WHITE PAPER

# VIDEO: THE BIG PICTURE

This technology's growth as a communication channel offers numerous productivity and cost-savings benefits.

## Executive Summary

Next to an in-person meeting, video is the most persuasive communications medium. Video communication takes advantage of a person's inherent ability to visually discern what others are saying based on body language and facial expressions. A video call restores the immediate clarity and feedback lost to years of audio-only telephone usage.

As video technology becomes more accessible, more people will use it to make video calls. A confluence of camera-enabled notebooks, smartphones and tablets combined with better wireless network capabilities has created a base of users that are willing to fire up the camera when they want to talk. This leads to more people becoming comfortable with video as a communications medium and ultimately desiring it in the workplace.

This video boom is taking place as organizations are collapsing and converging enterprisewide collaboration and communications services under the rubric of unified communications. At its core, a UC environment allows for data, voice and video to share a single network infrastructure.

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## Table of Contents

The demand for video communications in the workplace is a reality of modern business. Whether officially sanctioned or not, employees are using Skype, Google+ Hangouts, FaceTime and even personal WebEx accounts to talk face to face and collaborate for work.

Organizations stand to gain many benefits from deploying a well-planned and easy-to-use video platform. The challenge for IT departments is how to successfully deploy these platforms on their organizations' networks while controlling costs.

This white paper provides a practical guide to understanding and defining video communications needs, selecting the appropriate architecture, preparing the network and driving adoption.

But first, let's look at areas where video offers a clear return on investment.

## ROI No. 1: Increase Team Collaboration and Engagement

Effective communication is a requirement for an effective team. Historically, when a work team was given a high-value project with an aggressive deadline, its members would meet in the same physical space. They would work together in real time as a single, cohesive unit to meet their challenge.

A team that communicates face to face is less likely to waste time miscommunicating. Traditionally, placing a team in the same physical location was the best way to foster the clearest, most direct transfer of ideas while completing tasks.

But today, an organization's team members may be spread throughout world. A successfully deployed video communications platform provides a tool to bridge the distance. Geographically dispersed teams that use video regularly maintain the communication effectiveness that comes from seeing the people they are speaking with, while sharing the communications experience as a group.

Video also allows for more engaging meetings. Participants stay engaged and are less likely to multitask, which can lead to faster and more productive meetings.

A practical example of using a video communications platform to increase organizational effectiveness is during the hiring process.

In the past, organizations that wanted to have multiple managers and subject matter experts interview job candidates at far-flung offices were limited in their options. They could use multiple phone interviews over days or weeks to complete the vetting process, during which time the candidate might be snatched up by the competition. They could fly the candidate in, at considerable expense. Or, they could rely on just the local staff to interview the candidate, which could lead to undervetted candidates being hired.

Organizations with an integrated video platform, on the other hand, have a distinct advantage during the hiring process. Job candidates can simply visit the closest office and sit in a video conference room, where they can be interviewed by managers and subject matter experts from across the country or around the world.

Many organizations now see telecommuters or remote workers as a great way to reduce operational expenditures. In 2012, according to the U.S. Office of Personnel Management, approximately 25 percent of eligible federal employees worked remotely at least one day a week.

Every worker who is able to be productive outside of the office, even just once a week, reduces the demand and associated costs on an organization's facilities. And that's not all — telework also may actually increase employee productivity.

In fact, a 2012 Stanford University study found that contact center employees allowed to work from home increased their overall performance by 13 percent. Daily video communication also gives remote workers the face-to-face interactions essential to feeling like appreciated and productive members of the team. In turn, it provides their managers with an easy way to evaluate their morale and general productivity.

## ROI No. 2: Reduce Travel Costs and Employee Stress

Organizations place an intrinsic value on in-person meetings. Business travel for the sake of attending a meeting might take geographically separated parties across town, the country or the globe. But this is the least efficient and most expensive way for colleagues to meet.

The time spent travelling to and from a meeting often takes longer than the meeting itself. Hours or even days of productivity are lost to time spent in cars, planes, airports and taxis. The direct costs associated with business travel — flights, hotels, taxis, parking and meals — increase the cost of operations. In 2011, U.S. businesses spent roughly $90.7 billion on travel, according to travel market research firm PhoCusWright.

