The Public Communications Network In the 1990s

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SUMMARY

During the last few years, many technologists and network communicaition planners have been working together with one clear goal : to evolve the existing public communication network to meet the future needs in the 1990s and beyond, as our society becomes information-oriented. As a result, we have seen both evolutionary and revolutionary proposals to form the public communication network of the future. Integrated Services Digital Network (ISDN) will become the network standard. The network will evolve to offer many new services based on an Intelligent Network (IN) concept. Value-Added Network (VAN) providers would be able to offer data-base and other enhanced services based on Open Network Architecture (ONA) in the next decade.

In this workshop, the author will describe the basic concept of ISDN, IN and ONA and present how these three concepts are evolving to work the advanced network of the 1990s. It is hoped that the network planners and telecommunication policy-making authorities in Korea will understand the network evolution and be able to plan ahead to become ready for the network needed for the forthcoming information society. The challenge is to evolve the advanced network from existing network with minimum disruption and investment.

Since Alexander Graham Bell Talked to his assistant, Thomas Watson, over metallic open wire in Boston, Massachusetts, on June 3, 1875, the public telephone network has been steadily progressing as an essential infrastructure of today's society. With the advent of computer technologies in the 1970s, the network was transformed from the old electromechanical technology to a computer-controlled network, resulting in the largest computer network ever built. In today's public telephone network, virtually any telephone can be connected to any other phone in the world within a few seconds Without computer technology, this would be practically impossible. Computers and communications have

merged.

It would, therefore, be natural to consider exploiting the enormous technological and network-latent capabilities of the public telephone network, particularly when our society is becoming more and more dependent upon information and the exchange of infromation, both voice and data.

In this workshop, the author will describe the basic concepts of emerging communications network standards and architecture -- Integrated Services Digital Network (ISDN), Intelligent Network (IN), and Open Network Architecture (ONA) -- to present how these concepts are evolving and making possible the network of the 1990s.

Integrated Service Digital Network (ISDN)

During the last few years, many technologists and network planners have been working together with one clear goal : to evolve the existing network to meet the future needs of the 1990s and beyond, as our society becomes information-oriented. As a result, we have seen both evolutionary and revolutionary proposals for forming the public communication network of the future. The network is clearly becoming digital in order to handle both voice and data information efficiently. Also, it will take longer than anticipated by any network planners. Integrated Services Digital Network (ISDN) will eventually become the network standard.

The international telecommunications standard body, CCITT, defines ISDN as an end-to-end digital network which supports a wide variety of services using specific network standards. When these standards are all defined and deployed, users will have access to voice and data services which are not available today by merely plugging in a few user terminal which would replace the regular voice terminal used extensively today.

Unfortunately, however, the existing public telephone network requires a major to meet the proposed ISDN standards. Since ISDN has been mainly a technology-driven effort, a lot of controversy has surfaced. Based on market, economic and evolving technology considerations, it is a challenge to the network planners to plan for an orderly transition from the existing network standard full ISDN implementation.

Intelligent Network(IN)

As the communication and computer technologies emerge, the network will evolve to offer many new services based on the embedded, as well as new peripheral, intelligence. In today's telephone network, the majority of telephone access lines are served by stored program control (SPC) switching offices. As these SPC switching machines are interconnected with a computer-controlled common-channel signaling network, and as each switching machine accesses a common data base through the common channel signaling, one can create a huge intelligent network. For example, AT&T offers virtual private lines, 800, and alternate billing services, such as credit card calling service, based on common channel signaling and SPC switches which have been connected to a common data base since 1980.

With the AT&T breakup in 1984, Bell Communications Research (Bellcore) commissioned

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a formal study to come up with an intelligent network architecture offering flexible new services independent of any specific vendor's equiment. Furthermore, this was to be evolutionary architecture allowing new service introduction by distributing call-processing capabilities across multiple switching machines, constructing network services with service-independent capablilities, and using standard signaling protocols.

The IN approach differs from that of ISDN. The IN seeks new service-offering capability which is technology-independent. The IN concept is driven by a network provider, such as the telephone company, in order to offer new services and to gencerate new service revenue, while reducing the service introduction interval. The challenge is to apply IN architectural requirements to the existing network so that it will gracefully evolve to the emerging new communication products.

Open Network Architecture(ONA)

Leveraging the network standards and capabilities, one can offer value-added services today with the addition of intelligence in customer premises equiment (CPE). Without careful consideration, however, of the network interface to value-added services, either the VAN provider can choke (or even harm) the existing public communication network by inappropriate application of technology or the network provider may have an unfair advantage over the VAN provider who is not offering an efficient interface. When the ONA is fully understood and implemented, the value-added network (VAN) providers should be able efficiently to offer enhanced services in the future.

The ONA implementastion has been driven by telecommunication policy makers (such as the FCC, PUC, etc.). The ONA assumes that the basic network features will to be unbundled to promote efficiency of the network and to prevent prevent unfair discrimination. A joint effort is required to work with the VAN industry determine its needs and to develop products and services. The ONA will stimulate and accelerate new VAN services and will become a source of new revenue for the network providers. The ONA will open up the public telephone network for competitive communication services needes for the information society during the 1990s and beyond.

Conclusion

During the 1980s, three basic network concepts -- ISDN, IN and ONA -- have emerged. These concepts will shape the existing public telephone network of the future. These three concepts have three separate root : ISDN by telecommunications equipment manufacturers, IN by public network providers, and ONA by government policy makers. Although the three different groups have different motivations for the same cause, these three concepts are merging together. The author anticipates further compromise among the three groups resulting in a common network architecture. The challenge is to manage and plan today's communication network and available technologies in order to evolve the existing network toward the future network.

It is hoped the network planners, telecommunication policy making authorities, and telecommunication equipment manufacturers in Korea fully understand the network evolution which is taking place. Furthermore, they should be able to plan ahead to become ready for the network needed for the forthcoming information society.