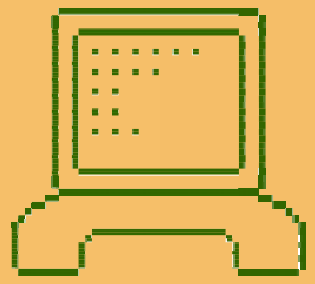


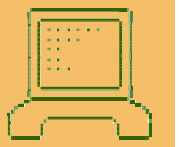
IPT-2
IP Telephony Station Sets

Michael Bayer

Computer Telephony Solutions

www.CTExpert.com

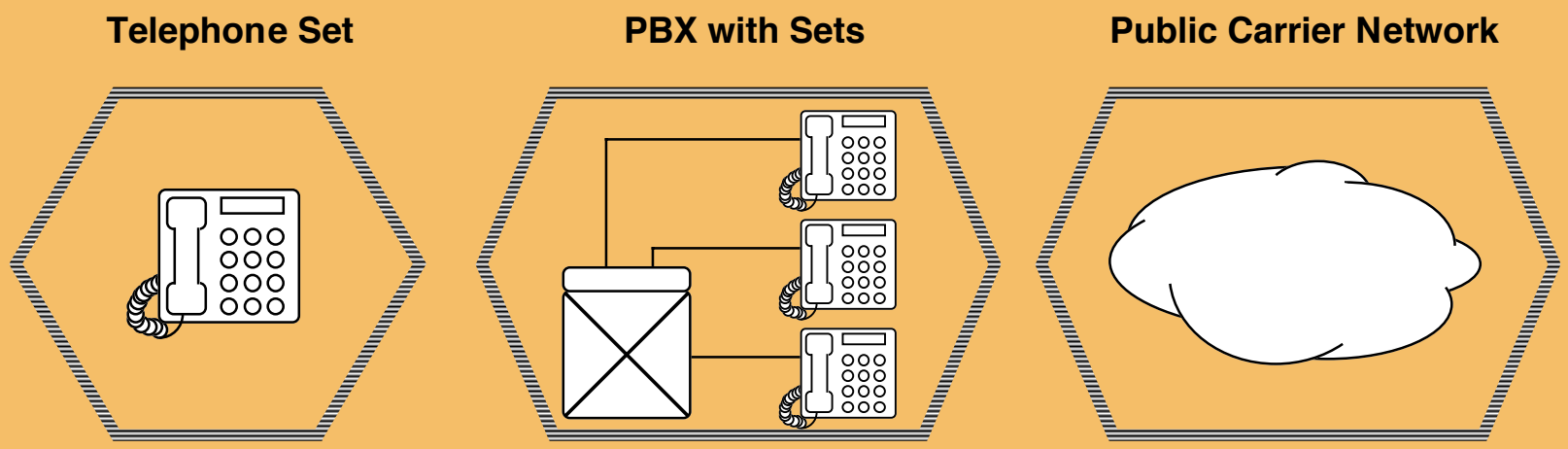
Agenda



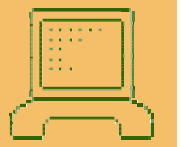
- IP Telephony Framework
- Existing Standards and Specifications
- The “Single Pipe” Dream
- Telephone Station Requirements
- Industry Directions
- Wireless Dimension

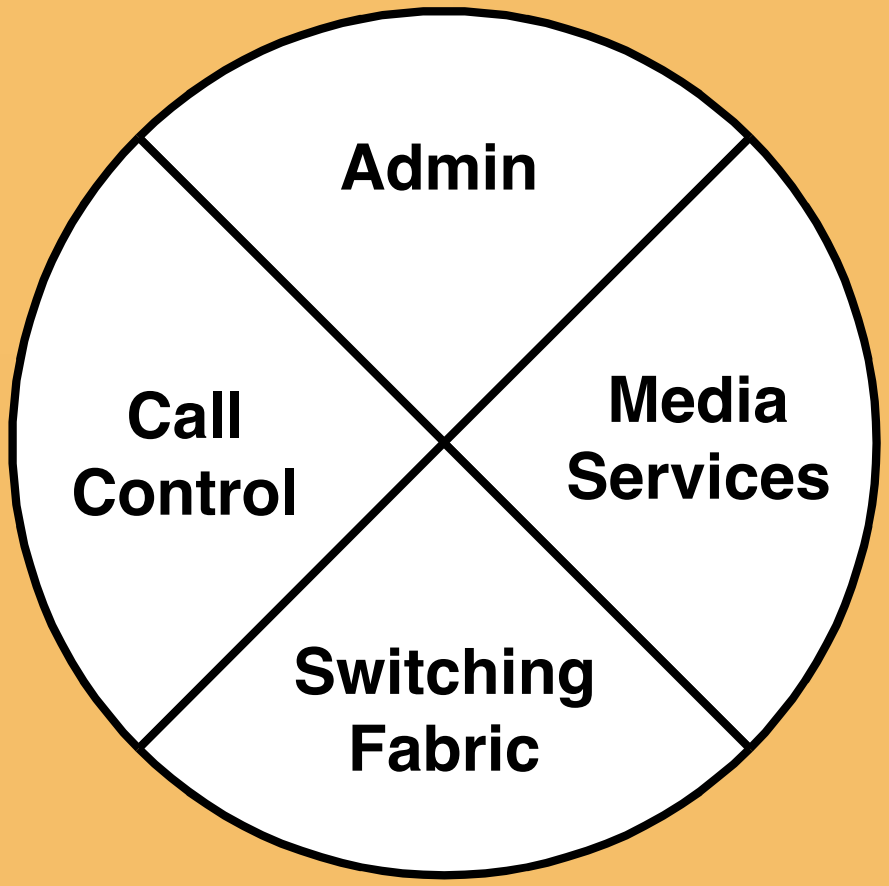
Telephone Systems

- Component or subset of a telephone network
- Typically the part of a telephone network over which the observer has control
- Size and Scope are essential factors in identifying applicable standards



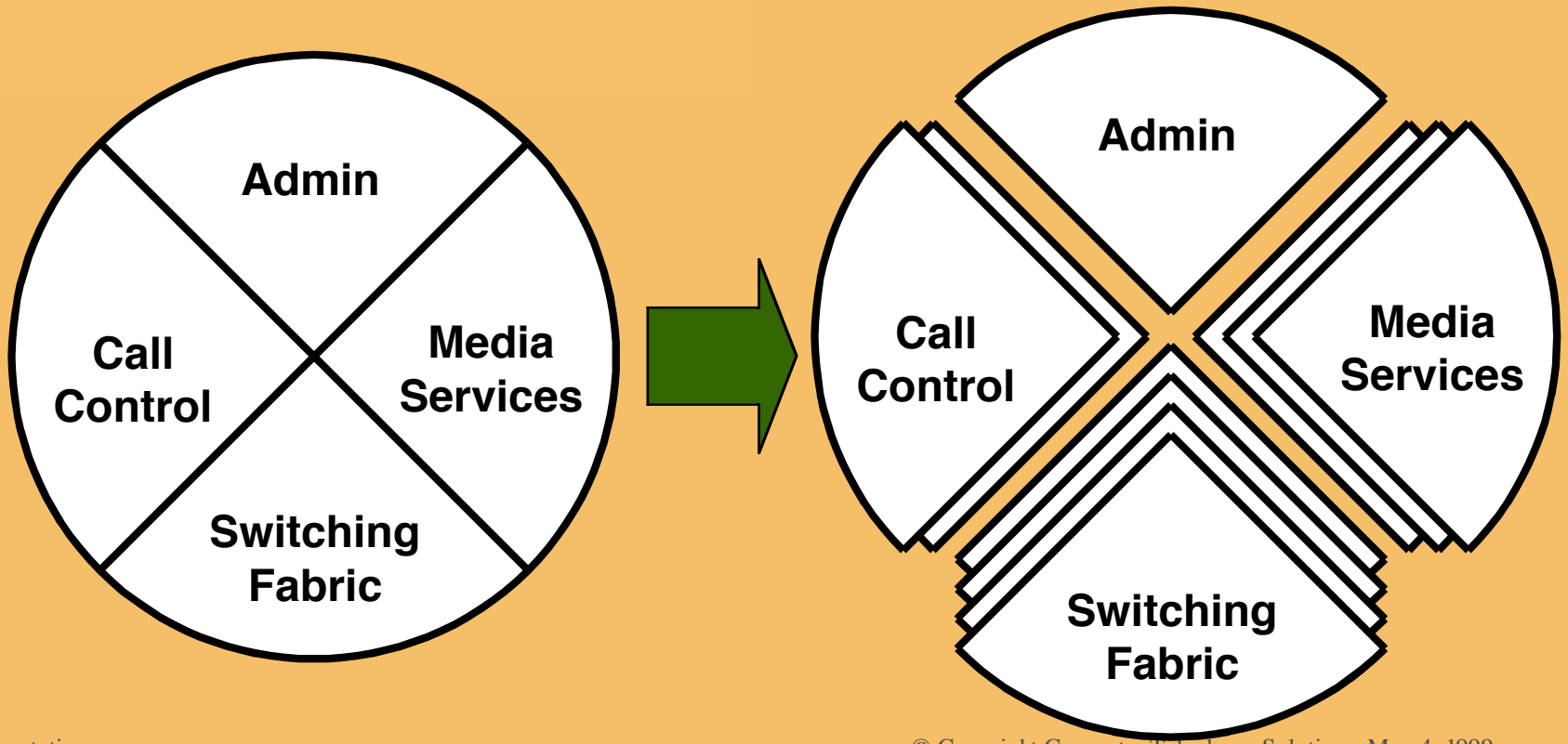
Telephone System Technologies



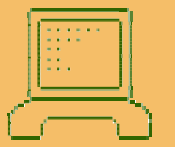


Computer Telephony Revolution

- Using off-the-shelf computer technologies to implement telephone system components
- Shift from Monolithic to Modular systems

