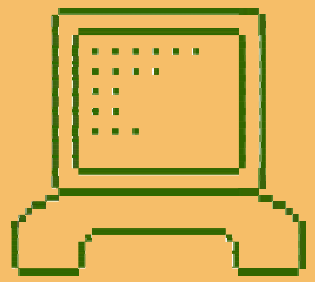


Creating the Virtual Corporation:
Market Opportunities & Projections

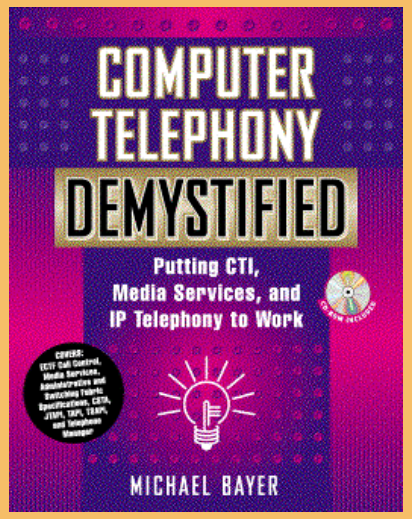
Michael Bayer

Computer Telephony Solutions

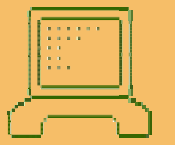
www.CTExpert.com

Introductions

- Michael Bayer
  - President, Computer Telephony Solutions
  - ECTF Board Member
- Computer Telephony Demystified
  - McGraw-Hill, ISBN #0-07-006153-X

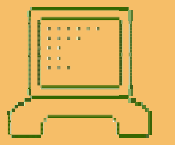


Agenda



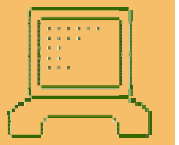
- Requirements for Virtual Organizations
  - Three basic technology ingredients
- Enabling Technology
  - Abbreviated History of Telephone System Evolution
- Flexible Telephone Systems
  - Attributes that Make Systems Customizable
- How to Evaluate Products and Services
- Seven key insights

Defining a Virtual Organization



1. Eliminates conventional assumptions about geographical distribution of people.
2. May eliminate assumptions about organizational boundaries.

Focus



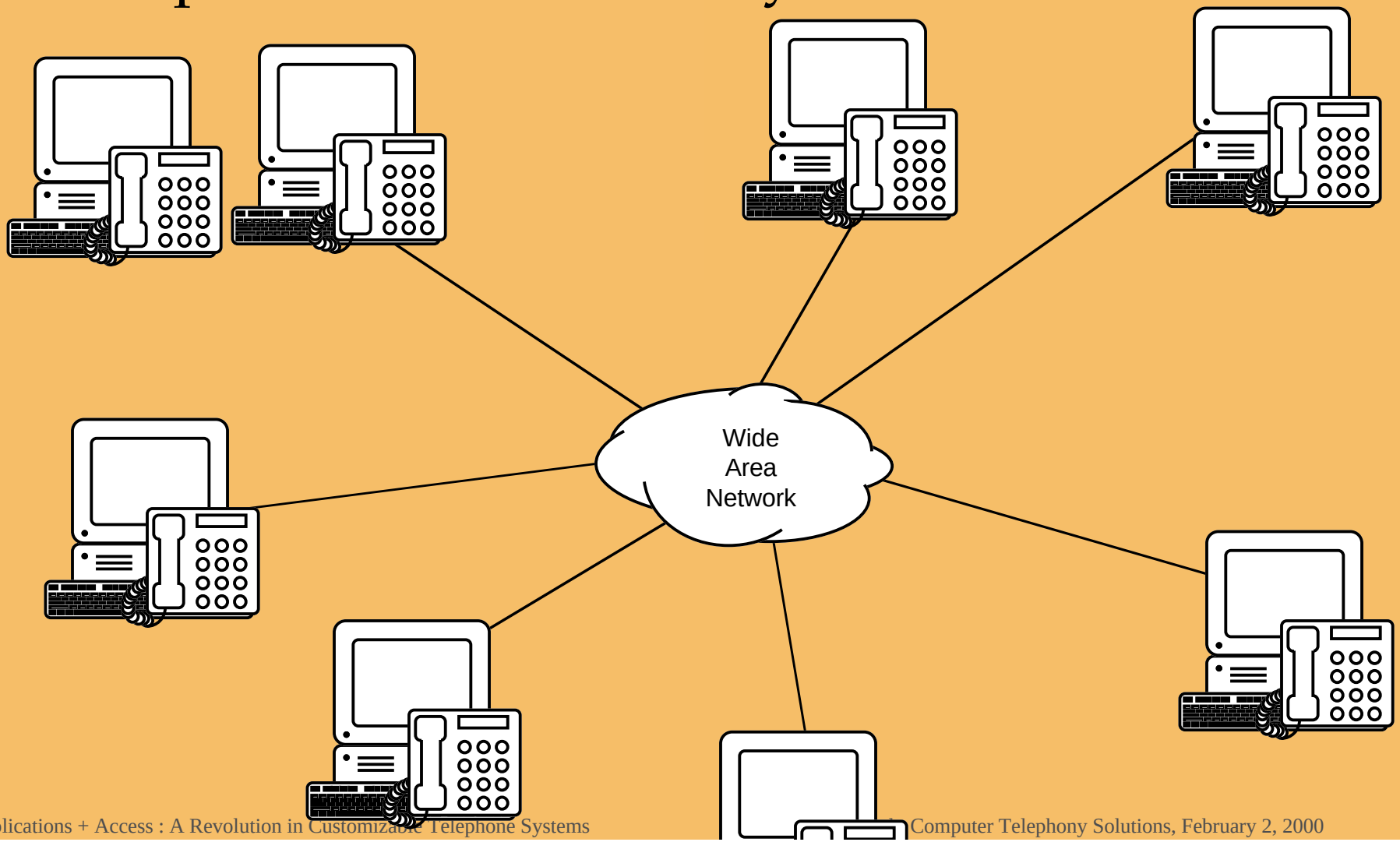
- Implications and requirements for computer telephony technology that support creating and operating virtual organizations

Conventional Organization

- Staff works in close proximity
- Teams meet face-to-face

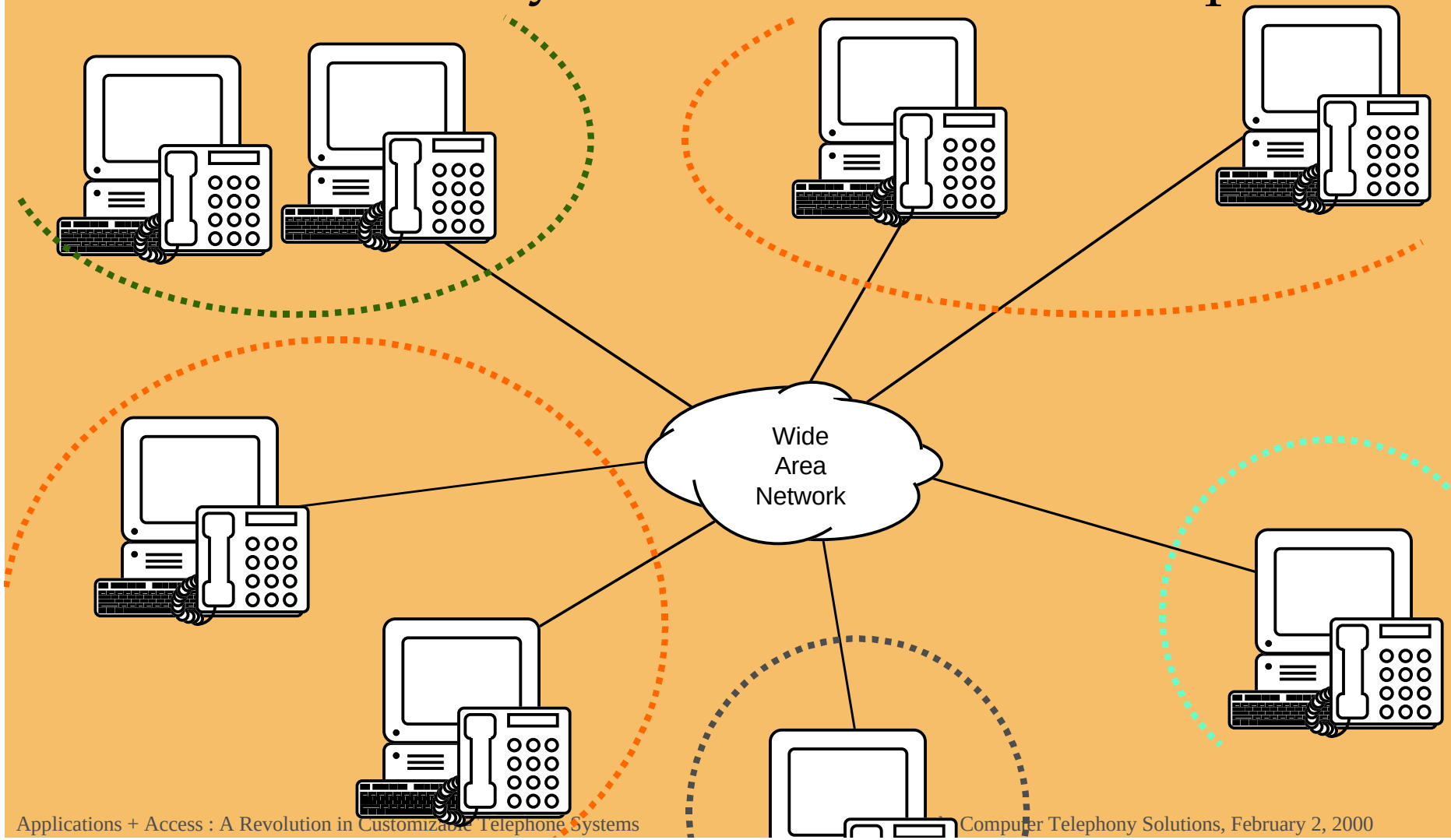
Virtual Organization

- People can work from anywhere

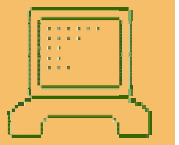


Virtual Organization

- Coworkers may work for different companies



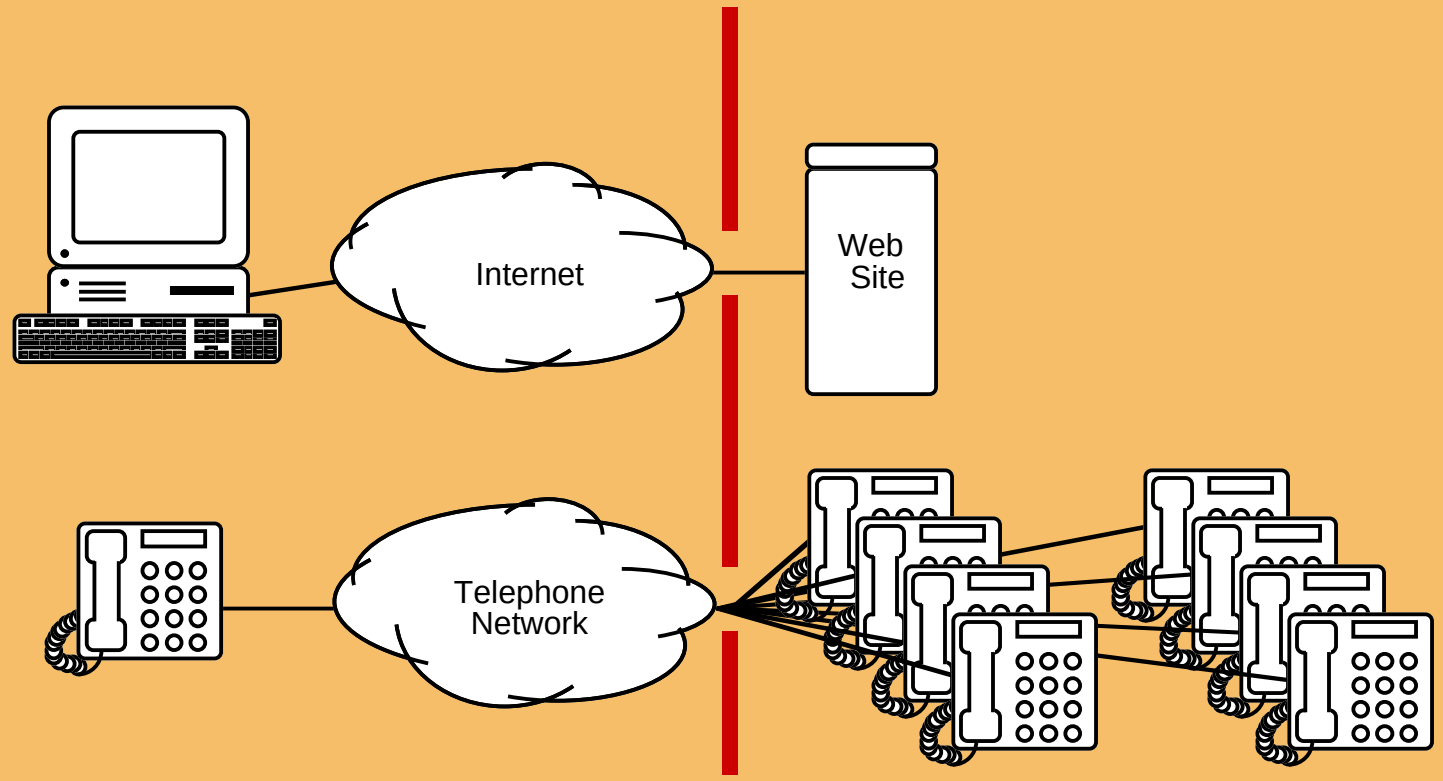
Requirements



1. For those outside the organization, the virtual organization must appear as a unified, cohesive entity.
   - Customer service must be at least as good as that provided by a conventional organization
   - Partners, vendors, analysts, etc. must perceive the organization to be at least as effective as a conventional organization
2. Those within the organization should benefit from the flexibility of the virtual organization without having to expend extra effort.

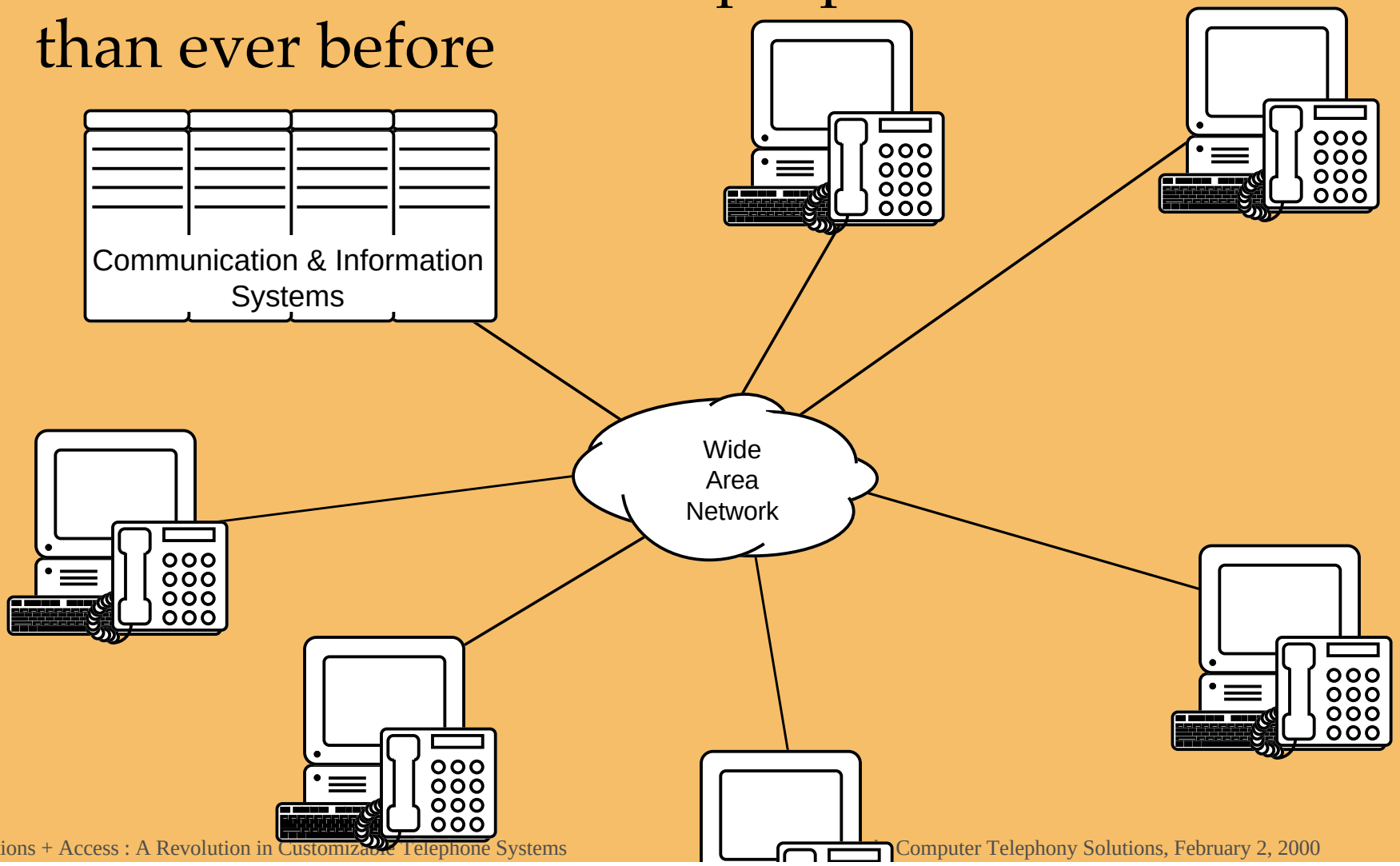
The External View

- Businesses of all sizes are deploying CRM systems to integrate telephone and information systems to provide seamless service

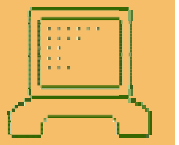


The Internal View

- Network services make people better connected than ever before

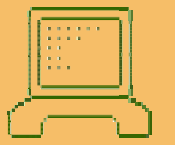


Insight #1



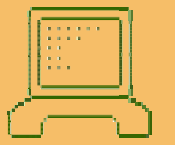
- The same communication technologies that allow an organization to deliver better service and operate more efficiently, are the enablers for building virtual organizations.

