gateway in its price range.
- Multi-Path Channel(+) (MPC(+)) protocol support–on the 2216 and 3746 multiaccess enclosure ESCON– coupled with VTAM enhancements reduces cycles dramatically for HPR access.
- New gateway software–IBM 3172 Interconnect Controller Program (ICP), NCP and other new 3746 features provide enhanced connectivity.
- The award-winning IBM 9729 Optical Wavelength Division Multiplexer continues to be enhanced for cost-effective, optical- fiber linking of S/390 servers.

Wide-area switch enhancements for networks that consolidate data, voice and video:

- The IBM 2220 Nways BroadBand Switch offers high voice quality and reduced costs for integrated voice and data networks with Q.SIG and Euro-IDSN support.
- A previewed entry-level 2220 Model 200 will extend multiservice access into remote sites, providing an affordable entry to consolidated 2220 networks.
- IBM 973x (IDNX) feature enhancements provide cost-effective ways to extend the reach of IDNX.

Nways wide-area switch enhancements for switched networks that support the advanced, collaborative applications that you want:

- Enhancements to our comprehensive line of Nways switches help you consolidate WANs and provide you with end-to-end WAN connectivity.
- The entire Nways Wide Area Switch Family provides enhanced connectivity with extended ATM support for the IBM 2225 Nways Multiservice Switch and IBM 2230 Nways ATM Switch and extended Frame-Relay support for the IBM 2219 Nways Frame Relay Switch.
- The 2225 and 2230 switches are now fully integrated for management by a single network management station.

Remote access that delivers office-like computing from anywhere:

- New upgradable models of the IBM 2218 Nways Frame Relay Access Device (FRAD) provide a low-cost, entry-level solution for bringing Frame-Relay access to remote branch networks.
- The already strong line of 8235 Dial-In Access to LANs (DIALs) Servers adds three new adapters for the Model I40 concentrator, enhancements for dial-in and dial-out clients and software enhancements for remote LAN access users.
- The IBM Wide Area Connector adds a PCI version that includes Windows NT and OS/2 software support and initial line-connection speeds of 56 or 64 Kbps.

- The WaveRunner PCMCIA ISDN or analog modem allows direct, high-speed remote connectivity over ISDN or standard telephone lines for laptops, notebooks and other computers.
- The 7845 Network Terminator Extended (NTE) allows a PC along with existing analog telephones to share a single digital telephone line.
- IBM's Cable On-Line offerings provide very responsive access to the Internet and intranets. The Cable On-Line Access System delivers high-speed data services over hybrid fiber-coax (HFC) networks.

Integrated management applications that reduce operations costs and ease network administration:

- The IBM Nways Wide Area Element Manager provides configuration capability, fault management and performance monitoring for 2219, 2225 and 2230 Nways switches.
- The IBM Nways Enterprise Manager R2 manages the Q.SIG and ISDN resources supported by the latest generation of 2220 switches.

Customer Business Solutions

Customer business needs

The need for additional capacity, growing numbers of remote-access users, easy access to the Internet and corporate intranets and continuing interconnection and consolidation of organization networks present challenges. Network managers seek solutions that:

- Are flexible and standards-based for interoperability
- Allow them to make incremental additions where their needs are greatest
- Accommodate new applications and emerging technologies
- Incorporate switching for high capacity and remove bottlenecks

They want solutions that have immediate benefits but are part of a longer term strategy. IBM satisfies these business needs with solutions that address network manager needs across their entire organization. In this section we discuss four customer business environments that are typical of the challenges that network managers face and show how IBM can help meet those challenges.

S/390 server-access breakthroughs for electronic commerce and network computing

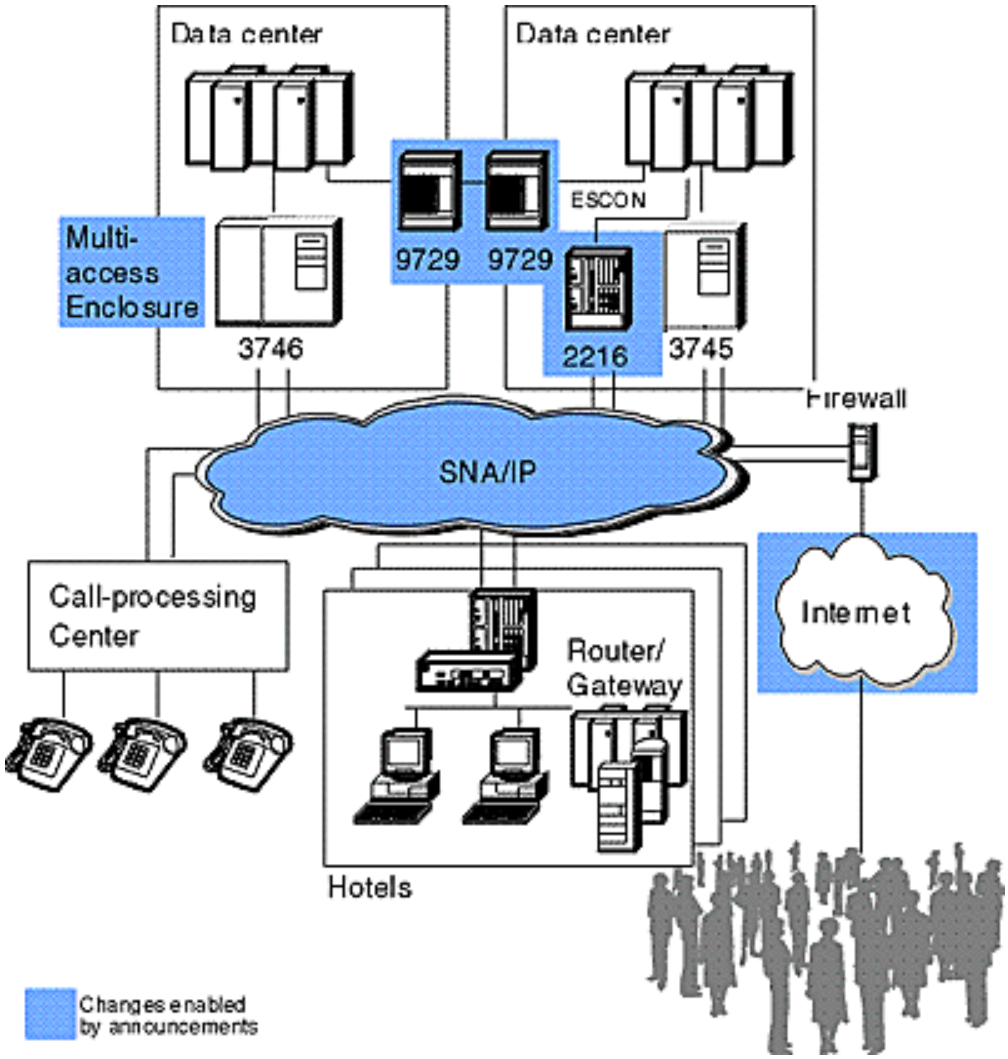
The board of directors of an international hotel chain decided that they needed to get a larger return on their strategic network and reservations system assets. IBM proposed a comprehensive, affordable plan to use the Internet and a company intranet to revolutionize their IT capabilities. After implementing the plan the hotel chain was able to reach 10 times as many potential customers, increase their occupancy rates to an industry high and add new travel businesses.

The board had initially wanted to implement a major advertising campaign and increase their call-processing center staff to take more reservations, but the call-processing center was at capacity.

An IBM sales representative told them about the growing number of potential customers using the Internet for shopping, especially for travel. The sales representative also told them that IBM was helping many companies use the Internet to expand their access to customers, suppliers, business partners and their own employees.

IBM proposed that they add an engaging Web page to advertise, take reservations and provide business traveler services. And IBM proposed incremental changes to consolidate and simplify the company's WAN. IBM further proposed leveraging Internet technology to build a company-wide intranet and establish linkages with other providers of travel-related services. The hotel chain dramatically expanded their exposure to customers, increased business traveler loyalty and expanded into new revenue-producing businesses like ticketing and delivering complete packages that include travel, lodging and even restaurant reservations.

