

Electrical Engineering Department

EE 400, Experiment # 7

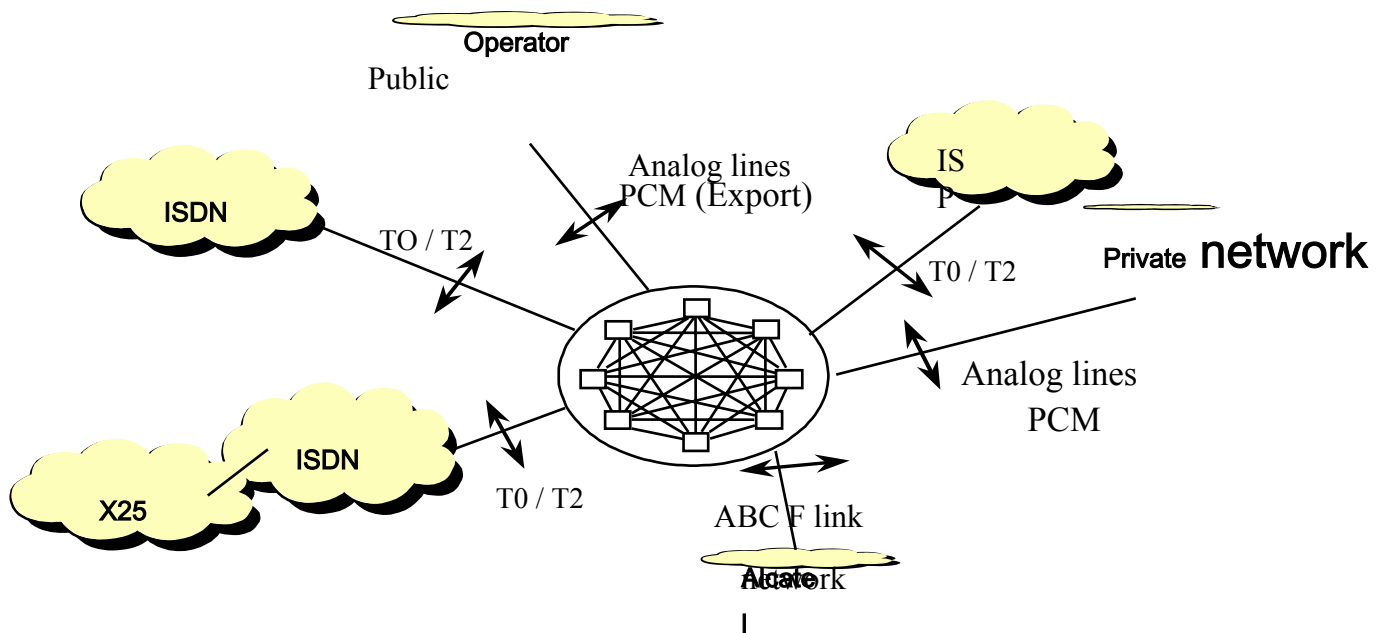
Intersystem Links - A visit to KFUPM Voice Network

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

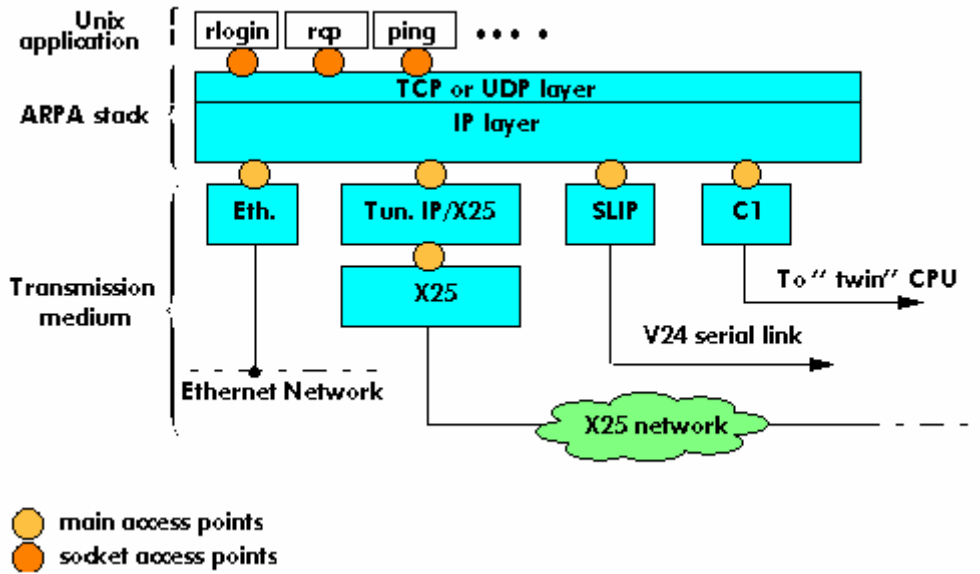
External networks and interfaces

Type of private voice networks:

