

The New IP Model: Proprietary Software and Commodity Hardware

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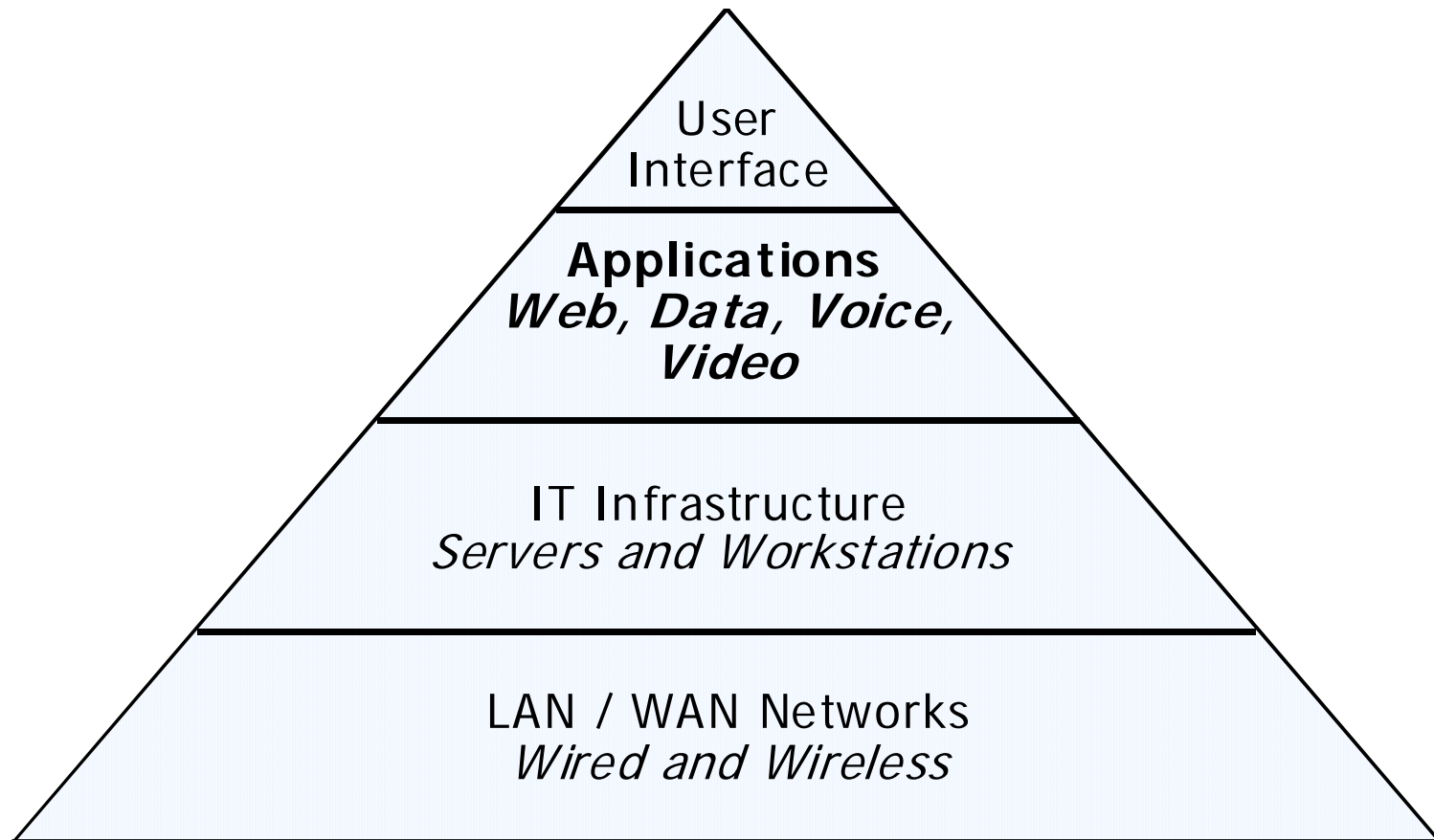
What Will Be Covered

- Changing Hardware: TDM to IP
- VoIP: On Top of IP
- SIP = Standardization and Interoperability
- The Commodity Server
- Telecommunication Computing Architecture (TCA)
- The Commodity Phone
- The Common Network
- Applications Working with VoIP
- Security issues

TDM-Based Voice Technology

- Smart centralized telephone switch
- Dumb telephones
- Identity = phone number
- Restricted administrative control access
- Proprietary hardware
- Proprietary applications and support software
- Proprietary operating system