Figure 1. Server-access breakthroughs



The hotel chain was operating separate SNA and IP networks, optimizing each independently. Employing the IP Routing feature within their 3746 Model 900, they combined both networks on a single platform. In the other data center, with fewer SNA connections, they continued to use their 3172 as a separate IP gateway next to their NCP-controlled 3745 SNA gateway.

Advised of today's announcements, they will be adding the multiaccess enclosure to their 3746 and they will be replacing their 3172 with the ESCON-attached 2216. The 3746 multiaccess enclosure gives them industry-leading attachment flexibility in a single footprint, and the 2216 gives them all the features required to support router networks in a cost-effective gateway. Each solution gives them high-speed access from the Internet and can easily and inexpensively be upgraded to ATM when the time comes. See Figure 1 for the server-access breakthroughs in the changed hotel network.

Because the network is even more critical to company operations than before, the hotel chain has decided to connect their separate data centers with IBM 9729 Optical Wavelength Division Fiber Multiplexers. The 9729s will let them run their separate centers as a single center, with load-balancing and backup in case of failure. The team also advised the hotel chain to take advantage of continued enhancements to IBM's existing server-access products that add capability and flexibility, increase network availability and lower costs.

WAN consolidation cuts communication costs

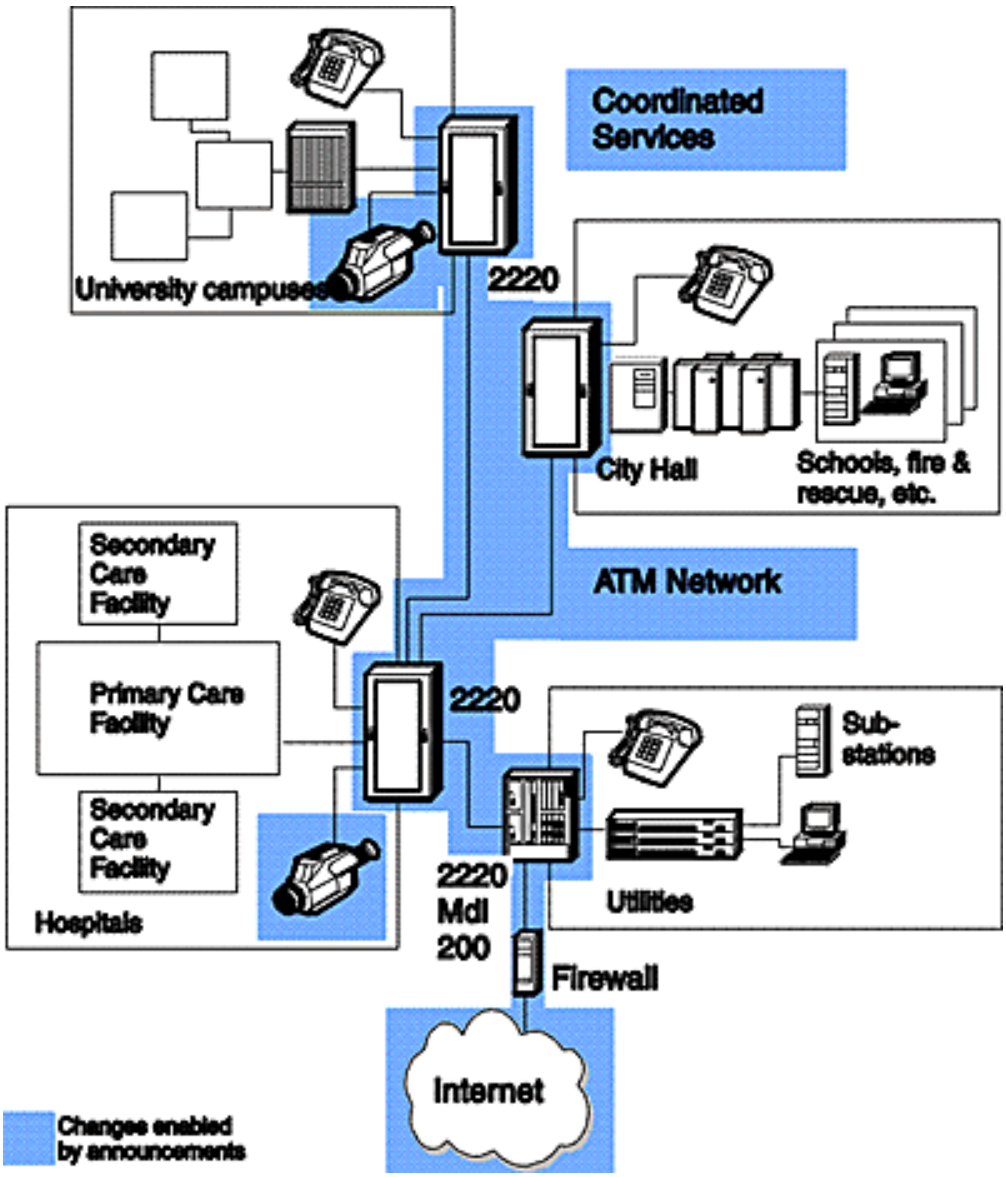
A European city that recently found itself with growing expenses and shrinking revenues requested assistance to bring its budgets back into balance without tax increases or major cuts in services. IBM responded with an innovative proposal that cut costs by 60%, restructured city government information technology and prepared them to increase, rather than cut, services without raising taxes.

The city government, like many other organizations, had separate networks for each major area or department. Each separate network performed well but often duplicated resources available in other networks. Separate networks also precluded departmental integration, lowering the potential for cost-savings and making even simple tasks (like getting a new business started) difficult.

Realizing that their IT system was a fundamental building block in their quest for more efficient services, the city enlisted the computer science department at the city university to take a fresh look at city operations and recommend changes. The study team talked to a number of manufacturers before settling on IBM as the company best able to provide the wide range of equipment and services needed.

IBM recommended taking a fresh approach to networking using wide-area ATM. The study team found a city-wide fiber network run by the city utility. Using this fiber network as the foundation, the team designed an ATM backbone network that linked the offices of all the departments across the city. And they designed the network to carry telephone traffic among central-office switches in the city telephone network. The team used IBM 2220 WAN switches because of their highly efficient use of bandwidth and the ability to consolidate voice, video and data networks using either Frame Relay or ATM. The team is also excited about their ability to connect even small city offices using IBM's previewed entry-level 2220 Model 200 when it becomes available.

Figure 2. WAN consolidation



Using the new ATM network the city then began a total consolidation of city services, with new applications enabled by ATM and the 2220 switches.

Building information from city planners is now available to help fire and rescue teams find their way during emergencies. The city administrator has up-to-the-minute access to growth patterns, school enrollments, utility consumption and other information needed to focus services to minimize costs. The hospital is collaborating with the university on telemedicine. Starting a new business is a one-stop event.

The city has balanced its budget, added new services and is now considering services that reach out to its citizens, like high-speed cable access to schools, community information and the Internet.

