

# **Polycom® Guide to Conferencing and Collaboration**



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In an increasingly global, fast-moving, knowledge-based economy, organizations must react to change by processing information and making decisions quickly. At the same time, they must cut the costs of doing business as the global slowdown maintains its stranglehold and travel becomes more difficult, more complex, and less convenient.

More than just another technology, video conferencing and collaboration, together with data sharing and collaboration, allow increasingly dispersed organizations to pull their human and information resources together to create new ways of working, interacting, and responding to customers and partners.

Huge sums have been invested worldwide on computers and the communication networks that link them together. Now, organizations are focusing on getting even better returns from that massive outlay, with new applications that can bring real business benefits.

Near the top of that list is conferencing and collaboration. The demand for real-time, high-quality communication tools is driving the growth. No longer just a way to hold telephone-style conversations with pictures, video and data conferencing exploits the power of the underlying technology to build stronger, more impactful organizational networks.

- Networks of people
- Networks of information and ideas
- Networks of expertise

## Virtual teams replace the traditional workplace

Today, geographically dispersed work teams are the rule, not the exception. Video conferencing (VC) offers the benefits of face-to-face communication without the inconvenience, wear-and-tear, unpredictability, and expense of traveling to a meeting. But it doesn't just displace travel—it is a better way of communicating for all but the most exacting interpersonal contacts. The fact is that speech is only a small element of human communication. Without a visual dimension, conversations can do little more than facilitate information exchange. That's because research shows that approximately 80 percent of what is communicated when people interact is conveyed visually—through body language, gestures, facial expressions, and other visual nuances. And people better understand, and remember more, of what they see than of what they have only heard.

## How do organizations benefit?

Video conferencing is usually adopted by an organization for a combination of three productivity-enhancing reasons:

- To reduce the need for people or work teams to physically reside in the same place.
- To enhance teamwork and collaboration within large organizations by engineering a high level of intimacy and interactivity.

- To actually collaborate on a document or graphic creation, with insertions, deletions or alterations made to a document by any participant, in real time.

As a result, executives report such benefits as faster decision-making, improved employee morale, improved access to the best talent, reduced time to market, better customer responsiveness, more efficient work practices, fewer concerns about travel problems, and a greater focus on results overall. And, of course, measurable cost benefits accrue as travel, accommodation, and entertainment expenses are significantly reduced.

## So, who does it?

Today, people from a wide variety of businesses, educational institutions, government bodies, healthcare facilities, and many more all benefit from video conferencing and collaboration. Regardless of size or location, today's technologies are within the grasp of any organization. Also, conferencing is no longer confined to executive boardrooms. Price reductions and connectivity improvements make it available to any conference room, desktop, or home office.

## What technology does conferencing involve?

IVC systems use video cameras, microphones, display monitors, and processing technology to create virtual meetings between geographically dispersed participants. Conferences involve the ability to

see and hear other participants and increasingly, to share data, presentations, and anything else—prototypes, scale models, samples—that are brought to the meeting. Video conferences can be conducted either point-to-point, meaning two locations are connected in the call, or multi-point, meaning more than two sites are on the call at one time.

Today's growth in conferencing and collaboration is real and sustained, with more people in the U.S. now meeting electronically than in person. Research commissioned by Polycom has confirmed that unrelenting market pressures combined with security concerns have jolted business people into reassessing the role of conventional in-person meetings.

This has resulted in a strong upsurge in usage of all the collaborative applications — voice, Web, and video conferencing. Wainhouse Research polled more than 700 U.S. business travelers in July and August 2002, and found that for the first time, technology-enabled meetings were more popular than in-person meetings. Before 9/11, in-person meetings accounted for 54.2 percent of meetings; post-9/11 in-person meetings decreased 16.3, percent to only 45.4 percent of meetings. This trend has continued as other shocks, such as SARS, have further limited the desire or ability to travel.

### **Several factors are promoting this accelerating trend**

#### **Evolution:**

Technology is changing the way people hold and share information. While seeing and hearing people are key elements of human interaction and thus of video conferencing, one of the most significant trends in group video systems is the ability to share data. Data collaboration standards (known as T.120) allow participants to display live PC content to other participants as the

conference progresses. This means everyone can view and work off the same presentation, spreadsheet, or any other image or document, while still being able to see all participants in the video call.

