ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

RECEIVED
MAY - 7 1996
FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45

DOCKET FILE COPY ORIGINAL

REPLY COMMENTS OF NORTHERN TELECOM

Northern Telecom Inc. ("Nortel") hereby replies to some of the comments on the Commission's rulemaking to address Universal Service and establishment of a Joint Board.[1/] Nortel supports the Commission's and Congress' policies, as reflected in the Notice, of (i) reaffirming the importance of universal service and (ii) refining universal service support mechanisms in light of the increases in competition that will emerge as a result of the Telecommunications Act of 1996. Nortel believes that the Commission's previous universal service policy has contributed greatly to the development of a robust telecommunications infrastructure in the United States, and urges it to adopt rules that will continue this important function. Nortel also believes that as telecommunications technology

1/ Federal-State Joint Board on Universal Service, CC Docket No. 96-45, FCC 96-93, released March 8, 1996 (hereafter cited as "Notice").

No. of Copies rec'd 0+12
List ABCDE

evolves, the definition and role of universal service should evolve as well.

Nortel is the leading global supplier, in more than 100 countries, of digital telecommunications systems to businesses, universities, local, state and federal governments, the telecommunications industry, and other institutions. The company employs more than 23,000 people in the United States in manufacturing plants, research and development centers, and in marketing, sales and service offices across the country. Nortel is keenly interested in universal service and its impact on the telecommunications network.

Nortel has several observations with respect to the technical issues raised in the Notice and the initial comments in this proceeding. In determining the parameters of services to be supported by universal service, Nortel agrees that such services should include more than merely dial tone. Nortel supports the position that Touch Tone capability should be an integral feature of a subscriber's service for purposes of universal service support.[2/] Touch Tone capability is now much more than a dialing convenience.[3/] Indeed, Touch Tone dialing is necessary to access many enhanced and automated services. Nortel thus believes that

---

2/ Notice at ¶ 19. See also, Comments of AT&T, ICORE, Cincinnati Bell, Missouri PSC, GVNW, Inc., BellSouth Communications, Oregon Independent Telephone Association, Washington Independent Telephone Association.

3/ The apparent importance of TouchTone dialing is reflected in the fact that according to Yankee Group statistics, some 81.1% of U.S. households have TouchTone service on the main line in their home.

Touch Tone dialing should be considered part of the basic infrastructure as a key enabling technology.

Nortel similarly contends that Signaling System 7 ("SS7") should be considered fundamental in today's telecommunications infrastructure and part of universal service. SS7 is widely accepted as the key enabler to enhanced services such as transmission of calling party number. In determining universal service support, Nortel urges the Commission to include allowances for SS7 deployment.[4/] Nortel observes that SS7 has not yet been fully deployed in the telecommunications network, particularly in smaller rural communities.[5/]

To the extent that the Commission is adopting a dynamic (and not static) concept of universal service, the Commission should also bear in mind that many of the advanced network capabilities that will emerge from Advanced Intelligent Network ("AIN") functionality will also be dependent on having SS7 capabilities deployed. SS7 will therefore continue to grow in importance in assuring that all Americans have access to advanced telecommunications services. Universal service support for SS7

4/ Including SS7 capabilities within the definition of universal service is also consistent with the Congressional policy supporting the creation of incentives for the deployment of new and advanced telecommunications technologies, as recently reflected in Section 706 of the Telecommunications Act of 1996. See also, 47 U.S.C. § 157 ("It shall be the policy of the United States to encourage the provision of new technologies and services to the public.").

5/ Although becoming more widespread, SS7 capabilities have not yet been universally deployed. At the end of 1994, the RBOCs had deployed SS7 on approximately 88% of their lines. The deployment by the other telephone companies varies, although in general the levels are significantly below those of the RBOCs (at about 35%).

deployment thus will render increasingly larger dividends over time.

