

Datapro

Communications Perspective

Technologies, Systems, Strategies

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Network Management: What Will OSI Do for You?

What will OSI network management do for you? The answer to that question depends on whether you are a user or a vendor.

What OSI Management Means to the User

For users, OSI promises to solve the nightmare of monitoring and controlling thousands of diverse devices that make up large heterogeneous networks—devices purchased over the years from lots of different vendors. Some of these devices may already pass alerts to localized network management products but, of course, these disparate network management systems can't communicate with one another.

And so, the beleaguered network manager looks toward standards to provide one common management protocol (actually, the Common Management Information Protocol, or CMIP) to enable all types of devices to forward alerts, events, etc. to one integrated network management system that talks CMIP.

Can OSI management really fulfill these promises? When will this really happen? Will users be able to afford it when it does?

OSI management will provide a much needed starting-point for developing integrated multivendor network management. Actual vendor implementations will differ, and it will inevitably require some tweaking to make different OSI implementations run as one system. Users should expect difficulties, particularly with the initial product implementations.



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OSI Network Management

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Pure, honest-to-goodness OSI management will not happen within the next few years. When it does arrive on the market (if indeed it does), it will not be cheap. But then, neither is any form of comprehensive network management. Operating a large network without effective network management is even more expensive, however, in terms of downtime, repair costs, and lost revenue.

What OSI Management Means to the Vendors

OSI network management means something very different to vendors. Vendors are *not* pursuing OSI because they "believe in standards," although they might try to convince users of that. Vendors are *not* primarily motivated by the desire to enable their customers to manage *all* disparate devices and connect to *all* other network management systems. Current OSI-based network management products (including those on the drawing boards) cannot do that now—each vendor's CMIP implementation is different, and the standard is still subject to change. More important, CMIP only defines *how* management information is transferred—not *what* it looks like. OSI standards on information content have not even reached working draft stage and will not approach finalization for several years. True interoperability and management can only oc-

cur after information content guidelines are established.

Finally, most vendors are not primarily motivated to pursue OSI management because their *current* commercial customers are demanding it, although this is certainly a secondary factor. (An important exception, of course, are government users seeking GOSIP compliance.) The U.S. economy is cooling down, and commercial customers are experiencing increased financial pressures to keep their networks up and running as inexpensively as possible. They need immediate, affordable solutions. Although many commercial customers are looking into OSI, price and functionality are still higher on the list of immediate customer demands.

Why Are Vendors Rallying around OSI Management?

Vendors are building OSI support into their products because they believe it will make them money. That sounds obvious. What is not obvious, perhaps, is *how* OSI will produce revenues for each vendor.

In general, OSI management will allow network management system (NMS) vendors to penetrate new markets. To a lesser degree, OSI will enable vendors to bolster their presence in existing weak markets. OSI management will also enhance platform credibility and cut development costs by giving vendors a partially predefined platform on which to build their products.

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VSAT Market's Strength Draws New Entrants

After a period of consolidation, the VSAT services market is once again expanding. With the market projected to grow between 75 and 100 percent a year until the mid-'90s, new vendors are now entering the market. In May, two communications veterans—Racal-Milgo SkyNetworks of Charlotte, North Carolina and Williams Telecommunications Group (WTG) of Tulsa, Oklahoma—announced that they were offering shared-hub VSAT networks for the first time. Racal-Milgo, a strong contender in the data communications market, offers a broad line of digital, analog, and fiber optic systems including T1, statistical, and subrate time division multiplexers; modems; network management systems; digital service units; packet network systems; and data encryption devices. Williams Telecommunications Group, best known as a long-distance (interexchange) fiber carrier, holds membership in the National Telecommunications Network (NTN) and has access to all of NTN's 16,000-mile fiber network. It has a degree of in-house experience with VSAT networks, having operated its own dedicated network for 18 months.

Racal-Milgo SkyNetworks is a joint venture with Telecommunications Enterprises, Inc. (TEI) of

Charlotte, North Carolina. The partnership announced that it signed a contract with American Express subsidiary Information Services Company (ISC) to establish VSAT networks for First Data Resources and Cable services, two of its business groups.

