



DTH Multiscreen Streaming Solution

Application Note

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Traditional TV operators are exploring ways of delivering their content across multiple screens and delivery methods, and satellite or Direct to Home (DTH) operators are no exception. Like broadcasters, DTH operators can repurpose their existing premium content for use on other devices. Unlike cable or telco operators, however, a DTH operator will have to rely on third party terrestrial networks or the Internet to deliver video to multiple screens.

Multiscreen strategy is generally based on the following goals:

1. Expanding reach beyond the existing subscriber base
2. Augmenting existing product or premium subscription packages

The latter is especially applicable for unique content the operator has the rights to, such as top-tier sports content. In such cases, delivery to iPhones or mobile devices can augment existing premium subscription packages and is usually bundled into it at no charge.

The DTH operator therefore needs a system that can transcode and deliver content across multiple mobile and PC screens. As traditional broadcasters are also shifting to deliver video to multiple screens, it is highly important to keep superior picture quality versus transcoder feature set.

SYSTEM DESIGN AND ARCHITECTURE

There is currently no single standard in place for the multiscreen market, and so operators are required to stream in multiple formats. The most common formats include Apple HTTP streaming, Adobe Flash, Windows Media, RTSP 3GP and Silverlight Smooth Streaming formats for smart phones.

As can be seen in the diagram below, the target end user devices are mobile devices such as the iPhone, Blackberry and Android, and PCs with browsers supporting Adobe Flash and Windows Media

At the headend side, the following components are available:

1. ProStream 4000™ – Harmonic LIVE Transcoder array
2. NMX Digital Service Manager™ – Harmonic management, configuration and status monitoring
3. Content delivery network or content distribution network (CDN) system
4. Gateway or origin server – Used to display URL address of live streams
5. CMS – Content Management System

The solution architecture proposes a transcoder array that can be set for streaming a variety of output formats from a single input directly to a CDN.

The ProStream 4000 offers a dense platform supporting Apple LIVE transcoding as well as other formats. In one deployment, the ProStream 4000 was used to support the same 16 premium sports channels. It was configured for three Multiple Bit-Rate (MBR) outputs per input channel, and prior to the CDN would output an MPEG-2 Transport Stream (TS) to an in-house developed Apple segmenter.

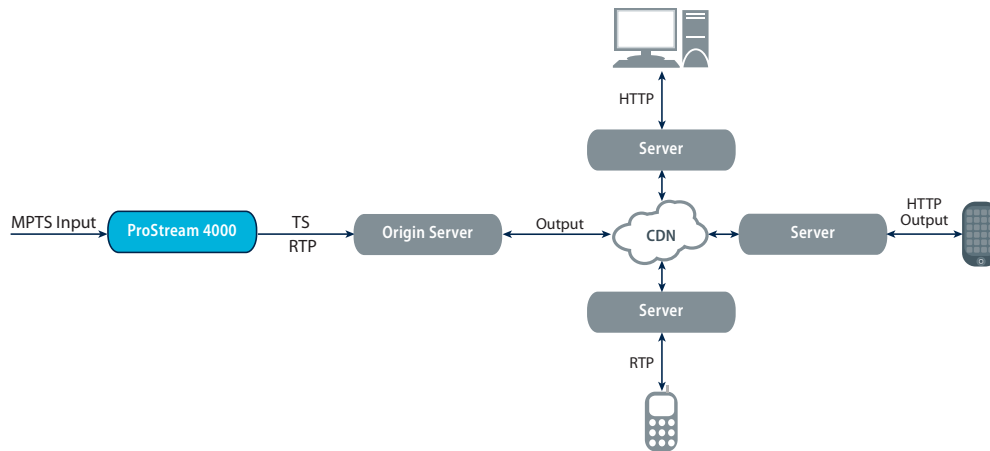


Figure 1: ProStream 4000 Transcoder Solution

Although the ProStream 4000 can generate HTTP fragmented outputs for iPhone and Silverlight, an interim stage between the live transcoder and the CDN may be used, depending on the implementation. An example can be seen above, as an Apple segmenter is used to convert the TS output to iPhone fragmented output. The purpose of NMX is to ensure high availability of the encoding system, just as it is implemented in a DTH headend. Input streams from a DTH operator are usually DVB-compliant multiple program transport streams (MPTS) and IGMPv3 networks. Delivery of content to the end user iPhones and other mobile devices can rely on local Wi-Fi and 3G Networks.