As a general proposition, Nortel also supports the Commission's tentative conclusion that it is unnecessary for the Commission to prescribe specific technical standards to ensure quality telecommunications services.[6] Nortel believes that the current standards setting organizations are able to establish the necessary technical standards. There is, however, one area where Nortel thinks some additional industry effort should be focused -- development of standards specifically adapted to the needs of rural, high cost areas.

In the past, the Rural Electrification Administration ("REA") has largely fulfilled this role However, with the increasing complexity of the telecommunications network and the limited resources of REA, little attention has been paid to this area. As a result, there has been a general tendency by rural telephone companies and their consultants to rely on Bellcore recommended specifications, but without making adjustments for the unique characteristics of rural, high cost areas. Bellcore typically develops its specifications for the topologies of urban markets that are common to the Bell companies.[7] As a result,

---

6/ Notice at ¶ 68.

7/ For example, Bellcore has developed specifications for ISDN and for host to Integrated Digital Loop Carrier (IDLC) interconnection (TR-303) that add some cost and complexity, but which result in overall savings because of the scale economies of deployment of into high density environments typical of many Bell company urban systems. These complex requirements are also necessary to allow multi-vendor compatibility between switches and the DLCs. However, their application in a rural environment (continued...)

applying such requirements in a rural, high cost environment could lead to higher costs for the rural telephone companies than would be the case if the specifications were adjusted to take account of the different characteristics of rural environments.[8/]

Nortel also contends that in defining universal service and developing universal service support mechanisms, the Commission should be technology neutral.[9/] Traditional telecommunications services are defined from a wireline perspective. The Commission should ensure that the definitions of services supported by universal service funding reflect the impact of new technologies and recognize the similarities as well as differences.[10/] There are now numerous alternatives to the traditional wireline delivery of telephone service, including CMRS, fixed wireless local loop services, LMDS, satellite and cable.

7/ (...continued)
imposes the same costs, but does not present the opportunity for any offsetting savings from economies of scale or traffic concentration, nor are there likely to be the same needs to support multiple vendors.

8/ Perhaps the Commission could use universal service funding to ensure that an appropriate standards-setting entity has the necessary resources to fulfill the specific role of developing standards for rural telecommunications networks.

9/ Cf., Notice at ¶ 18 ("voice grade service, whether provided by wireline or wireless technologies, should be considered indispensable").

10/ Nortel, in Table 1 of its Reply Comments in WT Docket No. 96-6 on CMRS Flexible Service Offerings (submitted March 25, 1996), identified important differences in the service capabilities of fixed wireless local loop and mobile cellular technologies, differences which would be important in some applications and not important in others.

In light of advances in technology and under certain circumstances, wireless terrestrial and satellite services may be less costly to deploy than wireline networks. After an initial investment in base stations or satellites, the incremental cost of adding a subscriber will be relatively small. Thus, some wireless services may be well suited for ensuring access to advanced telecommunications services in remote and rural applications. The Commission should thus ensure that its requirements are defined in a way that is technology neutral so as to be able to take advantage of these economies where they are appropriate.

New telecommunications technologies are also capable of delivering various mixtures of basic and advanced services. Broadband networks (deployed by the telephone companies and others) are capable of providing telephone service, video programming, Internet access, interactive video services and other similar offerings. In developing its rules for defining and supporting universal service, the Commission must ensure that its requirements do not inadvertently force the service providers to build separate infrastructures.[11]

Nortel has also accumulated extensive experience in understanding the issues and the benefits for using broadband

---

11/ Nortel is concerned that in establishing rules that limit a telephone company's ability to fund non-universal service facilities from universal service support payments, the Commission not intentionally or unintentionally preclude or otherwise discourage the deployment of multifunction networks. Appropriate accounting safeguards should provide sufficient protection from potential anticompetitive abuses; it would be inefficient and counterproductive to require separate networks or facilities to serve universal service needs.

networks to support education through distance learning and other means for K-12 schools as well as with telemedicine in healthcare. Nortel has been involved in numerous projects to develop and refine such applications. Attachment A hereto is a more detailed description of Nortel's view of important applications in these fields.