Along with the direct costs to an organization, business travel also takes a toll on employees. Constant travel can sap employee morale and job enthusiasm. Over the long term, this can affect employee retention and overall performance.

A successful video platform with a clearly defined usage policy provides most of the benefits of a face-to-face meeting while eliminating the travel. An employee could conceivably attend multiple geographically separate meetings in a single day, at significant savings to the enterprise.

Case in point: After spending approximately $1.2 million on video conferencing facilities and infrastructure, a multinational telecom company was able to reduce the number of business flights taken by its employees in a single year by 26 percent. Over five years, the company expects a total cumulative savings of more than $80 million.

## ROI No. 3: Optimize Training and Distance Learning

One of the easiest ways to recoup the investment in a video communications platform is to make it available for training and distance learning. Most curricula can easily be adapted to a video communications learning environment.

Using video for training and professional development provides two major benefits: First are cost savings achieved by avoiding travel. Second is the creation of a video archive of training sessions. Classes delivered by video can be easily recorded for future use, with the only cost to the organization being the storage of the video files.

Universities and colleges have led the way in the use of video for teaching and learning by deploying video equipment in their classrooms. The ability to simultaneously broadcast and record lectures has created new online learning opportunities for these institutions. The same infrastructure used for distance learning can easily be modified for recording and archiving business training and professional development classes.

## ROI No. 4: Connect and Support Customers in New Ways

As part of a greater shift from the audio-only call center to the multichannel contact center, video is slowly making inroads in customer service. Video in the contact center will most likely be deployed as part of a larger portfolio of real-time collaboration services, such as instant messaging and web sharing.

When customers call with a problem and are able to see the person on the other end of the line, it can build instant credibility and trust in a way not available through audio communications. Video use in customer service is a natural progression of the industry's current direction toward more personalized service. The use of video brings organizations closer to their customers and is the next best thing to providing a live person at every client location.

## ROI No. 5: Support Environmental Initiatives

Many organizations are taking voluntary or government-mandated steps to reduce the environmental impact of their business operations. The prevailing logic is by reducing environmental impact and waste, a business will also ultimately reduce its operating costs.

For example, BT (formerly British Telecom) is more than halfway through a 20-year plan to reduce its carbon dioxide ($CO_2$) emissions by 80 percent. Such goals spur organizations to consider the potential environmental benefits of new technologies and infrastructure. The adoption of video as a meeting and training standard allows organizations to quickly reduce their carbon footprint (and accumulate $CO_2$ avoidance credits) by reducing travel.

Further, some organizations analyze and model the estimated $CO_2$ offset as part of their business case when considering a video communications platform deployment. For example, consider a report by the nonprofit Carbon Disclosure Project, which estimates that an organization can reduce $CO_2$ levels by 2,271 tons over five years through the deployment of four telepresence video conferencing rooms.

## Design Considerations

The first step in deploying a video communications platform is to search through the organization and find the people and groups who will most benefit from the technology. Often, these individuals or groups don't understand how video will improve their work because the service doesn't exist for them yet. As the saying goes, "You don't know what you don't know."

### Building a Video Usage Model

The job of the video communications architect is to concisely describe the proposed use case and its benefits. He or she must illustrate how video integrates with the user's or group's job function and daily workflow.

Once the use case is agreed upon, detailed service requirements can be derived from it. If done correctly, the user or group will provide both valuable business drivers to justify the investment and specific technical requirements for the platform's design.

Once usage groups are identified, detailed business and technical requirements can be compiled. The final deliverable of a video usage model is a data-derived estimate that details the types, quantities and traffic flows of all anticipated video communications on the network. Understanding and documenting how the organization will use video, now and in the future, is a foundational step to an optimized design and successful deployment.

The model created by this requirements-gathering exercise will help define both the video platform and the improvements that may be necessary to the underlying IP network. The video usage model will uncover shortcomings in network readiness prior to deploying video. Therefore, accuracy is paramount.

