Standardization—A Phased Approach

Because of the complexity of intelligent networks, the number of unresolved technical issues, and the significant financial investments, the development of an intelligent network architecture supporting all possible telecommunications services and technologies, called the *target intelligent network*, will take many years. Standardization bodies have chosen to adopt a phased approach to intelligent network development that takes advantage of the technological capabilities at a given point in time and that guarantees backward compatibility between the different phases.

The International Telecommunications Union—Telecommunications Standardization Sector (ITU-T) has addressed this phased approach in its Recommendation Q.1211.

Table I shows the different phases in terms of capability sets and their descriptions. Each capability set gives a set of definitions of capabilities that are of direct use to both manufacturers and network operators.

Table I
Phased Approach to the Target Intelligent Network

Phase (Capability Set)	ITU-T Recommendation	Time Frame	Description
CS1	Q.121x	Finalized in 1995	First standardized stage
CS2	Q.122x	To be finalized in 1997	CS1-compatible. Handling of multiparty calls.
CS3	Q.123x	Work started at end of 1996	CS2-compatible. Handling of broadband aspects and integration with the TMN.
CSn	...	...	Evolving towards target intelligent network

TMN = Telecommunications Management Network.

Capability Set 1 (CS1)

CS1 is the first standardized stage of intelligent network evolution based upon the existing technology. It is a subset of the target intelligent network architecture. CS1 defines the functional entities (see Fig. 2 in *Article 6*) and the interface between these entities. It also defines the generic model of two-party call processing functionality, the Basic Call State Model (BCSM). CS1 limits end-user access to service processing capabilities to the following types: analog lines, ISDN basic and primary rate interface (BRI/PRI), and analog and SS7 trunks.

The target set of services for CS1 includes universal personal telecommunication (UPT), freephone, virtual private network (VPN), credit card calling, user-defined routing, and others. All of these services are considered immediately marketable and highly profitable. The common characteristic of all CS1 services is that they apply only to one party of the call (either the originating or the terminating party), and generally only during the call setup phase.

The protocol used by the different CS1 functional entities to communicate is called the Intelligent Network Application Protocol (INAP). This protocol relies on existing underlying transport protocols (e.g., SS7/TCAP) to convey the intelligent network application layer protocol messages.

Capability Set 2 (CS2)

CS2 is the second standardization stage and is a superset of the CS1 recommendations. CS2 aims to support enhanced services in addition to the ones supported by CS1. It introduces new capabilities that allow handling of multiple parties that are or will be involved in the same call, such as conference calling. Other capabilities will be included in CS2 to support personal mobility (UPT) and terminal mobility (DECT, GSM) functionality. These new enhancements and capabilities are achievable by extending the existing CS1 call-processing model and functional model. INAP operations are also extended and new ones are to be defined. Standardization activities are going on at ITU-T and ETSI (European Telecommunications Standards Institute). A complete revision of the CS2 protocol is expected at the end of 1997.

The target set of services for CS2 includes call completion to busy subscriber, conference calling, call transfer, call waiting, mobility services (UPT, GSM), and others. The common characteristic of all these services is that they require call party handling functionality that is not supported in CS1.

Future Capability Sets

CS1 and CS2 do not cover all possible user accesses and network capabilities. According to the phased approach, ITU-T plans to introduce CS3 (and maybe others later) to cover broadband network aspects (intelligent network/B-ISDN integration), intelligent network/TMN integration, and full support of mobile communications systems. Requirements are being set up and specifications might come in 1998.

HP Approach

Because the needs, in terms of network operation, vary from one network operator to another (operator-specific charging and billing, implementation limitations), and because the INAP standard will continue to evolve following the different capability sets, network equipment providers have to work with a large number of INAP variants.

To meet this need and to be able to respond to its customers' requirements rapidly, HP has developed a flexible service execution platform (see the accompanying article) that is able to rapidly follow the evolution of the INAP and support different customers' specific variants. Tools are provided to automate the support of a message set's syntax. The implementation of the message set's semantics has been pushed to the application level, leaving the platform itself independent of any supported message set. This has the benefit that a single platform can be maintained for a varied and evolving customer base.This independence from the INAP message set also allows the HP platform to easily support similar message sets defined by other standards bodies such as MAP (defined by ETSI for mobile networks) and AIN 0.1 and 0.2 (defined by BellCore).