Remote access enables office-like access from anywhere

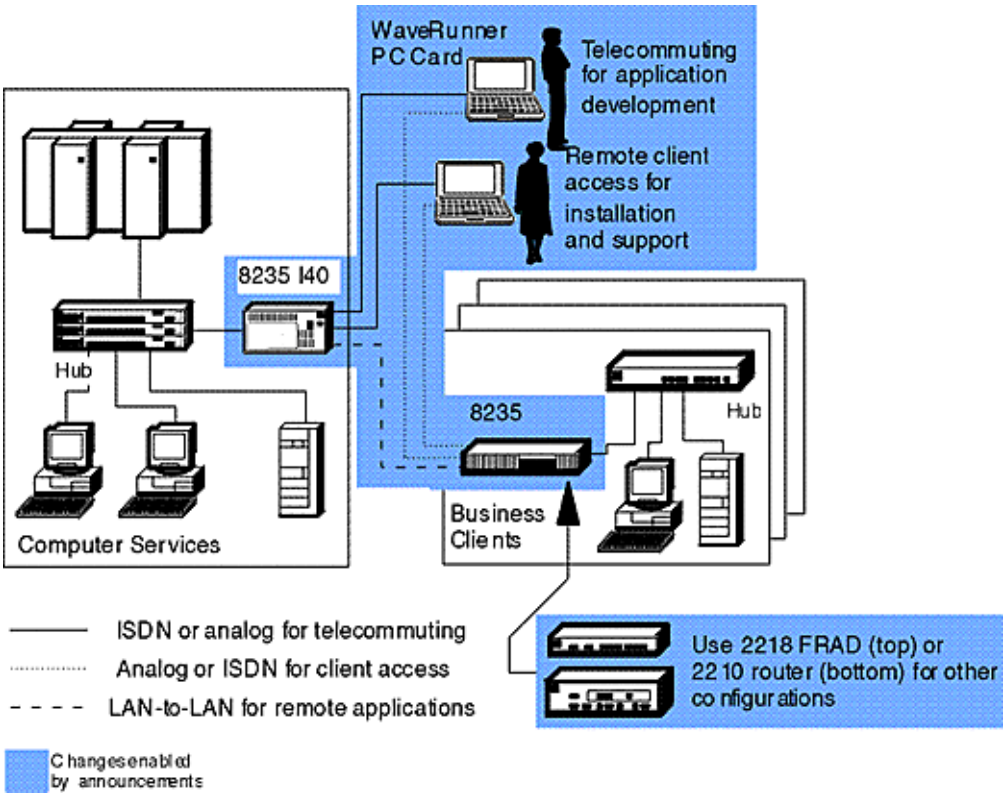
Attracting and keeping skilled employees is a fundamental business requirement. Yet a computer services firm found itself unable to keep its programmers happy because of excessive travel, leading to constant turnover and critical cost and skills exposures. IBM was able to show the firm

not only how to raise employee morale and virtually eliminate turnover, but also how to enter the lucrative small-business, remote-application market.

Prior to IBM's proposal the computer services firm developed custom applications at its headquarters site. When it was time to install the applications, the company sent its programmers to the client location, often for extended periods. And programmers would often have to return to fix problems or install upgrades. The programmers rebelled at frequent travel and often left after only a few months. The firm contacted IBM when it became evident that the situation was threatening its survival, because it had heard about IBM's success with remote access and the wide range of products and services IBM could offer.

IBM proposed an innovative approach that tied the firm to its clients with 8235 remote-access servers, and gave its programmers the ability to remain connected no matter where they were-even from home. Programmers connect to the firm's LAN for development and to client LANs for installation and maintenance. They still have to travel occasionally, but travel is reduced by 80%. IBM proposed a central office model, the Model I40, for the firm's headquarters, and smaller models for client locations. Programmers use IBM ThinkPads with WaveRunner PC cards that provide ISDN and analog modem support. Programmers use the same PC card for ISDN access from home and analog access while traveling.

Figure 3. Office-like access anywhere



The LAN-to-LAN capability of the 8235 also opened a new application to the services firm-the ability to run applications for its clients remotely. They can now offer remote execution of applications too large or complicated for their clients. Figure 3 shows the office-like access provided by the firm's network changes.

The computer services firm is now on a path toward rapid growth. They are taking advantage of IBM's broad line of remote-access products, which include the award-winning 2210 routers and the first modular FRADs, the IBM 2218, to add new clients and offer new services.

Automated management improves productivity

The appliance business, like many others, requires broad product lines with many options and the ability to respond quickly to changes in consumer preferences. An electronics appliance manufacturer recently found itself plagued by growing network operations costs. With IBM's help the company simultaneously simplified operations and improved network efficiency, establishing the highest levels of productivity ever.

The manufacturer had separate sites for its radio, recording and laser-optical product lines. Although its engineering and manufacturing processes were highly organized and efficient, its network operations were not. They had skilled operators at headquarters and each plant site, but network problems would occur without warning. Many problems required headquarters specialists to travel to the plant sites. The CEO decided to apply some of the same concepts used to streamline engineering and manufacturing, and turned to IBM for suggestions for streamlining operations and reducing costs.

IBM told the CEO about other successful management applications, and how these applications could improve network operations while lowering costs. The fact that the manufacturer was using Windows NT and HP UNIX posed no problem, IBM said. IBM's integrated Nways managers run on Windows, Windows NT, AIX and HP UNIX.

The manufacturer installed the new Nways Workgroup Manager for Windows NT for plant sites, the Nways Campus Manager for HP OpenView for headquarters and the Nways Enterprise Manager for the WAN. These applications made it easier to find and fix problems, resulting in fewer outages of shorter duration, and gave network administration up-to-the-minute, graphical network and component status at a glance. Because the specialists can see from headquarters what the plant operators see locally, they can make suggestions without traveling. The Enterprise Manager, enhanced to support more operators, adds detailed information about the WAN to the campus information gathered by the Nways managers for Windows NT and HP OpenView. Increased consistency among sites also led to reduced training, improved end-user support and increased staffing flexibility.

Figure 4. Management applications

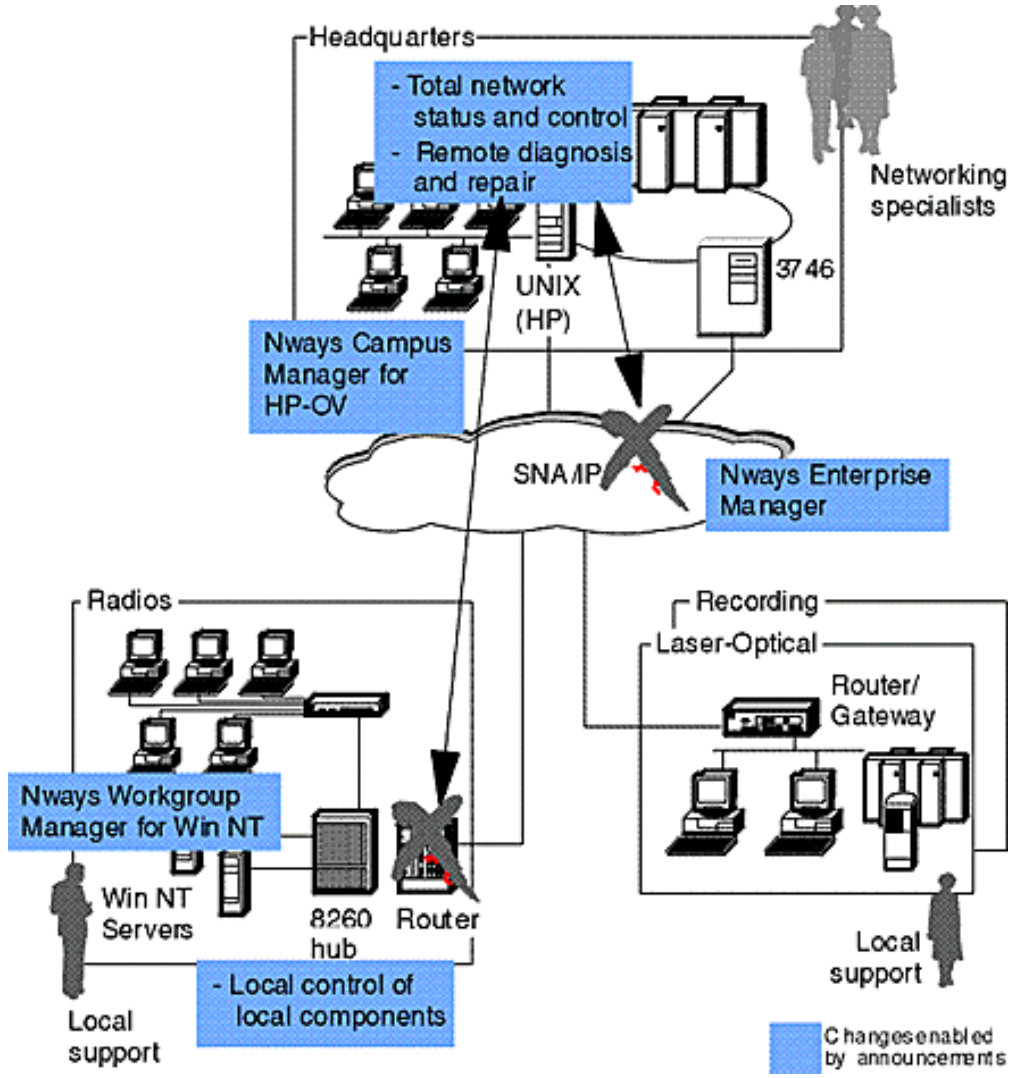


Figure 4 shows how management applications are used to collect information from the enterprise network and send it to the central site for analysis and display.

