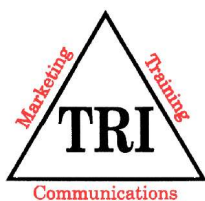


ISDN TO IP: IT'S MORE THAN TECHNOLOGY



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Introduction

For many years ISDN (Integrated Services Digital Network) has been the network of choice for videoconferencing. However, ISDN was never really designed for videoconferencing, since carriers never got together and agreed on a call completion rate for video calls (i.e. 99.6% of the time calls would complete when dialed), nor did conferencing vendors adopt all levels of bonding, thus making all video calls over ISDN connect all the time. As a result, many organizations have looked to the Internet Protocol (IP) as a transport for audio, data, and video calls. The purpose of this document is to review the pros and cons of ISDN and IP, discuss why organizations are adopting IP, and emphasize that the migration from ISDN to IP includes more than technology issues.

An Overview of ISDN

ISDN is a switched, digital telephone line over which calls are routed on circuits dedicated to that connection. ISDN has been viewed as a reasonably secure network because it is a switched circuit, not a shared circuit. When used for videoconferencing, separate lines are banded together (bonding) to obtain the data needed for a call (i.e. six channels are used to make up a 384 Kbps call). Concerns expressed regarding ISDN include the fact that it is not deployed everywhere, it is no longer being further developed, and there are toll charges associated with each call. However, it is important to note that the majority of group videoconferencing systems installed to date run over ISDN (87% use this network). In many instances organizations have either migrated or are in the process of migrating their videoconferencing transport from ISDN to IP. This migration is not always being done solely because of videoconferencing usage, but rather, in many cases the networks are being converged to allow audio, data/web, and video over one network.

An Overview of IP

IP uses a shared digital circuit to communicate between two points while sharing the pipe with other traffic (i.e. web, email, etc.). IP for videoconferencing is viewed as attractive because there is continued development of the network and its functionality, IP is being proliferated in most parts of the world, there are no toll charges associated with the calls, and a variety of add-ons (chat, webconferencing, directory services, etc.) are being developed. The negative for video over IP is that currently IP is not a reliable network for real-time traffic like videoconferencing and voice over IP where there is no quality of service (QoS) scheme in place. Regardless of the current negative aspects of IP, organizations are looking at IP because it offers converged network opportunities, is lower in ongoing costs, it affords on-demand communications, provides improved communications quality, it offers PBX type feature/functionality, and video is not the only solution for use over the IP network.

Technology Issues

Although the purpose of this document is to focus on areas other than technology, it is important for the reader to know what technology issues need to be considered when migrating from ISDN to

IP. The following information is based on data obtained from 25 end users who recently migrated their videoconferencing networks from ISDN to IP. They recommend others consider:

- Replacement cost of legacy ISDN codecs
- Selecting the right codec to meet ones needs
 - Integrated, roll-about, or desktop?
 - What features are needed?
 - What is the return on investment?
- Does ones current bridging service provide multipoint for H.323?
- Does ones local network need a forklift to support H.323?
- People issues.

People Issues

In discussing people issues, the respondents to the study recommended the following as guidelines to others migrating from ISDN to IP:

1. Be sure to focus on user need and not new technology or what is purchased will not necessarily be utilized by the end users.
2. Buy only what is really needed and plan to grow as the needs change.
3. Keep things as simple as possible for both management purposes and to ensure users will want to use the technology.
4. Look at the goals of your organization – immediate, near term and future.
5. Buy the best quality you can afford.
6. Plan on phased deployments of the technology in order to be sure all bugs are worked out before the technology is given to the masses.
7. Don't underestimate the high cost of IT management & user support.
8. Keep users informed through all steps of the process.

Application Examples

Navy-Marine Corps

The U.S. Navy and Marine Corps has a video teletraining program, installed and managed by Applied Global Technologies (www.appliedglobal.com), “to provide training, education, conferencing, and quality of life opportunities to sailors and marines as close to their duty station as possible”. In 2003, they had 37,000 participants in their programs who took advantage of technology deployed at 51 shore locations, in 61 classrooms, 18 conference rooms, and on board 25 ships deployed world wide. The benefits of the program have been travel savings since 1989 of \$38 M, standardized instruction, increased throughput of students, and providing unique education and quality of life opportunities. The initially technology used was over an ISDN network. Most recently that network has been migrated to an IP network for the Navy mixed with an ISDN network for the Marines and ISDN for global access. The issue is providing the training services, not what network the calls go over. In the future the Navy will be blending learning classrooms by integrating interactive video with web-base learning, expanding video to the desktop, constructing new classrooms in Europe, increasing the variety of training courses offered, and use the Navy-Marine Corps Intranet.

