



# **White Paper**

## **Interactive Multicast Technology**

**Changing the Rules of Enterprise  
Streaming Video**

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*Gordon Daugherty  
Chief Marketing Officer  
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## Introduction

Time is probably the most valuable resource that businesses today consume in quantities, and there never seems to be enough of it. In a paper published by MCI, referencing a recent National Statistics Council survey about meeting behavior in America, they claim that 37% of employee time is spent in meetings, and that there are 11 million business meetings every day. This survey also indicates that attending a four-hour meeting in person can cost overall more than 16 hours of planning, traveling, meeting and follow-up. According to this report, traveling is the most expensive aspect of these personal meetings.

Many companies and institutions are turning to video-based applications to reduce travel costs, improve efficiency and extend the reach and range of all types of services. For years, videoconferencing has been the video application of choice for most companies. Videoconferencing is fully interactive, and is certainly the technology of choice for point-to-point conferences between two locations. However, when multiple locations must participate simultaneously (like a conference call), special networking equipment is required to bridge the participants together, similar to an audio bridge.

Many companies are searching for a complementary technology that is better suited for broad-based video communications. This technology is needed to reach hundreds or thousands of participants simultaneously - without complex configuration or management requirements. The technology they are turning to for enterprise deployment is IP Multicast. As an industry standard, IP Multicast exploits the ubiquity of the Internet Protocol (IP), which is by far the dominant networking protocol for data communication.

One of the biggest benefits of IP Multicast is its ability to stream audio and video to hundreds or thousands of users. The biggest pitfall is that all of these users must be passive participants. In other words, IP Multicast does not have a built-in mechanism for active interaction among the participants. This is where traditional videoconferencing has its biggest advantage - the ability to fully interact with the other parties in the videoconference.

VCON has changed all of this with an exclusive new technology called Interactive Multicast. It allows users, for the first time, to enjoy IP multicast, or streaming video with the true interaction that a videoconference gives. Interactive Multicast delivers the ability to multicast audio and video to participants using VCON endpoints or standard multicast viewers, while allowing any participant using a VCON system to fully interact during the conference. With Interactive Multicast, the source for an audio/video stream can be moved among the various participants during the multicast, allowing interactivity on an unprecedented scale. This award-winning technology from VCON delivers new, cost-effective opportunities for communication applications, and is particularly beneficial in corporate communications, training and distance learning settings.

This white paper describes the key technologies surrounding IP Multicasting & streaming video, and the solutions associated with deploying video applications on an IP network. As such, it is targeted primarily at the executive either considering or implementing an IP video deployment. As both a market share and technology leader in IP videoconferencing, VCON knows a great deal about deploying video applications on an IP network. This white paper breaks down the various deployment issues by describing how they apply to IP multicasted video and how they can be resolved. However, like many network design and deployment issues, there is no single solution that addresses all network topologies and configurations. Therefore, the issues and solutions described in this white paper should be treated as guidelines or design considerations. Ultimately, it is up to the network manager to make the final decision about how to best meet the service level commitments to his/her end user constituency.

## IP Multicast Technology in a Nutshell

When sending the same data to multiple users, IP Multicast is a technology that provides a workable solution to a real problem. Any form of network communication that involves the transmission of information to multiple recipients can benefit from the bandwidth efficiency of multicast technology.

In many ways, IP Multicast is analogous to broadcast television. In both cases, a single signal is transmitted for receipt by multiple participants. The participants effectively “tune in” to the broadcast. IP Multicast does this by sending packets on the IP network in such a way that they can be received by multiple desktop PC users.

An alternative to IP Multicast is Unicast. Comparing the two methods of transferring data to multiple users emphasizes the benefits of IP Multicast (see Fig 1). While the Unicast method sends multiple copies of data, one copy for each receiver, IP Multicast sends only one copy for all of the receivers at once. Thus, multicast transmission reduces the load on the network significantly, allowing multipoint conferencing to occur over any existing network infrastructure, typically with little extra cost or replacement of equipment. Bandwidth is more efficiently utilized, resources are saved, and video packets are transmitted with less processing.