The popularity of this sort of collaboration reflects the degree to which knowledge workers and managers have moved from paper and filing cabinets to electronic documents and data storage. Without a networked computer application, however, electronic content is actually difficult to share and collaborate over, even when participants are in the same room. A video conferencing system, on the other hand, can often provide a rich and effective collaboration environment, even though participants may be thousands of miles apart.

#### **Revolution: More cost efficiency**

The rapid development of information technology has not only changed the way information is stored and processed, it has also significantly lowered the costs and improved the effectiveness of video conferencing technology. Since 1998, the prices of video conferencing endpoints have dropped ten-fold.

Cost, picture and sound quality, and ease of use have all greatly improved as a result of development work and increasingly powerful, lower cost technology. Just as important, the emergence of IP as the pervasive network technology for local area networks

(LANs), wide area networks (WANs), and the public Internet promises standard connectivity, making it easier to set up conferences on an as-needed, cost-efficient basis.

#### **Revolution: Dramatically changed business environments**

With technical hurdles to video conferencing mostly overcome, psychological and organizational barriers to adoption and use are now falling fast, as well. Video conferencing is no longer seen as just a cheap alternative to travel.

Companies understand that it can also help them address issues such as the dispersion of global teams, the need to make decisions and implement them within ever-shorter time frames, and the need to respond more quickly to intense competitive pressure. In addition, as cost, environmental, and security concerns heighten, video conferencing is also being seen as a more responsible option from a variety of perspectives, including:

- With the global business slowdown, prudent companies are acting to reduce their costs.
- Environmental concerns are increasing the pressure on companies to adopt green policies, including optimization of business travel which, it can be argued, contributes to global warming.
- Security and health concerns mean that organizations must be concerned about the well being of their employees. This increasingly means curtailing travel to certain destinations at certain times.

Not surprisingly, many organizations are promoting video conferencing as an alternative to air travel. Some companies already require employees to confirm on travel requisition forms that video conferencing is not an option for a specific trip.

## How is it done?

Video conferencing used to be complex. Today, easy-to-use and manage technology means that employees do not need to know very much about how the equipment actually works. What's important is what it can do, not how it works. VC systems have evolved into four main types, corresponding to the different types of conferences that people engage in. Each is appropriate in certain circumstances, for different types of organizations and VC applications.

### Appliance-like Group Systems:

Group systems were introduced in the late 1990s and greatly improved usability over legacy systems, which usually required a technician to manage the call. Based on the principle of a home appliance that is designed for a dedicated purpose and is very easy to use, these systems liberated and empowered video conferencing users. They are designed to sit on top of a standard TV monitor, and run over ISDN or IP networks. The camera and processing technology are in a box that can be controlled remotely through graphical, on-screen menus. Dialing calls, zooming in and out on both the near and far end, and troubleshooting are as simple as pushing a button. Additional connectivity options include the ability to hook up



extra microphones, a second or third camera, and more TV monitors. For data collaboration, PC interfaces may be used.

### Multimedia Conferencing Systems:

When sharing and working on documents is the highest priority for a business team, multimedia conferencing systems are the right choice. Characterized by PC-style interfaces, these systems enable users to easily incorporate collaboration tools into their VC sessions with point-and-click functionality. The systems integrate information from laptops, a local network, the Web, and devices such as document cameras, projectors, and VCRs into the video conference. They allow users to see both people and information live at the highest resolution all the time, regardless of where the data originates. They also can function as multimedia centers for local, in-room meetings that do not involve remote participants.

### Installed Room Systems:

Sometimes the room where the video conferencing is to take place, or the application itself, requires that a system be custom designed into the facilities. These are known as installed or custom systems. Executive boardrooms and classrooms are classic exam-



ples where such systems may be preferred. The "codec" for the system is separate from the camera and microphones so that it can be built into the cabinets of the room, and cameras and microphones can be placed strategically around the room for maximum impact.

