Future of IP Phones

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The Evolving IP Telephone

Design Attribute	IP Telephone 2000	IP Telephone 2006
Communications Protocol	H.323, Proprietary	H.323, Proprietary, SIP
Typical Voice Codecs	G.711, G.723.1	G.711, G.723.1, G.729, G.722
Display	Traditional 2 - 4 line, LCD alphanumeric screen; grayscale	Large, backlit pixel-based graphics screen; color
Information Access	Telephony system, only, e.g., directory	Telephony system; Peripheral application server; Web-based server
Speakerphone	Two-way half-duplex, narrowband	Two-way full duplex, wideband
Peripheral Interfaces	10/100 Ethernet	10/100/1000 Ethernet; Infrared; BlueTooth; USB; 802.11

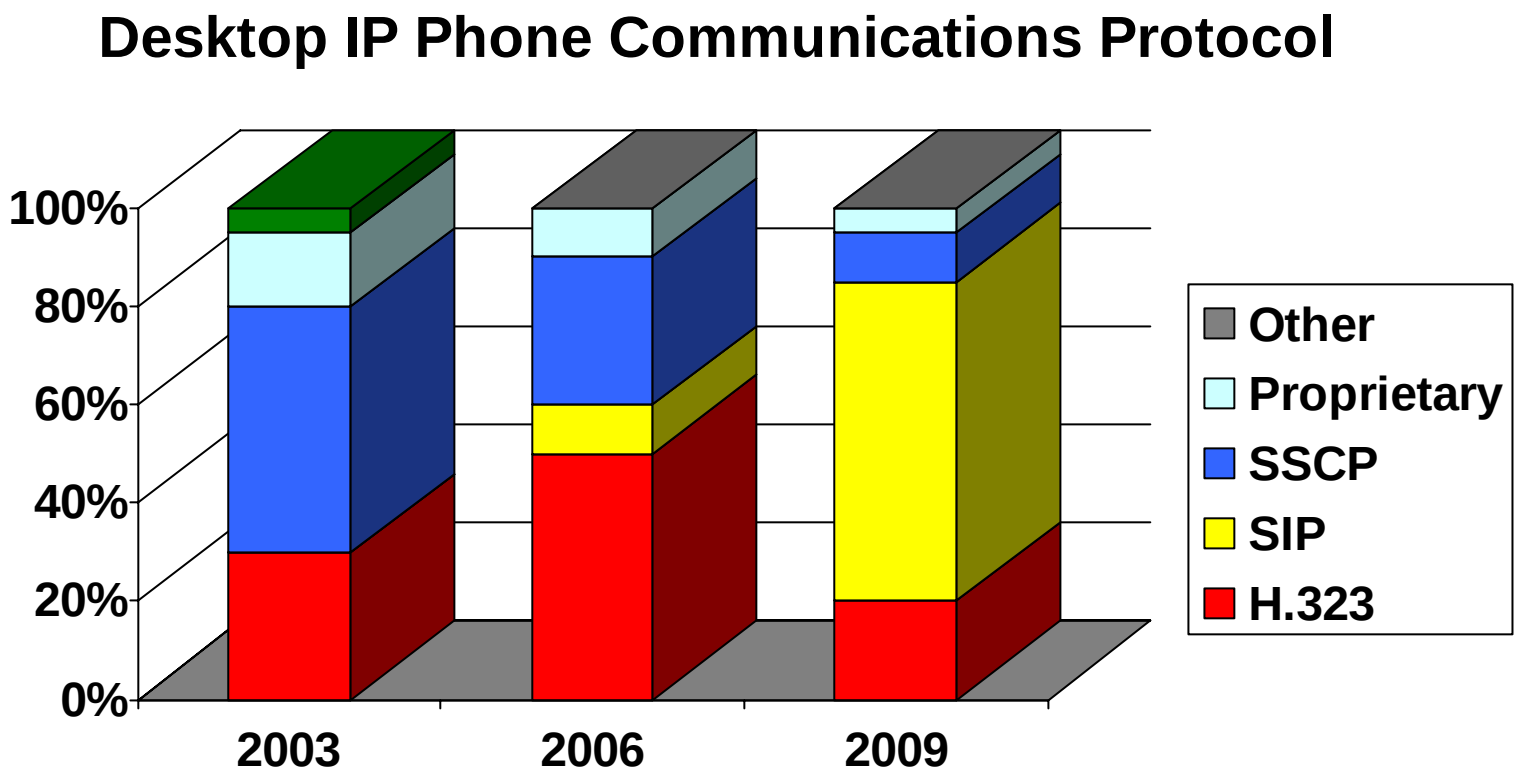
Sample Current Day IP Telephone

Siemens OpenStage 80

IP Telephone Technology Basics

- Communications Protocol
  - **H.323**
  - **Proprietary**
  - **SIP**
  - **Other (Skinny, MCGP, et al)**
- Voice Codec
  - **G.711**
  - **G.723.1**
  - **G.729 variations**
  - **G.722 or other wideband algorithm, e.g., Broadvoice**
- Echo Canceller
- Jitter Buffer
- QoS mechanisms, e.g., 802.1p/Q
- 802.af PoE

Forecasted Increased Deployment of SIP



Some Current SIP Advantages

- SIP is the most widely supported communications protocol (95%+ current IPT systems)
- SIP is an application-layer control protocol that can establish, modify and terminate multimedia sessions or calls
- SIP is a true peer-to-peer communications protocol
- SIP is media independent, allowing the flexibility to initiate sessions for different media types
- SIP is superior to H.323 in several important technical areas (faster call set-up time, simpler protocol stack, loop detection, embedded proxy firewall, support of third party call control, et al)
- SIP has inherent presence recognition and notification capabilities for messaging, conferencing, collaboration applications
- SIP is the IMS communications protocol standard that will be used to integrate wired and wireless networks (FMC)

IP Phone Categories (1)

- Entry
  - Basic POTS requirements
  - Single line appearance
  - Limited display/speakerphone capabilities
  - User: lobby, conference room, common areas, factory floor
- Administrative
  - Full feature requirements
  - Multiple line appearances (10+) for call coverage applications
  - Full display capabilities; headset interface
  - Users: management support staff, group answering centers

