CUTTING EDGE GOSPEL:
A Guide To Understanding & Using New Information Technology in the Church

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Chapter 5:
A Primer on Distributive Learning Technology

“Transport of the mails, transport of the human voice, transport of flickering pictures—
in this century as in others our highest accomplishments still have the single aim
of bringing men together.”

Antoine de Saint-Exupéry (1900–1944), French aviator, writer.

Put simply, distance learning technologies “get people together” to communicate,
collaborate, and learn. Using videoconferencing technology, for instance, two or more
people at different locations can see and hear each other at the same time, sometimes
even sharing computer applications for collaborations. Videoconferencing can reduce
barriers and costs associated with interactions at a distance and key components of
effective communication can be preserved. Wendy Grossman writes that “like it or not,
most of the time learning is something that happens between people. It is not
broadcasting, however much it feels like it...” 2 This rich communication technology
offers new possibilities for communicating in a variety of settings including formal
instruction, connecting with guest speakers and experts, multi-congregation
collaboration, professional activities, and community events. Evan Rosen, author of the
book Personal Videoconferencing,3 aptly coined the term “collabication”, a blend of the
words “communication” and “collaboration,” to describe in a nutshell what
videoconferencing tools can provide.

Distance learning technologies and videoconferencing technology in particular enable
activities and interactions that would not otherwise be possible without face-to-face
interaction. As individuals and groups get progressively farther apart, it becomes less
likely and more difficult to carry on meaningful communication and discussions. Jessica
Lipnic and Jeffrey Stamps 4, illustrate this concept as a set of concentric circles or spheres
of influence radiating out from an individual (Figure 5-1). Fifty feet is a good rule of
thumb to estimate the proximity required for developing cohesive workgroups. Distance
learning technologies can enable us to transcend some of these distance barriers and
think “virtually”, in some cases eliminating the distinction between “internal” and
“external” as applied to congregations.

4 Lipnic, Jessica and Stamps, Jeffrey (1997). Virtual Teams: Reaching Across Space, Time, and Organizations with
As an interactive communication medium, two-way video stands out in a number of ways. First, it’s almost like being there. The visual connection and interaction among participants enhances understanding and helps participants feel connected to each other. This goes a long way toward building relationships in a way that email, telephone, or online chat systems cannot, supporting collaboration among traditionally isolated individuals and groups. A videoconference can improve retention and appeal to a variety of learning styles by integrating diverse media such as video or audio clips, graphics, animations, and computer applications.

Videoconferencing preserves and encourages the kinds of overt and subtle communication cues we use when communicating effectively… not only words, facial expressions, and gestures, but more subtle cues like voice tone and timbre, subtleties in facial expression, and other more subtle body language. Videoconferencing technology is one of the few enabling technologies that provide a holistic view or “in context” picture of the visual, motion, and sound components we value and cue upon in face-to-face interactions with one another.

The further we diverge from the face-to-face, the more difficult the communication. This sometimes becomes painfully apparent when we catch ourselves using our entire communication repertoire, including gestures, animation, and facial expressions in a telephone conversation. Our “audience” on the other end of the line experiences only one audio channel of communication out of context of the whole, perhaps missing some
of the important information we think we are conveying by voice. Likewise, rapid-fire, knee-jerk email responses are often misinterpreted, leading to “flame wars”. Ironically enough, a whole new online repertoire of ASCII text symbols has been developed to convey these subtleties and avoid or reduce miscommunication.  

The good news for congregations is that over the past five years, distance learning technology has improved rapidly and costs of setting up the technology infrastructure have been significantly lowered. As a result of the merging fields of communications, computing technologies, and consumer electronics (Figure 5-2), many of the components needed for distance learning may already be available in congregations for other purposes. Audio systems, big screen TV or computer displays, video cameras, and internet access are only a few examples of components that could be integrated into a distance learning tool set. As the functionality of distance learning technology has increased, the cost has decreased. Integrated distance learning technologies, once affordable only to the largest corporations, government institutions, and research universities, are now affordable for congregations. Two-way videoconferencing technology is now available for under $10,000.