## Make the Case

To help compile system usage requirements and illustrate benefits for a video communications project, first answer the following questions:

**1. What is the purpose of the video communication?**

Describe the purpose of the meeting and rate its importance to the business. Example: It's a weekly all-hands executive call — very important.

**2. Who will participate in the video call?**

Describe the number of video call participants and their roles. Example: The call will include up to 15 executive team members and up to three executive assistants, one of whom will run the call.

**3. Where will the participants be located physically?**

Describe the geographic location of all participants (if known). Example: Participants will join from three corporate locations (Dallas, New York and Los Angeles); some may join from home offices or while traveling.

**4. Where will the participants be logically located?**

Describe network-based location information for meeting participants, especially with regard to any firewalls. Example: Participants will all be internal; mobile and home office participants will connect via VPN.

**5. What devices will the participants use?**

Describe participant's video communications devices.

Example: Primary site participants will use room-based telepresence systems. Home office participants will use either a stand-alone, high-definition (HD) video conferencing system or a notebook with a web camera. Traveling users will connect via notebook, tablet or smartphone.

**6. How often will this meeting occur?**

Describe the meeting's usual schedule if it is a recurring meeting. Otherwise, work with the user group to estimate usage for the next 12 months. Example: Meeting takes place every Monday at 7 a.m. Eastern.

**7. What video communications experience do users expect?**

Describe expectations of the video quality and availability. Example: Executives expect HD video for onsite, fixed devices and standard-definition video on mobile devices. They expect 100 percent availability during business hours.

**8. What is the travel cost-avoidance associated with conducting this meeting via video?**

Describe the amount of cost-avoidance the organization expects to achieve by eliminating travel for the meeting.

Example: This meeting requires four executives to travel by air every week. The average cost for that two-day trip is $600 for each executive. The total travel budget saved by using video for this meeting would be approximately $2,400 per meeting.

**9. What is the carbon dioxide offset associated with conducting this meeting via video?**

Describe the amount of actual $CO_2$ offset the organization expects by eliminating travel for the meeting.

Example: This meeting requires four executives to travel by air every week. The average $CO_2$ created by that two-day trip is 664 lbs. The total carbon offset achieved from using video for this meeting would be 2,565 lbs. per meeting.

# Choosing a Platform

When deploying a video communications platform, there are a variety of video-capable endpoints to consider. Some are dedicated video endpoints, while others are video-capable multipurpose devices.

The early definition of device types supported by the video platform will help focus the design process and optimize the final architecture. Each device has different capabilities and may require different network and design considerations.

**Immersive and telepresence:** These devices provide the closest thing to an in-person meeting that can be had over video. They consist of multiple HD cameras and large-screen displays in a dedicated, specially configured conference room. They provide users a lifelike meeting experience complete with dynamic directional audio and video communication.

The video quality of these devices is comparable to watching an HD television channel. Telepresence devices also require the most bandwidth for video conferencing, with some multiparty units requiring up to 20.5 megabits per second. Traditionally, these units are used for multiuser (up to 16 participants) executive and VIP video conferencing needs.

**Room-based and dedicated:** Dedicated video conferencing devices are capable of providing a very good video experience. These devices can provide either standard or HD video conferencing and can be deployed as a fixed, room-based system or on a mobile cart. The main difference between these and the more expensive telepresence systems is their limit of two screens and one camera, with no directional audio.

Dedicated endpoints tend to require less bandwidth than immersive systems. Some systems boast HD video streams at 512 kilobits per second. Dedicated units also usually cost less than their immersive counterparts. These endpoints are traditionally used as a dedicated video conferencing system in general-purpose conference rooms. They usually support up to eight in-room conference participants.