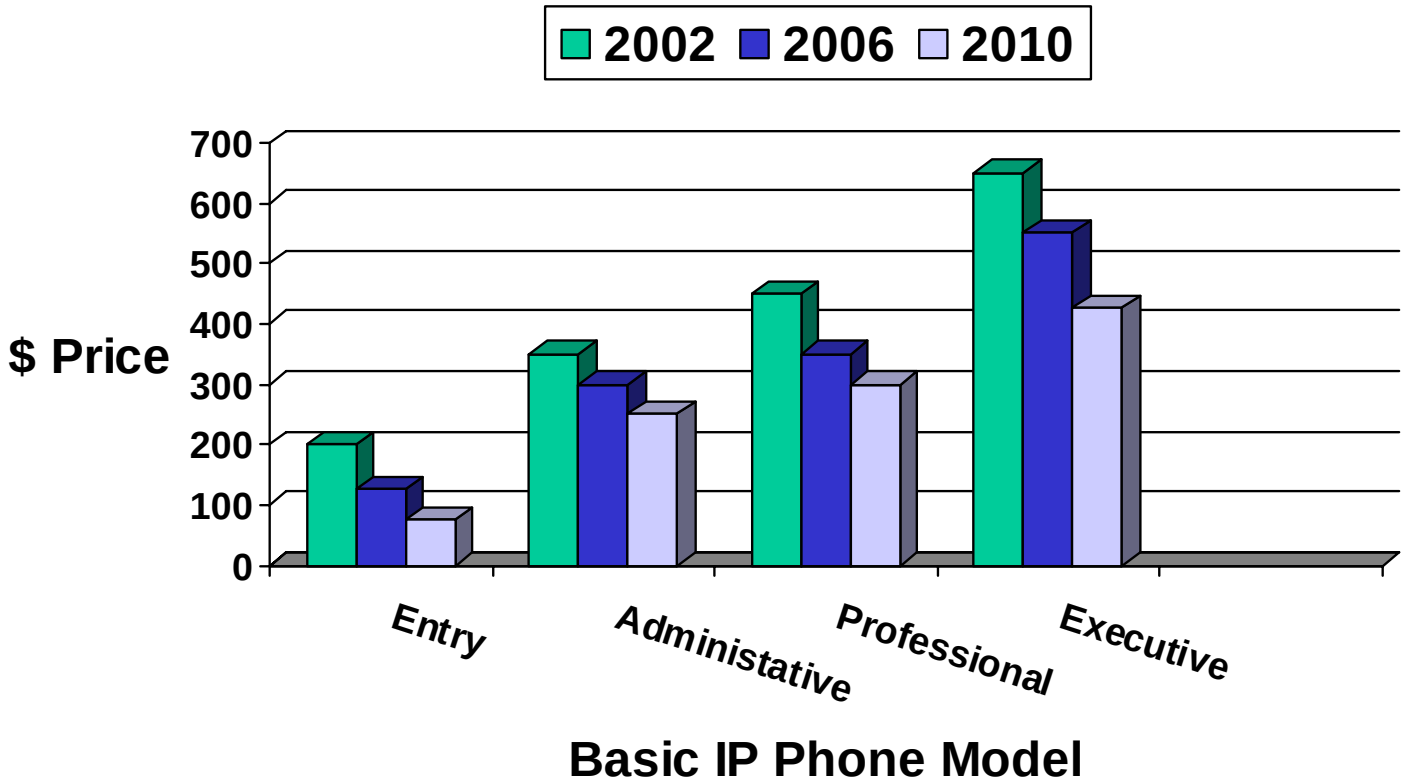
IP Phone Categories (2)

- Professional
  - Full feature requirements
  - Multiple programmable line/feature buttons (6 – 10)
  - Enhanced backlit monochromatic display
  - Wideband handset and speakerphone
  - Peripheral interfaces and embedded web browser
  - Users: management team members, technical staff
- Executive
  - Full feature requirements
  - Multiple programmable line/feature buttons (6 – 10)
  - Enhanced backlit color display capabilities
  - Wideband handset, speakerphone & headset
  - Peripheral interfaces and embedded web browser
  - Uses: executives, select personnel

IP Phone Pricing

- IP phone prices have been declining precipitously since their introduction in the late 1990s
  - Technology learning curve
  - Volume shipments
- Early IPT systems had limited phone portfolios without low cost entry models or high end executive models
  - Current portfolios typically include five or more current generation models
  - Older generation models are often available at lower prices

Typical IP Phone Prices (List)



IP Telephone Displays

- Color or monochromatic (gray-scale)
- Pixel-based imaging format
- High resolution, high contrast backlit display
- Multiple image types
  - **Text**
  - **Graphics**
  - **Video**
- User interface
  - **Cursor keys**
  - **Navigator wheel**
  - **Touch screen**
  - **Mouse**