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**Figure 5-2**

*Distance Learning Teething Rings*

- Computers
  - Computer projector
  - Digital camcorder
  - Big screen television

- Communication Technologies
  - ISDN lines
  - DSL service
  - Cable modem
  - Speaker phone
  - FAX
  - Voice mail

- Consumer Electronics
  - Web
  - Email
  - Chat
  - Electronic whiteboards
  - Desktop videoconferencing

* Adapted from: Evan Rosen (1997), *Personal Videoconferencing* and Nicholas Negroponte (1995), *Being Digital*

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<http://www.randomhouse.com/features/davebarry/emoticon.html>

Distance Learning Tool Palette

A variety of distance learning tools can be used to enhance interactivity, learning, and collaboration across distances. Figure 5-3 illustrates some of the technologies and places them in context of their level of interactivity and whether or not the interactivity happens at the same time the message is sent or at a later time. Interactivity can be two-way as in a telephone conversation or one-way as in a television broadcast (sometimes referred to as “couch potato” mode). Synchronicity refers to whether the interactions occur at the same time as in a telephone conversion or at different times (delayed responses) as in email, voice mail, or threaded email discussions.

Figure 5-3
Taxonomy of Distance Learning Tools

<table>
<thead>
<tr>
<th>Interactive (two-way)</th>
<th>Non-Interactive (one-way)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Synchronous</strong> (same time)</td>
<td><strong>Asynchronous</strong> (different time)</td>
</tr>
<tr>
<td>Sender -&gt; Receiver</td>
<td>Sender &lt;- Receiver</td>
</tr>
<tr>
<td>• Face to Face</td>
<td>• Email</td>
</tr>
<tr>
<td>• Telephone</td>
<td>• Voicemail</td>
</tr>
<tr>
<td>• Videoconference</td>
<td>• Threaded Discussion</td>
</tr>
<tr>
<td>- ISDN</td>
<td>• Web space</td>
</tr>
<tr>
<td>- Internet</td>
<td></td>
</tr>
<tr>
<td>• Chat</td>
<td>• Written</td>
</tr>
<tr>
<td>• Whiteboard</td>
<td>• Printed</td>
</tr>
<tr>
<td>• Computer Program Sharing</td>
<td>• Web Pages</td>
</tr>
<tr>
<td></td>
<td>• Archival video/audio streams</td>
</tr>
<tr>
<td></td>
<td>• Videotapes</td>
</tr>
<tr>
<td></td>
<td>• Cassettes</td>
</tr>
<tr>
<td></td>
<td>• CD-ROMs</td>
</tr>
<tr>
<td></td>
<td>• Surveys</td>
</tr>
</tbody>
</table>

Just like an engaging academic class, the most effective programming includes a balanced diversity of face-to-face synchronous interactions (one-to-one and one-to-many) as well as opportunities for asynchronous interactions (email, web pages, etc.) that occur outside the regularly scheduled class time. Programming is often mixed to include several different kinds of distance learning technologies that blend different modes of interactivity and synchronicity. For example, a conference could be broadcast, providing a one-way message to the audience. But additional communication in the opposite direction (audience to conference speaker) is often provided both during and after the conference using telephone, chat, or email pathways.
Distributed learning technology is just part of the broader communications media palette that includes traditional communications media illustrated in Figure 5-4. Adding new technology might be an integral part of a congregational communications plan and should be considered during preparation for programming opportunities to make the best use of face-to-face, at-a-distance, and at-different-time interactions. The American Association of Higher Education (AAHE) suggests seven principles for good practice in using distance learning in higher education. We have adapted these principles for congregations to include the following practices:

- Encourage contacts between presenter and audience as well as between sites.
- Develop reciprocity and cooperation among audience and sites.
- Use active and collaborative learning techniques.
- Give prompt feedback and provide clearly defined and scheduled opportunities for participant responses.
- Emphasize time-on task in online conferences; use separate local group interaction time to enhance communication opportunities when offline.
- Communicate high expectations with participants.
- Respect diverse talents and ways of learning; integrate a variety of learning modes including visual, auditory, musical, etc.

