Customer

Arthur Andersen—*Cisco IOS® Multicast Technology Enables Innovative, Global Brand Launch*

Repositioning a Global Consulting Firm

As the new economy has created new opportunities, new rules, and new market leaders, savvy, established companies with an eye to the future have become introspective. In 1998, Arthur Andersen conducted a major business strategy review that included nearly 3,000 interviews with managers, employees, and clients. Research showed that the majority of external audiences associated the firm with its audit and tax services, which account for less than half of the company's $7 billion in annual revenues. With services such as e-Business, human capital, assurance, and risk consulting, Arthur Andersen wanted to position itself to become top-of-mind among customers and potential customers in these areas as well.

A year later, a freshly re-tooled strategy and brand identity had been developed. Arthur Andersen's management wanted to promote this revitalized direction and image to the firm's 77,000 employees and to top-tier media. To support a strong debut the details of the announcement were kept secret until the last minute. Then, the information had to be disseminated quickly and dramatically to Arthur Andersen's 384 offices around the world.

Cisco's implementation of IP multicast in IOS provided the answer.

Y2K Challenge

In late September of 1999, Arthur Andersen formed a 15-person technology team to begin planning a January 24, 2000 Webcast of a message by CEO Jim Wadia, in addition to coverage of brand launch events around the world. The team had to work around a freeze on any hardware, software, and network upgrades because of the coming Year 2000 systems cutover.

"There were six weeks when we couldn't do a thing to the network, from December 1st to January 10th," remembers Dennis Grzesiak, Senior Manager of the Global Network at Arthur Andersen. Nevertheless, between October 1 to January 24, the Arthur Andersen network had to be upgraded to support IP multicast. Network management had been previously considering a move to multicast technology, but now they didn't have the luxury of waiting until 2000 to begin the work.

In addition to deploying IP multicast, Arthur Andersen determined that certain QoS capabilities also had to be in place, to make sure that the multicast traffic had precedence over everything else on the network. Grzesiak's team also made some changes to the hardware.

As the solution was being designed, Arthur Andersen began testing multicast broadcasts in their network labs in Chicago. In November, Cisco provided their Performance, Design, and Verification Center in Raleigh, North Carolina for further testing and tuning.

"We wanted to have the multicast traffic flows available at three different rates: 22k, 50k and 96k. That would take care of users with different types of connectivity at different locations, including dial-up," says Grzesiak.

EXECUTIVE SUMMARY

BACKGROUND

Arthur Andersen's vision is to be the partner for success in the new economy. The firm helps clients find new ways to create, manage, and measure value in the rapidly changing global economy. With world-class skills in assurance, tax, consulting, and corporate finance, Arthur Andersen has more than 77,000 people in 84 countries who are united by a single worldwide operating structure that fosters inventiveness, knowledge sharing, and a focus on client success. Since its beginning in 1913, Arthur Andersen has realized 86 years on uninterrupted growth, with 1999 revenues of more than $7 billion.

CHALLENGE

The global Arthur Andersen network hosted a continuous 24-hour broadcast on January 23-24, 2000, to carry information on the company's repositioned strategy and new brand identity. IP Multicast and Quality of Service (QoS) features were designed and tested at Arthur Andersen network labs in Chicago and off-site at the Cisco Performance, Design, and Verification Lab in Raleigh, NC, despite a freeze on network upgrades at Arthur Andersen during the weeks before Y2K.

CISCO IOS SOFTWARE SOLUTION

IP Multicast protocols including Internet Group Membership Protocol (IGMP) and Protocol-Independent Multicast (PIM) routing protocol were used to enable individual clients to join the multicast groups and to build routes for each group of clients trying to access the broadcast. QoS features for congestion avoidance included Random Early Detection (RED), both "weighted" and "distributed."

RESULTS

An extremely smooth and problem-free broadcast to more than 400 Arthur Andersen offices on all seven continents was made possible via a mix of router upgrades, and the various multicast and QoS features of Cisco IOS software. "It was like watching CNN."