Sample IP Phone Displays

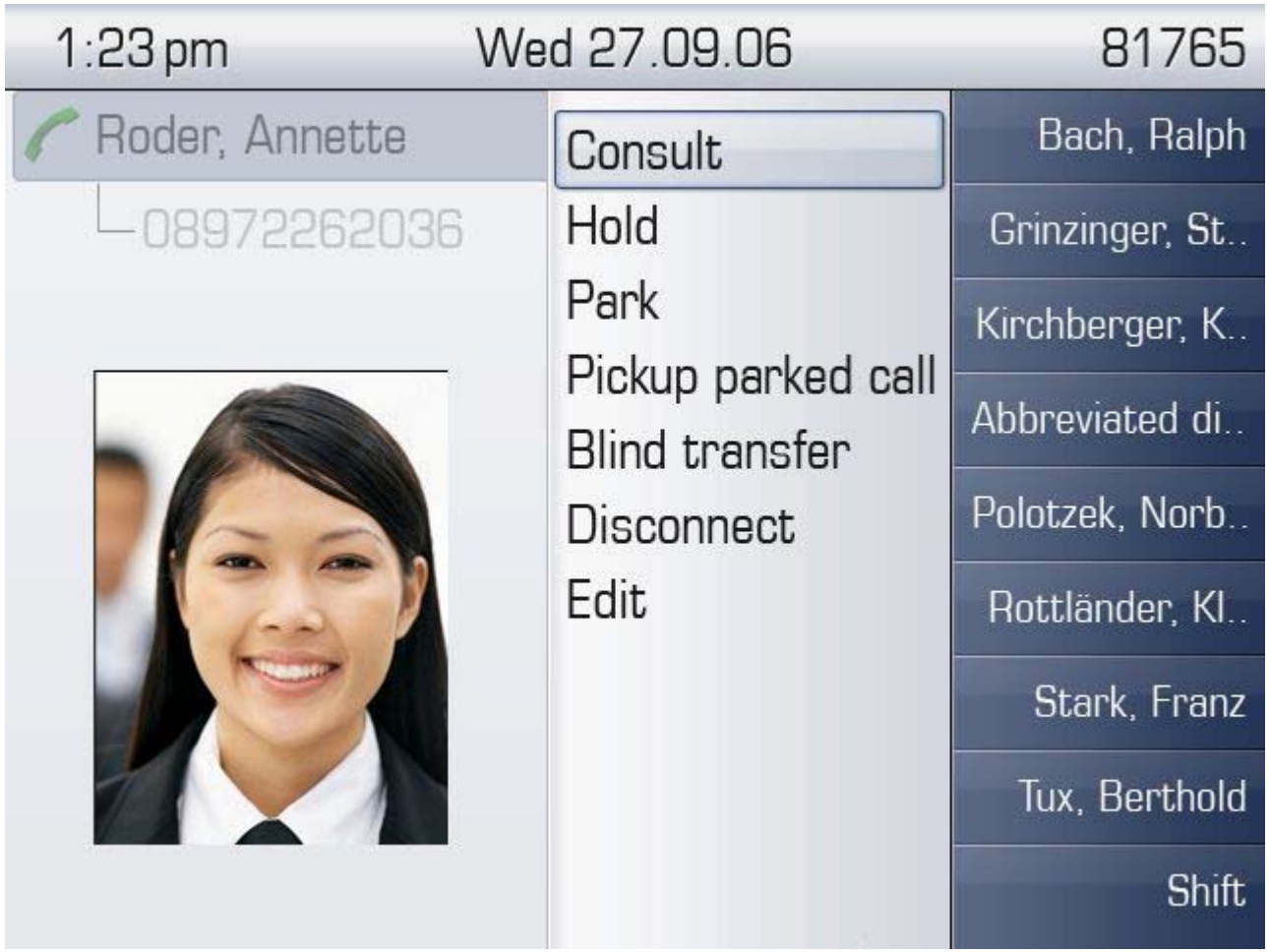
Mitel 5340

Monochromatic

Nortel 2007

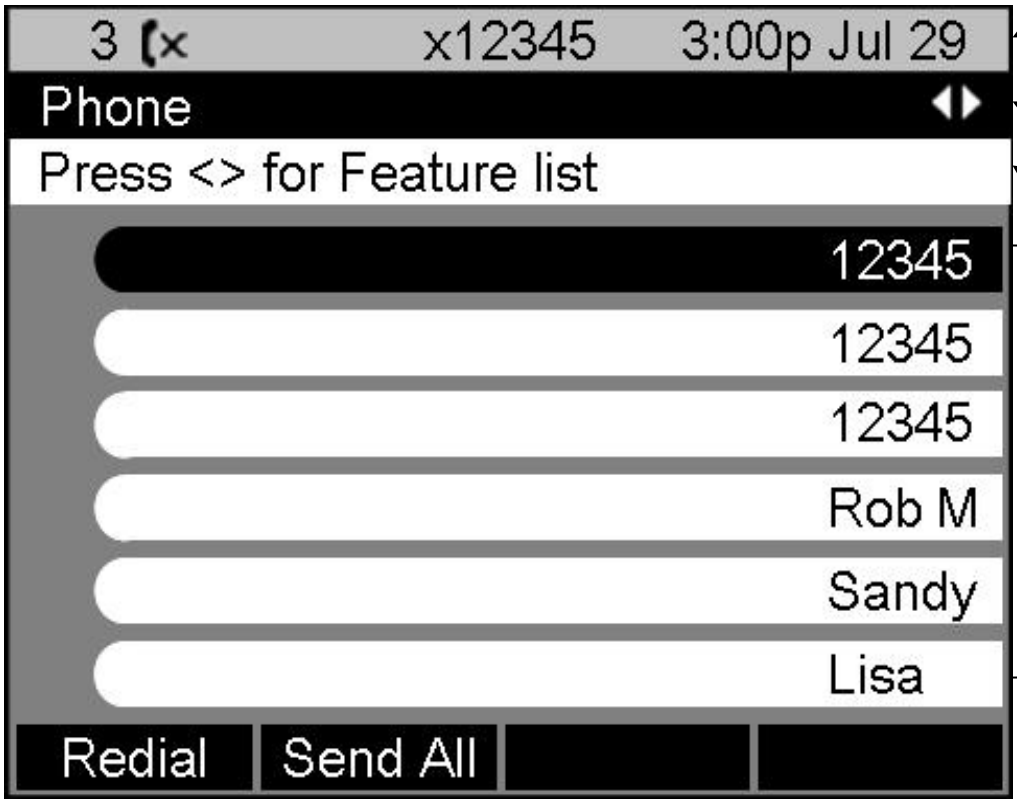
Color

On Screen Feature Access and Selection



Source: Siemens Enterprise Communications

Enhanced & Intuitive Context Sensitive User Interface



Information Line
(missed calls, forward extension, time/date)

Current Application

Instructions & Prompts

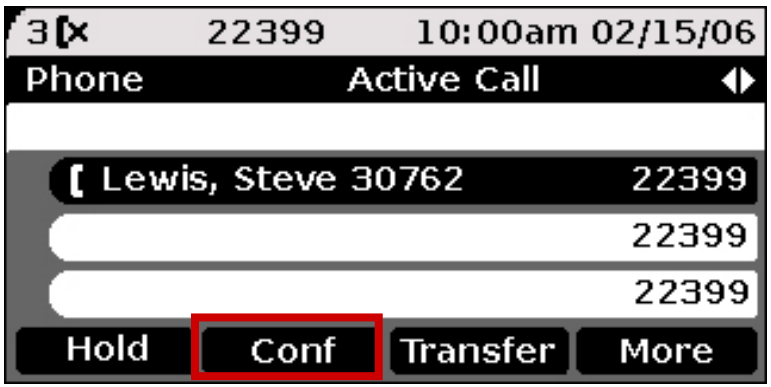
Call Appearances & Programmed Features

Context Sensitive Softkeys

Avaya 9630 Display

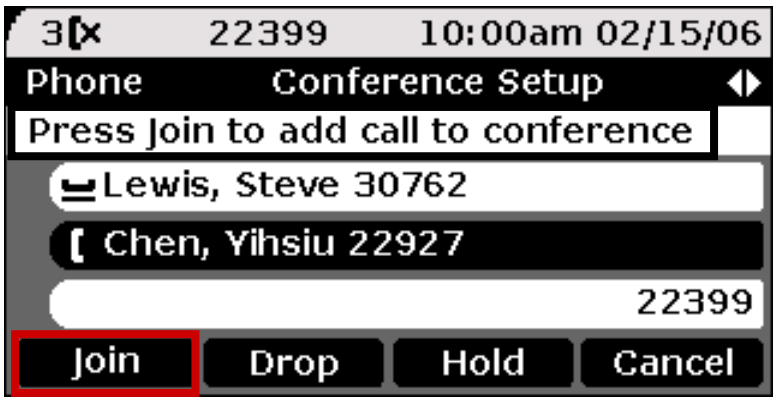
Simplified Conference Call Implementation