Figure 5.4
Communications Media Palette

<table>
<thead>
<tr>
<th>Non-Interactive</th>
<th>Oral</th>
<th>Written</th>
<th>Printed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to Many</td>
<td>Sermon</td>
<td>Tablet</td>
<td>Book</td>
</tr>
<tr>
<td></td>
<td>Conference</td>
<td>Announcement</td>
<td>Newspaper</td>
</tr>
<tr>
<td></td>
<td>Debate</td>
<td>Flyer</td>
<td>Magazine</td>
</tr>
<tr>
<td>1 to Few</td>
<td>Workshop</td>
<td>Graffiti</td>
<td>Newsletter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Memo</td>
<td></td>
</tr>
<tr>
<td>Interactive</td>
<td>Dialogue</td>
<td>Letter</td>
<td>Greeting card</td>
</tr>
<tr>
<td>1 to 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Few to Few</td>
<td>Face to face meeting</td>
<td>Flip chart</td>
<td>Handouts</td>
</tr>
<tr>
<td>Many to Many</td>
<td>Social event</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Adapted from: Jessica Lipnak and Jeffrey Stamps (1997) Virtual Teams: Reaching Across Space, Time, and Organizations with Technology

Phipps, Ronald (1999). What’s the difference: a review of contemporary research on the effectiveness of distance learning in higher education. The Institute for Higher Education Policy, April 1999, 42 pages
Carefully selecting an appropriate technology might provide passive, interactive, and collaborative communication opportunities as illustrated in Figure 5-5. Using different technologies in context of time provides time-slices before, during, and after an event, providing opportunity for audience preparation before the event, audience-speaker and group interactions during the event, and follow-up and collaboration after the event. Some of the key factors for success\(^7\) of interactive videoconferences are that they:

- are related to communication objectives and goals of programming
- have an agenda and clearly defined goals
- provide an opportunity for informal interactions with the speaker as well as the audience members
- provide adequate support and exploratory materials such as handouts, readings, resources, etc.

\[\text{Figure 5-5} \]

\textbf{Mixing Distance Learning Technologies}\(^8\)

<table>
<thead>
<tr>
<th>Pre-Event</th>
<th>Event</th>
<th>Post-Event Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive</td>
<td>Online newsletter</td>
<td>Streaming</td>
</tr>
<tr>
<td></td>
<td>Reading assignments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bulletin announcement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flyers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Email announcements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Web site</td>
<td></td>
</tr>
<tr>
<td>Interactive</td>
<td>Scheduled chats</td>
<td>Videoconference</td>
</tr>
<tr>
<td></td>
<td>Threaded discussions</td>
<td>Chat</td>
</tr>
<tr>
<td>Collaborative</td>
<td>Work teams</td>
<td>Videoconference</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Telephone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textbf{Videoconferencing Technologies}

Videoconferencing provides real-time synchronous video and audio interactions between remote sites so that learners are no longer place or time-bound. Equipment is needed at both ends to perform capture, transmission, and display/presentation functions (Figure 5-6).


\(^8\) Adapted from: Rocket, Valor, Miller, and Naude (1998).
At the message-originating site (the near-side), the following events happen:

- A camera and microphone are used to capture video and sound respectively.
- A codec (compressor/decompressor) digitizes and compresses video and audio signals into a form that can be transmitted to the remote site.

The signals are transmitted via ISDN (Integrated Services Digital Network) lines to the remote site. Equipment on the other end (the far-side) is used to reverse the process.

- The codec decompresses and converts the signal back into analog audio and video.
- A TV, amplifier, and speakers are used to present the video and audio.

On the near-side, the TV or screen displays the far-side video output and may optionally include a small picture-in-picture view of the near-side in the corner of the screen.

The reverse process occurs when the far-side sends video and audio signals back. As you can imagine, large amounts of information must be transmitted back and forth each second for maintenance of high quality, synchronized audio and video.

Most high quality videoconferences use dedicated ISDN lines as the transmission pathway. These lines provide more extensive quality of service (QoS) than POTS (Plain Old Telephone Service) lines. ISDN lines provide dedicated bandwidth: that is, only the sender and receiver are using this transmission “pipe” so there is no contention with other traffic and video and audio quality is preserved.
ISDN videoconferences can be run at various speeds, with increasing speeds requiring additional ISDN lines. Figure 5-7 illustrates some of the common speeds and their associated quality. ISDN lines produce full screen video at various qualities.