The CEO was satisfied with the new streamlined network management process, and even more satisfied with a 30% reduction in operation expenses. The CEO is now looking forward to converting their WAN to a switched network using 2219 and 2225 WAN Switches, confident that the newly released Nways Element Manager can deliver the proactive management functions required to integrate WAN switches into their management process.

IBM—Eager to help find a solution for your business needs

Although these four situations provide a good overview of IBM's capabilities to help its customers, they by no means tell the entire story. IBM's wide range of server access and switching solutions for WAN networks, with integrated management to keep it running smoothly, makes it very likely that IBM has a solution for most customer business needs-including yours.

Additional Technical Details

Server-access solutions–new connectivity at impressive price-performance

IBM provides a wide range of products to meet your server-access needs. These products serve as WAN or LAN gateways for large or small networks. They build upon IBM's recognized expertise in server access with:

- New ESCON channel hardware and software for the 3746 Multiaccess Enclosure and the 2216 Multiaccess Connector
- New ATM connectivity for the 3746 Multiaccess Enclosure

3746 Models 900 and 950

The multiaccess enclosure of the 3746 offers a wide range of network connectivity. It enables you to transport multiprotocol traffic such as TCP/IP, SNA and dependent logical unit requester (DLUR), DLSw, APPN, and HPR. You can transport the traffic over LAN, leased lines, Frame Relay, PPP, ISDN, ATM or X.25. It provides the following network connection support:

- ATM 155-Mbps multimode and single-mode adapters support ATM Forum-compliant LAN Emulation Client and Classical IP routing.
- An ESCON channel adapter that supports SNA passthrough, APPN Intermediate Session Routing (ISR), HPR and TCP/IP routing. Each ESCON channel adapter provides access to multiple hosts or logical partitions (LPARs), up to a maximum of either 16 for IP traffic, 16 for HPR traffic or 32 for APPN traffic, SNA passthrough and terminated DLSw connections.
- HPR over the ESCON channel adapter uses the new MPC(+) protocol, which brings increased throughput and a reduction in CPU cycles of up to 60%, depending on the application. Support on the S/390 server is provided by VTAM 4.4.
- DLUR and Boundary Access Node (BAN) support in APPN to connect downstream SNA devices to VTAM SNA applications
- DLSw support with VTAM 3.4 (or higher) SNA applications. DLSw allows for local conversion from SDLC to the channel and remote (with a DLSw partner) connectivity to SNA devices on SDLC, LANs and ATM LAN Emulation (LANE).
- Worldwide ISDN PRI adapter supporting line speeds of 1.544 Mbps with twenty-three 64-Kbps B-channels for data and one 64-Kbps D-channel for signaling as well as dial backup and dial on demand. This type of adapter also supports line speeds of 2 Mbps with thirty 64-Kbps B-channels for data and one 64-Kbps D-channel for signaling.

The 3746 multiaccess enclosure provides these additional interconnection and routing functions as well as extensions for higher speed technologies. It offers high WAN port density for cost-effective traffic concentration, with seven adapter slots and up to eight interfaces per adapter.

2216 Model 400

The 2216 Model 400 ESCON adapter adds S/390 channel to ATM access with a low-cost, high-availability platform to business-critical SNA and TCP/IP applications.

The 2216 ESCON adapter provides scalable, flexible design for access to SNA and TCP/IP host applications from Token-Ring and Ethernet LANs, WANs (with Frame Relay, PPP, SDLC, X.25, and ISDN) and ATM (with Classical IP or LANE). It supports BAN and boundary-network-node (BNN) connectivity between FRADs and S/390 applications. You can select IP routes based on static routes, RIP, OSPF or Border Gateway Protocol (BGP-4) and you can filter IP frames.

The 2216 ESCON adapter provides improved server-access availability. It provides MPC(+) support for high-throughput APPN/HPR routing to VTAM 4.4 SNA applications and APPN/ISR to VTAM 4.2 (or higher) SNA applications. It supports IP and APPN routing over any other 2216 interface. It provides connectivity between dependent downstream SNA devices and VTAM SNA applications with APPN/DLUR support. The adapter provides DLSw support for VTAM 3.4 (or higher) SNA applications. DLSw allows for local (a single 2216) conversion from SDLC to channel and remote (with DLSw partners) connectivity to SNA devices on SDLC, LANs and ATM LANE. It enables ESCON channel-to-LAN connectivity for Token Ring, Ethernet and ATM LANE.

You can have multiple LPARs to S/390 servers using ESCON multiple image facility (EMIF). You can have up to four ESCON channels for each 2216. Each ESCON channel adapter provides access to multiple hosts or LPARs, up to a maximum of 16 for IP traffic, 16 for HPR traffic or 32 for APPN traffic, SNA passthrough and terminated DLSw connections.

Server-access solutions connectivity enhancements– 3746, NCP, 3172 and 6611

ISDN Enhancements

The 3746 multiaccess enclosure provides a worldwide ISDN PRI. An upgraded ACF/NCP V7R5 provides increased Euro-ISDN connectivity and nondisruptive backup options on the 3746. With this Euro-ISDN support, failed Frame-Relay traffic between two 3746 Model 900s is automatically diverted to predefined ISDN interfaces without interrupting established sessions.

A 3745 or 3746 Model 900 connected to an IBM 7820 ISDN Terminal Adapter (or similar adapter) with a Frame-Relay connection can establish subarea sessions with an IBM 3746 Model 900 PRI adapter in a network supporting Euro-ISDN standards. It can also establish subarea BAN sessions when connected with a Token Ring to an IBM 2210 (or similar) router that has the subarea BAN function.

Frame-Relay enhancements

With the 3746 you can now switch Frame-Relay traffic over alternate routes for enhanced availability. And you can automatically and nondisruptively recover from network failures, such as loss of an intermediate link or node.

For congestion control the 3746 can exploit the Frame-Relay Committed Information Rate (CIR) and adjust the data it sends to the network to the capacity of the network at a given time. It controls the transmission of traffic over every line and permanent virtual circuit (PVC) by detecting congestion through frame headers. If congestion occurs the 3746 automatically reduces the transmission rate to the committed burst size of each PVC.

IP enhancements

The new 3172 ICP software release provides IP enhancements. For greater host connectivity, multiple TCP/IP hosts can now share a LAN adapter in the 3172 Model 3. ICP 3.5 enables you to predefine the target TCP/IP host based on the IP address. A default target host can also be defined–if the default target is acting as an intermediate router. This greatly increases the number of TCP/IP hosts a single 3172 gateway can support.

Improved backup and recovery options provide increased application availability. With ICP 3.5 you can define redundant or backup paths to improve the availability of TCP/IP applications on S/390 servers. Manual takeover can be expedited by defining the same 3172-to-host path for an active and inactive backup host. You can assign primary and alternate paths for automatic host takeover and for gateway backup.

ACF/NCP V7R5 also provides enhancements for IP users; they can now define a backup, native IP channel interface between an NCP and the NCPROUTE application in an owning TCP/IP host.

The 3746 IP routing feature is enhanced with bandwidth reservation system (BRS) support on PPP lines. You can reserve a certain percent of the bandwidth for different IP applications using the same line.

The IBM Multiprotocol Network Program (MPNP) supporting the IBM 6611 Multiprotocol Router provides enhanced functions including multiple IP addresses, IP address helper, IP BGP-4, IP Classless Inter-Domain Routing (CIDR) addressing, IP asymmetric filters, and Switched Multi-megabit Data Service. In addition, IBM announces new migration capabilities that significantly simplify the movement from earlier releases of MPNP to Release 4 with the enhanced functions.