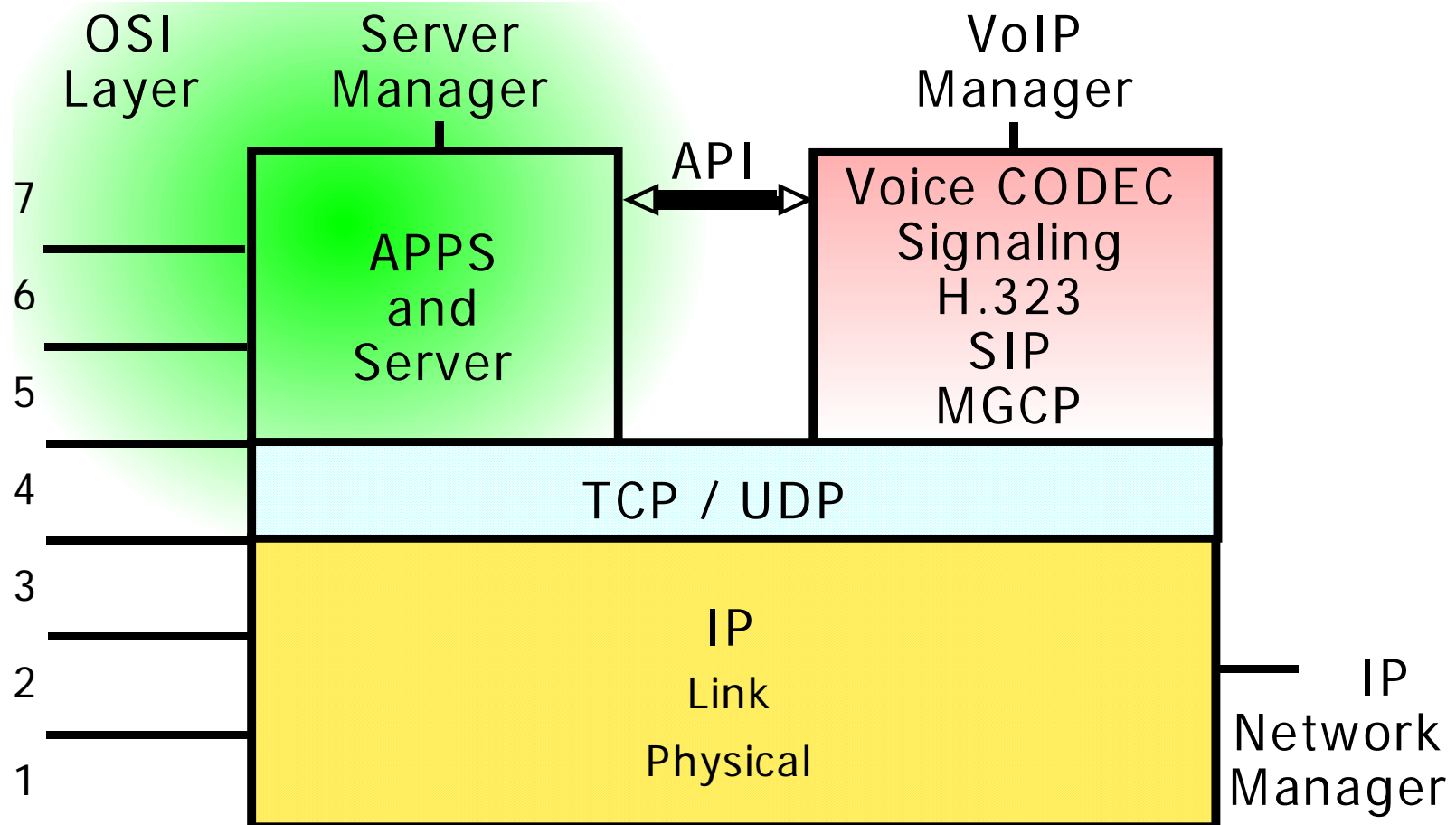
Convergence Pyramid



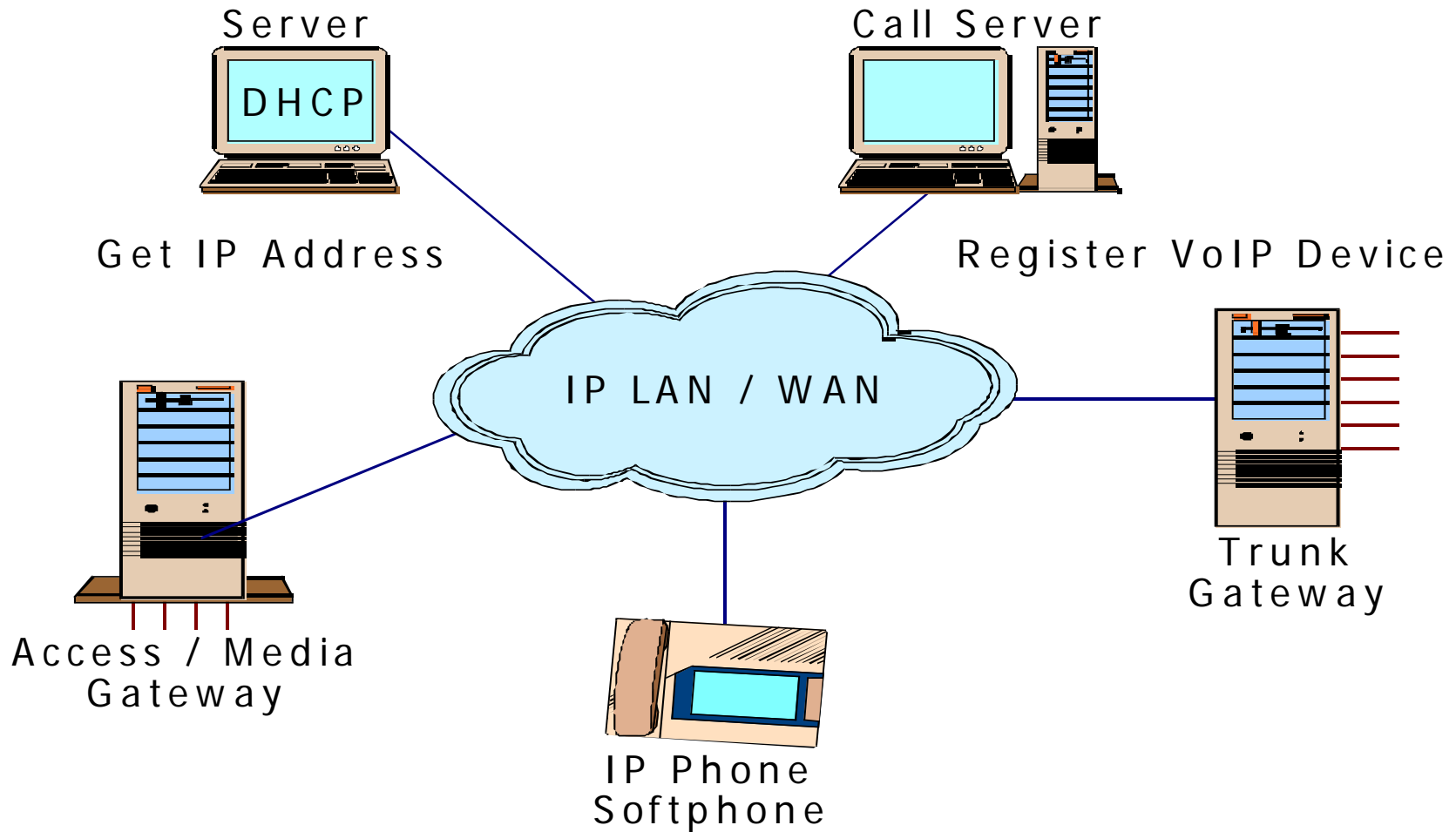
IP-Based Voice Technology

- Call server-based control software
- Dumb LAN switch and router for transport
- Distributed software based smart telephones and gateways
- Identity = phone number + IP address
- Open control access through IP network
- Several off-the-shelf servers
- Third party operating systems
- Proprietary applications and support software
- Third party application vendors