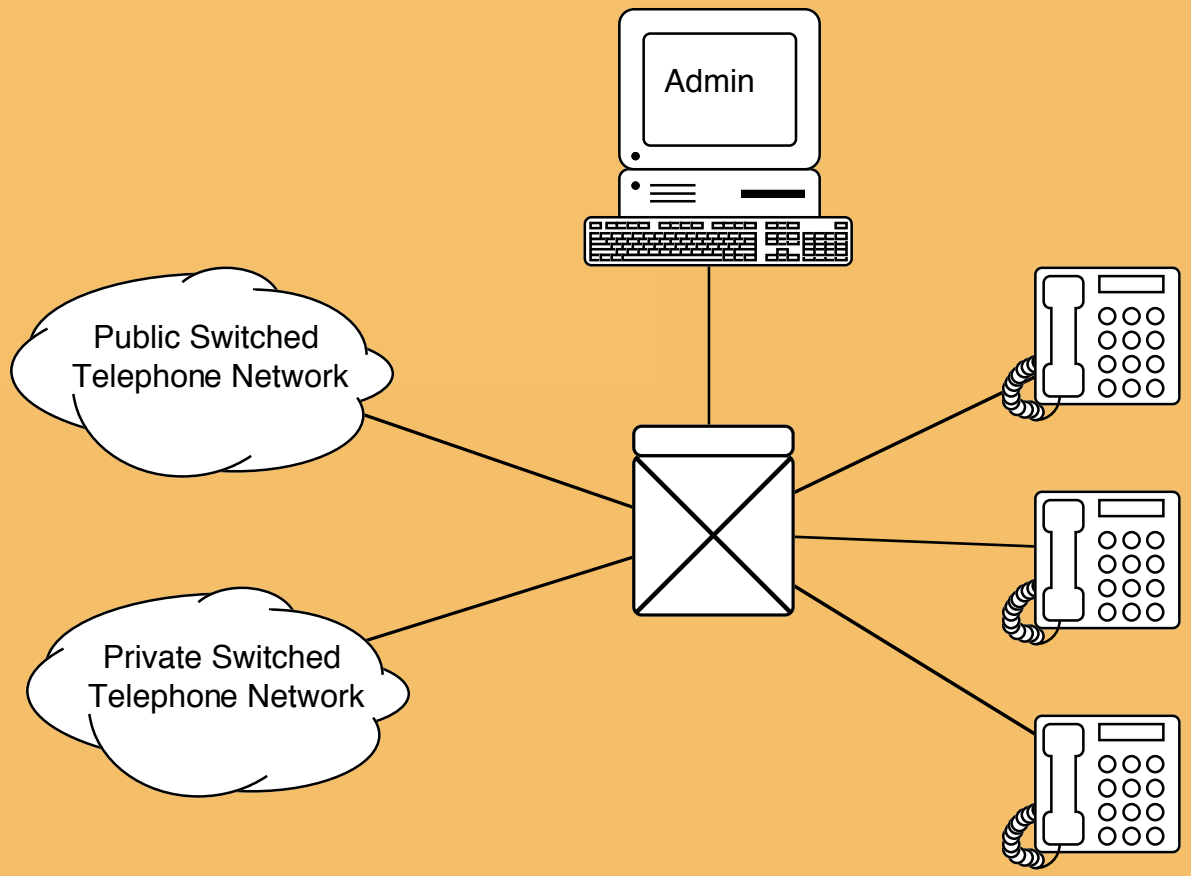


Switching Fabric

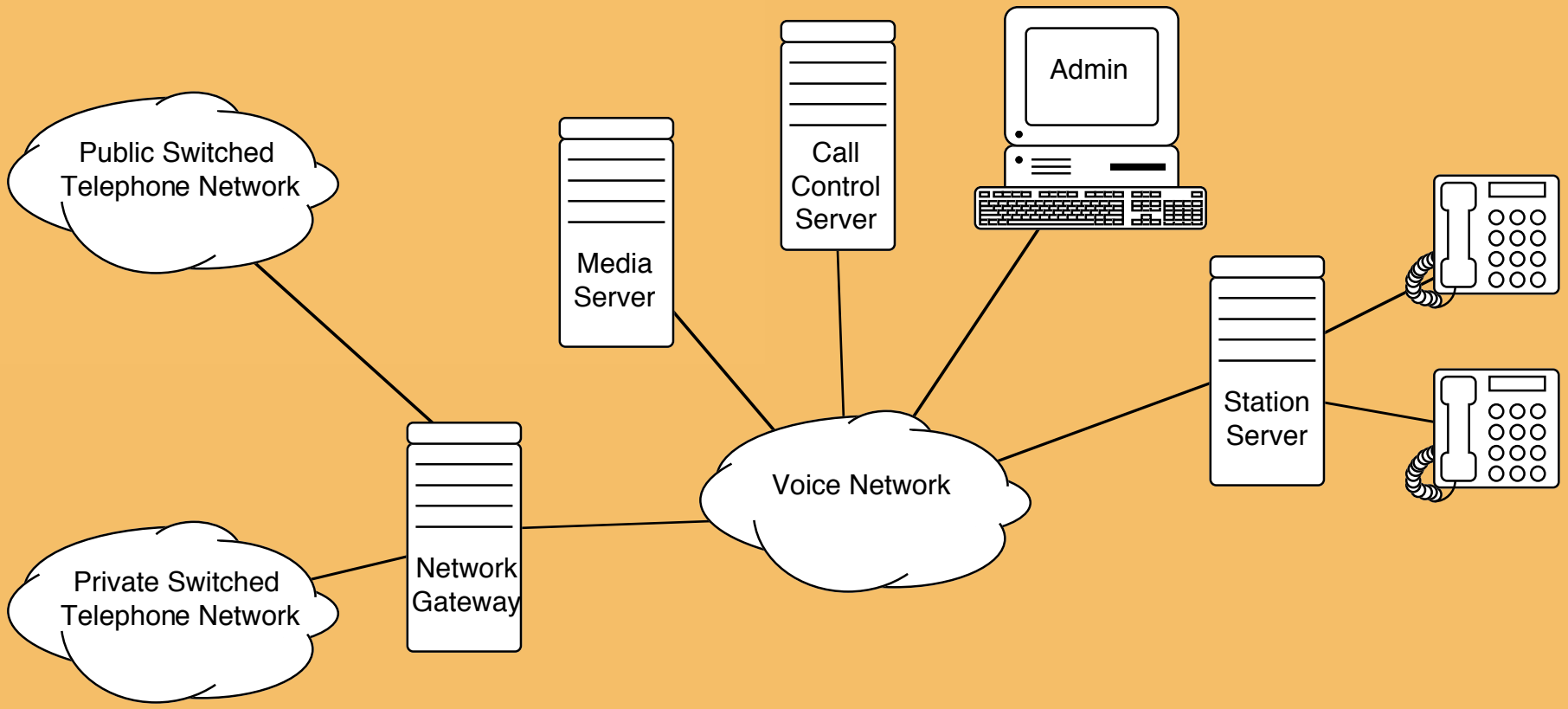


- Establishes media stream channels between endpoints and conveys signaling information
- Traditional Switching Fabric
  - TDM bus backplanes connecting line cards
  - Analog (POTS) and digital (T-1, ISDN, proprietary) telephony circuits
- IP Telephony Switching Fabric
  - Packetized voice over conventional IP networking infrastructure
  - Typically based on off-the-shelf computer technology
- Other Alternatives

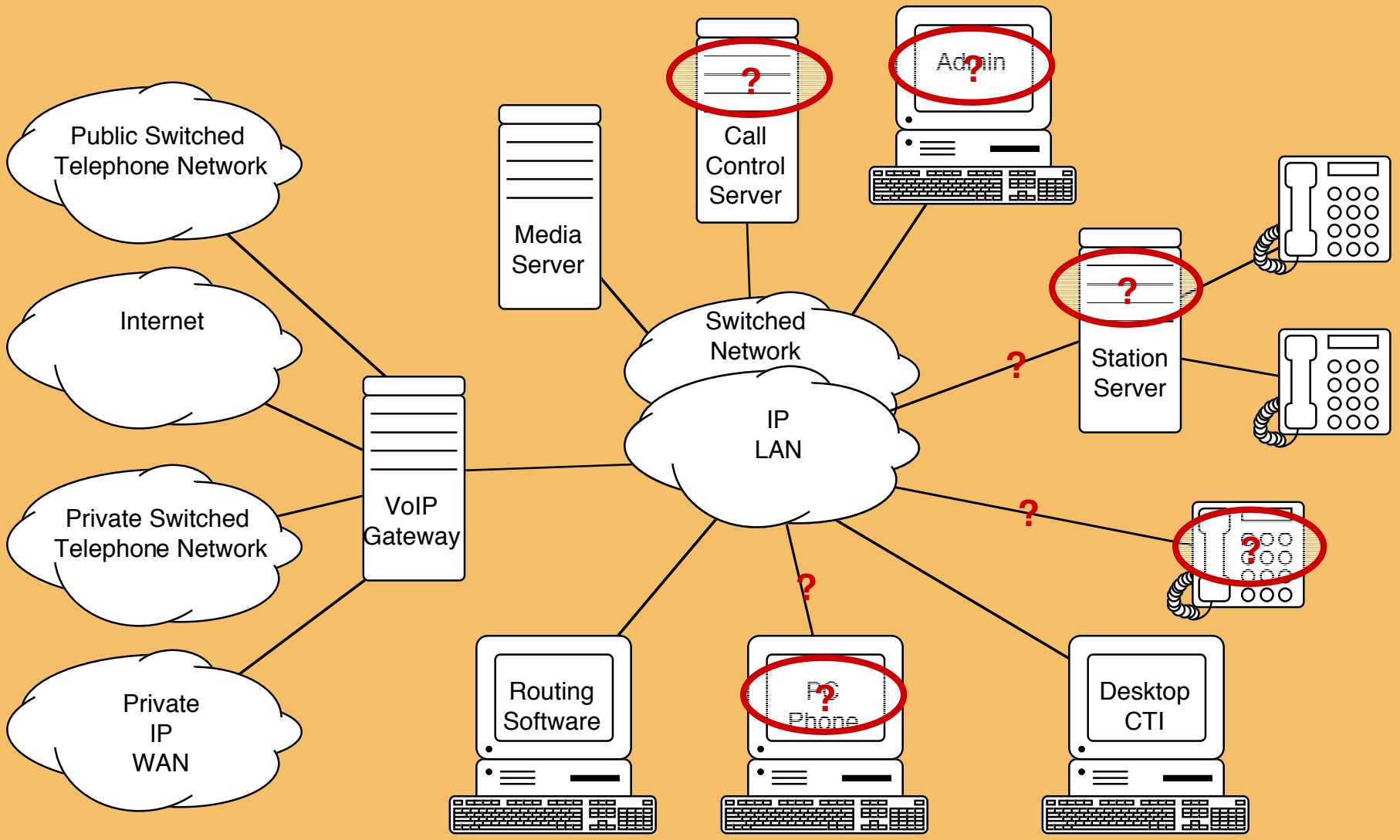
Telephone System Implementation



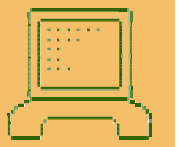
Distributed PBX Architecture



Telephone System Implementation

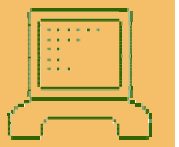


VoIP Switching Fabric Specifications



- Media Streams
  - IETF RTP/RTCP
  - ITU CODECs
- Signaling
  - ITU H.323
  - IETF SIP/SAP
- Control
  - ITU H.GCP
  - IETF MGCP

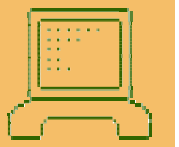
ITU H.323 Family



- Media Stream Channels
  - RTP/RTCP
  - G.711/G.722/G.723/G.728/G.729
- Signaling & Control
  - RAS
  - Q.931
  - H.235
  - H.245
  - H.GCP (under development)

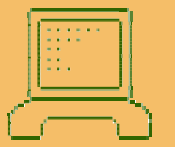
Signaling	Audio Codecs
H.235 H.245 Q.931 RAS	G.711 G.722 G.723 G.728 G.729
	Media Stream Transport RTP RTCP

H.323 Logical Abstractions



- Terminals
  - Station devices
- Multipoint Control Units
  - Provide conferencing capability
  - Made up of multipoint controllers and processors
- Gateways
  - Interconnection to other switching fabrics
- Gatekeepers
  - Access Controls
  - Address Translation
  - Bandwidth Management

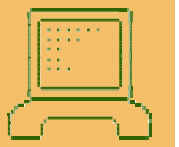
IETF SIP/SAP/RTSP



- Media Stream Channels
  - RTP/RTCP
  - [G.711/G.722/G.728/etc.]
- Signaling
  - SDP
  - SIP
  - SAP
  - RTSP

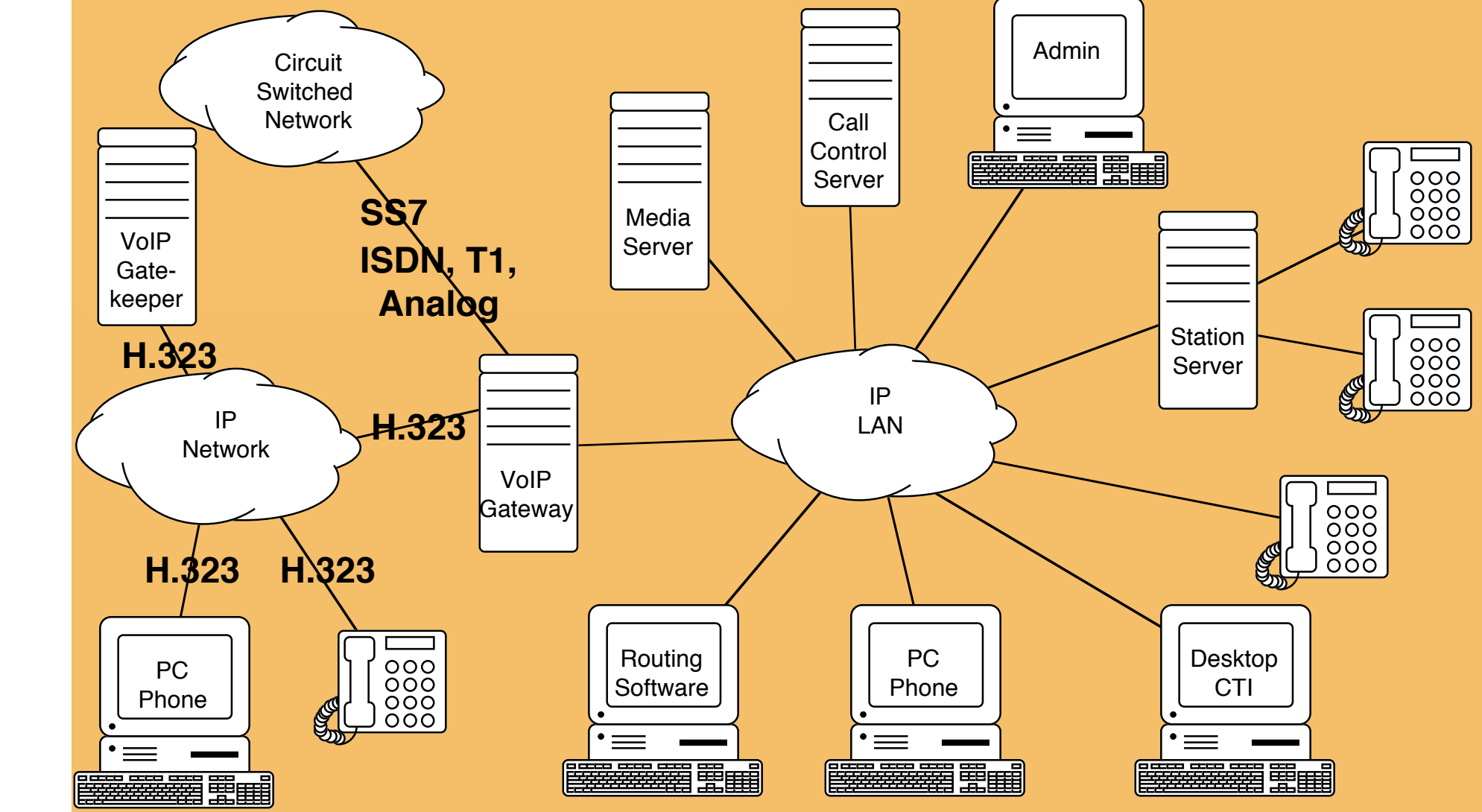
Signaling	Audio Codecs
SDP SIP SAP RTSP	G.711 G.722 G.723 G.728 G.729
	Media Stream Transport RTP RTCP

