

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