SkyNetworks' plans include the construction of 80 to 100 regional shared hubs to provide turnkey VSAT network services nationwide. The hubs, to be owned and operated by SkyNetworks, will be constructed at sites provided by so-called anchor customers. The vendor will share revenues generated by the hubs with these major customers, which are expected to attract other users to the service. Services will be offered to customers headquartered within 50 to 100 miles of the hubs. SkyNetworks believes that the large number of hub sites will help to attract customers, because long terrestrial connections from customers' premises to the hub sites will be unnecessary. SkyNetworks will design, install, and manage the networks. A monthly fee for the service will vary according to customers' traffic requirements and will be quoted for five-year periods. If completed as proposed, the network will be the largest VSAT network yet constructed or planned.

An issue that will affect the growth of SkyNetworks is the availability of Ku-band satellite capacity. All domestic satellite operators have made it clear that the present oversupply of transponder space will not continue beyond the next few years. When a network of SkyNetworks' projected size is added to already forecast demand, it is clear that additional satellite capacity will be needed. The availability and cost of this capacity will have a direct effect on the company's growth.

WTG's VSAT Network is a Ku-band shared hub service for point-to-point and point-to-multipoint communications within the continental U.S. at rates from 9.6K to 2.0M bps. Shared hub customers are connected to the company's Tulsa or Des Moines hub facilities over WTG's fiber optic network. The Des Moines site is expected to be operational in third-quarter 1989. Access is available from any metropolitan area reached by the fiber network. The network is owned and operated by WTG and network activity is monitored and managed from WTG's Network Control Center in Tulsa. Point-to-point customers' sites are connected directly over the satellite.

WTG will also construct dedicated hubs for large customers.

If its fiber optic network customers choose to take advantage of WTG's VSAT service, the company should do reasonably well. An added benefit for WTG is its long experience in the energy field—energy companies are among the largest users of VSAT-based networking. WTG's technical expertise and experience in running its own VSAT network should also help the company.

Aside from questions regarding the character of the VSAT market, both WTG and SkyNetworks face technically and financially formidable competition. Among the vendors competing for VSAT network contracts are AT&T, Contel ASC, GTE Spacenet,

Hughes Network Systems, Scientific-Atlanta, and a number of smaller, regional vendors. These vendors are well established in the market and will be difficult to dislodge.

With the market projected to grow between 75 and 100 percent annually, however, there is much opportunity to capture new customers. Racal-Milgo's start-up costs are going to be very high—construction of a shared hub can cost more than a million dollars. While Racal-Milgo is strong financially, it will have to build its customer base rapidly to recoup its initial costs. It is not yet clear whether the company plans to reduce start-up costs by installing "mini-hubs," small aperture terminals with somewhat less capac-

ity than typical shared hubs. WTG's challenge is to leverage its existing base of fiber network customers, convincing them to add VSAT capabilities for sites not reached by its fiber network. It remains to be seen whether potential customers will see any benefit in sending their data long distances over a fiber network to reach WTG's uplinks.

The entrance of these vendors into the market is a strong indicator of the vitality of the VSAT network services industry. It is clear that it has passed its difficult adolescence and has gained the confidence of American business. As AT&T's Karl Savatiel said at a recent industry conference, "The business is for real. The opportunities are out there."

—Tim McElgunn

Choosing a Communications Consultant

If your company is experiencing difficulty in designing, implementing, and/or converting a communications network, where do you turn? Communications consultants may provide the answers. Companies can retain consultants' services for as little as two days or for as long as several years, according to their needs and resources.

What circumstances might necessitate hiring a consultant? Answers range from changing software packages to automating billing procedures, from implementing network management to revamping a telecommunications system. Other services that consultants provide involve evaluating current computer systems; handling inventories; selecting new facilities; attaining optimum network performance; controlling costs; integrating operations in conjunction with management and corporate objectives; and providing the facilities and personnel for training your staff.

Determining the actual need for a consultant requires careful planning and assessment. One consideration is the potential long-term savings by retaining a consultant. Also, it must be determined that the in-house staff cannot handle the job on its own. In addition, an impartial assessment should be performed to see if, in actuality, a problem requiring a consultant exists.