The Devil's in the Details…



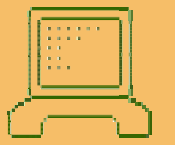
- The same communication technologies that allow an organization to deliver better service and operate more efficiently, are the enablers for building virtual organizations.
- Not all products are created equal. The products and solutions deployed must support the requirements of a virtual organization.

The Basic Ingredients



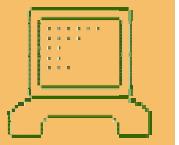
- Wide Area Network
- Intranet Applications
- Customizable Telephone System

Wide Area Networks



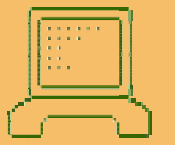
- Privacy
  - Dedicated
  - Virtual Private
- One Network or Two?
  - Separate voice and data networks
  - Converged networks

Intranet Applications



- Web Servers
- Directory Services
- Messaging
- Calendar Systems
- Enterprise Databases
- CRM
- Other Collaborative Applications

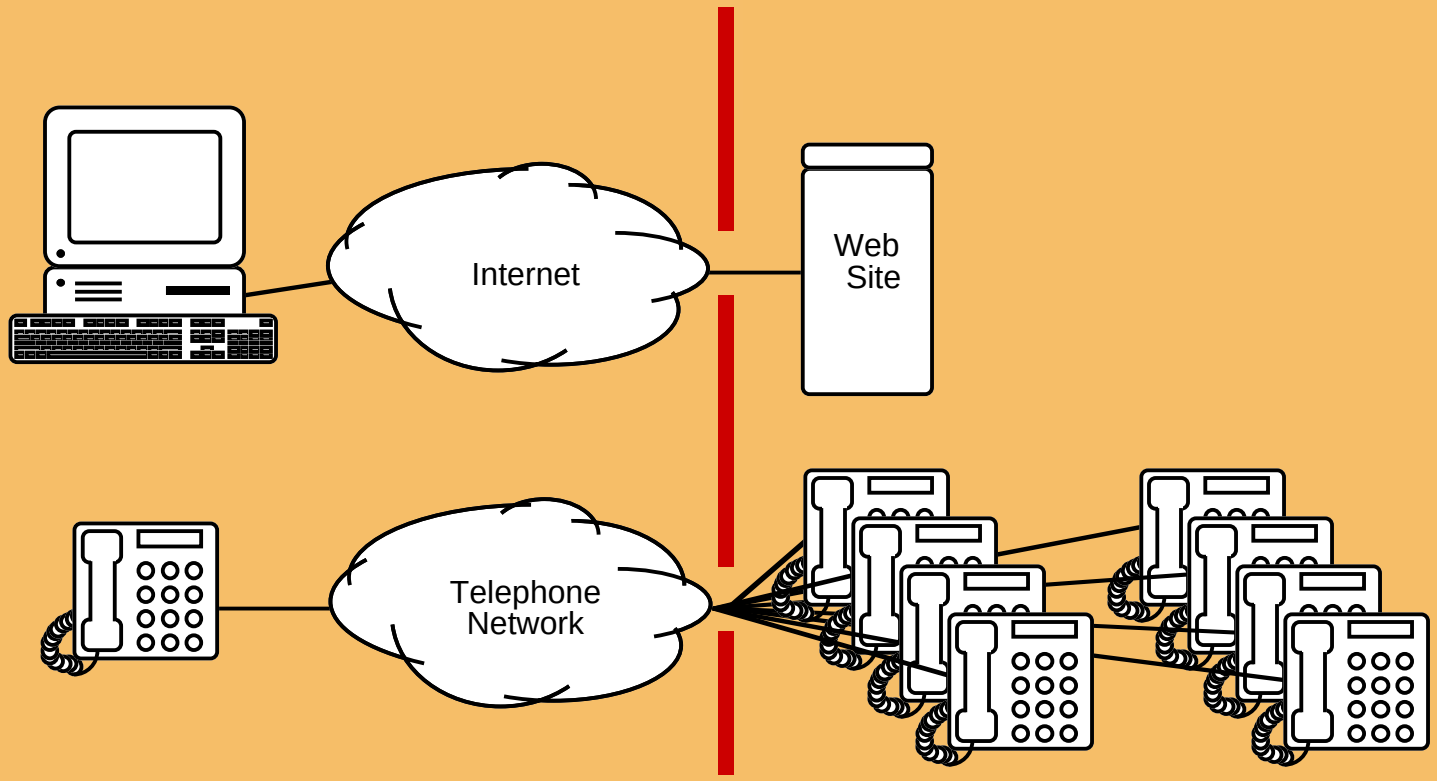
Customizable Telephone Systems



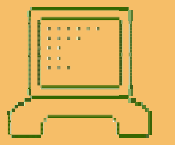
- Improved customer relationships
- Greater morale and productivity
- Increased professionalism
- Coping with drive for higher productivity
- Return on IT and Telecom investments
- Reduced operational expenses
- Support location independence
  - telecommuting workforce
  - mobile workforce
  - virtual organization

Customizable Telephone Systems

- Application servers represent a single point of contact, but every staff member represents a point of contact over the telephone

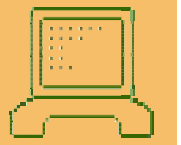


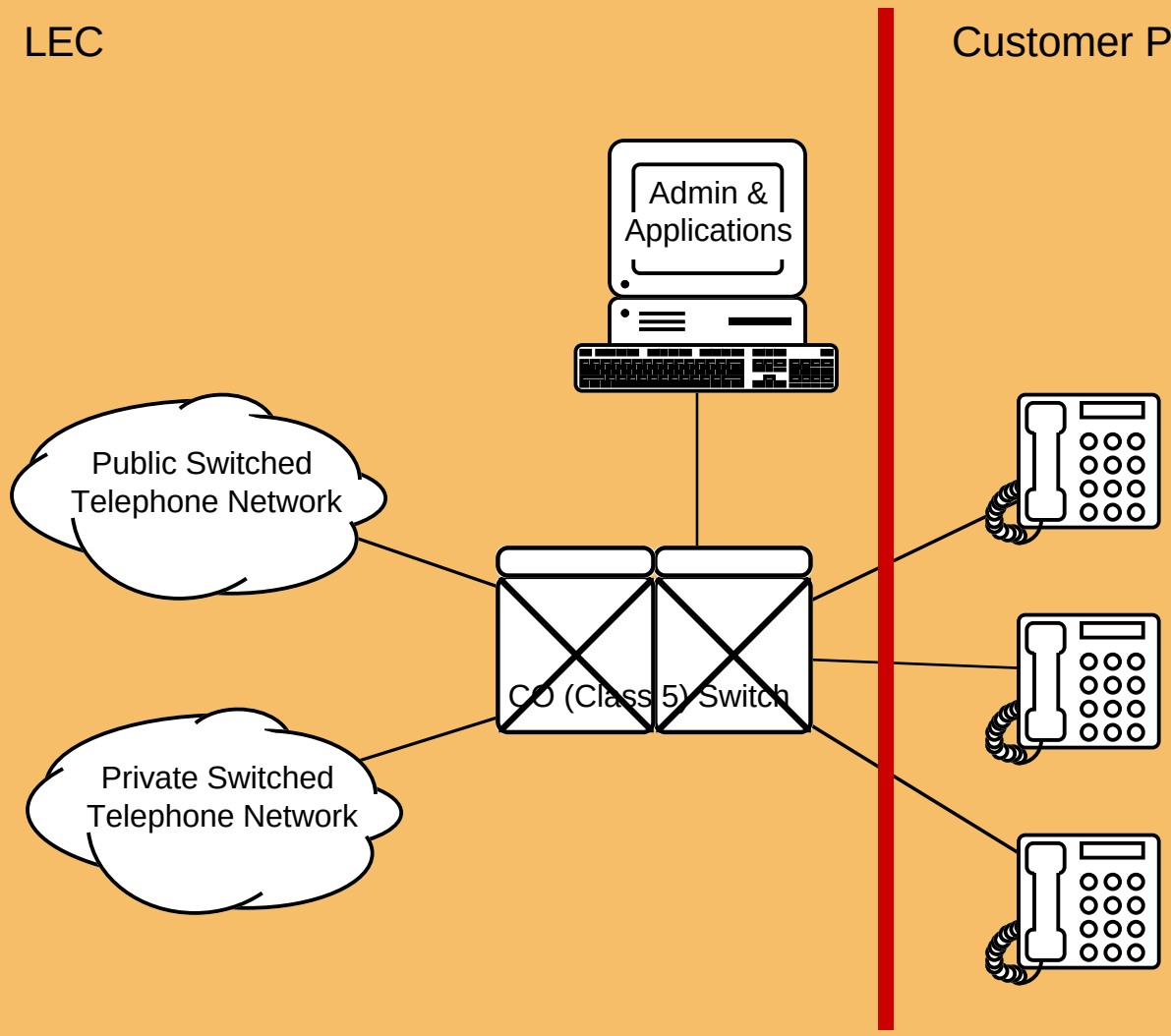
Customer Hierarchy of Needs



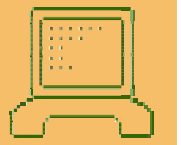
- Reliability
- Cost-effectiveness
- Flexibility
- Customizable

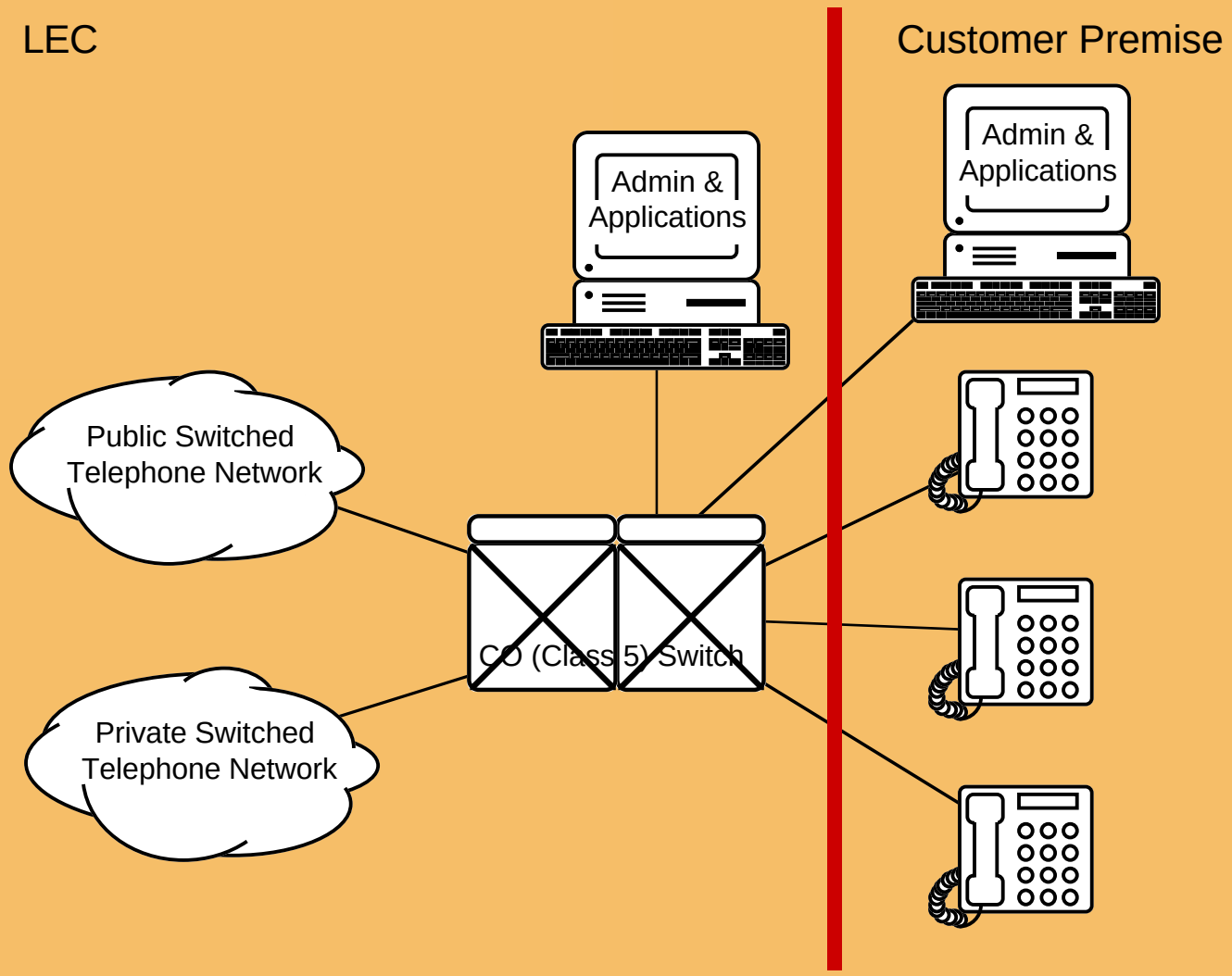
Traditional Telephone System Implementation: Centrex



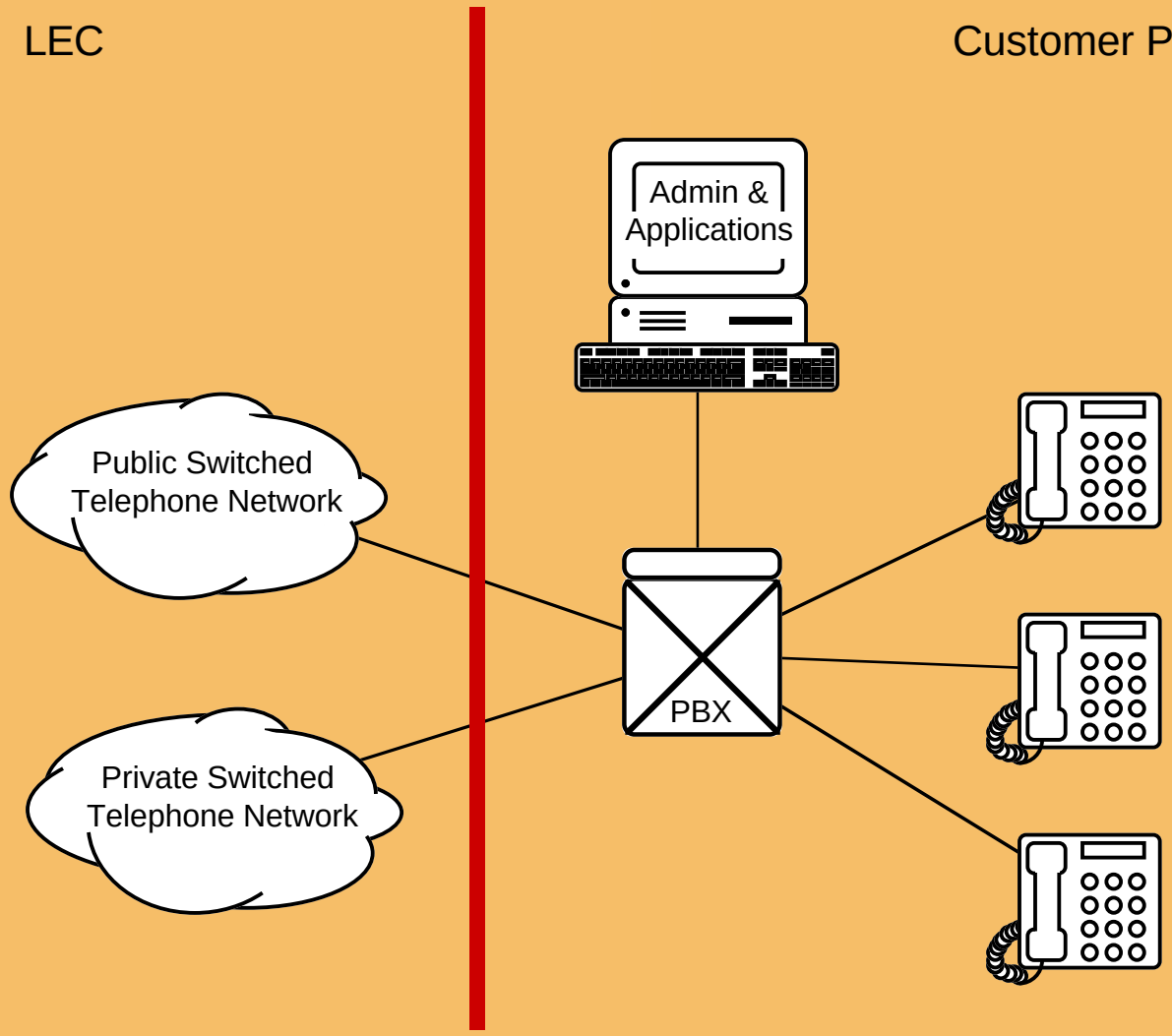


Traditional Telephone System Implementation: Centrex

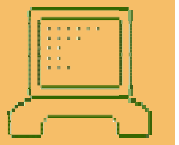




Traditional Telephone System Implementation: PBX

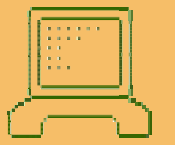


Insight #2:



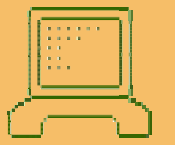
- The way to deliver customization is computer-based applications that add functionality to the telephone system:
  - Desktop CTI
  - Customized Call Routing
  - Unified Messaging
  - Interactive Voice Response
- Delivering on the need for customization requires incorporating computer platforms into the telephone system

Questions:



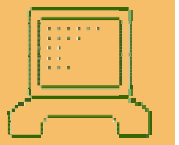
- What is a customizable telephone system?
- What are the implications of deploying this technology for a virtual organization?
- How do you evaluate product offerings?