FDDI enhancements

3172 ICP support for dual FDDI adapters increases availability by enabling separation of LAN group traffic and definition of alternate paths. Dual FDDI adapter support can separate workgroup traffic, eliminating the need for traffic-filtering. Dual adapters also enable definition of alternate routes for backup and recovery purposes.

Server access solutions–linking with optical fiber

With the enhanced support for the 9729 you can now use a single optical-fiber path to provide your parallel-processing and backup needs in a multisite environment. The 9729 provides for Sysplex Timer, OC3 protocols, network management and even a dual-fiber backup path for ensured reliability and system availability.

The 9729 enables multiple bit streams, each possibly using a different communications protocol, bit rate and frame format, to be multiplexed into a single optical fiber for transmission between locations. Up to 10 full-duplex connections of ESCON at 200 Mbps, FDDI at 100 Mbps, and now ATM at 155 Mbps (OC3) can be intermixed in any combination and the output signals transmitted over a single fiber up to a maximum distance of 50 km (31 mi).

Based on its financial advantages and its ability to enhance data security, the 9729 was selected as a ”Hot Product” by *Data Communications* magazine. The magazine states that the 9729 makes ”economic sense for corporations.”

Switches for voice integration–2220

The 2220 Nways BroadBand Switch provides the extended voice support of Euro-ISDN and Q.SIG (a standard PBX voice-signaling protocol).

An ISDN switched-connection protocol saves costs by optimizing line utilization. And you can save on equipment costs because the ISDN switched connection allows you to eliminate tandem PBXs–and that means improved voice quality. Support for ISDN in this announcement includes:

- Attachment of a 2220 Nways switch port to ISDN equipment through a PRI access line
- Attachment of PBXs, where the 2220 backbone acts as an ISDN DCE (NT2 interface)

- Attachment to a public or private ISDN network, where the 2220 acts as a DTE (network termination 1 [NT1] interface provided by carrier).

Q.SIG helps customers efficiently establish switched services in private networks. The 2220 switch will support the following functions for both ISDN and Q.SIG:

- E.164 and Private Numbering Plan
- Line-bundling
- Virtual Private Networks

Digital Private Network Signaling System (DPNSS) support is provided by a DPNSS-to-Q.SIG external converter.

Real-time Frame-Relay support means connections can carry voice traffic at a higher priority than accompanying data traffic, for an improvement in voice quality and decreased transport delays.

The 2220's capability to mix several protocol interfaces on a single adapter has been extended. Merging several protocols in the same adapter can reduce the cost of supporting multiple protocols. Each line interface can support a different protocol, such as Frame Relay, voice, HDLC, circuit emulation, ISDN or Q.SIG.

Switches for data networks–2219, 2225 and 2230

Integration of the 2230 and 2225

Routing and management of the 2230 Nways ATM Switch and 2225 Nways Multiservice Switch are now fully integrated in the same OSPF Virtual Network Navigator (VNN) domain because you can attach the 2230 with a direct ATM VNN trunk. The integration provides:

- Optimized routing
- Reduced configuration definition
- Improved network management

OSPF domain-sharing lets network operators establish permanent virtual channels (PVCs) on an end-to-end basis and routing is done hop by hop. You can now manage the 2219, 2225 and 2230 switches in the same Network Management Station.

Improved scalability

A network composed of 2230s and 2225s can now have more than 255 nodes. The 2225 and 2230 support Class B IP addressing, distributed OSPF routing and distributed client/server network management. Class B IP addressing provides a growth path for existing customer networks in a single, flat routing domain, with support for more than 255 nodes in a network. Up to 400 nodes can be supported per OSPF network.

Three new processor cards for the 2225 switch include a higher speed processor, a hard disk and additional memory to prepare for product enhancements. A new I/O module for the 2225 switch triples the T1 capacity with a single channelized DS3 port, improving scalability by connecting up to 28 T1 channels to this single port. Every DS1 logical port can be used at full 1.5-Mbps speed or

at a subrate. The logical port supports Frame Relay, PPP FRAD, SDLC transparent FRAD, direct and OPTimum frame trunks.

Improved ATM

New ATM speeds are available on the 2230 and 2225. The 2225 also now supports ATM cell-switching in addition to current Frame-Relay and ATM interworking. The 2225 can now be used as an ATM concentrator in addition to its multiservice functions.

For the 2225 switch, a new DS3 ATM Cell-Switched (CS) I/O module supports pure Cell-Switching and ATM User Network Interface (UNI) 3.0 or 3.1 PVC Point-to-Point. A new OC3c/Synchronous Transfer Mode (STM)1 ATM CS/internetworking unit (IWU) I/O module supports a single optical-fiber single-mode fiber (SMF) or multimode fiber (MMF) physical port with speeds up to 155 Mbps.

For the 2230 the OC12c/STM4 I/O module provides a single-port ATM UNI with maximum full-duplex throughput of 622 Mbps. The module contains two physical ports, one of which is used for Automatic Protection Switching. These ports comply with all (SONET) transport-level physical-layer requirements. Eight-port T1/E1 ATM UNI I/O modules provide T1/E1 ATM UNI support for low-speed user connectivity. ATM Flow Control processors provide closed-loop, hop-by-hop congestion control, which reduces congestion and cell loss and improves network utilization.

Improved Frame Relay

The 2225 Nways Multiservice Switch provides many Frame-Relay enhancements. Closed-loop congestion control improves utilization of network bandwidth, reduces congestion and reduces frame loss. Closed-loop congestion management reduces the rate of excess data coming into the network during congested periods and helps optimize use of network resources.

Flexibility in the Frame-Relay network is improved. Asymmetric CIR gives customers the ability to specify different quality of service (QoS) parameters in each direction of a Frame-Relay PVC. Zero CIR Virtual Circuits allow delivery of a best-effort service by permitting PVCs to be provisioned with assigned CIR values of 0. Frame-Relay SVC service is now supported.

A resilient Frame-Relay PVC that is already available on the IBM 2225 is now available on the 2219. The number of active ports on the 2219 is increased from 60 to 90.

Improved ISDN

New ISDN support improves remote access. ISDN PRI access to Frame Relay is available with 2225 Nways Multiservice Switch switch microcode Release 4.1. Switch microcode Release 4.2 includes this support as well as ISDN trunk backup, which allows a trunk to be defined as backup to a primary trunk for improved network reliability. And Euro-ISDN and Australian standards are supported as well as PPP multilink for aggregation of multiple B-channels into a single, higher speed pipe.

Improved routing

A new distributed OSPF scheme allows routing decision-making to be fully distributed, that is, made in the I/O processors rather than centralized in the CP. The results are a higher call-setup rate, faster re-routing and support of larger networks.

Priority-based re-routing capability allows a PVC with higher configured priority to select a more optimal path over virtual circuits configured with lower priority. Higher priority circuits will always have the best routes. Lower priority circuits can be bumped if there is not enough available bandwidth. And an OSPF delay metric allows delay-sensitive applications to be routed over least-delay

routes.

A feature for application- or customer-specific routes allows a trunk to be dedicated to a specific application or customers, which could be a base for virtual private network (VPN) implementation.

Integrated Network–IDNX

The 973x INDX feature enhancements include two new versions of the PX3 Frame-Relay packet processor card. The current PX3 card has 16 ports, and the new 4- and 8-port versions are a cost-effective way to extend the reach of the IDNX's Frame-Relay network.

Remote access

8235

More than 80% of organizations with LANs now use remote-access to improve productivity and speed project completion. With the 8235 DIALs remote-access servers and switches, customers can use standard dial-up telephone lines or digital networks to remotely access LAN resources. Three new higher density adapters for the 8235 I40 increase session capacity and lower costs.

The Dual E1/PRI adapter supports E1 service with ISDN PRI for digital and analog calls. The dual E1/PRI adapter will support a maximum of 60 calls for E1 ISDN service, of which 30 can be digital. A Model I40 at Release 4.5 or higher can support this adapter.

The Dual T1/PRI adapter, with software-selectable DSU/CSU and channelized T1 support, supports T1 service with ISDN PRI for channelized digital and analog calls. The adapter also supports channelized T1 service, without ISDN PRI, for analog calls. The dual T1/PRI adapter will support a maximum of 48 analog calls for channelized T1 service or 46 calls for T1 ISDN service, of which 30 can be digital. A Model I40 at Release 4.5 or higher can support this adapter.

