



PEREY Research & Consulting
1455 Cedar Oak Rd.
Placerville, CA 95667
Voice (530) 621-0468
cperey@perey.com
www.perey.com

Streaming Media Service Provider Shoot Out



Test Plan

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

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Streaming Media Service Providers

Time for a Sanity Check

Market Overview

Some market research companies estimate that the streaming media content delivery services market will grow from a mere \$125 Million in 2000 to \$2.5 billion by 2004. Others predict even greater numbers. A significant proportion of this growth will be from expansion of media and entertainment providers who seek to reach broadband-connected consumer audiences, however, enterprise customers will also drive demand for service providers' network and applications to communicate internally, with partners and with their customers.

The early adopters of streaming media service providers (specifically video NSPs and ASPs) are primarily companies with strong desire to stream content to Internet-based audiences but limited resources to build out and/or manage infrastructure. As visionaries breaking boundaries, their primary motivation for outsourcing was and remains sheer reach. They are anxious to grab market share (eyeballs) at any data rate/quality and (practically) any cost.

Having established that streaming media is more than a fad for entertaining applications, a mainstream market for the technologies is emerging. The early mass market growth is coming from a different group of companies: those with more varied audiences (not just the public connected to the Internet per se), more complex application requirements and higher demands when it comes to quality of service (user experience), security and management.

These are the companies who in the next 12 months will help streaming media products and services cross the chasm between the vision of benefits and the technical "realities" encountered when implementing young, unproven "whole systems" from a pile of components with potential. These businesses have streaming media content (in hand or under development) and audiences today, but their networks are not designed to meet the challenges of streaming media delivery.

A multi-segment market model will clarify where the opportunities for streaming media in enterprise-driven applications are greatest.

	Audience and content sources are on a network managed by the same in-house IT group	Audiences in other Businesses (resellers, customers, partners) or in remote offices	Audiences in Consumer (residential) setting
On-Demand (Play back any time)	Unlikely to outsource for small quantities	Very Interested in outsourcing	Only if there is BB access to the home
Near Real Time (Live Broadcast Events)	Interested in outsourcing	Very Interested in outsourcing	Only if there is BB access to the home
Real Time (conferencing, no latency)	Interested in outsourcing	Not practical on IP end to end	Not practical

Objectives of this study

This study is designed to assist those who in the first quarter of 2001 seek a network and hosting service provider to whom they can outsource their streaming media live broadcast content delivery and/or their on-demand content storage, delivery and management. The emphasis is on these two streaming paradigms (live broadcast and on demand) where they intersect with third party enterprise network-based audiences.

PEREY Research & Consulting will define constraints and create the complete scenarios, develop relationships with third parties for content acquisition and development in each scenario and evaluate service provider offers relative to the different business requirements. The review will help Network World's 164,000 subscribers select the best streaming media service provider for their needs.

Partners

This study would not be possible without the enormous talent and resources made available to PEREY Research & Consulting by WatchIT.com (for content creation), Streamriver Networks, a division of Media100 (for digitizing, encoding and compressing original on-demand content), Keynote Systems (for measurement of the performance of the service provider networks), and EchoStar Data Networks (for DISH Network access and satellite time for the live event broadcast phase).

Service Provider Invitations

In order to perform a comprehensive analysis of the leading service providers with limited resources, it is necessary to reduce the field of companies included in the shoot out from over 20 potential participants to only 9 that meet a set of pre-determined criteria. Participation is strictly limited to companies who agree to NetworkWorld review guidelines extended in the formal invitation letter. The criteria for invitation to participate in this study are as follows:

- Complete support for the latest Real Networks and Microsoft Windows Media Technology streaming media formats. This means the provider is listed, for example on the Level 3 provider list in Real Networks' partners area.
- Support for live video-rich Event Broadcast at 100kbps and On Demand services at 3 data rates (40K bps, 100K bps, 300K bps)
- Own or lease server space in at least 40 secure nationwide Points Of Presence, including multi-homing and peering with multiple backbone providers at DS3 or greater capacity, for use by streaming media servers, and at least 10 servers internationally
- Ability to offer application level support for events or content being distributed to populations of at least 10,000 simultaneous users
- Contracts to provide streaming media services in place at the time of testing with at least 25 existing medium and large *enterprise* customers
- Two or more advanced services such as multiple video content acquisition technologies, video indexing/cataloging, digital asset management systems, video encoding, slide/presentation synchronization, text chat as part of live broadcasts, local content insertion servers, transaction servers for voice and video enhanced e-commerce, automated/browser accessible reporting and billing, etc.