![Figure 5-7 ISDN Lines and Transmission Speeds](image)

<table>
<thead>
<tr>
<th>ISDN lines</th>
<th>B channels</th>
<th>Speed (Kbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>128</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>256</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>384</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>512</td>
</tr>
</tbody>
</table>

ISDN lines require monthly fees as well as per-minute long distance charges if you are originating long distance calls. ISDN lines are more expensive than telephone lines if you are calling out long distance. According to Lamont Wood 9 “ISDN calls cost about twice as much as long-distance calls, so a videoconference [3 ISDN lines at 384 Kbps] costs about six times more than a phone call.” Mary Francis Grasinger10 estimates three ISDN lines cost around $85 - $90 per hour. On the other hand, there are no charges other than the monthly ISDN fees if you receive a long distance ISDN call.

During the past several years, videoconferencing using computers and the internet has developed rapidly. Applications such as Netmeeting (Figure 5-8), CuSeeMe, and others allow video and audio to be carried across the internet. A computer workstation would need an inexpensive desktop video camera ($100 - $300) as well as a microphone/headset ($20-$50) to enable video and audio transmission. Desktop files and applications such as documents, spreadsheets, presentations, etc. may be shared between the computers. Online whiteboard and chat tools may be used as well. Though the current technology works reasonably for some applications, it is not a viable reasonable-quality alternative unless the sites are connected via a local area network, a dedicated videoconferencing network, or via Internet2.

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The advantage of *Netmeeting* is its low startup costs and no per-minute ISDN charges. But the down side to videoconferencing over the internet is small picture size and poor, inconsistent quality. Audio comes through as telephone quality, but video rarely exceeds 15 frames per second in very small windows: 160 by 120 pixels (less than 2 inches wide) or 320 by 240 pixels (less than 4 inches wide). Furthermore, service quality is not guaranteed. If there is lots of traffic on the internet (bandwidth contention), then video and audio quality and synchronization may fluctuate widely.

**Figure 5-9**
Comparing ISDN and Internet Transmission Paths

<table>
<thead>
<tr>
<th>Criteria</th>
<th>ISDN</th>
<th>Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Minute Costs</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>fixed</td>
<td>in contention with other traffic</td>
</tr>
<tr>
<td>Quality of Service</td>
<td>guaranteed</td>
<td>fluctuating</td>
</tr>
<tr>
<td>Audio Quality</td>
<td>high fidelity stereo</td>
<td>telephone</td>
</tr>
<tr>
<td>Video Image Size</td>
<td>full screen</td>
<td>160 by 120 pixels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or 320 by 240 pixels</td>
</tr>
</tbody>
</table>

Desktop videoconferencing works well in very specific conditions with direct access to high-speed internet connections, but most of these conditions are not likely scenarios for congregations. Desktop videoconferencing works well on a local area network segmented from major internet traffic and not contending with internet traffic.
bottlenecks. For instance, it may work tolerably on local area networks within or between buildings. If small windows are used, it works reasonably well, though many of the subtleties of expression are lost. Many of the newer videoconferencing units are hybrid systems that can use both ISDN and internet pathways for transmission. But unless you and your far site are both connected to a dedicated T1 network or to the Internet2, ISDN transmission is likely to be the only viable alternative. Internet may be used as a low-quality backup mechanism if ISDN lines go down.

If more than one site is to be connected for a videoconference, then a bridge is needed to connect the sites. Bridges are available as a service from ISDN service carriers and can be used for audio as well as video applications. Bridges from carriers must be reserved in advance and are fairly costly. They do have significant advantages. For instance, they may be used to connect sites using different speeds, protocols, and equipment. The quality and speed of the videoconference will be “downshifted” to the lowest quality connection. For instance, if two of three sites are capable of 384 Kbps, and one site can handle only 256 Kbps, then the videoconference will use an ISDN rate of 256 Kbps. All sites will see that level of quality. Some of the newer videoconference units have built-in bridging capabilities. The Polycom 512 Multipoint unit we use at Pacific Lutheran University can use up to 512 Kbps for point-to-point conferences and connect up to 4 sites at 128 Kbps for multipoint conferences.

**Making Sense of the Alphabet Soup**

A number of different standards are used to describe videoconferencing technology. Many of these standards have been established to protect investments in the technology and to provide interoperability among equipment manufactured by different vendors. The key standards-setting body is the United Nation’s International Telecommunications Union, Telecommunications Standardization Sector (ITU-T).

