Unified Collaborative Solutions Over IP

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Agenda

- Drivers
- Challenges
- What UCC is all about
- Network Requirements
- Industry Support
- Summary

Drivers

The move to IP Infrastructure

- More and more Corporates & Enterprises are moving towards IP
- Yankee Group Enterprise IT survey
  - 60 percent have already moved to an IP Network
  - 30 percent plan to do so in 12-24 months
- IP is Ubiquitous
  - But IP Networks are best effort
  - Now evolving to support every communications requirement
    - Universal access
    - Lower costs
- Future

> "… in 7 to 10 years video traffic on the net will exceed data and voice traffic combined."
>
> *Bob Metcalf, Forbes Magazine February 3, 2003*

Successful Organizations Today….

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- Are Extended Enterprises
  - Global
  - Networked
  - Distributed
    - Multiple locations
    - Across Geographies
- Have a flexible structure
  - Designed to move quickly
  - Need real-time communications
- Have decision making that is distributed and dynamic

Challenges

The Challenges to Collaboration

- The Internet has helped productivity
  - Instant Messaging / IP telephony show the way
  - Not designed to be a real-time communications medium
  - Need SLAs for collaborative multimedia applications
- Decision makers are mobile and distributed
  - Poor access to resources and efficient collaboration
- End Users must be able to invoke multimedia services in real-time
  - reservationless, real-time, ad-hoc meetings
- Resolve barriers to adoption
  - Make multimedia service offerings comfortable to learn and use
  - Guarantee performance
  - Create a converged multipurpose infrastructure

Multimedia Communications
OR
Unified Collaborative Communications

Unified Collaborative Communications (UCC)

- Move from a collection of proprietary, single purpose networks
- To one, converged, multi-purpose infrastructure
  - Voice
  - Video
  - Web
- Communicate with one another
  - Anywhere
  - Anytime
  - Across any medium
  - From multiple diverse endpoints
- IP is the natural choice of protocol for unification

UCC is Voice, Data and Video

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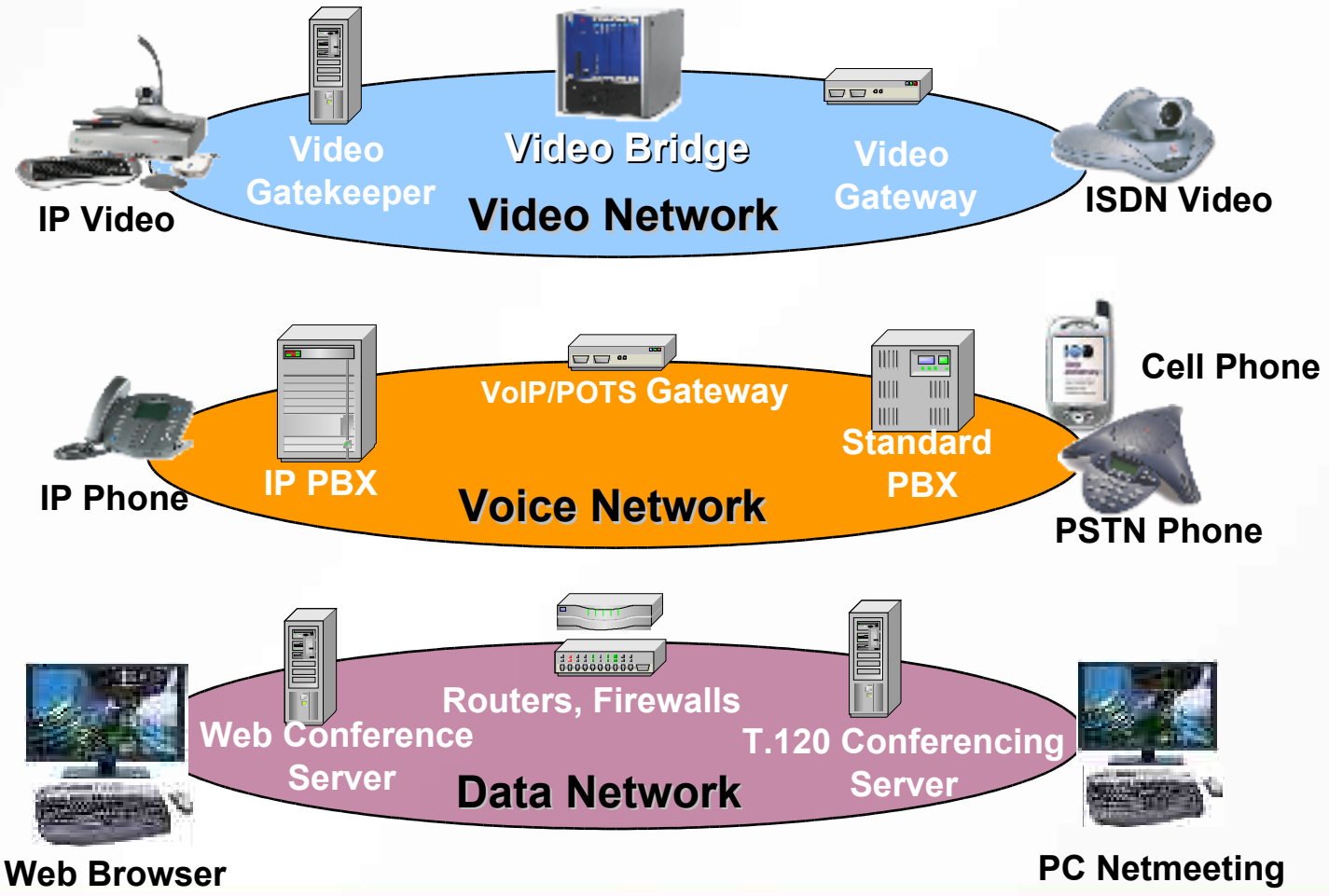
Increased Learning	Attendees learn 200% more in face-to-face meetings than with audio alone (Source: University of Wisconsin)
Improved Rate of Absorption	Attendees absorb information up to 40% faster than with audio alone (Source: Wharton School of Business)
Augmented Content Retention	Attendees in face-to-face meetings retain 38% more information than attendees in audio-only meetings (Source: Harvard University & Columbia University.)
Enhanced Persuasiveness	Face to face meetings increase the power of persuasion by 43% over audio-only meetings (Source: 3M Co.)
Improved Impact of Communication	55% of the impact of communications comes from facial expressions and body language, versus 38% from vocal inflection (Source: UCLA)

