Broadcaster Provides Unprecedented Coverage of Beijing Olympics

NBC Olympics built a high-speed Cisco network to select video shots from New York even as the video is being recorded in Beijing.

EXECUTIVE SUMMARY
NBC OLYMPICS
• New York, New York
CHALLENGE
• Enhance viewers' Olympics experience with more coverage
• Deliver coverage to new media outlets: online, on-demand, and mobile
• Minimize costs and environmental impact of Olympics coverage
SOLUTION
• Built a high-performance trans-ocean network
• Used the network as the platform for a file-based workflow for shot selection and editing
RESULTS
• Will achieve record-breaking coverage: 3600 hours
• Will broadcast events never before seen
• Avoided costs to move 400 staff members to Beijing

Challenge

NBC owns the exclusive U.S. media rights to the Olympic Games through 2012. From August 8-24, 2008, NBC Universal will present an unprecedented 3600 hours of coverage from Beijing, China. "The 2008 Olympic Games has the most ambitious media plan in history," says Craig Lau, vice president of IT, NBC Olympics. "With 3600 broadcast hours, 212 hours a day, it surpasses the combined total of all previous summer Olympics Games."

The 2008 Olympic Games coverage will be groundbreaking in other ways, as well. Viewers will be able to use their PCs and laptops to access 2200 hours of video that they can play back on demand, as well as 3000 hours of highlights, rewinds, and encores. And people on the go will be able to watch video and view results on their smartphones.

To meet these ambitious goals at a reasonable budget, the NBC Olympics IT group needed to solve several technical challenges:

- NBC wanted editors and shot selectors in the United States to be able to access video over the network as it was being captured in China. Used in this way, the IP infrastructure would reduce operational expense.
- Providing the quality of service (QoS) to assign priority to real-time video footage: All transocean network traffic shares the same pipes, and video of the Olympic Games would need higher priority than, say, event scores.
- Encoding and transmitting low-resolution (low-res) video from Olympic venues for broadband viewing: Low-res video uses far less bandwidth, which would enable NBC to provide Internet coverage of more Olympic sports.

Network Solution

NBC is using a Cisco® network as the foundation of an innovative long-distance, file-based workflow that spans the 6000 miles from Beijing to New York. The result is that shot selectors and editors in the U.S. can work as efficiently as if they were in Beijing.

Why Cisco? "We trust Cisco to meet our requirements for flawless execution," says Lau. "Cisco has been the de facto standard for reliability and rock-solid performance for the previous Olympic games." The NBC Olympics IT group also liked the fact that Cisco could provide both the IP network infrastructure and the low-res video encoding solution, which reduces complexity.

High-performance Trans-ocean Link

To transfer video between Beijing and New York, NBC deployed three 150 Mbps OC-3 connections. A Cisco 12004/4 Router combines all three into one gigantic virtual pipe with 450 Mbps bandwidth (Figure 1). Video content receives priority over other types of traffic sharing the same pipe, including teleprompter content and event scoring. "Cisco QoS enables us to dedicate 400 Mbps to video and 10 to 20 Mbps to voice," says Harry Ryan, network architect, NBC Olympics. The 400 Mbps dedicated bandwidth and a high-performance file transport engine enables NBC to transmit a one-hour DV25 file from Beijing to the U.S. in just three minutes.

Figure 1.   Network Diagram
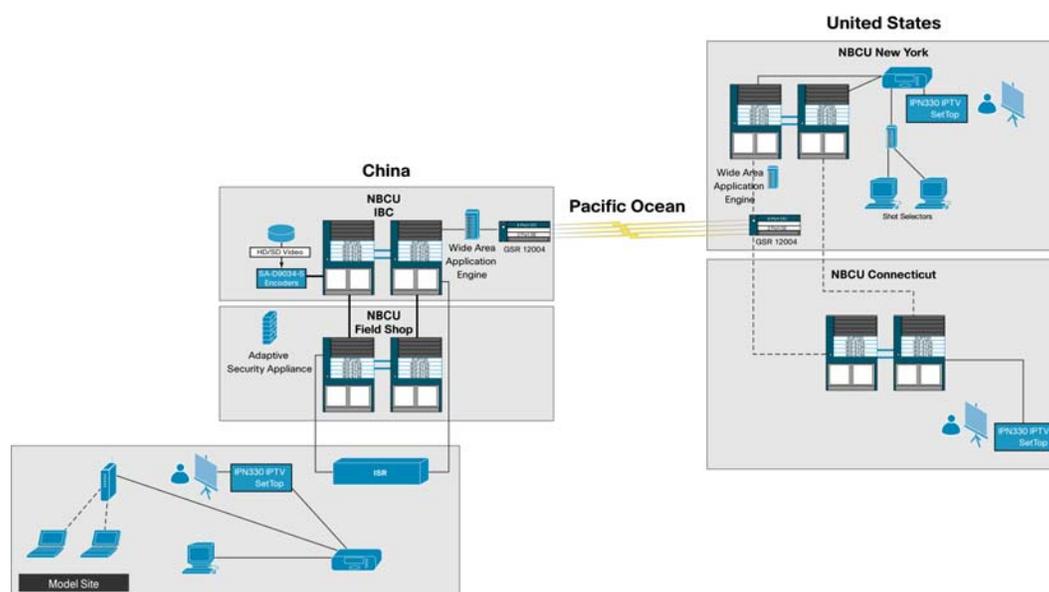
Long-Distance, File-Based Workflow