Computer Telephony (CT)



- Implementation of telephone system components using off-the-shelf computer hardware and software

The Promise of CT Technology



Telephone systems

that are

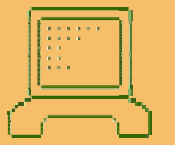
tailored

to the

specific needs and **preferences**

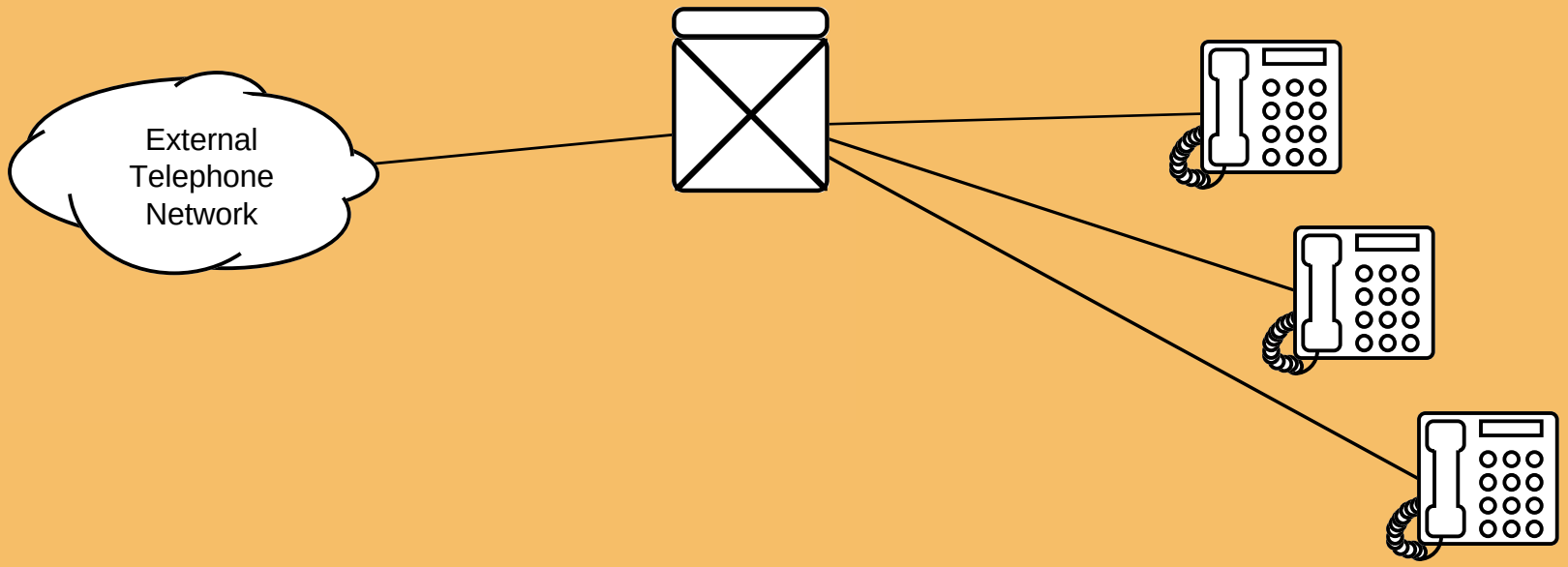
of **users**

A series of disappointments

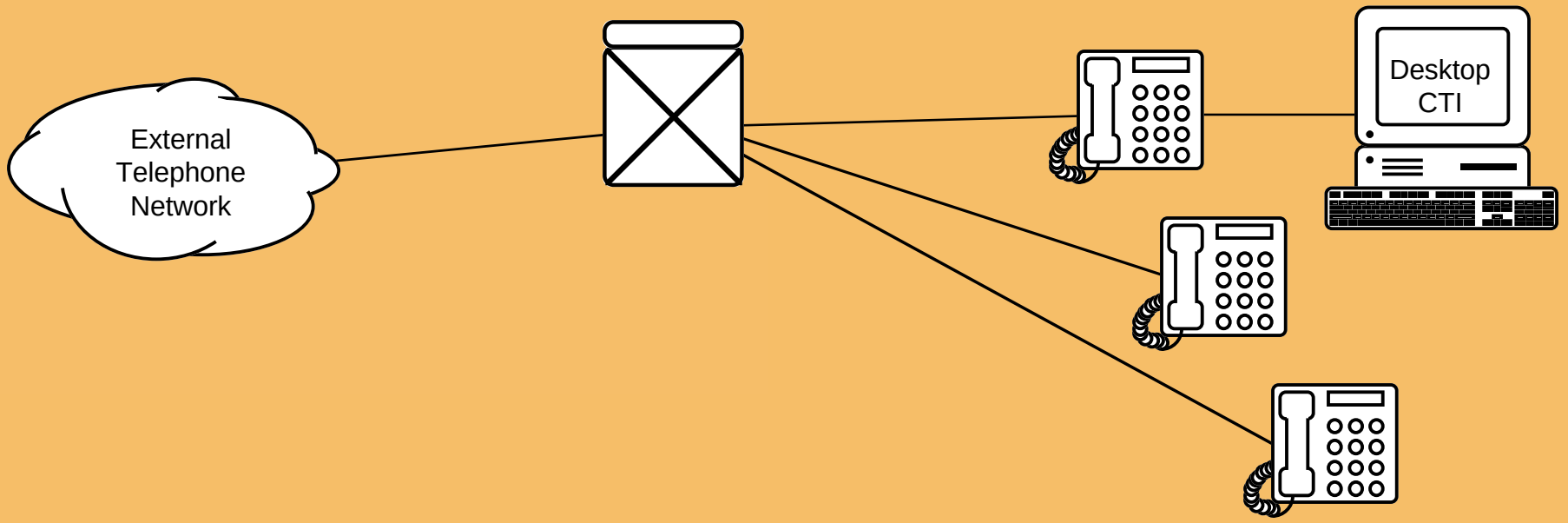


- mid-80s
  - Partnering announcements
- late-80s
  - Early SBT products (Meridian Telecenter, etc.)
- early-90s
  - Mainstream APIs (MTA, TAPI, TSAPI, etc.)
- mid-90s
  - API-based products

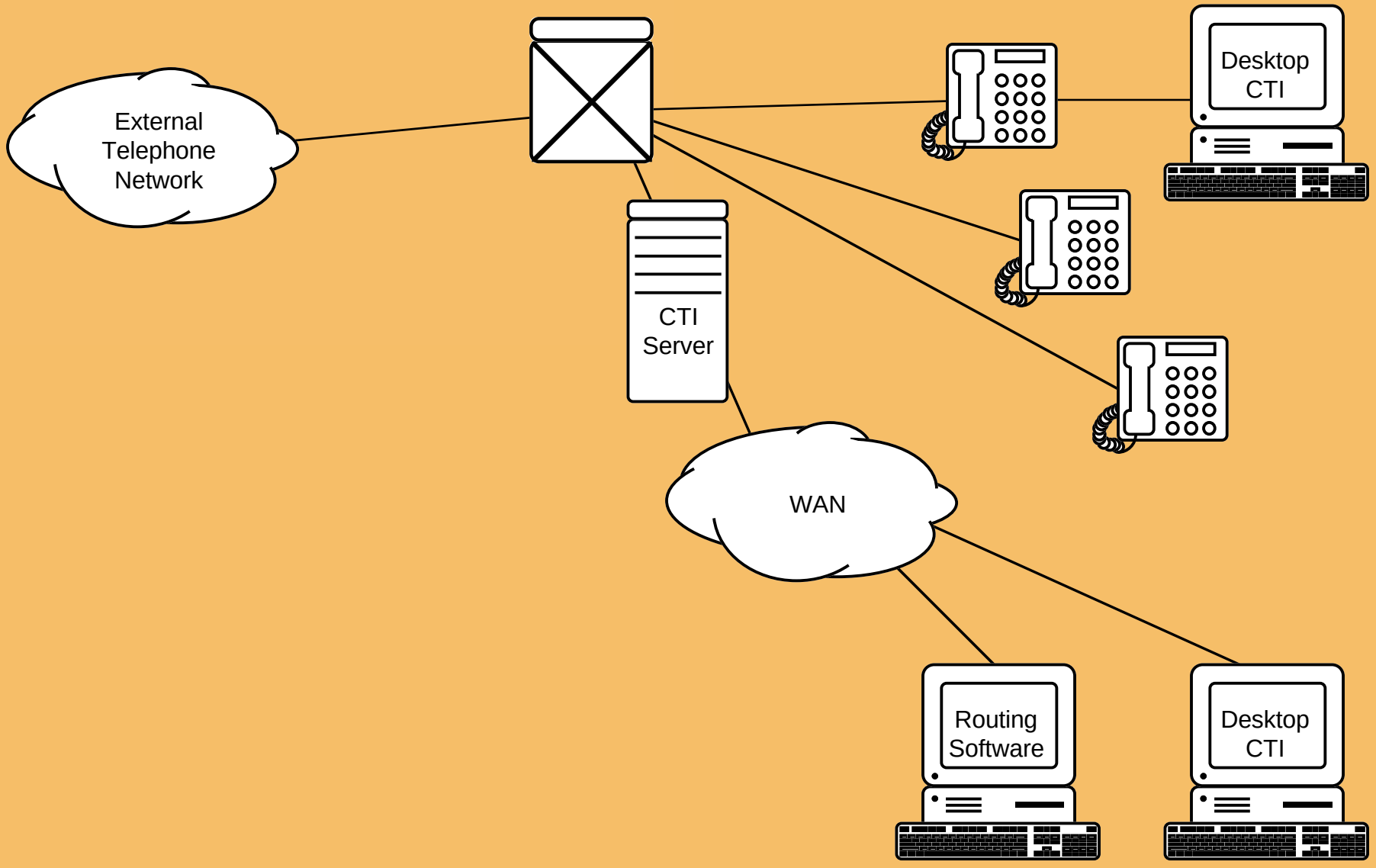
CT in Traditional Configurations



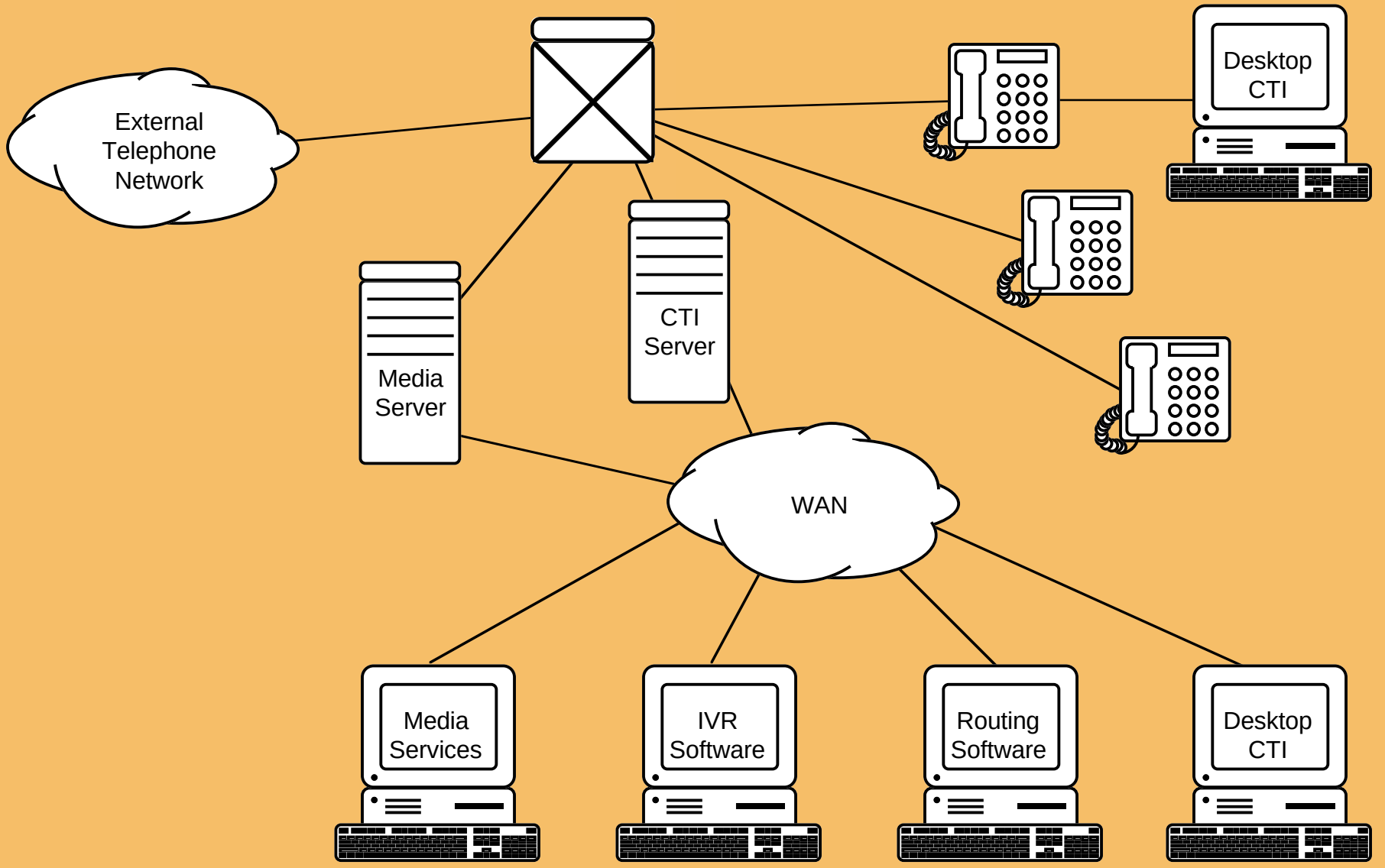
CT in Traditional Configurations



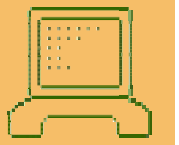
CT in Traditional Configurations



CT in Traditional Configurations

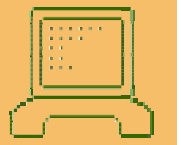


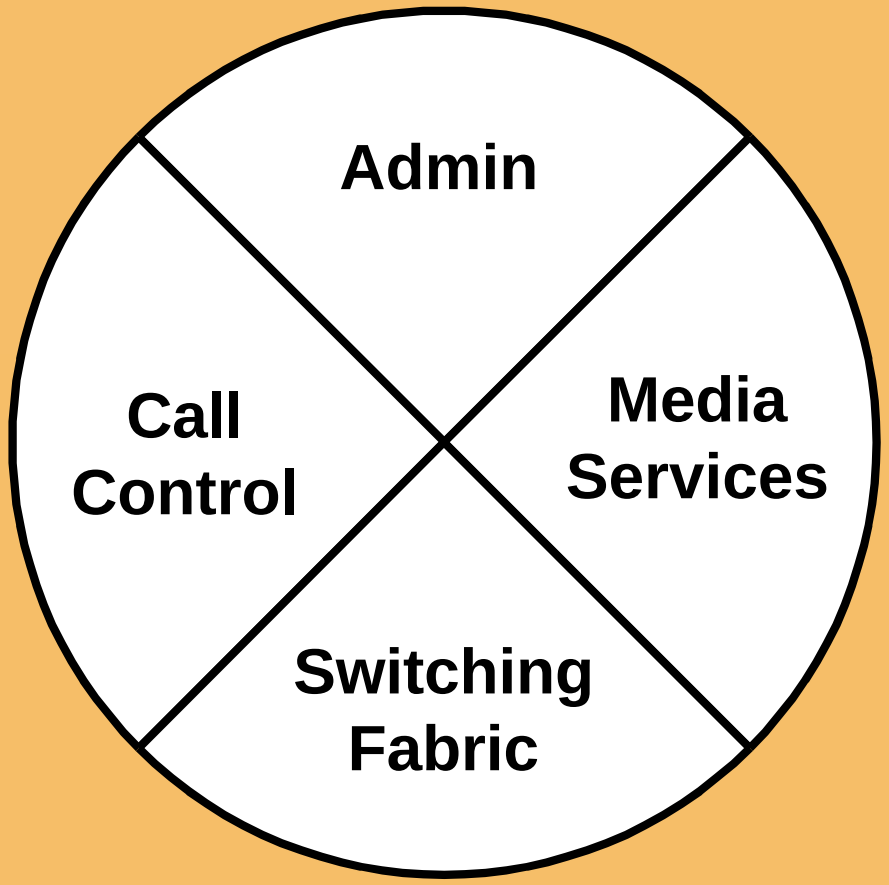
Insight #3:



- Monolithic, legacy telephony components limit the functionality available through add-on CT products
- Need to integrate modern CT components with legacy telephony components is a major barrier