OSI Function Distribution (Voice Is An Application)



VoIP Components



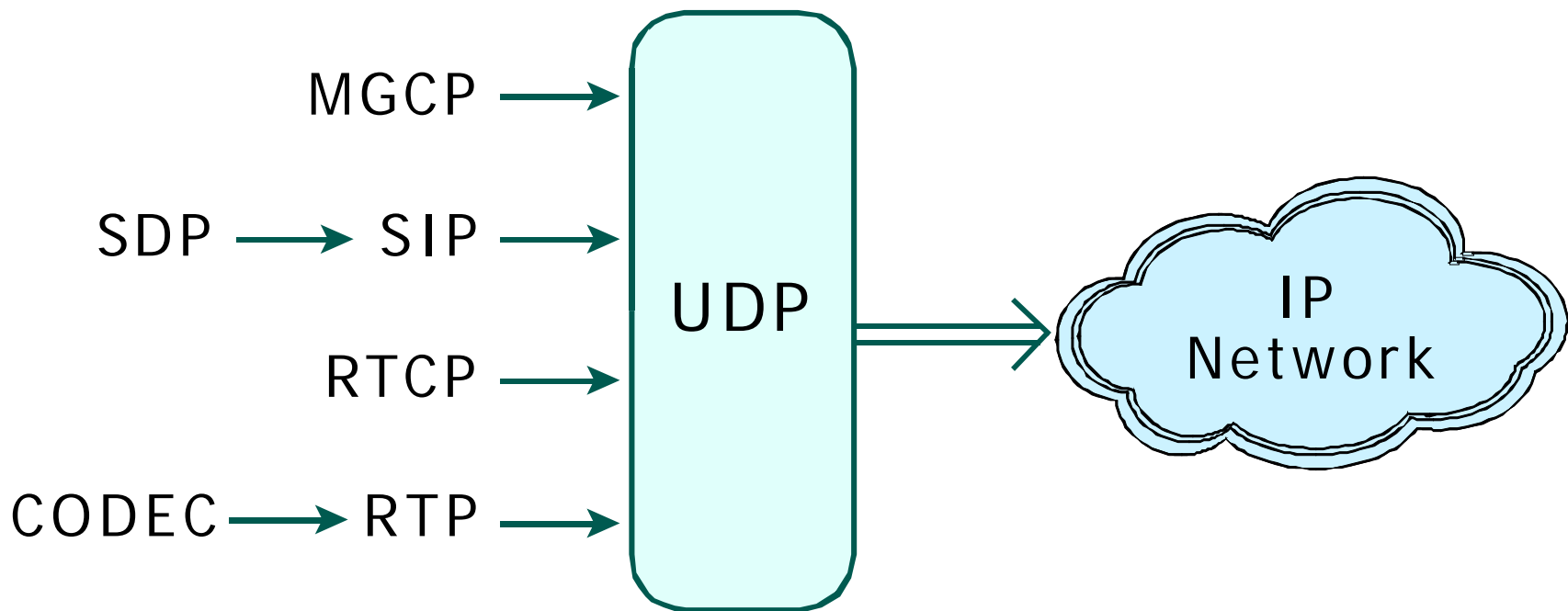
Standards

- H.323 (ITU-T), SIP and MGCP (IETF) signaling
- Requires gatekeeper (call server/manager) for switching control
- The switching fabric comprises the IP routers and Ethernet switches
- G.7xx compression standards (ITU)
- RTP for voice transmission
- RTCP for QoS monitoring

What is SIP?

- Session Initiation Protocol (RFC 2543)
- Designed to be simple
- Leveraging other IP related protocols
- Originally designed to allow users to participate in multimedia multicast transmissions (Mbone)

SIP and MGCP Operation



SIP Value to the Enterprise

- SIP broadens system and endpoint choices, reducing costs
- Open standards encourage greater interoperability
- Integrate IM and Presence into the VoIP telephone system
- More software developers

Scorecard: High-End IP PBXs 2006

	Alcatel OmniPCX Enterprise	Avaya S8720, G650	ShoreTel ShoreTel 6	Siemens HiPath 4000	3Com VCX IP Telephony	Percent Weighting
Architecture (1)	11½	14½	10½	13	12	15
Endpoints (2)	19½	20	17½	20	18½	20
Management and Administration (3)	8	8	9	6	5	10
Features (4)	21	21	21½	20½	21½	25
Security (5)	9	8½	7	8½	6	10
Performance (6)	17	19	19½	20	17	20
<i>Bottom Line</i>	86	91	85	88	80	100

High-End IP PBX Trends

- LINUX use is growing
- SIP is spreading
- Costs are dropping
- Discounts available
- Performance is good and getting better
- Security has been bolstered

Reference: BCR "High-End IP-PBXs", January 2006

The Commodity Server

- Many IP PBX servers started as proprietary devices
- 3Com VCX and Siemens 8000 use IBM servers
- Cisco and Asterisk use standard Windows servers
- Many SMB products work on Windows servers

Advanced Telecommunication Computing Architecture (ATCA)

- Series of industry standards for next generation carrier grade communications equipment
- Created to support features such as NEBS, ETSI and 99.999% availability
- Covers boards, shelves, mezzanines and management
- Standards-based modular applications platform

Programmable Processors in ATCA

- Core network technologies
- Call processing
- Softswitch
- Voice gateway
- Router and edge switch
- Network processors
- Signal processors