When evaluating videoconferencing equipment, you should check into compliance with and support for the following standards: H.320, H.323, H.324, and T.120 (Figure 5-9).
The H.320 standard, approved in 1990 by the ITU-T, was developed to provide videoconference interoperability among ISDN videoconference equipment. Since 1990, most equipment manufacturers have manufactured H.320-compliant equipment. The standard covers protocols for coding, framing, signaling, and establishing connections for point-to-point as well as multipoint conferences. It also provides audio algorithm standards.

H.323 was approved in 1996 and covers video conferencing across local area networks (LANs). It deals specifically with internet networks that do not guarantee quality of service (QoS) for traffic such as real-time video. It provides tools for LAN administrators to manage video traffic on their network backbone. H.323 also provides specifications for connecting with H.320 (ISDN) sites via a gateway.

H.324, also approved in 1996, governs videoconferencing via telephone connections (POTS) using multimedia telephones or computers connected to telephone lines with V.34 modems supporting a V.80 protocol. Though technology and line limitations make this a low-quality solution, this standard is a critical one for connecting with home audiences.

The T.120 standard governs the transmission of multimedia data or documents in videoconferences. It was adopted by the ITU-T in 1996 and defines how documents are transmitted in both point-to-point and multipoint conferences across a variety of transmission media. In simple terms, this standard is used to share computer desktop documents, whiteboards, and chat tools in conferences. It provides standards for sharing applications (computer programs), sharing documents (computer files), and transferring files among sites. The protocol governs rules for sharing, manipulating, and controlling functions such as whiteboards, chats, games, and virtual reality simulations. Since the standard crosses multiple transmission media, participants using a variety of connection protocols can be connected. For example, a local area network, a telephone connection using a modem, and an ISDN system may share applications using the T.120 standard.
Videoconferencing Equipment Trends

Over the past five years, the functionality of videoconferencing equipment and peripherals has gone up while the costs have gone down. At the same time, newer units often have hybrid capabilities with the potential for using H.320 ISDN as well as H.323 LAN transmission over the internet (Figure 5.10). However, the latter functionality is not presently a viable alternative unless sites are connected to Internet2 or to dedicated videoconferencing T1 lines.

Another trend is the movement from TV displays to computer displays. Big screen TVs with resolutions of up to 400 lines can be used effectively for videoconferencing signals but do not have adequate resolutions for displaying computer signals. Computer projectors have come down in price and have the ability to display computer signals as well as provide line doubling for displaying video signals. Computer projectors generally handle resolutions of 640x480, 800x600, and 1024x768. These displays have the added value of being able to display high resolution images from any video source including video tapes, DVDs, video cameras, cable TV, or satellite broadcasts.

Computers have also become integrated parts of videoconferencing systems. While computers were initially used as peripherals for integrating desktop applications and computer files with separate videoconferencing equipment, many of the newest systems such as the Intel Team Station have codecs and cameras integrated into the computer.
system. Some H.323 applications use desktop computers with inexpensive cameras and microphones for LAN or point-to-point videoconferences. Cole-Gomolski cites desktop computer videoconferencing costs at around $1,000 per workstation, though lower-cost alternatives are available today. But again, transmission across the internet is not likely to be a viable alternative for anything other than rudimentary point-to-point videoconference.

While the cost/functionality curves of videoconferencing equipment continue to change, there are several strategies you can use to plan for future changes that are likely to occur. First, it makes sense to purchase a hybrid ISDN/internet unit now so that as internet technology improves you have the option of moving to inexpensive internet transmission instead of the more expensive ISDN lines. Local service options for ISDN and internet services are likely to vary substantially from one locale to another. DSL and cable modem access might not be available in many rural locations. Internet access provides a backup pathway if needed, though quality is likely to degrade substantially. But as technology and service quality improve, it may be possible to begin using the internet transmission pathway.

Figure 5.11
Leveraging Present Equipment and Infrastructure Investments

It is very important to plan for redundancy and backup if your events are mission-critical. Having an extra analog telephone line and a speaker phone is crucial in case there are problems with ISDN lines. At least the voice will be available and you may be able to use internet tools such as application sharing, whiteboard, Netmeeting, or email to perform some of the communication that would have normally happened via ISDN videoconferencing. It is also important to budget for obsolescence and develop a phased replacement cycle for videoconferencing equipment, display devices, and computers.
Building a Mixed Learning Network

Considering the rapid rate of change of videoconferencing as well as changing cost models, one can begin developing a topology that builds on the strong, proven ISDN videoconferencing tools, but is poised to take advantage of newer internet-based transmission option as the quality becomes viable. Figure 5-12 illustrates a sample of this kind of learning network. Note that there are both synchronous as well as asynchronous communication alternatives as well as multiple transmission and cross-platform, cross-network options.

