

NETWORK WORLD

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Racal unit unites rival LAN worlds

By Laura DiDio
Senior Editor

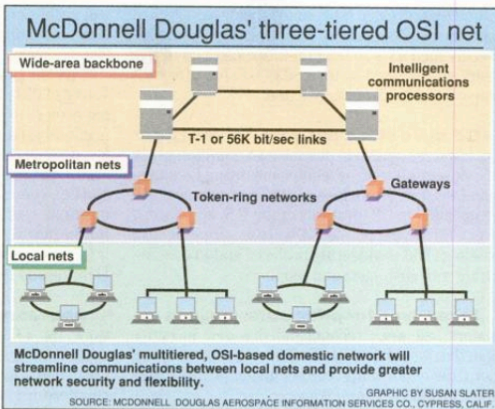
BOXBOROUGH, Mass. — Racal InterLan last week beat other vendors to market with a product that integrates Novell, Inc.'s NetWare and OS/2 LAN Manager environments.

LMN Server will enable NetWare users to access LAN Manager servers as if they were NetWare servers. Workstations in LAN Manager environments initially will only be able to copy files from NetWare servers.

Racal InterLan said the software, which runs on an OS/2 LAN Manager server, is available now. By contrast, Novell last month announced plans to forge a link between NetWare and LAN Manager by supporting the Named Pipes programming interface. The company will not ship its NetWare Requester for OS/2 until the first quarter of 1990 ("Software lets Novell users support OS/2 applications," *NW*, July 31).

Jim Fennessey, director of information systems and services at Johns Hopkins University's School of Public Health in Baltimore, a beta user of LMN Server, said this type of product is becoming a necessity for organizations with heterogeneous nets.

"Short-term, I can support
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McDonnell Douglas builds hierarchical OSI network

New architecture promises to reduce number of data links between sites, improve net security.

By Wayne Eckerson
Staff Writer

CYPRESS, Calif. — In an effort to streamline internal communications, McDonnell Douglas Corp. has begun building a three-tiered domestic network based on Open Systems Interconnection standards.

The new hierarchical architecture is expected to increase network flexibility, reduce the number of data links between company sites and improve network security, according to Lionel Gillerman, manager of network technology at the aerospace company.

The network, which is scheduled for completion next year, will replace a tangled web of circuits that is becoming increasingly unmanageable as users connect with a growing number of local networks, according to Gillerman.

"If we hadn't done something soon, we would have had a mish-mash of circuits, networks, protocols and hardware akin to a Tower of Babel," he said.

The architecture will feature a wide-area backbone network interconnecting a series of metropolitan networks and scores of
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IBM refines NetView, closes Siemens deal

NetView gets graphic interface, PBX links.

IBM outlines plans to merge 9751, Saturn.

By Paul Desmond
Senior Writer

NEW YORK — IBM last week teamed up with other vendors to expand its line of NetView-related products, adding a long-awaited graphical user interface and support for a wider range of private branch exchanges.

IBM said at a press conference here that it acquired a graphical user interface developed by US West Network Systems, Inc. (NSI). IBM also announced it will market third-party NetView/PC application development software and a NetView/PC-based package that forwards alarms to NetView from a range of PBXs.

In addition, IBM expanded its customer network support program to include network design, construction and operation. Previously, IBM would assume responsibility only for problem tracking and resolution, said Ellen Hancock, vice-president and general manager of IBM's Communications Systems division.

Users and analysts were split on IBM's third-party NetView alliances. Some said the announcements indicate that IBM's internal development is stalled, but others applauded the company for seeking help to make needed
(continued on page 58)

By Bob Wallace
Senior Editor

NEW YORK — IBM and Siemens AG last week finalized their Rolm PBX partnership and outlined their product strategy and distribution plans.

The consummation of the alliance, originally announced last December, capped eight months of user uncertainty and confusion during which IBM and Siemens said many of their customers halted or delayed private branch exchange purchase decisions.