IGMP and PIM Features Enable Multicast

Arthur Andersen used Cisco's Internet Group Membership Protocol (IGMP) to enable individual clients to join the multicast distribution group. IGMP is a major component of IP Multicast, which relies on Class D IP addresses for the identification of multicast groups and dynamically registers individual hosts in a multicast group with a Class D address. Routers listen to IGMP messages and periodically send out queries to discover which groups are active or inactive on particular LANs.

Protocol-Independent Multicast (PIM) routing protocol was used to build routes for each group of clients trying to access the broadcast. With PIM, when a sender wishes to transmit data, the first-hop router sends data to the rendezvous point. When a receiver wishes to receive data, the last-hop router registers with the rendezvous point and the data stream flows from the sender to the rendezvous point and to the receiver. Routers then optimize the flow by pruning the rendezvous point from the flow. The rendezvous point is only used in the beginning as a "dating service" for senders and receivers to meet. PIM "sparse mode" was used since PIM "dense mode" periodically floods the network with its routing traffic.

> "We also are applying all of the QoS features and multicast protocols as we move to Cisco IOS Software Release 12.1 and from there to voice over IP. We've already done the proof of concept in front of the entire company!"
>
> —Dennis Grzesiak, Senior Manager of the Global Network, Arthur Andersen

24 x 24 x 24

Following Arthur Andersen's smooth transition to Year 2000, beginning on January 10th, Cisco's support technicians began hardware upgrades (both Boot ROM and memory) on almost 60 routers. These hardware upgrades, which were deferred until after Y2K, were needed to enable the required IOS to be loaded which supported IP Multicast. Andersen network engineering and operations teams completed the deployment of the necessary IOS code and by January 21st a total of 240 locations around the world were ready to receive the multicast broadcast.

The January 24th brand launch had come to be known as "24 x 24 x 24" because it featured 24 events for 24 hours on the 24th. Video cameras at each party and press briefings around the world fed footage into an ISDN link back to a production team in Chicago, who then edited the content and created new Webcasts during the 24 hours, much like a news channel. These were combined with prerecorded two-minute discussions with Arthur Andersen executives.

"It was like watching CNN," says Grzesiak.

Two servers hosted the multicast content, one serving as backup. Microsoft Media Server was the software used on the server platforms and Microsoft Media Player was the client software sent out to all desktop and laptop PCs. Two other servers were responsible for gathering video data from the field and encoding it. For dial-up users, two other servers pushed content to a service provider, where it could be accessed on Arthur Andersen's web site via unicast redirection.

Grzesiak's team used a combination of QoS features for congestion avoidance, including Random Early Detection (RED), both "weighted" and "distributed." By randomly dropping packets prior to periods of high congestion, RED tells the packet source to decrease its transmission rate, thus avoiding congestion before it starts. Weighted RED drops packets selectively based on IP precedence. Edge routers assign IP precedences to packets as they enter the network. Distributed WRED uses the versatile interface processor to perform the queuing.

"The multicast broadcast went extremely well," says Grzesiak. "Where we encountered some choppiness—at sites in Mexico, Eastern Europe, and Asia Pacific—we enabled the Frame Relay traffic shaping feature, which improved quality of the program."