## Endpoint Comparison Matrix

| Endpoint type | User experience | Participants per device | Mobility | Cost | Maximum bandwidth requirements (Mbps) |
|---|---|---|---|---|---|
| **Immersive** | Excellent | Up to 16 | None | $$$$$ | 20.5 |
| **Dedicated** | Very good | Up to 8 | Good[1] | $$$$ | 13 |
| **Hybrid phone** | Good | 1 to 2 | Average | $$$ | 1 |
| **Desktop or notebook** | Good | 1 to 2 | Very Good[2] | $$ | 2 |
| **Mobile device** | Good | 1 to 2 | Excellent | $ | 1.5 |

[1]Assumes mobile cart system; otherwise, none [2]Assumes notebook-based system; otherwise, poor

**Desktop and notebook:** Computer-based video conferencing endpoints are desktops and notebooks with an integrated or attached video camera and a software communications client such as Skype, Microsoft Lync, Cisco Jabber or Polycom CMA. These have similar capabilities to traditional stand-alone video conferencing endpoints at a significant cost savings. Client-based endpoints are most effective for individual users.

**Hybrid video phone:** These endpoints are a combination of traditional IP telephones and personal video conferencing devices. Their best feature is their ease of use. A user literally picks up the phone and dials to make a video call. They provide good-quality video to users who want simplicity, and they tend to integrate easily in single-solution environments.

**Tablet and smartphone:** Advances in mobile processors, the addition of high-quality front-facing cameras and better wireless technology now allow tablets and smartphones to provide video capabilities and integrate with most video platforms.

All major video platform vendors provide native iOS or Android applications that allow some level of video communication interoperability. The biggest advantage to these devices is their unparalleled mobility and general ease of use. Also, depending on an organization's mobility policy, these devices can be added to the video platform at very little cost.

## Core Components of Video Communications

All onsite video platforms require a central infrastructure to manage endpoints and facilitate video calls. Here are generic definitions of the most common core components:

**Video bridge or multipoint control unit:** An MCU provides the processing power to combine or bridge multiple video streams into a single video conference. Without an MCU, only point-to-point video calls are possible, and all video call processing would be done on the endpoints. MCU cost is usually the limiting factor in scalability.

**Video scheduler:** This device provides video conference resource management. All video platforms have a finite number of processing resources available. Each video conference usually requires a dedicated portion of an MCU. The more participants using the platform, the more resources required.

The video scheduler ensures video processing resources will be available for a given video conference by reserving them in advance. Poor quality or failed video conferences might occur when no video scheduler is available to guarantee that scheduled conferences do not exceed a platform's resources.

**Video demilitarized zone and border proxy:** These devices provide a gateway to video endpoints outside the organization. DMZ proxies securely bridge external video calls onto an organization's video platform.

They are roughly the equivalent of an MCU combined with a firewall. They dynamically open and close firewall ports to facilitate inbound and outbound video calling while also providing dynamic endpoint address lookup and conversion. Without them, external video calling would be a cumbersome, manual process.

## The Options

Many video conferencing system makers (including Cisco Systems, LifeSize, Microsoft and Polycom) offer video communications platforms. Each vendor has a unique vision of video communications and its value to an organization.

Selecting a platform suitable to an organization means understanding the major difference among platforms and their potential impact on video communications requirements. (A list of platform selection criteria is available in the *Platform Selection Criteria* sidebar on page 6.)

## Integrating Video with the UC Environment

Integration into an existing or planned unified communications environment is an effective way to increase video communications adoption and enhance user experience.

Traditional video communications as a stand-alone technology has existed for many years — mainly as a niche tool with poor adoption because of cost and difficult integration. This changed with the advent of UC and its ability to merge multiple, real-time communications methods into a single, easy-to-use interface.

### Platform Selection Criteria

**Video platform architecture**

- How is the platform deployed?
- Are the components traditional servers or dedicated appliances?
- Can the components be virtualized?

**Total platform cost**

- What are the hardware and software costs?
- What are the feature licensing costs?
- Will they change based on usage?

**High-availability features**

- What happens to video calls when various components fail?

**Number and type of natively supported endpoints**

- Does the vendor provide all the endpoints an organization needs?

**Use of open standards and third-party endpoint interoperability**

- How easy is it to integrate multivendor endpoints?
- Do the devices communicate using open or well-defined methods?

**Mobile device interoperability**

- What mobile options are available?

**Guest video calling interoperability**

- How easy is it for an external video caller to connect to an internal video endpoint?

**Out-of-the-box unified communications integration**

- Does the video platform easily integrate with popular UC platforms?
- What features are gained or lost by integrating?

