“Internet Telephony” Panel at ICNP ’98

Cormac J. Sreenan

Networking and Distributed Systems Research

AT&T Labs - Research

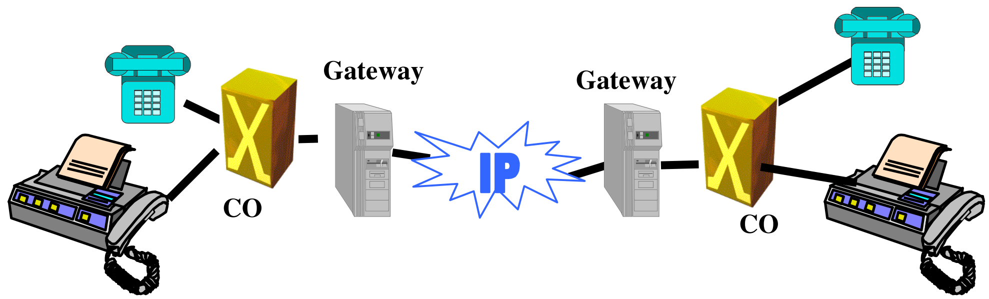
http://www.research.att.com/~cjs

Opportunities

- Cost reductions
  - currently service providers can avoid local access charges (3.5c/minute on domestic LD) and costly international settlement fees
  - transport efficiencies and equipment cost differentials of packet versus circuit
  - combined administration, customer care, network management, etc
- Increased flexibility
  - re-partitioning of functions between network and "intelligent" endpoints
  - improved user interfaces and modes of communication
- New applications
  - arising from use of multi-media, integration with web & email
  - "click to dial", virtual secretary , virtual call centers, connected-all-the-time

AT&T

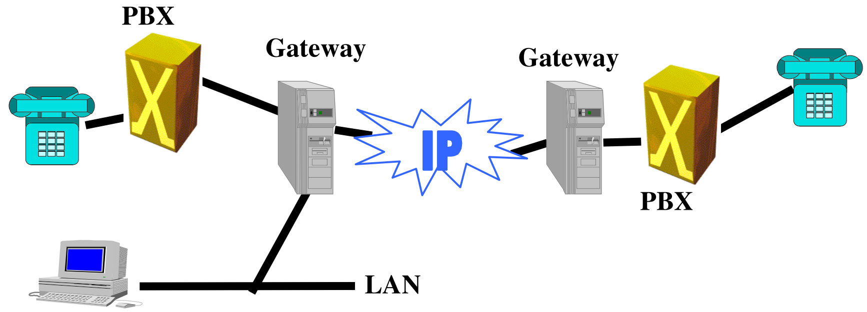
Status: IP Telephony for the Consumer



- Supports legacy equipment using on/off PSTN gateways
  - customer establishes account with ITSP or uses calling card
  - two stage dialing, requires caller to enter account details and phone number
  - call completed over Internet and/or private IP networks to destination gateway
- Issues include gateway interoperability, scaling & locating
  - and establishing service agreements between carriers
- Bottom line: mono-media, PSTN for access and calling features

AT&T

Status: IP Telephony for Business



- PBX-to-PBX connectivity over corporate intranets
  - legacy phone/fax calls routed over intranet via gateways
  - immediate cost reductions by eliminating LD charges
  - future cost reductions using software-PBX and PC/dedicated packet phones
- More controlled environment than that of ITSPs
  - private service over a private network
  - can simplify or avoid billing, directories, heterogeneity, etc
  - rely on (software) PBX to provide calling features

Consumer Telephony Service for IP Endpoints

- Non-legacy endpoints enabling full potential of IP telephony
- Today, callers use a PC telephony application
  - initiate call to another PC (or a PSTN phone via a gateway)
  - issues of heterogeneous coding, signaling, directories, addresses, etc
  - operating system latency and scheduling issues
  - provides basic "bypass" connectivity for a point-to-point voice call
- Future can expect a move towards "first-line" service
  - involvement of large telcos, packet telephony over cable etc
  - availability of dedicated packet phones, graphical displays
- Developments in wireless telephony
  - cellular/PCS infrastructure evolving to IP