Based on market review by PEREY Research & Consulting, the field of players to be invited currently includes, but may not be limited to:

- Activate.net
- Akamai Technologies
- AT&T's Ecosystem for Media
- Digital Island
- Enron Broadband Services
- Globix
- iBEAM Broadcasting
- Intel Internet Media Services
- Yahoo! Broadcast.com

Corporate Content Source Acquisition, Transfer and Publication to the Web

The usage scenarios for this study will portray the situation most commonly found when the streaming media content source is an enterprise business group, or a medium sized enterprise with need to communicate with multiple offices (such as corporate communications, human resources, sales and marketing support, channel sales/business development and/or any department charged with delivery of “learning services.”)

There are two modes of communication: on-demand and live event broadcast.

Video On Demand

For all stored/on demand content scenarios, the original content is captured with professional video equipment in DV or analog format (e.g. Betacam) and edited (using high end original source material) by visual communications professionals.

In the case of this shoot out, a three-minute original content segment is developed by Jim Fallon, Senior VP of Video Production at WatchIT.com (www.watchit.com) and output to BetaCam tape. The original content was then converted, encoded and compressed by Media100’s StreamRiver Network Division. Using the MediaCleaner Pro, original content is encoded in two formats and compressed at 3 data rates:

RealMedia 40kbps 100kbps and 300kbps

WMT 40kbps 100kbps and 300kbps

These 6 files have since been uploaded to an FTP server hosted and managed by Media 100’s Network Services division and the URLs made available to PEREY Research & Consulting. The URLs and password will be provided to those service providers who agree to participate in the study.

Each service provider will process the content (6 files) and provide one URL (RTFP reference) per clip back to PEREY Research & Consulting. That reference will then be inserted by PEREY Research into a standard-formatted web page, thereby linking the web pages (one per service provider) and the files’ pointers. The HTML pages will be hosted on PEREY Research’s ISP servers (InternetConnect.net). The service providers will be able to navigate to their pages as well as the pages of other participants for the duration of the study. Keynote System “agents” (measurement computers) will obtain the addresses of each file from the web pages on PEREY’s ISP.

Live Content

Live content, such as might be produced for a seminar or product launch in real-time, can include synchronized slides and a real-time chat window for the audience to interact with the presenter. There are quantitative and qualitative parts to this assessment. To do the quantitative assessment (involving Keynote) means that all 9 will need to have equal access to the original content and the exactly the same time. There will not be a similar measurement of performance associated with “advanced services.” Keynote will test all the network providers simultaneously/continuously (in random order) during the 1 hour streamed event.

The goal when doing any assessment is to create a level playing field for all study participants. Original live content for broadcasting over the service provider networks will be provided by EchoStar Data Networks and made available to all service providers’ operations center using precisely the same receiving equipment.

The service providers will receive (for 30 day period on loan) one 3722/3822 model receiver previously tested and activated by Paul Clarke of EchoStar. Service Providers will need to contract with a DISH network certified installation service company for local installation. Details of the 3722/3822 model receivers are provided as an appendix to this test plan.

All content used in the one-hour live event broadcast testing will be of the highest quality and any content not live will originate at EchoStar’s uplink center in Cheyenne, WY from Beta tape format. At the uplink center all content will be encoded using Divicom real-time transport encoders and statistically multiplexed at encode rates varying from 2.5 - 3.0 Mbps. The MPEG 2 / DVB compliant signal received by the EchoStar-provided hardware, will be

provided as an NTSC composite S-Video and stereo audio output from the receiver. Using this signal, each service provider/participant will transcode and stream identical content for one hour at 100kbps in both RealNetworks and Microsoft WMT formats. The URLs for the live event stream will be published to PEREY and to Keynote, at least 72 hours prior to the event launch.

In order to fully experience the customer services and event management support a company offers (and assess the qualitative aspects of the service provider), PEREY Research & Consulting will also plan and conduct one live event broadcast from Placerville, California with each of the 8 service providers' operations centers individually. The order of participation in the live event customer service experience will be determined by random number selection. In addition, the customer service and support will be scheduled and randomly distributed over the week prior to the event itself, using as consistent a set of requirements and questions as possible.

Corporate Audience Environment

Since remote offices may have different Internet Service Providers, people with desktop computers on the local area networks of these offices are effectively equal to audiences in third party businesses.

This study will only use the servers provided by Keynote Systems (see below) as the members of the streaming media audience. Service providers should plan capacity for approximately 50 simultaneous users. Measurements will be distributed evenly to avoid network and server loading problems.

Evaluation

This shoot out will capture data in two phases.

The first will involve a series of interviews and responses to two PEREY-developed request for proposals (RFP) as means to thoroughly assess what a service provider offers. Standard RFPs will be sent to each participant upon acceptance of the NetworkWorld invitation to participate. Service Providers will have 5 business days to respond to the RFP and schedule an interview with PEREY (the customer) as if in a competitive bid situation.

What's Offered?