MGCP

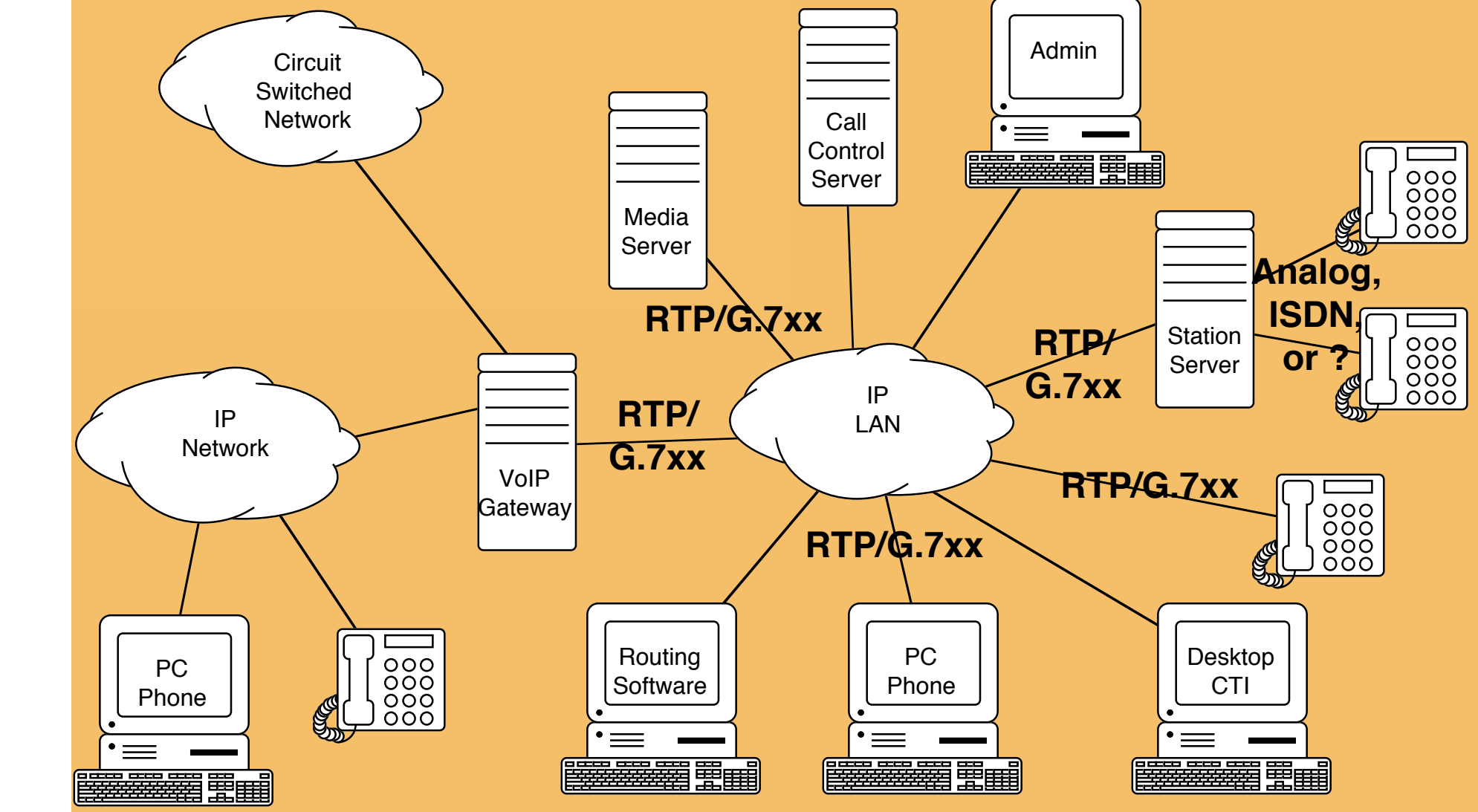


- Multi-media gateway control protocol
- Result of merging IPDC and SGCP
- Provides control of telephony gateways
- Allows “Gatekeeper” function to be independent of “Gateway” function
- Specification in track for IETF adoption