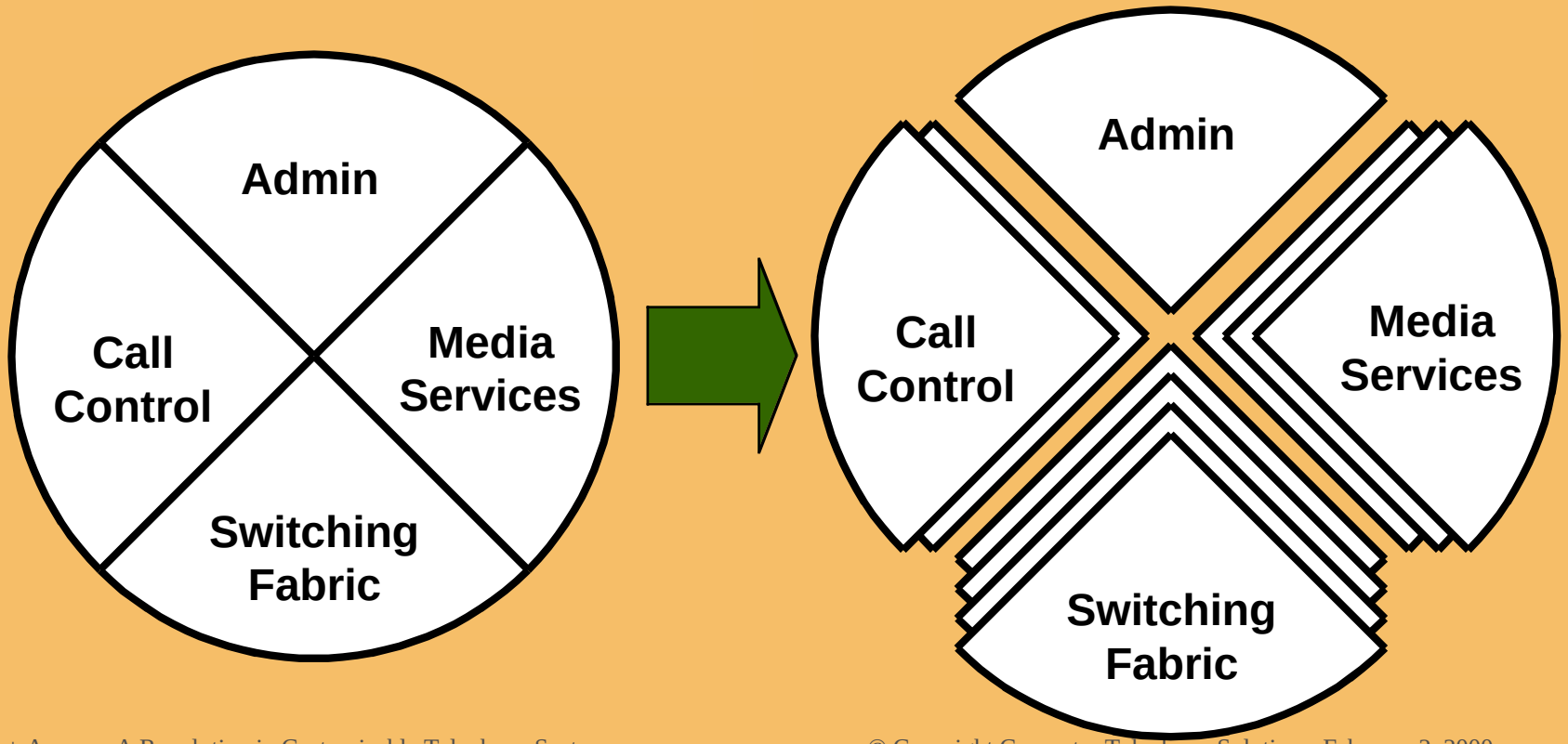
Telephone System Components



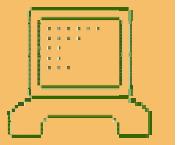


Computer Telephony Revolution

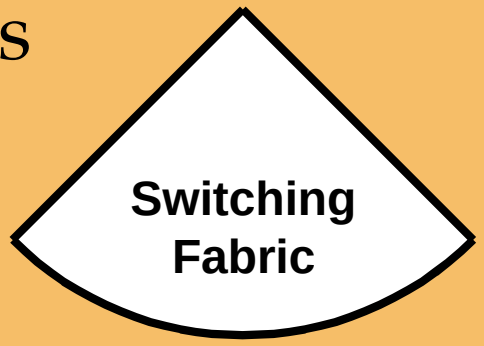
- Using off-the-shelf computer technologies to implement telephone system components
- Shift from Monolithic to Modular systems



Switching Fabric

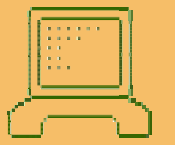


- Establishes media stream channels between endpoints and conveys signaling information



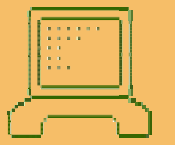
- Traditional Switching Fabric
  - TDM bus backplanes connecting line cards
  - Analog (POTS) and digital (T-1, ISDN, proprietary) telephony circuits
- IP Telephony Switching Fabric
  - Packetized voice over conventional IP networking infrastructure
  - Typically based on off-the-shelf computer technology

CTI

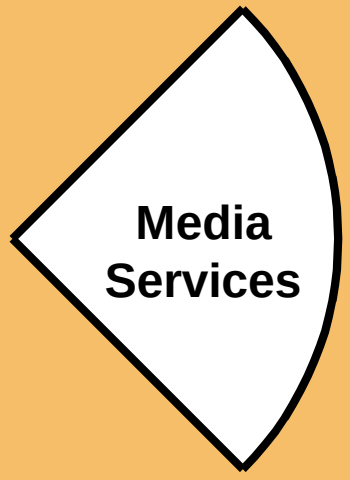


- Call Control
  - Monitoring and directing calls in a telephone system
- Telephone Control
  - Monitoring and controlling features of a telephone set
- Media Binding
  - Relating other communications/telephony functionality to calls in a telephone system

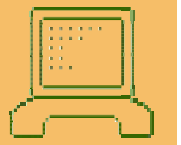
CT Media Access/Services



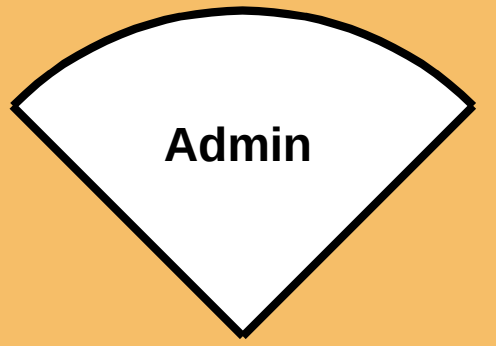
- Tone Detection and Generation
- Recording and Playback
- Text-to-Speech
- Speech Recognition
- Modulated Data (Modem/Fax)
- Digital Data (Compressed Video, etc.)
- Call Binding



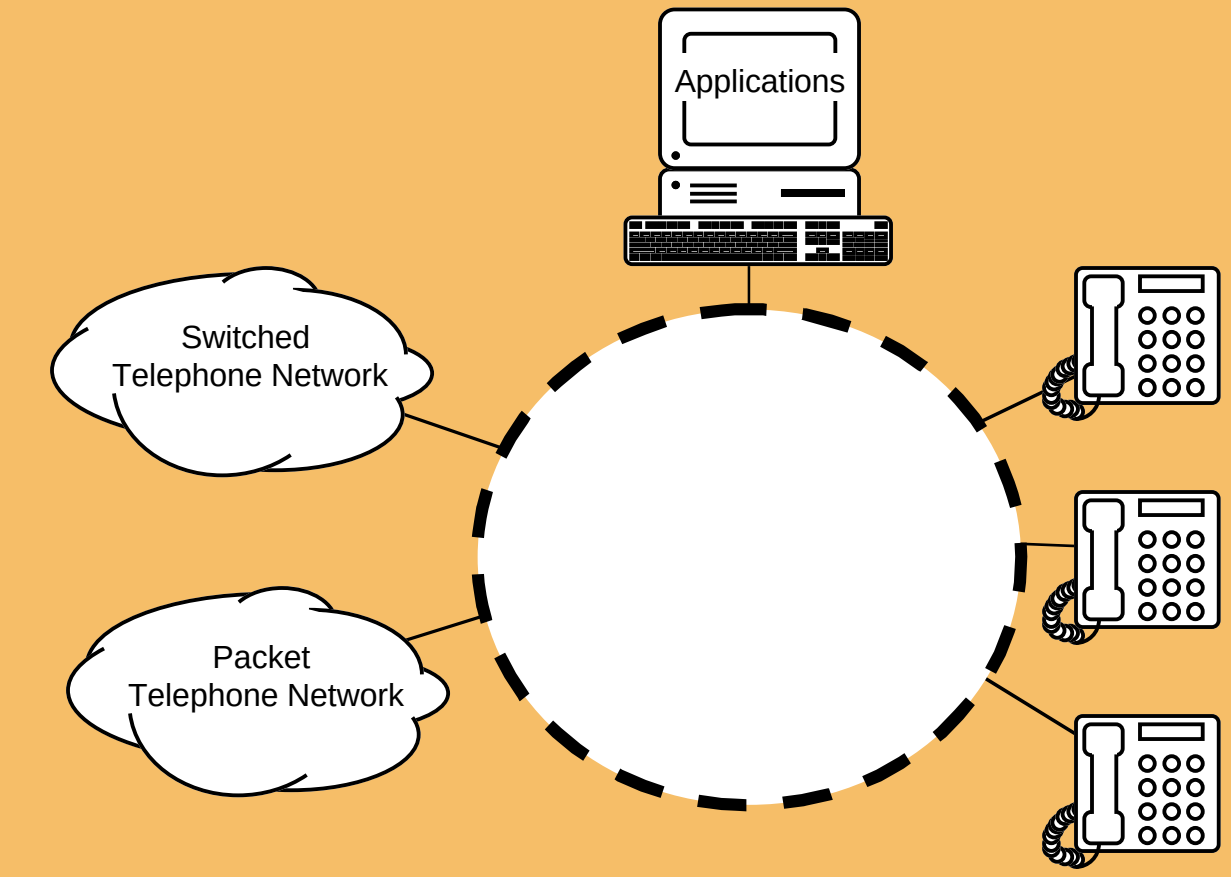
Admin



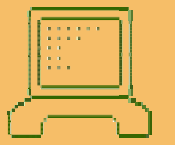
- System configuration
  - System customization
  - Moves / Adds / Changes
- Fault monitoring
- Accounting
- Performance management
- Security



Eliminating the Monolithic Switch

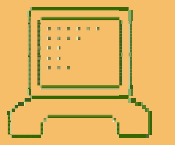


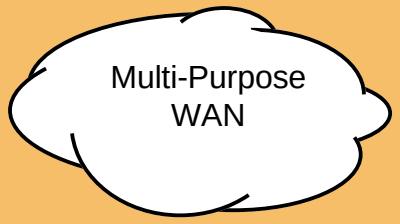
Insight #4:



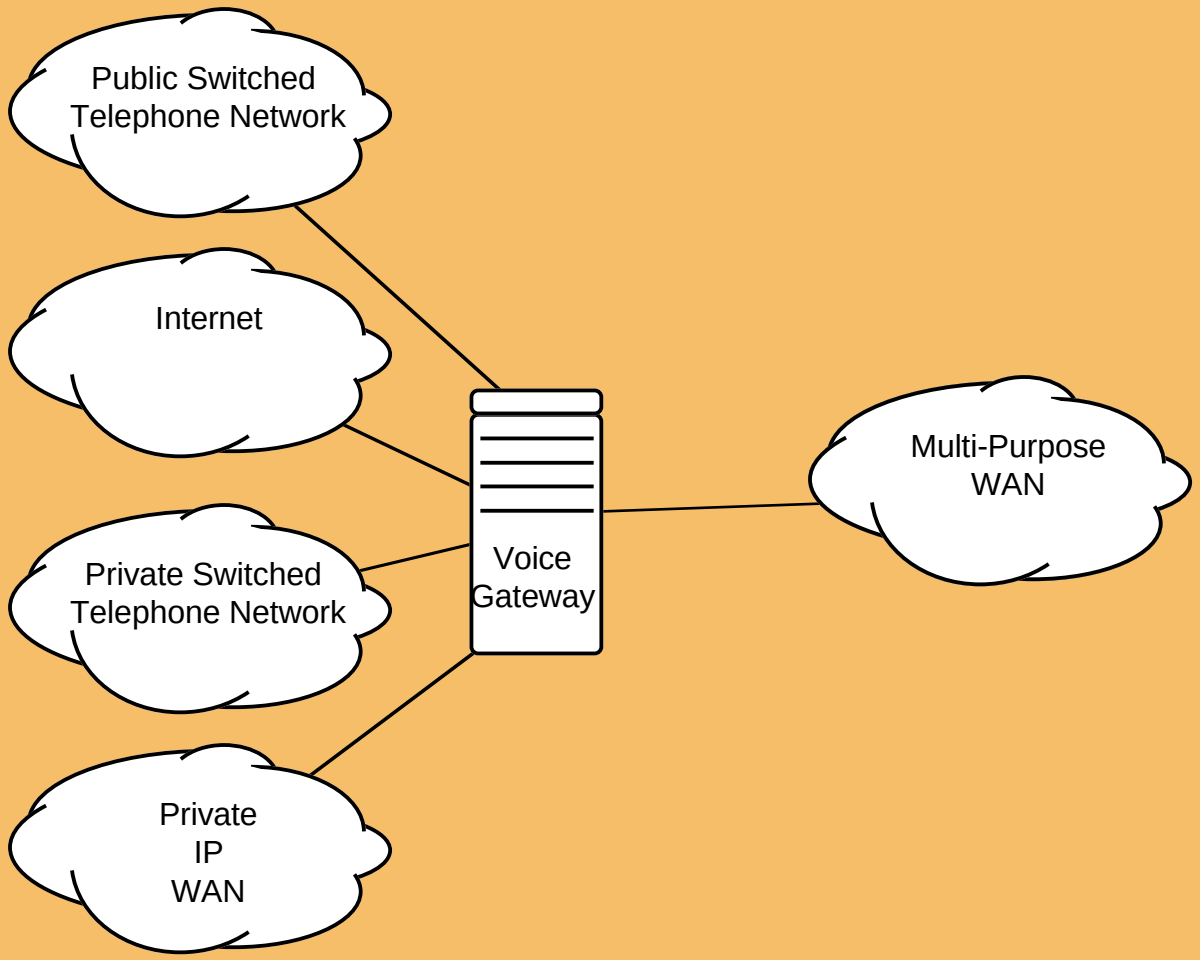
- CT involves implementation of all aspects of a telephone system, from switching to administration, using off-the-shelf computer technology
- We can now eliminate the monolithic telephony components
- This allows us to build, bundle, and sell telephone systems which incorporate customizable application functionality