Based on its experiences in education projects, Nortel has some specific suggestions for ensuring that K-12 schools will be able to take full advantage of the benefits made possible by an enhanced telecommunications infrastructure. Distance learning allows schools to help maximize the use of the education resources. The Commission should thus adopt rules that would ensure that K-12 schools have broadband network access. Nortel also urges the Commission to recognize the importance of ensuring that the telecommunications infrastructure to be used by these schools supports the industry standard signaling system for ATM call setup in order to maximize interoperability. Nortel further believes that the telecommunications infrastructure used by the schools should be capable of utilizing MPEG2 as the standard format for interactive video.

Nortel's experiences with telecommunications projects in K-12 schools also confirms the value to education of Internet access. In order that these opportunities be maximized, the schools must also deploy suitable local area network ("LAN") capabilities, such as Ethernet. Such a LAN will allow the students to have access to the full benefits of a multimedia, collaborative learning environment

Nortel believes that by taking the steps recommended herein, the Commission will further the goals of universal service and access to advanced telecommunications services by schools, hospitals and subscribers throughout the United States. Nortel believes that such policies will well serve the public interest and meet Congress' intent in adopting Section 254 of the Communications Act.

Respectfully Submitted,

Stephen L. Goodman
Halprin, Temple, Goodman & Sugrue
1100 New York Avenue, N.W.
Suite 650, East Tower
Washington, D.C. 20005
(202) 371-9100

Counsel for Northern Telecom Inc.

Of Counsel:

John G. Lamb, Jr.
Northern Telecom Inc.
2100 Lakeside Boulevard
Richardson, Texas 75081-1599

Dated: May 7, 1996

EDUCATION

Following are but a few examples of the applications of distance learning for educational institutions:

Managing a qualified teacher shortage, or limited funds available for specialized courses

In grades K-12 teacher shortage is a key issue. Being able to share teaching resources through distance learning is a solution. For example, bilingual teachers could teach students whose first language is not English. Special education teachers could reach a greater number of students in an educational environment where funding is limited

Rural schools do not have equal facilities and instructors compared to many urban centers

Language teachers, science instructors and educators in advanced math could, for example, provide interactive learning to augment rural teaching expertise, filling educational gaps and building opportunities. Likewise prestigious urban schools could transmit learning progress to less privileged urban areas.

Specialized programs and guest lecturers

An entire school system can co-op lectures of special interest to students and educators on pressing problems affecting students. The range of information could cover social and health issues, as well as topical world events of network-wide educational interest.

Staff development and training

School districts, private schools and colleges and universities spend significant sums of money for staff development and training. Distance learning eliminates travel and distance to provide the broadest range of continuing education and knowledge.

Teleconferences can also be utilized for internal communication statewide.

Multi-cultural linkage and understanding

The responsibility lies with the school system to provide multi-cultural exposure and understanding of the uniquely American melting pot. Geographical isolation is eliminated through distance learning.

Distance Learning can fill the gaps of specialized courses that are hard to staff or that few students are qualified

Advanced math and science courses, much language instruction and other courses can be shared across rural and urban areas and distance at the grade school, high school and college level. This expertise can be shared with a district at the primary and secondary level, or ascertained from higher institutions of learning.

On-line knowledge and resource access

Data transmission and shared data banks can be used to bring the resources of the Library of Congress or Harvard Medical School Library to a community college library or a high school. Duplication of facilities could be eliminated through aggressive resource and information sharing.

Administrative communications simplification

District communications and university communications are greatly streamlined through centralized records and data banking. Applications include attendance, assessment, emergency, scheduling, grades/records/transcripts, payroll, data bases, parent contact counseling, tracking, purchasing, inventory, receivables, facilities, automated library system on-line homework assignments and community links. These are but a few of the administrative streamlining benefits Integrated Community Networks have the potential to offer.