1. Homogenous (ABC-F2 or E1 protocol)
2. Alcatel Hetrogeneous (ABC\_F1 protocol)
3. Hetrogeneous (QSIG protocol)

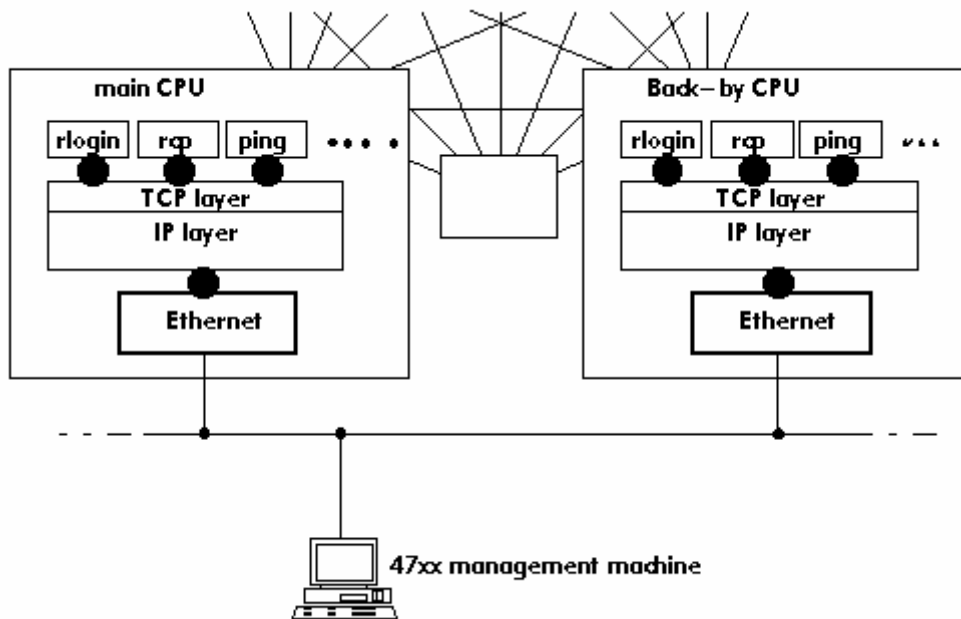


The IP facilities use the following transmission media: - Ethernet network - X25 network - V24 serial links - Inter ACT link.