**Vendor-specific capabilities**

- What platform capabilities does the vendor exclusively provide?

**Ease of support**

- Is the platform interface familiar to the support staff?

**Disaster recovery**

- How is the platform backed up?
- How quickly can it be restored in the event of a failure?

The most common forms of integration allow different types of video endpoints to connect easily to one another. With a single UC interface, a user can move quickly and seamlessly from an instant message to an audio call to a video call — all with the click of a mouse. For example, a user on a notebook with a Microsoft Lync client would be able to make a video call directly to a dedicated Polycom video endpoint in a conference room without leaving the Lync interface.

Most UC vendors have a preferred video communications platform, either their own or a specified partner's. Deploying the recommended video platform as part of a UC deployment ensures compatibility and eases incident resolution.

A video deployment that does not take the existing UC platform into consideration will not provide the best user experience and typically will suffer from lower user adoption.

It's also important to understand that integration with the UC platform need not be all-or-nothing. Integrated video communications can be made available to select groups of users based on need.

## Preparing the Network

Adding video or any critical real-time communications to a network exponentially increases that network's performance and availability requirements. Network degradation or outages that previously didn't interfere noticeably with daily functions will significantly disrupt IP video — small, formerly unnoticed network shortcomings will be literally seen and heard.

Before an organization adds real-time voice or video, it must evaluate the network's ability to support these services. Often, a third-party assessment is the best approach, as it allows a neutral expert to identify gaps and formulate a remediation plan. Third-party assessments can also head off interdepartmental riffs that may accompany internal evaluation.

### Assessing the Current Network

A video usage model is the first step in assessing a network's readiness. It lays out the anticipated number of video streams, their paths through the network and their bandwidth usage. The usage model also takes into account the physical location of video infrastructure such as MCUs or border proxies. These devices will represent distribution hubs for video traffic and must be planned for accordingly.

Comparing the existing network with the expected usage model will quickly highlight critical network links and components that may have shortcomings and need to be upgraded. The expected service availability level must also be considered when analyzing a network's readiness. If a high level of video platform availability is expected, then network high availability and redundancy must also be analyzed.

What follows are some common video communications readiness gaps, and how to correct them:

**Lack of quality of service on the LAN:** QoS configurations are an essential part of real-time voice and video services. A video-specific policy should be designed and deployed as part of a broader policy that includes voice and possibly high-priority data. QoS changes are software based and require changes in hardware only if existing equipment does not support QoS configurations.

**Lack of QoS on the wide area network:** QoS on the WAN is more important than on the LAN. WAN links are usually smaller and have a higher utilization ratio than their LAN counterparts. There are two requirements for adding QoS to the WAN: First, ensure the WAN provider is set up to prioritize traffic. Most WAN providers charge a premium for QoS. Second, create a WAN QoS policy that includes voice, video and possibly high-priority data.

**Lack of secondary connectivity on LAN devices:** A LAN expected to carry video should have at least two links to all network devices carrying video. The network should also be configured so that if the first link fails, the second link automatically activates with no manual intervention. Add secondary links to video-carrying network devices with a single connection.

**Lack of optimized routing and link-layer protocols:** The network's ability to detect a link or device failure and automatically switch between connections is as important as having multiple network connections. The optimization of Layer 3 routing protocols and Layer 2 link protocols dictates how fast the network can recover from an unexpected outage.

**Insufficient core performance or bandwidth:** Adding real-time video to any network link adds considerable bandwidth and performance requirements. This is multiplied exponentially when multiple video streams must traverse a network's core. Supporting high video communications usage may require an upgrade with newer hardware, faster processors and higher bandwidth links (such as multiple 10-Gigabit Ethernet).

**Inability to monitor network performance:** A network that supports video communications must be able to measure and report on its health and performance. Factors such as transit latency and bandwidth utilization must be constantly analyzed to ensure they remain within acceptable limits. A monitoring and performance reporting system should be used to capture and forward details about any critical video communications that degrades performance.