Also, ask the following questions: Will money ultimately be saved by upgrading an existing communications system? Is it better to expand your staff rather than bring in a consultant? Are new ideas and techniques necessary? Did your firm initially attempt the job in-house? Are specialized skills, such as knowledge of Integrated Digital Services Network (ISDN), needed? Is a consultant needed to help your firm meet deadlines?

Once you have determined the need for a consultant, selecting one is the next step. Consultants

can be chosen for their applications specialty (e.g., banking, health care facilities, or manufacturing) or for their specific technological specialties (e.g., voice messaging, PC communications, or Electronic Data Interchange—EDI). Also consider geographical areas. While some firms serve clients on an international basis, other firms restrict themselves to a particular locality.

Cost is certainly important. Understanding how a consultant will be paid is a must. Some consultants bill by the hour or day, others require a fixed amount, while still others charge a retainer fee. Companies must carefully determine their most beneficial billing method.

Consultants can be helpful in numerous ways, but objectivity is one of the most important positive aspects they provide. Since they are brought in from outside the organization, consultants are free from office politics. This allows them to zero in on the issues without prejudice.

Consultants also have the time needed to solve the problems. Their main function is to solve the problem, whether they are designing a new automated order entry project at a hospital or are revising the key system to a private branch exchange at a growing transportation company. The firm's personnel have their own responsibilities precluding them from handling such an extensive undertaking. Sometimes, consultants are retained only after a company tried to solve the problems alone.

Despite the potential benefits consultants can bring to a firm, the wrong choice can cause more harm than good. Some consultants lack the necessary experience to complete the job, perhaps due to their youth or because they are unable to stick to the task at hand. Another complaint about consultants is that they have been known to lure key employees over to their consulting firm. Other companies were

upset that although the consultant charged a very high fee, he/she merely rehashed old solutions to their problems.

When making your choice, it is important to interview the potential consultants carefully to see if they fit into your corporate culture: Consultants should not arouse the hostilities of company employees. Before making your decision, ask for references to see how pleased previous clients were with the consultants. Also, before soliciting bids from various consultants, it is a good idea to write a synopsis of the job you want done rather than a full Request for Proposal (RFP). This saves work, as writing a full RFP takes much time. If the consulting firm is interested in the synopsis, follow through with a full RFP.

Datapro's "Directory of Communications Consultants" (Reports CS30-510-101 and MT90-200-101) lists numerous consultants in the communications field. Presented in comparison column format, the directory provides such information as application specialties, technological specialties, geographical areas served, the number of consultants on the staff, etc. There is also an item asking how fees are generated, which helps you to determine any possible biases. While the directory is updated annually, Datapro is currently compiling a mid-year addendum, adding consultants not previously listed.

—Eileen Colangelo

OSI Network Management

(Continued from Page 1)

Vendors and Markets

There are three major vendors in the market for integrated network management systems; IBM, Digital Equipment Corporation, and AT&T. Together, these vendors represent the three major approaches to supporting OSI management.

IBM's Approach to OSI Management

IBM's approach to support OSI/Communications Subsystem (OSI/CS), which will act as an OSI service point within the Network architecture.

Thus, NetView will support OSI management in a master/slave relationship, as OSI devices and systems will operate under the centralized control of NetView. If implemented like NetView/PC, the OSI service point will initially only transmit alerts from OSI devices. NetView will not have the capability to receive nor process commands from OSI systems with network capabilities. (For more information, see *Datapro Network Management*, "IBM SNA and NetView," Report NM40-491-101.)

IBM does not plan to build a new OSI-based platform, as AT&T did; nor does IBM plan to evolve its architecture to full OSI compliance, as Digital plans to do over the next few years. IBM must support a massive installed base of SNA networks—there are currently over 30,000 SNA licenses throughout the world. Most of these networks do not require immediate OSI support within the next several years; thus, NetView's weak and cumbersome

OSI support will not impact sales to the bulk of IBM's base. OSI support is necessary, however, to expand IBM's European presence and to provide eventual compliance with the U.S. government's OSI (GOSIP) mandate. (For more information on GOSIP, see *Datapro Management of Data Communications*, Report CS93-107-401, "The Government Open Systems Interconnection Profile (GOSIP)."

