

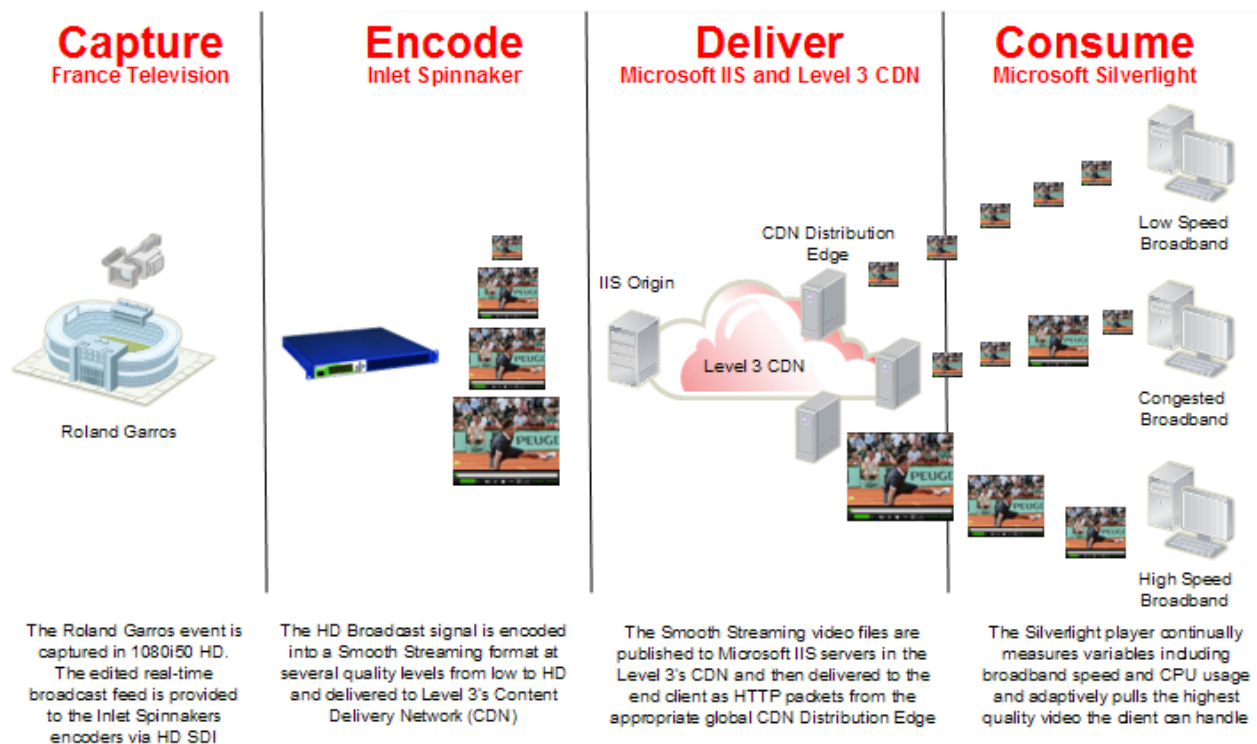
Event Overview

The French Open, organised by the French Tennis Federation, is one of the premier sporting events in the tennis calendar, and is the highlight of the clay court tennis season. It showcases the best talent in the tennis world playing in the world renowned Roland Garros stadium. In 2008, the Open was broadcast in 198 countries to a global audience of millions.

This year, France Televisions will maintain extensive coverage on its three broadcast channels (France 2, France 3 and France 4). In addition to continuing high quality online delivery, France Televisions will also showcase an Adaptive Smooth Streaming High Definition (HD) Internet experience. This delivery is done in partnership with: Microsoft and their IIS Smooth Streaming and Silverlight technologies; Inlet and their Live Smooth Streaming Spinnaker encoders; and Level 3 Communications and their global Content Delivery Network.

France Televisions and its partners have chosen Roland Garros to showcase the latest video encoding, delivery and consumption technologies and in the process, delivering the first live HD Smooth Streaming public event in the world. Smooth Streaming is an advanced media delivery method that switches seamlessly between multiple streams depending on the end user's available bandwidth and PC performance at any given moment. The best possible quality video stream is automatically delivered without stuttering, dropped frames or buffering. The process results in a much improved user experience, offering programmers the ability to offer true HD (720p+) streams to customers who have sufficient bandwidth, without alienating those who have lower speed connections.

Capture to Consumption



Delivering a live adaptive HD Internet Experience for the French Open requires four key steps: capture; encoding; delivery; and, consumption. For Roland Garros, Microsoft, Inlet and Level 3 Communications have brought together an end to end solution and workflow that combines the latest encoding, delivery and player technology.