Records sharing and transmission between high schools, colleges and universities can also be electronically managed, reducing paperwork and administrative handling, saving valuable time and resources, while enhancing accuracy and security.

HEALTHCARE

There are three very broad categories of health care application: (1) TeleMedicine; (2) Education and (3) Administration.

TELEMEDICINE

TeleMedicine (Telemed) can be loosely defined as any application in which a medical service (diagnosis, consultation, interview, analysis) is being performed at a site distant from the patient. For example:

- Urban hospitals providing specialized diagnosis and consulting services to small rural hospitals and clinics (e.g., a rural nurse, general practitioner physician, or physician assistant uses a live video link to a remote dermatologist to diagnose an unusual mole on a local patient).
- TelePathology: A pathologist in one hospital uses a special video camera linked to his microscope to show a "frozen section" of extracted tissue to an oncologist in another hospital as a surgeon waits with the patient on the table for the results of the diagnosis.
- TeleRadiology: A radiologist views and diagnoses a digital image of a chest x-ray sent to him by a remote site to determine if a patient needs to be sent via ambulance to an urban surgical center.
- A hospital or clinic provides routine and emergency medical diagnosis and consulting services to local prisons, high schools, and businesses.

These applications use live video and/or high-speed data to send motion or still images between geographically distant sites, in order to bring high-quality health care to areas that may lack specialized medical facilities or personnel. There are many tools that connect to traditional medical instruments that allow visual diagnosis to take place over standard video or digital links.

EDUCATION

There are three broad areas of education relevant to the health care industry: (1) Continuing education; (2) University education, and; (3) Public health education.

Continuing Medical Education

Physicians, nurses, physician assistants, and specialists need to be continuously trained and retrained to keep up with the latest advancements in medical technology, procedures and regulations. In rural areas, this usually means leaving their practice to travel to a remote site to attend classes or lectures. The cost to the physician is high: he/she loses revenues from work while away and incurs travel-related expenses. The cost to the community is also very high. While the physician is away, the community often goes without medical care, or must hire a temporary replacement at great expense.

The result of this professional isolation is that rural communities have great difficulty attracting and retaining qualified physicians and often lose their hospitals to larger towns.

University Education

Medical schools see clinical observation as a vital component of student education. Interactive video can be used as a tool to facilitate observation of surgical procedures, "sitting in" on a TeleMedicine consultation or diagnosis, or simply attending/participating in a remote lecture or seminar.

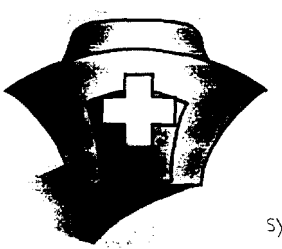
Public Health Education

There is also a critical need to bring basic health education to the general public. Hospitals can use public school facilities to provide public health classes in such topics as childbirth and parenting; caring for the elderly; sex and sexually transmitted diseases; and coping with common diseases such as heart disease, cancer and diabetes.

ADMINISTRATION

Hospitals spend an enormous amount of time finding and filing paper records, entering manual data into electronic databases and transferring records between locations. This is the area in which there is the greatest opportunity to reduce waste in the medical system.

Hospitals currently use several different, incompatible systems for such purposes as patient billing, visit records, lab results, diagnoses, inventory control, and bed scheduling. Many of these systems might be manual, paper systems. Even those systems that are electronic often use different hardware and software and cannot take advantage of time-saving, automated linkages. Not only are these systems incompatible within the hospitals, but they are also incompatible between hospitals and between hospitals and suppliers. Some examples of applications that could take advantage of high-speed telecommunications links include:



- Doctors using on-line systems to retrieve patient medical records — including visit records, lab results, lifestyle profiles, family medical histories and a complete historical set of medical images — from databases anywhere in the world.
- Hospitals and clinics automating their purchasing via EDI with medical suppliers.
- Automated billing and reimbursement systems linking medical facilities with patients and insurers.