How OSI Will Help IBM

According to Northern Business Information (NBI), IBM cannot continue to depend on the stagnant market for mainframes to maintain its current profit levels. Network management offers the best opportunity for increasing sales and profit. MIS departments are under enormous pressure to reduce operating costs and increase returns on MIS investment by using network management to optimize their current computing system inventory.

In integrated data network management, IBM's NetView (and its components, such as NCCF and NLDM) have captured more market share than any other vendor. IBM's market share is not large enough, however, to shield it from competitors such as Digital and AT&T. NetView is not the overwhelming choice of all MIS and telecom managers planning on future network management purchases, according to NBI. (For more information on this topic, see *Datapro Network Management*, "User Evaluations of Vendor Offerings," Report NM60-010-201.) A number of corporations combine in-house solutions with localized network management systems; many medium-sized

companies do not have an integrated network management system, although they may be considering one for the future.

IBM can accomplish three goals by pledging OSI support in NetView. First, IBM seeks to protect and strengthen its network management image among MIS managers. OSI management is considered "leading edge" technology. To neglect OSI management while AT&T and Digital forge their OSI strategies would invite market erosion and escalate complaints that IBM's net management is cumbersome and outdated. As sophisticated as NetView is, it still revolves around older 3270 technology (AT&T's product uses an icon-driven Sun Workstation) and uses log files instead of a relational database (AT&T uses an Informix database; Digital's EMA specifications call for an object-oriented database).

Second, OSI support may help IBM broaden its network management presence beyond its SNA strongholds. While IBM would much rather have its customers use its published NetView/PC interface to connect various third-party devices, NetView/PC's popularity has actually declined over the last 18 months. Although IBM claims that over 40 vendors pledge NetView/PC support, few vendors actually market products with the NetView/PC interface—and even fewer customers have them installed. In contrast, most third-party vendors are now investigating and/or planning on developing OSI-based interfaces for their products. OSI support may help IBM win back third-party vendor support for NetView—and increase IBM's

presence in networks with both non-SNA as well as SNA elements.

Third, OSI support will increase NetView's appeal among government users. The first phase of GOSIP will go into effect in August 1990. Declaring OSI support now is critical to obtaining consideration for future network management proposals.

AT&T's Approach to OSI Support

AT&T has developed an entirely new network management architecture based on the OSI model and OSI management standards. Thus, AT&T's Unified Network Management Architecture (UNMA) and its integrated NMS product (the ACCUMASTER Integrator) can provide more comprehensive OSI support than either IBM's or Digital's offerings.

AT&T has also brought OSI management to the market before IBM or Digital. The AT&T Integrator uses Network Management Protocol (NMP), AT&T's implementation of CMIP. AT&T demonstrated the Integrator at Comnet in Washington, DC, in February 1989. Digital is at least a year away from demonstrating its CMIP implementation, and has postponed publication of interface specifications. IBM's incorporation of the OSI/CS in NetView will not materialize until 1990. In contrast, AT&T published its interface specs in 1988 and is expected to release the Integrator for general availability this fall. (For more information, see *Datapro Network Management*, "AT&T Unified Network Management Architecture," Report NM40-313-101.)

AT&T brought its NMP implementation to market rapidly be-

cause the company decided not to wait for the OSI committees' final management standards. AT&T felt the time was right to create its own brand of OSI. AT&T hopes that users will buy it and generate momentum to influence OSI standards evolution in their direction.

This approach has risks for both AT&T and ACCUMASTER customers, of course, since final OSI management standards may indeed differ from AT&T's projection. AT&T hopes to reduce those risks by actively seeking support for NMP from third-party vendors. NMP support got a tremendous boost in July 1988, when AT&T and seven other leading vendors joined forces to create the OSI Network Management/Forum. The Forum's stated goal is to accelerate OSI product development and standards approval. While Forum members are free to vote on OSI implementations of their own choosing, NMP will form the basis for the Forum's recommendation on CMIP implementation. The Forum's final recommendations are not expected to differ much from AT&T's current implementations.