The Quad T1 adapter with software-selectable CSU/DSU and channelized T1 support has 4 T1 port connections, supporting up to 96 analog calls. One adapter is supported for operating in a Model I40, which must be at Release 4.5 or higher.

Award-winning, integrated Powerburst remote-node acceleration technology increases performance on file-based applications. It is supported in the Windows 3.1 and 3.1.1 environments running the IPX protocol.

2218

The 2218 models 02E, 02T and 02X are low-cost, entry-level FRADs targeted for remote branch locations. These modular offerings provide cost-savings, easy upgradability and improved efficiency. These models can provide connectivity for up to 30 controllers at speeds up to 64 Kbps. Designed for customer setup, they support Plug and Play installation and configuration, a plus for locations with no on-site technical support personnel.

The new models allow customers with serial multipoint and leased-line protocols to take advantage of the significant cost-savings and network consolidation that are the hallmarks of Frame-Relay networks. RFC 1490 compliance means the 2218 operates with many IBM products, including the 3745 and 3746 Controllers, the 2210 Router and the 2216 Multiaccess Connector.

Customers have a choice of four different microcode options for the 2218 Models 02T, 02E and 02x. The conversion node and Frame-Relay basic functions node options provide investment protection through support of legacy protocols such as BSC, polled asynchronous and LLC. The Frame-Relay internetworking function node option provides all the basic functions plus support such as IP or IPX routing over Frame Relay and dedicated dial backup. The Frame Relay Enter-

prise function node provides all the Internetworking function plus X.25 QLLC, BSC Remote Job Entry (RJE) and Auto LLC.

Release 2.1 of the 2218 microcode is also now available as an option for 2218 Models 1xx and 3xx. Some functions are supported only on the 3xx models and require a memory expansion feature.

Wide Area Connector

The Wide Area Connector/PCI adapter is a general-purpose, protocol-independent, synchronous communications adapter for workstations and servers with PC bus slots. It provides high-speed switched and leased network connections and supports the growing need for increased WAN bandwidth. This adapter is used by many SNA and TCP/IP customers for leased- and switched-line connections over leased 56-Kbps and 64-Kbps lines. The PCI version is an extension of the existing Wide Area Connector adapter.

Expanded software support for the PCI adapter includes Windows NT and OS/2 Warp. The Wide Area Connector/PCI Adapter features include a PCI bus on a single-port, half-size card supporting multiple electrical interfaces (EIA 232, V.35, RS-422 and X.21). It supports the OS/2 2.1 or higher Windows NT 3.5 operating systems and Communications Manager/2 Version 1.11 or higher, and Microsoft Windows NT SNA Server applications.

7845 and WaveRunner

The WaveRunner PCMCIA ISDN or analog modem allows direct, high-speed remote connectivity over ISDN or standard telephone lines for laptop, notebook and other computers equipped with PCMCIA Type II slots. The 7845 NTE, for U.S. and Canadian customers, allows a PC equipped for ISDN BRI along with existing analog telephones to share a single digital telephone line in a home or office.

The WaveRunner and 7845 combination package provides a digital connection to PCs for communications over an ISDN. The WaveRunner PCMCIA Adapter provides ISDN-to-ISDN connection and also ISDN-to-analog connection and supports line speeds up to 128 Kbps and the Windows 95 operating system. The 7845 NTE supports standard analog telephone sets and custom calling features and includes standard NT1 for ISDN.

Cable On-Line

IBM continues to provide the resources you need for responsive access to the Internet and intranets and mixed data over ATM by announcing the Cable On-Line Access System.

The Cable On-Line Access System is an ATM-based system that provides high-speed data over HFC networks such as those used in the cable TV infrastructure. It consists of the IBM Cable Modem, the IBM 8034 HFC Receiver Shelf and the IBM 8260 HFC Module, which all work together with IBM's Cable On-Line software to create the complete Cable On-Line solution.

The IBM Cable Modem connects to a workstation through an Ethernet 10BASE-T connection and to the HFC network through a standard coax connection. The 8034 receives the data from the cable modem and sends it up to the HFC module in the 8260, where the access and management of the modem are controlled.

The system, which is ATM-based and utilizes SVN architecture, provides remote location access with the capacity to handle the high bandwidths necessary to run high-speed data over the HFC infrastructure.

Network management

Network management reduces the cost of operating and administering WANs and increases their effectiveness. Scalability provides the capability to manage large and small networks.

IBM offers integrated Nways Managers for WANs to save money compared with other, less integrated managers. You can reduce training requirements and alleviate personnel shortages with easy-to-use managers that increase operator productivity. Nways Managers also reduce the time to identify, find and fix performance and operational problems by offering a suite of integrated management applications that run on industry-leading platforms like NetView for Windows, NetView for AIX and OpenView.

With this announcement IBM expands the scope of its managers for Enterprise products with 2220 enhancements to the Nways Enterprise Manager and with Nways Wide Area Element Manager management of 2219, 2225 and 2230 switches.

Nways Enterprise Manager

The Nways Enterprise Manager can now manage up to two hundred 2220 switches. It provides configuration, performance, fault and accounting management for Euro-ISDN and Q.SIG resources now supported by 2220s. The management is enhanced to be protocol-oriented, which means that you can handle the resources through an ISDN view. Taking advantage of Euro-ISDN and Q.SIG network operations and configuration management on logical resources, you can show a network interface list, show status of the interface or configure a new one. You can also activate or deactivate a network interface, show and configure Bearer Service Profile information and show or create a new numbering plan table. And you can configure an entry in an origin or destination numbering plan table.

For ISDN accounting, records specific to Euro-ISDN and Q.SIG contain calling- and called-side indications, B-channel number and usage and bearer capacity requested by the caller. ISDN performance management includes these counters: ISDN access layer counters, D-channel Layer 2 and D-channel Layer 3.

This release includes management of Frame-Relay real-time resources, such as QoS, and multiple access agents in an adapter, plus the capability to switch over to a backup switch card. An audit log facility records all operations performed and their results as an ASCII file so you can create an audit trail of user operations. Problem management is also enhanced to enable you to customize shell scripts for logging used-defined event information.

Nways Wide Area Element Manager

With the Nways Wide Area Element Manager for HP OpenView, you can now manage IBM 2219, 2225 and 2230 Nways wide-area switches from a single, easy-to-use, drag-and-drop, graphical user interface. You can configure, manage faults and monitor performance of these switches.

Nways Wide Area Element Manager for HP OpenView in conjunction with Sybase SQL Server Version 11 ensures consistency and control over the network by keeping an up-to-date database simulating real-time data storage. The Element Manager uses the open and widely accepted SNMP to communicate with network devices and support both in-band (over LAN) and out-of-band (over a serial line) network connections. Nways Element Manager is a key complement to the Nways 2219, 2225 and 2230 Wide Area Switches in that it provides the configuration management necessary to set up the devices.

Summary

Together these announcements demonstrate IBM's commitment to meet the continuing challenges of WANs, with:

- A server-attach portfolio that is the most extensive in the industry with the best price and best performing access provided by the range of 3745, 3746, 3172, 2216 and OSA-2 products
- New switch enhancements that increase network capacity and add flexibility
- A remote-access product line that supports both smaller and larger remote sites
- Continual enhancements to IBM's leading-edge line of integrated Nways Managers

These products continue the delivery of functions within the SVN framework. Now more than ever before, it's a good time for network managers to look at IBM Enterprise Networking products, as the customers shown earlier did.