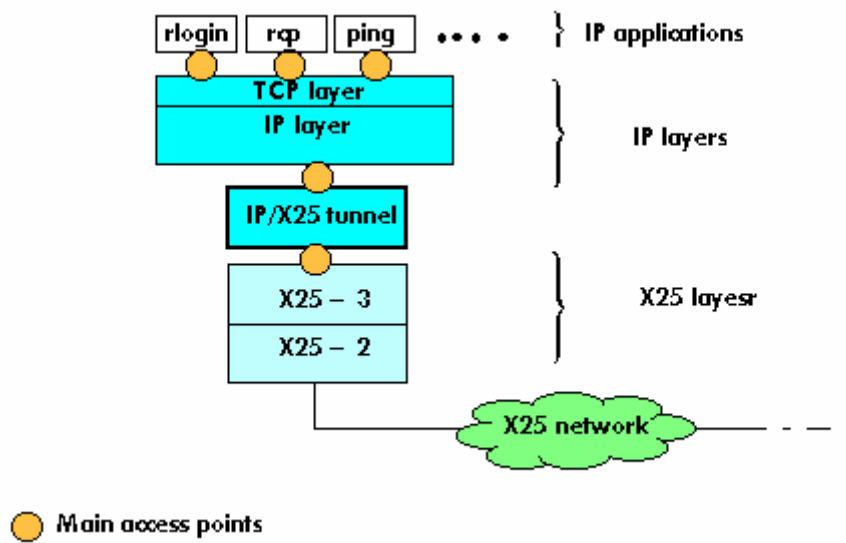
### 1. ETHERNET INTERFACE

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



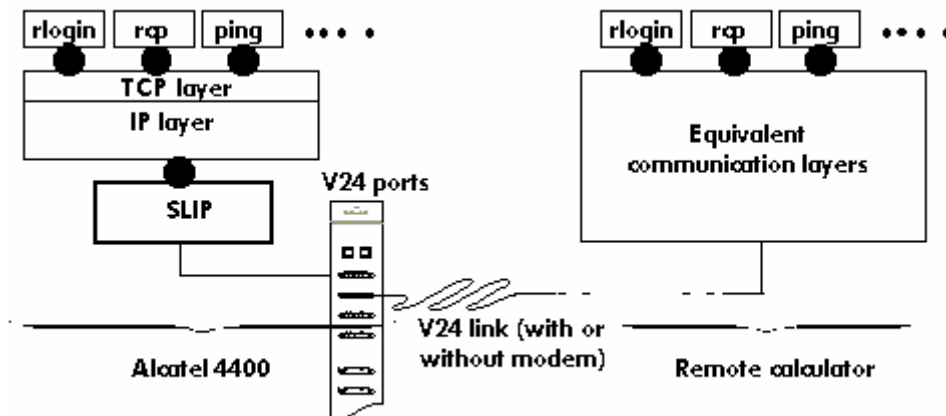
### 2. IP/X25 TUNNEL INTERFACE

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.