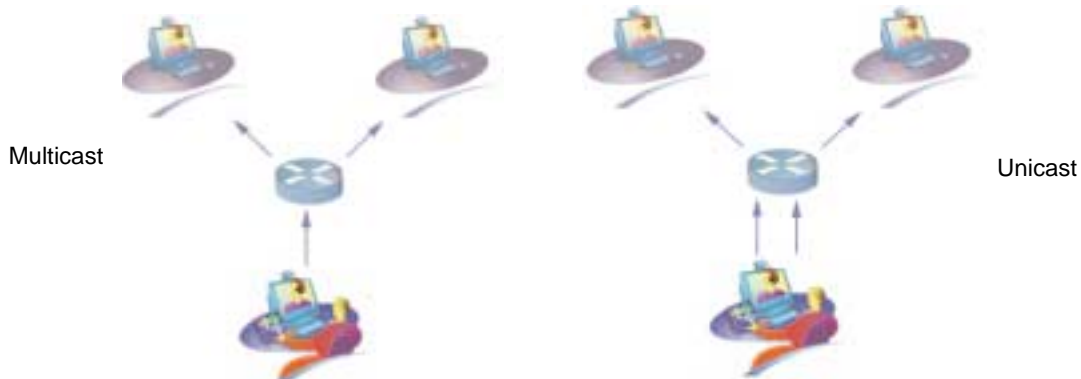


Fig 1: IP Multicast provides more bandwidth economy than Unicasts

## The Missing Interactivity: VCON Interactive Multicast

Applications such as all-employee announcements, corporate training and video-on-demand (VoD), are good examples for the immediate use and implementation of IP Multicast technology. However, videoconferencing is an interactive application by its nature. Participants in a multipoint meeting, a corporate training session, or in other distance learning applications (see Fig 2), expect to be able to interrupt the speaker and voice their opinions, or to raise a question from time to time. Even in the most organized meeting or well-behaved class the interaction between participants is desired and constructive. Therefore, any true multipoint conferencing solution should consider this need as well. Unfortunately, IP Multicast does not include this service in its standard form. VCON created a technology that keeps the advantages of IP Multicasting, while adding the missing interactivity for true visual meeting technology. The result is VCON’s Interactive Multicast technology.