The signing of the deal comes just one week after IBM introduced a series of products and enhancements for its flagship 9751 PBX line. The announcements included enhanced switch software and a new low-end model of the 9751, as well as new T-1 and Inte-

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User weighs 3+Open for LAN venture

By Paul Desmond
Senior Writer

DANBURY, Conn. — A task force within Union Carbide Industrial Gases, Inc. has recommended that the company adopt 3Com Corp.'s 3+Open LAN Manager as the foundation for a major local network project.

Although details of the project are still being finalized, the company plans to install nearly 20 token-ring networks based on LAN Manager to support some 1,200 workstations at several sites. The nets will be linked to a corporate-wide X.25 backbone.

The local net operating system was recommended because it will allow Union Carbide Industrial Gases to build client/server-type applications that distribute processing between workstations and servers, said Bryce Morgan, manager of communications.

3+Open also fits in with the company's plan to migrate toward Open Systems Interconnection net standards. Version 1.1 of
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NETLINE



USERS FEAR LABOR strikes against four RBHCs could thwart major networking projects. Page 2.

ASHTON-TATE'S dBase IV program for SQL Server is delayed again, and company finances grow worse. Page 2.

USERS SHIFT EDI TRAFFIC to private nets as they become

more dependent on trading electronically. Page 4.

UNDERSEA CABLE OUTAGES have users questioning cable reliability and rethinking international net strategies. Page 5.

HP'S DAN WARMENHOVEN discusses his company's role in today's networking market. Page 41.

FEATURE

HP: pilgrimage to profits on rocky, 'open' road

By Bruce Guptill
Features Writer

In a world of conflicting connectivity theologies, Hewlett-Packard Co. has chosen to follow the prophets — and profits — of the Open Systems Interconnection model.

The company was among the first to embrace the philosophy of openness; it announced support for OSI in 1985. At that time, migration of its product development from proprietary operating and processing sys-
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NEWSPAPER

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

"If OEM sales volumes [of OS/2 LAN Manager] aren't satisfactory by mid-1990, Microsoft will have to reevaluate its position and consider complementary distribution methods."

Mike Murray
Director
Networking Business Unit
Microsoft Corp.
Redmond, Wash.

Netnotes

Novell, Inc. has certified disk drive maker **Priam Corp.**'s external and internal storage subsystems for use with its Advanced NetWare and System Fault Tolerant NetWare 286 Version 2.15 network operating systems. Novell tested and approved more than 50 storage subsystems ranging in size from 45M to 330M bytes. Priam said its drives are Novell-ready, meaning they are outfitted with a defect map that instructs the network operating system of nonusable storage addresses on the hard disk. Previously, NetWare users were required to use Compsurf, a Novell disk utility to spot disk drive defects. Priam said it will also support future versions of NetWare, including NetWare 386.

IMC Networks Corp. recently announced a hub to connect workstations fitted with Ethernet local network cards to an Ethernet backbone in a star topology.

The PCnic Basket hub, in its basic configuration, contains a mainboard card, an attachment unit interface that connects the backbone to the hub and a two-port interface card supporting connection of two workstations to the hub. As many as four additional two-port interface cards can be added to the hub, supporting a total of 10 workstations.

PCnic Basket hubs can be stacked for multiple connections to the Ethernet backbone. The hub supports connection of thin or thick
(continued on page 24)



Apple's Morris Taradalsky

Potential buyers point out Mac's network gains, flaws

Connectivity announcements heighten popularity.

By Sarah Vandershaf
West Coast Correspondent

ORLANDO, Fla. — A number of the 350 information managers who attended a recent Apple Computer, Inc. seminar here said the vendor's June networking announcements have helped make Macintoshes viable additions to corporate networks.

Seminar attendees, many of whom were evaluating whether to buy their first Macintosh systems, said Apple's introduction of a Macintosh token-ring interface and its support for network standards have helped buoy Apple's credibility among corporate buyers.

One potential Macintosh buyer, an MIS manager who requested anonymity, said employee demand for Macintoshes is making him look more closely at Apple's networking offerings.

"People look at Macs and say, 'I'd love to have that,'" one MIS manager said.

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"People look at Macs and say, 'I'd love to have that,'" he said of the microcomputer's user interface. Until now, however, the lack of practical products to tie Apple devices to mainstream Ethernet and token-ring networks has taken precedence over user pleas for the hardware, the MIS manager said.

