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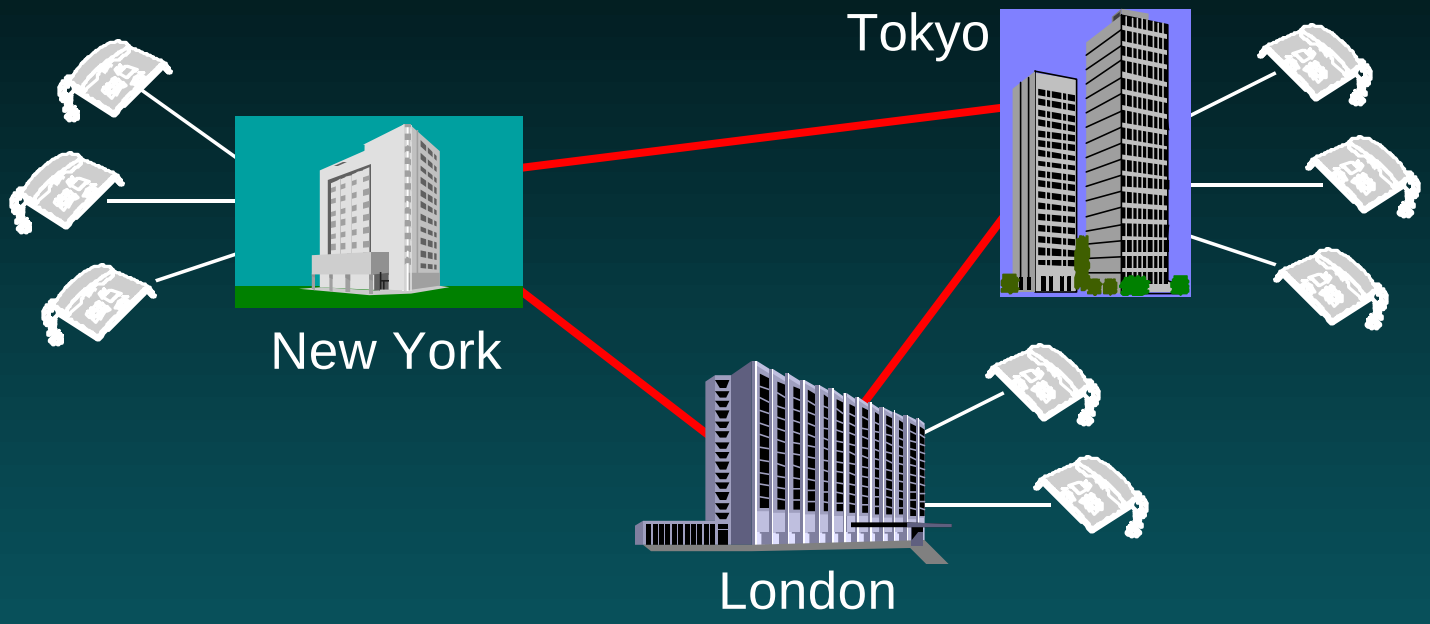
Structure of presentation

- Background to Corporate Telecommunication Networks
- Key technologies standardized by TC32
  - Private Integrated Services Networks (PISNs), including QSIG
  - Computer-Supported Telecommunications Applications (CSTA)
  - Broadband PISNs
  - PISN-IP interoperability
- TC32 today - Task Groups, working methods, relationship with JTC1 and ETSI

Corporate Telecommunication Networks

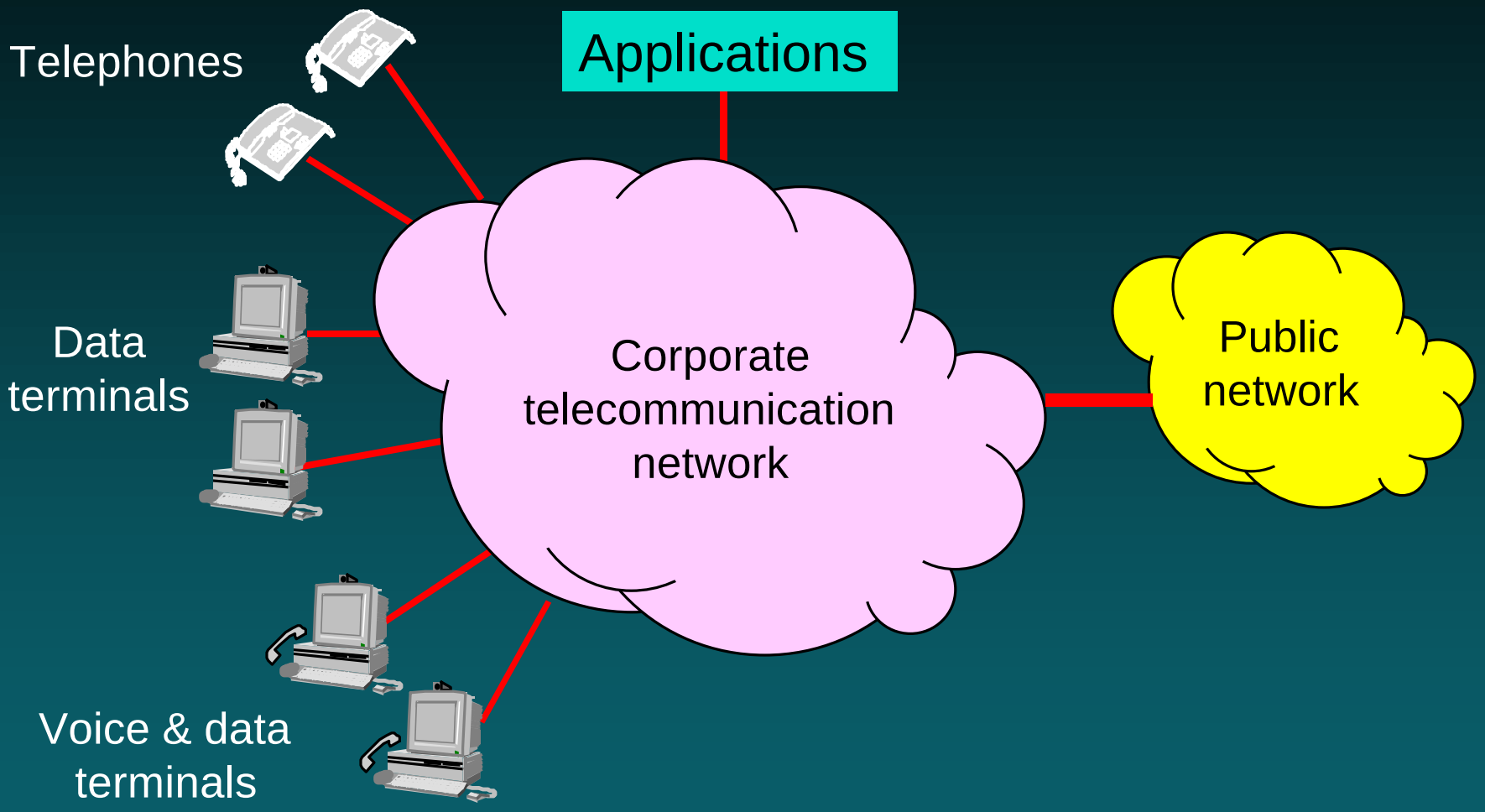


- Serving a defined set of users - not the general public
- Traditionally for voice - built around PBXs
- Alternatively can use public network infrastructure - Virtual Private Networks (VPNs)

