WHITE PAPER

# UNIFIED COMMUNICATIONS: CONFERENCING

Integrated audio, web and video technologies can enhance collaboration, increase productivity and decrease operational costs.

## Executive Summary

Technology can bring people together today in new and exciting ways. Planning, collaborating and training formerly required holding meetings at specific locations and times.

There's a high cost to working and learning this way, and even organizations with global scope or aspirations have to temper their vision to account for the reality of high travel costs. Various conferencing technologies offer new and sophisticated tools for collaboration without the need for travel, creating possibilities for rethinking communication.

There are three main types of conferencing: audio, web and video. Audio conferencing delivers a verbal communication channel for multiple people. It lets each participant on a call hear what the others are contributing to the discussion.

Web conferencing adds more information to the mix, allowing everyone to see documents, applications and any other materials a presenter wants to share with them. Video conferencing takes this one step further by letting people see one another during a meeting.

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## Table of Contents

Each type of conferencing offers a specific capability and enhances collaboration. Keeping this in mind, organizations should focus less on choosing between the various technology types and more on employing a mix of all three conferencing technologies.

This white paper examines the benefits of multimedia conferencing and looks in detail at the specific technical capabilities of audio, web and video conferencing. It goes on to cover how to build a network infrastructure that can support multimedia conferencing services.

## The Benefits of Multimedia Conferencing

Organizations deploy multimedia conferencing technologies, such as audio, web and video solutions, for very specific reasons. First and foremost, the technology saves money on travel and makes more efficient use of staff time.

It also projects an image of the organization as one that knows how to use technology to stay competitive in the 21st century. Most important, conferencing technology can directly effect an organization's productivity (and its bottom line) as a result of the following benefits.

**Improved collaboration:** Multimedia conferencing offers a way to bring people together for collaborative discussions: to share information, explore options, work together on documents and make joint decisions. No travel is required; all participants can work from wherever they are. Conferencing improves collaboration by enabling team members to meet more frequently and by encouraging contributions from those who would otherwise not participate because of high travel costs.

**Faster communication cycles:** The ease and speed of setting up a multimedia conference today helps collaborative teams work more effectively. Team members who don't work at the same location can build trust through regular communication and can more quickly resolve issues that might fester if left unaddressed for too long.

Other tasks can also benefit from video conferencing, such as meeting with job candidates who would otherwise have to travel for an interview. This both speeds up the process and presents the organization in a positive, progressive light to prospective employees.

**Reduced costs:** Team members in different locations now can meet from wherever they are, make their contributions and immediately return to work on other projects – with no travel time or expenses incurred. For an audio conference, staffers in different locations can meet at the appointed time; all they need are their phones. If the team requires richer interaction, such as the ability to view a spreadsheet jointly, it's easy to set up a web conference that team members can join from a notebook, tablet or smartphone.

### Conferencing's Green Tint

Think about it: If an organization has 2,000 employees commuting to the office every day, that's a big carbon footprint. One way to reduce those emissions and revisit how work gets done is to take advantage of conferencing technology.

Instead of requiring that every employee work from the office each day, administrators can work from home or from smaller regional offices on some or even all days. These employees can communicate with their colleagues using multimedia conferencing tools, including web conferencing for sharing information and documents. Similarly, regional managers who need to discuss options and make decisions can meet through video conferencing instead of flying cross-country.

Such changes can reduce an organization's carbon footprint and offer a host of other benefits, such as improved collaboration, reduced costs and greater organizational flexibility.

**Maximized office productivity:** Staffers can focus on their most important projects without losing time to travel for the sake of a short meeting. Government workers can juggle multiple priorities, gathering input from business leaders, community groups and other constituents without the unnecessary overhead of traveling for in-person meetings. And professors can offer office hours via conferencing for online students, students who work full-time jobs or any student for whom a visit to campus would be difficult.