Current Architecture



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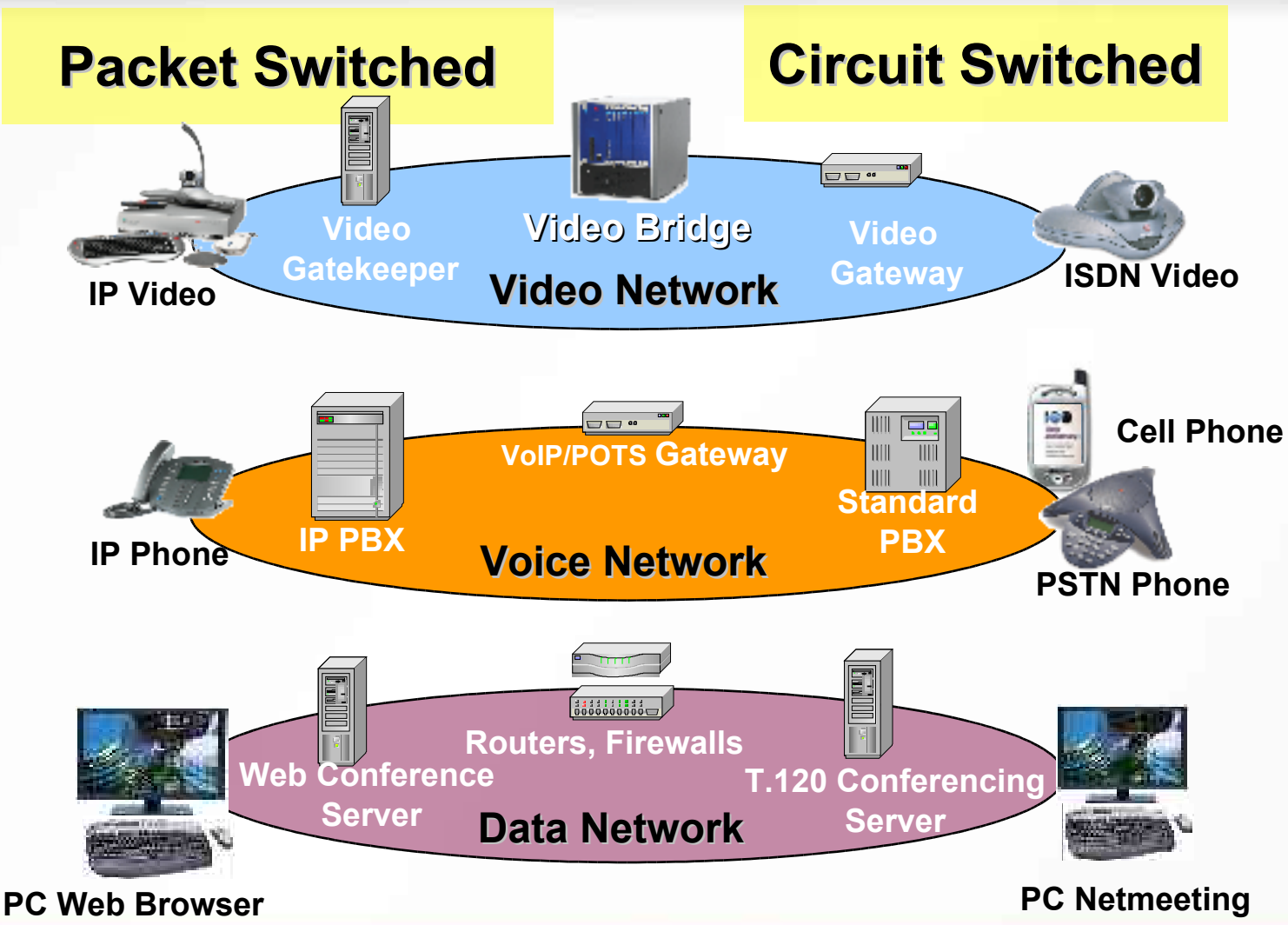
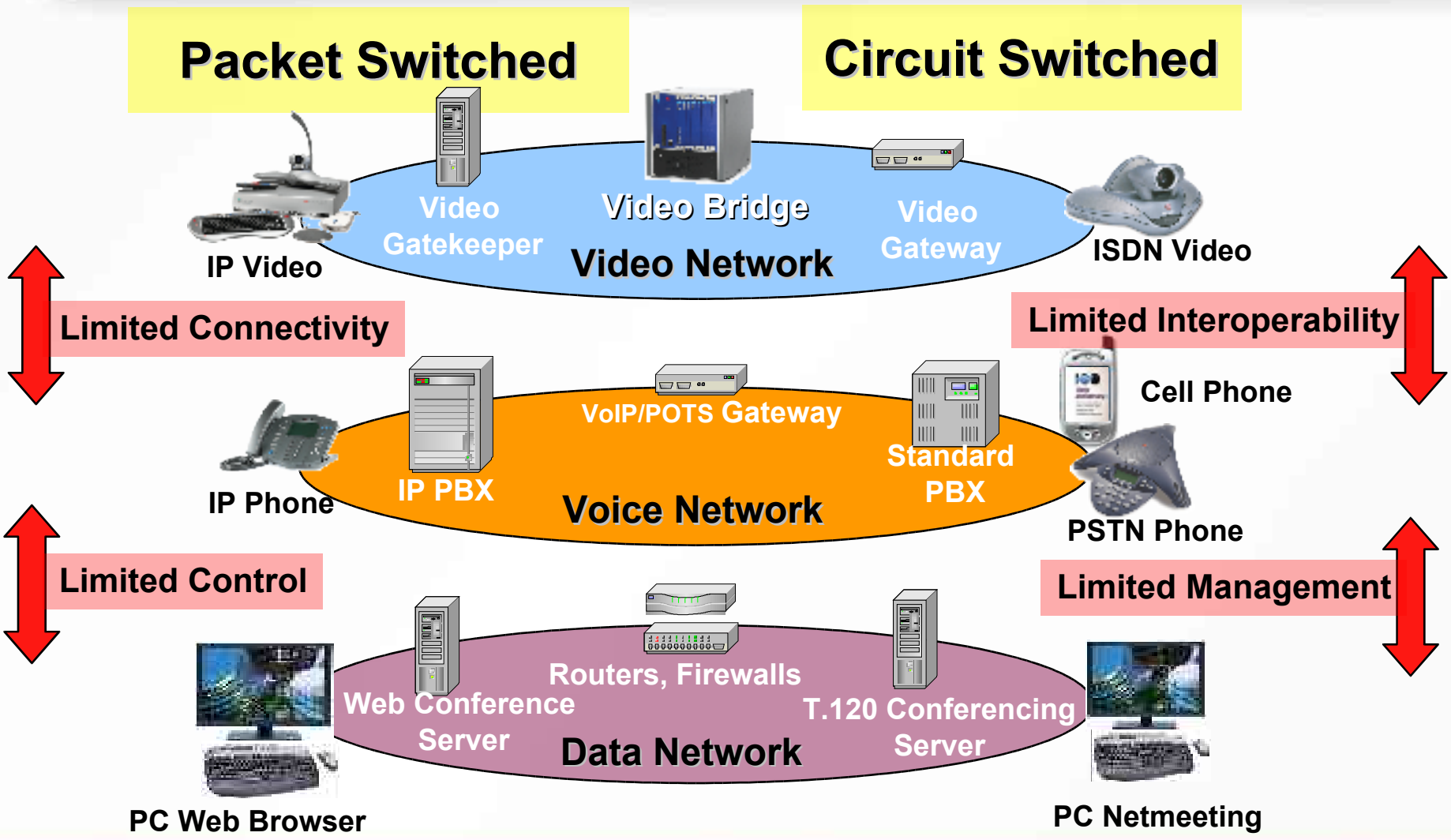