For the first time in Olympics history, shot selectors in the U.S. will use a file-based workflow. An application server in China will digitize and ingest high-definition (HD) and standard-definition (SD) feeds and simultaneously create full-resolution HD files and low-res proxy files of all recordings. While still being recorded, the files will be actively transferred to a storage system in Beijing. From there, a file transport engine will transmit only the low-res proxy files over the Cisco network to another active storage system in New York — 6000 miles away. There, shot selectors and will edit the low-res files. The resulting Edit Decision Lists (small files that do not contain actual video) will be sent back to Beijing to request the desired SD and HD high-resolution footage for final production editing. By only transferring the high-resolution footage that it actually intends to air, NBC will free up bandwidth to cover more events.

WAN Optimization and Application Acceleration

To ensure that editors and shot selectors in the United States can access video files as fast as if they were in China, the NBC Olympics IT group is using Cisco Wide-Area Application Services (WAAS) for WAN optimization and application acceleration. "With Cisco WAAS, our film-editing

software has 140 Mbps throughput compared to 35 Mbps without WAAS," says Ryan. "That's what makes it feasible for our editing people to work in our U.S. facility instead of China." Lau adds, "We have one of the most demanding network environments in the world because we're moving gigabyte-sized files, not megabyte-sized files. We used to hear complaints about slow network performance, and with Cisco WAAS that's no longer true."

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> —Harry Ryan, Network Architect, NBC Olympics

Low-Bandwidth Content for Broadband Viewing

NBC Olympics is also using a Cisco network to deliver Olympics footage to viewers using online, on-demand, and mobile services. "NBC is aiming to provide the Olympic experience anywhere, anyplace, anytime, using any delivery platform," says Lau. Cisco MPEG-4 encoders are used to encode and compress content captured in Beijing for low-bandwidth transmission to New York. Using less bandwidth means that NBC Olympics can send more material, including coverage of events that have never before been broadcast, including table tennis, badminton, and sailing.

In previous Olympics, editors had to work from videotapes to add graphics and captions to event shots. But during a 17-day event, it is just not possible to dub off enough video copies for eight different networks as well as NBC.com. During the 2008 Olympic Games, after the video content arrives in New York, editors will select recorded events and then either use them for reruns or subclip them to create highlights packages. The packages will be sent over the Cisco network for distribution. "This is the first time we've combined low-res and high-res video to deliver to cable, broadband, and broadcast networks," says Lau. "Using the IP network to transport video files eliminates the tape bottleneck."

Results

The Cisco network and video solutions are enhancing the viewer experience even as they reduce costs.

Faster Shot Selection for an Excellent Viewer Experience

In past Olympics Games, editing could not begin until the event was finished and the editing room received the videotape. Now, with the file-based workflow, the network can select shots and

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> —Craig Lau, Vice President of IT, NBC Olympics

distribute them to affiliates even before the event is finished. "The Cisco network solution accelerates our ability to make good decisions in terms of content and quality," says Lau. "With the

Cisco network solution, we've achieved the Holy Grail of digital video, which is the ability to perform shot selections on low-res files and extract high-res material from those files even as they are being recorded. That's a huge accomplishment."

More Viewer Options

Viewers who visit NBCOlympics.com using their PCs or mobile devices will be able to search for video based on an athlete's name, hometown, or emotional content. The reason is that NBC adds metadata (keywords describing the content) to all shots, which the crew can use to select content such as tears of joy or frustration or a happy family in the stands.

Viewers will also be able to follow the performance of hometown athletes, no matter how well they finish. NBC Olympics keeps a database of all athletes and their hometowns. Using the Cisco network and file-based workflow, editors can quickly create a cut-down reel and make it available to local affiliated stations. "This is the first Olympics for which we have been able to localize content to this extent for broadband viewers," Lau says.

Reduced Costs, Smaller Footprint in Olympic City

With the ability to access the video content as if they were in Beijing, 300 to 400 shot selectors and editors will not need to relocate for the duration of the Olympic Games. Studio personnel in New York can even switch the camera feeds over the network. "By efficiently transferring video files across international links, we will reduce travel and housing costs and take better advantage of our New York facilities," Lau says. And avoiding 800 airplane trips also supports NBC's green initiatives for the Olympic Games.

Lau concludes, "Cisco is a trusted partner, and in the demanding IT environment for the Olympics Games, we depend on trusted relationships. We have absolute deadlines for when Olympics coverage begins and ends. Cisco technologies help us exceed expectations and meet our timetables in an unforgiving environment."

PRODUCT LIST

Routing and Switching
- Cisco 12000/4 Router with four OC-3 connections
- Cisco Catalyst 6509-E Switches with 10GB modules and connections
- Cisco Catalyst 4948-10GE, 3750G, and 3560-E Switches
- Cisco 3845 and 2821 Routers

Security
- Cisco Adaptive Security Appliance 5580

Video
- Cisco D9034 MPEG-4 SD Encoders
- Cisco D9054 MPEG-4 HD Encoders
- Cisco IPN330 IPTV HD/SD Set-tops

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- Cisco Aironet 4400 WLAN Controllers

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