Benefit	**Features**
Server access solutions–3746, 2216, NCP, 3172 and 9729	
3746–Low-cost, high-performance connections leverage your investments and improve access to S/390 servers.	The 3746 Models 900 and 950 provide access from Ethernet and Token-Ring networks, SDLC, PPP, Frame-Relay, ISDN and X.25 attachments and support for ESCON channel protocols such as LSA, LCS and MPC(+) at a lower price per port. They also support 155-Mbps ATM host, campus and WAN connections for fast access to TCP/IP and SNA applications.
3746–Lower cost, more flexible Frame-Relay connections to S/390 servers.	Frame-Relay enhancements to the 3746 provide better flow control with CIR and BRS mechanisms.
3746 and NCP–Improved Internet and intranet access to S/390 servers.	The new BRS function on the 3746 enables you to reserve a specified percent of bandwidth for different IP applications using the same line. IP users can now define a backup, native IP channel interface in NCP. NCP also intends to provide internal IP routing capabilities between NCP and the 3746 Model 900 (product preview).
3746 and NCP–Frame-Relay backup over Euro-ISDN lines for improved network availability and reduced outages.	Automatic backup of SNA traffic over Frame Relay between 3746 Model 900s with new 3746 and NCP ISDN support.
3746–Increased return on 3746 Model 900 investments.	With new programming enhancements for current 3746 adapter processors (CLP, TRP2 and ESCP2), you can double APPN/DLUR sessions or adjacent PU connectivity and increase APPN/DLUR throughput up to 40%.

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Benefit	Features
3746–Low-cost, high-performance Fast Ethernet, FDDI and high-speed serial interface (HSSI) connections leverage your investments and improved access to S/390 servers.	The 3746 Models 900 and 950 intend to provide access from Ethernet 100-Mbps networks, access from FDDI networks and high-speed access using HSSI at T3 and E3 speeds (product preview).
2216 and 3746 ESCON channel– MPC(+) protocol support coupled with VTAM enhancements reduces VTAM cycles dramatically for S/390 access.	Dependent upon data characteristics and application, CPU cycle savings of up to 60% and throughput increases of 25% can be achieved with HPR over the MPC(+) protocol.
2216–Direct access to S/390 servers from a full-function multiprotocol router simplifies networks.	The 2216 ESCON adapter connects your SNA-based or TCP/IP-based applications to S/390 servers over leased lines, Frame Relay, ISDN, ATM, X.25 or LANs.
NCP–Lower networking fees.	New usage tier options offer a reduced tier price for 3745/3746 configurations. In some configurations, NCP licensing fees could be reduced as much as 50% per 3745 controller.
NCP–Increased network capacity provided through additional definition capability.	HPR flow-control improvements allow VTAM users to adjust the capacity values associated with HPR Adaptive Rate-Based (ARB) connections.
3172–Increased host application connectivity and availability plus FDDI connectivity.	The number of TCP/IP hosts a single 3172 gateway can support is greatly increased. Support for dual FDDI adapters enables separation of LAN group traffic and definition of alternate paths for increased availability. And with ICP 3.5 you can define redundant or backup paths to improve the availability of TCP/IP applications on S/390 servers.
Cost-savings by increased network availability for 9729 S/390 server connections.	The optical fiber path between sites and 9729s has a backup path. You can install a second fiber cable that can provide an alternate path if your primary path ever gets disturbed or broken.
Wide-area switching solutions–2218 Nways Frame-Relay Access Device	
Simpler, lower cost access to inexpensive Frame-Relay networks for companies with small remote offices.	The 2218 provides lower priced Frame-Relay access for smaller branches. Support for BSC and polled asynchronous protocols in addition to SDLC and LAN protocols enable branch office support from a single PVC.
Simpler networks and lower costs for companies migrating from X.25 to Frame-Relay networks.	The 2218 Nways Frame Relay Access Device now supports X.25 QLLC to SNA hosts over Frame-Relay and X.25 networks, and supports X.25 passthrough over Frame Relay.
Wide-area switching solutions with integrated voice–2220 and IDNX	

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Benefit	Features
Significant cost-savings, private voice networking and improved voice transmission quality	The IBM 2220 Nways BroadBand Switch supports Euro-ISDN for improved voice capability, line-cost savings over leased lines, and elimination of tandem PBXs. Q.SIG support improves voice capability and enables the extension of switched services to private networks as well as the encapsulation of proprietary PABX protocols. Real-time Frame-Relay support guarantees voice-quality service for traffic carried over a single Frame-Relay link. The protocol-merge capability has been extended, for increased ability to mix several protocol interfaces on the same adapter, thereby optimizing adapter use and lowering costs.
Cost-savings for small networks through network consolidation	The IBM 2220 Model 200, previewed in this announcement, plans to provide multiprotocol support in an entry-level package.
Increased capacity for IDNX networks.	Larger 20-slot Models 303 and 403.
Lowered 973x cost for entry-level configurations.	Lower priced, entry level for packet-based applications.
Wide-area switching solutions for high-speed data networks–2219, 2225 and 2230	
Improved integration and routing offer better network performance and easier management.	Enhanced OSPF routing capability allows a mixed network of 2219 and 2225 switches to take advantage of OSPF routing enhancements previously delivered in R 4.1. Improved integration of the 2225 and 2230 results in optimized route selection for high-priority connections, improved network availability and easier network management.
Enhanced ATM support improves network availability and reduces costs.	The 2230's congestion-control capability improves network utilization and reduces cell loss. The 2230 also supports a wide range of connectivity speeds from low-speed T1/E1 to high-speed OC12/STM4. The 2225 can now be used as an ATM concentrator. It also features higher speed ATM trunks.
Improved scalability means networks can grow as customer needs change.	Networks can now include up to 400 nodes. The 2225's T1 capacity is tripled and the port capacity of the 2219 is increased.
Remote-access enhancements with ISDN improve network availability.	ISDN remote-access enhancements, now extended to Europe and Australia, include trunk backup for increased availability of 2225 networks and PPP multilink aggregation for larger PPP circuits.
Enhanced Frame-Relay support improves network availability.	Best-effort service and congestion control support in the 2225 and 2230 result in better network utilization and reduced frame loss. New Frame-Relay applications such as voice over FRAD can be deployed. The 2219's Frame-Relay access offers improved backup, for greater availability.
Remote access	

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Benefit	Features
Lowered cost per port and increased capacity of a single 8235 Model I40.	A new card for the 8235 Model I40 supports 4 analog T1 connections.
Simplified networks and lower costs with a single 8235 card that supports either analog or digital ISDN connections.	New cards for the 8235 Model I40 support either analog T1 or E1 or ISDN PRI connections.
8235–Easier and less expensive remote access to company LANs.	New DIALs R 4.5 software provides enhanced support for ISDN.
8235–Capability for WIN 95 and WIN NT users to dial out to other networks or communicate LAN to LAN.	The 8235 now provides enhanced WIN 95 and WIN NT client software equivalent to other clients.
WaveRunner–Simultaneous use of ISDN (for data) and analog (for standard telephone) with a single PC card.	The WaveRunner PCMCIA ISDN or analog modem allows direct, high-speed remote connectivity over ISDN or standard telephone lines for laptops, notebooks and other computers equipped with PCMCIA Type II slots. The 7845 NTE allows a PC equipped for ISDN BRI along with existing analog telephones to share a single digital telephone line.
Wide Area Connector–High-speed switched and leased network connections.	A PCI version of the Wide Area Connector (used in many leased- and switched- line connections) includes software support for Windows NT and OS/2 Warp and initial line connection speeds of 56/64 Kbps.
The Cable On-Line Access System provides access to high-speed data services and the Internet.	The Cable On-Line Access System offers customers the advantages of high-speed data transmission with advanced ATM-based MAC, as well as the assurance of secure, private communication.
Network management	
Lower cost and increased network availability by providing a comprehensive view of what's happening to networks and the applications using them.	Integrated Nways Managers with uniform graphical interfaces make it easier and less expensive for network managers to configure and operate their networks. The Nways Enterprise Manager is enhanced for new 2220 support. The Nways Wide Area Element Manager provides management of the 2219, 2225 and 2230 Nways switches across platforms. The Nways Wide Area Element Manager provides configuration capability and enables you to monitor performance and manage faults for these switches.