Corporate Telecommunication Networks

- Recent years have seen start of convergence with data:
  - convergence of applications (e.g., data applications that control voice calls, integrated mailboxes and directories)
  - convergence of desktop (1 terminal for data and voice)
  - convergence of network infrastructure (1 network for data and voice - IP)

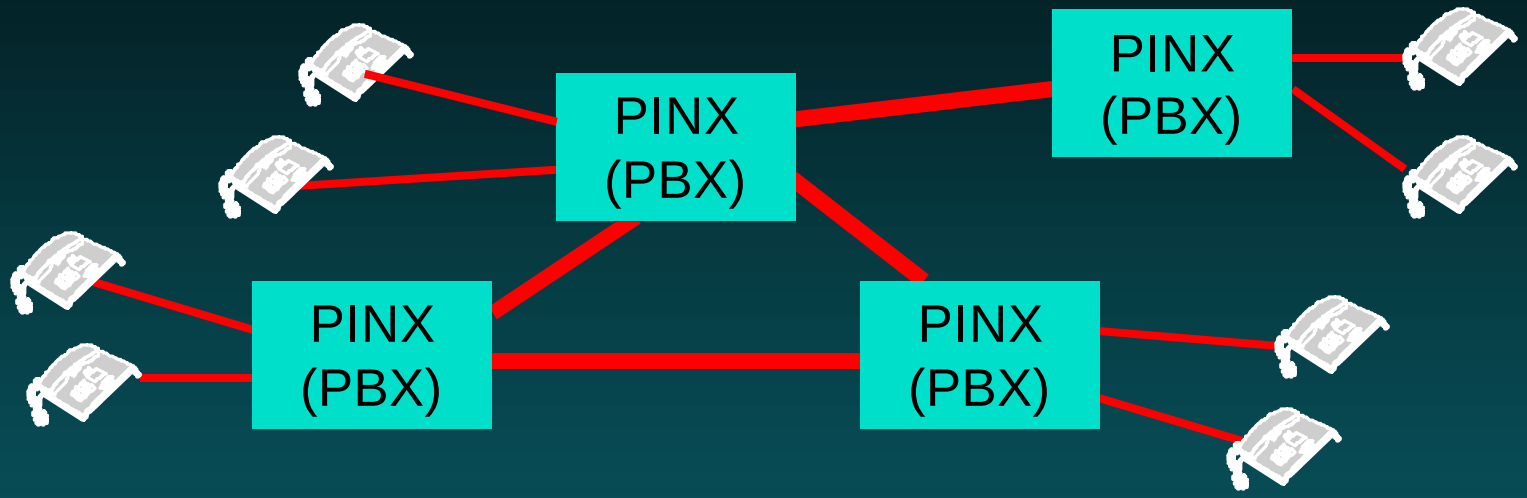
Corporate telecommunication networks



Private Integrated Services Networks - background

- Based on Integrated Services Digital Network (ISDN) technology (as defined by ITU-T)
  - Time division multiplexing (TDM)
  - 64 Kbit/s pipes
  - Voice normally encoded using G.711
  - Common channel signalling
- Nodal entity known as Private Integrated services Network eXchange (PINX)
- ISDN technology took over from analogue technology and digital channel-associated technology in corporate telecommunication networks in mid to late 80s
- Can carry data as well as voice, but not efficient

Private Integrated Services Networks - implementation



- Typically implemented using customer premises equipment, I.e. Private Branch eXchanges (PBXs)
- Can be implemented on public ISDN infrastructure as VPN, or a combination of public ISDN equipment and customer premises equipment

Private Integrated Services Networks - Inter-PINX signalling

- Need for a signalling protocol for controlling the establishment, maintenance and clearing of calls between PINXs
- Initially carried out by proprietary protocols - also DPNSS in UK
- Need for an internationally standardized protocol to permit multi-vendor operation in multi-national corporate networks
- TC32 began work on QSIG in 1988