In a call

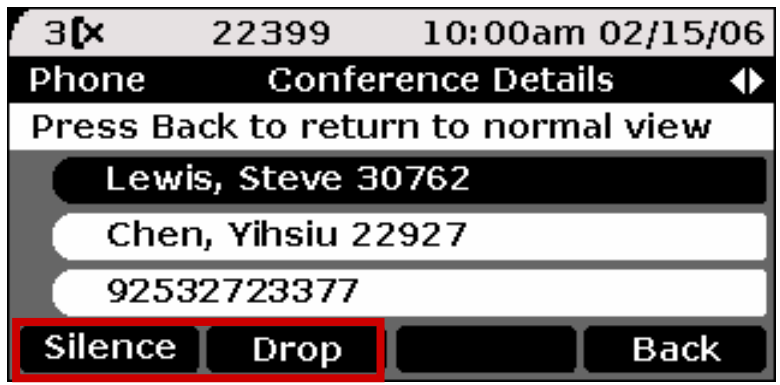


Look-up

Conference



Control Conference

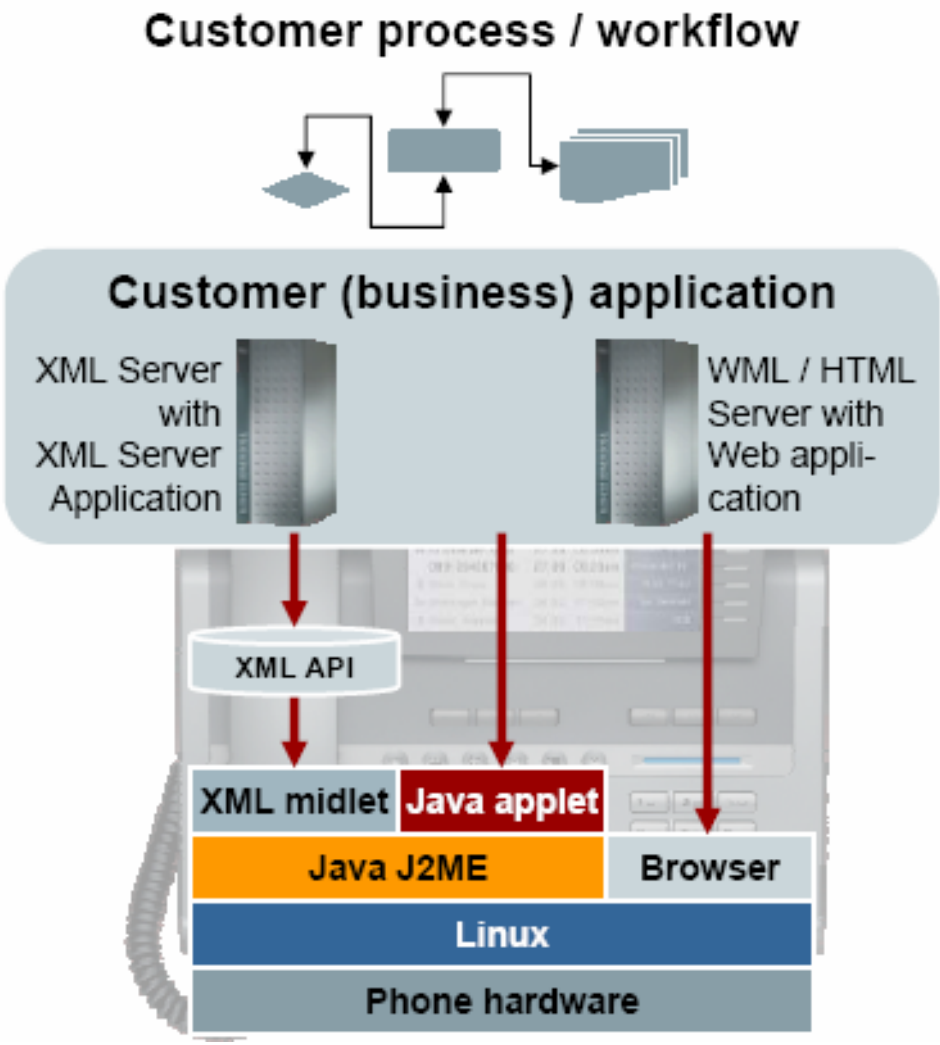


Source: Avaya

Embedded “Web Browser” Functionality

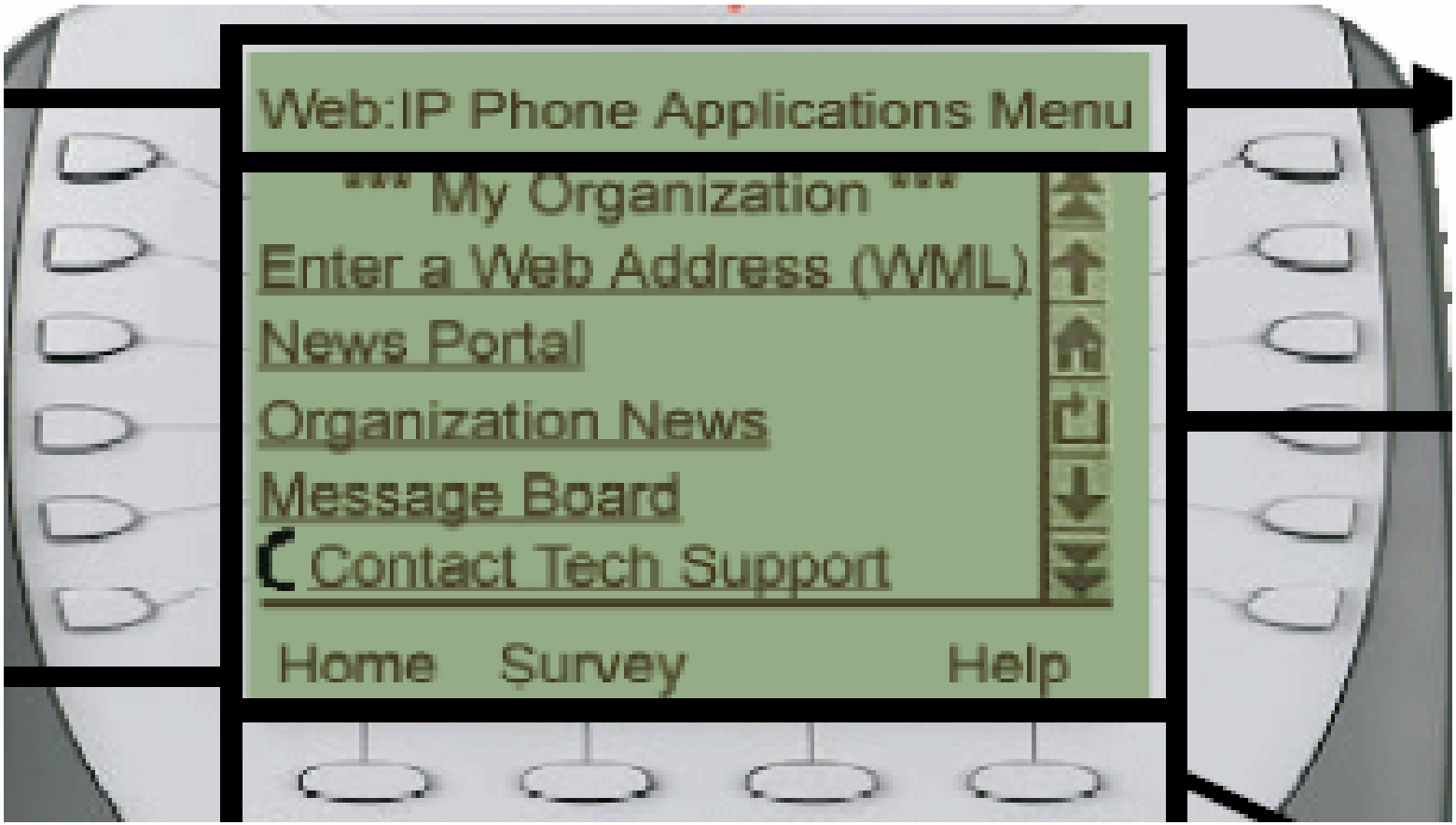
- Embedded processing and information access and download interfaces
  - Embedded O/S Web server and/or application database standards, such as XML, HTML, WML, WAP, LDAP, Java, TAPI
- Basic browser-based applications
  - Fixed menu or screen pop
  - Interactive station user/screen transactions
  - Push-through information & alerting
    - Text
    - Audio

Application Development Platform



Source: Siemens Enterprise Communications

Sample Web Browser Menu Display



Source: Avaya

