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IP Videoconferencing Services and Service Providers



Updated Test Plan

*Prepared by PEREY Research & Consulting for
Network World Reviews*



IP Videoconferencing Services and Service Providers

What are the enterprise options and how do you choose?

Market Overview

Several recent advancements make videoconferencing in enterprise and over IP networks more likely than ever before:

- *End Point Affordability and Function.* Personal computers and specialized appliances for video capture, compression and transmission are dropping in price while rising in functionality and quality. Enhancements in the both software and hardware codecs deliver higher video and audio quality. Higher compression rates means that video and audio use less and less bandwidth for transmission on the network. Standards for building end points are also maturing and interoperability in multi-vendor networks is rising.
- *Improved Networks.* Internet Protocol networks are ubiquitous—reaching from any server to meeting rooms and desktops—and increasingly robust. Some are capable of not only transporting a few video streams but a great many streams or channels simultaneously to audiences worldwide. New technologies, such as for Quality of Service guarantees, are reducing the cost of building an infrastructure suitable for multiple voice and video formats and applications. And, bandwidth is also more abundant than ever before.
- *Internet Generation.* The Web and multimedia on the Internet has increased the overall exposure to digital video. Surrounded by video content and cameras, people are overall more comfortable with video. At the same time, mobility and virtual office technologies are pushing collaborators apart. Some individuals with pressing needs are finding new ways to create and use video for internal and external communications.

Application service providers with video expertise are essential to accelerating the adoption of video in business communications and will profit directly from there being a total solution. Video ASPs simplify user access to services through web-based interfaces and manage the delivery of the services across a variety of networks on the back end. Synergy between the video application service providers and infrastructure service providers lowers costs to the customer while, at the same time, increasing reliability and usability. These benefits appeal to the enterprise customer but concerns about quality, scalability, security, functionality and cost of using a new IP infrastructure remain in the buyer's mind.

Single or Multi? Private or Public? Proprietary or Standards based?

Buyers aren't the only ones with concerns and questions. When implementing a videoconferencing-over-IP service, a service provider must make a number of difficult choices. For example:

Local Area Network—A service provider may rely on the last mile of network already in place in the enterprise (i.e., the LAN) to a meeting room or desktop computer, or it may require the deployment of a dedicated connection between the client and the service provider's network or partners. When using a corporate network for local access, there may be congestion and security issues beyond the service provider's control causing usability and performance issues. In addition, the service provider must designate a point of presence where the LAN and WAN interconnect. On the other hand, when a service provider requires the installation of dedicated services to the client computer and avoids all local area networks, there are additional costs and functionality (e.g., the ability to access resources on the corporate LAN during a conference) may be compromised.

Wide Area Network—The selection of wide area transport infrastructures and development of operations centers go hand in hand. When a service provider elects to use a single wide area network for all videoconferencing traffic, then servers may be distributed strategically in the network and shorten the distance across which end points and servers will interact. This can reduce the need for over provisioning. When a single network is selected, a quality of service guarantee mechanism can be implemented across all segments, increasing the reliability of QoS and offering the option of offering Service Level Agreements. Finally, negotiating bulk bandwidth agreements with a single provider may reduce the cost of ownership for the Video application service provider.

When a company remains neutral to the wide area infrastructure some of the above advantages may be compromised, however, on the other hand, the video application service provider can choose transport on a customer by customer, day by day or application by application basis, according to cost, availability and quality of the services. A multi-network service platform may also be more complicated to manage and requires that operations be more centralized.

Some companies elect to place their service platform on the public Internet. While there are a number of disadvantages, namely in areas of security, stability and reliability (since traffic on the public Internet fluctuates and peaks have detrimental impact on real time applications), the advantages of using the public Internet are reach and cost. Anyone can reach the public Internet and the cost is only for access, not for throughput.

Standards—For videoconferencing applications, the client must have the ability to capture and compress video and audio and to packetize the compressed data when placing it on an IP network. Standards for video communications over IP (e.g., H.323) have been adopted by many equipment manufacturers, however, new standards (e.g., SIP) are approaching and proprietary solutions persist. Proprietary solutions may take advantage of improved compression algorithms, or be lighter in footprint as a result of having lower need to support functionality required in standard-compliant clients. Some clients are hybrid and can operate in proprietary as well as standard modes.

If a service provider elects to develop the service and client technologies as an integrated whole, special features can more quickly be added or removed, depending on the service agreements with customers. Designating the client can also eliminate problems with supporting multiple software releases, conflicts with corporate network firewalls and other factors outside the control of the service provider. In the majority of the cases where a private network service is offered, service providers are expecting the customer to purchase or already own client equipment that is compatible with the protocols used in the operations center servers.