**Reduced carbon footprint:** Most organizations today look to do business in an environmentally sustainable way, and conferencing plays an important role in helping reduce the carbon footprint by curbing travel. For example, if a global organization deploys video conferencing across all of its international locations, the result can be the equivalent of taking thousands of vehicles off the road each year. Demonstrating such sensitivity to environmental issues sends a powerful message to investors, advocacy groups and competitors.

**Support for flexible schedules:** Organizations increasingly work across time zones, countries and continents, which makes it difficult to find a time to get everyone together for a meeting during the workday. And within offices, childcare and other family responsibilities have brought changes to the traditional 9-to-5 workday. Conferencing technologies allow far-flung and flextime staffers to meet with their coworkers anytime, from anywhere.

**Enhanced external engagement:** Requiring face-to-face meetings with clients, colleagues, business partners and guest speakers can add to participants' costs. Using multimedia

conferencing instead makes everyone more efficient and also raises the organization's profile as one that's in step with the latest communication technology.

## Audio Conferencing

An audio conference allows multiple people to join the same call, regardless of location. Everyone can hear what is being said – just like in a meeting room – and can add to the ongoing discussion.

Participants require only knowledge of the time of the conference, the conferencing phone number and the meeting number to join. Meetings congregate when each participant in the session dials the phone number for the audio conferencing service. (In some situations, participants may connect via different phone numbers because they are calling in from different regions. But all of the numbers used to call in will take the caller to the same destination.)

Upon accessing the audio conferencing service, callers enter the meeting number that uniquely identifies which session they want to join. Many services announce that someone new has joined a meeting by either stating the person's name or sounding a beep.

The following are key features to look for in an audio conference service.

**High sound quality:** Because audio is the only communication channel participants use during the conference, a clear broadcast of everyone's voice is essential. Audio conferencing systems are built with specialized hardware and software to optimize sound quality – for example, a wideband speech codec that captures a greater range of the human voice.

**Call controls:** This feature allows participants to put themselves on mute in the event of loud background noise or other distractions. The meeting owner, or host, generally has additional call controls. Most hosts can mute participants or request assistance from a human operator. Some systems even offer a complementary interface that gives the meeting owner point-and-click call controls using a tablet or similar device.

**Security features:** For highly confidential audio conferences, additional levels of access security are available. For example, access can be secured by using a second number to identify the individual caller, or having a human operator connect a caller to the audio conference after confirming that his or her name is on the list of authorized participants. Another security option allows the host to lock the meeting to prevent anyone from joining once all authorized participants are connected.

**Recording option:** When meetings are recorded, the participants can focus on the matters at hand without having to worry about taking notes. The recording offers a transcript of what was discussed and agreed upon, and it can be posted to the team's collaborative workspace for future reference.

**Management and diagnostic features:** Audio conference management tools usually list the people on the call as well as any charges due for using the service and access to an operator. Diagnostic tools come into play when a caller finds it difficult to join the conference from their phone. If the audio conferencing system can't resolve the call-in problem, a common option is to have the system call that person to connect them to the meeting.

Many large organizations have their own internal audio conferencing setups, either as a dedicated system or as part of a telephony presence and instant messaging environment. If your organization has the expertise to run such a system and enough internal demand for one, the upfront costs are often quickly justified.

For organizations that don't want to fund their own audio conferencing infrastructure or that lack the expertise to make it work, using an audio conferencing service is a better approach. Organizations can pay for what they need and stay focused on their core missions.

## Web Conferencing

Sometimes an audio channel alone is not enough to support the required group dynamics. When people describe something during an audio conference, participants are at the mercy of the speaker's ability to offer precise detail.

Web conferencing is a complementary technology that gives participants the ability to view documents and images on their computer screens. There is still an audio component, but a visual element is added via each person's computer, tablet or smartphone.

A web conferencing setup should include the following capabilities.

**Document collaboration:** Participants can jointly view and collaborate on the same document, spreadsheet or slide deck. For example, a group of researchers working on a research proposal can set up a web conference and work together on the document simultaneously instead of e-mailing it around, asking for input from the other members of the group.