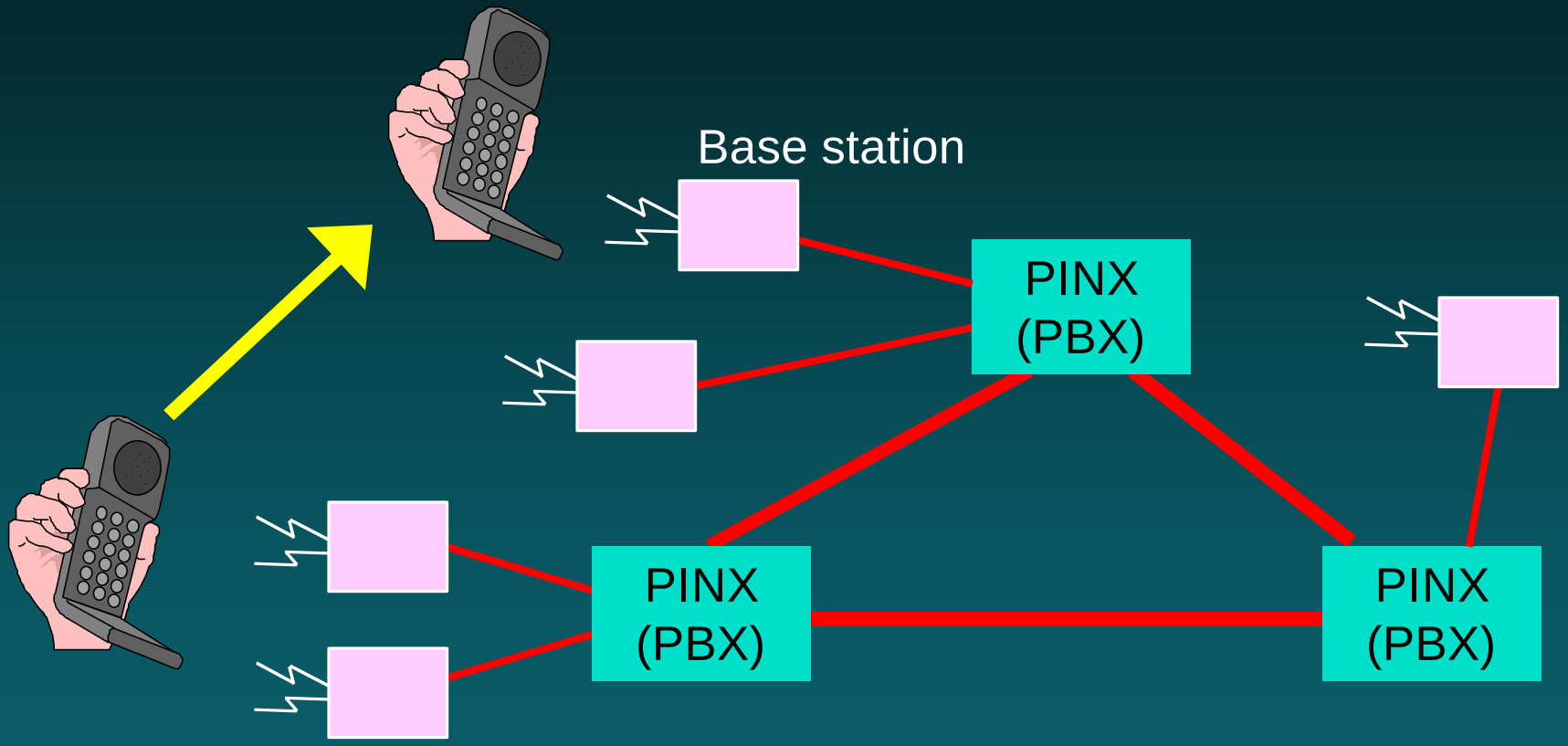
Private Integrated Services Networks - QSIG

- QSIG - Signalling at the Q reference point
- Q reference point is logical interface from a PINX to a peer PINX
  - a number of 64 Kbit/s user information channels
  - a common signalling channel
- Independent of how the inter-PINX link is realized, e.g., leased line, via public ISDN, via IP network

Private Integrated Services Networks - QSIG standards

- ECMA 143 - QSIG basic call (ISO/IEC 11572)
- ECMA-165 - QSIG generic support for supplementary services - a toolkit on which signalling for support of supplementary services can easily be built
- ECMA Standards for QSIG support for individual supplementary services / additional network features, e.g., call transfer, call diversion, advice of charge, caller's name
- ECMA Standards describing basic and supplementary services (providing requirements for the corresponding QSIG standards)

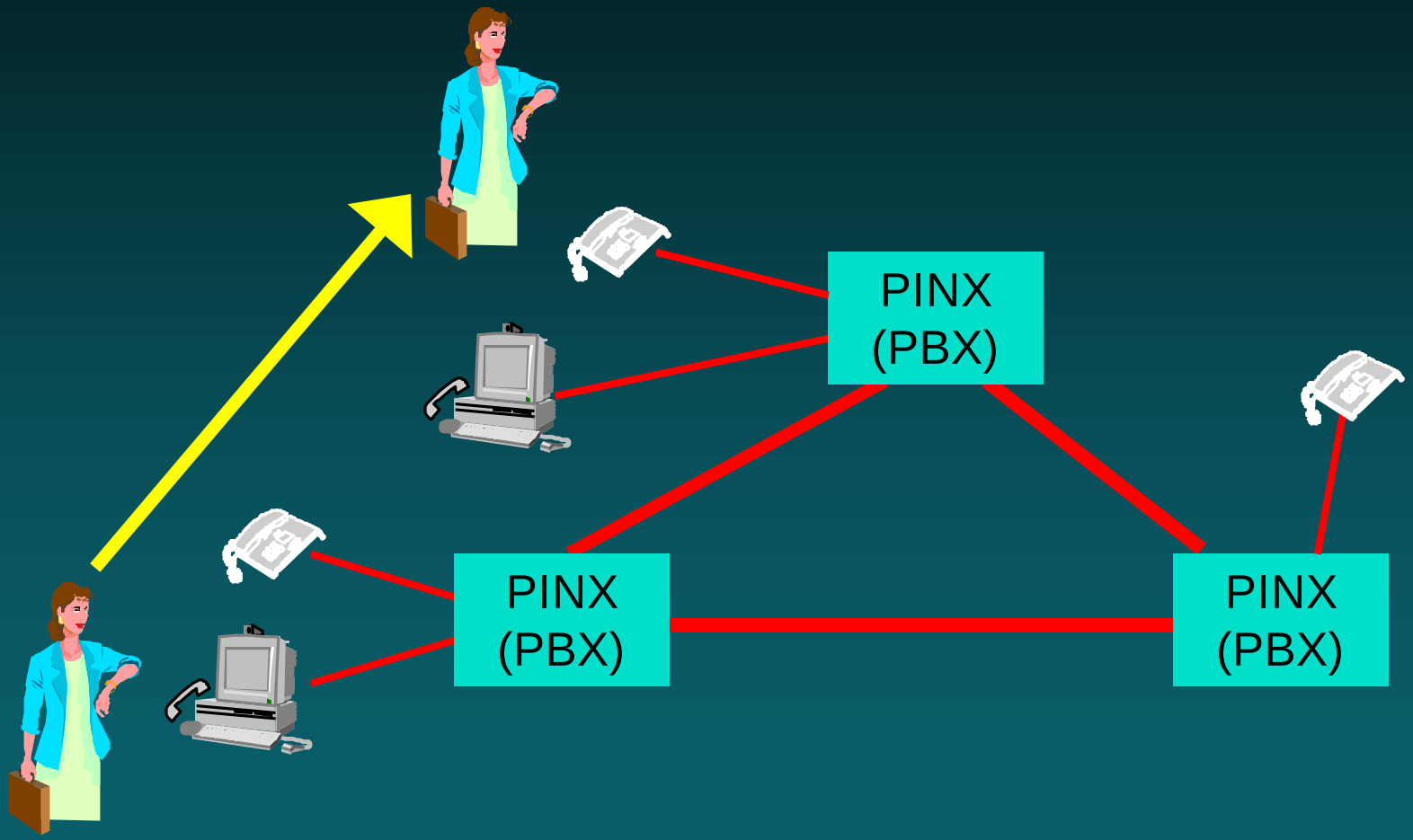
Private Integrated Services Networks -Wireless Terminal Mobility (WTM) support in QSIG