Morris Taradalsky, vice-president of customer service and information technology for Apple, said that for most users of IBM networks, the "most significant issue has been the lack of token-

ring connectivity, which [we have] addressed with our TokenTalk NB Card."

While many show attendees agreed with Taradalsky, some users said Apple has some holes in its current connectivity strategy.

Waiting for action

Action Products International, Inc. of Ocala, Fla., which manufactures and imports aerospace-related novelties such as freeze-dried "astronaut ice cream" for museum gift shops, would like to combine the graphics capabilities of its 15 Macintoshes with the company's accounting, inventory and sales data bases residing on an IBM System/36 minicomputer to produce sales graphs, price lists and a product catalog.

John Sible, who manages Action Products' network, is considering two networking alternatives. Apple's TokenTalk NB Card would allow him to connect the Macintoshes over a token-ring net with the System/36. But he would either have to buy a \$1,250 interface for every Macintosh or buy one card for a Macintosh and dedicate it as a server — an expensive move either way, he said.

The other option would be to purchase a protocol converter and terminal-emulation software for each Macintosh, which would cost \$1,295 for the whole setup.

Although both options would only support AppleTalk's 230K bit/sec transmission speed, the limitation does not deter Sible. The Macintoshes would communicate mainly with the System/36 rather than with one another, so the higher 4M bit/sec speed of TokenTalk would not be essential, he said.

But Sible believes that Apple could offer a better option than the two from which he must now choose. If Apple were to add 5250 terminal emulation to its
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Microwave technique extends E-net links

NEARnet, vendors devise way to split signal to allow distances of up to 8.6 miles between nets.

By Laura DiDio
Senior Editor

BOSTON — Members of the fledgling New England Academic and Research network (NEARnet) and two vendors have developed a way to double the reach of a single microwave span used to link remote Ethernets.

The technique enables users to link Ethernets at distances up to 8.6 miles while retaining compatibility with the IEEE 802.3 specification.

Previously, microwave could only be used to bridge Ethernets at distances up to 4.3 miles without using relays.

NEARnet, formed in late 1988 by Harvard University, Boston University (BU) and the Massachusetts Institute of Technology, is a nonprofit regional net that will eventually support connections to similar nets in six states.

The group currently has 12 members located in a 50-mile radius. Besides the university founders, other NEARnet members include Digital Equipment Corp., Thinking Machines Corp. and Encore Computer Corp.

Twelve-mile link

NEARnet and Microwave Bypass Systems, Inc. technicians recently linked MIT Lincoln Laboratory's Ethernet with the school's main campus network in Cambridge, Mass., 12 miles away via a microwave connection using only one repeater.

The 12-mile link, which supports a full 10M bit/sec Ethernet bandwidth, uses a single repeater between the two campuses that breaks the transmission into a

four- and an eight-mile segment.

The microwave technology enabled NEARnet to cut its network costs by about 40% over traditional microwave techniques, which would have required another hop, according to Kent England, director of networks and systems engineering at BU and a cofounder of NEARnet.

Further, unlike dial-up and leased-line services, users that purchase microwave equipment only incur onetime purchase costs, rather than recurring monthly usage charges.

Traffic patterns

NEARnet engineers developed the microwave link with Microwave Bypass of Braintree, Mass., and Cisco Systems, Inc. of Menlo Park, Calif. They discovered a way to extend the microwave reach by splitting a 23-GHz microwave signal into two channels and devoting each channel to one-way data traffic, one channel to send and one to receive, according to Microwave Bypass President David Theodore.

Microwave is inherently a full-duplex medium, capable of simultaneously sending and receiving data packets. But the 23-GHz radios have enough capacity to support two 10M bit/sec Ethernet channels, Theodore said.

With ordinary full-duplex microwave links that exceed four miles, the data transmission delay surpassed the maximum allowed by the IEEE 802.3 standard.

