

RADVISION Technology at the Core of the Largest IP Network for Global Voice and Videoconferencing: ViDeNet (Part I)

Challenge

Once universities migrated from ISDN videoconferencing to IP videoconferencing, the new challenge became taking this communication beyond the local area network to interconnect multiple global sites making daily videoconferencing an effortless, intrinsic part of the workplace.

Solution

ViDeNet, collaborating with RADVISION and its Gatekeeper technology, can now manage, organize and effectively control this large-scale global network environment, making both point-to-point and multipoint videoconferencing between sites as easy and accessible as picking up a phone and dialing a number.

On ViDeNet, anyone can contact anybody anytime, for anything, from anywhere, with any device!

Benefit

- Dramatic cost savings by carrying telephone services over the data network saving on long distance and 'local' services.
- Cost saving on national and international Travel & Expenses
- Increased collaboration, communication and organizational effectiveness in everyday use to manage projects, teach students, troubleshoot problems, provide medical services, and talk with co-workers around the world.
- Innovation in communication services -moving service platforms off the telephone network and onto the IP network, creating an environment in which innovation is fostered at the same rate as the Internet and the Web.

Introduction

ViDeNet, the world's largest international H.323 network for voice and video conferencing between universities and research organizations, was created approximately five years ago by a consortium called ViDe, the Video Development Initiative.

ViDeNet brings together over 73 pioneering universities and other organizations that test and deploy voice and videoconferencing over IP networks. They promote ViDe's goals for highly scalable and robust networked video technologies that offer innovative new communication services, increase project teams' communication and dramatically cut telecommunications costs.

RADVISION's gatekeeper technology — the Enhanced Communication Server and Embedded Gatekeeper which is built into RADVISION's Multipoint Conferencing Units and Gateways— is at the core of the network, managing and controlling the majority of ViDeNet zones and making communication between those zones possible.

Enhanced Communication Server
(ECS-100, ECS-200, ECS-500)
RADVISION's family of Stand Alone Enhanced Communication Server is a powerful gatekeeper application for call control and system management for voice and video over IP networks.

Embedded Gatekeeper
Built-in gatekeeper functionality to RADVISION's MCU and Gateway products provides complete H.323 network control such as registration and management, address resolution, bandwidth control and more.

Multipoint Control Unit (MCU)
A device that bridges together multiple inputs so that more than three parties can participate in a videoconference.

Gateway
Gateways translates between circuit switched (ISDN) and IP (H.323) Networks.

ViDeNet's global H.323 network lays the groundwork for voice and videoconferencing implementation by carriers, xSPs and large enterprises, who can confidently look to the ViDeNet network architecture as a model for deploying voice and video services in today's demanding market.

"RADVISION stepped up unlike any other vendor to help build a global videoconferencing environment and learn from it," said Tyler Johnson, a leading engineer for the ViDeNet initiative. "Other vendors focused on building workgroup solutions, which don't scale to the kind of network ViDeNet needed. The extraordinary thing is, we are moving ahead in leaps and bounds in a real world environment, not a 'temperature controlled' laboratory".

Zone

A zone is an "administrative domain" managed or registered to a single gatekeeper. It can include any network or end-user device that "sits" on an H.323 network that has been aggregated logically (not physically) into a zone.

By participating in ViDeNet, RADVISION was able to improve its products based on real-world experience with a large, scalable network. RADVISION has observed how the network has worked in a production environment and has been able to incorporate changes into products, as well as providing valuable feedback to standards bodies.

ViDeNet Beginnings

The universities and research organizations that formed ViDeNet all had IP videoconferencing infrastructures within their organizations, but they were only able to conference within each university's local area network. Conferencing between universities was difficult and required extensive pre-arrangement because each zone had its own dialing plan, which was incompatible with the other zones.