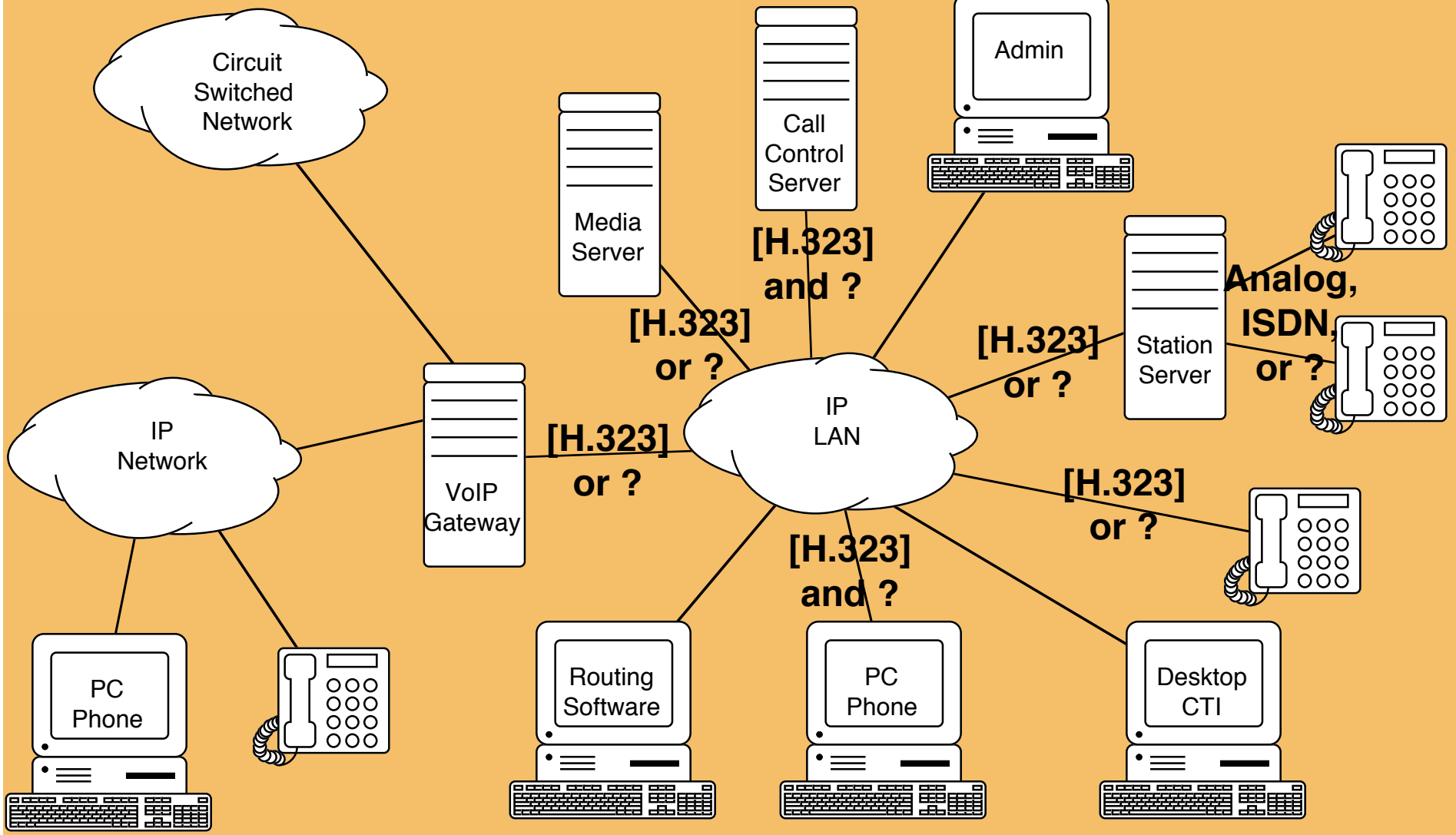
Public Network Switching/Signaling



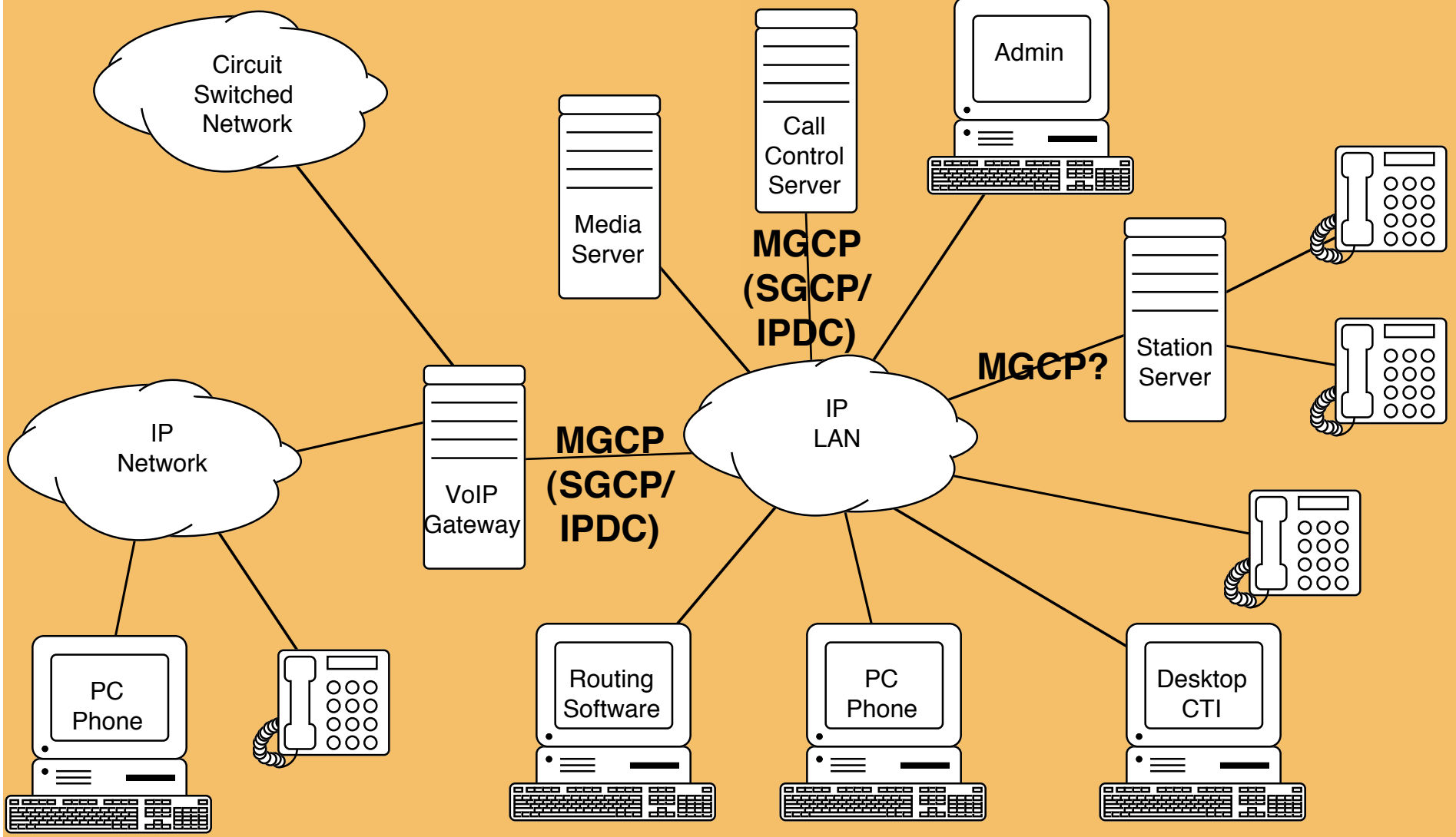
Switching: Media Streams



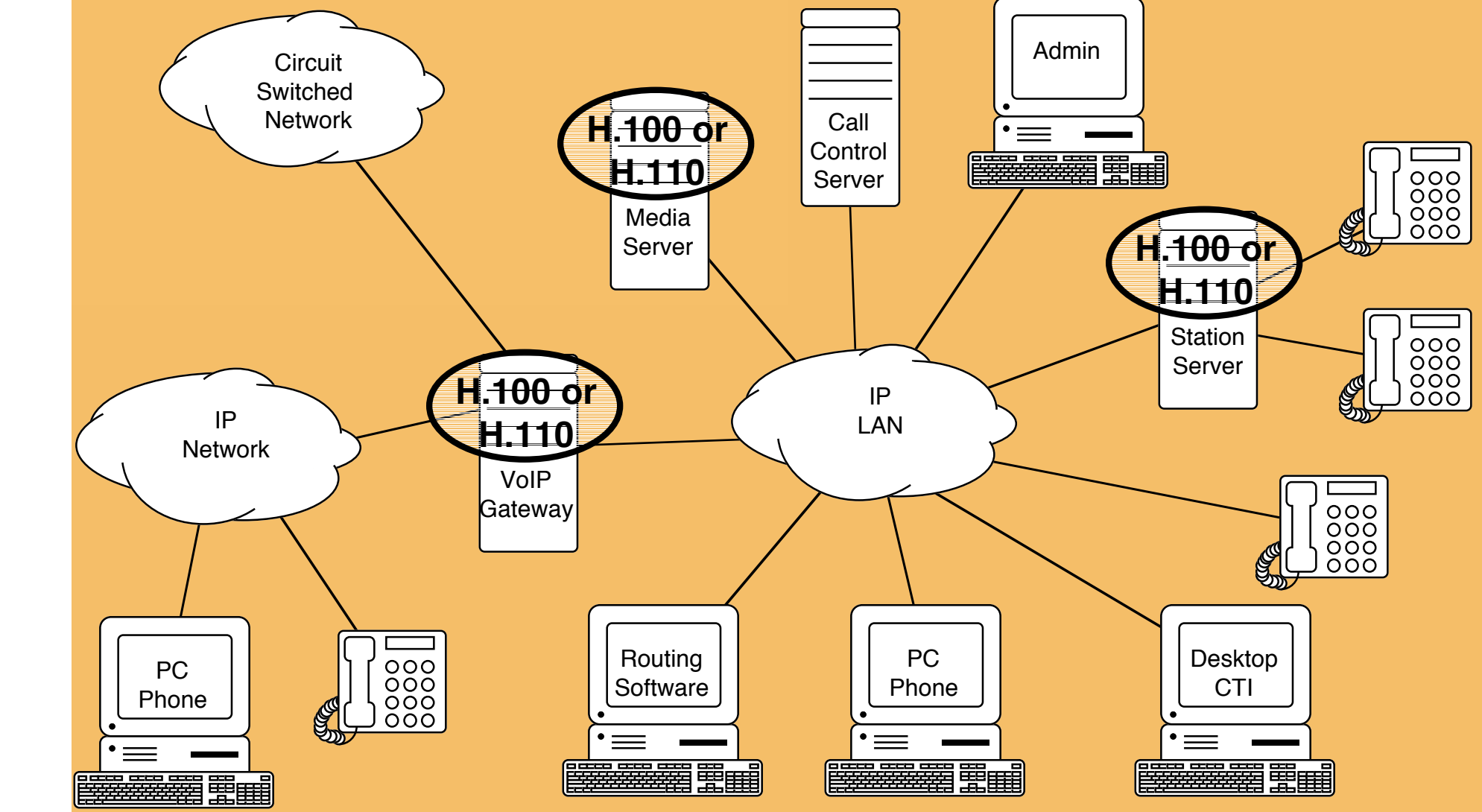
Switching: Signaling



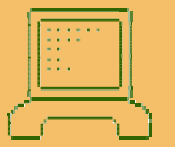
Switching Fabric Control



Switching Fabric: TDM Bus



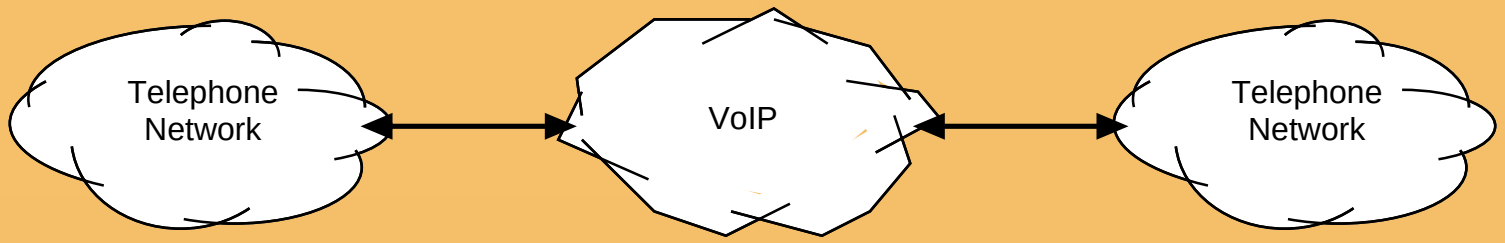
Motivation for Single Network



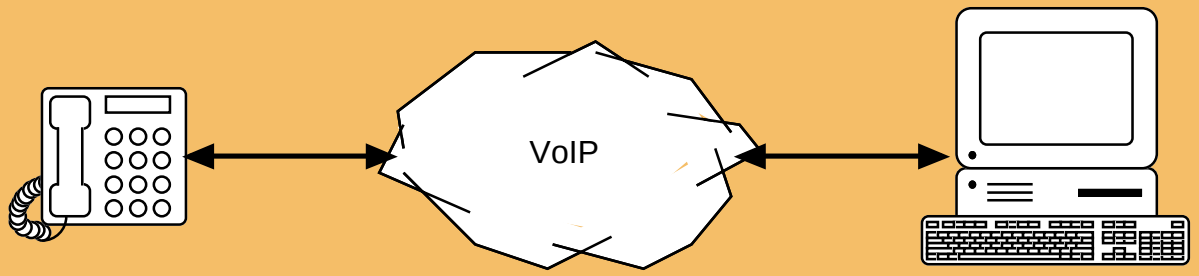
- Engineering
  - Because we can?
  - More elegant?
- Economics
  - Cheaper to Install?
  - Cheaper to Maintain?
- Applications
  - New capabilities?
  - New flexibility?

VoIP Usage Models

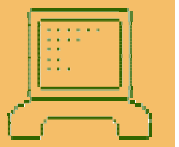
- Switch-to-Switch
  - Connect existing telephone networks



- Subscriber
  - Deliver voice to and from a computer or phone

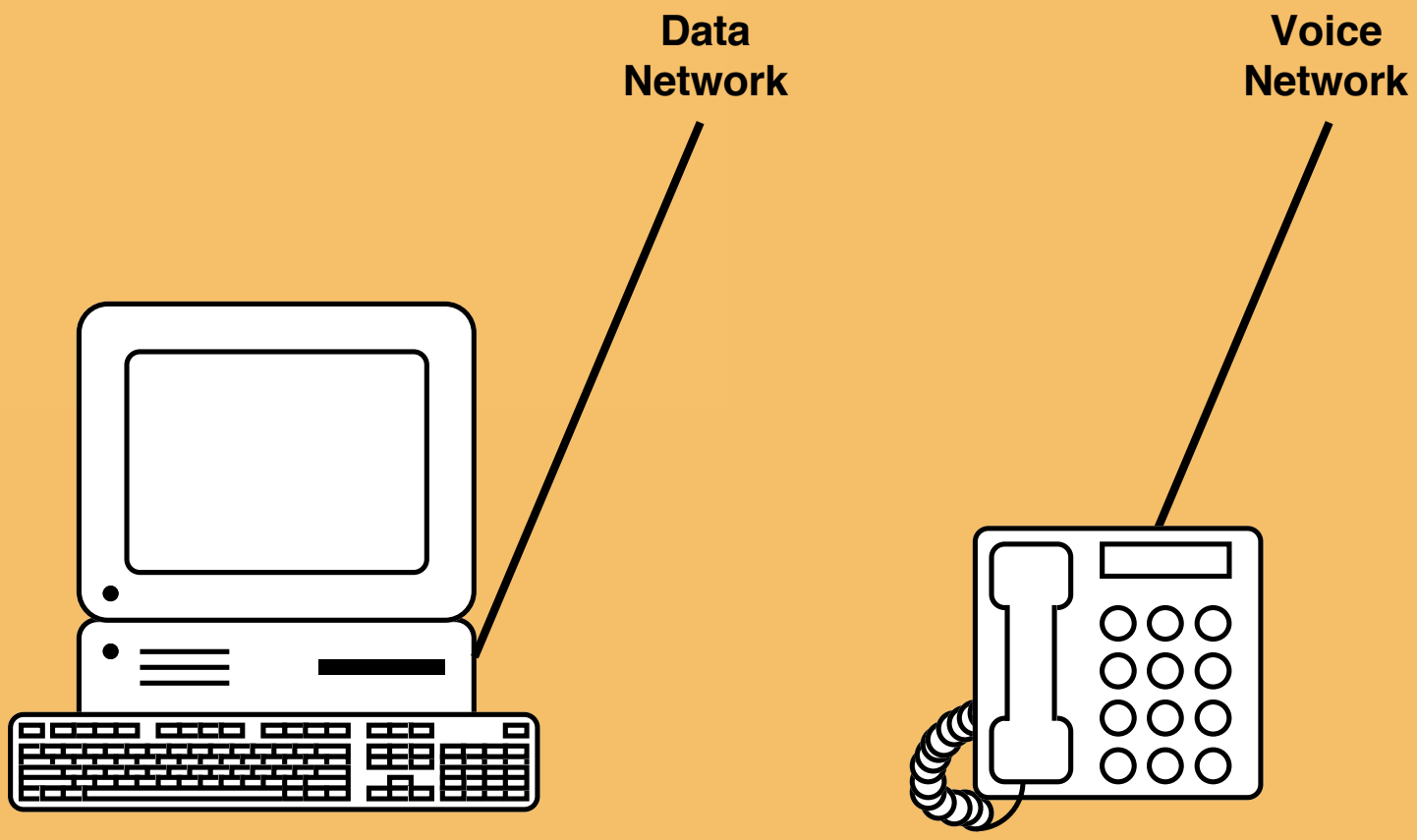


Single Pipe to the Desktop?

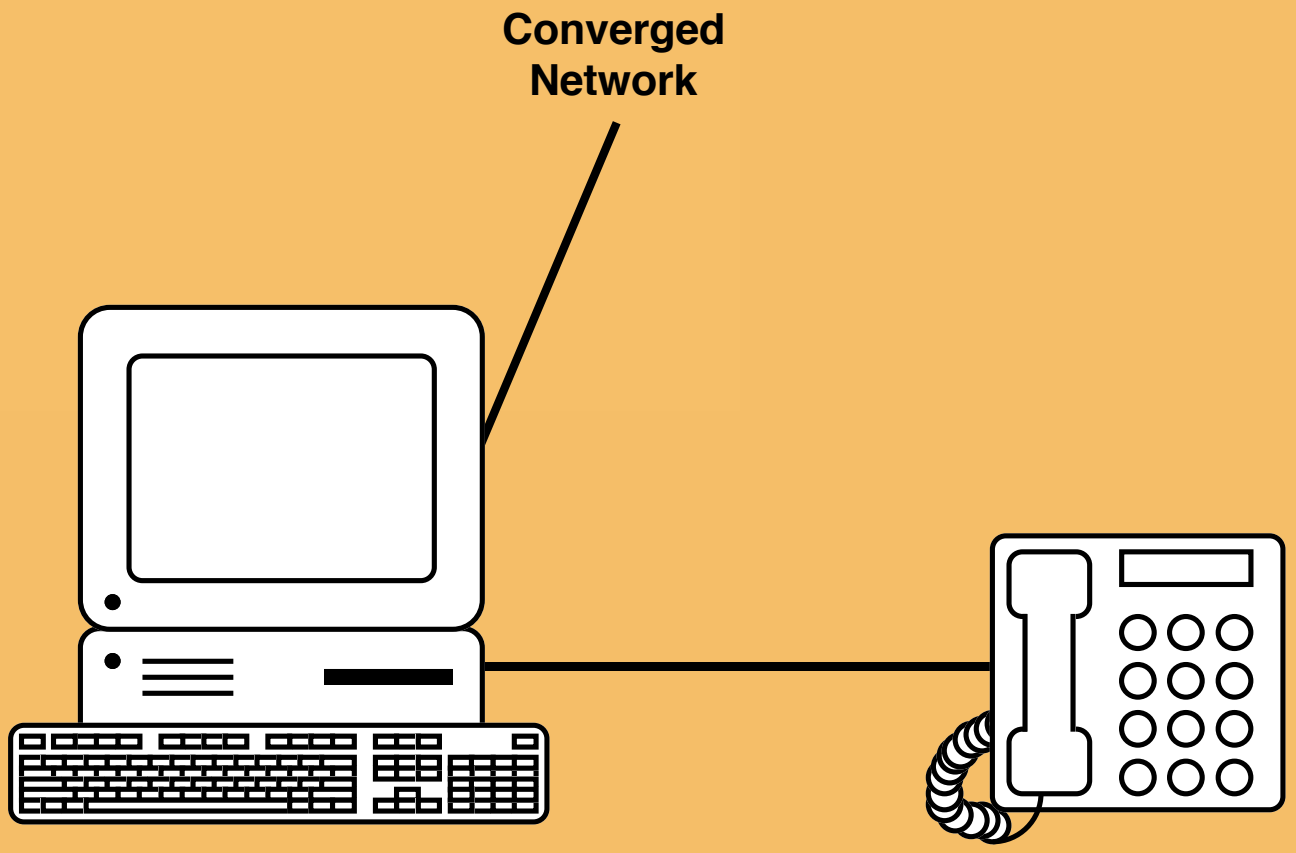


- Not if,
- But:
  - What?
  - Why?
  - When?
  - How?

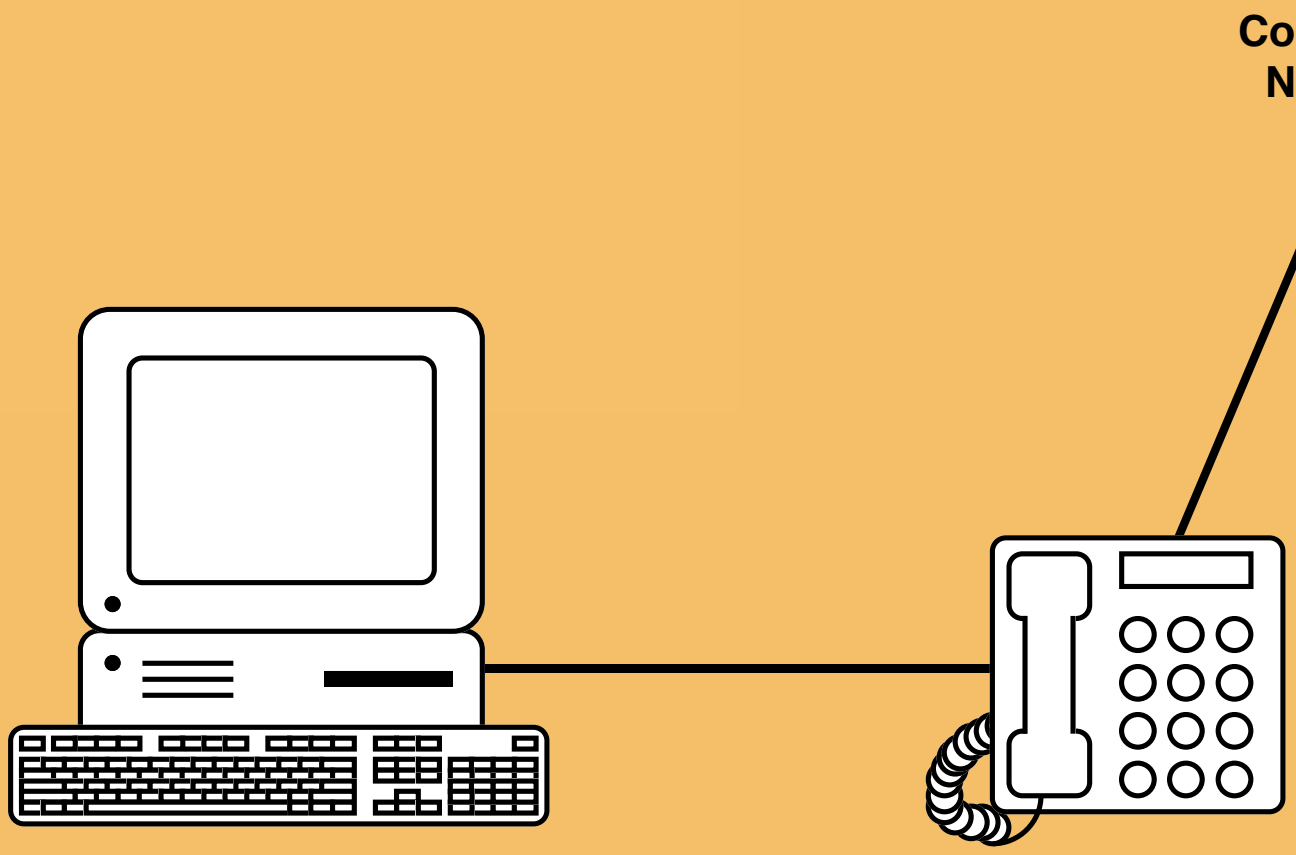
Traditional Approach: Separate Voice and Data "Pipes"