Due to these and other considerations, no two service architectures (“platforms” in ASP jargon) are exactly alike. For purposes of this review, however, we separate those services that use the public Internet for transport from those that manage the wide area network services through strategic alliances with bandwidth providers or by using their own network.

Objective of this study

The objectives of this review is to gather objective information from service providers about their offers and strategies, to measure the performance of videoconferencing over IP in a controlled study with different wide area networks, and to experience qualitative aspects of the resulting services first hand. The study spans two classes of IP-based videoconferencing services: those that include highly-managed network services and those that do not (i.e., they use the public Internet, or a corporations private backbone for transport). Each service category and its providers will be studied separately and representatives in each class compared and contrasted with one another.

PEREY Research & Consulting will define constraints and create the complete scenarios for use, develop relationships with third parties for access to physical premises and uniform end point equipment, and evaluate solutions from providers. The review will inform Network World’s 170,000 subscribers about the options available for end-to-end IP videoconferencing services and, based on rigorous tests of reliability, usability, quality, security, functionality, customer service and cost, rank the providers within their class.

Evaluation Team

The three-member evaluation team includes project manager and independent analyst Christine Perey, Jason Meserve multimedia editor for NetworkWorld magazine and Michael Pendleton, an IT manager who faces the issues outlined in this study but has not made a purchasing decision.

Time Line for Tests/Report

June 29	Official invitation issued with test methodology
July 11	Formal responses to invitation due to Christine Perey and Network World editor, Keith Shaw
	All necessary information collected for preliminary implementations
TBD	Study participants receive Request for Proposal
14 days from receipt	Final proposals due
November 1	All last mile broadband networks in place
November 5	Testing begins
November 8-9	Data consolidation and analysis. Performance tests review and repeat as necessary
November 12-16	Preparation of report
December 7	Service Providers may discontinue last mile connectivity or negotiate new terms with evaluation sites
January 21, 2002	Publication of report

Criteria for Participation and Invitations

Participation is strictly limited to companies who agree to Network World review guidelines extended in the formal invitation letter. Those invited to participate in this study must offer a commercial solution that fits one of the two above categories.

Based on market review by PEREY Research & Consulting, the vendors invited currently include, but may not be limited to:

Company	Local Loop Options	Tightly Control Backbone Networks	Use Public Internet
Standards-based end points			
WireOne	Customer selects from service provider designated options	X	
AT&T	AT&T end to end		
EDS	Designed for Gov; uses Level 3 for backbone	X	
Internap Network Services	Cisco routers Polycom ViewStations	x	
V-SPAN	Customer selects	x	
Sprint	Customer Selects	x	
InView	Customer selects	x	
First Virtual Communications	LAN or ISP		x
Proprietary end points			
FocusFocus	LAN or ISP		x
Eyeball Networks	LAN or ISP		x
Reality Fusion	LAN or ISP		x
VideoNEXT	LAN	x	

Service providers participating in the study will cover all fees for any local access network implementations and waive all account costs and usage fees for the duration of all testing.



Methodology

The usage scenario for this study will portray a situation commonly found in enterprise: members of a cross-functional group are dispersed among 3 remote facilities, separate companies in effect, and with diverse infrastructures. A minimum of three locations will be involved in multiple test scenarios and in some cases there may be multiple clients at a single location.

Each facility will be equipped with identical end points: a stand-alone videoconferencing appliance (e.g., Polycom ViewStationFX), and several Windows PCs with USB webcams (Intel PC Camera Pro). One of the end points in each location will have network monitoring software by WildPackets (EtherPeek and NetDoppler) installed and capturing network performance metrics during all videoconference sessions. All end points will be available for use on appropriate networks.

In addition to network monitoring software, the performance of each dedicated network service provider will be measured using the Chariot application provided by NetIQ, and custom scripts developed to accurately reproduce end to end symmetrical traffic flows with precisely the same parameters as the ViewStation FX application. The custom scripts will be made available to any party wishing to evaluate their suitability for testing.

This review will collect data in two phases. The response to a standard Request for Proposal will count for 20% of the final score. The remainder of the score will be determined in the hands on testing phase. The hands on phase of the testing is described in detail below.

The published report will stress to readers that results of first hand testing only reflect the status of networks and services at the time of testing, and that rapid changes in all services are expected. Therefore, prospective buyers should repeat some tests (especially performance measurements) prior to finalizing their purchase or contract negotiations.

What's Offered?