### Desktop Systems:

Video conferencing on the desktop has also reached a critical juncture of acceptance. Previously, desktop conferencing was available in two extremes:

- Users could mount a small Webcam on a PC and run a software program, but these solutions suffered from poor sound and bad visuals due to a lack of processing power.
- Users could crack open their PCs to install video cards for a fully integrated system. These offered better quality, but were cost-prohibitive for mass deployment throughout an organization.



Today, a third product category has been introduced that offers professional, conference room-quality video conferencing on the desktop at a low cost and with greater ease of use. Personal video systems like ViaVideo®.

But, regardless of the structure of the equipment, elements for VC include:

**Cameras:** A camera at each site captures the picture to be transferred to the other site(s). Today, cameras range from tiny, basic PC-mounted cameras to highly sophisticated cameras that can pan, tilt, zoom, and even track speakers' voices automatically to make the experience of being in a video conference as lifelike as possible. Cameras can either be integrated into a VC system, or remain as standalone peripherals for customized positioning.

**Screens:** Some form of screen or monitor is needed to allow participants to view the video images of those at the remote end. These can be PC monitors, television or plasma screens, or dedicated video screens and projection units.

**VC Systems:** The engine of a video conferencing system, or endpoint, is a codec. This unit codes the analog signal into a digital signal, then undertakes the all-important task of compressing the video and audio streams. Without digital compression techniques, video conferencing would soak up unnecessarily large amounts of network bandwidth. As described above, codecs can either be set-top boxes that are integrated with a camera or separate, rack-mountable boxes that can be hidden away in an A/V cabinet and the camera(s) strategically placed for custom room fittings.

In addition, to enhance the capabilities of a conference, other components may be required:

**Gateways:** Designed to bridge different video conferencing systems' coding standards, enabling conferencing to be conducted between a variety of video conferencing types and networks.

**Multipoint control units (MCUs):** When more than two sites are involved in a conference, an MCU is required, and conference management becomes critical.

Some video conferencing systems have built-in MCUs that allow users to dial up to four parties into a call at the click of a button, and now some systems can handle optional internal MCUs that connect up to 12 sites. However, when multiparty, complex video conferences become popular within an organization, an external MCU is often recommended. These robust MCUs allow numerous conferences; each made up of several sites, to take place at one time. They also serve as gateways to facilitate cross-network conferences (for example, from IP to ISDN). They can carry out transcoding, which allows sites with different frame rates, connection speeds, audio algorithms, resolutions, and network protocols to transparently connect with one another. In addition, MCUs orchestrate sessions by

organizing (and allowing users to dictate) the appropriate display for each participating site, providing maximum viewing effectiveness.

### **Remote management: Happier users, happier IT**

As organizations' VC networks grow, the need for management of the systems increases. This traditionally has been the worst fear

of a company's IT department, and one of the arguments raised against large-scale deployment of video conferencing. However, many of today's systems have built-in diagnostics, so troubleshooting is easy and immediate. Should problems emerge during a conference, nontechnical users can even handle some troubleshooting. To provide the fullest management capabilities and troubleshooting with minimal IT resources, video management software is now available. These Web-based server applications allow a single network operator to view the activity and rectify issues with any number of video conferencing endpoints around the globe from one location. Additional management features include automatic registration of VC systems in a network directory (much like an e-mail address book); call detail recording (CDR) for use in internal billing or evaluation of usage; preferred VC system settings that can be sent remotely to newly installed systems to help

decrease set-up time and hassle; and other IT-friendly functions. End result: Users are more satisfied with their VC experiences, and the IT department can utilize its resources more effectively while reducing VC support costs.



IP network technology is the settled direction for global communications networks. As IP becomes the standard video conferencing technology at increasingly high speeds, it creates both opportunities and challenges.

The growth of broadband connection to the Internet is causing applications such as Web casting — where live, audio/video conferences are set up for everything from company financial results discussions to corporate seminars — to become highly popular. The everyday use of these applications makes conferencing and collaboration pervasive and accepted.

