

Videoconferencing Whitepaper

Videoconferencing may be one of the most imagined and least understood technologies of our time. Although science fiction writers have presented videoconferencing as a routine part of life almost since the dawn of talking movies a generation ago, most people believe real-world videoconferencing in the early 21st century is only available to a privileged few and requires expensive, special purpose sites, maintained by armies of technicians. Affordable videoconferencing for the rest of us, most people believe, is still science fiction.

This is no longer true.

In fact, due to recent technological innovations pioneered by InfraSupport, reliable and affordable videoconferencing is now available to any organization with broadband access to the Internet for less than \$5000 in capital cost per site.

Imagine conducting an international trade meeting with partners from around the world – each person in a conference room in his/her own office, interacting with everyone else as if they were all together in the same room. Imagine the savings in time, travel costs, and jet lag.

Imagine a buyer in North America inspecting products coming from a factory on the other side of the world – before shipment.

Imagine a teacher in Russia teaching the Russian language to a group of students in Canada. Imagine a math teacher in rural Minnesota teaching Math to a group of students geographically disbursed across the state. Imagine a family in rural North Dakota consulting with a team of doctors from around the world. Imagine a team of people in Minnesota conducting a job interview with a candidate in Milan, Italy. Imagine a family in the United States meeting with a loved one serving in the military, 9 time zones away.

These scenarios are all possible right now using low cost technology pioneered by InfraSupport.

Videoconferencing has two major components; presentation and transport. Presentation is straightforward. Use a window on a computer display, a standard television, an expensive HDTV, a projection system, or any appropriate combination, depending on the size of the room and the number of people.

Metaphorically, think of presentation as a water faucet. Some homeowners spend elaborately for nice faucets, while others choose plain units. But no matter how nice the faucet, each unit still needs plumbing to deliver water. Think of plumbing as the metaphor for videoconference transport. Nobody sees the plumbing, but everything depends on it.

Historically, videoconferencing used a technology called ISDN for transport. ISDN is a conditioned telephone line from the telephone company central office to the customer premise. Similarly to a traditional phone line, each ISDN line has a telephone number. Customers pay a monthly charge for ISDN and a per-minute charge for use. Videoconferencing centers typically charge \$200 - \$300 or more per hour for ISDN calls.

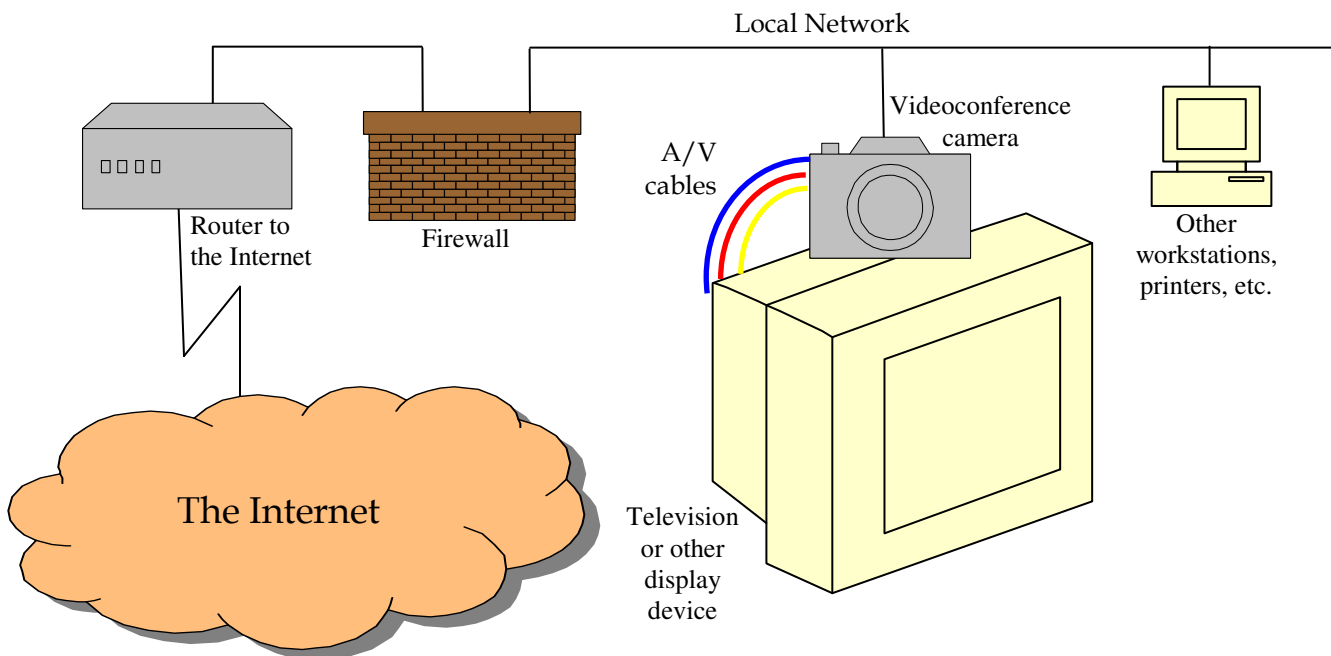
A videoconferencing standard named H.323 eventually developed around IP (Internet Protocol). With H.323, it became possible to make calls over a TCP/IP network, and several large organizations and service providers built proprietary, private networks to handle such calls. These private networks are specifically tuned to handle videoconference calls. Customers pay for proprietary equipment and a monthly charge to connect to them. Some plans have a fixed monthly cost for unlimited use, while others mix a per-minute charge with lower fixed costs. Although less cost than ISDN, these networks are all still too expensive for most organizations.