Micro TCA

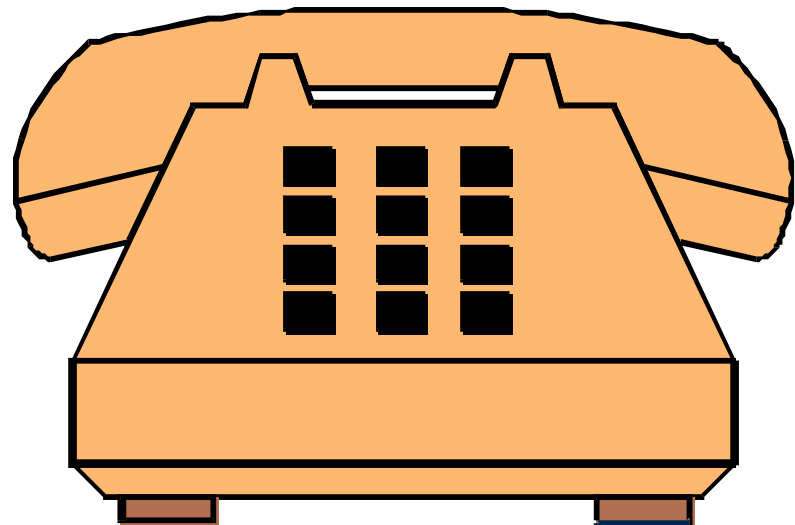
- Complimentary to ATCA
- Recent approval 2Q06
- For smaller implementations
- Small footprint
- For edge devices

TCA Influence

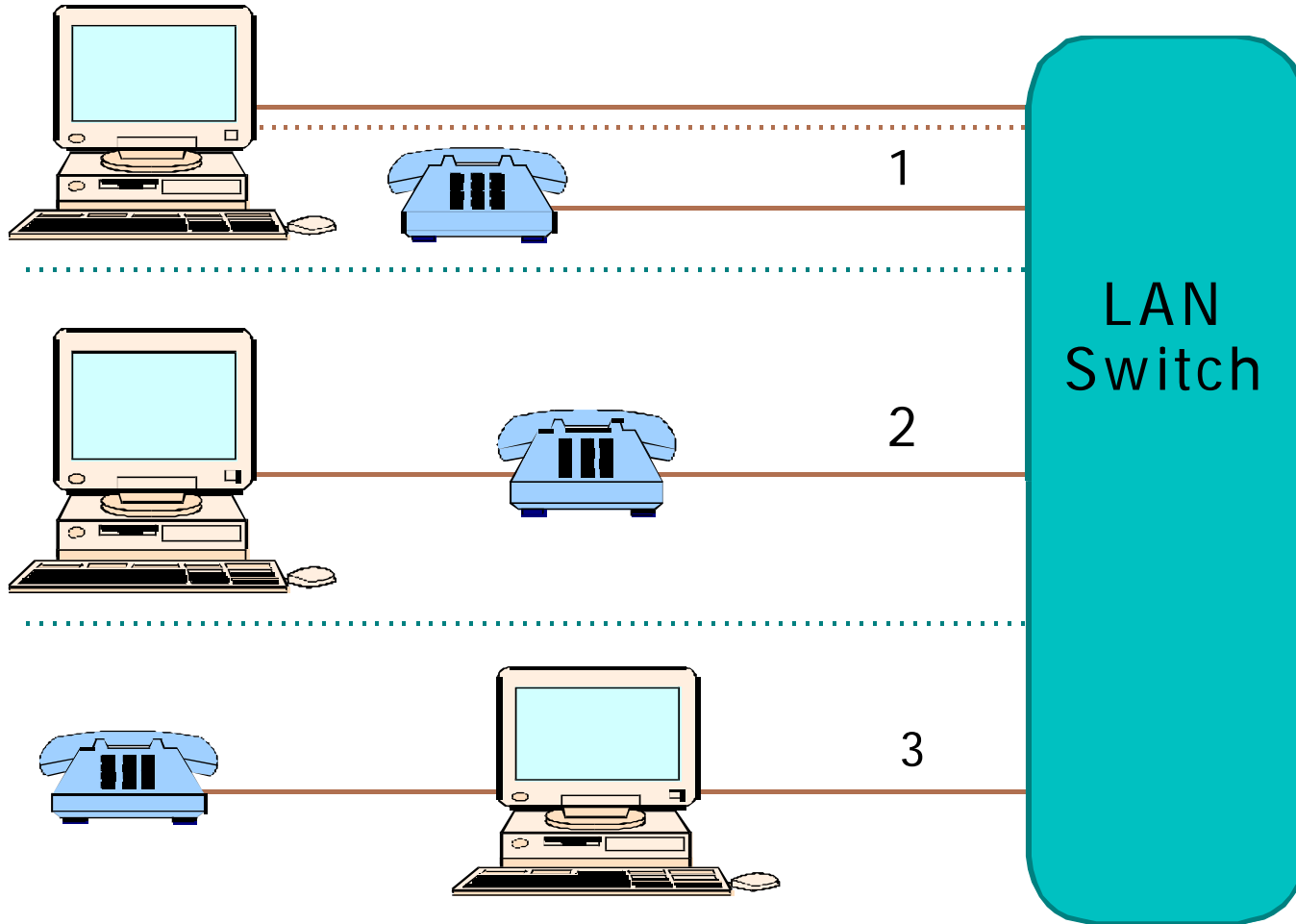
- Boosts software standardization
- Stimulates more VoIP/IPT startups by reducing the capital cost to enter the business
- Makes software, not hardware, as the differentiator
- Vendor profit will be more from software
- May create more, and more expensive, software licenses

IP Phones

- Application support over LAN with APPs server
- Power over LAN
 - Optional
 - Proprietary (Cisco)
 - Standard (802.3af)
- Functionality
 - SIP based
 - Management capabilities
 - Peer-to-peer operation