Changes made to the document are immediately displayed to everyone in the web conference. When a researcher wants to edit a line in the proposal following a verbal discussion, editing control is passed to that person, who then can make changes that are seen in real time by colleagues.

**Highlighting**: Participants can display the current view of an application to others in the web conference and highlight salient points using the mouse. This alleviates the onerous task of describing what the application is doing using words alone.

Instead, the leader can simply point and click to show what happens. The other conference participants can see what's happening on their own screens and give input, coaching and advice as necessary.

**Cobrowsing:** Team members can browse the web, intranet pages or business applications together. For example, a member can talk others through a set of web pages outlining the implications of a new government policy while illustrating the discussion by clicking on the pertinent links.

Team members can pass control to one another while browsing the pages and make suggestions for improving the content or the design. Everyone in the web conference gains the required overview and can revisit the policy pages later, on their own, with greater understanding.

**Shared whiteboards:** This feature is the virtual equivalent of a whiteboard in a meeting room that gives a shared place for the group to work – only in this case, it's not in a physical meeting room, but rather online and accessible from anywhere. It gives everyone in the web conference a place to write ideas, draw diagrams or sketch out a project plan.

**Polling:** Teams can get a sense of the alignment within the group by conducting polls. A group leader can post a simple question on the screen along with a list of multiple-choice answers.

Each participant in the web conference clicks the answer that best reflects his or her perspective, and the results are computed and shared with the group. Teams can use polling to determine whether the group has a shared sense of the next step or if further research, discussion and negotiation are required.

Web conferencing changes the dynamic of a collaborative effort from that of a collection of individuals working separately on a shared project to that of a group working together at the same time. Team members gain a deeper understanding of one another's perspectives by working this way.

In situations where there is only a short window for responding to a customer request, collaborating through web conferencing allows the team to respond quickly and effectively. Everyone can coordinate their efforts in the moment, rather than each member working and giving input in a vacuum.

### Going Mobile

Web conferencing started as a service for desktop and notebook computers, but with the recent proliferation of tablets and smartphones, providers have released applications for these devices.

Now, tablet and smartphone users can join meetings hosted by onsite services such as IBM Sametime or Microsoft Lync. Other services that have mobile apps include WebEx from Cisco Systems and Citrix's GoToMeeting.

The apps are generally free to install, making it easy for people to join a meeting. These apps are also well supported by Apple products (such as the iPad and iPhone) and by most Android devices.

### Beware the Subgroup

Creating subgroups in a web conference can lead to difficult group dynamics.

Subgroups occur when more than two people are together in person and join a web conference with other remote participants. The remote participants may be joining as individuals or as their own subgroups.

Difficulties arise when people in a subgroup have side conversations that are not shared with everyone else. This creates an unequal distribution of information – fine in a negotiating session, but not in a collaborative one. It can give the impression that remote participants are missing out on important information or that a subgroup is acting collectively against other participants.

For more effective results and to minimize the potentially destructive effect of subgroup dynamics, organizations can require that everyone join the web conference as an individual. This levels the playing field as everyone will have to work equally as hard to understand the discussion and then share information.

The question of whether to deploy an onsite web conferencing system versus using a service provider is similar to the choice an organization faces with audio conferencing.

If the organization has skilled IT professionals who can run such a system and the funding is available, onsite implementation can make sense. Using a service provider may be more attractive when there is an inconsistent demand pattern, numerous external parties are being used or the pay-as-you-go model is preferred.

Of course, a hybrid approach is also possible. Organizations with an internal web conferencing system still can use a service provider for meetings with external parties, thereby minimizing the risks associated with opening their internal IT network to those outside the organization.

## Video Conferencing

There's a purpose for audio conferencing, as well as a need for sharing data and applications through web conferencing. Although both play important roles in supporting collaboration, video conferencing adds a third, more personal approach. In a video conference, everyone can see their colleagues, enabling participants to read facial expressions and analyze body language during a discussion.