Figure 5-12
Building a “Mixed” Learning Network

Figure 5-13 diagrams potential equipment configurations for congregations considering becoming part of a mixed learning network. The system allows use of equipment that may already exist in congregations. In addition, it uses hybrid ISDN/internet technology that has the ability to use internet as a transmission mechanism for backup and in the future as quality of service improves.
Figure 5-13
Leadership Learning Network
Congregation Equipment Configurations

Basic Videoconferencing Unit

Multisynch Monitor

Big Screen TV

Computer/Video Projector

Screen

Computer

VCR

Playback

2nd Camera

Document Camera

Scan Converter

Telephone Network

ISDN Network

Speaker Phone (backup)

Internet

Basic Configuration

Options

Basic Configuration

Options
Chapter 7. Glossary of Terms

A

112, 128, 224, 256, 336, 384, 448, and 512 kbps - Refers to the speed at which data (voice and video) is transmitted over a pair of telephone lines during a videoconference. Your lines may be either 56 kbps per line or 64 kbps per line. Here's how it works:

You have to have a minimum of two 56 kbps telephone lines to videoconference - anything less and the picture quality is compromised. Some areas have lines that carry 64 kbps worth of data so they can transmit 8 kbps more per line but it's such a small amount that you really don't notice it when you are participating in a videoconference. Here's how call speeds are determined:

<table>
<thead>
<tr>
<th>Lines</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 lines @56 kbps</td>
<td>112 kbps</td>
</tr>
<tr>
<td>2 lines @64 kbps</td>
<td>128 kbps</td>
</tr>
<tr>
<td>4 lines @56 kbps</td>
<td>224 kbps</td>
</tr>
<tr>
<td>4 lines @64 kbps</td>
<td>256 kbps</td>
</tr>
<tr>
<td>6 lines @56 kbps</td>
<td>336 kbps</td>
</tr>
<tr>
<td>6 lines @64 kbps</td>
<td>384 kbps</td>
</tr>
<tr>
<td>8 lines @56 kbps</td>
<td>448 kbps</td>
</tr>
<tr>
<td>8 lines @64 kbps</td>
<td>512 kbps</td>
</tr>
</tbody>
</table>

In multipoint videoconferences you are usually restricted to the speed of your lowest-speed site. For example: you want to connect sites in Arizona, California and Washington; Arizona and California are both 384 kbps sites but Washington is a 112 kbps site. Your call will have to be conducted at the 112 kbps speed.

asynchronous – Interactions occurring at different times. A message is not responded to immediately as in a conversation, but at a different time. Includes technologies such as email, threaded discussions, and on-demand streaming media.

audioconference or teleconference - A telephone call involving three or more different locations.

auto-tracking camera – An automated camera that cues on the sounds made by a speaker to track the speaker around the room.

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B

bridge - See multipoint bridge

bridge provider - A commercial service (company) that provides multipoint bridging.

broadband – A high-capacity communication circuit/path. It usually implies a speed greater than 1.544Mbps.

C

codec – Coder-Decocoder. Videoconferencing hardware that codes the outgoing video and audio signals and decodes the incoming signals. Prior to transmission, the codec converts analog signals to digital signals and compresses the digital signals. Incoming audio and video must be decompressed and converted from digital back to analog.

compressed video – When the vast amount of information in a normal TV transmission is squeezed into a fraction of its former bandwidth by a codec, the resulting compressed video can be transmitted more economically over a smaller carrier. Some information is sacrificed in the process, which may result in diminished picture and sound quality.

computer interface - Equipment and cables used to connect a computer to a videoconference unit.

contention – Transmission of signals where network traffic varies and quality of service (QoS) is not consistent. Information being transmitted is in contention with other traffic and is not guaranteed fixed bandwidth.

continuous presence - "Hollywood Squares" or multiple squares (usually four) on one television monitor, displaying a different site in each square. This feature is built into the Polycom MP and some other units or your bridge provider can provide it as a service within your videoconference.