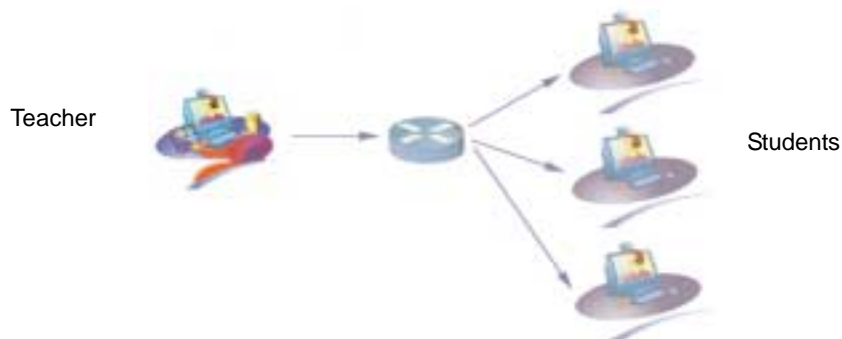


Fig 2: Interactive meeting, such as distance learning

### A Meeting Anatomy

In any organized meeting, there is a chairperson that controls and facilitates the flow of the meeting. We will use the terms, 'chair' and 'participants', to distinguish the role of the meeting's chairperson from that of the other participants. When the chair speaks, everyone else is quiet. Participants who wish to speak, gesture to the chair, such as raising a hand, to get the chair's attention without interrupting the flow of the meeting, and without drawing special attention to themselves. Sometimes this can be done by passing a note, with a short purpose statement or an explanation for the request to speak. The chair may receive, in short intervals, a number of requests to speak from different participants. The chair has both the responsibility and the authority to decide who will be permitted to speak next. We will use the term 'floor' to signify that the chair gives permission to a participant in a meeting to speak. The chair's role is, therefore, to pass the floor between participants. Taking back the floor from a participant and passing it on to someone else is included in this role. In extreme cases, the chair is entitled to remove a participant from the meeting. The chair can also summon additional staff members that were not present when the meeting was initiated. Finally, such a meeting may include participants from different locations by means of audio-conferencing and videoconferencing. Now, using VCON Interactive Multicast, the interaction between a large group of people over video can occur in a very similar way.

In Interactive Multicast, there is a Chair - the person that started the conference and is ultimately in control of who speaks, who joins the discussion and when the conference begins and ends. In many cases the Chair will also be the main speaker during the Interactive Multicast. The Participants in the conference have the ability to ask questions via text chat or to "raise their hands" by pushing a button and letting the Chair know they want to talk. The conference can be password protected, so that only authorized participants may attend. The conference can be open to multicast viewers, which allows a user with a multicast viewer on their desktop to dial the IP address of the conference, give the password if needed, then join the conference as a passive participant - able to see the "podium" being moved from Participant to Participant and back to the Chair - but unable to ask a question or speak in the conference. VCON's Interactive Multicast technology allows all of this within the confines of a video-based conference.



*Fig 3: The Chair (picture on the left) controls the conference; the Participant (picture below) can actively participate in the conference*



## **Convergence of One-way Streaming Video and Interactive Videoconferencing**

VCON is committed to improving the quality and manageability of Video over IP for group meetings. With this general goal in mind, VCON developed an interactive multipoint conference technology to be integrated with IP Multicast protocols – an approach enabling group meetings as part of a networked multimedia solution for an enterprise. VCON's Interactive Multicast technology is firmly embedded into VCON's 4th generation H.323 technology.

Interactive Multicast technology meets the following objectives:

- Enables group meetings over IP without decreasing network bandwidth as more participants join.
- Makes group meetings over IP as easy as setting audio-only conference calls, free of considerations such as the maximum number of users, or the total amount of parallel sessions that are running on a given network.
- Is a low-cost software option that is supported by all VCON endpoints, so anyone on a VCON network can participate.
- Allows efficient training over IP to remote users. With Interactive Multicast, VCON is enabling corporate training and distance learning over the global Intranet (such as university courses, virtual schooling, etc.).
- Converges one-to-many streaming video with real-time interactive videoconferencing. By doing so, VCON delivers two products in a single package, and the users can switch between these two modes of communication at will.

The five design objectives outlined above address many of the most significant inhibitors to mass volume deployment of video applications over IP-based networks. By applying VCON's Interactive Multicast technology, users can now, for the first time ever, ask the question 'when to deploy?' rather than 'should we deploy at all?' The benefits of doing business over IP with networked multimedia as its transport and front-end have been acknowledged. The convergence of one-way streaming video with two-way and interactive videoconferencing is the next logical step for any competitive enterprise today.



VCON Headquarters  
Ph: +972-9-959-0059  
Fx: +972-9-956-7244

VCON Americas  
Ph: +1-512-583-7700  
Fx: +1-512-583-7701

VCON Europe  
Ph: +49-89-614-57-0  
Fx: +49-89-614-57-399

VCON China  
Ph: +86-10-65269791  
Fx: +86-10-65269790

VCON France  
Ph: +33-155-840-175  
Fx: +33-155-840-179

VCON Germany  
Ph: +49-89-614-57-0  
Fx: +49-89-614-57-399

VCON Italy  
Ph: +39-06-545-50-217  
Fx: +39-06-592-09-24

VCON Spain  
Ph: +34-91-444-0900  
Fx: +34-91-444-0907

VCON United Kingdom  
Ph: +44-1256-316-586  
Fx: +44-1256-316-585

**[www.vcon.com](http://www.vcon.com)**