Network administrators from these universities, together with RADVISION, created a common dialing plan that would link the various universities over the Internet, the Abilene network of Internet 2, or other data networks. Each university then became a zone within ViDeNet, most often administered by a RADVISION gatekeeper. Members within a zone could now easily call other members in any zone using the dialing plan.

Dialing Plan

The Dialing Plan is a way of addressing voice and video communications in an IP network. In order to allow easy communications between zones, the network administrators of each zone must agree upon a common dialing plan to be used in all participating zones. The "address" in a dialing plan designates which endpoint in which zone should receive the call. The dialing plan allows the gatekeeper to direct the call to the right zone and end point.

The former university "islands" are now connected into a global network. Anyone can communicate at anytime from any endpoint to anyone else on the network!

Current ViDeNet Network Topography

Today there are more than 73 zones around the world, with more than 60 percent of these zones run by a RADVISION gatekeeper. Because it wholly supports the H.323 industry standard, the RADVISION gatekeeper also interoperates with the gatekeepers used in the zones that don't use RADVISION gatekeepers.

"We implemented the RADVISION gatekeeper from the start and it is considered by many to be the best of what's out there. We anticipate continuing to use it as it keeps pace with the evolution of H.323 and the growth of the network," said Mary Fran Yafchak, IT Program Coordinator for Southeastern Universities Research Association (SURA), a sponsoring organization of ViDe and a ViDeNet member. "Although the RADVISION gatekeeper isn't mandated by ViDeNet because of our emphasis on standards, it is currently the gatekeeper of choice and also provides a high level of interoperability with other gatekeepers being used on the network."

Important links

- ViDeNet: www.vide.net/videnet
- RADVISION: www.radvision.com
- Internet 2: www.internet2.edu
- Abilene: www.ucaid.edu/abilene
- International Telecommunication Union (ITU): www.itu.int
- SURA: www.sura.org

The RADVISION gatekeeper application is essential for the management of real-time IP communication networks. It provides complete functionality for defining and controlling real-time voice and video traffic management over packet-based IP networks. Network managers set policies and control network resources, such as bandwidth usage, to ensure optimal implementation.

"ViDeNet wouldn't be as successful as it is today without the RADVISION gatekeeper and, more importantly, the close partnership and technical understanding RADVISION brought to the project," Yafchak said.

ViDeNet serves as a production test bed and research network to explore the real possibilities of videoconferencing over H.323 networks, as used in real-world applications. The global nature of ViDeNet gives the participating universities the opportunity to deploy videoconferencing on a larger scale.

Today, when telecommunications carriers are ready to implement videoconferencing services, networks like ViDeNet will have done much of their research for them.

The Gatekeeper Dialing Plan

One major step forward in implementing multi-organizational, multi-location videoconferencing is the dialing plan – the way video calls are routed to the appropriate person within each zone. ViDeNet, together with RADVISION, created a standardized plan for naming telephones, videoconferencing stations and zones on the network. This naming scheme includes both telephone-like numbers and email-like friendly aliases. Users on the old telephone network dial a unique telephone number and never need to know it's dialing into the Internet. Users at computer terminals can dial using a friendly name like John_Doe@jupiter.edu.

RADVISION's Intelligent Gatekeeper

Another step forward in the ViDeNet approach to videoconferencing is the emphasis on network-based intelligence. Conferences were previously limited by the controlling role of the endpoints: each user had to be online and at the endpoint in order to participate in the conference with no way to automatically forward or transfer video calls.

ViDeNet, focuses on the network. The intelligence resides in the gatekeeper that controls and sends calls to the appropriate endpoint. The gatekeeper also sends and receives calls from other zones, directing them to the right endpoint within each zone. With the intelligence residing in the gatekeeper, the network becomes more flexible. New features or changes in administration or dialing plans can be implemented at the gatekeeper level, so they take effect for all endpoints throughout the zone.