In higher education, professors can deliver lectures by video conference to remote students and engage in post-lecture

discussions with full interactivity. Senior executives and high-ranking government officials can meet with their counterparts at other organizations without the hassle and expense of travel.

There are three broadly defined approaches to video conferencing: desktop-based, room-based and immersive systems. What follows is a brief rundown of each option.

**Desktop-based:** In desktop-based video conferencing, participants have access to a video conferencing system that's available immediately in their work environment — usually at their desks. This can be a specialized hardware/software combination that includes a video camera and a means of calling other people. Organizations also can use desktop or notebook computers that have embedded cameras.

Integrated cameras are also available on most tablets and high-end smartphones. With these options, participants can call a one-to-one or small group video conference from where they sit, accomplishing high-quality interaction without leaving their immediate work environment. Team members who are traveling or are otherwise out of the office can stay in the loop, participating via notebook, tablet or smartphone.

**Room-based:** The emphasis with room-based video conferencing is on creating a working environment that's ideally suited for two or more small groups at different locations. The standard setup typically includes a large display (or multiple displays, if two or more locations are joining the conference), a high-definition video camera and high-fidelity microphones strategically positioned on the table to pick up conversation. Once the video conferencing call has been placed, each location can see and hear what's happening at the other location or locations.

## How Video Conferencing ROI Adds Up

Five managers have a regular planning meeting. Three of them fly in for the two-hour meeting — which takes three hours per manager each way.

| | Face-to-Face | Video Meeting |
|---|---|---|
| Meeting Time | 10 hours | 10 hours |
| Travel Time | 18 hours | 0 hours |
| Total Time | 28 hours | 10 hours |
| Time Saved (%) | | 65% |

Meeting by video reduces the total time required by 65%. Assuming a round-trip fare of $500 per manager, and an effective hourly cost of $100, cost saved per video meeting is $3300.


Standard features include the ability to zoom in on someone when they are speaking and to zoom out when the group as a whole enters a discussion. Groups that typically use a slide deck when working together can broadcast slides using the video conferencing system. And if the group works together on physical objects or printed materials, having a special camera for documents and objects in the room allows for concentrated focus on the item at hand.

**Immersive:** Also known as telepresence, these systems deliver a high-end, high-quality meeting experience. Telepresence systems work best when video technology and meeting room design are carefully blended. On the technology side, large, flat-panel screens (each focused on only one or two people), display remote meeting participants in full size. The video cameras are of a very high quality, rendering lifelike images.

By carefully coordinating the layout of the room, the selection of the seats and meeting tables (and even the décor), organizations can project a fully immersive experience. A common telepresence suite design includes a lineup of three large screens on one side of a table, with seating for up to six people on the other side.

This allows up to four groups to meet, with the people from each group appearing on their respective screen. Many organizations strive for a design that makes it appear that everyone is sitting around the same table.

Video conferencing is most frequently cost-justified by the opportunity for the organization to save money on travel. When an organization's staff is spread across multiple office locations, it's much cheaper to hold a meeting by video conference than to pay to fly the participants to a single location. Once hotel accommodations, meals and other expenses are factored in, it's often possible to recoup the upfront costs for a room-based video conferencing setup in two locations after just a few meetings.

Though cutting travel costs is often the initial driver for buying video conferencing equipment, deriving long-term value requires a thoughtful approach. Organizations can achieve long-term value by re-examining their business processes and redesigning them to incorporate video as a fundamental part of their operations.

They should start with processes that include lag time while people wait for meetings or other face-to-face sessions. Time to market expands one day at a time — or one delayed meeting at a time. Removing this lag time through video conferencing and other complementary collaborative technologies can help the organization derive long-term value.

When considering room-based and immersive video conferencing systems, organizations need to choose between building an onsite facility or contracting with a service provider. Onsite implementation involves the usual upfront costs and

ongoing maintenance and support issues, compared with a pay-as-you-go model when using a service provider.

