

Electrical Engineering Department

EE 400, Experiment # 7

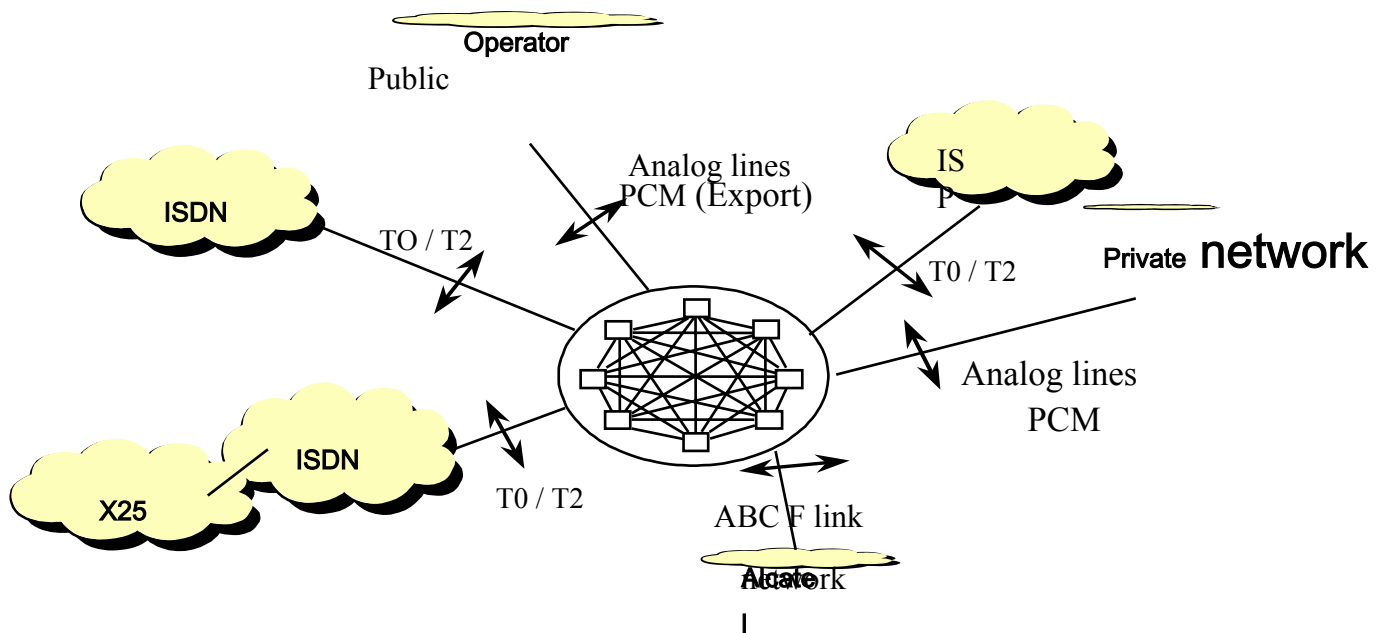
Intersystem Links - A visit to KFUPM Voice Network

Objectives: After this experiment, the students should be able identify different types of voice and data network links.