Thirty percent of the total score will be based on service providers' response to the RFP, which will include at least the following questions. The highest possible score of "10" will be given to the company answering the most questions with the best answers in response to interviews and service provider's response to a formal request for proposal.

- ⇒ Software: is the service provider offering a "full service" package? is there any proprietary software (for subscribers to use) or a private portal to which the subscriber will go? Is the service provider offering applications or an API to which a network administrator can write applications or private label for an EIP? Is there security software in the network? Levels of security? How are file uploading, downloading and other management aspects performed? If the customer wants to sell content on the web, is the service provider commerce-enabled?
- ⇒ Hardware: 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?
- ⇒ Production: What is the service provider's solution if the enterprise does or does not have streaming video production (encoding, publishing, etc) facilities on site?
- ⇒ Data Centers/NOCs: is the service provider's network architecture centralized or distributed or hybrid? How many servers and locations of POPs? which and how many backbones are connected to this service provider? Is multicasting available (enabled)? How is security offered for the customer's files and streams? How often is signal integrity monitored?
- ⇒ Cost: what is the basic unit of service and what does it cost for the same service from different providers? What is the cost of optional features?
- ⇒ Reporting: What type of reporting capabilities does the service provider offer? Are there Service Level Agreements assuring that reporting and data collection is secure and accurate? How are billing, transactions, etc between customer and service provider approached?



Streaming Media Network Performance Tests

The second phase of this evaluation is the performance testing in which quantitative measurements will be collected during on demand and broadcast of a one hour live event.

Keynote Systems will in no way be responsible for the analysis or interpretation of the data collected by the measurement computers using Keynote developed techniques. All analyses and the selection of a winner (very likely two, one for the stored/on demand service options and another for the live event/broadcast service) will be the full responsibility of PEREY Research & Consulting and will be held highly confidential until the publication of the complete report on December 4, 2000.

For the performance measurements portion of the service provider shootout, Keynote will take measurements from each of 10 large metropolitan areas in the U.S. These measurement computers will play the 6 (3 Real Media and 3 Windows Media) audio and video clips, capture data and report back relevant data about the performance of the clip (reflecting the network conditions).

Keynote's measurement computers will measure the same set of Real and Windows Media clips that will be placed on each of the service providers' sites. These measurement computers will measure each of these clips in its entirety every hour for a 2-week period beginning September 18. The audio and video statistics will be reported back to Keynote's database. Keynote will provide the data to PEREY Research & Consulting (exclusively and directly) for use in the preparation of the NetworkWorld service provider shootout article.

Data Collection

There are many statistics that impact the perceived quality of a stream on the Internet. Keynote measurement computers will collect the relevant data and insert them to Keynote's database. These statistics will get reported as a general indication of the overall quality of the audio and video streams being measured.

Keynote measurement computers will collect the following information about each of the six previously stored clips and the live event streamed from the 8 service provider networks:

Lost audio Packets (Real only)	Lost video Packets (Real only)
Lost Streaming Packets (Windows Media Only)	High bandwidth used by agent
Low bandwidth used by agent	Average bandwidth used by agent
Number of redirects	Redirect time
Initial buffer Time	Number of rebuffers
Total time of rebuffers	Average frames per second (video only)
Frames dropped (video only)	

Data Reporting

Each hour measurement computers will report collected information back to the Keynote database. PEREY Research & Consulting (Network World's selected reviewer) will then use this information as part of its service provider assessment.

The data that gets reported will be indicative of the experience of end-users on each particular backbone in each of the cities measured. Although this provides a good indication of the quality of the audio and video streams being delivered, inferences about how these streams perform from backbones or metropolitan areas other than the ones being measured cannot be made. The only way performance can be measured from the perspective of users in other Internet locations are to take measurements from those locations.

Keynote will provide technical guidance and expertise on methodology and Internet/streaming technologies, but will not provide any subjective interpretation or commentary on the data.

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Appendix: 3722 / 3822 Equipment Description

Technical Aspects

- Advanced MPEG-2/DVB compliant
- Software upgradeable via satellite
- System information available at a button push
- V-chip-type technology for Parental Control based on ratings and content
- Inbound DISH Network electronic mail support

Program Guide Features

- On-screen Program Guide with complete program listings
- Page-At-A-Time Scrolling in on-screen Program Guide
- On-screen transparent channel and program information banner
- 4 user defined Favorites Lists (30 channels each)
- Theme categories for program selection
- Closed caption support
- Alternative language support
- Pay-per-view on-screen purchase summary

Output Connectivity

- S-Video Output jack
- RCA-type audio/video output
- Off-air antenna input (F-connectors)
- 2400 baud internal modulated jack

Antenna and LNBF

- Compact, unobtrusive 18" dish antenna
- Dual LNBF design for a multi-receiver household
- Advanced low noise block converter with integrated feed (LNBF) for reliable, high-quality digital signals