UNMA provides end-to-end management of both data and voice networks. Its real edge, however, is its support for managing the customer-allocated portion of the public network. This allows customers to integrate information from public networks with management data from private networks. IBM's NetView and Digital's EMA stop short of the public network boundary and instead offer much more sophisticated logical network management capabilities, particularly at the applications level.

By building upon the evolving OSI standards and drawing from the company's unparalleled expertise in managing the world's largest network, AT&T is in an excellent position to offer an integrated solution for managing multivendor networks . . . if MIS customers can be persuaded to consider it.

How OSI Will Help AT&T

AT&T has tried unsuccessfully to penetrate the data market for several years. Network management provides AT&T with an ideal entry into MIS strongholds. For years, AT&T has dominated the network management market in the public-switched sector. AT&T lacks one ingredient for leveraging that expertise to attack MIS markets—credibility among MIS managers. Selling leading-edge technology is not enough. If AT&T were to develop a new proprietary platform to manage large data networks, leery MIS managers would not buy into it. While AT&T manages the world's largest network, every MIS manager knows that managing voice is much simpler than managing data. AT&T needed a platform—a network management architecture—with widespread appeal that, in the customer's view, would be around for a long time.

OSI management provides that platform—it already has industry-wide support and is gaining momentum. IBM actually lent credence to that platform when it announced OSI support in NetView last September. To further bolster its appeal to SNA markets, AT&T jointly developed an SNA Management application with

Cincom Systems, which markets Net/Master (NetView's only true competitor).

In addition to helping AT&T extend its reach beyond the public-switched network and into MIS departments, AT&T's OSI-based UNMA may also serve as a vehicle for allowing AT&T to market future ISDN services as well.

Digital's Approach to OSI

Digital is evolving its proprietary connectivity architecture, the Digital Network Architecture (DNA) towards full-stack OSI compliance within the next decade. (For more information, see *Datapro Reports on Data Communications*, "Digital Equipment Corporation Digital Network Architecture," Report C10-384-101.) Consequently, Digital is including OSI support in its new Enterprise Management Architecture (EMA), announced in September 1988. EMA is a flexible, open architecture that is highly adaptable to distributed computing environments. Digital has delivered the blueprint—but the actual products will not appear until 1990.

Digital's approach does not revolve around its own brand CMIP implementation, as does AT&T's. Using CMIP is more of an option than a requirement for vendors wishing to offer EMA-compatible products. Under EMA, third-party devices and network management systems (*entities*) use *Access Modules* to

communicate with EMA *Directors*. Digital recommends, but does not require, that these vendors implement CMIP within the Access Modules to support communications with the EMA Directors.

Digital's approach is, instead, to provide a type of network management operating system (the EMA Executive) which supports the routing and exchange of management information between nodes with network management capabilities. Digital plans to sell the EMA Executive to other vendors for use in their network management products.

The EMA Executive will support a Management Information Repository (MIR), an object-oriented configuration database for the entire network. The MIR obtains information about the network via Access Modules.

It is presumed that, upon the initial release of an EMA product, Digital will offer its own set of Access Modules for managing Digital nodes. Digital will use CMIP instead of its current Network Information and Control Exchange (NICE) protocol to convey management information. Like IBM, Digital pledges full support for CMIP and other OSI management standards *when they are fully defined*.

How OSI Will Help Digital

During the past 12 months, Digital has found itself squeezed between increasing manufacturing costs and price cutting on its

minicomputers (to compete with the IBM AS/400), and growing competition from VAX software suppliers and third-party Digital maintenance companies. This equation adds up to shrinking profits—forcing Digital to move into more lucrative markets, such as network management. For several years, Digital has offered embedded network management capabilities within certain DECnet products as well as separate local network management systems. Like IBM, Digital needs to reach beyond DECnet networks and attract users with non-Digital equipment. Digital's first step was to attract the vendors that produce this equipment.

OSI management attracts third-party vendor support much better than just DECnet alone. Vendors reluctant to invest heavily in developing their own state-of-the-art network management interfaces can benefit by using Digital's platform and building their own proprietary "value-added" features on top of it. Digital has already gained the support of seven key vendors: DCA/Cohesive, Stratacom, Timeplex, Codex, Siemens, TSB International, and Vitalink.