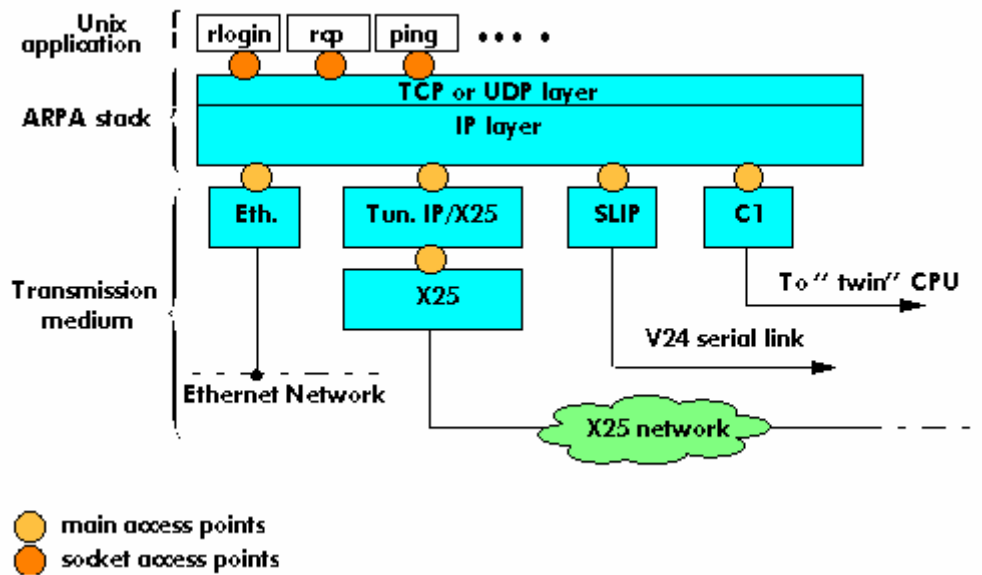
External networks and interfaces

Type of private voice networks:

1. Homogenous (ABC-F2 or E1 protocol)
2. Alcatel Hetrogeneous (ABC_F1 protocol)
3. Hetrogeneous (QSIG protocol)

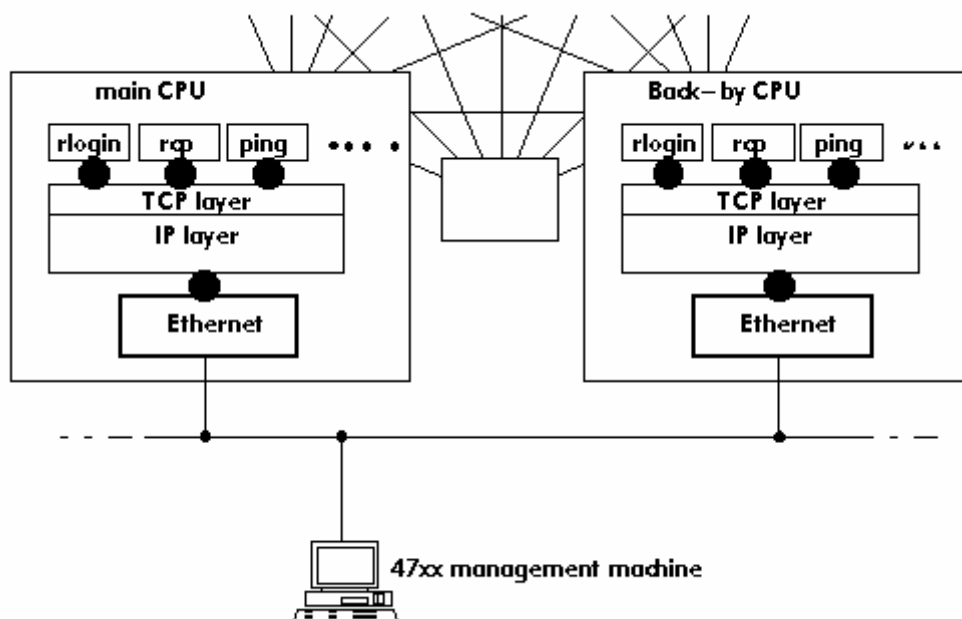


The IP facilities use the following transmission media: - Ethernet network - X25 network - V24 serial links - Inter ACT link.



1. ETHERNET INTERFACE

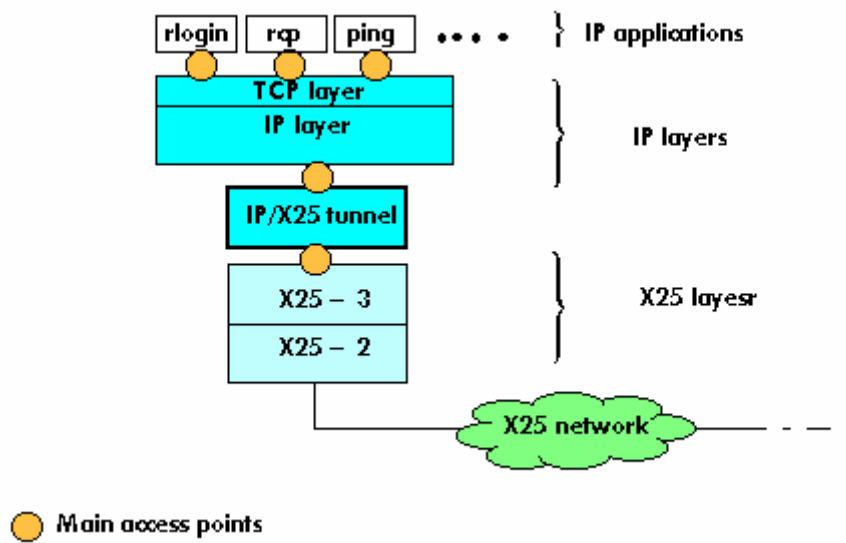
The Ethernet interface enables the PABX to be connected to an Ethernet network.