Consequently, users experienced undetected collisions that
(continued on page 24)

HLS unveils file servers, software

By Susan Breidenbach
West Coast Bureau Chief

MOUNTAIN VIEW, Calif. — Hughes LAN Systems (HLS) recently unveiled a new line of file servers and protocol software that expands the workstation types and cabling options the firm supports on local networks running Novell, Inc.'s NetWare 2.15.

Software drivers built into the new servers support HLS' broad-

band Ethernet and token-ring adapters, as well as Novell's NE2000 Ethernet and NL1000 AppleTalk boards. This lets users mix and match four cabling options, and attach Macintosh work groups as well as personal computers to HLS local networks.

The new 4450 and 4460 servers, which come with NetWare 2.15 installed, are based on Intel Corp.'s 25-MHz 80386 microprocessor. Novell's NetWare For Macintosh, a server-based application that provides NetWare services to Macintosh workstations, is available from HLS as an option for the 4460.

The two servers are available in a total of seven models ranging in price from \$8,995 to \$17,995.
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HLS unveils file servers, software

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The minimum configuration is a 4450 with 2M bytes of system memory and a 383M-byte hard disk, while the high end is represented by a 4460 with 8M bytes of random-access memory, dual 383M-byte hard drives and a 150M-byte tape backup drive.

The 4450 and 4460 join HLS' existing 4430, which has a 16-MHz 80386. HLS has discontinued the 4430 but will continue to support it with software upgrades to new versions of NetWare.

Protocol moves

HLS' new Linc/PS2 software, a DOS application that runs in workstations, provides support for IBM's Micro Channel Architecture-based Personal System/2s. The software includes drivers for Western Digital Corp.'s Micro Channel EtherCard Plus adapter and IBM's Micro Channel broadband board.

The new Linc/PS2 software is an extension of HLS' Multiple Protocol Architecture (MPA), joining the Linc/PC software for workstations based on IBM's original Personal Computer architecture. The Linc line of MPA software puts multiprotocol support in the workstation, rather than in the server or gateway.

According to K.C. Clawson, manager of HLS' personal computer product line, there are performance gains to be had by distributing the protocol processing out to the workstations rather than handling it on gateways or with server-based protocol

multiplexing.

"The Linc software in the workstations is what makes our servers really fly," Clawson said.

The basic Linc/PC and Linc/PS2 packages support Novell's Internetwork Packet Exchange (IPX) transport protocol and can be enhanced to support optional protocol stacks, including Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s Local Area Transport (LAT), IBM's Data Link Control (DLC) and HLS' proprietary LocalNet 2000 transport protocol.

"Our goal is to eliminate gateways as much as possible," Clawson said. Gateways are costly, represent both a performance bottleneck and a single point of failure, and often make protocol translation errors, he added.

Separately, HLS also reduced prices on its Multiple Protocol Terminal Server family by 10% to 50%, and enhanced the product line with two new options.

Users can now purchase "read-only memory-loaded" terminal servers which can store the terminal's operating software in erasable programmable ROM chips. HLS' existing terminal servers must boot up across the network from a dedicated DOS-based personal computer containing the operating software and running a downline-load protocol.

The second enhancement is a third protocol stack for the Linc/Term multiprotocol software that runs in the terminal servers. Users can now add HLS' LocalNet 2000 protocol to the TCP/IP and LAT protocols already in the Linc/Term software. **■**

Netnotes

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Ethernet and coaxial cable.

Interface cards that support twisted-pair and fiber-optic cable will be available in the future.

The basic PCnic Basket configuration, including power supply, costs \$1,395, and each extra two-port interface card is \$450. With the full configuration of five two-port cards, PCnic Basket costs \$2,995.

The PCnic Basket hub will be available at the end of September. IMC Networks can be reached at 1342 Bell Ave., Unit 3E, Tustin, Calif. 92680, or by calling (714) 259-1020.

Standard Microsystems Corp. recently introduced an internal four-port hub for Arcnet in versions for coaxial cable or twisted-pair wire. The hubs fit into any IBM Personal Computer and do not require an external power source. As many as four hubs of either type can be daisy-chained in a single Personal Computer without use of external ports.

Each hub can support 2,000 feet of coaxial cable or 400 feet of twisted-pair cable between networked devices. Hubs include diagnostic displays at each port for fault isolation.