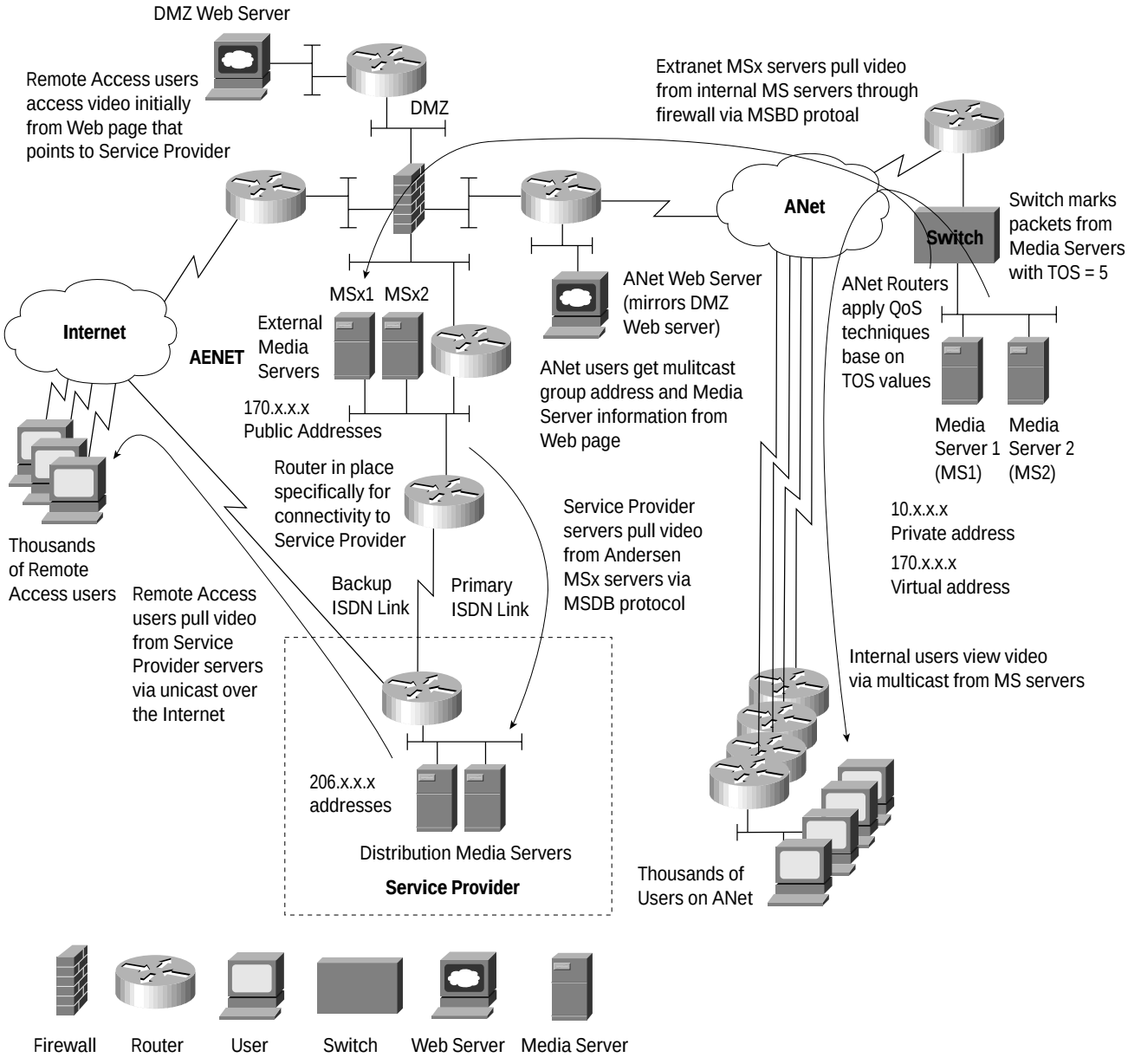
Results

Ongoing Use of Multicast

By the end of the broadcast, at 11:00 P.M. on Monday the 24th, the Arthur Andersen network team was exhausted but jubilant. As the pioneers of IP multicast within Arthur Andersen, the network team has since used this technology to enhance the firm's ability to rapidly deliver video and audio information to wide audiences. At Andersen, senior partners now use IP Multicast to deliver video addresses detailing firm matters to partners and employees in the field. The Andersen Auditorium speaker program, which involves interviews with both internal and external business leaders, is now recorded and broadcast monthly using IP Multicast. These monthly broadcasts are delivered to partners and employees in the field, and to clients and prospective clients via service providers. Lastly, Andersen uses IP Multicast to present real-time and recorded training videos produced by its Center for Professional Education in St. Charles, Illinois to its employees worldwide.

"We also are applying all of the QoS features we learned from our IP multicast project as we move to Cisco IOS Software Release 12.1 and from there to voice over IP," says Grzesiak. "We've proved that QoS works and have already done the proof of concept in front of the entire company!"

Figure 1 Arthur Andersen IP Multicast Architecture



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