Current Architecture



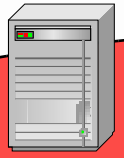
Unified Collaborative Communications

IP Video

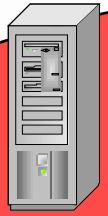
ISDN Video

Cell Phone

IP Phone



IP PBX

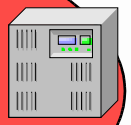


Web Conferencing Server

Unified Platform

VoIP/POTS Gateway

Standard PBX



PSTN Phone

Firewall Gatekeeper

Conferencing Portal

Voice/Video/Data Network

Desktop Conferencing

Unified Collaborative Communications

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IP Video

Full Control

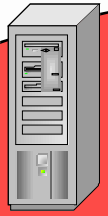
ISDN Video

Common Management

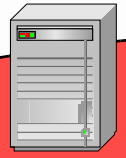
Cell Phone

Total Connectivity

IP Phone



Web Conferencing Server

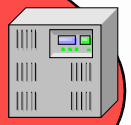


IP PBX

Unified Bridge

VoIP/POTS Gateway

Standard PBX



Firewall Gatekeeper

PSTN Phone

Conferencing Portal

Voice/Video/Data Network

Complete Interoperability

Desktop Conferencing

Network Requirements

Converged Solutions –network requirements

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- **Well engineered IP network**
  - Video is a Bandwidth hog
  - Ensure sufficient bandwidth in the access
    - Broadband connection speeds close to 384 kbps give good performance for multimedia applications
  - Ensure adequately provisioned backbone
    - Methods to handle network congestion
  - Ability to support multicast (?)
    - Depends on Video application
    - Reduces bandwidth requirements
    - Increases Scalability

Converged Solutions –network requirements

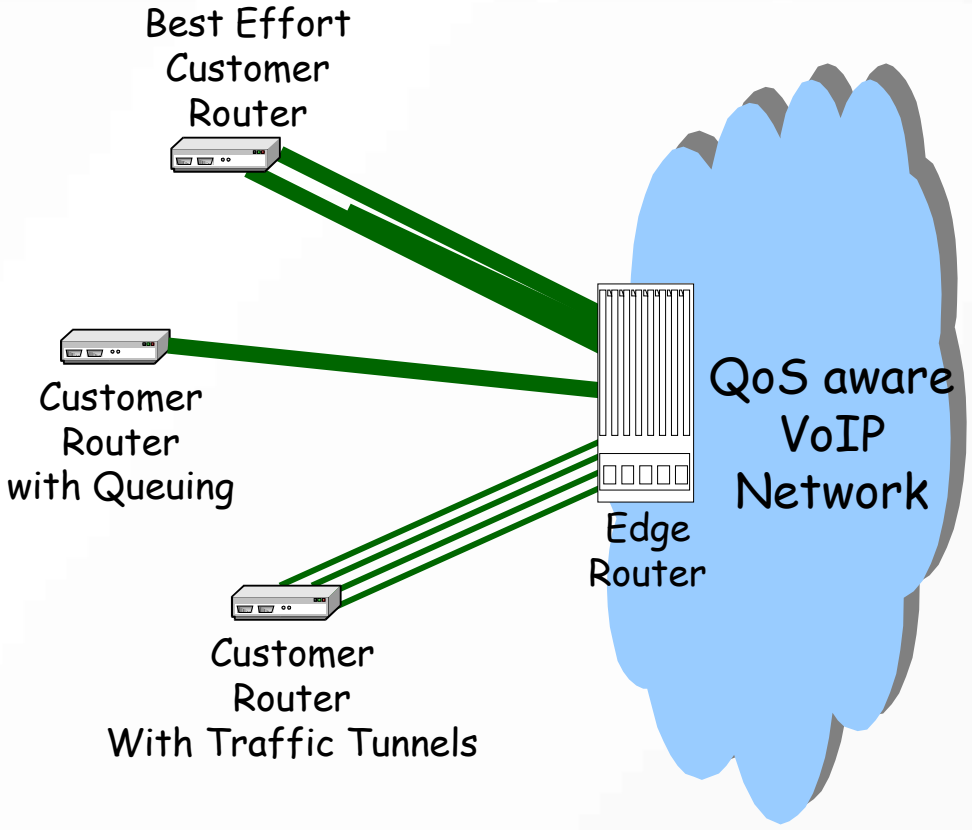
- Provide guarantees for delay, jitter, packet loss through traffic engineering
  - Voice/Video VERY delay sensitive
  - Media Anchoring to prevent loss of audio-video synchronization
    - Resynchronize audio/ video timestamps in the network
  - Packet loss compensation
    - PLCs with audio codecs
    - insert blank video frames to compensate for video packet loss
  - Jitter buffer to compensate for jitter
    - Decide optimal size