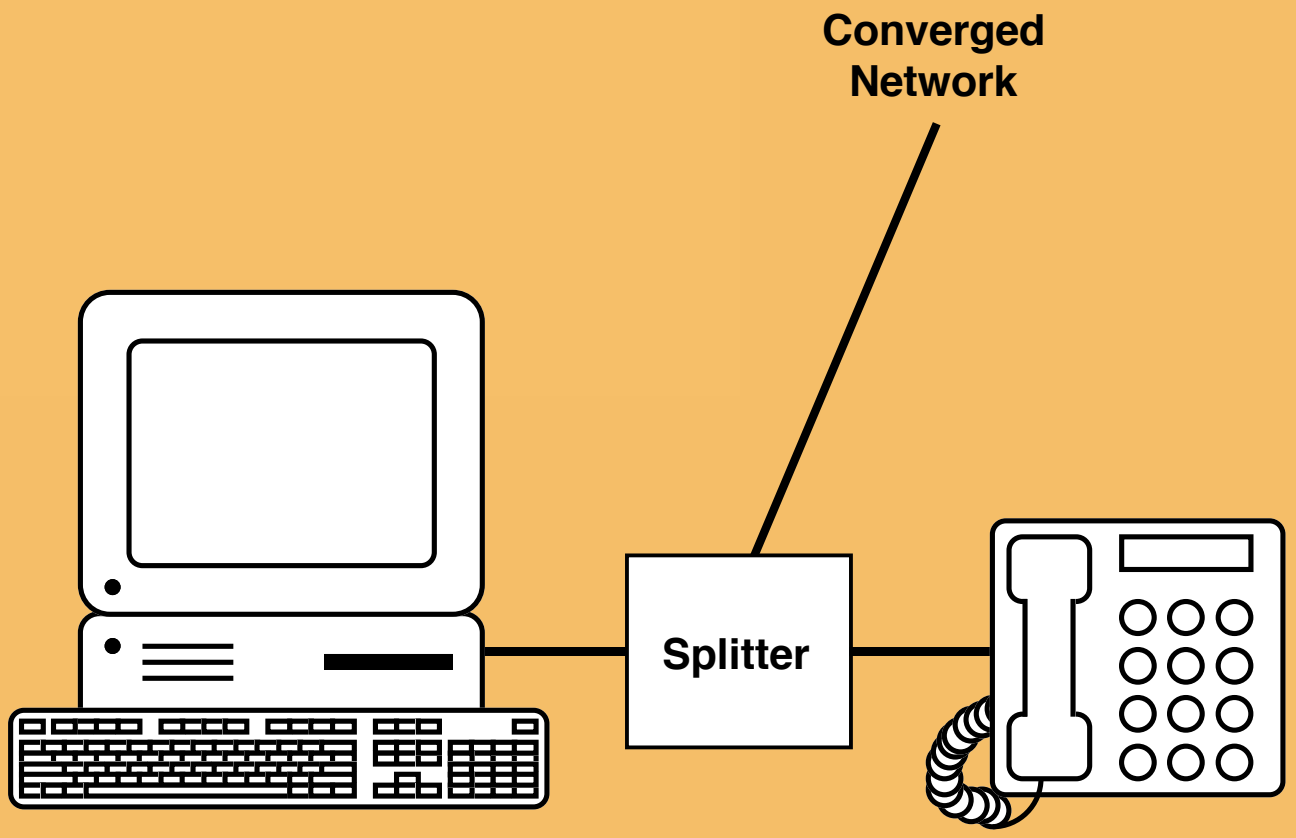
Approach #1:
Phone as PC Peripheral



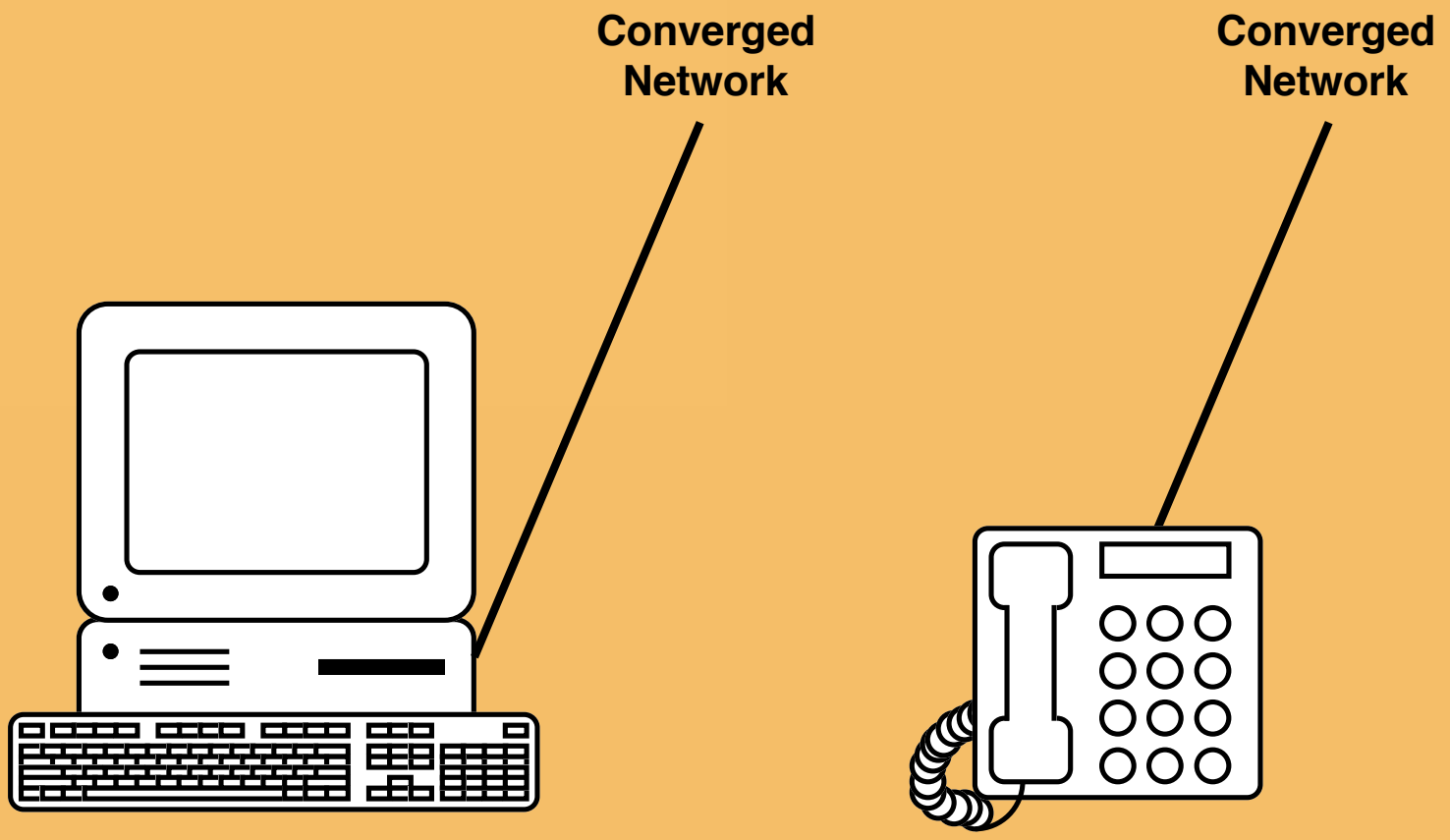
Approach #2: Phone as Hub



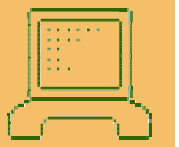
Approach #3:
PC and Phone via a Splitter



Approach #4:
PC and Phone as Network Peers



The Promise of CT Technology



Telephone systems

that are

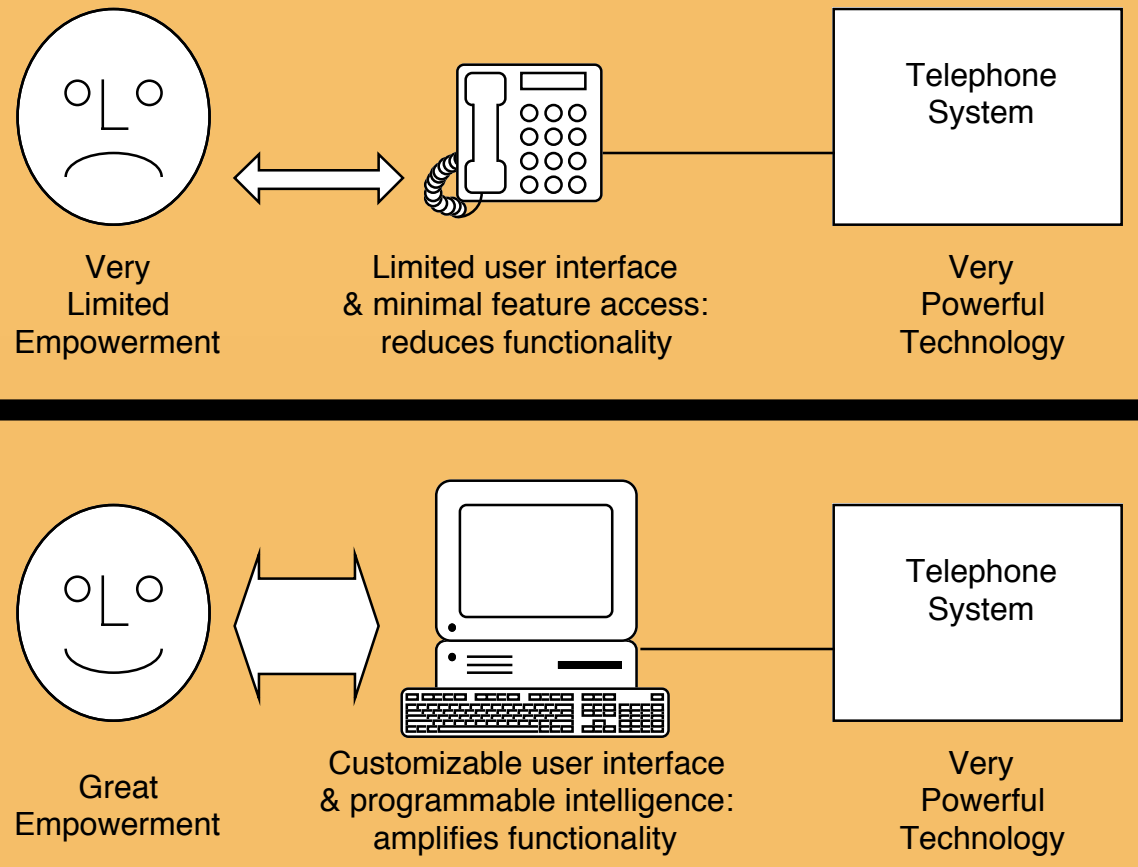
tailored

to the

specific needs and **preferences**

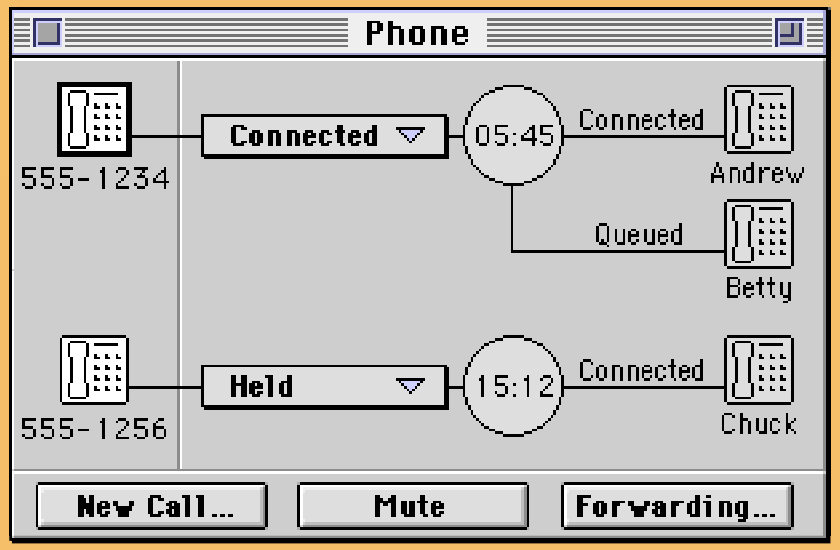
of **users**

CT: Before & After



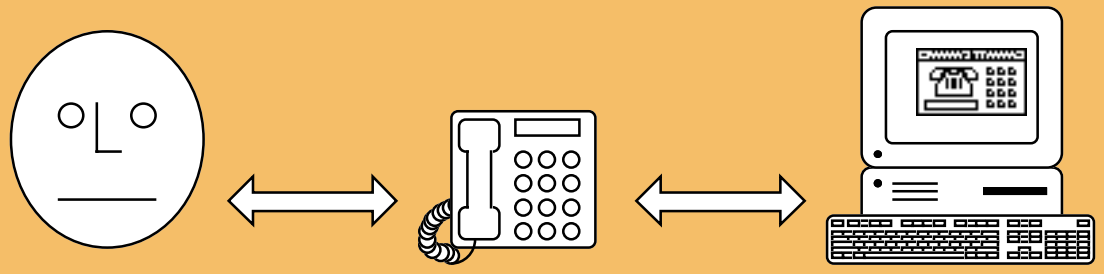
Screen Based Telephone Applications

- Software that provides users with control over a telephone set and all call activity