2. IP/X25 TUNNEL INTERFACE

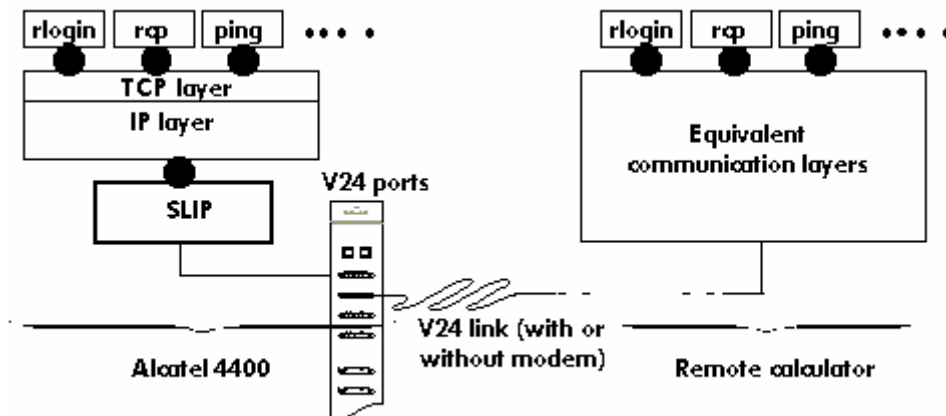
The tunnel enables the internal X25 network between the PABXs to act as a communications medium. The function of the IP/X25 tunnel is to transform the datagrams which leave the IP layer into X25 packets. The IP/X25 tunnel also controls the transforming of the off-line IP protocol into on-line X25 protocol. For this, it establishes and releases the X25 connections.

The IP/X25 tunnel only works on ABC links.



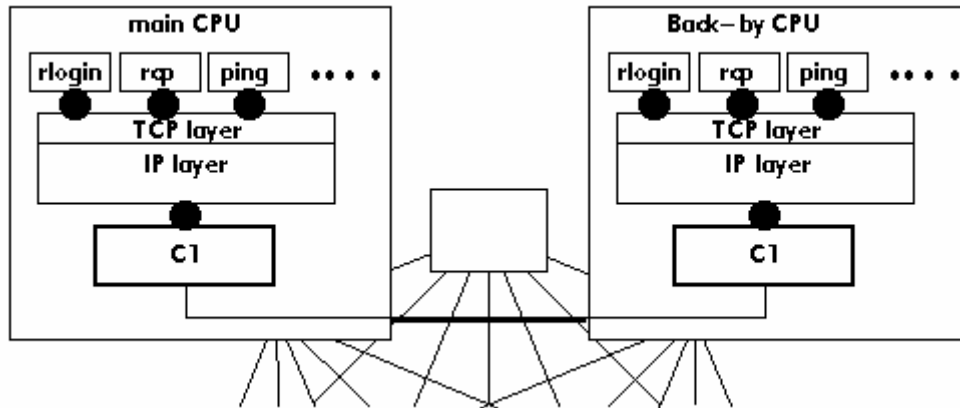
3. SERIAL LINK

The management equipment or other equipment of the PABX may be connected by a V24 type serial link. For this mode of communication, two protocols are suggested: the SLIP protocol and the PPP protocol

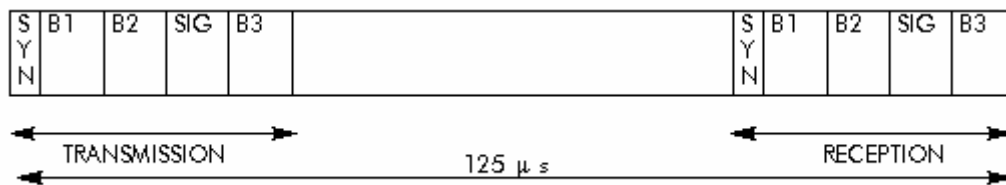


4 C1 Link

The C1 link allows the master and slave CPU to communicate with each other via the ACT.