Until recently, full video conferencing took place primarily on circuit-switched networks such as ISDN, ATM, and leased lines. But now packet-based IP is gaining favor because it significantly reduces the cost of connectivity as well as conferring other benefits. By 2005, IP packet networks are expected to predominate in both the LAN (in-building), WAN, and public network domains. This will provide an alternative and, eventually, a replacement for ISDN connections. Beyond becoming the standard corporate data networking protocol, IP has also become the network layer protocol that is often deployed with broadband access services using DSL, broadband wireless, or optical fiber.

### Standards

The International Telecommunications Union (ITU) publishes a set of recommendations or standards for communications, most importantly H.320 and H.323 (see Glossary of Terms). Generally, video conferencing systems support three audio algorithms: G.711, G.722, and G.728. Video resolution standards are either PAL (25 frames per second or fps) or NTSC (the standard used in the U.S., Japan, and Taiwan, NTSC transmits video at up to 30 fps). Most of today's video conferencing endpoints (codecs) are standards-based to ensure interoperability among systems.

### Advantages

The ability to integrate VC into PC platforms (both at the desktop and in the meeting room) and use standard data networks to make connections between conferencing systems is very powerful. This enables video conferencing applications to scale with the growing corporate data network and public and managed IP networks, while sharing the economies of converged voice, data, and video.

The problem is that the packet networks (which IP orchestrates into a usable shared network) were not originally designed to handle time-sensitive traffic such as video and audio. That is because IP transmits data using a 'connectionless' approach, with packets contending as they progress through the network. At congested links, packets are queued. If the queue grows too

long, the packages are sometimes dropped, prompting the end systems to request retransmission. With VC, one-way packet delay of more than 150 milliseconds, jitter (uneven arrival of data), or dropped packets can badly compromise performance and cause periods of screen freeze, a change in the appearance of artifacts, (such as blank rectangles), or contribute to poor audio quality and synchronization problems.

### Controlling wayward packets

The consensus in the IT industry is that the performance of IP networks (both corporate and public) should be tamed through Class of Service (CoS) and Quality of Service (QoS) techniques. Properly deployed and managed, these enable priority to be given to time-sensitive streams of traffic (such as voice or video), overcoming performance problems.

Polycom, the video conferencing market leader, developed the iPriority™ initiative to replicate network-based CoS and QoS features by rebuilding and reordering packets, removing duplicate packets, or intelligently replacing packets that have been dropped.

Polycom's full, end-to-end video conferencing solutions give customers considerable advantages, since Polycom is able to support the broadest range of video conferencing end-points over networks. This is most important when it comes to interoperable features: the greater the range of

vendor equipment participating in a multisite conference, the less broad the conference feature set. Polycom, on the other hand, is able to support a wide range of enhanced features across its equipment platforms.

# Mission Accomplished: The Case for Conferencing and Collaboration

Successful organizations have learned that conferencing and collaboration must be built into their business models and culture, where it can provide real returns on both cost and organizational performance.

## **Treating Patients Around the Globe: Johns Hopkins International**

The world-renowned Johns Hopkins International has an ambitious charter – coordinate all international patient care, treat up to 3,500 patients per year, and conduct research and clinical trials with teams dispersed throughout the world. The enormity of this task, combined with the need to reduce travel time and costs, led to the deployment of Polycom video conferencing systems at the medical institution.

Video enables coordination with medical teams in other countries, as well as the ability to provide critical second opinions, consult with hospital management, and offer remote participation in promising clinical trials. Video is also used extensively for education and training. In a short time, the organization has seen tremendous results, including significant cost savings, less need to send medical teams abroad, and increased efficiency. As an added benefit, reduced costs and increased productivity are growing the revenue generated from international consultations. Johns Hopkins International's use of Polycom video is removing barriers to quality care and enabling the world to leverage the organization's tremendous array of resources.

## **A Blueprint for Communication Success: Barton Malow**

Barton Malow is one of the United States' largest and most successful construction companies, employing more than 1,500 people and generating revenues in excess of \$1.2 billion dollars. A need to limit business travel and become more productive—and thus more competitive—drove Barton Malow's decision to deploy an interactive video collaboration solution.