Capture

The tennis action is captured and edited on site at the French Tennis Federation in a 1080i50 HD format and work flow. For the French Open, France Televisions is using HD cameras and an end to end HD workflow. The production broadcast signal is then delivered to Inlet Spinnaker encoders located in the production trailers at the venue through standard HD-SDI connections..

Encoding

In this step, the Inlet Spinnaker encoders take the HD broadcast feed and synchronise it across two Spinnakers to produce multiple time-aligned streams. The number, size and bandwidth of streams are determined by the quality of the video source and the range of bandwidth speeds and computer processing power anticipated to be available to the end viewer. For this event, the Spinnaker encoders are delivering seven feeds ranging from 350 kilobits per second to 3 megabits per second.

Delivery

The video feeds are pushed from the Inlet Spinnaker encoders to Microsoft IIS mount points within the Level 3 Content Delivery Network (CDN). The IIS servers receive the multiple video feeds, store them for DVR purposes, create the required client side description files, and act as an origin for the Level 3 CDN.

End user requests for content are directed to the most appropriate edge caching server on the Level 3 CDN via a DNS-based rendezvous technology. This technology constantly monitors Internet conditions to ensure end users are connected to the optimal edge server. The Level 3 edge server pulls the requested feed from regional parent caches which are in turn populated from the IIS servers. The edge server delivers the requested feed to the consumer over HTTP, taking advantage of the massive scale of the Level 3 CDN.

Consumption

In this final step the Microsoft Silverlight player dynamically detects and seamlessly switches between feeds from the Level 3 CDN. The Silverlight player switches the video quality of the feed based on local client conditions. Consumers with high bandwidth connections can experience true 720p HD and others with lower bandwidth speeds or lower powered machines receive the appropriate stream for their connectivity.

Event Management

To ensure a quality experience for all viewers it is important to not only select the right technologies but to also run the event with experienced broadcast operations teams. For this event France Televisions and Level 3 Communications combined their operational talents to create a dedicated event management team that managed all elements of the solution. The France Televisions production team, located at Roland Garros, was responsible for setting up and monitoring the entire broadcast environment at Roland Garros. The France Televisions team then delivered a clean broadcast signal to

the Inlet Spinnaker encoders located onsite. Beyond the broadcast feed, the Level 3 Communications European based Internet Broadcast Operations Centre was responsible (directly or in partnership with Microsoft and Inlet) for setting up and monitoring the Internet video delivery environment. This included the encoders at the venue, the IIS servers in the Level 3 CDN, all CDN edge servers, and the Level 3 Internet backbone. This ongoing monitoring by France Televisions and Level 3 Communications allowed the team to take proactive steps in resolving any delivery issues.

Benefits

- **Inlet Spinnaker encoders bring broadcast HD content online:** The Spinnaker encoders integrate seamlessly into the broadcast workflow to deliver a true HD Smooth Streaming experience. Located in a broadcast truck at the venue, the encoders (installed by the French systems integrator SAV) acquire the signal and deliver directly to the Level 3 CDN, eliminating the need for costly backhaul solutions.
- **Level 3 CDN is able to guarantee quality to massive online audiences:** Level 3 operates one of the world's largest Internet Protocol (IP) networks that is extensively connected to regional eyeball networks. Sitting on top of this IP network, the Level 3 CDN is able to deliver directly to the eyeballs through dedicated links, avoiding the congested peering exchanges and other Internet bottlenecks. Microsoft Smooth Streaming is optimised to work with the Level 3 CDN and is integrated deeply into the caching network.
- **Microsoft Smooth Streaming improves quality of experience for consumers:** The audience can enjoy a consistent high quality streaming experience without buffering or stuttering, even as local conditions on their client and Internet connection change, which drives up viewing times and subsequently the ability to monetize the content. DVR functionality allows consumers to never miss a moment of the action, and to replay time and time again before catching up with the live action again.
- **Microsoft Silverlight provides a rich player environment:** The France Televisions video player built on Microsoft Silverlight technology has the intelligence built in to enable adaptive streaming and DVR functionality and is readily extensible through the .NET 2.0 programming environment.
- **Experienced event management ensures smooth running** – By setting up the delivery environment and through ongoing monitoring of the broadcast video signals, encoders, and Internet delivery, France Televisions and Level 3 were able to proactively respond to any issues that arose. This ensured that the online experience was maintained as close to the broadcast experience as possible.