Converged Solutions –network requirements

- Supports Quality of service
  - Prioritize voice/video packets
  - Real time voice/video packets receive higher priority than non-real time web traffic
  - Significant delay/jitter events can be avoided only by implementing a proper QoS Strategy

Converged Solutions – network requirements

- Best Effort
  - A class of service in which the network provides no guarantees to the edge equipment
- Prioritized Queuing
  - Differentiation in the queuing of traffic for various classes of traffic
  - Assigns a priority or classification to every IP packet
  - Higher priority assigned to real-time application packets
  - Packets are sent in order of priority
- Traffic Engineered in the core:
  - MPLS
  - Other mechanisms



Converged Solutions – network requirements

- Call control, signaling
  - H.323 & SIP is the natural order of things today
  - H.323 is the existing market base
  - SIP is the standard of the future – enabling new services
    - Presence, Mobility, User preferences
    - Instant multimedia communications: Text, Voice/Video/Data
    - Multiple media: Text, Voice, Video, Shared Data
    - Multiple devices: phones, PC/laptop, Handheld computers, Pagers
    - Advanced Multimedia Conferencing through app. Integration
    - SIP enables application/service integration across various collaboration domains
  - Both protocols will co-exist & must interoperate

Converged Solutions – network requirements

- Transcoding
  - Various parameters to transcode
    - Audio codecs (G.729A. G.711)
    - Video Codecs (H.261, H.263, H.264)
    - Video bandwidths (128 kbps, 384 kbps)
    - Video formats (CIF, QCIF)
    - Video frame rates (30 fps, 14 fps)
  - Must ensure that each participant gets his optimal capabilities
  - Transcoding adds to delays so powerful processors must be employed

Converged Solutions – network requirements

- Network Security
  - Session-aware firewalls for two-way multimedia communication
    - Dynamic pinhole opening and closing
  - Secure packet processing and filtering
- Scalable elements to handle millions of voice/video/data sessions
- Reroute upon failures
- Billing for usage
- One management interface to manage the complete service

Industry

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UCC Industry Momentum

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	WAN	LAN	PBX / IP PBX	Voice Handset	Collaborative Applications	Video Applications	Video Endpoints	Web-conferencing	Video-conferencing
3Com	✓	✓	✓	✓					
Avaya	✓	✓	✓	✓		✓			✓
Cisco Systems	✓	✓	✓	✓		✓			✓
Lotus					✓				
Microsoft/PlaceWare					✓			✓	
Nortel Networks	✓	✓	✓	✓					
Polycom				✓	✓	✓	✓	✓	✓
Raindance									✓
Sony							✓		
Spectel								✓	✓

UCC Has Support Across Major Players in The Industry

Summary

Summary

- Unified Collaborative and Multimedia solutions are becoming a reality
- Certain challenges need to be overcome
- Service Providers need to build a network infrastructure capable of handling the multimedia requirements
- Vendors must support standards based technology to enable wide adoptability of multimedia applications
- Universal Collaborative and Multimedia solutions will make communication much easier!!!