IP Phone to LAN Switch



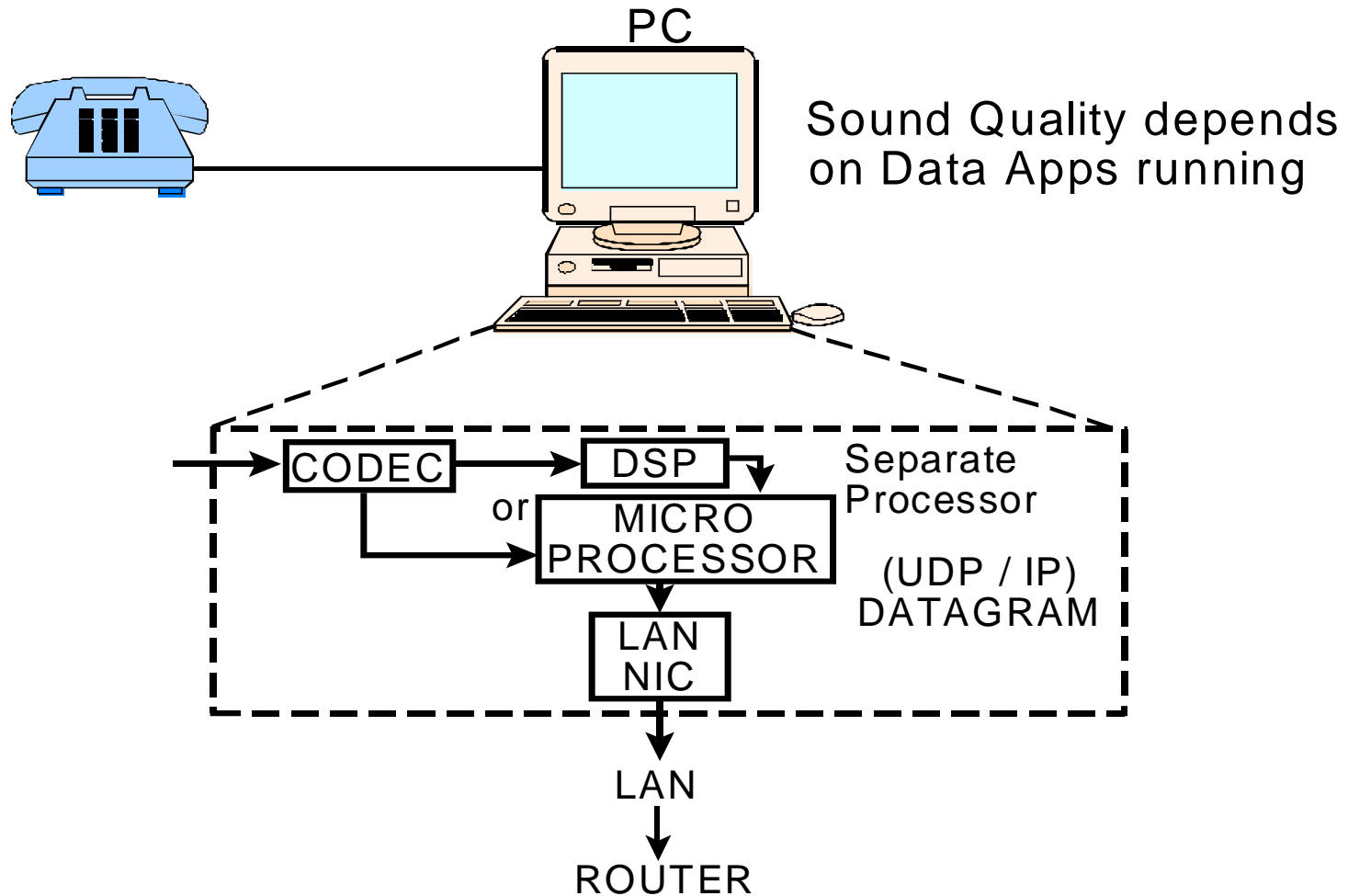
Questions:

- Power
- QoS
- Failure
- Cost

The Wireless IP Phone

- Support WLAN and cellular communications
- Nokia, Avaya and Cisco working on H.323, SIP and SCCP phone
- Many IP PBX vendors have wireless gateways
- Vertical market phones such as health care