Advanced Directory Applications

- External LDAP server
- Integrated directory/autodialing (call by name)
- Alpha entry procedures: single or multiple keystrokes
- Directory pruning
- Auto-display or menu list
- Multiple directory record fields
  - Name
  - Extension
  - Department
  - Personal information

Example of Intelligent Directory Access

Source: Nortel

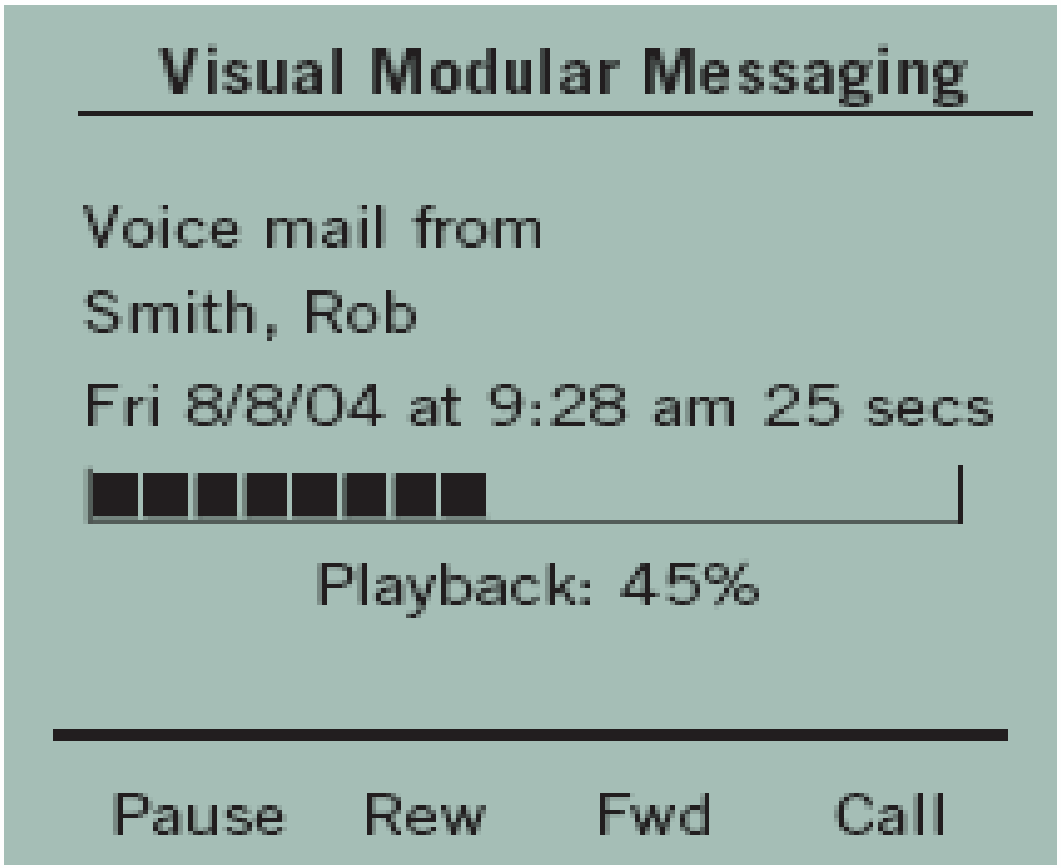
Sample Productivity Applications

- Web browsing
- Directories
- Time reporting
- Emergency alerts
- Travel reservations
- Account code entry
- Inventory lookups
- Visual voice mail
- Text messaging (Email, IM)
- Conferencing/Collaboration
- Announcements
- Branding via screensaver
- Zone paging
- Scheduling