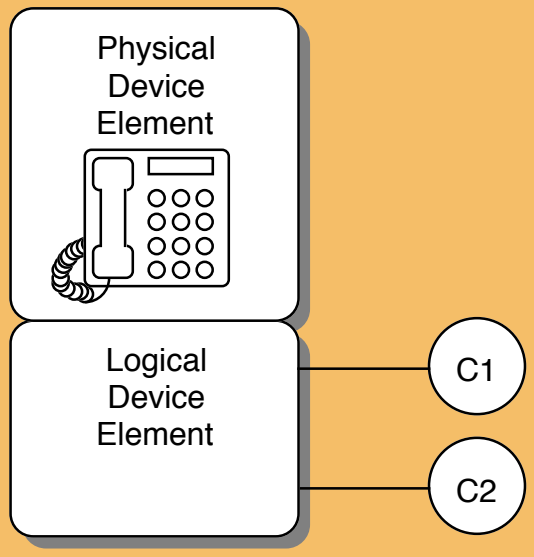
Manual vs CTI Interfaces

- CTI interface is an alternative, parallel means for interacting with call control
- CTI-enabled computer is one of many potential observers (people and other computers) that may be simultaneously operating on a particular device

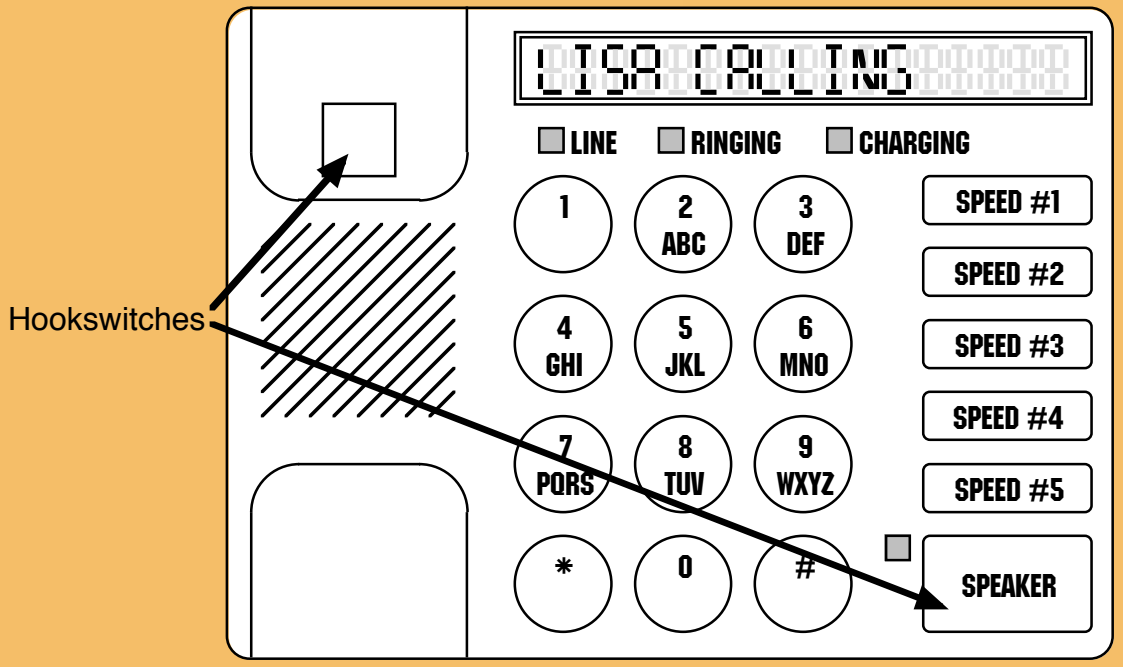


Telephone Stations

- The devices that expose the interface everyone is familiar with
- Thousands of variations in telephone station capabilities and designs
- Physical element
  - the tangible components
- Logical element(s)
  - the portion that can be associated with calls

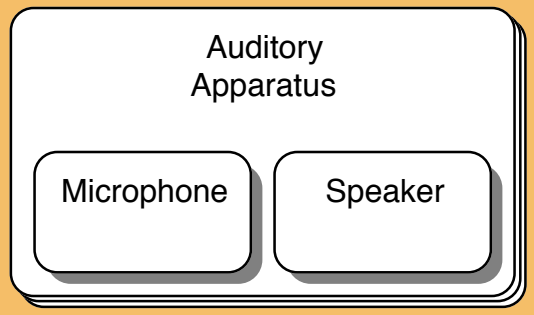


Hookswitches

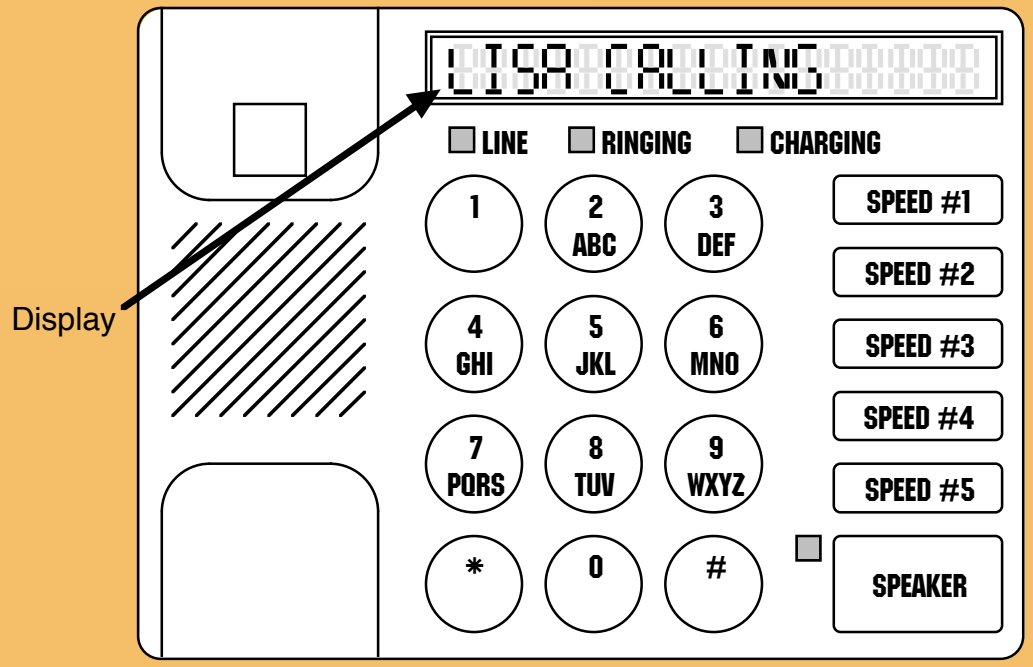


Auditory Apparatus

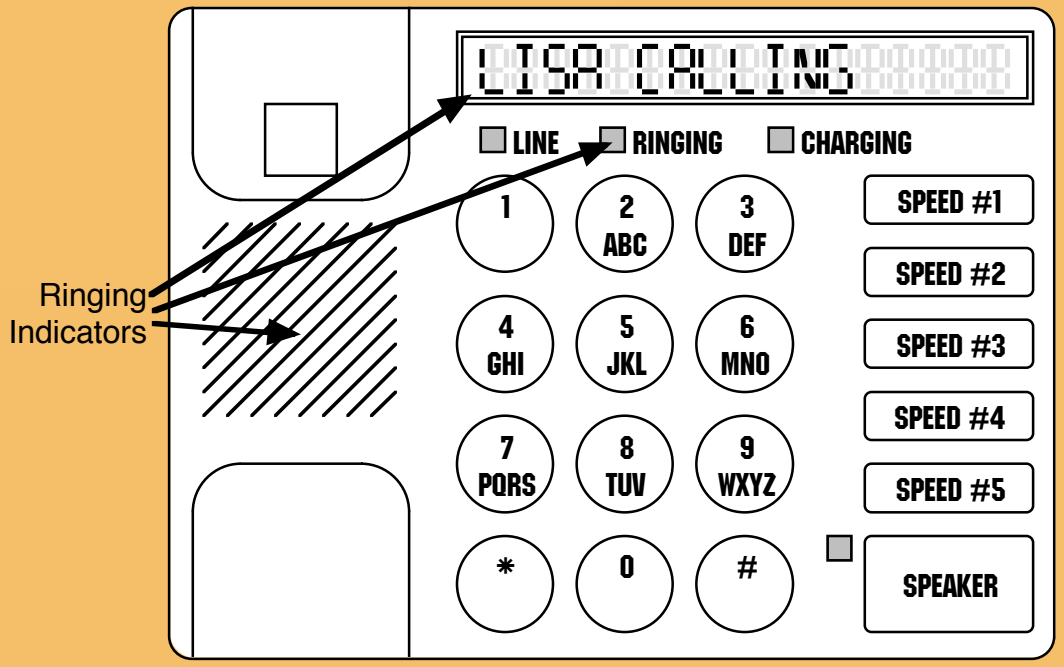
- Microphone and/or speaker combination
- Independent mute control
- Independent gain/volume control
- Associated with a hookswitch