IP Softphone



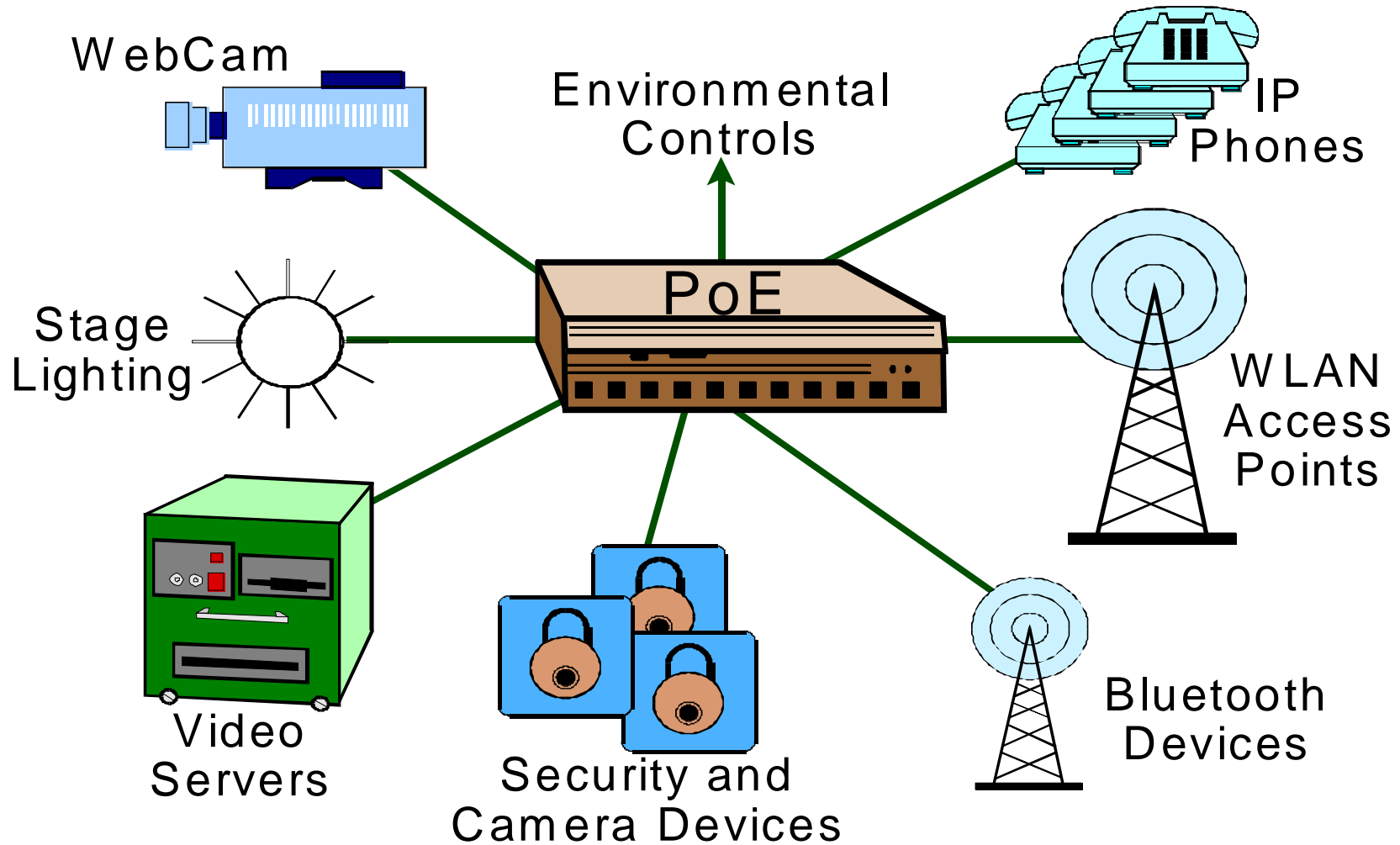
The VoIP Switch Fabric

- Standard routers
- Standard VPN services such as MPLS
- Standard LAN switches
- Standard PoE for phones

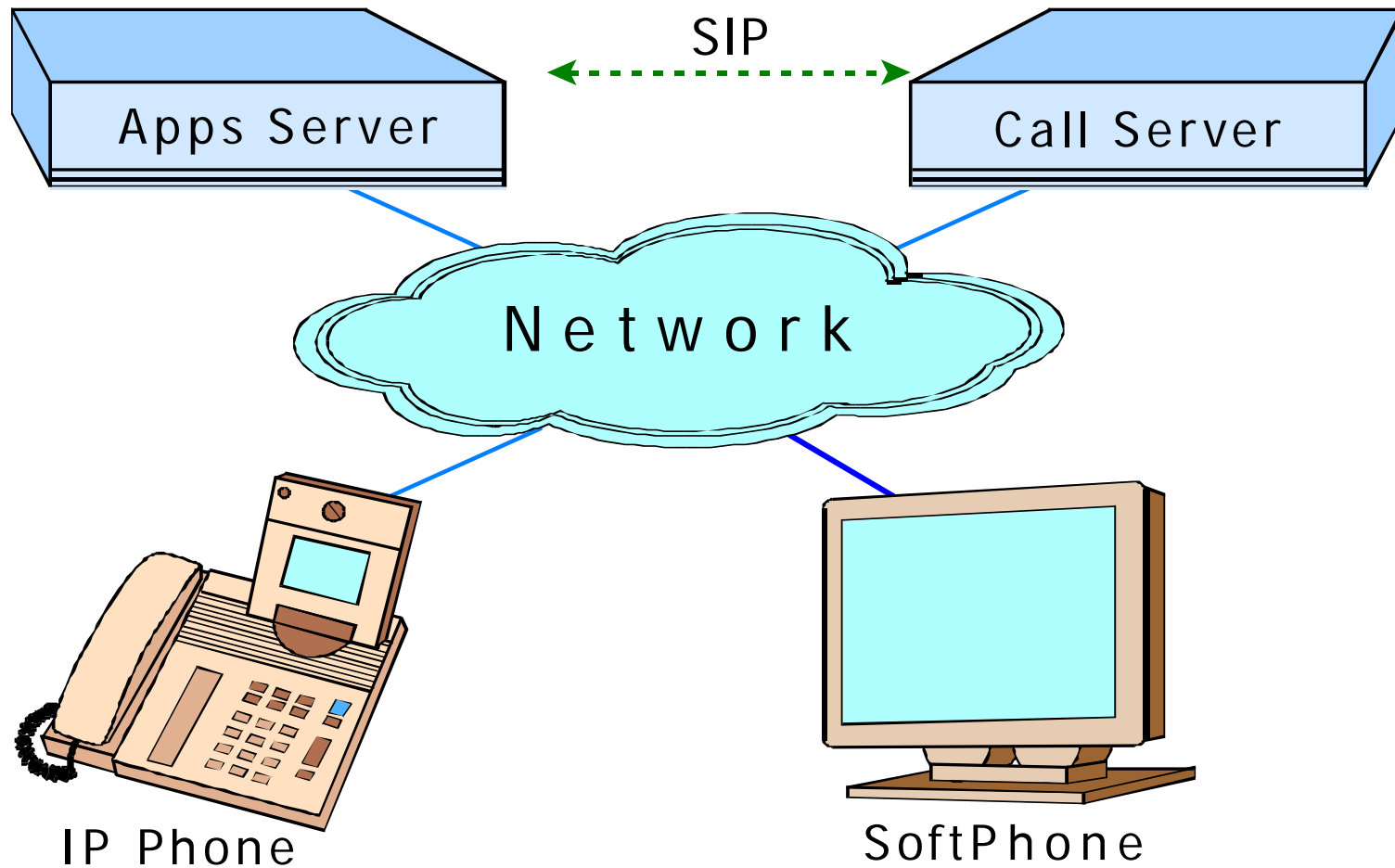
Cables and Closets

Component	Legacy Phone	IP Phone
Legacy Phone Closet		
— MDF	Use As Is	Use for Trunking Only
— IDF	Use As Is	Abandon
LAN Closet	Not Used	Expanded
Cabling	1 Pair Voice Grade	2 to 4 Pair Category 3 to 5
Power	From Switch	From LAN Switch, Gateway, Power Bar 110/120 volts
Air Conditioning	Switch Room, not MDF or IDF	LAN Closet
Distances	1000 to 2000 meters	100 meters
Closets	Same as Before	Multiple per Floor