Sample ACD Agent Application

Source: Avaya

Sample Visual Messaging Application



Source: Cisco Systems

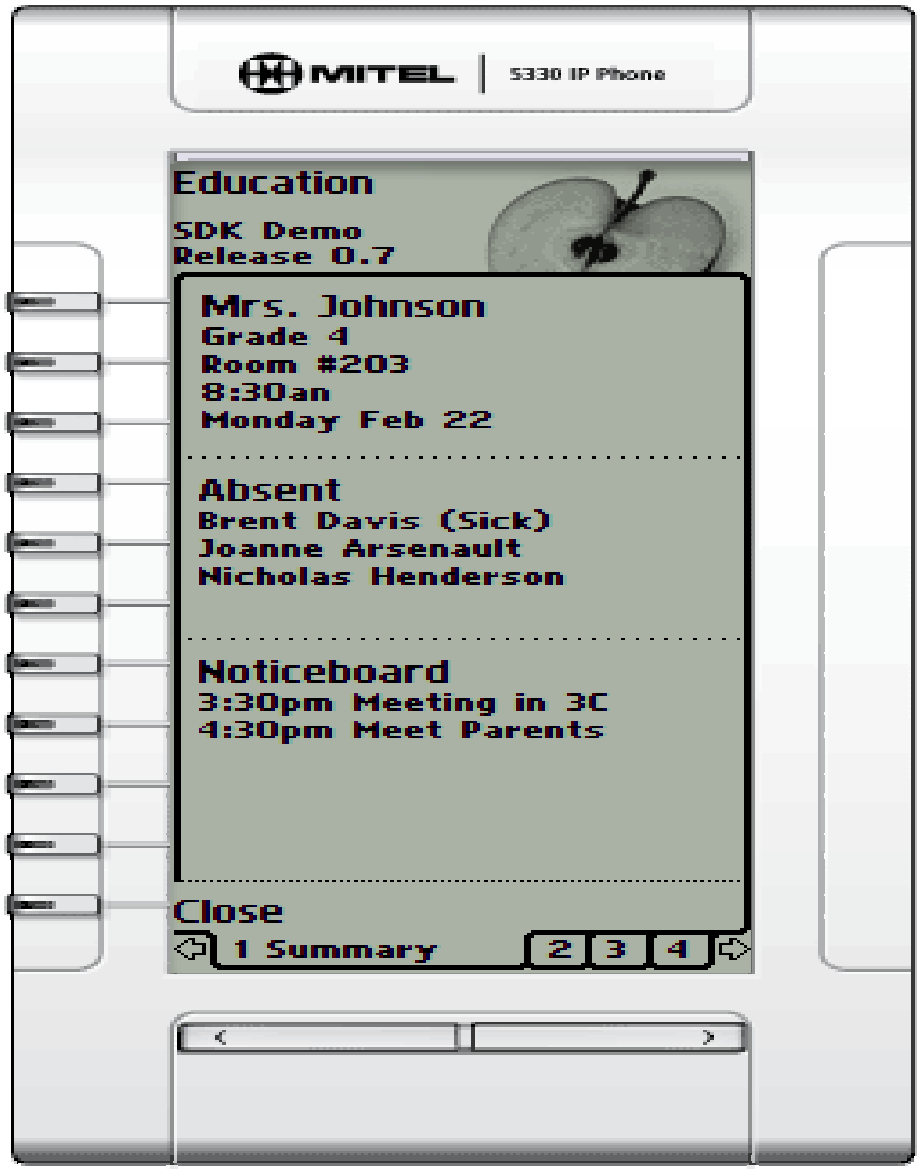
Sample Hospitality Application

Source: Mitel Networks

Sample Conferencing/Collaboration Application

Source: Cisco Systems

Sample Education Application



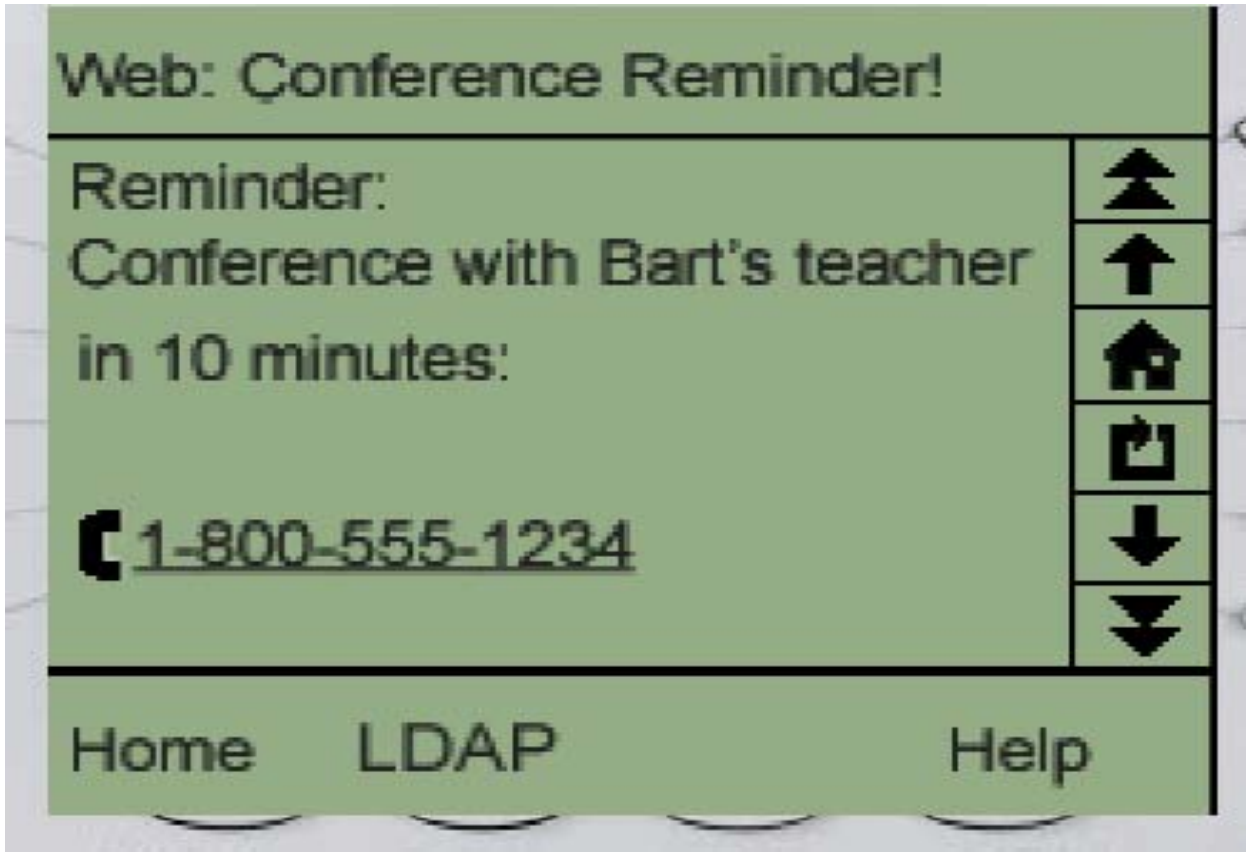
Source: Mitel Networks

Sample Time Card Application

Desktop Alerts

- Security Alerts **— i.e. “Smoke in building D, please evacuate”**
- Weather Alerts **— i.e. “Severe weather expected at 2 pm. Please leave work early”**
- IT Alerts **— i.e. “E-mail server is down. Expected up time is 8 am", "Update your anti-virus software”**
- Travel Advisories **— i.e. “Ice on highway 1”**
- Company Announcements **— i.e. "Meeting reminder — All hands meeting at 10 am”**