In addition to helping Digital win vendor support for EMA, OSI management provides a uniform platform for integrated network management—a platform that meshes well with Digital's long-term networking goals.

—Jill Ann Huntington

Cellular's Digital Future

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As mobile telephones become increasingly popular, cellular mobile telephone service providers are faced with a demand that will soon exceed the capacity of their existing facilities. Most industry analysts estimate that cellular demand will triple over the next three years. Because the FCC has assigned a limited radio frequency spectrum for cellular telephony, service providers must develop more efficient methods of using the assigned space. By incorporating digital technology into the cellular mobile network, three times the number of existing analog subscribers can have access.

Other advantages to using digital voice technology in cellular systems include cost savings, less power consumption, and lighter, more compact equipment than analog systems. Digital cellular service provides telephone service for remote, sparsely populated regions where traditional wired service is not economical. Digital cellular service should also enhance roaming capabilities, allowing subscribers to move smoothly from one cellular system to another without disconnections. Digital technology also provides for encryption to ensure privacy on cellular calls. Data applications are limited due to the interrup-

tions that occur as a call is passed from one cell site to another.

Digital technology is currently used only in the switching and land connection portions of cellular networks. Digital cellular telephony's future will involve implementing digital communications between mobile phones and base stations at the cell sites. The Cellular and Common Radio section of the Telecommunications Industry Association (TIA) and the Cellular Telecommunications Industry Association (CTIA) are working together to select and endorse standards for digital cellular technology. CTIA set December 1989 as the deadline for completion of standards definitions. In January 1989, the CTIA selected time division multiple access (TDMA) as the standard access method. The groups are currently working on the coding schemes for analog-to-digital conversion and error detection and correction methods.

Once the standards are defined, cellular service providers will gradually incorporate digital technology into the existing analog network. There will be a transitional period in which both analog and digital technologies will be in use simultaneously. Cellular telephone manufacturers will in-

troduce new mobile telephones that switch between analog and digital.

AT&T Bell Laboratories recently announced Excited Linear Predictive Speech Processor (CELP), a speech coding technology that allows for transmission of digital information at 8000 bits per second, while maintaining the voice quality of existing analog systems. CELP may well become the standard coding technique, since most existing CTIA proposals involve a CELP speech coder. AT&T is working closely with OKI Electric Industry Co., a leading mobile telephone vendor, to incorporate CELP into mobile telephone design.

In late 1988, cellular telephone manufacturer AOE International, announced the first commercially available digital telephone with encryption for secure communications. By the end of this year, as the standards process nears completion, we expect more digital product announcements from the major suppliers.

Europe currently leads in digital cellular development with plans for a Pan-European digital cellular radio network. The network is the product of The Groupe Special Mobile (GSM), which consists of representatives from PTTs of 17 European coun-

tries (Austria, Belgium, Denmark, Finland, France, West Germany, Greece, Ireland, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the U.K., and Turkey). The project includes Europe's three major switching vendors—Siemens, Alcatel, and Ericsson—as well as 18 carriers. The network plan will provide for interfaces between the various vendors' switching systems and incorporate Signaling System Number 7.

GSM is part of Conference Europeennes des Postes et Telecom-

munications (CEPT), based in Brussels, Belgium. The acronym "GSM" is commonly used to refer to both the group and the network project. The GSM system will allow for digital voice transmission, ISDN access, and roaming, in which cellular mobile subscribers can be reached through the same cellular telephone number anywhere in Europe with complete data security. GSM is scheduled to be operational by 1991.

As the development of cellular telephony runs a parallel evolu-

tionary track to wired telephony (e.g., analog to digital switching), the future will bring Integrated Services Digital Network (ISDN) applications to the cellular environment. Digital cellular telephony will incorporate intelligent signaling systems, such as the CCITT Signaling System Number 7. Future applications include a wide range of services, such as integrated paging, vehicle monitoring, alarm reporting, and ambulance patient monitoring.