ViDeNet has taught a number of lessons about how large-scale videoconferencing works in the real world as opposed to the development laboratory. One area of particular interest has been network management where there was a single zone administrator responsible for monitoring and troubleshooting that zone. In a test environment, that scenario made sense because it meant that responsibility for the zone was well defined. However, in the large-scale ViDeNet environment, administrators learned that it was too big a job for one person when the number of users increased. Those lessons have been incorporated into RADVISION's advanced gatekeeper that now allows multiple administrators to troubleshoot, changing the administrative function to be run by a staff of support people rather than a single administrator.

RADVISION's intelligent gatekeeper also proved valuable when dealing with endpoints that have not integrated the H.323 standard in its entirety. The intelligent gatekeeper has to be able to adapt to implement policies that will work with non-compliant endpoints, accommodating them while still efficiently running the network.

The Master Gatekeeper

RADVISION's gatekeeper continues to evolve to meet the needs of large-scale networks. As the network of videoconferencing participants grows larger and larger, the gatekeeper needs to be able to scale to keep up with demand. The existing dialing plan of ViDeNet has relied on neighbor tables, lists of addresses of zones with whom the gatekeeper needs to communicate. This list is entered into each gatekeeper in the network. But now there are more zones than existing gatekeepers have room to hold. Maintaining and updating neighbor tables is also cumbersome for network administrators, resulting in poor network functionality.

To solve this problem, RADVISION developed a Master Gatekeeper for the ViDeNet environment. The Master Gatekeeper maintains a single, current, master list of all gatekeepers, enabling each zone gatekeeper to simply "point" to the Master Gatekeeper to get the most up-to-date list of available sites. To comply with redundancy issues in a global scale network like ViDeNet, there will be multiple Master Gatekeepers, in the event of network outage preventing access to any single Master Gatekeeper.

Moving forward

ViDeNet, Internet 2, and other large-scale H.323 videoconferencing implementations demonstrate that this kind of conferencing is viable for large networks. These networks can be used as the basis for networks operated by service providers and large enterprises. The efforts to create multi-institution dialing plans for university networks will make it easier for corporations and service providers to allow conferencing with other networks.

RADVISION's products - the ECS Gatekeeper, Embedded Gatekeeper, MCU and Gateway - used in these implementations, have received extensive real-world testing in the largest existing H.323 network. Not only have these networks demonstrated the ability to offer the kind of commodity videoconferencing a carrier or enterprise would most likely need to offer, but they've provided a space for the exploration of the technology, with new applications and uses that show the current and future development of videoconferencing.

In addition to resolving technical issues related to videoconferencing, these efforts are also addressing how the communications process is affected by videoconferencing. As more institutions interconnect, network engineers have to alter their preconceived notions of how the network will perform. They're using the technology to create a forum for discussing how videoconferencing should be more actively used in business, as well as how to better build and manage gatekeepers.

Just as the Internet grew from a way for academics to communicate into a global network that links individuals and businesses, videoconferencing is poised to move from the province of academic institutions to a viable service offered by large enterprises, based on the work of organizations like ViDeNet and participating vendors like RADVISION.

If you are interested in obtaining a
FREE DEMO VERSION of RADVISION's Gatekeeper,
please contact Info@radvision.com

RADVISION & ViDeNet - The Next Step: Internet 2 Adopts the ViDeNet Architecture for Internet 2 Commons and Other Internet 2 Applications (Part II)

Internet 2 is a consortium of over 180 universities working in partnership with industry and government to develop and deploy advanced network applications and technologies, accelerating the creation of tomorrow's Internet. Internet 2 is recreating the partnership among academia, industry and government that fostered today's Internet when it was in its infancy.

The primary goals of Internet 2 are to create leading edge network capability for the national research community that enable revolutionary Internet applications and to ensure the rapid transfer of new network services and applications to the broader Internet community.