Proximity is a significant issue to consider when choosing a service provider. If the provider's facilities are too far away, users may be less inclined to schedule conferences. Plus, the amount of time spent traveling to and from a conferencing facility directly offsets the cost savings the technology is intended to provide.

## Video Conferencing Use Cases

How might an organization use video conferencing to revamp business processes? Consider the following examples.

**Interviewing prospective new employees:** Instead of bringing applicants to a specific location for in-person interviews, video conferences can be used for at least the initial meeting. This lets the organization interview more applicants at a lower overall cost, and there is less disruption for everyone involved. It's even possible to run follow-up interviews via video conference, saving a face-to-face visit for when a job offer is expected.

**Staffing teams based on expertise rather than geography:** People with the right skills can meet through video conferencing for the necessary discussions and decision-making. This lets an organization use its best people, regardless of their location.

Such an approach is also especially useful for customer support. Each customer support team member can focus on their particular area of interest, deepening their expertise and strengthening the level of assistance they can offer customers.

When a customer needs help, the appropriate expert can meet with them through a video conference. This replaces a model that is geographically aligned, in which customers get whoever is available locally — possibly a support staffer without the necessary background and expertise. Other collaborative technologies, such as project spaces or audio and web conferencing, provide necessary complements to support such collaborative work.

**Scheduling expert speakers:** Video conferencing can be an especially powerful tool in education and government. Colleges and K–12 schools alike can use video technology to bring expert speakers to their students. Many colleges and universities use video conferencing as a way to open their educational programs to a global student body, and also as a means of offering their on-campus students international expertise without the need for travel.

Bringing in expert speakers via video conference also makes sense for government agencies that need to train staffers but can't afford travel costs. Plus, the interactive nature of conferencing lets participants ask questions of speakers, making training sessions more effective.

### How Video Can Bond a Team

Agile software development methodology strives to keep developers on a team in close alignment. Starting every day with a short planning meeting is central to the agile software development model.

The intent is for each team member to state what he or she is working on and to relate any stumbling blocks. All members of the team hear what their colleagues are doing, which gives them a higher-level view of what's happening beyond their own task list and allows them to offer assistance where needed.

Distributed teams working together over time and space can embrace the same principle in their use of video conferencing, holding short daily catch-up sessions to keep everyone on the same page. Video conferencing doesn't always have to be a formal affair; it can support the deep communication needs of distributed teams on a daily basis.

## Preparing the Infrastructure

As an organization makes greater use of multimedia conferencing for meetings, collaboration and business processes, the technology can quickly become mission critical — if conferencing isn't working, important work may not get done. For this reason, the organization must ensure that its network infrastructure can support its conferencing requirements.The real-time nature of the communications in audio, web and video conferencing sessions means that delays in transmitting data, from one location to another, are extremely disruptive.

In an audio conference, if the words are scrambled and hard to decipher, participants may not be able to understand what's being said. The conversation can become strained as participants ask for statements to be repeated, At worst, a conference might need to be supplemented with another channel of communication, such as instant messaging or texting.

During a web conference, if it takes too long for slides to refresh or application sharing is unbearably slow, the problems with the technology can prevent free-flowing conversation. And in a video conference, scratchy pictures or an unclear audio channel can shift the focus away from the meeting's key issues and to the technology's failings.

With conferencing, there are a number of network infrastructure variables to consider, especially the following.

**Bandwidth:** Ensuring sufficient bandwidth between conferencing locations tops the list. If there is not enough bandwidth, the organization will have to provision more from its service provider. Expect to need more bandwidth for video

than for other forms of conferencing. This is because of the large amount of data that has to flow between the different locations to create a meeting-like experience.