The core of the construction, architecture, and engineering business is in physical documents, so the company needed a solution that would combine sophisticated, high-quality image and document sharing capabilities with lifelike, face-to-face interaction. Polycom's iPower™ video collaboration systems fit the bill, offering the power of a built-in PC to allow users in different locations to share and actually work on applications and documents in real time during a video call.

Video use has surged at Barton Malow. In just four months, the company estimates it has saved close to \$100,000 through its use of Polycom systems. That includes direct travel-related costs, productivity gains, and the elimination of downtime and physical wear and tear associated with business travel.

## **A Perfect Fit: Fashion Company s.Oliver**

In the retail clothing industry, progressing from the initial design phase to finished products hanging on shopkeepers' racks is a breathtaking feat of logistics. For Würzburg, Germany-based fashion company s.Oliver, accomplishing this feat required 7,000 hours of travel in just one year. In any given season, every collection is presented not only to the company's seven showrooms and their teams in Germany, but also to a network of international licensees spanning four continents. In addition, whenever a problem occurred in the production process – from Hong Kong to Indonesia – someone had to fly there and sort things out. This was costly, time-consuming, and sometimes caused production delays.

Tasked with finding a communications solution to alleviate these problems, s.Oliver's IT department chose Polycom's iPower video systems. Now every step in the process benefits from the use of video communication: from supervising production to approving prototypes and presenting collections. The result? s.Oliver enjoys significant cost savings, increased productivity, and greater efficiency.

## **Cutting through the traffic: POSCO**

Korean steel giant POSCO first pioneered video conferencing in the late 1980s, as its rapid national and international growth made face-to-face communication between executives increasingly costly.

Not only was POSCO expanding, but the Korean economy was growing so fast that Korea's transport infrastructure couldn't keep up, so travel was difficult and time-consuming. Today, POSCO has a network of Polycom ViewStation® systems in ten sites in Korea, plus units in Tokyo and Beijing. The company integrated video conferencing deep into its executive culture, with managers making approximately 40 video conference calls every month, each lasting an average of 2.5 hours. As a result, POSCO identified significant savings in return on investment (ROI), improved management efficiency, and faster decision-making.

## **Building a conferencing culture:**

### **Bristol-Myers Squibb**

Global pharmaceutical company Bristol-Myers Squibb used an internal marketing campaign to ensure it was exploiting the full capacity of its legacy and new conferencing facilities. Since the early 1990s, the company used video conferencing primarily to enable its dispersed scientists to collaborate between 13 primary international sites. But legacy systems discouraged VC use — quality was poor, and communication specialists had to be present to run the sessions. By introducing 40 new Polycom ViewStation systems and internally pushing the benefits, the company was able to double usage. As a result, Bristol-Meyers Squibb believes it also increased the

## Mission Accomplished: The Case for Conferencing and Collaboration

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speed of internal decision making, since executives can now make spur-of-the-moment conference calls when necessary. The company also uses the technology for job interviews and to interact with alliance partners. Most importantly, Bristol-Meyers Squibb calculates that in just a year, the company saved \$2.4 million in productivity costs.

### **Overcoming distance: New Zealand Ministry of Education**

Video conferencing can enable organizations to form virtual groups for collaboration and learning that otherwise could not exist. And VC expands beyond business and research. New Zealand's Ministry of Education used Polycom's ViewStation MP system to link underprivileged or remotely located Maori students with qualified, Maori-speaking teachers. Before the initiative, New Zealand's sparse population and vast distances meant it was difficult to match teachers and pupils in viable ratios.

### **Building IP video applica- tions for its customers: China Unicom**

The use of advanced network technologies means that service providers can develop huge value-add service networks – such as video conferencing networks – at low cost. The services reduce the start-up costs of establishing in-house VC networks, and make VC more accessible to a wider array of users. China Unicom selected Polycom as one of its major system providers for the world's largest IP video com-

munications network, which covers more than 300 cities in China, including Hong Kong. Through cooperation with operators outside China, China Unicom plans to extend its business to other countries. The IP network technology allows video calls to be cost-effectively carried over the same fiber optic lines the company uses for Internet services. The IP network consists of seven major hubs and 23 minor hubs, and is scalable up to 100,000 users. "The new system will provide users with easy-to-access, easy-to-use, and cost-effective telephone conferencing and desktop video communication services, as well as multimedia applications in areas such as distance learning and remote diagnoses," said Mr. Liu Junjie, Vice President of China Unicom.