UA link The terminal adapters (TA) and dedicated sets are connected to the system via this UA link, which carries 4 x 64Kbit/s channels (3 B channels and one signaling channel). It is used to multiplex voice and data on the same physical link. The UA link presents a 125 micro second frame with the following format:



For example, in the case of a V24 terminal connected behind a UA set, the multiplexing is carried out as follows: - the SIG channel carries the UA signaling exchanged between the set and system, - one B channel carries voice, - one B channel carries the V24 terminal data.

ISDN interfaces ACT boards

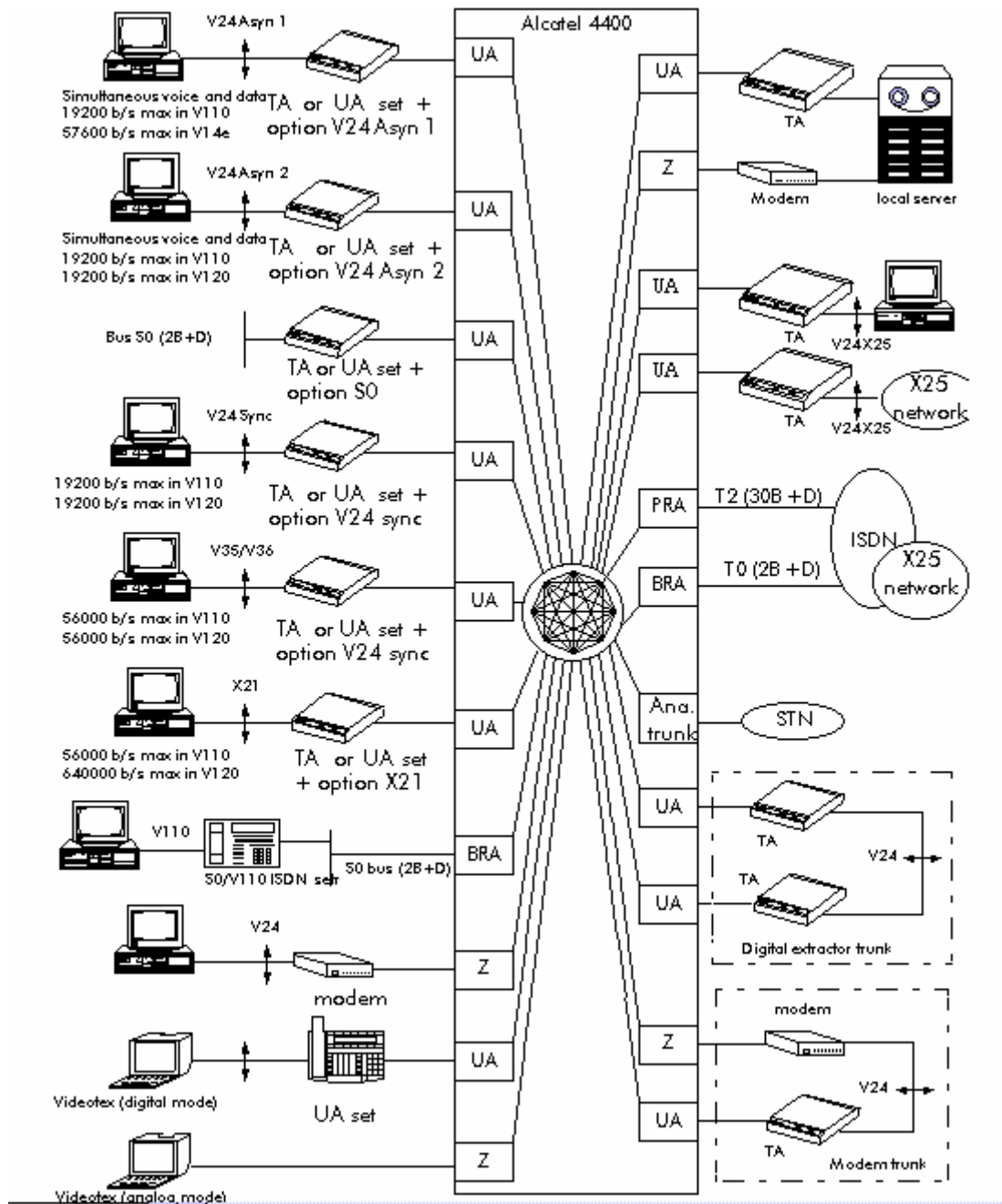
The ISDN boards that can be connected on the ACT backplane are of the following types: - --