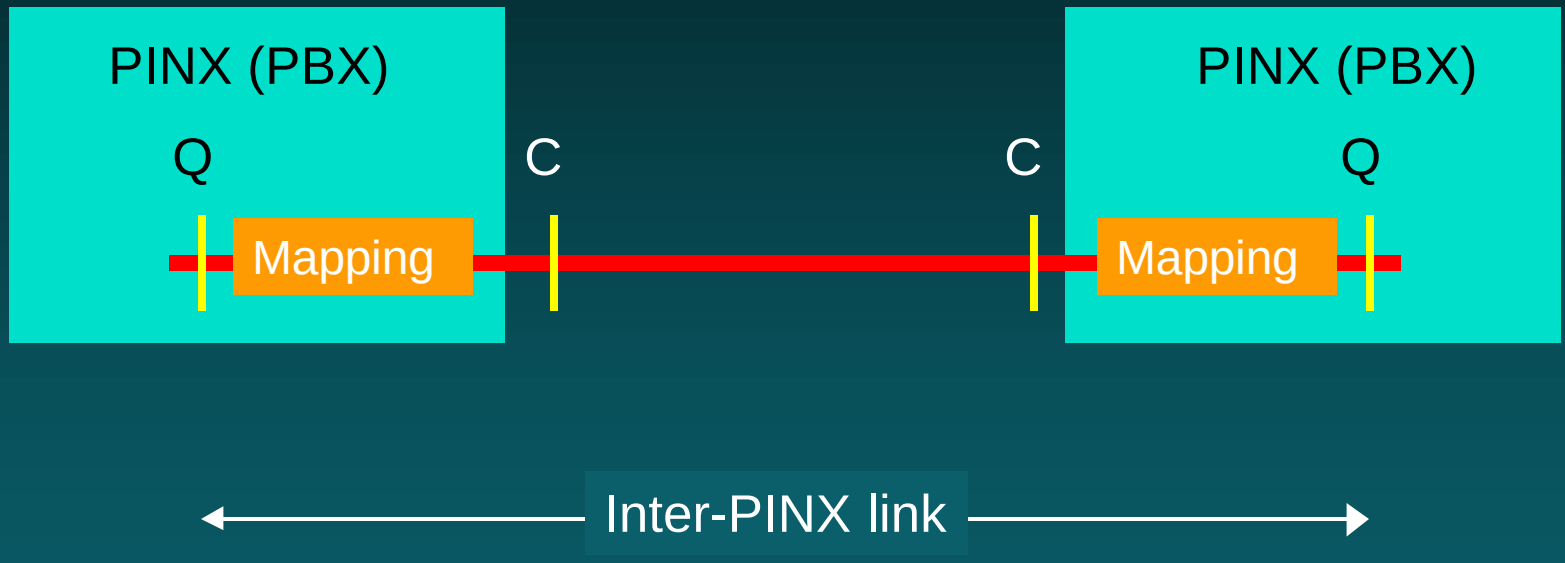
Private Integrated Services Networks - Wireless Terminal Mobility (WTM) support in QSIG

- Formerly CTM (Cordless Terminal Mobility)
- Air interface independent, but typically using the DECT (Digital Enhanced Cordless Terminal) air interface standard
- QSIG support for
  - location registration
  - incoming call
  - outgoing call
  - terminal authentication
  - network authentication.

Private Integrated Services Networks - Personal User Mobility (PUM) support in QSIG