D

desktop videoconferencing - Using a personal computer to videoconference. See also room-based videoconferencing.

dial numbers (dial-up numbers) - The phone numbers assigned to the videoconference unit. There are two phone numbers at a minimum, six at most, but most units only require you to dial the first number to make a connection.

document camera - A camera on a stand that functions similar to an overhead projector and allows the display of paper-based materials, transparencies, slides, photographs, and any 3-dimensional object.
far-end, far-site - Refers to the videoconference site you're connected to (YOU are the “near-end” to yourself, THEY are the “far-end”).

far-end control - Refers to when you control the videoconference equipment at a site other than the one you are physically located at. Can only be used in point-to-point videoconferences and only if that option is enabled on the equipment at the far-end.

gatekeeper - In the H.323, IP network videoconference world, the gatekeeper provides several important functions. First, it controls access to the network, allowing or denying calls and controlling the bandwidth of a call. Second, it helps with address resolution, making possible email type names for end users, and converting those into the appropriate network addresses. They also handle call tracking and billing, call signaling, and the management of gateways.

gateway - Equipment that allows videoconference equipment on one network (e.g. ISDN sites) to talk to videoconference on another network (e.g. LAN-based sites). A linking providing communication between two different standards such as H.323 and H.320.

H.261 - ITU-T standard for video coding for videoconferencing. H.261 is a discrete transform (DCT). Based algorithm for video in the 64 kbps to 2 mbps range. All H.261 compliant video conferencing systems are required to support this codec.

H.263 - ITU-T standard for video coding within videoconferencing. H.263 offers better compression than H.261, particularly in the low bitrate range used by modems.

H.320 - ITU-T standard for videoconferencing over ISDN and fractional T1 lines. This mechanism provides dedicated lines with no contention with other network traffic. Two sites with equipment following H.320 standards should be able to videoconference regardless of the make or model of equipment.

H.323 - ITU-T standard for videoconferencing over networks that do not guarantee bandwidth, such as the Internet. Due to limited bandwidth and contention for bandwidth, quality of service (QoS) is not guaranteed and video performance is poor over long distances due to bottlenecks. Two sites with equipment following H.323 standards should be able to videoconference regardless of the make/model of equipment.
**H.324** - ITU-T standard for video conferencing over standard phone lines using a V.34 compliant modem.

**high speed** - Refers to a videoconference that is connected at a speed of 336 or 384 kbps.

**I**

**internet-based videoconferencing** - where the internet is used to connect the videoconference instead of ISDN lines. The most commonly used products are called **CUSeeMe** and **NetMeeting**. The benefits are that there are no long distance costs, the downside is that internet transmission speeds are not consistent so you may only receive one video frame per second, not moving video.

**IP** - The Internet Protocol. IP is the basic language of the Internet.

**IP multicast** - A system for sending IP transmissions out only one time, but allowing for multiple users to receive it. This reduces bandwidth required for audio and video broadcasting over the Internet, but it is not widely used.

**ISDN** - Integrated Services Digital Network, basically a digital telephone network.

**K**

**KBPS or kbps** - Kilobits per second, the speed at which data (video and voice) can travel over telephone lines.

**L**

**LAN - Local Area Network** - Network of connected computers and printers in an office.

**LAN -based videoconferencing** - Where a local area network or a wide area network are used to connect the videoconference instead of telephone lines. This eliminates long distance ISDN costs.

**loopback** - A test number that sites can dial which transmits their own site's image back to themselves. This function is used to test whether a site's network connection is functioning or not.

**low speed** - Refers to a videoconference that is connected at a speed of 112 or 128 kbps.
monitor - A television or computer screen.

multipoint - A videoconference involving three or more sites. Some hardware provides internal hardware/software to link more than two sites in a videoconference. External bridges may also be ordered to provide videoconferences with three or more sites. Bridges can typically handle differences among communication mechanisms as well as equipment.

multipoint bridge – A device used to connect multiple sites into one videoconference. This service is purchased from a bridge or service provider.

mute - Each site is equipped with the 'mute' function, either in the form of a button that is pressed on the remote control or keypad operating the system or on the microphone itself. When your site is 'muted' no one else can hear your audio. Having all sites except the presenting site on mute improves the audio quality of the videoconference by blocking the noise of paper shuffling, pencil tapping etc. and eliminates unnecessary switching of the camera from site to site in response to sounds (see voice-activated switching).