Positioning	Features
Server Access Solutions	

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Positioning	Features
3746 Models 900 and 950	The 3746 Model 900 consolidates multiple 3745s, reduces cost of operation and provides S/390 server access for networks migrating from subarea SNA to APPN/HPR or relying on IP for transport. The 3746 Models 900 and 950 are high-connectivity, high-throughput APPN/HPR network nodes and IP routers. Operating independently of NCP, the 3746 Model 950 provides a cost-effective S/390 access to SNA, APPN/HPR and IP networks. With today's announcements the 3746 will be able to act as a DLSw partner to network routers in addition to supporting new connectivity. Customers can leverage their current investments in these controllers with the impressive price-performance of the multiaccess enclosure for increased connectivity options including ATM, improved WAN routing and enhanced capabilities for IP and Frame Relay. IBM intends to evolve the enclosure to support new connectivity including Fast Ethernet, FDDI and HSSI and to provide TN3270E support. And a no-charge, direct, native attachment of the enclosure to the 3746 Nways Controller switch will enhance performance and free Token-Ring hardware.
ACF/NCP V7R5 Service Update	The 3745 along with NCP provides connectivity for the large quantity of lines found in established SNA networks. Customers should consider the ACF/NCP V7R5 service update if they are investing in IP or HPR technology on the 3745 or are using a 3746 Model 900.

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Positioning	Features
2216 Model 400	The 2216 Model 400 provides ATM and ESCON connectivity to servers running multiprotocol applications. Optimized for high-speed WAN connectivity, the 2216 is well suited for linking switched campus networks and moderate-size WAN networks to TCP/IP and S/390 SNA applications. The 2216 Model 400 is a gateway for smaller locations where use of 3746 models isn't appropriate. In addition to its industry-leading, price-performance ESCON support, the 2216 also provides ATM and LAN attachment to S/390 servers. Customers should consider the 2216 as a cost-effective ESCON- or ATM- attached S/390 gateway for: • TCP/IP applications transported across a router-based network • A DLSw partner for routers transporting SNA applications across an IP network • A host-attached DLU server providing APPN connectivity and flexibility to dependent devices • An effective S/390 attachment for networks that have migrated to APPN/HPR • Back up of a failed 3745/3746 • An upgrade from 3172s
3172 ICP	The 3172, along with ICP, provides IP and SNA application access from LANs to ESCON or parallel-channel-attached S/390s. The new enhancements are especially important for customers who require a LAN gateway and have one or more of the following attributes: • Multiple 3172s installed and want to continue with the same technology • Current LAN gateway needs demanding connectivity unique to the 3172–parallel channels or FDDI links • Data center requesting that all channel-attached devices have a physical unit appearance to VTAM to support NetView/390 management • Multiple TCP/IP host designation function wanted as an addition to the present 3172/ICP gateway

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Positioning	Features
9729	Customers who have or plan to have multiple data centers or have LAN interconnect requirements should consider the 9729. With the trend of multiple data-center enterprises to increase their emphasis on implementing backup and recovery solutions, the 9729 plays a vital role in providing cost-effective communications solutions. It has high reliability, very low preventive maintenance requirements and virtually no limitations to providing new protocol support (I/O adapters). Customers should also consider the 9729 if they are a provider of fiber to customers who require high-bandwidth communications between multiple sites located less than 50 km (31 mi) apart. Fiber providers can exploit the use of their installed base of single-mode fiber to provide their customers with a total solution for their customers' communication needs at very competitive prices. The 9729 gets even better with OC3 support and Sysplex Timer and backup capability.
Wide-area switching solutions	
Wide-area switches–data networks	IBM offers end-to-end SVN solutions for IP, IPX and SNA networks. For example the 2225 and 2220 provides pure data integration for customers who want to build a Frame-Relay network and attach SNA or IP traffic through a single network interface. PPP connections to Frame-Relay and ATM networks is also possible.
Wide-area switches–integrated networks	The 2220 is an excellent choice for networks that require both voice integration and guaranteed QoS. The 2220 is designed for customers who need to integrate voice, batch, real-time and multimedia traffic. It also supports customers who need fixed-rate and bursty traffic and traditional, lower speed applications. The 2220 also provides Frame-Relay support through shared use of an NBBS backbone for integrating voice and video as well as data. The 2220 provides real-time Frame-Relay support for customers who want to use external OEM devices to carry voice over Frame Relay. The previewed 2220 Model 200 will reduce the cost of entry and extend multiservice access to small establishments and regional offices. Customers with legacy interfaces can benefit from the multiservice connectivity offered by IDNX. And IDNX integrates with other backbone networks such as ATM and ISDN.

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Positioning	Features
Wide-area switches–ATM networks	Customers who want a high-speed ATM backbone switch can derive significant benefits from the 2230. Designed for public or private networks, the 2230 provides standards-based ATM WAN services. Because the 2220 can operate as both a pure data switch and as an integrated voice-video switch, customers can use it with their current leased-line network as they gradually move toward ATM. The 2220 is an excellent ATM access switch that can be used as a building block for a new network that includes ATM switching. Customers who want to combine Frame Relay and ATM over a single network to help reduce network operating and management costs and who want to migrate current networks to the benefits of SVN and ATM will be interested in the Nways Wide Area Switches. The 2219, 2220 and 2225 provide a migration path from Frame-Relay to wide-area ATM connectivity.
Remote Access	
8235	The 8235 DIALs Remote Access Server and Switch family is intended for the smallest organizations to the largest enterprise whose employees need casual to full-time access from remote locations to their LAN-attached resources. It is also intended for companies whose business partners or customers are given access to the company LAN. The Model I40 DIALs Switch provides a fully integrated solution for mission-critical, large-scale, remote-access applications. It is ideal for central sites that have hundreds of dial-in users, including corporations and Internet Service Providers (ISPs). The 8235 fixed-port models are high-performance, remote-access devices that enable corporations to link telecommuters (client-to-LAN) to headquarters LANs and public networks with all the functionality and ease of a direct network connection. Remote users can get to the office network from any location using either analog or digital dial-up phone service.

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Positioning	Features
2218	The 2218 provides a migration path for customers who want a low-cost solution for moving toward networks of the future. It offers upgradable models for remote branch office environments. It is scalable to meet the needs of a branch office with various connectivity options and is an excellent entry-level solution for optimizing Frame-Relay access to remote branch networks. It provides an alternative to a router-based solution for configurations that are mainly hierarchical and have little branch-to-branch traffic.
Wide Area Connector	Customers who have a Wide Area Connector and are looking to move to PCI machines or use SNA and TCP/IP with leased- and switched-line connections over leased 56-Kbps and 64-Kbps lines will be interested in the Wide Area Connector/PCI adapter. It is extremely successful in the banking segment and has great potential to expand into transportation, insurance and medical business segments because they use similar network structures.
7845 and WaveRunner PCMCIA Combination Offering	The 7845 and WaveRunner PCMCIA Combination Offering, with the addition of Windows 95 support, is an outstanding remote-access adapter. It allows you to use all your current applications while providing the fastest connection line-speed support. The 7845 also allows use of an analog telephone over one channel while data is transmitted over the other channel.
Cable On-Line Access	The Cable On-Line Access System is a key component of the complete end-to-end solution for networking systems in an HFC environment. It fits the needs of traditional HFC network operators, as well as providing a solution for organizations that require high-speed data services such as Internet access, remote learning applications and high-speed graphical and information exchange for remote users.
Network Management	
Nways Enterprise Manager	Nways Enterprise Manager provides, on the same management station, three management applications for customers who need to manage networks of 2220 switches, routers and 3746 controllers. With router management, this solution handles SNMP management of networks that consist of routers, bridges and controllers. By including switch management, it also handles 2220s with ATM applications. These three programs are packaged in a single image to order and install.
Nways Wide Area Element Manager	The Nways Wide Area Element Manager is a network management application that customers need for configuring the IBM 2219, 2225 and 2230 Nways Wide Area switches. It also provides fault management and performance monitoring of these switches.

For more information

This Fact Sheet is an overview of the 11 March 1997 Networking announcement of Enterprise products and solutions. Some products may not be announced in your country. Refer to product announcements for your specific country or contact your local IBM representative or IBM Business Partner.

This Fact Sheet, along with related Fact Sheets supplying more details, can be obtained from IBM networking resources and databases. You can also access this information on the IBM Networking Home Page at `http://www.networking.ibm.com`.

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