State of South Carolina

The State of South Carolina has deployed an IP-based managed video services solution to offer services to state agencies, technical colleges, local & county government, public K-12 schools and libraries. Installed and managed by AGT, the IP H.323 video network includes the ability to schedule calls and hold point-to-point and multipoint calls, gatekeeper functionality, gateways to H.320 legacy systems, billing and reporting services, and endpoint room control & trouble ticketing service. The State agencies have the ability to use video services on a cost-per-minute basis or for a flat rate per month.

Initial users of the IP video network include the Department of Health & Environmental Control (DHEC), State Technical colleges, and the University of South Carolina.

There are 14 health districts throughout the State who want to use IP video conferencing to conduct training and communicate with others, especially at a time of potential disease outbreak or bioterrorism threat.

At the Technical Colleges there is a shortage of professors and a desire to expand beyond the 17 colleges into rural districts. IP video will be used to offer courses to those who would not be able to travel, and to hold monthly meetings among the Colleges for the Presidents' Council and the Foundation.

The University of South Carolina is planning to expand student access to upper-division courses leading to baccalaureate degrees on its regional campuses in Allendale, Walterboro, Lancaster, Sumter, Union, and Laurens through what will be called the Palmetto College. IP video is being developed as a tool to share faculty expertise and courses across a broad geography. IP video will also strengthen the potential for faculty collaboration and service with K-12, Technical Colleges and other Universities.

Other potential applications include the use of guest lecturers for distance learning & training, medical consultations, parole board hearings, video arraignment, joint course development between multiple institutions, homeland security/disaster response, and virtual field trips.

IP Implementation

The users surveyed had recommendations for a process to follow to implement an IP network for conferencing purposes. These recommendations include technology and process recommendations.

1. Evaluate current network capacity
2. Determine maximum bandwidth needed for each type of conferencing to be used (i.e. audio, data/web, and video).
3. Review Firewall design
4. Implement Quality of Service
5. Use one network service provider for ease of implementation and finger pointing
6. Use gatekeepers
7. Pilot test on a dedicated LAN subsegment
8. Extend to IP Wide Area Network
9. Extend to H.320 via Gateway

10. Extend to the Internet
11. Learn from your mistakes and those made by others.

Lessons Learned

As organizations migrate from ISDN to IP there are lessons that can be learned from those who previously made the transition. The following suggestions were made by end users:

1. Find an executive sponsor & owner for the technology. These may be two separate people, but the role they play is key to successful usage.
2. Video applications require a lot of memory and this must be kept in mind as more users choose to utilize the network.
3. Training is necessary to ensure usage and must be on going to ensure success.
4. The number of multipoint conferences is usually underestimated.
5. Transition from ISDN to IP will occur over many years and we are in about year 4 of a 10 year cycle.
6. Collaboration, streaming, and remote presentations will become dominant applications.
7. Users need a process that works, not a particular technology.

SUMMARY

Networks will continue to evolve, offering higher speeds and more features and functionality to users. It is important to realize that there are issues other than technology that need to be addressed to ensure successful network upgrade and usage. Current network migration includes planning to converge voice, data, and video applications over one network or build an overlay network for video applications over IP. To ensure success, it is important to focus on the people issues, as well as the technology issues or network deployment may not be properly utilized.

About TRI

Telemanagement Resources International Inc. (TRI) is a 22 year old management consulting firm specializing in marketing, communications, and training with an emphasis on design, assessment, project management, promotions, and training for collaborative conferencing systems. More information about TRI can be obtained at www.TRIInc.com.

About S. Ann Earon

S. Ann Earon has been a researcher and consultant in multimedia communications for 22 years. She holds a Masters in instructional technology and educational administration from Northeastern University, and a Ph.D. from Boston College in business, speech & communications, and education. Dr. Earon currently chairs the Interactive Multimedia & Collaborative Communications Alliance (IMCCA), the non-profit industry association for conferencing & collaborative communications. She can be reached at AnnEaron@aol.com.

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