—Kim Peckman

Regulatory Issues: Rate Watch

This month's Rate Watch covers quarterly changes in the intrastate interLATA market in five states: California, Georgia, Illinois, New York, and Texas.

In the toll segment of the market, AT&T's rates fell an average 1.7 percent because of reductions in Illinois (10.4 percent), New York (3.8), and an increase in Texas (3.8 percent). MCI's average toll rates for the five-state area fell 4.3 percent. MCI reduced rates in California by 11.8 percent and in Illinois by 11.7 percent.

US Sprint's average fell 2.2 percent due to a 12.2 percent decrease in California.

In the WATS segment, AT&T's average price for the five states covered by Rate Watch dropped only 0.1 percent. Its rates fell in Illinois by 6.8 percent but rose in New York by 4.1 percent. MCI's overall WATS rates decreased 1.2 percent in its Tier I locations due to a 7.1 percent decrease in California's Tier I rates. US Sprint's average rates dropped by 0.9 per-

cent in its Tier I locations because of a 4.6 percent decrease in California's Tier I rates. Neither MCI nor US Sprint showed changes in Tier II rates.

Rate Watch reports no price changes in analog private lines or in Digital Data Service (DDS) private lines in the five-state reporting area.

AT&T's T1 rates fell an average 14.4 percent due to a 41.3 percent decrease in Georgia. MCI and US Sprint showed no changes in T1 pricing.

—Colleen Spiegel

At the LATA Level

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Bell Atlantic

Pennsylvania—Cable TV subscribers can now use their telephones to order special programming, thanks to a new Bell of Pennsylvania service. While some video providers previously offered such a service, the start-up costs were high, preventing smaller cable companies from offering the service. The new technology makes it affordable for all cable companies to offer expanded programming.

Also, Bell of Pennsylvania followed New Jersey Bell's recent precedent and introduced a family of I.Q. services that permits callers to have much more control over their phones. These features include automatic redial, blocking of unwanted incoming calls, assigning of special rings to selected numbers, forwarding of selected calls, and the ability to initiate a trace.

Pacific Telesis

California—Pacific Bell Directory, the yellow pages publishing and marketing services subsidiary of Pacific Bell, has entered a joint venture with Ogilvy & Mather Direct, a leading direct response advertising agency. The venture creates a one-stop creative and marketing services facility for small- and medium-sized businesses. Called SMARTPost, the venture's purpose is to raise the production standards and overall quality of direct mail advertising.

The telco also announced that it will begin selling terminal equipment as a service to its large business customers. PacBell struck a deal with PacTel Meridian Systems and AT&T to sell AT&T and Northern Telecom equipment along with Pacific Bell network services.

Finally, PacBell announced it will begin testing a new electronic messaging service. The service will allow subscribers to exchange computer files and messages in various formats, including text, fax, and

formatted computer files. Initially, the service cannot be used to connect with commercial on-line vendors such as The Source, MCI Mail, or CompuServe.

Southwestern Bell

Missouri—Under the terms of a recent agreement, Southwestern Bell Telephone (SWBT) and McDonnell Douglas will link their packet-switching communications networks (MicroLink II and Tymnet, respectively). The end result will be more access locations for customers of both networks. SWBT customers can now reach a Tymnet access node via a local call, to connect a personal computer or terminal to a host computer that's connected to MicroLink II. McDonnell Douglas customers have the same benefit through a local Tymnet call into MicroLink II.

In other news, SWBT announced that it plans to participate in an interLATA ISDN test with MCI Communications, and possibly US Sprint. The test, scheduled for fourth-quarter 1990, will result in the first call over the public network using ISDN technology on an interLATA basis.

U S WEST

Colorado—Colorado has earned the dubious honor of becoming the first state to end a lifeline telephone assistance program. Spurred on by ultra-conservatives, who view the program's beneficiaries (the poor, the handicapped, and the aged) as a special interest group, the state's House Appropriations committee voted down establishing the program permanently. The lifeline program, which frees a qualifying recipient from paying federal subscriber line charges, was initiated by the FCC. States can choose whether to participate in the program—to date, 38 states do so. Colorado became the first state to drop the program.

—Brad Schepp