Telephone System Implementation

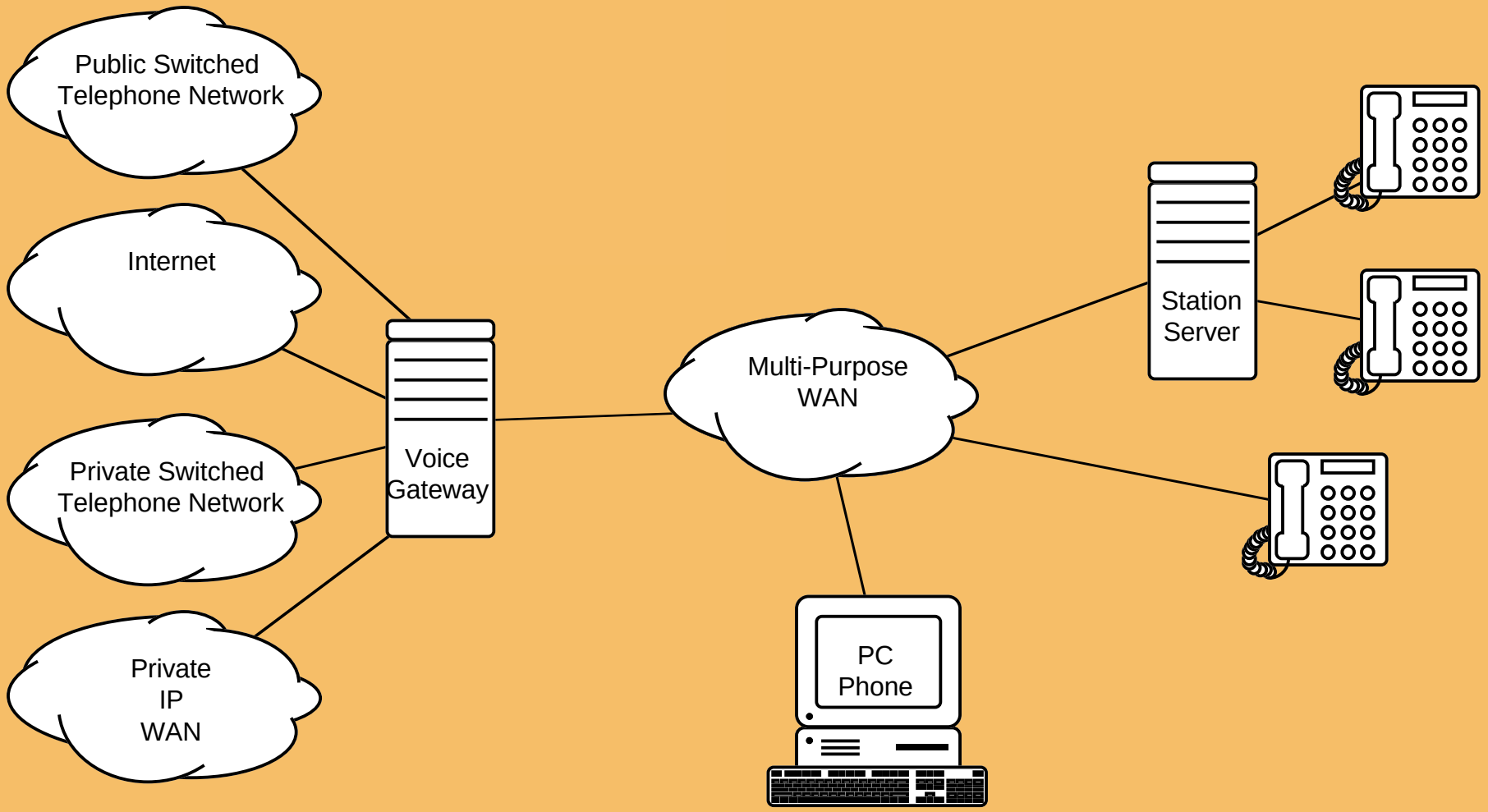




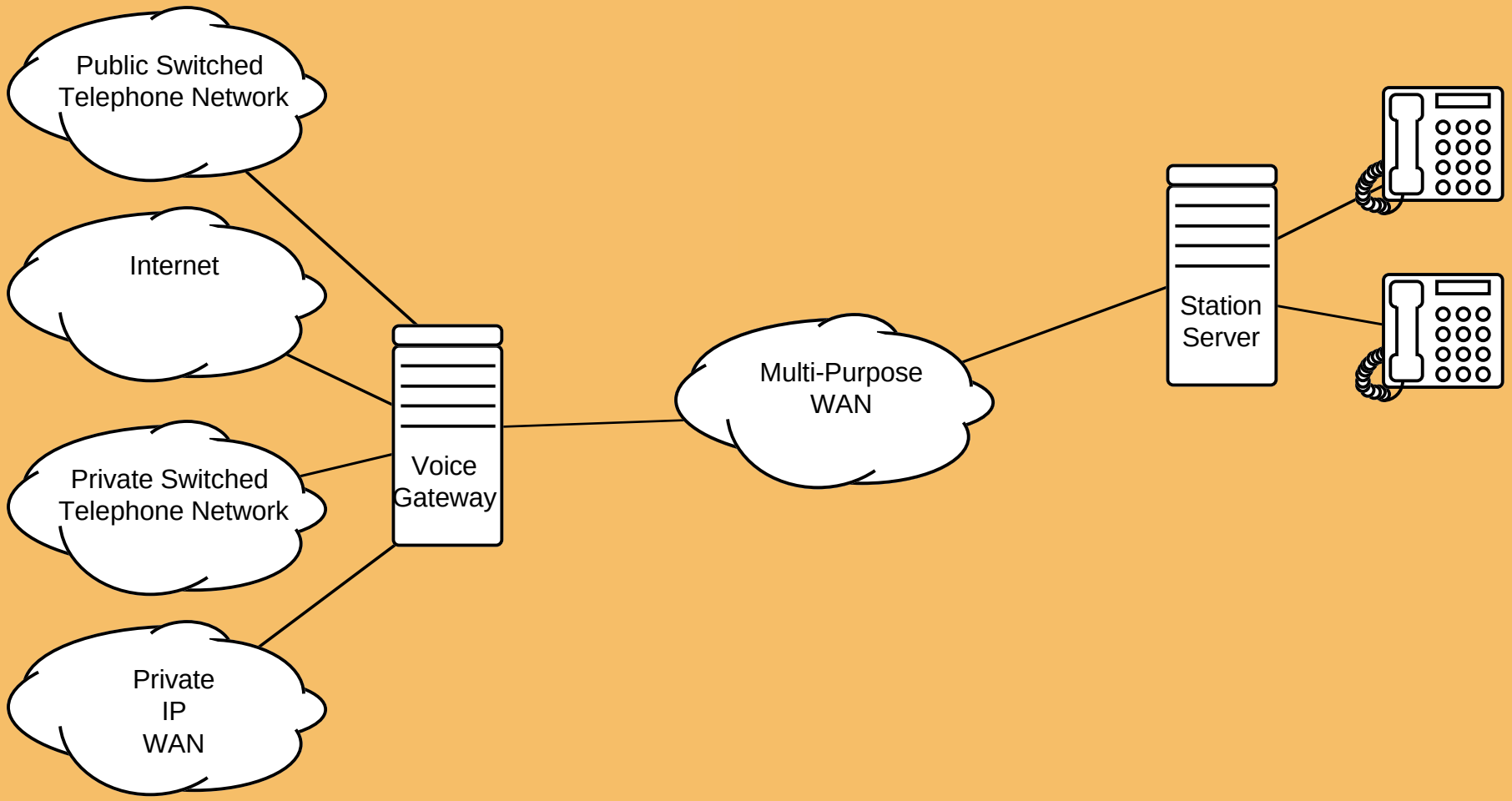
Telephone System Implementation



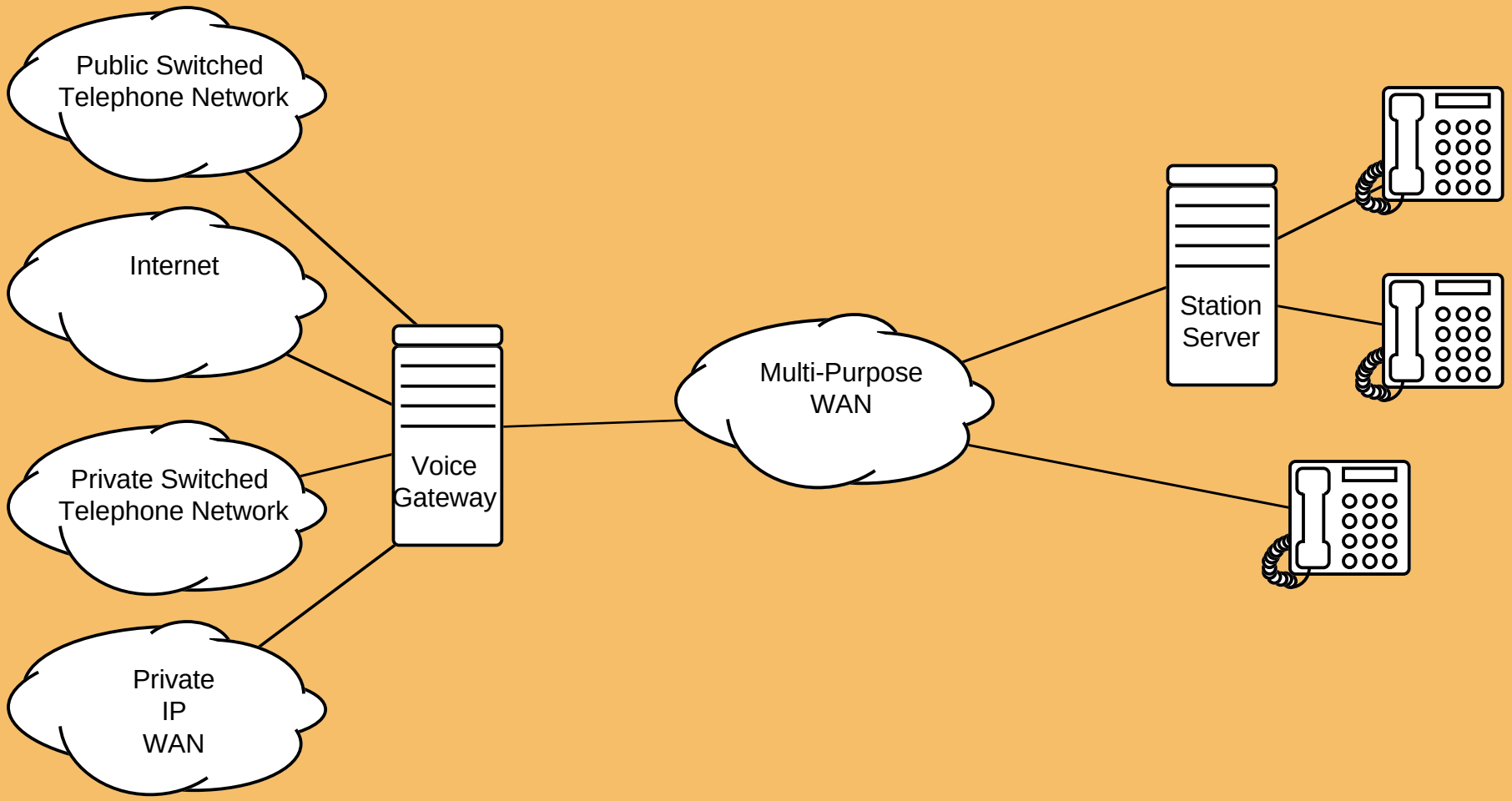
Telephone System Implementation



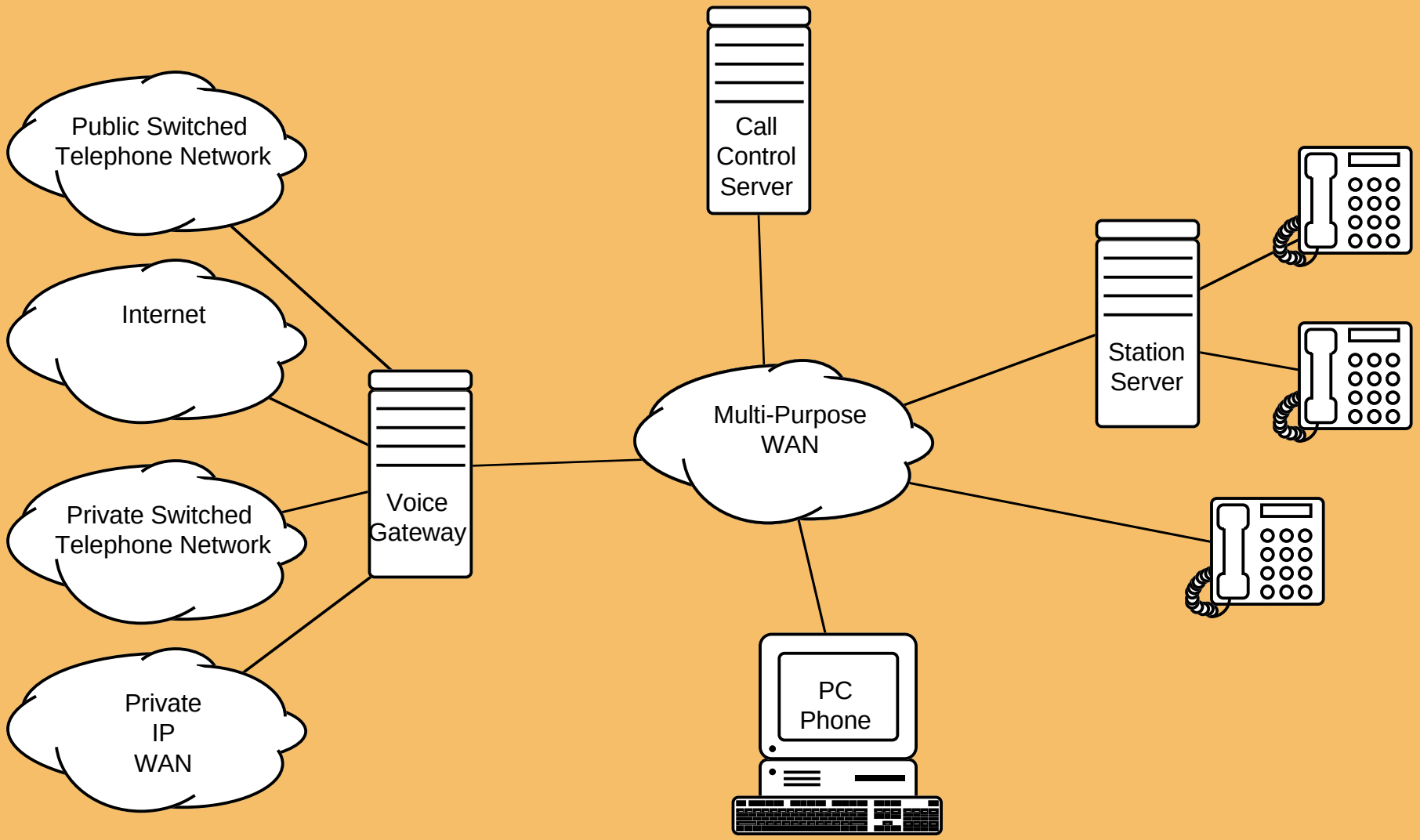
Telephone System Implementation



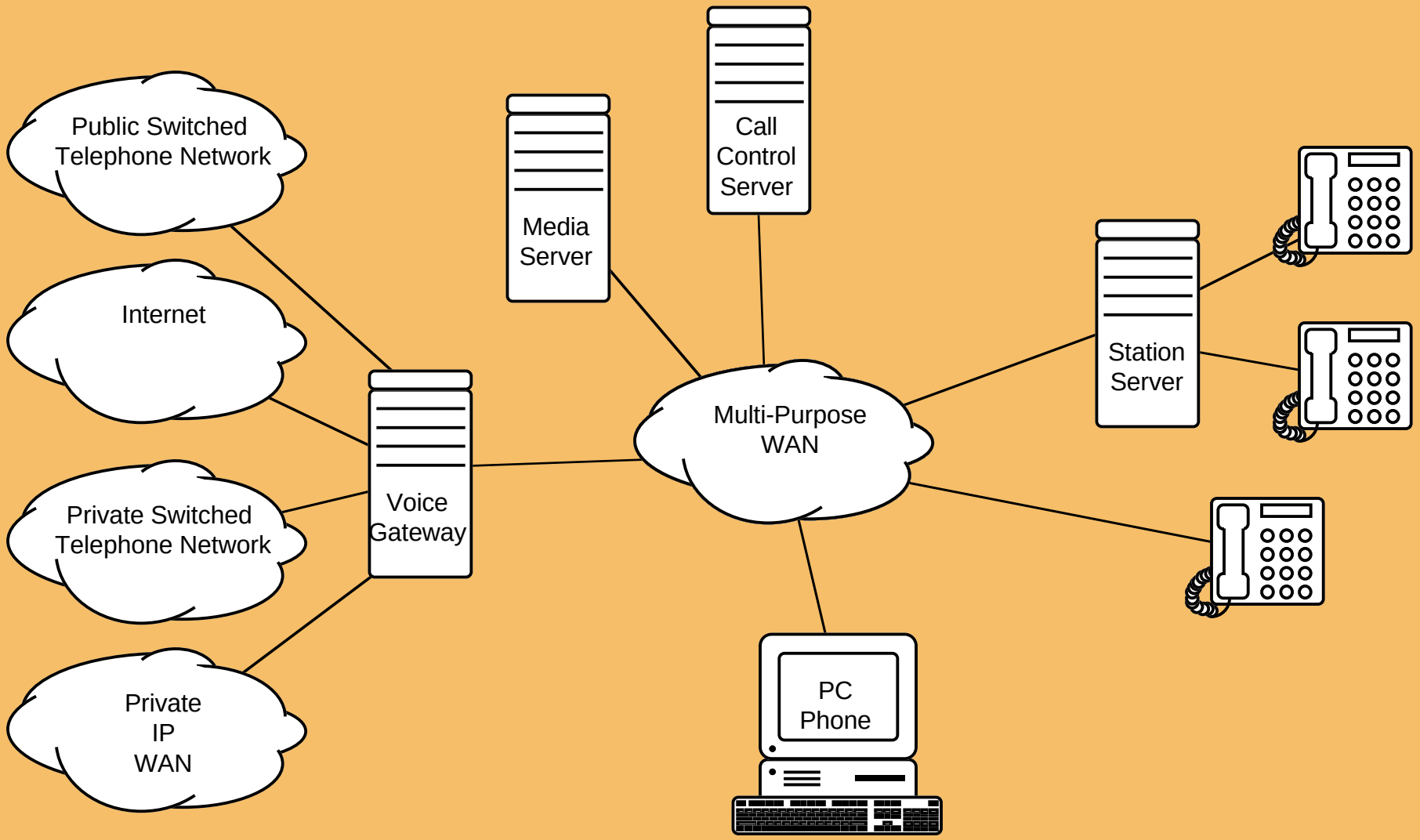
Telephone System Implementation



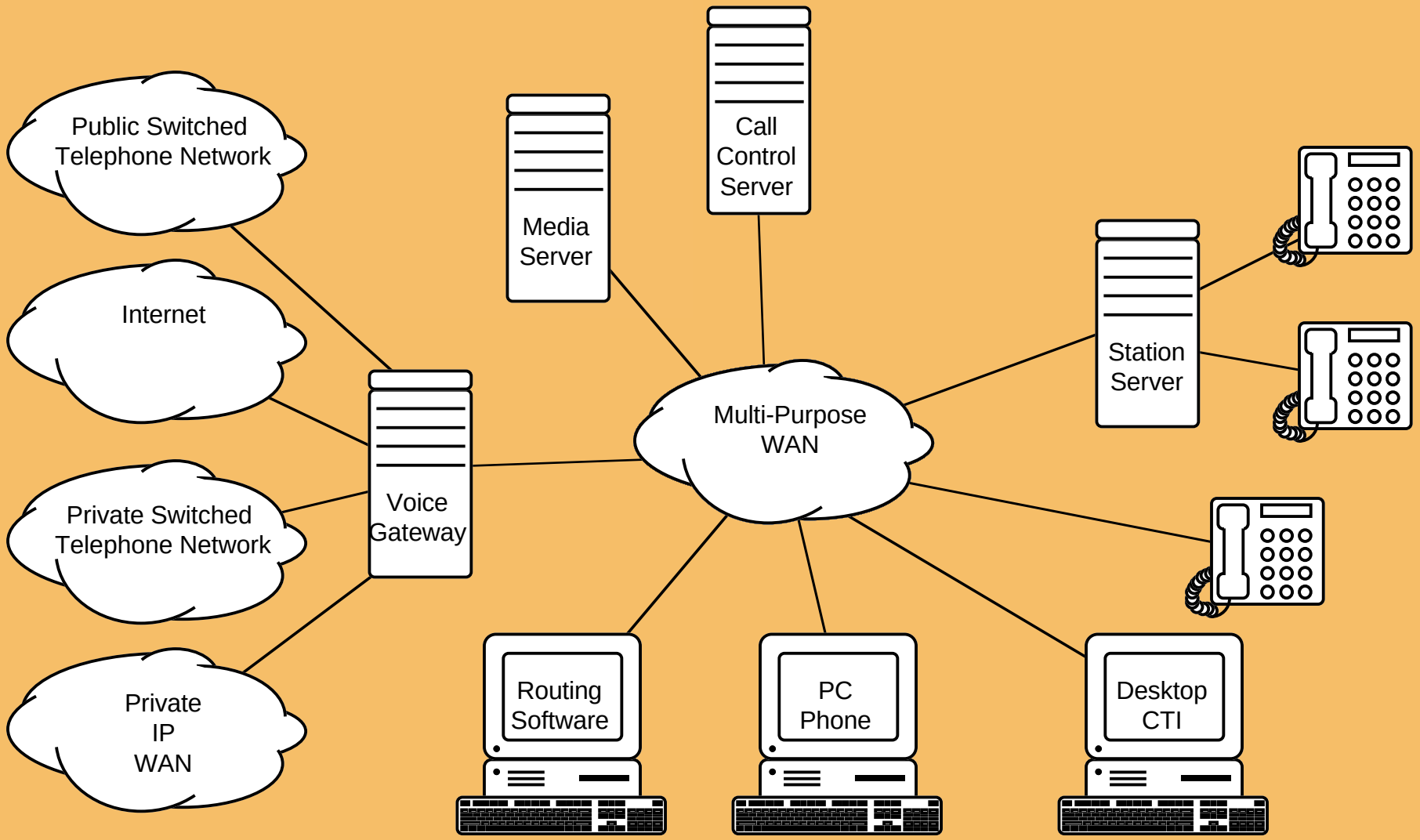
Telephone System Implementation



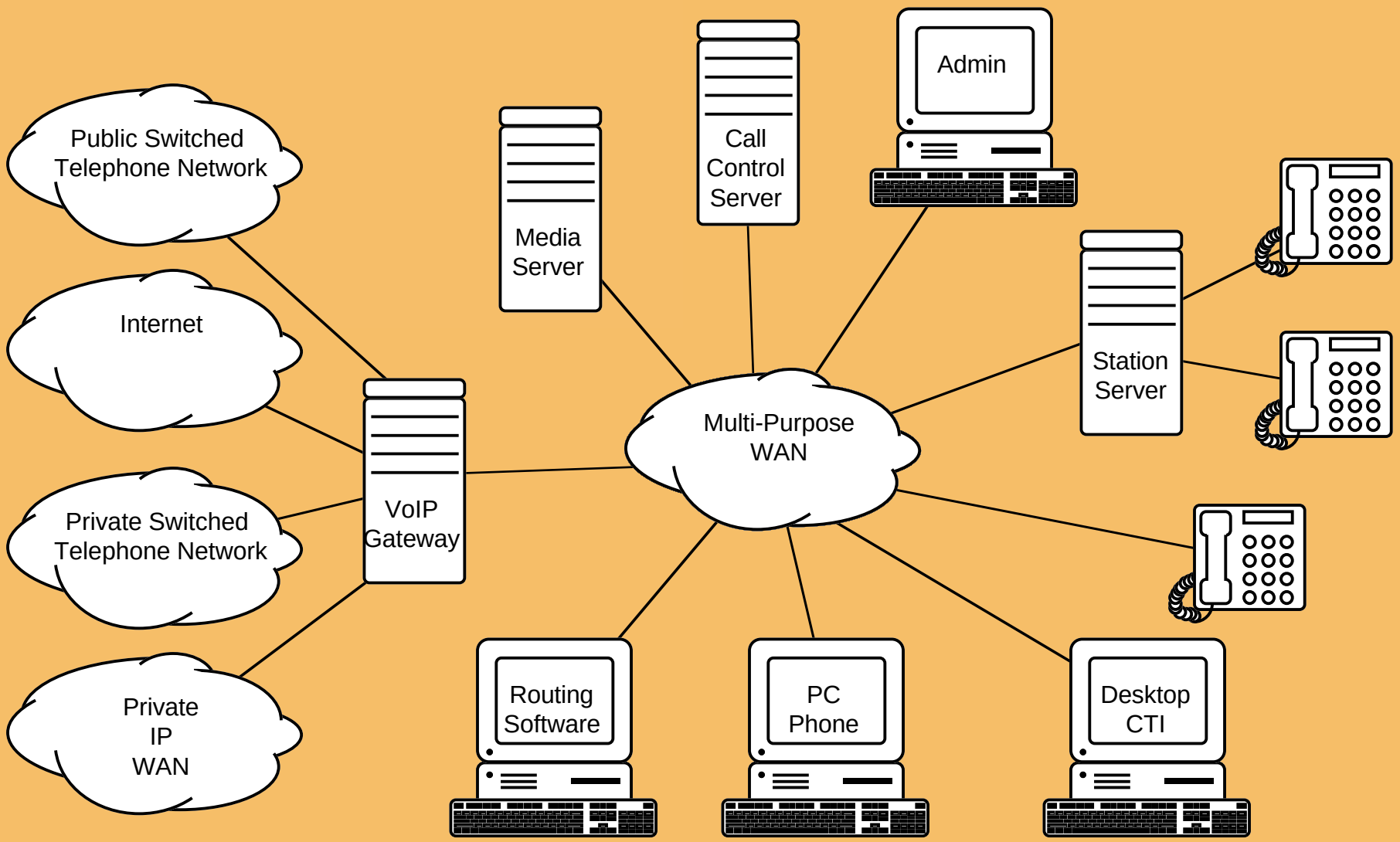
Telephone System Implementation