Sample Conference Alert

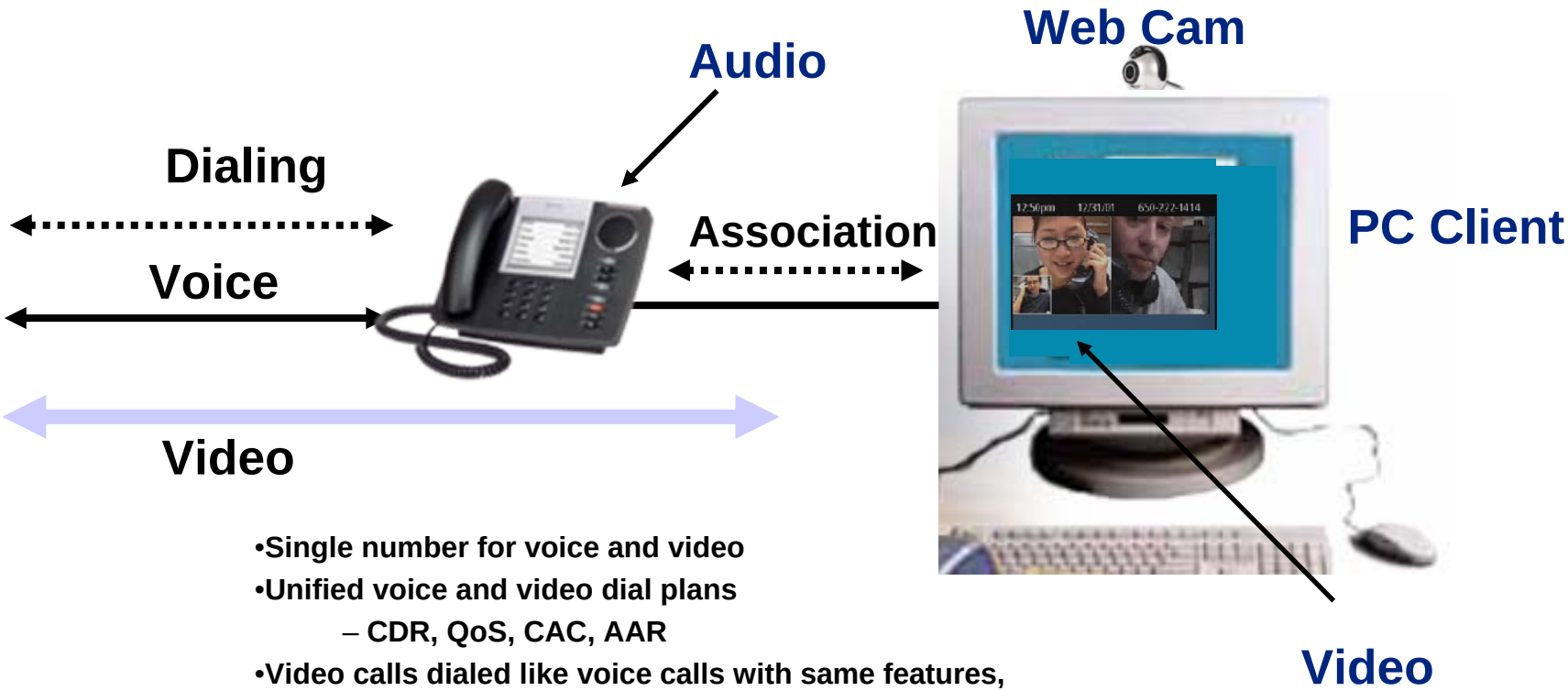


Source: Cisco Systems

Peripheral Interfaces

- Ethernet switch/connectors: 10/100 Mbps, Gigabit (integrated or add-on module)
  - **Computing applications (PC behind phone)**
  - **Video applications**
- Built-in VPN interface for teleworking applications
- Infrared: PDAs
- Bluetooth and/or USB:
  - Headsets
  - Speakers
  - Cameras (videoconferencing applications);
  - Keyboards/mouses (enhanced system interaction)
  - Printers (paper record of display information/graphics /graphics)
  - Flash Drives for memory storage
- WiFi 802.11

Integrated Desktop PC/Video Application



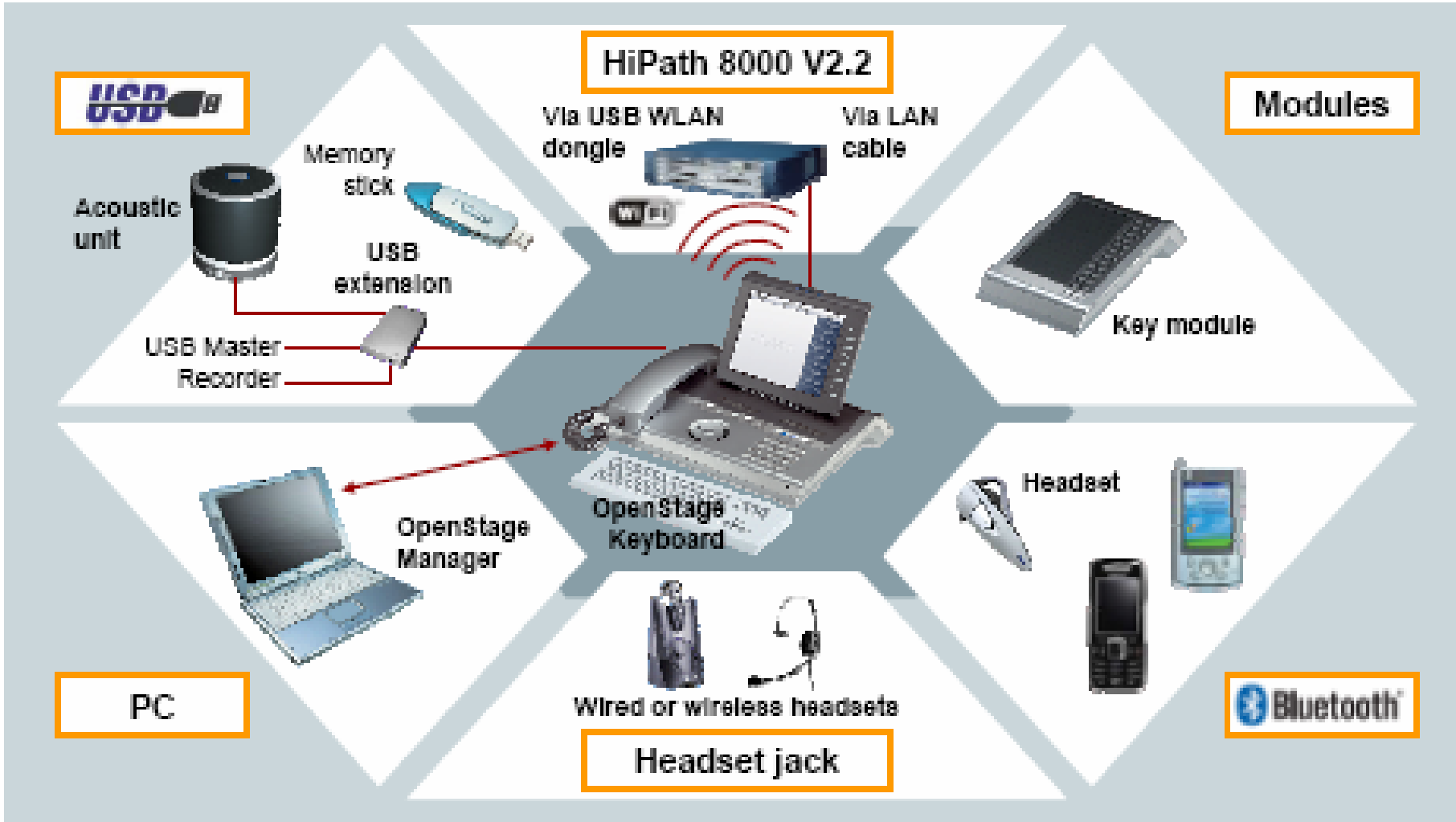
- Single number for voice and video
- Unified voice and video dial plans
  - CDR, QoS, CAC, AAR
- Video calls dialed like voice calls with same features, such as Mute, Hold, Park, Transfer, Conference, Forward)
- Single point of management and administration - Proven scalability enables affordable video at every desktop