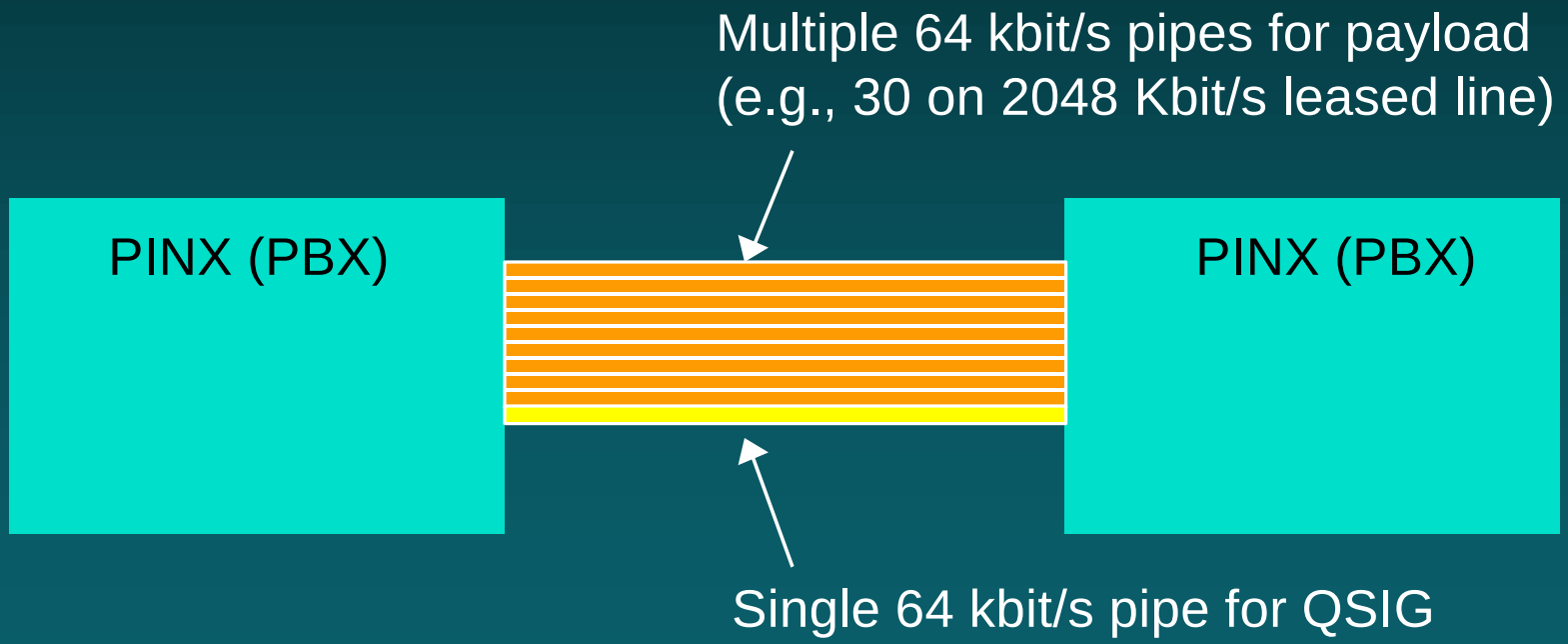


Private Integrated Services Networks - Means of providing inter-PINX links



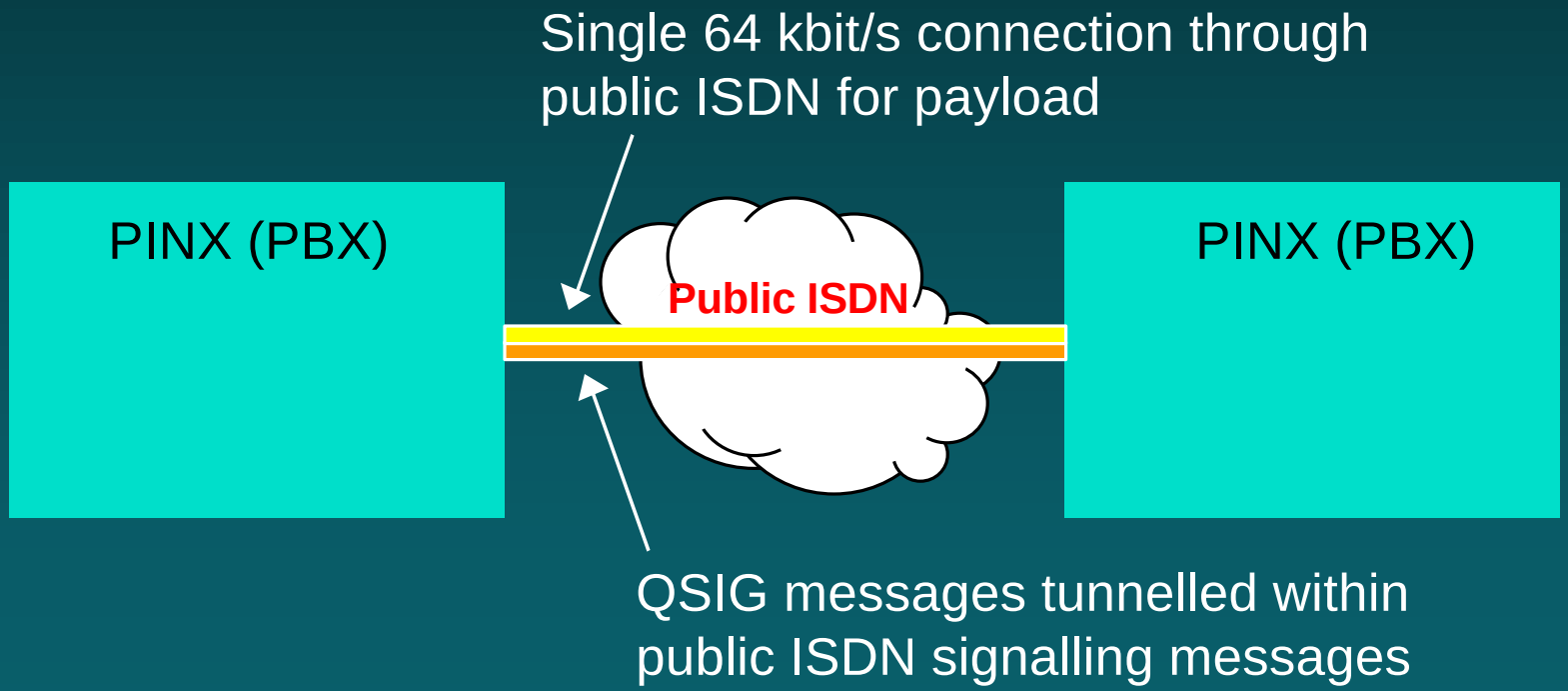
Private Integrated Services Networks - Mapping standards (1)

- ECMA-226 - Mapping circuit mode - for leased lines or use of public ISDN connections with separate 64 Kbit/s connection for QSIG



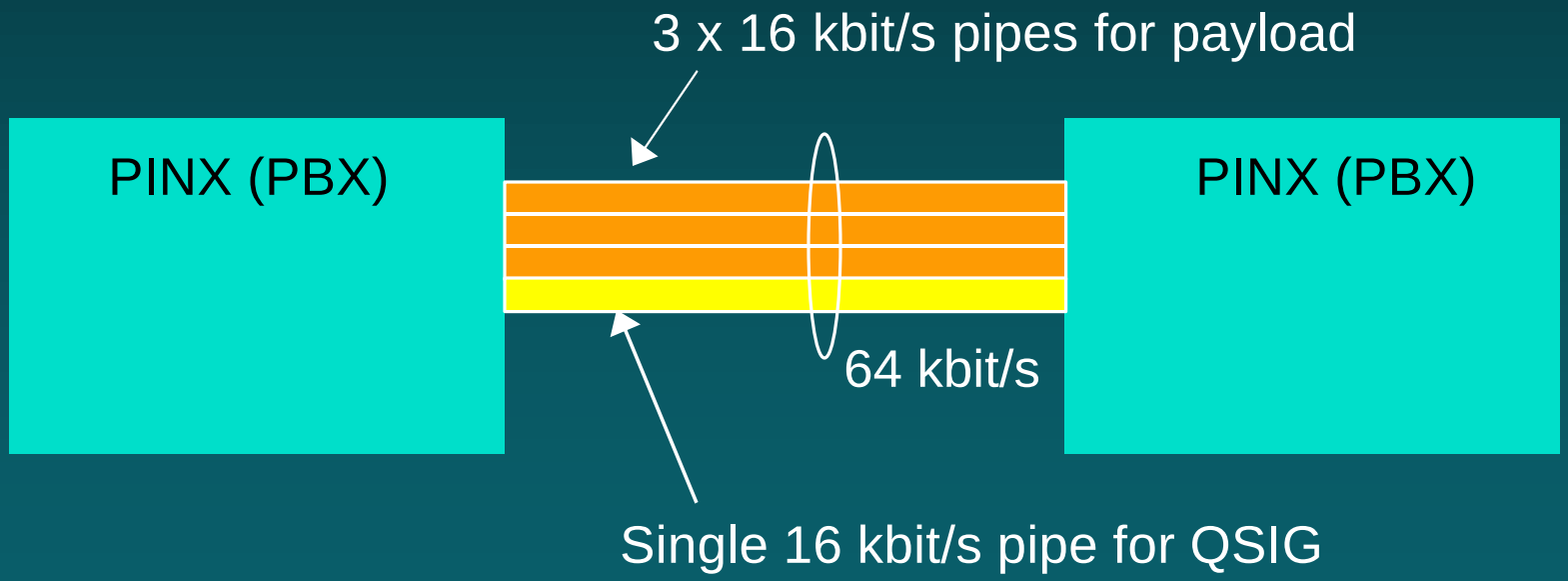
Private Integrated Services Networks - Mapping standards (2)