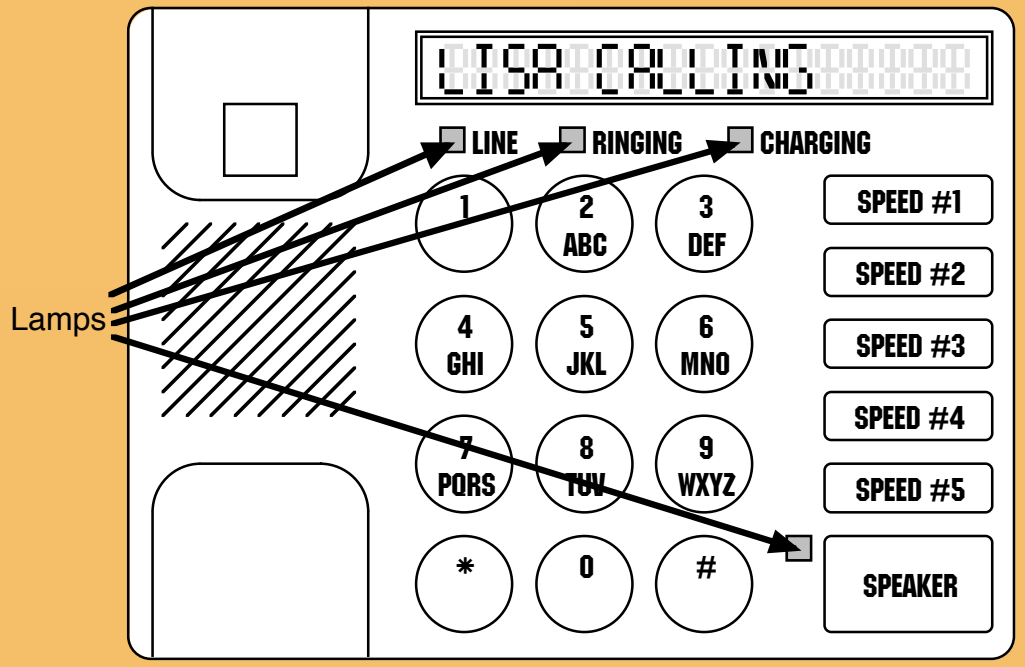
Display



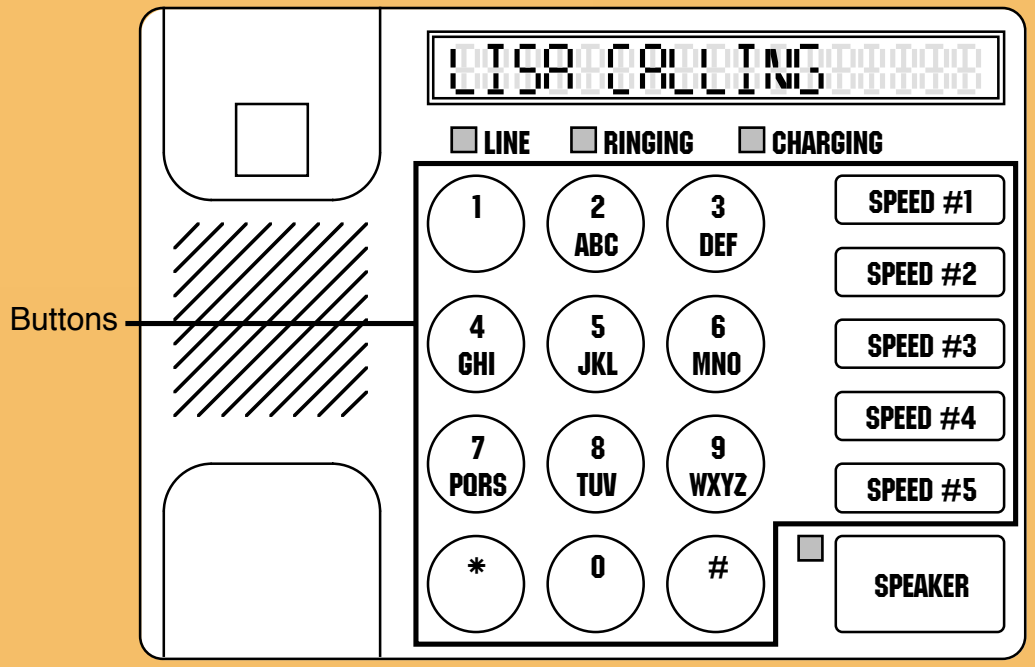
Ringers



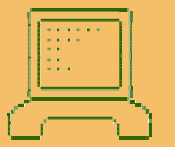
Lamps



Buttons

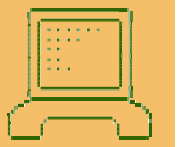


IP Telephone Station Requirements



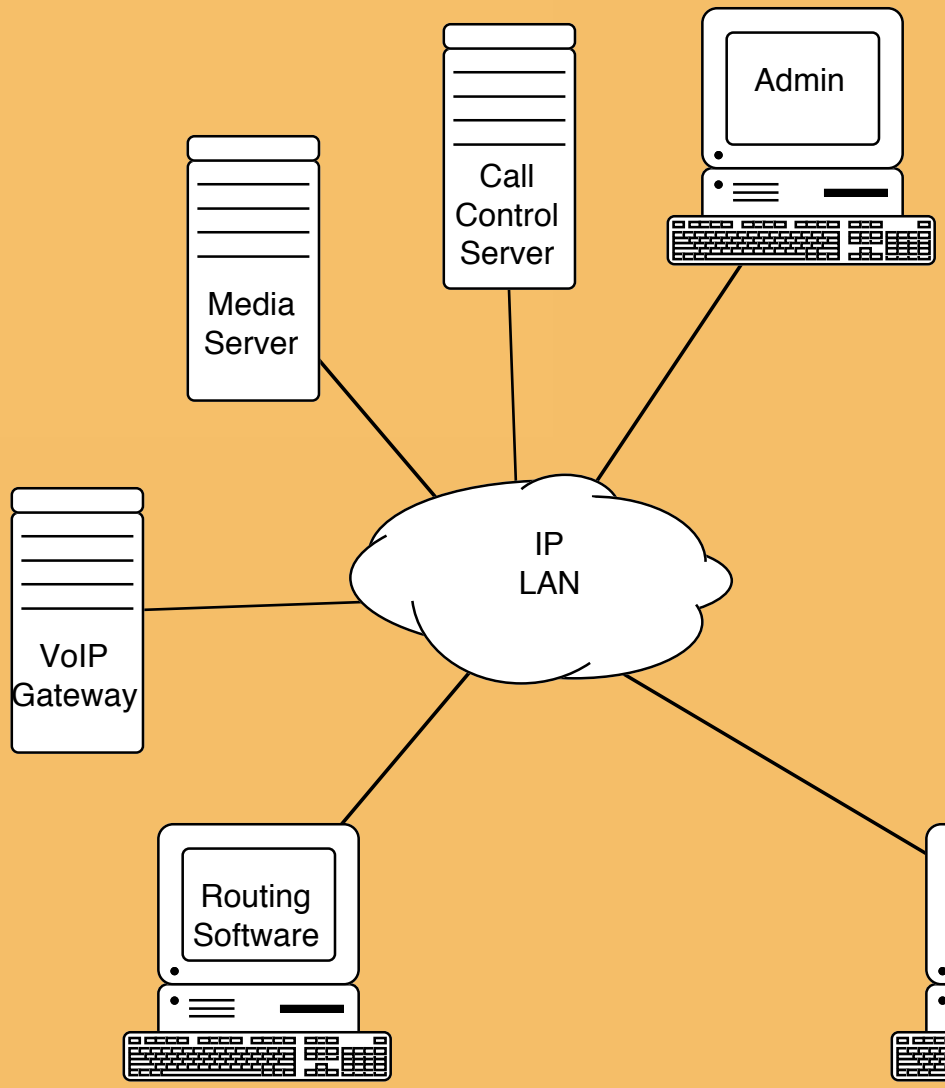
- No-compromises telephony feature set
- Plug and Play
  - Standardized protocols
  - Standardized physical interface
- Support for full CTI functionality
  - Master-slave protocol
  - Access to logical and physical element functionality
- Support for administrative functionality
  - Class of service assignments, numbering plan
  - In/Out of service
- No restrictions on design diversity

TIA TR-41.3.4

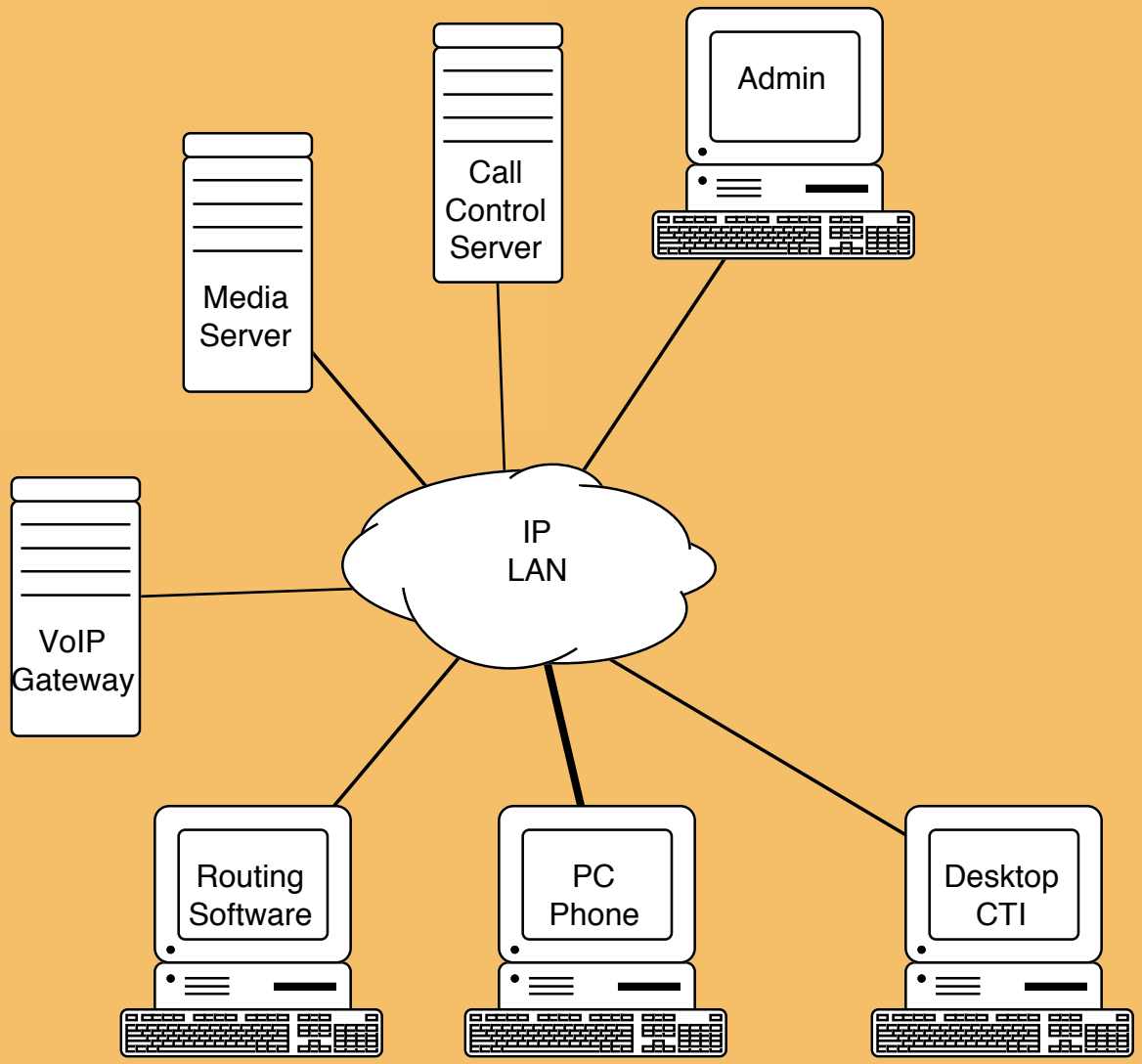


- New TIA working group to develop specifications for IP Telephones
- Aim for completion by year end
- Current direction:
  - New package to MGCP for full-feature stations
  - Adopt IEEE twisted pair ethernet cabling specifications including support for hub-delivered power