### **The problems of size: Liaoning Electric Power**

Liaoning Electric Power Company Ltd (LEPCL) is the state-owned power provider for China's Liaoning Province. To keep the power cables humming, it needs 38 regional offices and some 86,000 employees. Like many large, dispersed organizations, LEPCL was finding it difficult to implement an economical communications technology. Hour-long daily meetings for management teams were augmented by half-day full management meetings every month, which involved extensive and costly travel. In 2001, LEPCL decided to use video conferencing if the company could find a system within

budget. LEPCL Power installed an easy-to-use, state-of-the-art Polycom video communications system that saves on travel time and cost, while providing the all-important, face-to-face meetings necessary to build teamwork across the company. While video conferencing is widely used by multinational companies in China, this was the first time a state-owned enterprise there had embarked on an organization-wide video conferencing project. Several others subsequently followed.

### **Polycom. The only way to connect any way you want.**

Polycom designs and delivers the world's best-selling voice, video, multinetwork gateways, and multipoint conferencing solutions. And our products consistently earn recognition for their quality and ease of use. In fact, Polycom was named 2002 Conferencing Company of the Year by industry analyst Frost & Sullivan. And, only The Polycom Office™ offers integrated video, voice, data, and Web conferencing, so anyone can easily meet, connect, and collaborate at any time. Due to recent advances in technology, Polycom conferencing is easier and more affordable, while the quality is higher than ever before. In fact, many Polycom conferencing solutions pay for themselves in travel and time savings alone.

**Bandwidth**

The data-carrying capacity of a communication channel.

**BRI**

Basic Rate ISDN is the standard copper line ISDN service. It usually comprises two 64Kbs channels and a 16Kbs signaling channel. Improvements in video conferencing technology mean that good picture and voice quality may be enjoyed with just one BRI (providing 128Kbs by using both channels).

**Bridge**

An electronic device that enables communication signals to cross from one network circuit to another. Also known as a Multipoint Control Unit or MCU, which links three or more conference sites so they can communicate simultaneously.

**Codec**

Coder/Decoder is the device (or increasingly software), that converts analog pictures and voice into a compressed digital stream for its journey across the network between conferencing sites.

**Continuous Presence**

A display feature of video conferencing which allows each participant to see all parties (or a select number of parties) on the call at the same time, as opposed to just seeing the person currently speaking.

**Data conferencing**

Where two or more participants can share computer applications and data in real time across a network. Enables collaborative working.

**Gatekeeper**

A programmable IP network device that manages the flow of traffic across a network or between networks, and enables certain applications or users to be prioritized vis-à-vis the available bandwidth.

**Gateway**

Enables the connection of an H.323 conference to other networks, communication protocols, and multimedia formats.

**Interoperability**

The ability of conferencing systems and devices to work together with complete compatibility, especially with respect to features, functions, and performance. Standards-based technologies help ensure interoperability.

**ITU-T**

The Telecommunication Standardization Sector of the International Telecommunication Union. A United Nations body, based in Geneva, Switzerland, that governs standards for telecommunication.

**H.320**

ITU standards governing video conferencing standards across circuit-switched ISDN (see ISDN).

**H.323**

ITU videoconferencing standard for IP networks.

**IP**

Internet Protocol: the network protocol governing the Internet and increasingly accepted as the future standard for local, wide area and public networks for all traffic, including voice and video.

**ISDN**

Integrated Services Digital Network: Global standard for digital dial services, comprises Basic Rate (Two channels of 64kbit/s, see BRI); Primary rate (32 channels). ISDN extends digital telecom network out through the access network to provide end-to-end digital circuit switched services.

**Multipoint Conferencing**

Where more than two sites are involved in a conference. Requires a Multipoint Control Unit (MCU), either integrated or standalone.

**T.120**

ITU-approved standards for data conferencing. Specifies how documents should be moved, viewed, and changed in a conference.

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