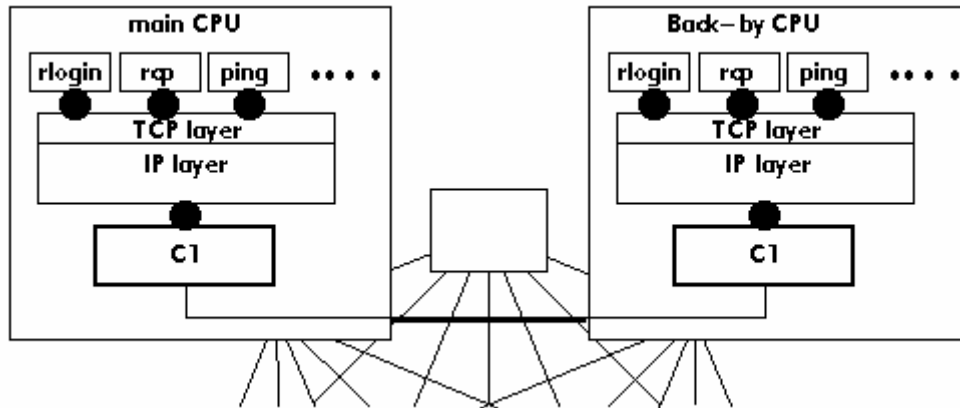
### 3. SERIAL LINK

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

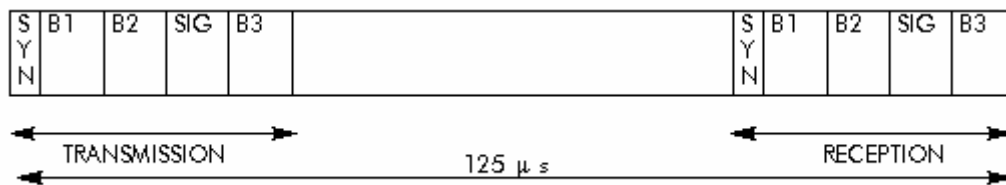


### 4 C1 Link

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**

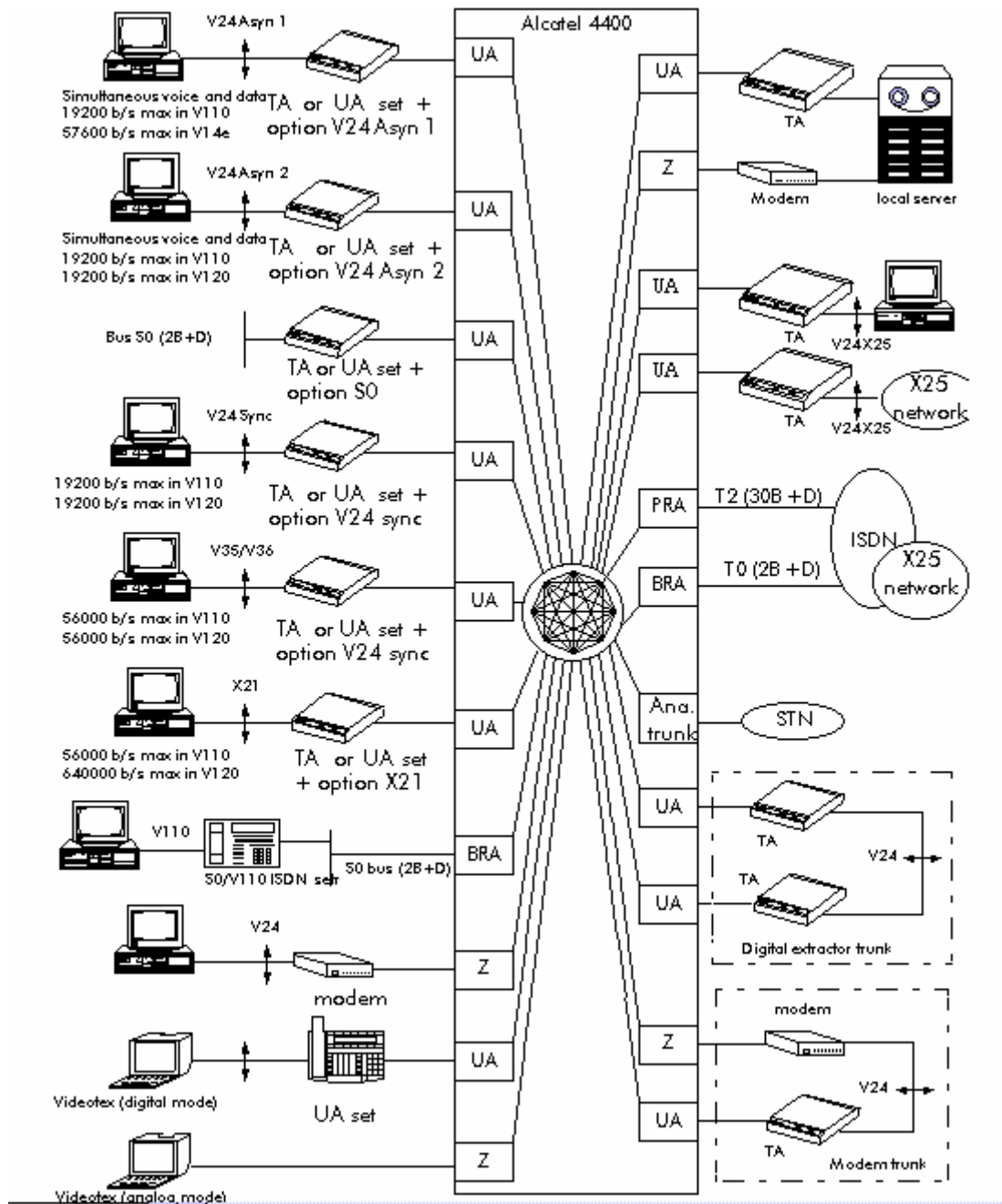
The ISDN boards that can be connected on the ACT backplane are of the following types: - --

**BRA** board offering 8 E0 bus interfaces

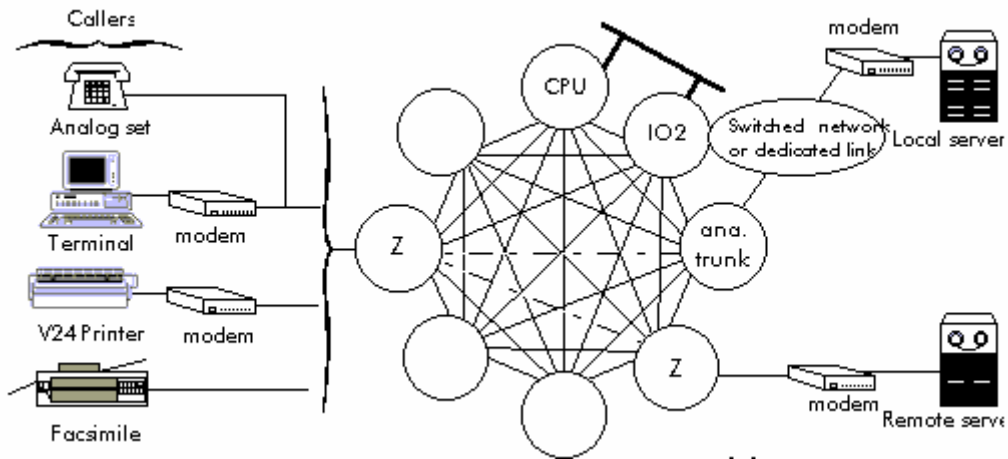
**PRA** board offering 1 E1 interface.