BRA board offering 8 E0 bus interfaces

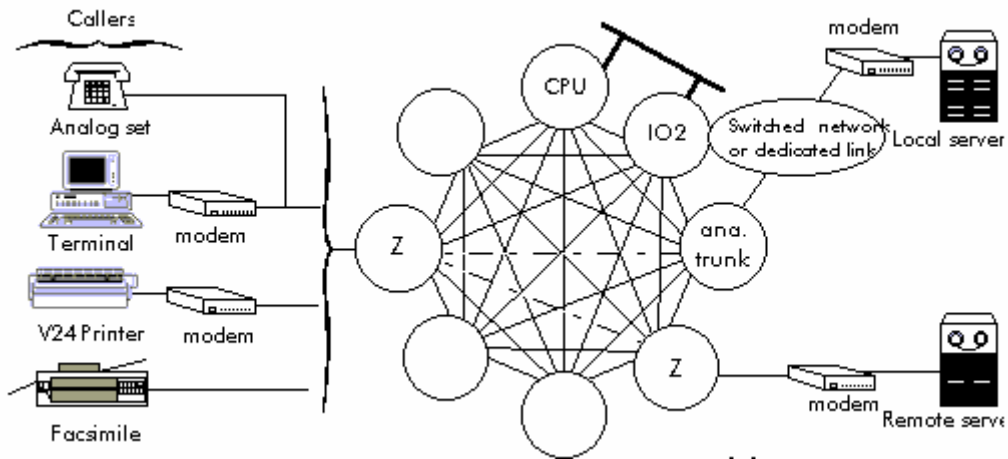
PRA board offering 1 E1 interface.

BPRA board offering 1 E1 interface and 3 E0 bus interfaces

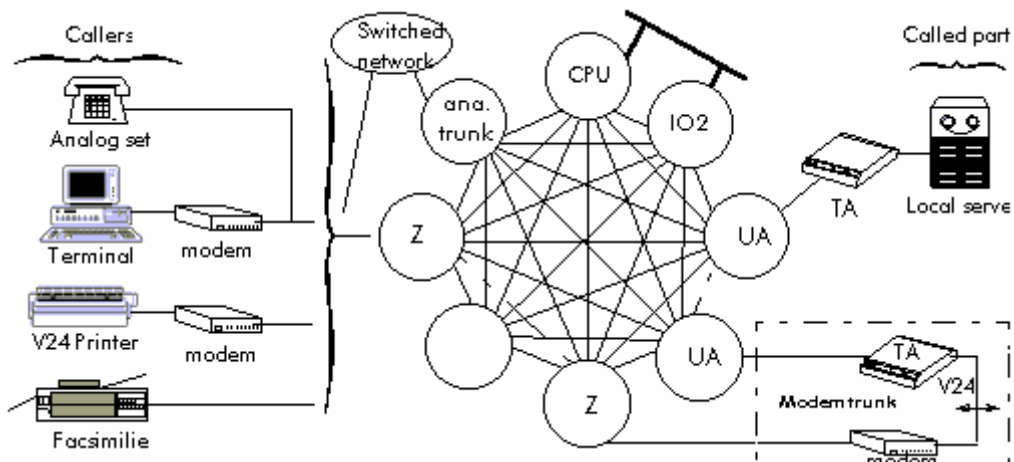
Terminal connection This takes place using interfaces behind the UA set or TA adapters: - asynchronous V24 interface, - synchronous V24/V35/V36 interface, - X21 interface, - S0 interface.