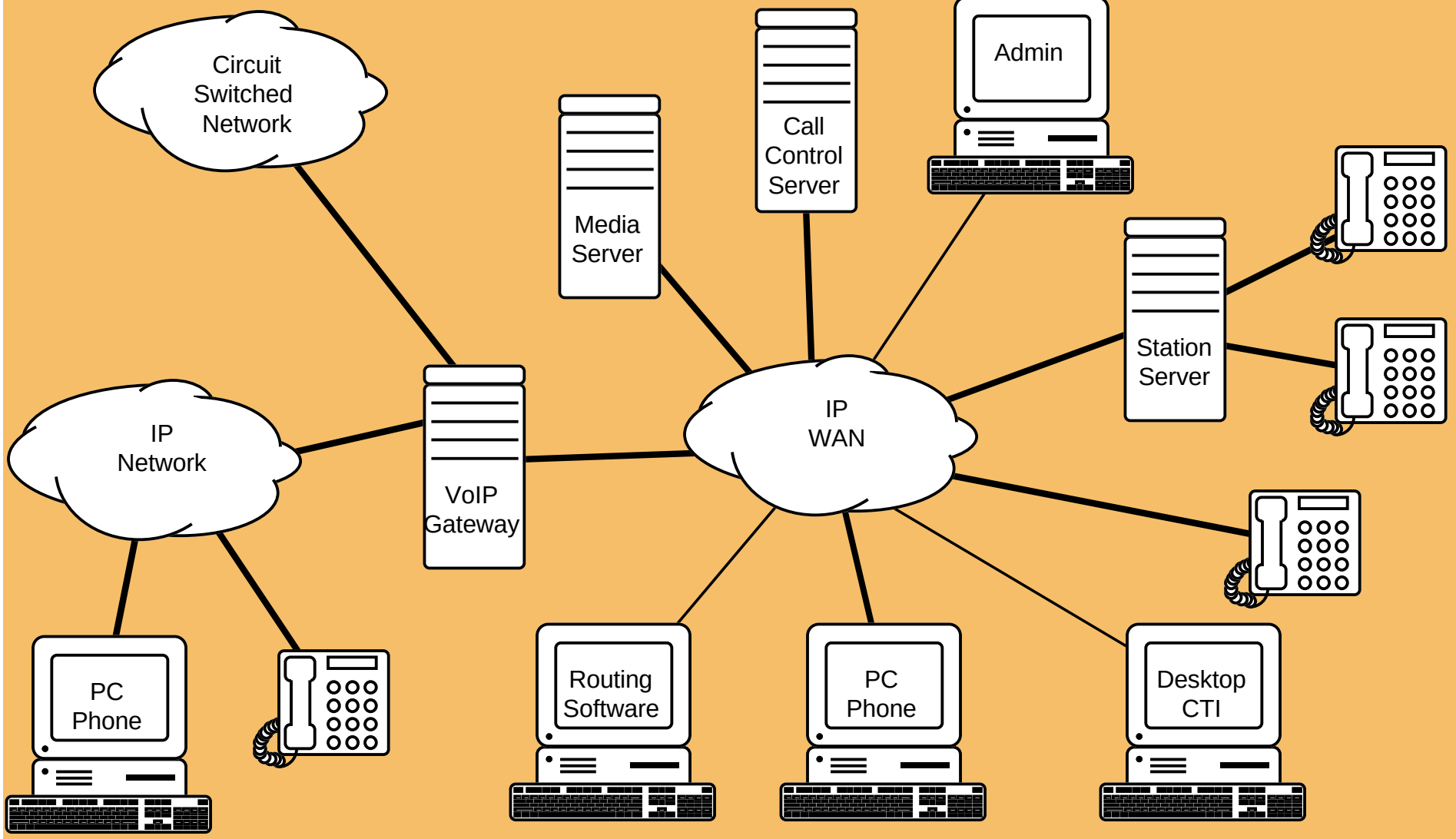
Telephone System Implementation



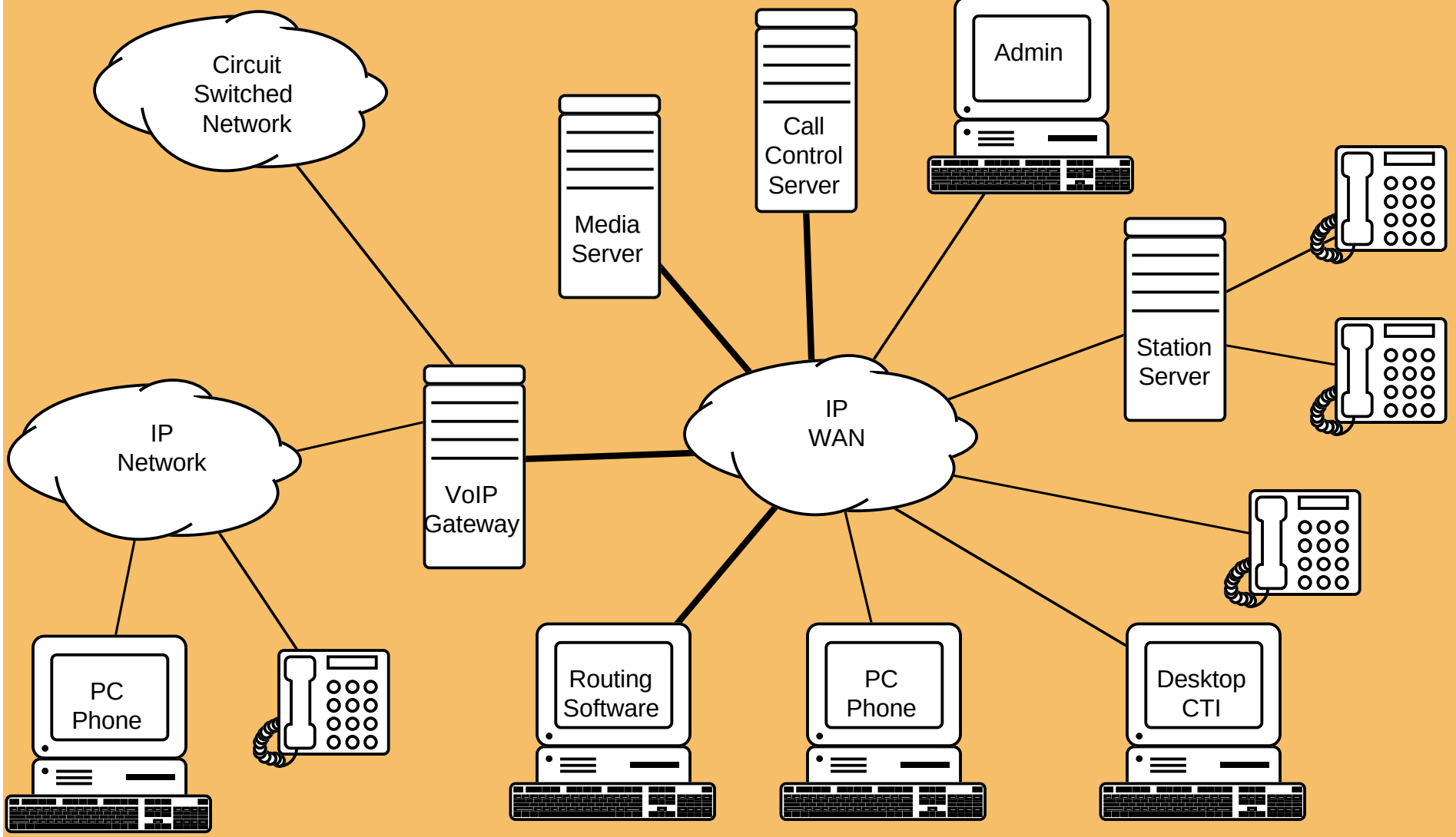
Telephone System Implementation



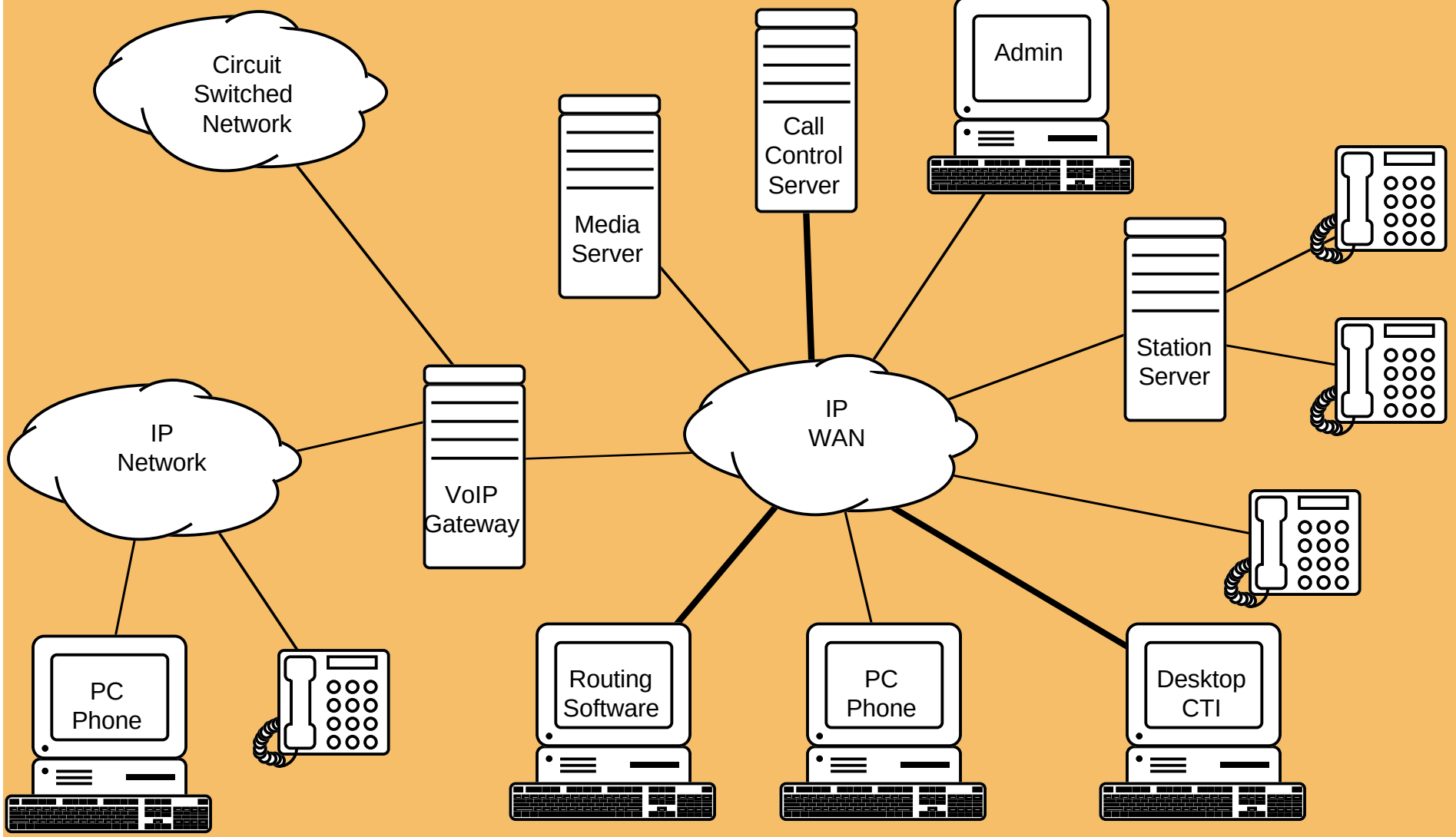
iPBX: Switching



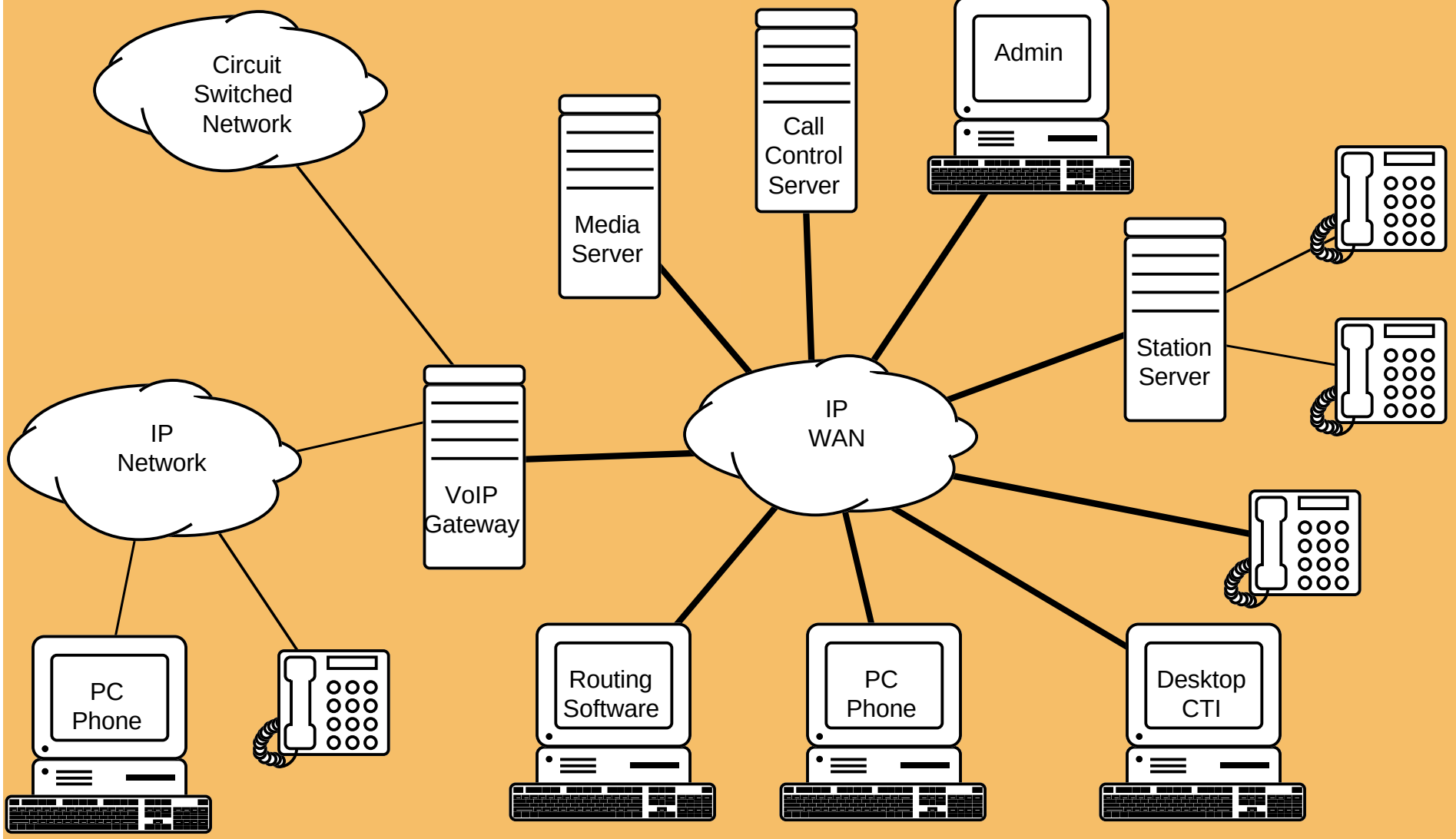
iPBX: Media Services



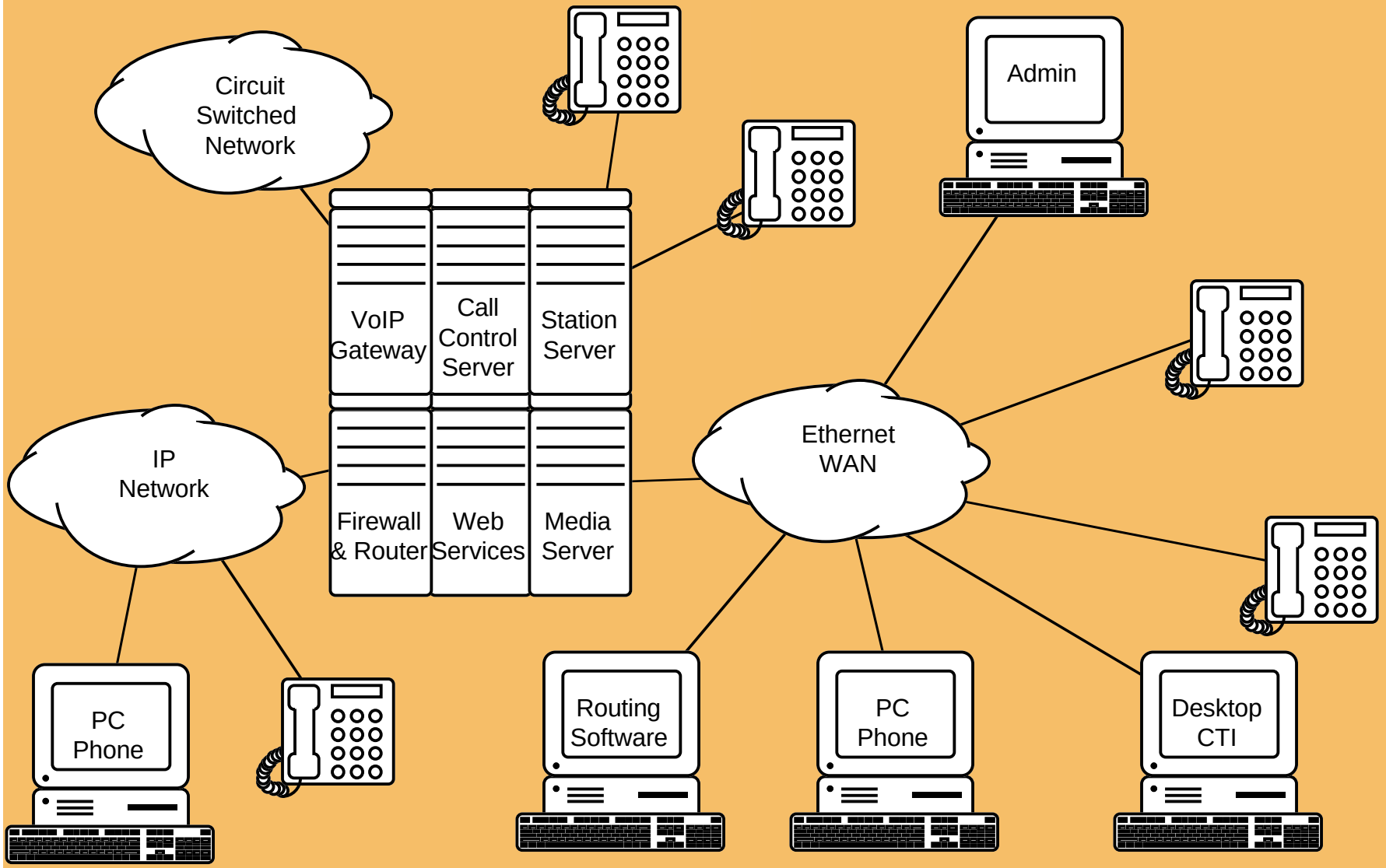
iPBX: CTI / Call Control



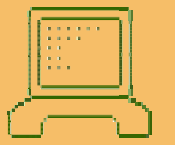
iPBX: Administrative Services



Integrated Access Device

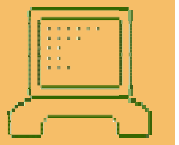


Insight #5:



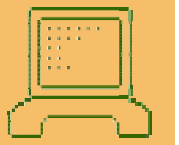
- Applications are telephone system components
- Applications + Network = Telephone System

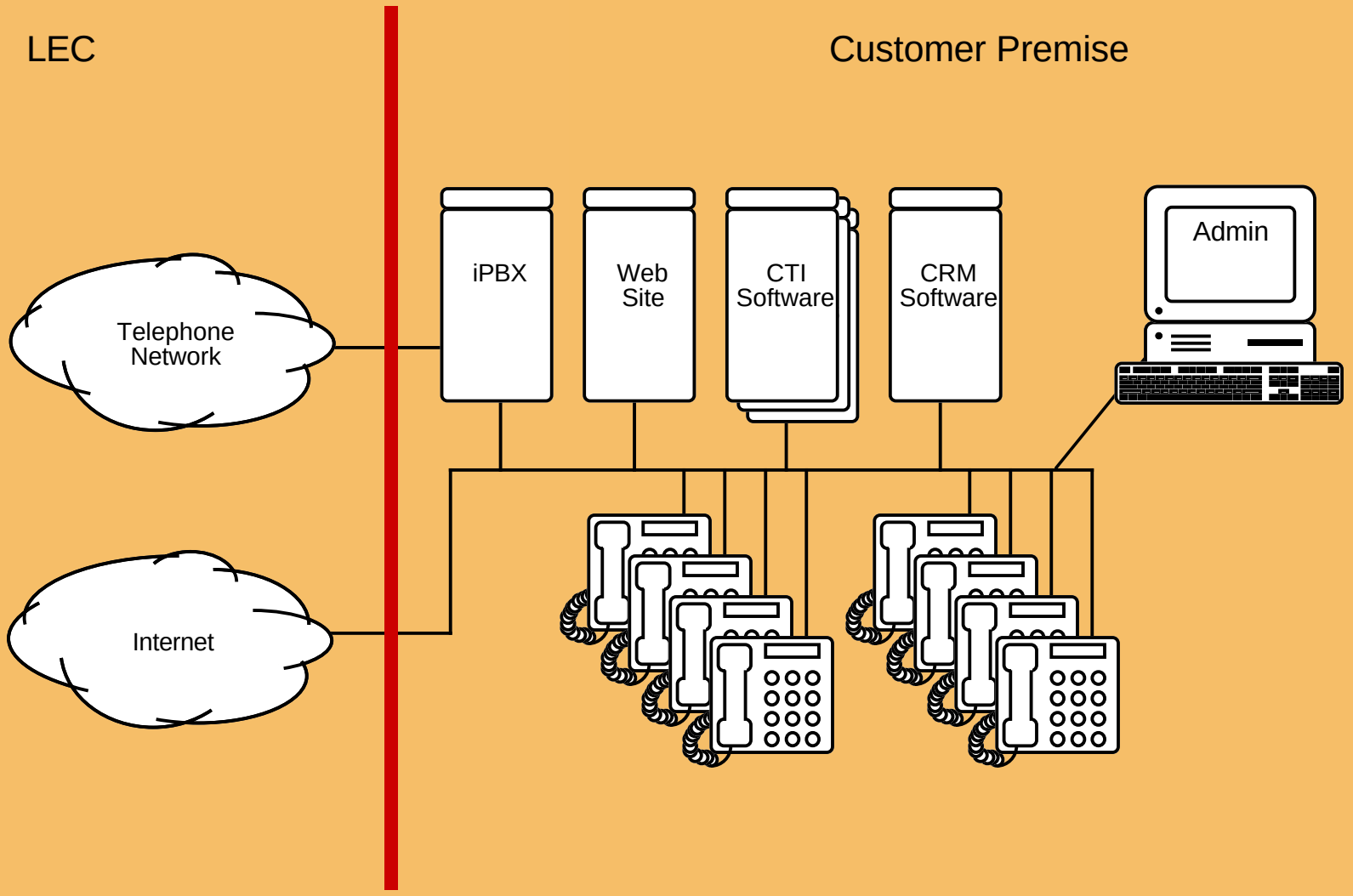
Implications for Virtual Organizations



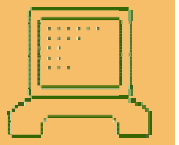
- Modular telephone systems based on open switching fabrics allow functionality to be distributed
- Hosting telephony services is just like hosting any other application
- Anyone can host all or some part of the telephone system:
  - Enterprise
  - LEC
  - ISP
  - ASP