near-end; near-site - Refers to the videoconference site you are at (the other site is the far-end or far-site).

picture-in-picture - When a television monitor displays a small picture of a different image than the one being displayed full-screen. In videoconferencing picture-in-picture is often used to avoid having two monitors. The far side is often full screen with the near side picture-in-picture.

point-to-point - A videoconference involving two sites.

pre-sets - Refers to the ability to preprogram camera shots so that with the press of one button the camera will zoom/pan/tilt to a previously arranged camera position.

pre-test - The time immediately preceding the start of a videoconference where sites connect and check audio and video levels with each other.

protocols - The signal standards or etiquette of videoconferencing.
**Q**

Q&A - The question and answer period during the videoconference.

**quality of service (QoS)** – Refers to the maintenance of constant quality of transmission lines for signals such as compressed video and audio. Videoconferencing using ISDN lines usually maintain QoS while internet videoconferencing does not.


**R**

RealAudio - A proprietary system for streaming audio and video over the Internet. Also supports real-time broadcast of audio and video programs. Many radio stations broadcast on the Internet using RealAudio.

**real time** - A transmission that occurs right away, without any perceptible delay. This is very important in videoconferencing, as significant transmission delays will make the system unusable.

**remote control** - The handheld device used to operate the videoconference unit.

**room-based videoconferencing** - Using a videoconference unit that is designed solely for videoconferencing. Unlike a desktop computer unit where the computer is used for videoconferencing and a host of other applications, a room-based unit does only videoconferencing.

**S**

**screen** - A television or computer monitor.

**site** - See videoconference site.

**satellite downlink** - Refers to a site with a satellite dish, used to receive videoconferences but it is usually one-way and participants use a telephone, fax or e-mail to ask questions or interact with the presenters. If you have a satellite dish at your home it is technically a downlink site.

**satellite uplink** - The process where the videoconference signals are sent to a satellite orbiting the earth and then broadcast so that satellite downlink sites can pick it up. This process usually requires the use of either a studio (ie. Knowledge Network) or the rental of a satellite uplink truck from a local television station. This process is expensive but does provide for two-way interaction, though with a delay of one to two seconds from when people speak to when you hear them.
**streaming media** - Sending video or audio over a network in streams as needed, such as Real Audio/Video or Microsoft *NetShow*, instead of forcing the user to download the entire file before viewing it. Typically, a few seconds of data is buffered in case of network transmission delays. Although some data is buffered to the hard drive, it is written to temporary storage and is gone once the viewing is complete. Due to limited bandwidth and traffic contention, videoconferencing streaming is not synchronous as there is a time delay of several seconds or more from the live event.

**synchronous** – Interactions occurring at the same time; simultaneous. A message is sent and responded to immediately as in a conversation. An example would be a chat or videoconference.

**T**

**T.120** – A standard used for sharing desktop applications for computers. Provides protocol for windowing, control of windows, and permissions to view and change desktop files.

**teleconferencing** - Two or more people who are geographically distant having a meeting of some sort across a telecommunications link. Includes audio conferencing, video conferencing, and or data conferencing.

**V**

**videoconference** - A conference call consisting of two or more sites with the ability to communicate via video and audio.

**videoconference site** - An office, building, boardroom or classroom with videoconference equipment and the necessary ISDN lines, a minimum of two 56 kbps lines.

**video on demand** - Being able to view any number of videos when you want to. Used on the Internet and at hotel, cable systems, etc.

**video server** - A computer that has been designed to store large amounts of video and stream it to users as required. Usually a video server has large high speed hard disks and a large amount of network bandwidth to allow for many users to simultaneously view videos.

**voice activated switching** - When a site makes a noise (speaks, sneezes, bangs on the table, etc.) the video for that site will appear on the other site's monitors. The site making the loudest noises will appear on screen which is why microphone muting is so important.
webcast - When a videoconference (of any type) is broadcast over the Internet. People wishing to view the videoconference from their computer must download a 'viewer' (usually at no cost) to watch the videoconference and hear the audio. The computer used for viewing must have a sound card and speakers. The webcasting service is usually purchased from a company specializing in webcasting although it is possible to purchase units that perform this function. People viewing from their computer usually access the webcast through a link on a web page. They are not able to interact with the main videoconference unless arrangements have been made for a phone or fax number or an email address where questions or comments to the main videoconference can be made.


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