Internet 2 Commons: Global IP Videoconferencing Based on ViDeNet Architecture

Internet 2 has a vision of enabling ad hoc one-to-one, one-to-group, or group-to-group videoconferencing for collaboration, personal communication, meetings, conferences, teaching and learning. This vision has become the Internet2 Commons initiative. "The Commons" will provide this as a service to its members.

The planned Commons videoconferencing service will primarily use the established ViDeNet architecture. RADVISION and several members of ViDeNet are playing an active part in the planning efforts for the Internet 2 Commons.

To this end, RADVISION became a corporate sponsor of Internet 2 and donated its new vialP multifunctional platform providing cost-effective solutions for the IP communication requirements of service providers and large enterprises. The vialP integrates multipoint conferencing, data collaboration and gatekeeper intelligence into a single platform.

Ohio State University, spearheaded by Bob Dixon, Chief Research Engineer, is playing a leading operational and design role in the Commons, hosting nine stackable RADVISION OnLAN standalone MCUs and the new RADVISION vialP, as well as a loaned Accord MCU, giving a total of 179 conferencing ports. As in ViDeNet, each site participating in the Commons has its own gatekeeper.

Global Videoconferencing – The Megaconference over Internet 2

Megaconference is an annual event to demonstrate the power of global, large-scale videoconferencing. It is a multi-site conference using videoconferencing technology to bring together universities from all over the world in the largest Internet videoconference ever.

For a short time during the Megaconference, a massive videoconferencing network is created by linking together gatekeepers and conferencing units at all participating sites. The first Megaconference, held in 1999, was a demonstration that linked the 60 sites as participating universities presented songs, dances and skits. The second Megaconference was the first totally virtual conference track in which 13 speakers from around the world interacted with audiences at 100 participating sites. The third Megaconference, scheduled for October 2001, will go beyond global, with participation from the International Space Station. The conference will also test the network's ability to support smaller conferences within the large conference as groups split off around the world to work on creative problem solving, then rejoin the larger conference to present their results. The majority of universities participating in Megaconference use RADVISION MCUs for these events. For the purpose of Megaconference, a chain of MCUs is cascaded into an ad hoc network and programmed to work together and talk to the RADVISION Gatekeeper that controls the conference.

Distance Learning over Internet 2

Videoconferencing has practical, real-world applications that are having an immediate impact. Several universities have collaborated to provide graduate-level courses through distance learning and collaborative teaching over ViDeNet. These courses are in subjects that might not attract enough students at a single university to provide a full-scale curriculum. By joining forces, universities are able to offer real-time classes taught by experts in other universities. This is a regular use of conferencing, in much the same way as an enterprise might use videoconferencing for regular business meetings.

ViDeNet has created a community of learning for groups that may have otherwise been isolated. The Center for Islamic Studies on ViDeNet is one example. There might only be one or two scholars in Islamic studies at each university, but ViDeNet has allowed all of these scholars to collaborate on research, to conduct virtual conferences and to enhance coursework in the subject matter. Once the network was provided, people found ways of using it to form an energetic group that has enhanced scholarship for many universities.

Videoconferencing also extends opportunities to younger students. Schools that serve grades kindergarten through 12 can now join Internet2 through their state networks. Museums and libraries also have joined this effort to create an "education intranet." Many of these efforts rely on existing MCUs owned by the school districts. Because many of these conferencing units were ISDN-based, they can use RADVISION's VIU interface to connect these ISDN-based conferencing systems to an H.323 network so they can interact with other organizations through Internet2.

Business and Interpersonal Communications

Although these more formal initiatives get the lion's share of the attention, the primary use of ubiquitous videoconferencing is to connect groups of people who are geographically separated. Small video meetings of two to three people are an everyday occurrence. People use videoconferencing to collaborate, share ideas and make business and operational decisions. Communicating by video instead of just by phone makes the interaction more personal. The discussion and decision-making process by videoconference is closer to that experienced by people who meet in person.