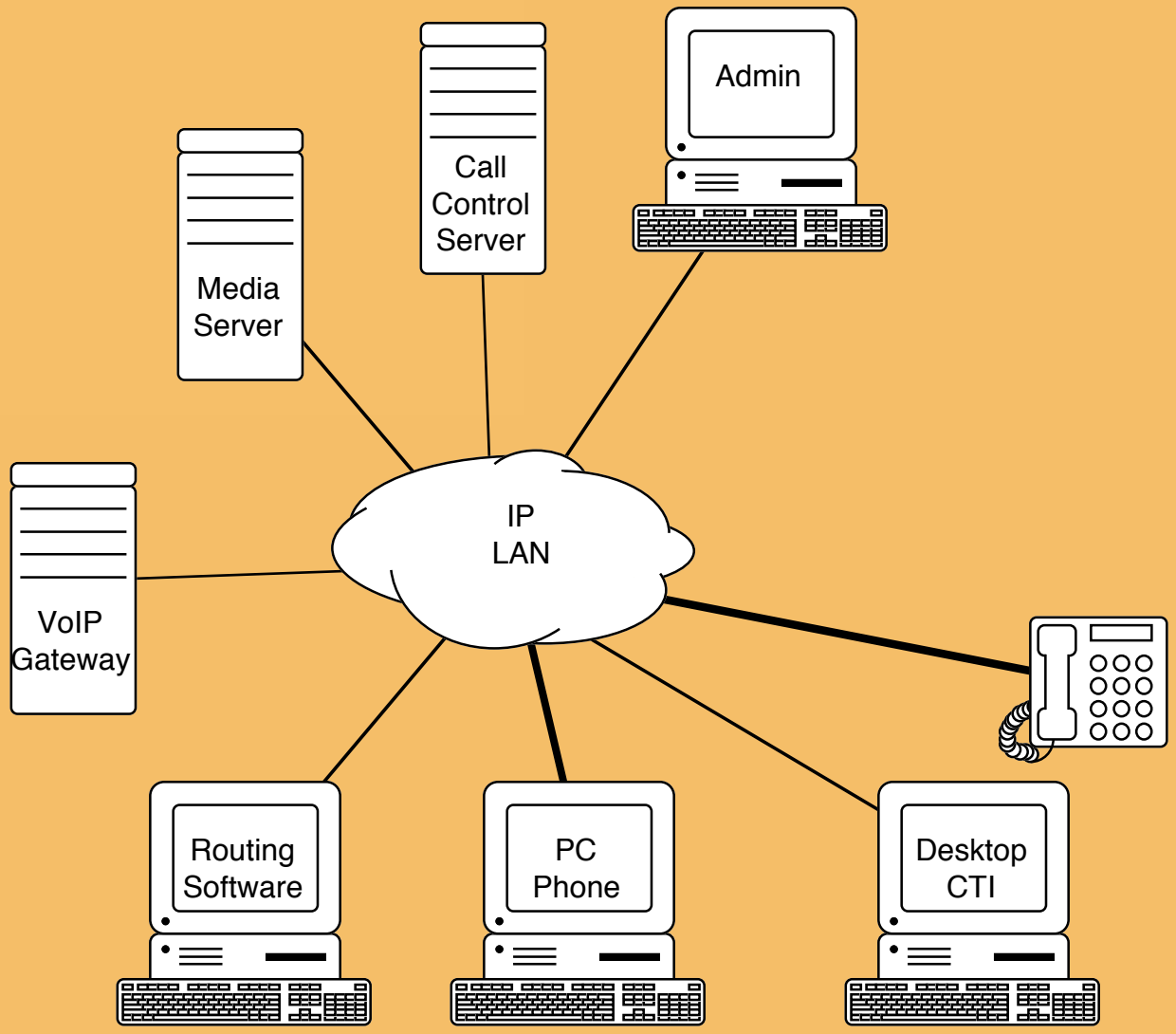
IP Telephone Station Options



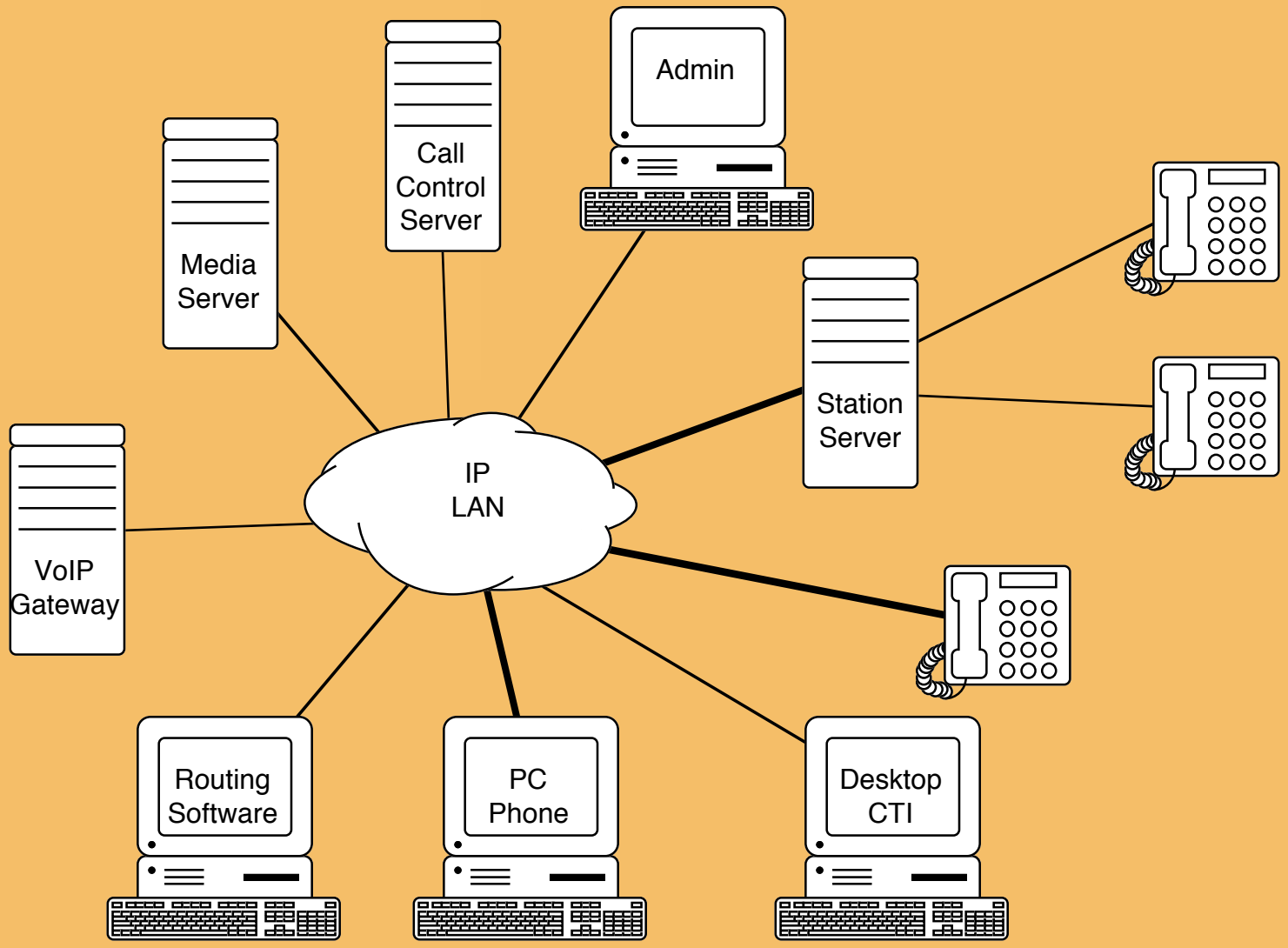
IP Telephone Station Options



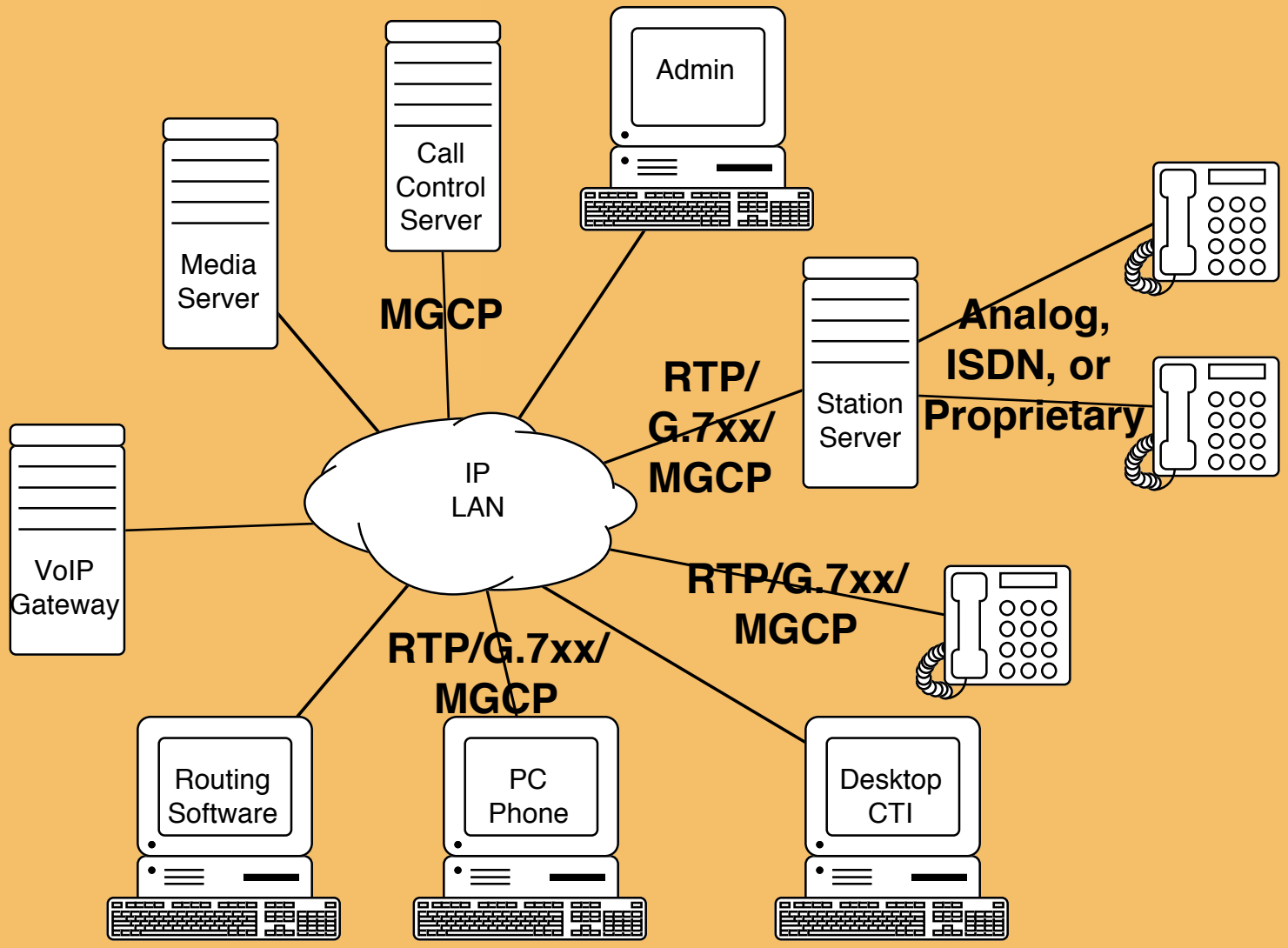
IP Telephone Station Options



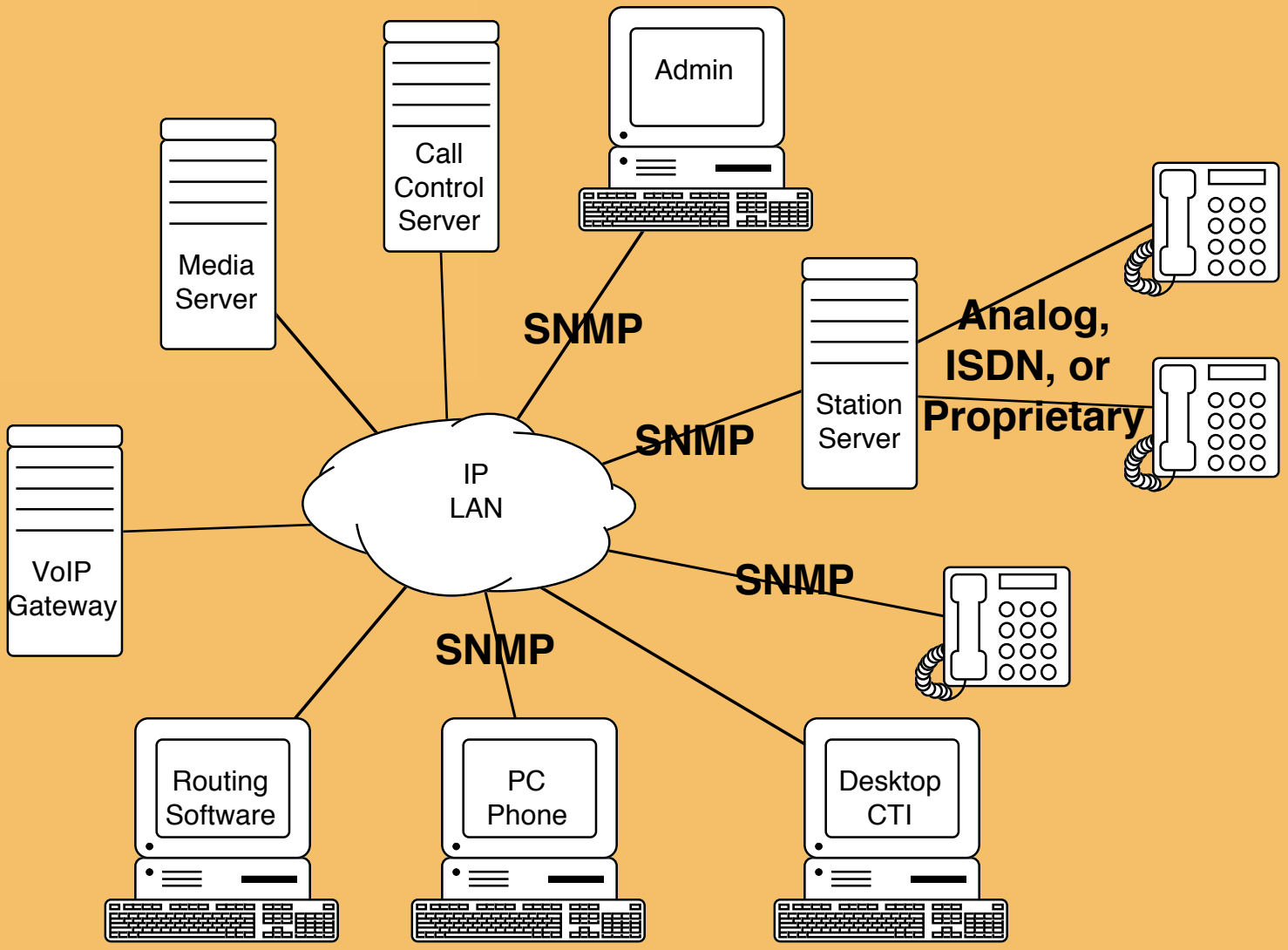
IP Telephone Station Options



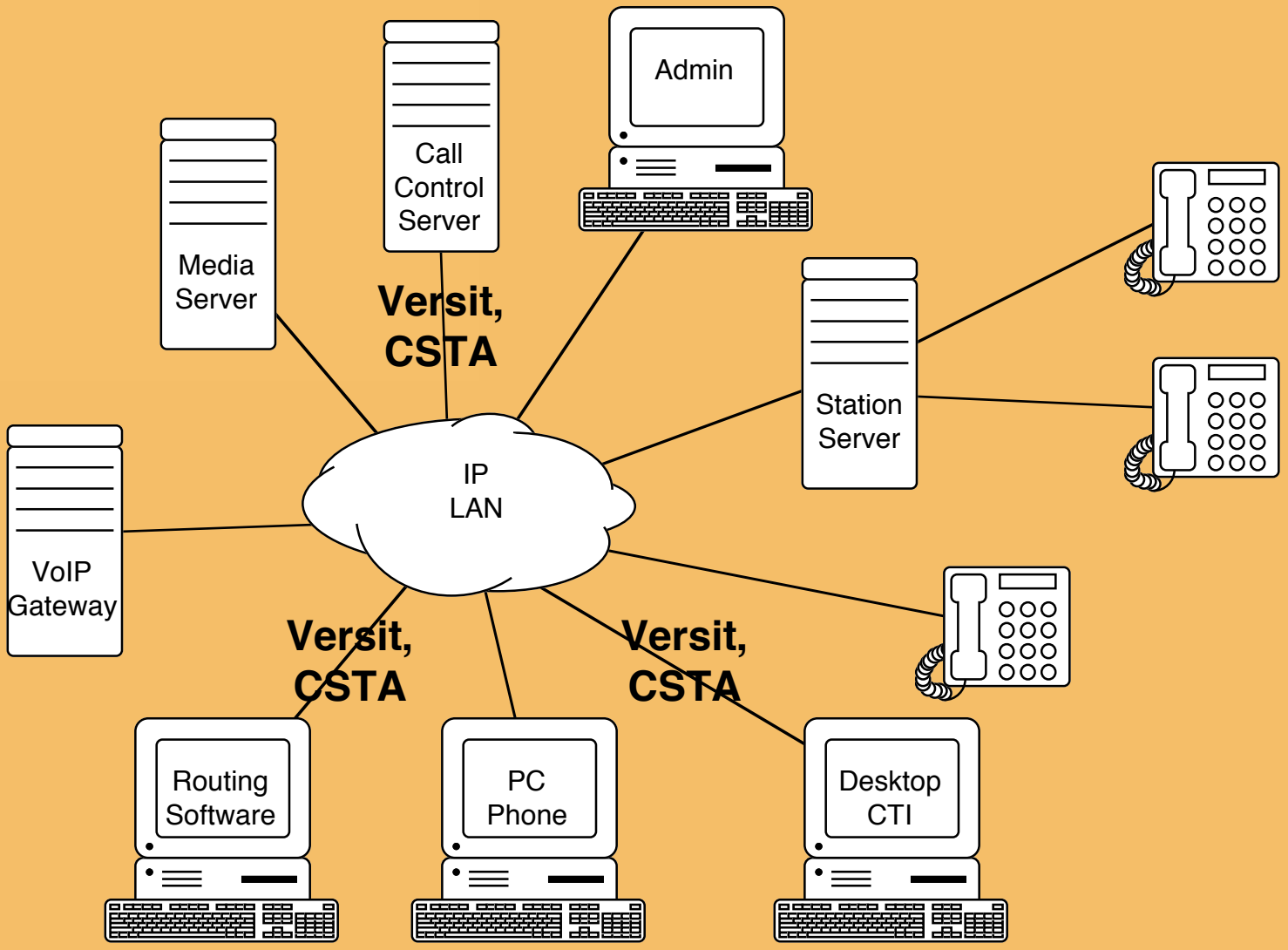
Switching Fabric



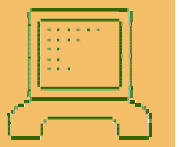
Administration



CTI

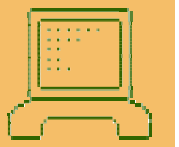


Know Your Requirements

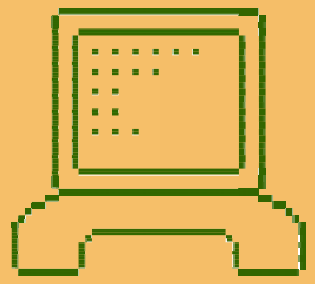


- Don’t take anything for granted
- What do you have that you don’t really need?
- What do you need?
- If it ain’t broke don’t fix it

What should you be doing?



- Get tough with vendors
  - Get “Questions for Vendors” from ECTF (booth #247)
  - Encourage vendors to implement and ship products based on specifications (not just to talk about it)
- Think modular
  - Shop for components
  - Support manageable diversity
  - Build in a modular fashion by taking advantage of interoperability specifications wherever possible
- Don’t rush
  - If appropriate, defer purchases or invest in products that will help you migrate over time



IPT-2
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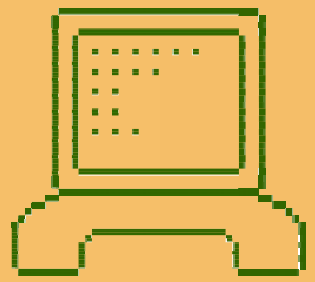

Q&A