**Latency:** This is the delay inherent in a particular type of network connection. For example, for an Ethernet connection, the delay is around 0.3 milliseconds. This is much shorter than a DSL connection delay of 10ms to 20ms, which in turn is much less than the latency of 500ms for a satellite connection. If the delay in the organization's conferencing sessions causes problems, the IT staff will need to consult its network engineers about low-latency alternatives.

**Jitter:** Networks experience jitter when the reproduction of an audio or video message is mixed up because of timing differences between the sending and receiving ends. Organizations should strive to have as little jitter as possible. This can be accomplished through correct bandwidth sizing, the use of low-latency connections and Quality of Service (QoS) approaches.

**Availability:** For network infrastructure purposes, availability refers to the likelihood that a given conferencing service can meet the demands placed on it by prospective users at any point. If the system fails, reaches its usage limits or other factors constrain its ability to meet a specific demand, then it is "unavailable."

Maximizing system availability is an appropriate goal, but extremely high availability carries a price. Organizations must balance the need for high availability against cost and resource contraints.

**Manageability:** This refers to how easily a conferencing system can be managed by a trained IT professional. For example, a conferencing system would be considered highly manageable if the IT staff can set up new users in the organization's main directory service (such as Microsoft Active Directory) and then automatically enable them to securely use the conferencing system with the same username and password.

Another example would be an integrated system for reporting errors to the organization's main systems management program, rather than requiring a separate management console. Using a common systems management console simplifies the IT manager's job and reduces the complexity and likelihood of errors that multiple management systems can bring.

**Quality of service:** QoS techniques offer a common way to optimize the performance of applications, especially when real-time performance is critical to how applications are perceived by users.

With QoS, different applications receive different levels of priority on the network. Real-time applications (such as voice, web and video conferencing, for which latency and jitter can cause miscommunication between users) receive high-priority service through techniques that include packet prioritization and bandwidth reservation. Other applications with low real-time demands receive lower levels of priority.

**Infrastructure upgrades:** Organizations may also need to upgrade their local and wide area networks to handle the growing demands placed on the network because of the increased reliance on conferencing technologies. This may be as simple as installing faster network switches or purchasing a higher-bandwidth service for linking the organization's office buildings and remote locations.

Increased reliance on conferencing can also make a network upgrade a more complex and time-consuming proposition. If the organization has older cabling inside its buildings, an increased focus on conferencing may require upgrading the LAN cabling. In some instances, the IT staff may even need to use fiber-optic links to build a high-speed conferencing network.

The bottom line is that an organization must ensure that it has network of sufficient size and scope to support conferencing traffic. If conferencing is a new initiative, network engineers should be consulted regarding the size of local and wide area networks needed.

If the organization is embarking on the next stage of its conferencing strategy (for example, by adding telepresence rooms for executive meetings), then the infrastructure that is already in place may be sufficient. If it's not, the organization will need to move quickly to upgrade the network. The last thing IT decision makers want to do is kill conferencing's usefulness because of degraded service from a network that is no longer functional.

**Security:** Conferencing involves a host of security issues that require decision-making on the part of the organization and its IT department, driven by the nature of the discussions that are held using the conferencing technology. For starters, organizations need to decide on encryption. Most can rely on the default encryption technology included with their video conferencing system.

But meetings that involve sensitive, confidential or classified communications may require higher levels of encryption, as well as additional network technology to ensure a secure environment. Intrusion detection systems (IDS), for instance, can guarantee an encrypted communication channel for the duration of the conference and can monitor incoming requests to prevent access by unauthorized individuals.

Organizations that must maintain compliance with security regulations (for instance, those in the military, government or the financial services and healthcare sectors) should work with in-house security and legal advisers when evaluating a new conferencing system.

Organizational policies should dictate some security decisions: whether to automatically answer incoming calls, activate warning lights when microphones are on, use secure passwords or install conferencing equipment behind a firewall, among other considerations.

Regardless of the organization's conferencing infrastructure, its IT department should work closely with the service or technology provider to ensure that conferencing is set up and configured with security levels that meet the necessary requirements.

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