Source: Cisco Systems

Integrated IP VideoPhone

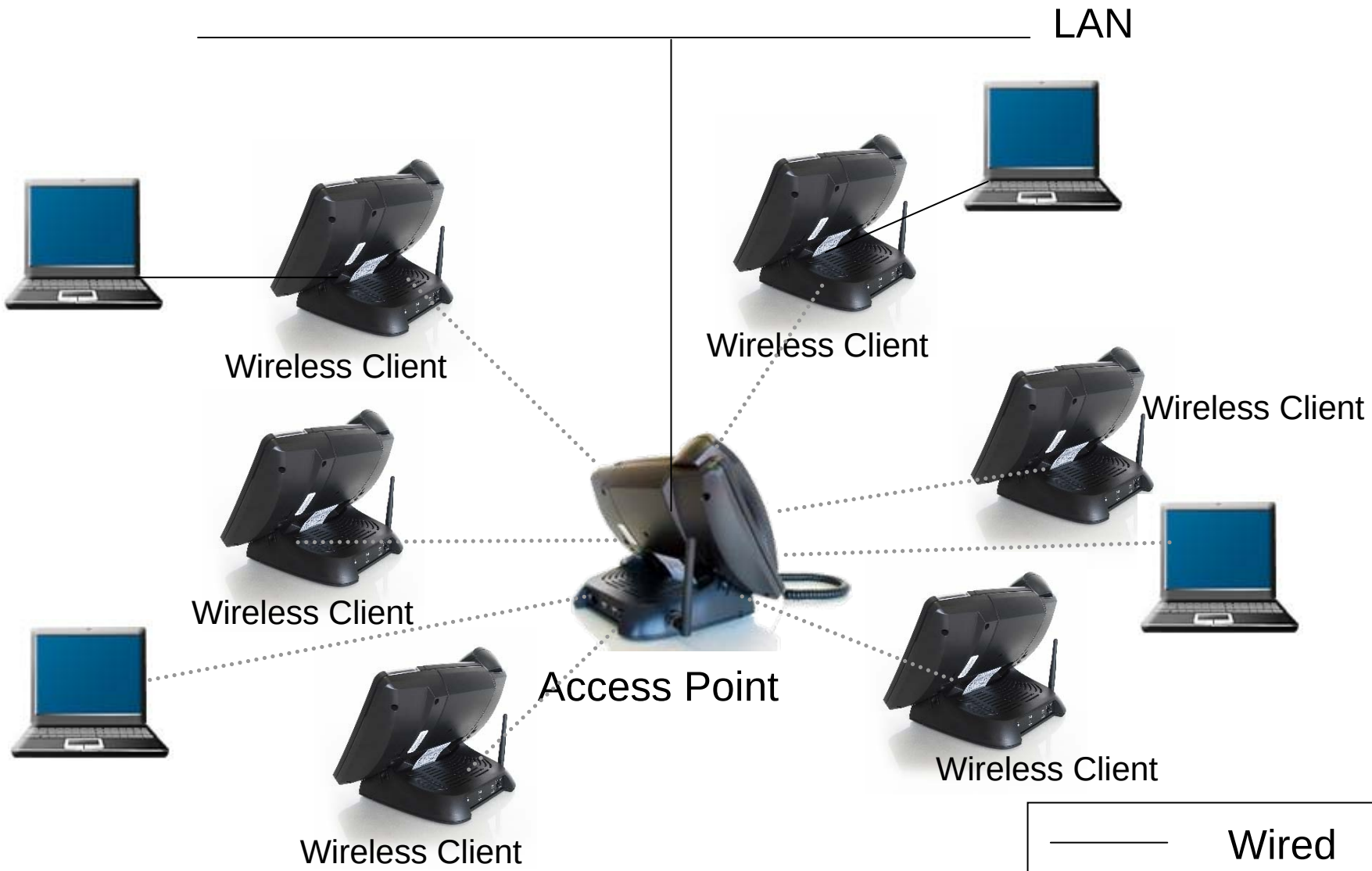
Source: Cisco Systems

Sample Peripheral Interfaces



Source: Siemens Enterprise Communications

Wireless LAN Stand Configuration



Source: Mitel Networks

A Few Closing Statements

- Desktop IP phone instruments can account for 20% to 50% of the total IPT system price
- It is important to select an IP telephone model that best satisfies the needs of the individual user while taking into account price regardless of their job title or salary
- It is highly recommended that the selected phone be SIP-capable when required (firmware download)
- Know what peripheral options can be added, and at what price, when needed
- Test drive IP phone models before buying, because the complexity of today's offerings may limit their effectiveness if the individual station user is overwhelmed by their design and interfaces