AT&T

Issues Going Forward

- For equipment vendors
  - scalable gateways, interoperable
  - low-cost easy-to-use packet phones
  - scalable conference bridges
- For service providers
  - support required user features
    - » call waiting, caller ID, call forwarding, three-way calling, return-call, etc
    - » terminating announcements, operator break-in, 911, operator services
  - infrastructure for resource accounting and billing
  - increased predictability, high reliability
  - infrastructure for settlements and QoS agreements with other carriers

AT&T

Security

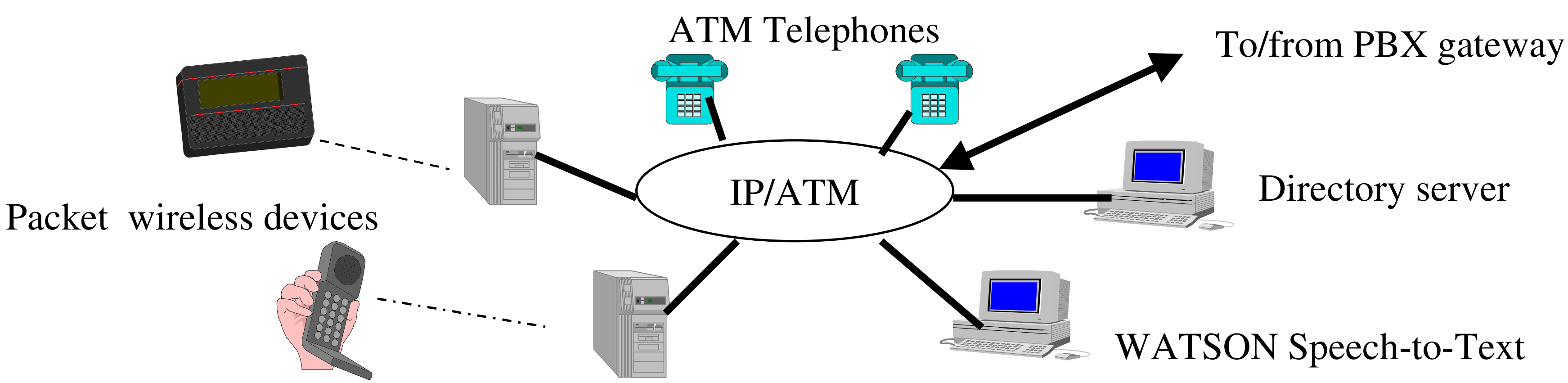
- Impact of perceived security issues associated with Internet
- Privacy concerns
  - unauthorized recording or logging of private conversations
  - anonymous calls requiring hidden caller identification, impact on return-call
  - desire to hide location information, including IP addresses
- The law
  - support for court-ordered wire tap
  - need to maintain state to allow call tracing
- Fraud
  - unauthorized calling, resource usage or call diversion
  - denial of service attacks

AT&T

Directories and Mobility

- Directories are required to determine destination network addresses
  - opportunity for allowing call-by-name features, supporting user mobility
  - but, removes the flexibility user's have today : to hide
    - » unpublished number, or selective distribution
  - therefore need ability for users to provide profiles or call handling logic
    - » who can reach a user, at which places, time and in what manner
  - issues of profile design, authentication, service scalability
  - need to continue supporting low-end devices and PSTN interworking
- Mobility requires mechanisms for updating current location
  - notion of registration, possibly automatic and long-lived
  - short-term terminal mobility requires re-routing - Mobile-IP?

Some Related Work at AT&T Research



- Telephony Over Packet networkS (TOPS)
  - system architecture for packet telephony using IP/ATM endpoints
  - directory service with user-programmable call processing logic
- Wireless Integrated Services Platform (WISP)
  - platform to explore integrated voice and data to mobile devices
  - initial focus: scheduled MAC, VC rerouting, low-latency handoffs

AT&T

Conclusions

- Three key opportunities for IP telephony are:
  - lower costs due to network efficiencies and new revenue sources
  - increased flexibility for network operation and service creation
  - new applications enabled by packet infrastructure and “intelligent” endpoints
- Status today is mainly supporting legacy endpoints
  - phone-to-phone via gateways for consumer long distance
  - PBX-to-PBX interconnection for business voice and fax
- Technical challenges related to using IP endpoints
  - services,quality and reliability for a “first-line” service
  - address security, privacy and authorization issues
  - provide directories and support for user mobility

AT&T