The same standard RFP will be sent to each participant. Participants will have 2 weeks to respond to the RFP and schedule an interview with Perey and the evaluation team as if in a competitive bid situation. Responses to the RFP will include answers to at least the following questions:

- ⇒ Software: what does the solution include? What enabling (core) technologies are used? Are there optional modules or a private portal to which the subscriber will go? What security precautions have been taken to protect corporate content? How are account maintenance and other management aspects performed?
- ⇒ Hardware: what is included? What must the customer provide? Does the service provider offer or require any special hardware to use the service? To use any special aspect of the service? Is there a dedicated access point from the customer premise to the service provider's network? Please explain all details of configuration.
- ⇒ IT Expertise: what sort of training will IT need to have to manage the solution?
- ⇒ Cost: what is the cost of the service package or basic unit of service? What are the costs of optional features? How are billing, transactions, etc between customer and service provider approached?
- ⇒ Service Level Agreements: what are the SLA? And what are the penalties for not upholding them?
- ⇒ Future Proof: what is the provider's proposed strategy for customer expansion in terms of increased number of users or increased number of sessions? How are new features added?

Hands On Tests

The second phase of this evaluation involves first hand exposure to services in which quantitative measurements will be collected and qualitative observations made.

All testing will be conducted at all three facilities. Location of facilities are:

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Cap Gemini
600 Memorial Drive
Suite 200
Cambridge, MA 02139

NetworkWorld Magazine
118 Turnpike Road
Southborough, MA 01772

Participating service providers will be assigned a date and time prior to November 1, 2001 to demonstrate the user set up process and to provide the evaluation team formal training in all aspects of system usage.



Tests

Service provisioning and account set up for each study participant will be experienced and assessed by each member of the evaluation team. Once service has been configured, the evaluation team will perform at least the following tests:

- Set up scheduled point to point and multipoint calls using customer portal or customer service representative
 - Call ends before scheduled duration
 - Call exceeds scheduled duration
- Place ad hoc call to members of evaluation team
 - Directory services
 - Is there a services hosted company or global (aka “white pages”) address book?
 - Called party answers
 - Invite and add third party
 - Drop third party
 - Call forward
 - Call transfer
 - Called party does not answer
 - No answer call forward?
 - Called party is in another call
 - Busy call forward?
 - Callers need data collaboration and/or web touring to supplement videoconference
- Call to ISDN-based videoconferencing end points via an IP/ISDN gateway
- Point to point or multipoint call to include voice only (PSTN originating) participants
- Receiving calls from ISDN end points
 - Point to point calls
 - Hybrid multipoint conferences (with ISDN and IP end points)
- Streaming live point to point or multipoint conference to Internet-based audiences
- Recording point to point or multipoint conference for later replay

Scoring

A. Each solution will get a 1-5 score for degree to which the service offered appears appropriate for use in an enterprise application scenario. This score will include the team’s perception (subjective assessment) of the service provider’s ability to scale the service to meet increases in demand. It will also reflect suitability of business interfaces (e.g., billing options and customer service) for medium and large enterprise customers.

B. The usability assessments (user interface design, use of wizards, clarity of on-line help features, etc) will be made in each of 3 key steps in the complete application experience:

- Customer account configuration (is it possible to use a web interface to change specific settings on any end point? To add and remove end points from a user directory) and end point policy management (by IT or telecom staff, for example) in different security environments (behind firewall, behind NAT)
- Is call placement policy (use of resources, basic and premium services in the above tests) and resource scheduling adjustable?
- Feature/functionality (beyond call set up and tear down, based on above tests).

C. The quality, reliability and stability of each solution will be assessed by

1. reviewing VHS video tape recordings of videoconferences and

2. measurements of network performance while running scripts¹ using Chariot 4.1 application software.²
 - Network performance will be assessed as follows:
 - We will note any lack of service availability and report it immediately to the service provider
 - Number of times (and degree to which) packet loss exceeds 1% in 4 one-hour tests
 - Number of times (and degree to which) jitter exceeds 1% in 4 one-hour tests
 - Number of times (and degree to which) latency exceeds 100ms one way in 4 one-hour tests
 - Call completion and failure rate (and recovery), and
 - Any application errors detected by the user that can be directly attributed to the service.

On November 9, each service provider will be offered an option to review the data acquired during the above tests. We will discuss the results of the tests during a 30 minute telephone or videoconference.

If service providers request that network performance tests be repeated, the evaluation team will repeat all Chariot performance tests one time and take the best of test results for the final scoring and report.

¹ Chariot testing scripts are generated by NetIQ professionals using NetIQ's Application Scanner on EtherPeek data generated during 3 separate videoconferences with ViewStation FX end points. The data on which scripts are based was generated at 128k, 384k and 512k data rates.

² Any service provider wishing to learn more about the NetIQ Chariot software can visit the NetIQ web site (<http://www.netiq.com/products/chr/default.asp>), and/or contact product manager Kim Shorb kim.shorb@netiq.com at (919) 337-0313.