- ECMA-244 - Mapping user-user signalling - uses single public ISDN connection, with QSIG tunnelled within ISDN signalling as “user-to-user” information



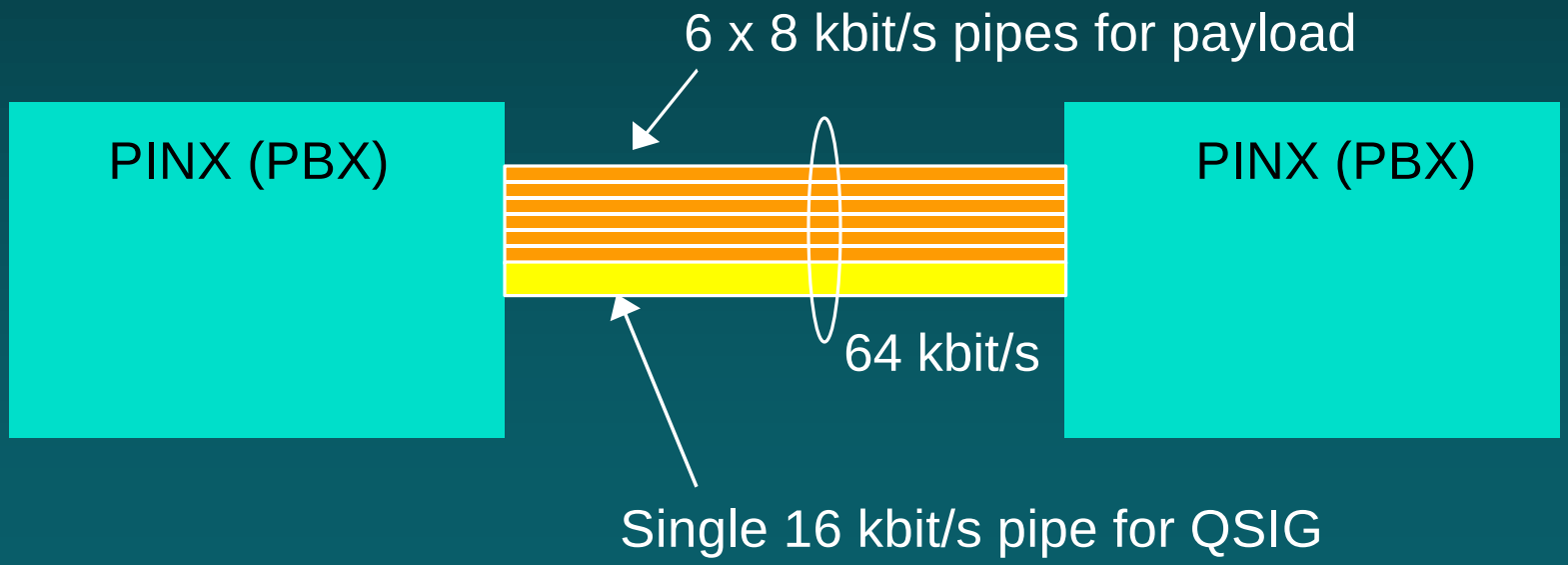
Private Integrated Services Networks - Mapping standards (3)

- ECMA-253 - Mapping 16 Kbit/s - uses single 64 Kbit/s connection to provide:
  - 3 x 16 Kbit/s user information channels (for compressed speech)
  - 1 x 16 Kbit/s signalling channel for QSIG



Private Integrated Services Networks - Mapping standards (4)

- ECMA-289 - Mapping 8 Kbit/s - uses single 64 Kbit/s connection to provide:
  - 6 x 16 Kbit/s user information channels (for compressed speech)
  - 1 x 16 Kbit/s signalling channel for QSIG



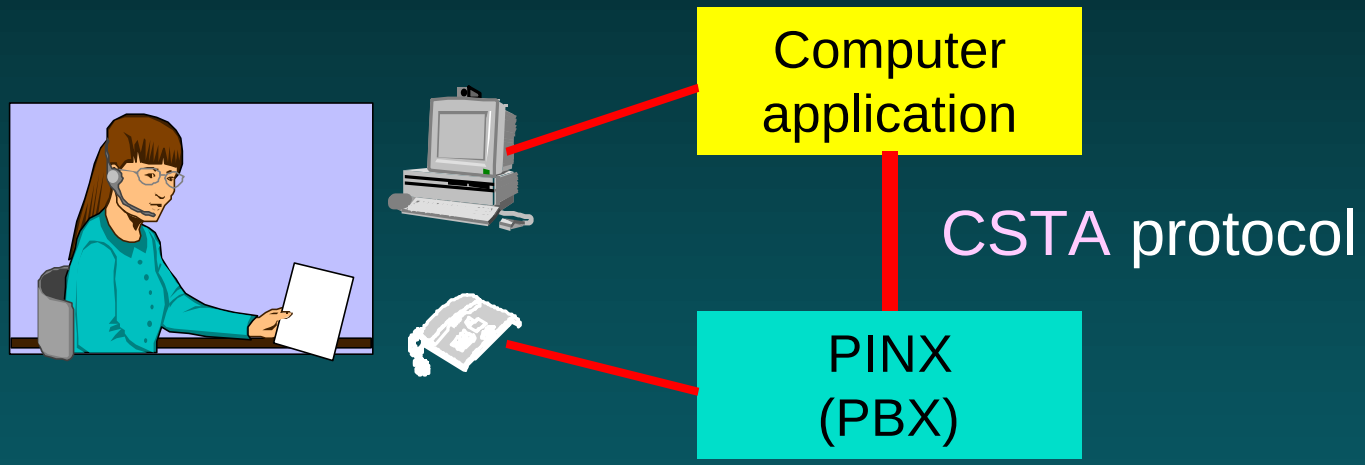
Private Integrated Services Networks - other ECMA Standards