Just as e-mail moved from a tool used by a few engineers to an integral part of day-to-day business life, videoconferencing is becoming more of a tool in the everyday process of working with others to increase productivity, enhance communication and collaboration, and save time and money on travel.

For more information, please visit:

www.internet2.edu
www.mega-net.net/megaconference
www.ucaid.edu/abilene

UPDATE: LOAD TEST, July 25, 2001

A load test was done in preparation for the Megaconference III and The Commons service. All users worldwide were invited to connect to the RADVISION viaIP 50-user capacity and two Accord 30-user capacity MCUs, via the Internet.

User connected with all kinds of endpoints, mostly Polycom ViaVideo and Viewstation, but also some Zydacron, VCON and Tandberg products.

There were also four RADVISION VIUs, connected legacy ISDN-based systems to the network.

"The RADVISION viaIP 50-user capacity performed flawlessly! We captured the ViaIP display showing all the 50 users, and maybe that is something we need to frame! "

*Bob Dixon
 Chief Research Engineer,
 Office of the CIO
 Ohio State University*



Customer Testimonials

"Having recently worked with other members of ViDe on a hierarchical dial plan, with multiple master gatekeepers, using ECS exclusively at it's core, I can say the following: ECS is, in my opinion, the very best H.323 gatekeeper on the market right now. It's quality and flexibility are unsurpassed. The list of features that are incorporated into the ECS -- hunt, LDAP and H.341 MIB support, to name but a few -- are powerful and important ones, and far surpassed its closest competitors."

*John Warnicke
Multimedia Telephony Analyst
University of North Carolina, Chapel Hill*

"I have been directing a public service project to support regional early adopters of high performance networked video technologies for about five years now. Our group is focused on public benefit applications of these emerging technologies in the education, healthcare and government service sectors throughout the Western New York region and has been growing rapidly and enthusiastically.

My experience with RADVISION has been consistent and unequivocal from the beginning; without exception they have always been able to rapidly afford access to world-class development engineering assets whenever necessary to identify obscure problems and to develop work-arounds or solutions.

Functional development and interoperability has also been a consistent RADVISION forte, particularly in Gatekeeper technology, and has consistently set the industry benchmark for functional development within a standards-compliant envelope.

To this day, if I have a choice, I will always opt for RADVISION technology -- even when my users are seduced by the marketing claims and flashy features (often highly proprietary) of competitors' products.

No manufacturer/developer of technology as new and complex as H.323 could possibly be without fault. But I'm hard pressed to identify any significant concerns about RADVISION. Well, if only they were even more successful so they could invest more in their research and development and continue with their track record at a more rapid pace; we could certainly use tomorrow's exciting promises today and want the quality and support we have come to expect from RADVISION in order to ensure our own continuing successes."

*James O. Whitlock
Associate Director of Computing Services
University of Buffalo*

"I have been a user and an enthusiastic promoter of RADVISION technology for quite a few years. For core H.323 technology, I would neither consider nor recommend any other manufacturer unless they were OEM customers of RADVISION, like Cisco."

*James O'Connor Whitlock
Associate Director of Computing Services
Director, WNY High Performance Networked
Video Initiative
University at Buffalo*

"Our RADVISION MCU with Embedded Gatekeeper has worked seamlessly over the past three years. We use it everyday for ad-hoc meetings and credit classes. I like the anytime, anyplace idea - I give a group of people their own number to conference in with. They can set up their own schedule and meet at their own convenience.

I highly recommend the RADVISION MCU embedded gatekeeper unit. It works well and requires little or no maintenance. I have used RADVISION products for over 5 years now, and they have performed superbly. When I need to further expand my H.323 capabilities, I will choose RADVISION."

*Thomas Brenneman
Director Multimedia Technology Services/
Interactive Video Network
University of Missouri*

"We migrated from the embedded gatekeeper to the ECS-100 as it is much simpler for our video operations staff to monitor activities in real time with this gatekeeper. We use the ECS-100 to provide a simplified method for dialing as well as address some security issues. Our dial plan of seven digits allows video systems, even those without the ability to dial IP addresses directly, to connect to the bridge or to each other.