**BPRA** board offering 1 E1 interface and 3 E0 bus interfaces

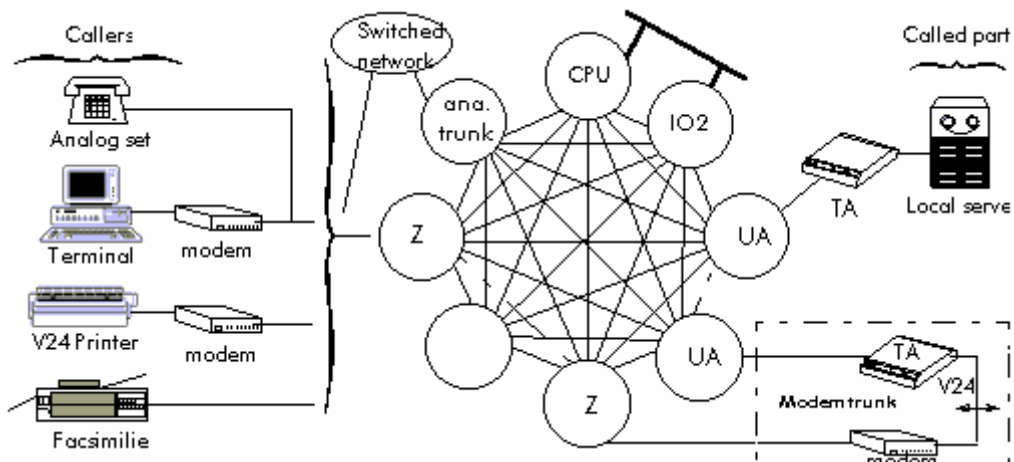
**Terminal connection** This takes place using interfaces behind the UA set or TA adapters: - asynchronous V24 interface, - synchronous V24/V35/V36 interface, - X21 interface, - S0 interface.



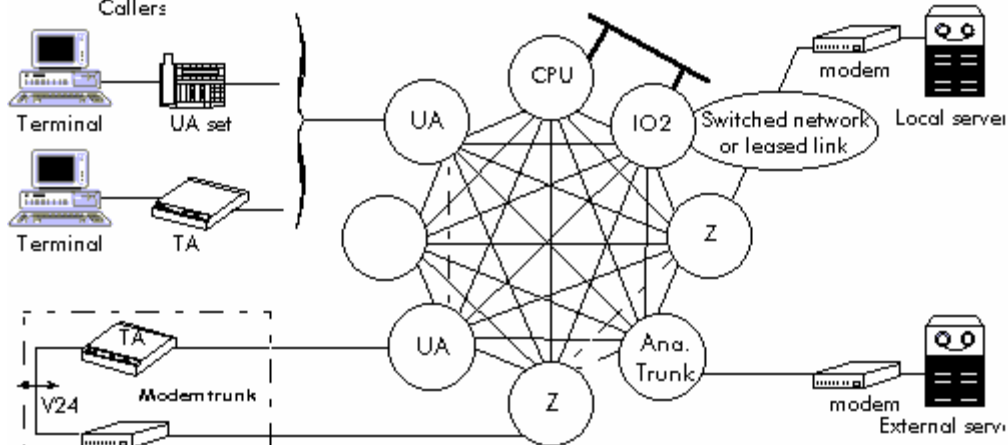
### Analog - analog connectivity



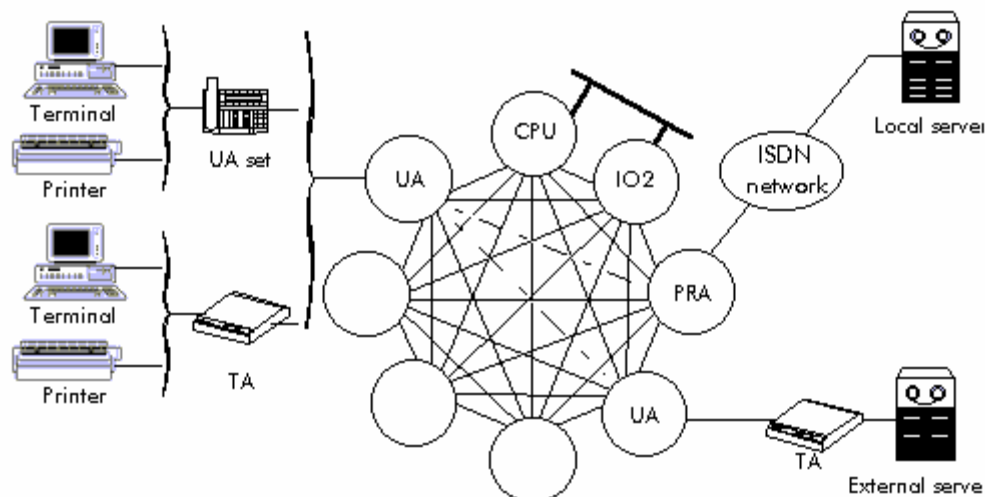
### Analog - digital connectivity



### 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;