- ECMA-133 - reference configuration
- ECMA-155 - addressing and numbering in PISNs
- QSIG profile for air traffic systems (submitted for GA vote)
- QSIG profile for VPN access (being worked on in TC32-TG14)

Private Integrated Services Networks - current status of QSIG

- ✓ THE internationally accepted standard for inter-PINX signalling
- ✓ Published also as ISO/IEC International Standards
- ✓ Endorsed by ETSI as European Standards
- ✓ Implemented by all major PBX vendors
- ✓ The basis for some VPN implementations

Computer-Supported Telecommunications Applications (CSTA)



Computer-Supported Telecommunications Applications (CSTA)

- A form of 3rd party Computer-Telephony Integration (CTI)
- Allows applications to be written that will work with PBXs from different vendors
- Allows a PBX to work with a variety of applications from different vendors
- Examples:
  - Screen popping
  - Automatic call distribution for call centres

Computer-Supported Telecommunications Applications (CSTA) - functionality

- Allows application to:
  - monitor calls on extension lines or trunks
  - modify the behaviour of calls, e.g., by transferring caller to a different extension
  - make a call between two partiesdp

Computer-Supported Telecommunications Applications (CSTA) - standards

- ✓ Phase III standards
  - ◆ ECMA-269 - CSTA service (ISO/IEC 18051)
  - ◆ ECMA-285 - CSTA protocol (ISO/IEC 18052)
- ✓ Incorporate material from a range of external sources as well as material from phase II
- ✓ A mature standard / comprehensive set of capabilities
- ✓ Published as International Standards
- ✓ Future enhancements will be backward compatible with phase III

Broadband Private Integrated Services Networks (B-PISN)

- PISNs that use Asynchronous Transfer Mode (ATM) instead of Time Division Multiplexing (TDM)
- Fixed cell size (48 byte payload + 5 byte header) allows high speed switching
- Different traffic classes - allows mixing of data / voice / video
- B-QSIG standards developed by merger of QSIG and ATM Forum signalling concepts
- Re-positioning of ATM with respect to IP in the market has removed the need to develop the B-QSIG series of standards further

PISN-IP interoperability - IP telephony in the corporate network

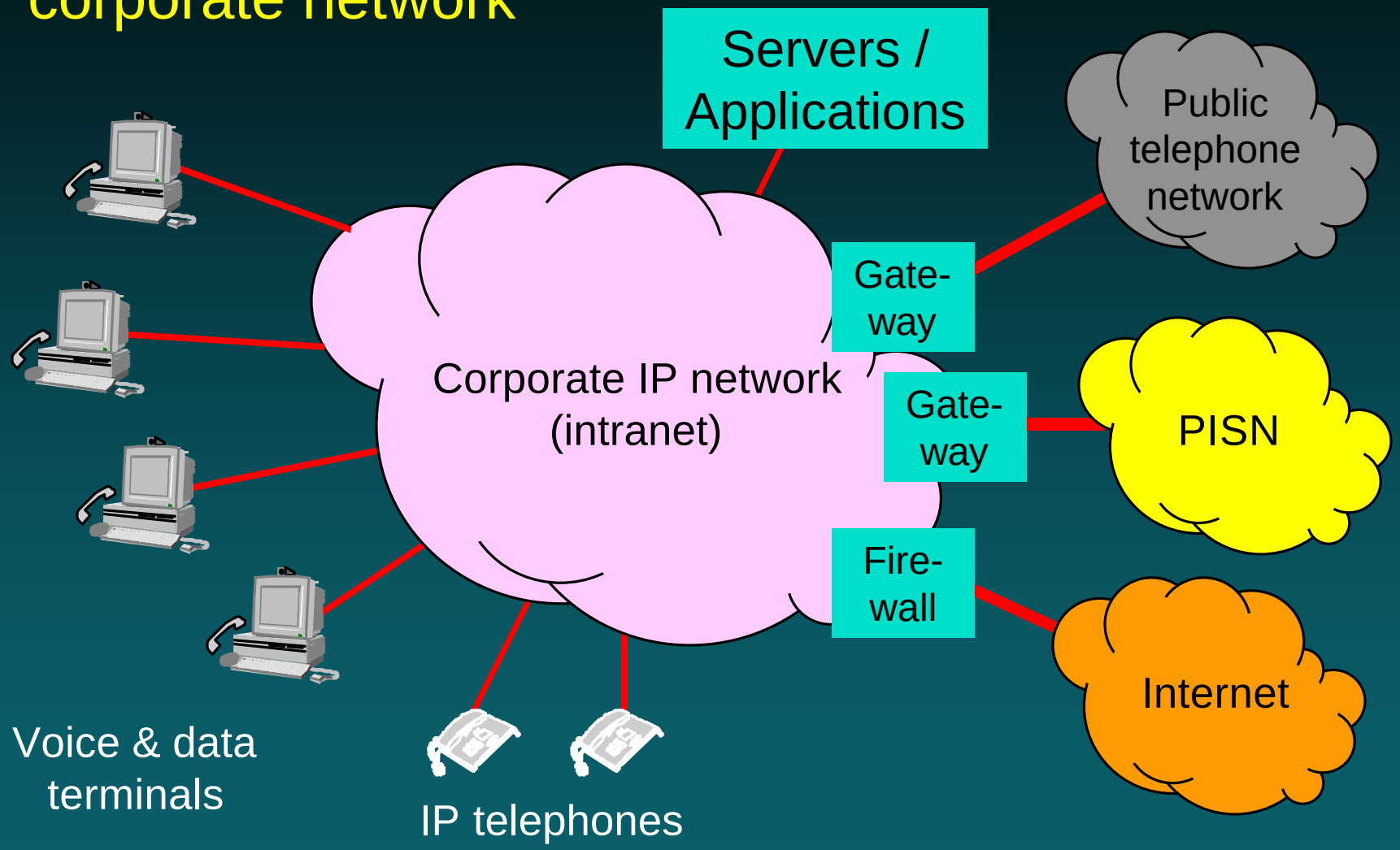
- Internet Protocol (IP) becoming the universal layer 3 in data networks
- Data bandwidth increasing rapidly - already overtaking voice bandwidth
- In a few years, voice bandwidth will become almost insignificant compared with data bandwidth

PISN-IP interoperability - IP telephony in the corporate network

So put voice onto data (IP) network

- one network infrastructure to manage
- one cable to the desktop
- facilitates convergence of the desktop - use PC for voice as well as data
- facilitates applications convergence