PoE As a Power Source



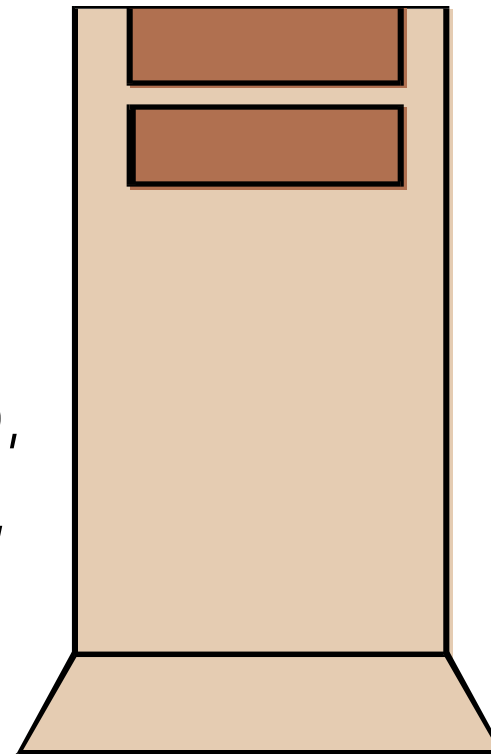
Application Residence



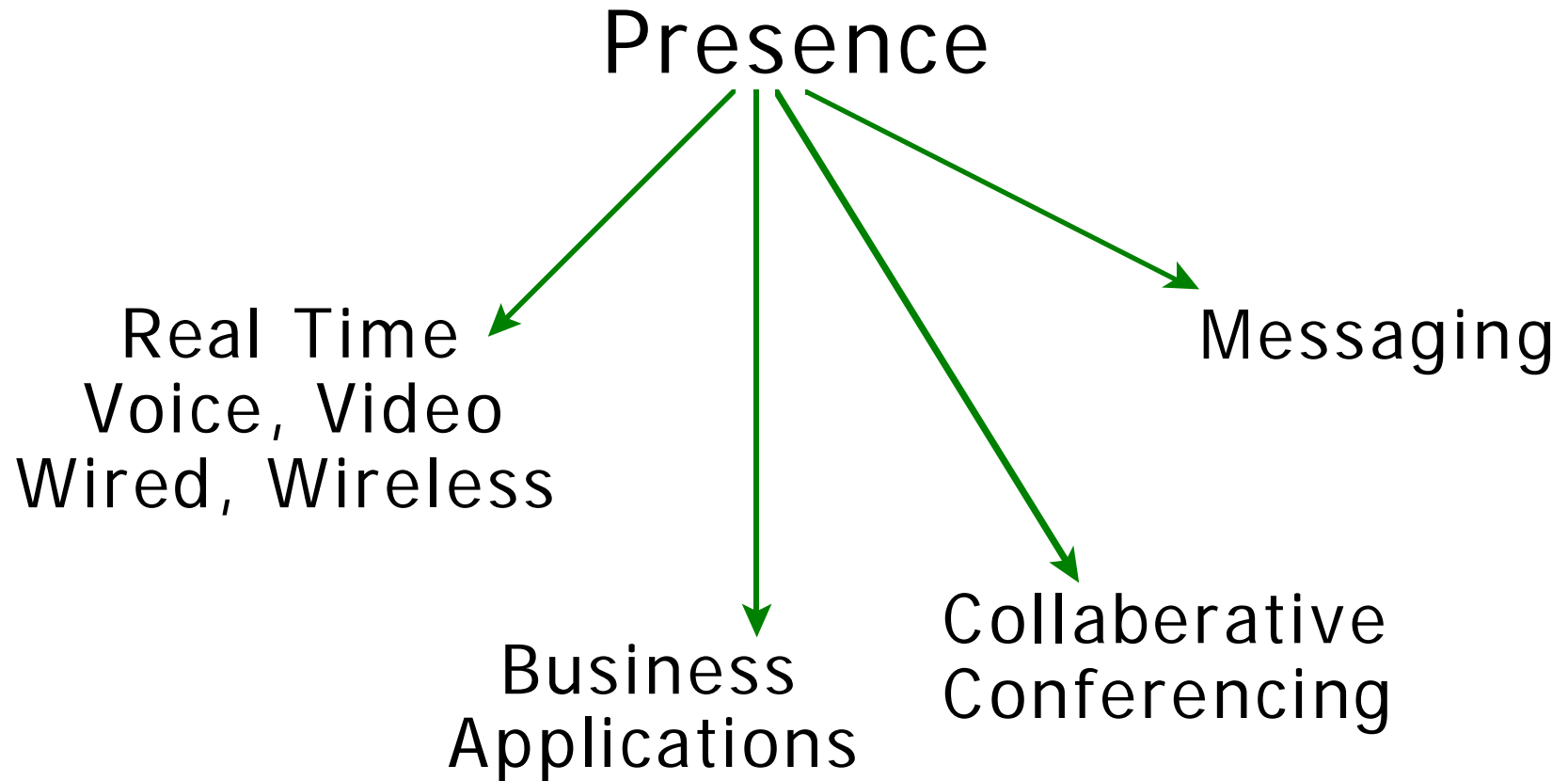
Microsoft Office OLCS

(OLCS = Office Live Communications Server)