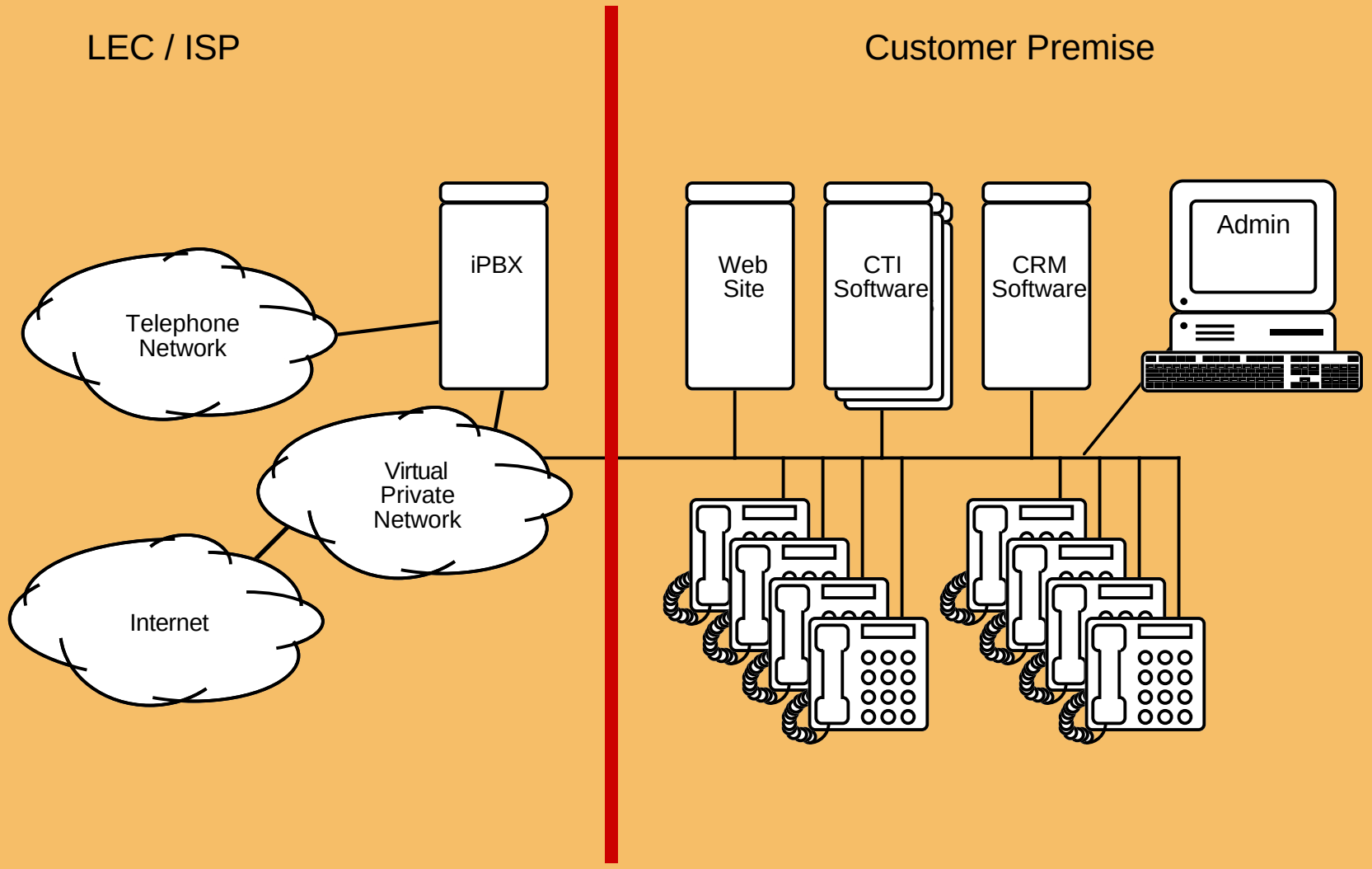
Enterprise Hosted



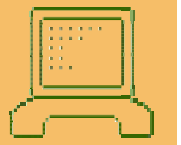


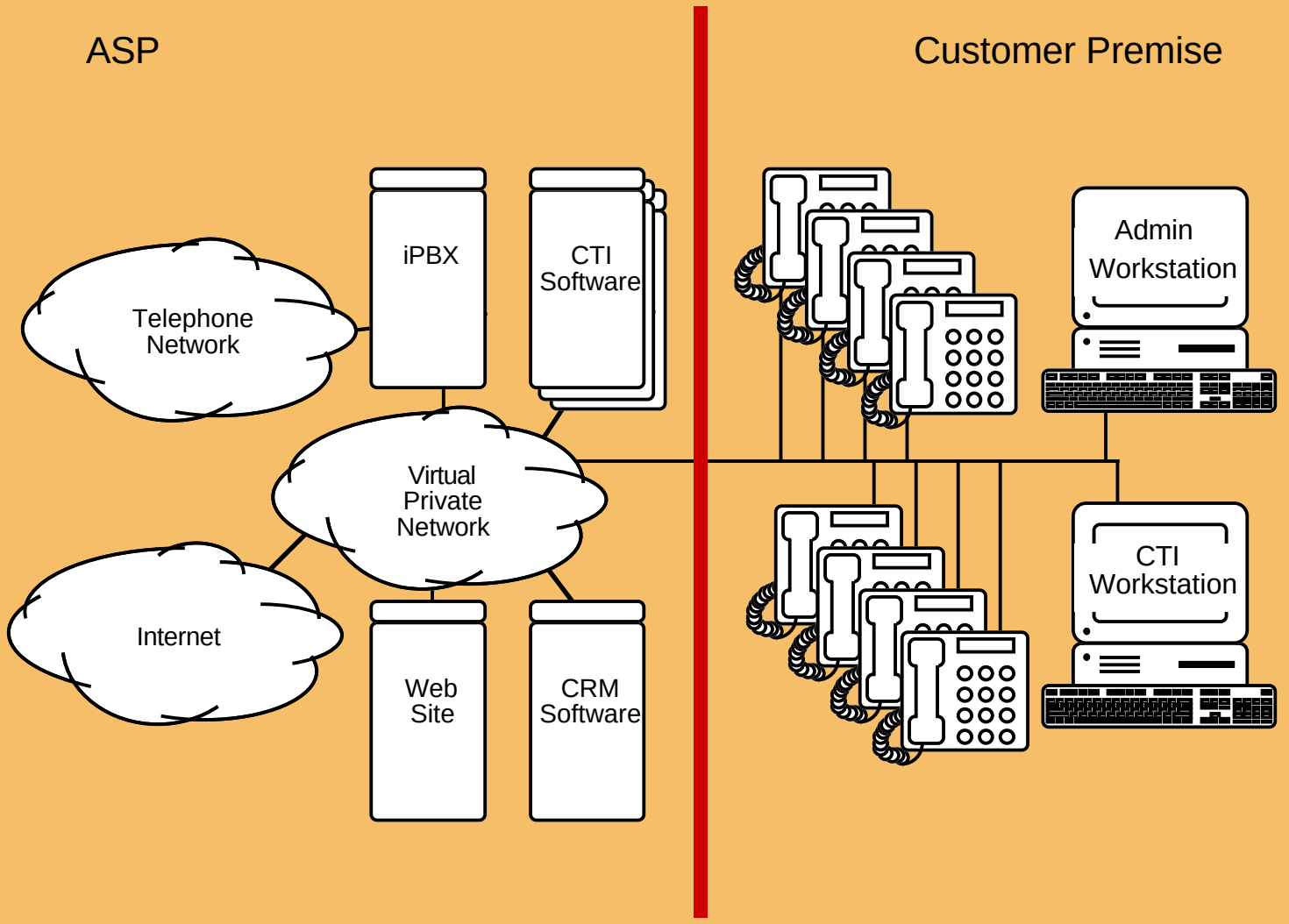
LEC / ISP Hosting



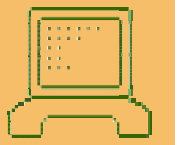


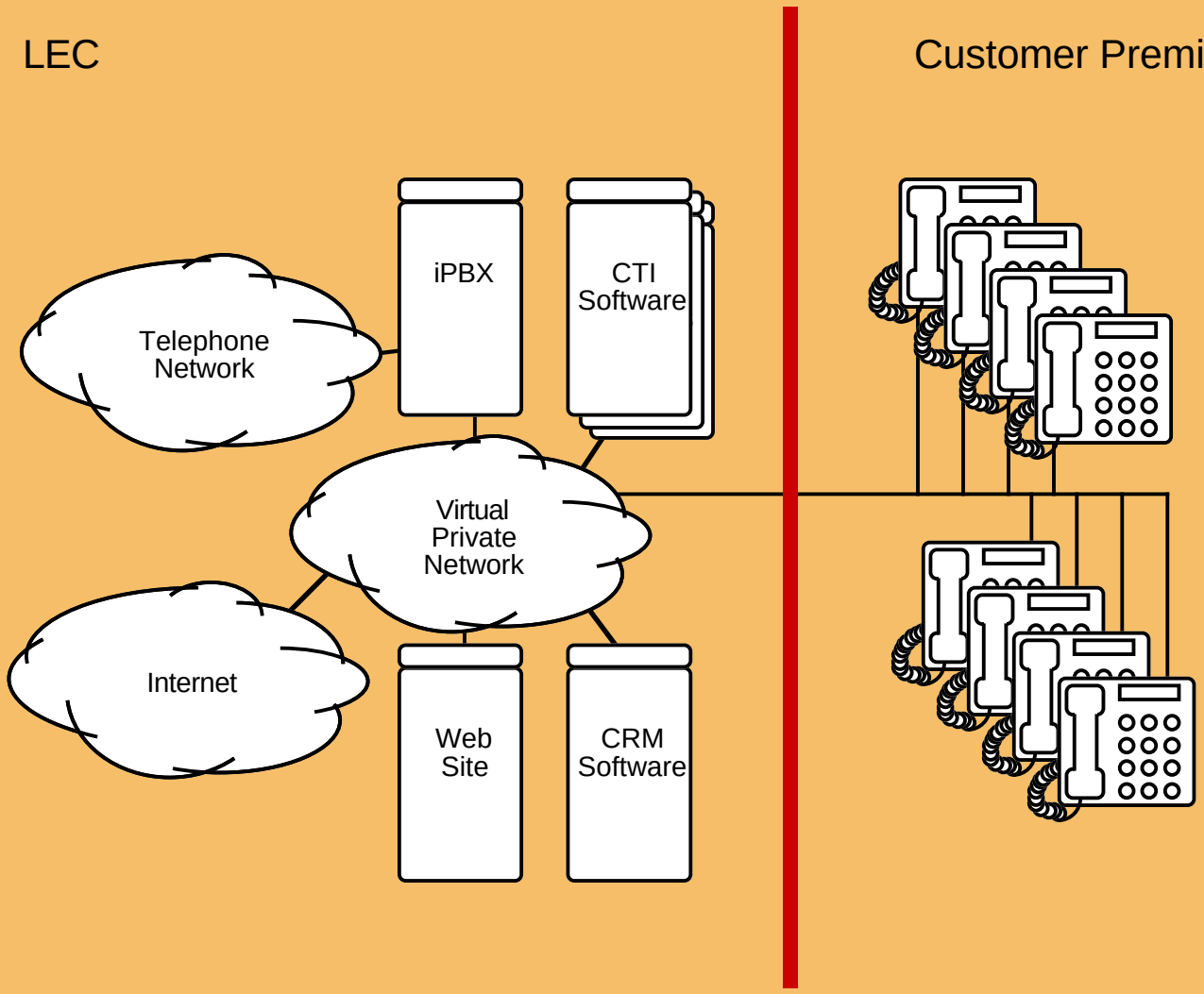
ASP iPBX Hosting



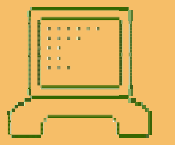


ASP iPBX Hosting



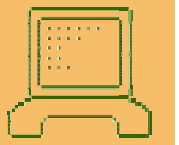


Insight #6:



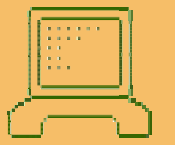
- Distributed telephone system components change the way that telephony services are sold, creates a diversity of customer options, and simplifying construction of systems for virtual organizations

Rent vs. Buy



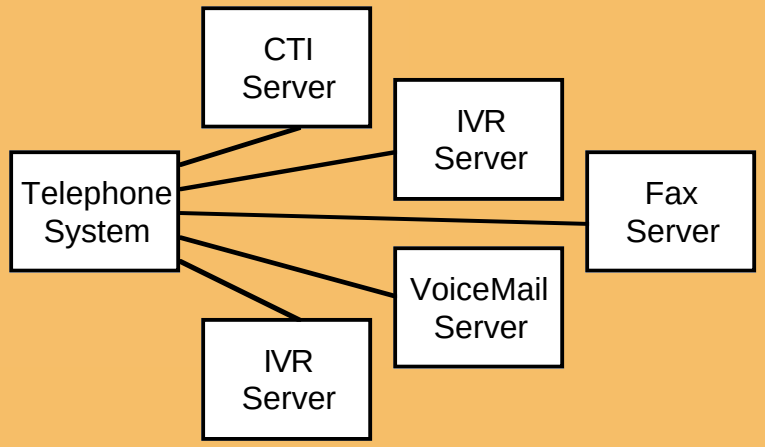
- Reliability
  - Service provider may be able to provide better infrastructure and 24x7 trouble shooting
  - Shared resources are more susceptible to failure
- Cost-effectiveness
  - Service provider can pass along economies of scale
  - May be asked to pay for unneeded features
- Flexibility
  - Service provider can scale and deliver to more endpoints
- Customizable
  - Ultimately the most important factor is functionality

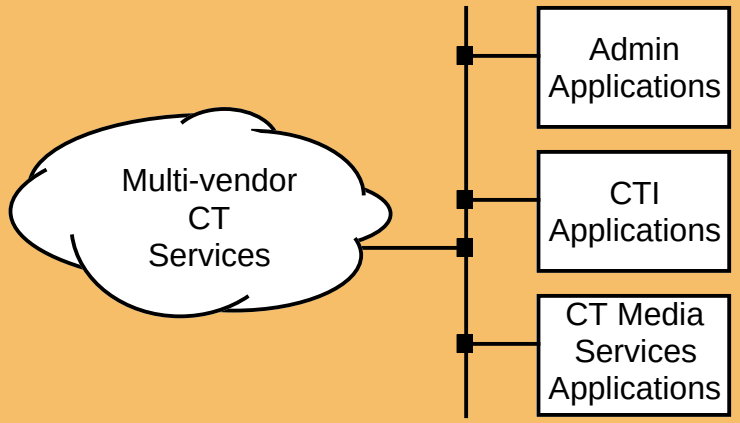
Customer Requirements



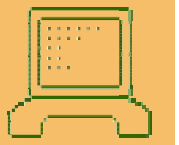
- No limits to addition of functionality
- No barriers to multi-vendor systems
- No barriers to multi-platform support
- System-centric (rather than vendor-centric) administration

Manageability



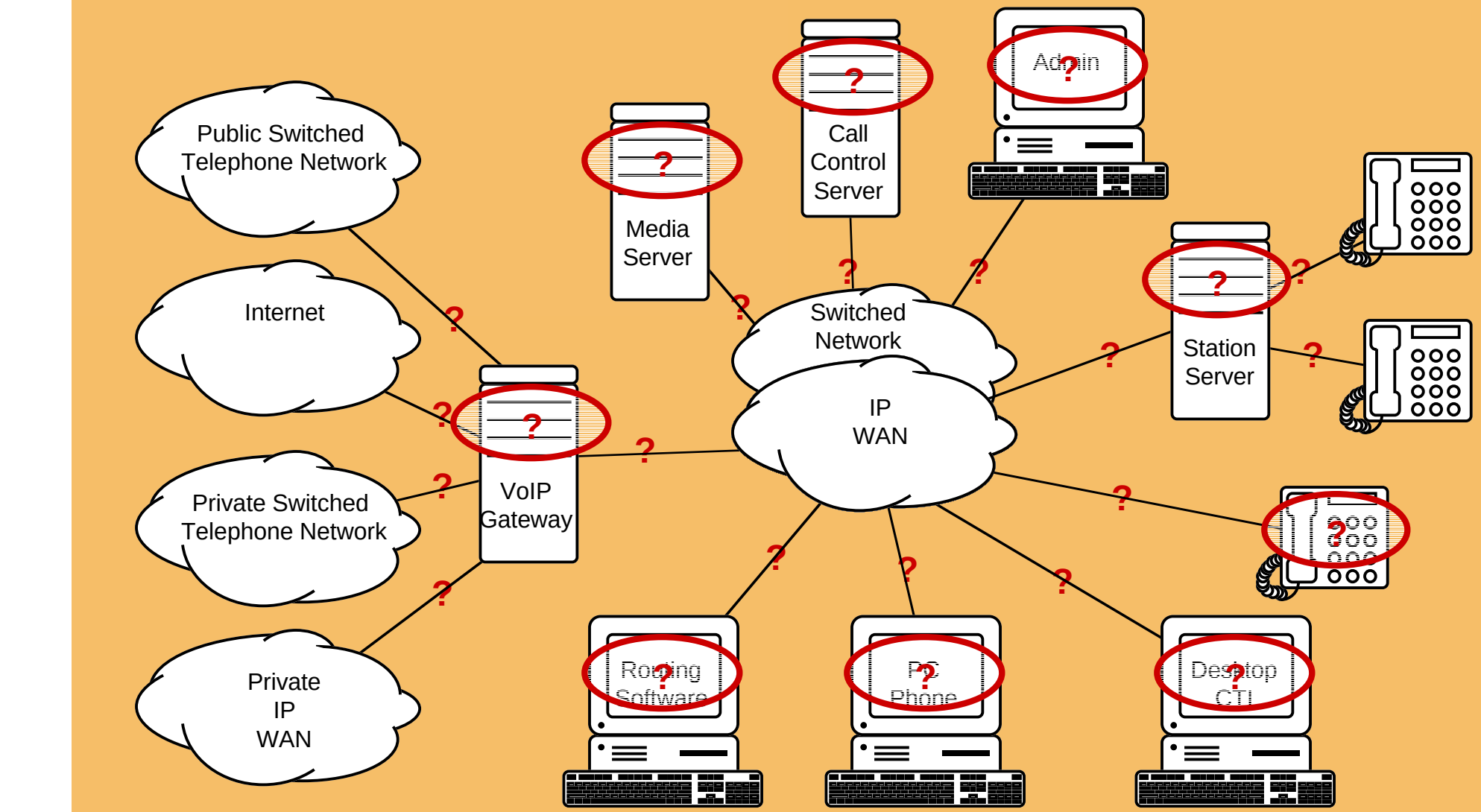


Focus on Modularity and Prioritize Interoperability

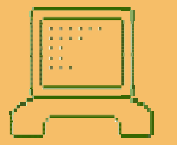


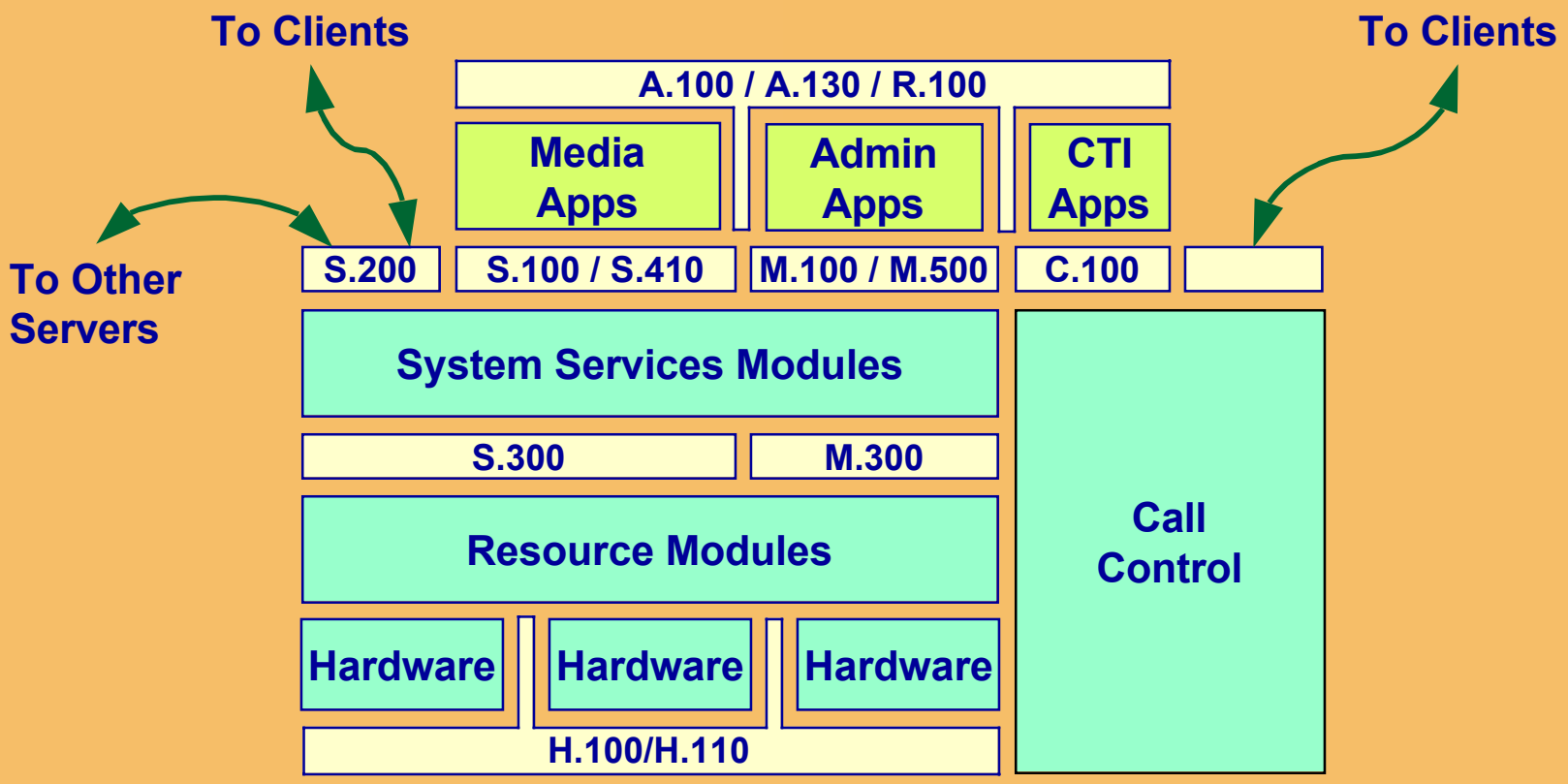
- Standards and other interoperabilty specifications allow for modular systems
- Modularity is a measure of maturity

Telephone System Implementation

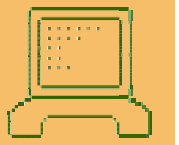


ECTF Framework (www.ectf.org)



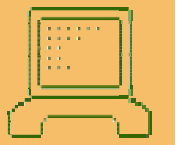


Maturity Checklist



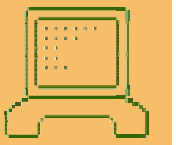
- Framework
  - ECTF
- Call Model
  - C.001
- Published APIs / Multi-platform
  - TAPI, TSAPI, JTAPI, S.100, M.100
- Open Protocols
  - H.323, MEGACO/H.248, Versit/CSTA, S.200
- Plug & Play Products

Insight #7:



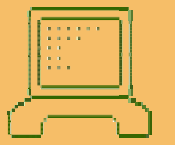
- Customization requires open interfaces for addition of applications and additional system components
- Support for industry standard specifications is critical in all offerings

CT is Finally Delivering on the Promise

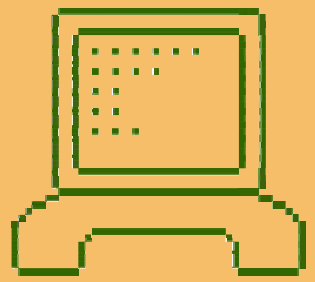


- Customer motivation is for telephone systems...
  - that are open and modular
  - present no barriers to computer telephony applications
- Computer Telephony is about...
  - componentizing the telephone system
  - eliminating dependence on a single vendor
  - blurring the distinction between telephony applications and services
  - allowing every customer to build a customized telephone system

Key Insights:



- Enablers for virtual organizations are the same technologies needed for better service and productivity
- The need for customization drives applications into the telephone system
- Legacy telephony components are a major barrier to application integration
- Off-the-shelf computer components and applications can replace monolithic telephony
- Applications + Network = Telephone System
- Bundling changes how services are sold, creates customer options, and simplifies customization
- Support for industry standard specifications is critical in all offerings



Q&A

Michael Bayer
Computer Telephony Solutions
www.CTExpert.com