PISN-IP interoperability - IP telephony in the corporate network

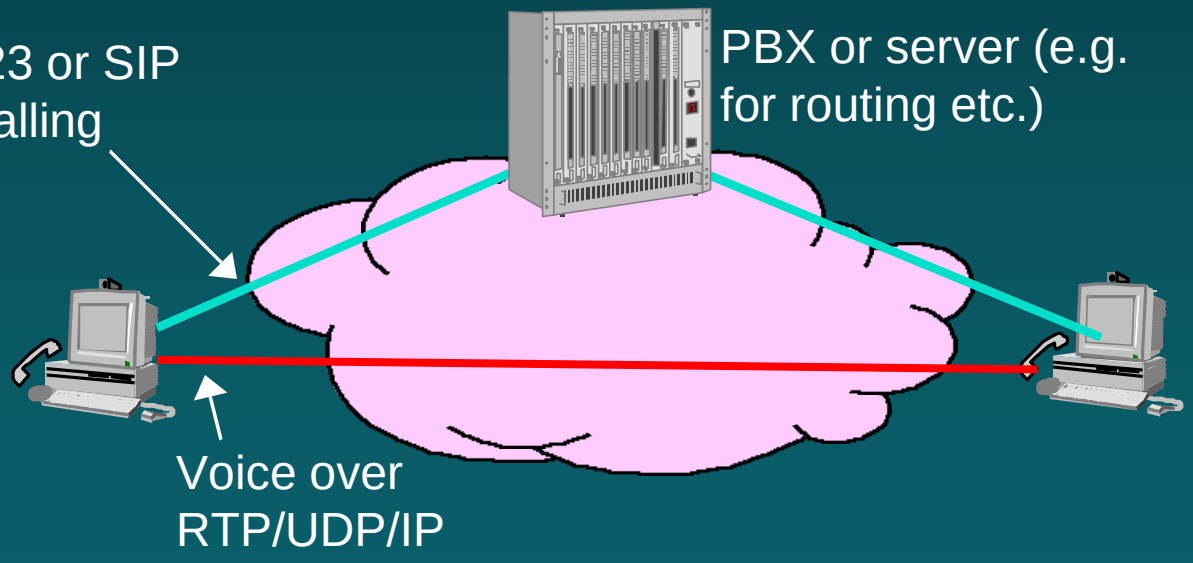


PISN-IP interoperability - current status of IP telephony in the corporate network

- Manufacturers offering two types of product:
  - Evolution of the PBX - addition of IP interfaces - finding favour with large networks
  - Server-based “soft” PBXs - finding favour with green-field sites and SMEs
- Changeover being held back by lack of bandwidth in data network and voice QoS problems
- But this will change as data network bandwidth increases - voice requirement will remain steady

PISN-IP interoperability - standards for IP telephony

- Voice carried over RTP (Real-time Transport Protocol) over UDP/IP
- Competing signalling standards from ITU-T and IETF
  - H.323 from ITU-T
  - SIP (Session Initiation Protocol) and other protocols from IETF



PISN-IP interoperability - standards for IP telephony

- Signalling standards equally applicable to public and enterprise environments
- ETSI project TIPHON looking at interworking between IP networks and switched-circuit telephony networks - but with emphasis on public networks
- TC32-TG17 therefore looking at PISN-IP interoperability

PISN-IP interoperability - scope of TC32-TG17 work

- Interworking via a gateway between a PISN and an IP network
- Interconnection of remote PISNs (or parts of a PISN) via an IP network
- Connection of terminals to PISNs via an IP network
- Aspects include:
  - Architecture
  - Protocols
  - Services
  - Naming and addressing
  - Security
  - Mobility
  - Network management

TC32 today - structure

ECMA Standardizing Information and Communication Systems

- TC32 - Communication, Networks and Systems Interconnection
  - **TG11 - CSTA**
  - **TG13 - Architecture, numbering, naming & addressing**
  - **TG14 - Services and signalling**
  - **TG16 - Internet ScreenPhones**
  - **TG17 - IP-based multimedia communications**

TC32 today - TG11 (CSTA)

- CSTA phase 3 completed
- Investigations continuing in a number of directions:
  - Use of CSTA with IP telephony
  - Work flow studies: customer relationship management
  - APIs

TC32 today - TG14 (services and protocols)

- Continuing to add further QSIG supplementary services and network features
  - message centre support
  - call identification and linkage in support of networked CSTA
- QSIG VPN access profile
- Support for long messages

TC32 today - TG17 (Multimedia over IP)

- Technical Report on PISN-IP interoperability almost complete
- First 3 standards on QSIG-H.323/H.450 interworking complete - work starting on a further one
- Successfully influenced ITU-T SG16 to provide tunnelling mechanism in H.323/H.225.0 - suitable for tunnelling QSIG
- Investigating areas for further study and/or standardization

TC32 today - other TGs

- TG13 (PISN architecture and numbering) - basically dormant, but low level of activity by email as need arises
- TG16 (Internet Screenphones) - dormant.
  - Demise of Internet Screenphone Reference Forum has undermined existing programme of work
  - Final call for new work proposals

TC32 today - working methods

- TC32, TG14 and TG17 meet quarterly
- TG11 generally meets separately and slightly more frequently (alternation between Europe and North America)
- Audio conferences used from time to time
- Extensive use of email
- Paperless meetings

TC32 today - relationship with JTC1

- Most Standards & Technical Reports fast-tracked to JTC1
- Close relationship with JTC1/SC6/WG6
- Project work in JTC1/SC6/WG6 complete - remains as a group for fast-tracked standards in this area and for maintenance of existing standards
- WG6 has early exposure to work of TC32 and opportunity to influence - helps fast-track to run smoothly
- WG6 to become a “virtual group”, acknowledging fact that technical work is done in ECMA TC32 - does not plan to meet with SC6 in future unless there is a real need

TC32 today - relationship with ETSI

- Joint ECMA-ETSI Agreement - covers PISN, B-PISN and PISN-IP interoperability work
- Former EC mandates - resulted in ENs (formerly ETSs) for ECMA Standards, aligned with ISO/IEC standards where appropriate
- Current move from endorsing ENs to use of full ECMA texts
- Use of other ETSI deliverable types where ENs not required

Summary

- QSIG standards mature, but still being added to
- CSTA phase III a stable base - new directions being explored
- PISN-IP interoperability studies ongoing and first interworking standards emerging
- International recognition for all TC32 work via JTC1
- Seeking broader participation in TC32 and TGs to allow opportunities to be seized