- Instant messaging
- Buddy list
- Collaboration
- Outlook address books
- Interface with Outlook, WORD, Powerpoint, Excel, SharePoint, OneNote
- Built on desktop / laptop



Presence-Based Software



Innovative Communications Alliance

- Microsoft and Nortel alliance
- Following a Business Transformation plan
- Unified Communications shared vision
- Integrating the Nortel open SIP-based solution with Microsoft Office Communicator 2005 and Office Live Communications Server

Third Party Vendors

- Applications working with or on top of LCS
- LCS connection via SIP/SIMPLE and XMPP (Extensible Messaging and Presence Control) - Jabber
- Specific to vertical markets
- Competitors may also provide interfaces

Voice Extensible Markup Language (VXML)

- New dialog markup language for voice browser scripts and telephony applications
- Exploits Web infrastructure
- Audio or keypad input
- Audio output
- Uses VXML pages, speech recognition grammars, sound files, streaming audio

Voice XML 2.1

- Adds two more elements and enhances six others
- Boosts the creation of greater functionality without added complexity
- Voice XML 3.0 due about June 2007

Speech Application Language Tags (SALT)

- Designed to enable speech interfaces
- Speech access to Web content
- Operate through telephones, PCs, PDAs
- Applications include self service, call centers, CRM, sales force automation
- An extension to HTML, XHTML, XML

What to Worry About: The Same Security as IT

- Access Control
 - Who can physically access the network?
 - Wired
 - Wireless
- Authentication
 - Knowing/identifying the accessing party
- Authorization
 - Is this party allowed to use the requested services?

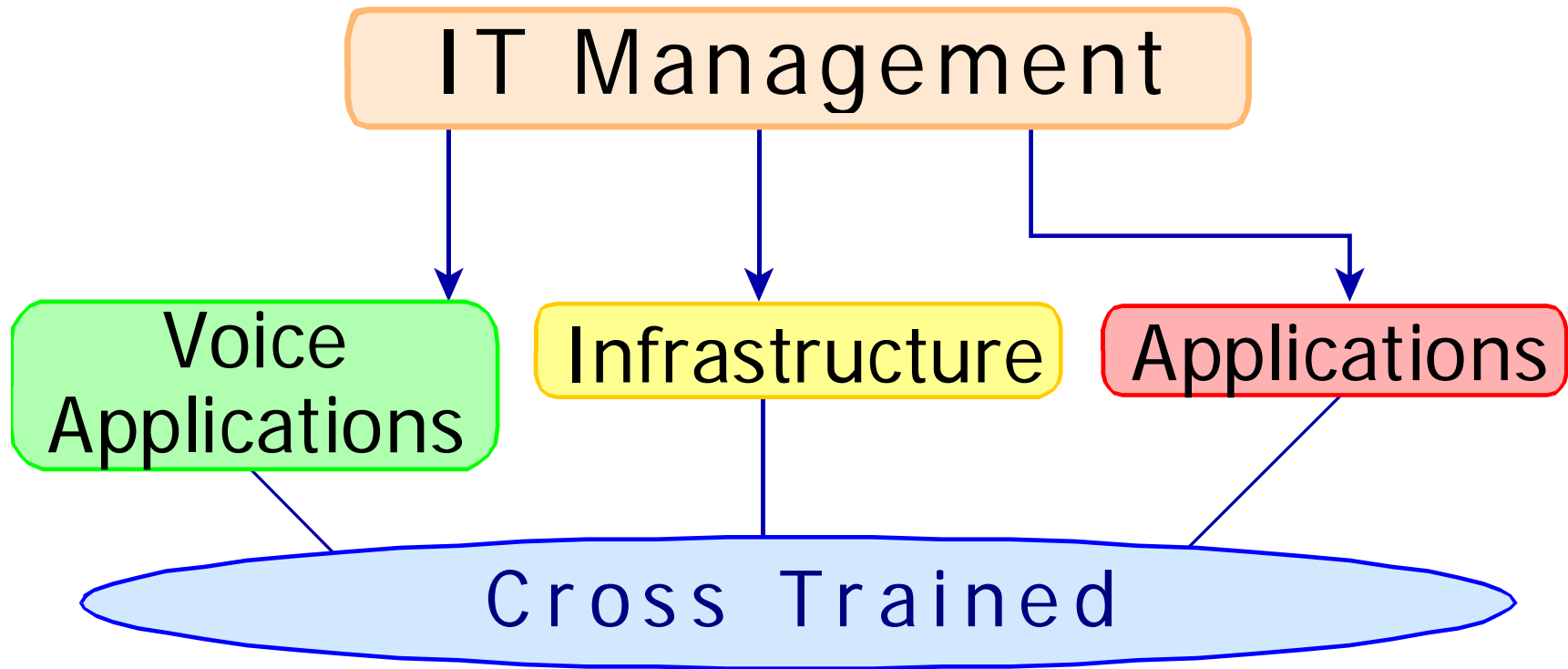
More to Worry About

- Confidentiality
 - Protesting the transmission
 - Signaling
 - Conversation
- Liabilities
 - Financial
 - Reputation
 - Legal

Old/New Security Threats

- Default password vulnerability (switch, phone)
- ARP cache poisoning and floods
- Web server interface
- IP phone netmask vulnerability
- Extension to IP address mapping vulnerability
- Insecure state (reset...)
- DHCP server insertion attack
- TFTP server insertion attack
- CPU resource consumption
- Account lockout

True Staff Convergence



Key Points to Take Home

- Software is the differentiator
- The server hardware is becoming a commodity
- The Telecommunication Computing Architecture (TCA) will encourage more startups
- IP PBXs are becoming equal
- Applications servers (Office LCS) will drive new functions
- Security will be more like an IT issue

Delphi, Inc.

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- Consulting and analysis firm
- 28 Years as an independent consultant
- Contributor to major publications such as Business Communications Review and the ACUTA Journal
- Speaker at many user conferences
- International experience with enterprises, vendors, educational institutions and government agencies

QUESTIONS?

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