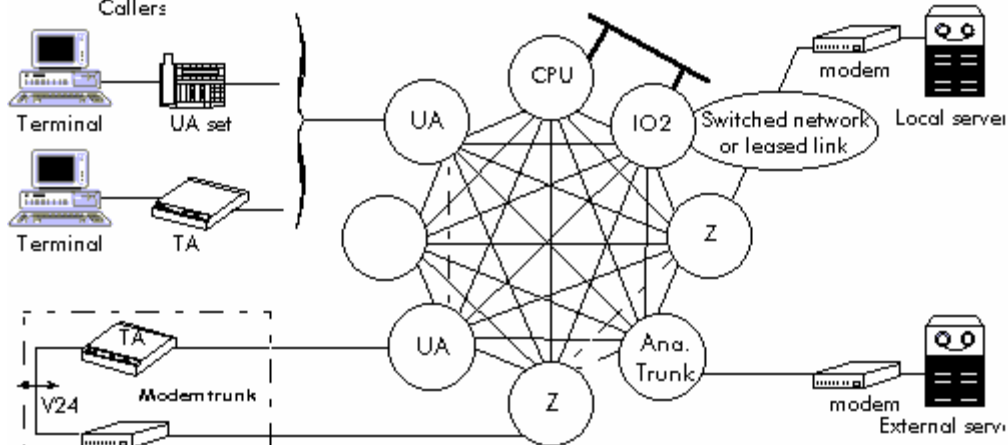
Analog - analog connectivity



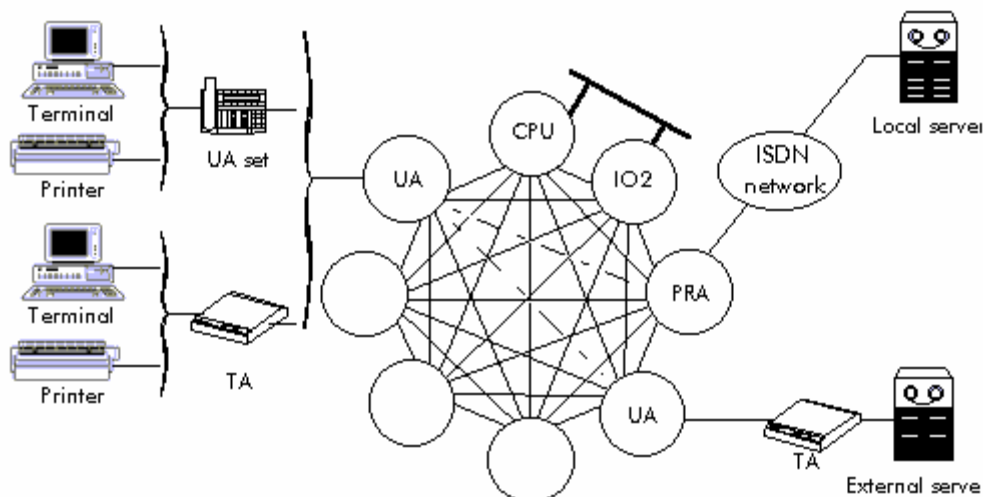
Analog - digital connectivity



Digital - analog connectivity



Digital - digital connectivity



Configuration of Inter-system links (E1/T2):

- PCM link is E1 link (uses PCM boards)
 - ABC link is special link for inter-node connection (uses PRA boards)
 - T2 is ISDN link used for public network connection (uses PRA board)
- Time slot 0 is used for alarms, Time slot 16 is used for signaling.

ABC Link management (Inter node links):

- PRA coupler management
- Link configuration
- Channel assignments
- IP/X25 Tunnel management

ABC Trunk Group management (Links b/w heterogeneous systems):

- Trunk group creation
- Coupler management

QSIG Protocol:

QSIG is a modern, powerful and intelligent inter-PINX (Private Integrated services Network Exchange) signaling system designed specifically to meet the requirements for sophisticated communications services. It provides:

- a platform for future development supported by international standards organizations;
- a harmonized method for interconnecting multi-vendor equipment;
- a mechanism for manufacturers to provide innovative features within a heterogeneous environment;
- a flexible and cost efficient method of linking PINX equipment;