We have successfully implemented video over IP and also retained some of the trappings that ISDN users were familiar with. We have also managed to extend the lifespan of the legacy PictureTel systems by connecting them to the RADVISION L2W-323 Gateways to provide the IP link."

*Phil Coolick
Office of Telecommunications
Manager, Network Applications Services
Penn State University*

"Out of all the gatekeepers currently available in the market today, RADVISION's gatekeeper is the easiest gatekeeper to use. The interface is simple, easy to understand and very straight forward. There are no hidden settings to worry about. No extra hoops to jump through to make it work. Its very refreshing to have something that works the way it's supposed to, right out of the box."

*Patrick Watson
Sys. Analyst
Technology Evaluation
Office of Research and Information Technology
University of Tennessee*

"The RADVISION Gatekeeper is a life saver for H.323 video folks like me. It has shown its worth as a true solution provider. Even to this date there is no other product in the market that can even come close to RADVISION Gatekeeper. We have been extensively using it with our setup and with the new LDAP implementation we are developing; a system that will allow our video calls to be much more secure. Our H.323 topology represents several RADVISION and ACCORD MCU's, and Starback streamers, with over 200 ports. This is one of a kind H.323 setup in the world and we are proud to have it. I have to say that the center of all this is a RADVISION Gatekeeper."

*Arif Khan
Network Engineer
OARnet Network Operations
OARnet*

"Rice University wanted to establish a regular Friday videoconference with the University of Texas Medical Branch (UTMB) in Galveston in order to share a popular colloquium series.

The Friday seminars were very popular, but the room in which the colloquium was held only supported H.323 style videoconferences. For several Fridays, we used the RADVISION Gatekeeper to route the H.323 call to a LAN/WAN gateway to dial out to UTMB Galveston via H.320. Unfortunately, the H.320 call incurred long distance charges and another solution was needed.

The University of Texas Medical Branch in Galveston found a way to route their H.320 conference call via a local site in order to eliminate recurring long distant charges. But due to the complicated routing, they could not receive a H.320 call over the same path.

By using the RADVISION Gatekeeper in concert with the RADVISION Gateway we were able to accept the incoming H.320 call on the gateway and route the call to the H.323 system in the room where the colloquium series.

We have used this solution for several months. The only problem has been with the gateway freezing up after many days of inactivity. A quick reset and the system works again. We have never had a problem during a session."

*Hubert Daugherty
Rice Multimedia and Edupop Project
Rice University*

"The RADVISION Gatekeeper has made access and control of our video resources possible through it's ease of use and flexibility."

*Kenrick Chan
Instructional Technology Development
Coordinator
Information Technology Services
University of Hawaii*

"We are using a Cisco 3520 MCU (rebadged RADVISION MCU). We are very happy with it and the embedded Gatekeeper. From a network standpoint, it has been easy to manage and upgrade. The "automatic" endpoint registration has been a real lifesaver as more of our faculty and staff have added H.323 terminals in classroom and seminar environments. Often these have been added with little or no notice to the network engineering and management team. It's handy that the "customers" have the functionality they were expecting, and that we can identify the newly added terminals by looking at the Gatekeeper registration table. Also, being able to predefine terminals, the resources and bandwidth available to each goes a long way to make the use and management of our H.323 assets much less arduous.

I do plan to transfer the Gatekeeper duties to the NGK-100 yet this summer, and have hopes of upgrading to the newer ECS, but until then have every confidence that our current embedded Gatekeeper will continue to function as well as it has in the past. Keep up the great work."

*David H. Shantz
CATV/Network Engineer
The College of William and Mary
Williamsburg, VA*

Opinions expressed in these Customer Testimonials belong to each individual and do not reflect the opinions of their employer.