**Insufficient hardware support:** Support contracts are often overlooked as roadblocks to meeting internal service-level agreements. If a hardware maker's replacement window is longer than the internal SLA that the IT department has with organizational groups, it may be necessary to revise the external SLA with the hardware provider to account for the addition of critical real-time video communications.

**Insufficient WAN SLA:** The addition of video or any other real-time data communications is an opportunity to revisit the current WAN SLA and verify that it's sufficient to support the desired internal service levels.

**Insufficient Internet connectivity:** If the video usage model requires users to conduct video calls with participants outside of the enterprise network or via virtual private network, then the current Internet connection must be analyzed to ensure that it's capable of successfully supporting the new influx of video calls. Specifically, current link utilization, high-availability capabilities and firewall performance should be compared against the model's requirement estimates.

Finally, all remediation actions should be prioritized and organized into a video readiness roadmap or added to a larger UC roadmap. A single view of all the work that must be completed to prepare the network for video traffic will help advance the remediation and start the journey toward a successful video communications platform deployment.

# Adoption Considerations

Even the most well designed and masterfully deployed video communications platforms can suffer from poor user adoption.

User adoption is the final metric of a successful deployment. But unlike many issues faced by the IT team, low video adoption is not a technology issue. It's a cultural inertia and training challenge. The good news is both issues can be addressed with early planning and appropriate action during platform deployment.

## Changing the Culture

The first step is to identify trailblazers among the organization's stakeholders, and it's critical that top leaders be among this initial user set. When users at the top of the organization take part in the initial user group, it creates an environment that encourages all users to embrace the new tool.

The job of the IT department is to actively promote these users and their video communications usage. A structured adoption program will provide these users with praise and peer recognition for their video adoption behavior, which will encourage them to become internal advocates.

## User Training

User training is often overlooked as a cause of low or slow adoption. Because most IT professionals can easily operate dedicated video conference equipment and software, they might assume ease of use for others in the organization. Overconfidence in the user population's ability to tackle new video interfaces can lead to missed opportunities and drive down overall utilization.

User training should include operational instructions for all video devices, including telepresence, dedicated room systems, software applications and mobile devices. Training should also provide details about the organization's video usage policy, while encouraging users to find new ways of using the video platform.

Planning for training can begin as soon as the platform is defined and can be provided in house or acquired as part of the deployment program. The training should also include multiple delivery options: live training classes during or directly after deployment; computer-based training available at any time after deployment; and printed materials, such as laminated "cheat cards," at all video conference locations.

## Help Desk Training

Equally critical to adoption is support. The help desk staff must be able to immediately assist users from the get-go.

To prepare the support staff, organizations should provide two types of training. The first is standard end-user training for the video platform. This will enable the staff to respond to typical user requests. But the help desk also needs training on how to identify and appropriately troubleshoot a wide range of endpoint problems.

A well-trained help desk will reduce support calls to video communications administrators and increase user satisfaction.

## Administrator Training

A new video platform usually means new and unfamiliar technology for IT administrators as well. Even so, these administrators are expected to quickly diagnose and troubleshoot the new infrastructure on the first day of deployment. This creates a critical need to train and support the IT staff responsible for the video platform.

Administration training should take place well before any pilot deployment. The training should cover network transport design, QoS and lastly the video communications endpoints and platform. The administrator training must include the help desk agent training, with the addition of platform infrastructure specifics.

Without proper administrator training, an organization risks longer than necessary downtimes, missed SLAs and, most important, a poor user experience.

## Users Driving Usage

The ongoing challenge to a video communications platform — any new technology really — is to stave off usage fade.

If video use cases and polices are too rigid, usage will gradually decrease over time. This is a result of the natural changes that happen in every organization.

Leadership turnover, organization acquisition or divestiture, and a changing industry landscape all influence how work is conducted. Video usage decline happens when the platform does not adapt to the new realities of an organization's communications needs. New platforms spring up to meet the needs that video neglected, and video usage drops.

Organizations can avoid such a decline by soliciting and integrating new uses on a regular basis. For instance, maybe tablet-based video conferencing was not a requirement initially but becomes one when the organization launches a bring-you-own-device program. A continual cycle of fresh user input will keep the video platform relevant and well utilized over its life.

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