Greg Scott, Chief Technology Officer of InfraSupport, had a better idea. Why not use the public Internet for transport? After all, the Internet is the largest TCP/IP network in the world. If

videoconferencing were possible over the public Internet, then organizations would not need to buy any kind of proprietary transport and it would be affordable to all. The cost savings in reduced travel, and the benefits of affordable, face to face communications, are endless. Imagine, for the first time in history, reducing the traffic on our over-crowded highways and airways by 20 percent. The potential cost savings are staggering.

InfraSupport had an opportunity to try its ideas beginning in late 2004 by connecting families in the United States with loved ones serving their country overseas. By late December, 2004, U. S. Marines serving in Iraq had the ability to routinely attend Sunday church services in Eagan, Minnesota, 9 time zones away. In early 2005, a Minnesota charter school used InfraSupport videoconferencing technology to interview an Executive Director candidate in Milan, Italy. Later in 2005, a team including Operation America Cares, InfraSupport, M:Space, and TDS Metrocom connected families with loved ones serving in Iraq at the St. Paul Chamber of Commerce, Minnesota Twins and St. Paul Saints baseball games, and Minnesota Vikings and Gophers football games, continuously refining and improving the technology along the way.

The picture below illustrates a typical videoconferencing site using the InfraSupport approach:



Transport over the Internet presents some challenges, especially doing it securely. The major challenges include keeping videoconference cameras safe from the viruses and worms plaguing the Internet, and delivering H.323 streams in a timely manner along with web, email, and other Internet traffic.

Once on the backbone, the public Internet is an extremely reliable medium to move H.323 traffic, and reliability increases every day as service providers make continuous improvements. The bottlenecks are the boundaries between customer networks and the public Internet. When these boundaries were originally built, very few foresaw the need to handle such demanding, real-time traffic as VOIP and H.323. To reliably and securely handle today's H.323 traffic, these boundaries need to be improved.

The InfraSupport network firewall is the key. Sitting in a backroom out of sight, the firewall regulates traffic in and out of the local network and prioritizes videoconference H.323 and traditional IP traffic. When H.323 and, say, email or a web download contend for the same bandwidth, the InfraSupport

firewall gives priority to the H.323 traffic. Milliseconds are important to people conducting a real-time, face to face conversation. Milliseconds are not so important to a web download.

The InfraSupport firewall also provides all the traditional stateful packet filtering expected from any modern firewall, and InfraSupport firewalls are protecting dozens of networks today, ranging from very small to very large.

All Internet connections eventually experience problems, and the InfraSupport firewall system includes a wealth of troubleshooting tools to help quickly diagnose and fix these problems. In many cases, InfraSupport has used its tools to help Internet Service Providers find problems in their networks. InfraSupport routinely uses these tools to debug H.323 conversations, especially far-end problems for sites where the network boundary is still a bottleneck.

VPNs (Virtual Private Networks) are also important, and the InfraSupport firewall supports several VPN approaches, including IPSEC and PPTP. Dozens of organizations are using InfraSupport VPNs today.

Videoconferencing over the Internet is quickly becoming the disruptive technology of the early 21st century. It will change the way we live and work.

InfraSupport spent several months and significant engineering effort pioneering, testing, and improving its existing firewall technology to meet the new challenges posed by this opportunity, and is now a leader in the field. InfraSupport has already overcome the technical hurdles that most others have yet to learn even exist.

Organizations with people who wish to communicate face to face over long distances need to investigate this technology. It is affordable and InfraSupport has it now.