In addition, the twisted-pair hub has a display showing if the wire's polarity has been reversed during installation.

The coaxial hub is priced at \$295, and the twisted-pair version costs \$345.

Standard Microsystems' Systems Products Division can be reached at 35 Marcus Blvd., Hauppauge, N.Y. 11788, or call (516) 273-3100.

Ten X Technology, Inc. last week introduced the Optical Conversion Unit (OCU) for a Write Once, Read Many (WORM) optical disk, which can be used to permanently back up network application programs.

The OCU makes a WORM disk appear as a Winchester drive to a server so the disk can be read without software drivers.

Although the data stored on WORM disks cannot ordinarily be altered, the OCU is able to relocate blocks of data on the disk so stored applications can be updated.

The OCU is priced at \$1,295 and is available now.

Ten X Technology can be contacted at Bldg. 3, Suite 3200, 4807 Spicewood Springs Road, Austin, Texas 78759, or call (800) 922-9050 outside Texas or (512) 346-8360 inside Texas. **■**

Microwave technique extends E-net links

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randomly destroyed data packets and adversely affected network performance, England said.

Splitting the transmit and receive signals was a surprisingly simple and feasible matter, he said. Users no longer are constrained to the single-hop, 4.3-mile limitation and can transmit data at the 8.6-mile maximum distance of microwave while conforming to 802.3.

Once the signal passes through Microwave Bypass Etherwave Transceiver — a local net-to-microwave interface — it goes through a router that joins the channels for full-duplex transmission across the local Ethernet.

"We had this crazy idea that it was technically possible to extend the distance between remote local Ethernets beyond the four-mile point and at the same time avoid undetected collisions," BU's England said.

Splitting the signal, however, did create a small problem. Internetwork routers, which are used to direct traffic among remote Ethernets, do not recognize one-way data traffic. Routers are traditionally configured to send and receive all information about data packets on one Ethernet line.

So Cisco Systems, which supplies many of the routers for NEARnet, modified the software on its AGS/2 internetwork router to understand and accept the two separate one-way, serial-line Ethernet signals, England said.

"The trade-off is that we've had to use two Ethernet interfaces on each router to achieve the equivalent full-duplex transmission path," England said.

Breaking ground

Doug Gold, manager of communications industry research for local networks at market research firm International Data Corp. in Framingham, Mass., said users have traditionally shied away from running Ethernet transmissions over microwave because they didn't think it could get the full 10M bit/sec Ethernet speed.

"This not only proves them wrong, but it breaks new ground. It lets users transfer huge amounts of data over previously impossible distances within seconds," Gold said.

With the trial of the new microwave technology, NEARnet becomes the first network to extend the distance between Ethernet segments up to eight miles, England said. **■**

Potential buyers point out Mac's gains

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Coax/Twinax Card, "that would be the ideal solution for us," Sible said. Currently, Apple's Coax/Twinax Card only supports 3270 emulation.

Chemical reaction

Gary Turner, systems analyst for the Latin American division of Dow Chemical Co., is looking to use Apple networking products to integrate IBM Personal Computers into a Macintosh network.

The division, based in Coral Gables, Fla., bought 17 Macintoshes for word processing in February, opting for them over DOS-based personal computers primarily due to the Macintosh graphical interface, Turner said.

"We're seeing a large proliferation of IBM [Personal Computers] on Token-

Rings," Turner said. "My gut feeling is that we're going to have to tie [the Token-Rings and the Macintosh nets] together eventually."

The Macintoshes are networked to one another over phone wiring using Berkeley, Calif.-based Farallon Computing, Inc.'s PhoneNET. They access the division's IBM mainframe through MacIrma 3270 terminal-emulation boards supplied by Digital Communications Associates, Inc. of Alpharetta, Ga.

Turner has not yet decided on a strategy for doing this. But if in the future the division implements token rings with IBM Personal Computers as well as AppleTalk networks of Macintoshes, he may link them via a gateway.

Turner said he may eventually use one of Apple's Ethernet or token-ring adapters to connect the Macintosh systems to a faster local network in order to allow Macintoshes to access a data base. **■**

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