OUTPUT FORMATS AND NOMINAL BIT-RATES/RESOLUTIONS

The following are examples of output formats, bit-rates and resolutions the ProStream 4000 can support simultaneously.

APPLE HTTP STREAMING

Apple Streaming involves using software on the server to break an MPEG-2 transport stream into small chunks saved as separate files. The .m3u playlist (.m3u8) file tells the client where to get the files that make up the complete stream. Clients merely download and play the small chunks in the order specified in the playlist. In the case of a live stream, the media client periodically refreshes the playlist to see if there have been any new chunks added to the stream.

Stream	Video Configuration	Audio Configuration
High	500 kbps, 480 x 270, 30 fps	16 kbps, 32 kHz, stereo
Medium	256 kbps, 480 x 270, 15 fps	16 kbps, 32 kHz, stereo
Low	40 kbps, 480 x 270, 5 fps	16 kbps, 32 kHz, stereo

ADOBE STREAMING FORMATS

Real Time Messaging Protocol (RTMP) is a proprietary protocol developed by Adobe Systems for streaming audio, video and data over the Internet, between a Flash Media Server and a player.

Stream	Video Configuration	Audio Configuration
High	1.0 - 2.0 mbps, 1280 x 720	16-32 kbps, stereo
Medium	700 kbps, 528 x 480	16-32 kbps, stereo
Low	300 kbps, 320 x 240	16-32 kbps, stereo

RTSP (MPEG-4 PART 2)

Real Time Streaming Protocol (RTSP) is an application-level protocol for control over the delivery of data with real-time properties. RTSP enables on-demand delivery of real-time data, such as audio and video.

Stream	Video Configuration	Audio Configuration
Medium	160 kbps, 240 x 180, 10 fps	32 kbps, 16 kHz, stereo
Low	80 kbps, 176 x 144, 7.5 fps	16 kbps, 16 kHz, mono

WINDOWS MEDIA

Windows Media allows generation of live streaming media (audio/video) and the ability to cache and record streams, encryption, limit inbound/outbound connections, and FEC. Both unicast and multicast streams are supported.

Stream	Video Configuration	Audio Configuration
Medium	256 kbps, 320 x 240, 30 fps	32 kbps, 32 kHz, stereo
Low	77 kbps, 240 x 180, 15 fps	16 kbps, 22, kHz, mono

CDN FUNCTIONALITY

A CDN is a system of computers containing copies of data, placed at various points in a network so as to maximize bandwidth access for clients throughout the network. A client accesses a copy of the data from a nearby server, as opposed to all clients accessing the same central server. This avoids bottleneck at the central server. Strategically placed edge servers decrease the load on interconnects, public peers, private peers and backbones, freeing up capacity and lowering delivery costs.

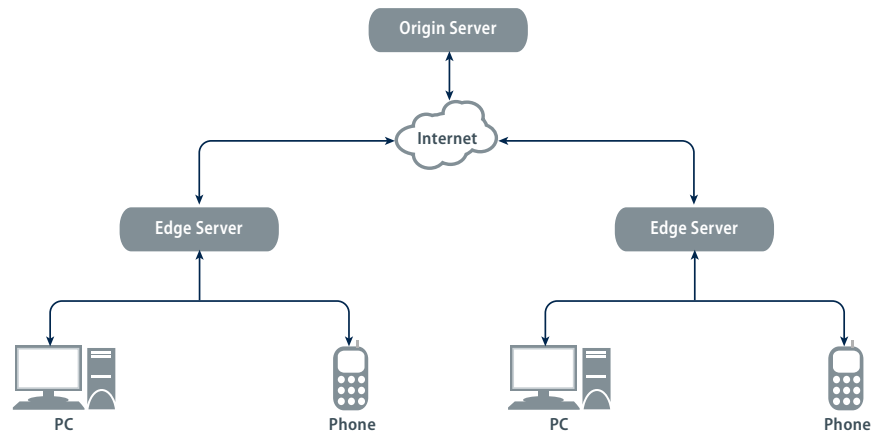


Figure 2: CDN Diagram

DTH operators can utilize OTT, WiFi or mobile networks to distribute their premium content across multiple devices. The ProStream 4000 offers high density with multiple outputs and fits seamlessly into any CDN. In addition to superior video quality, Harmonic's ProStream 4000 and NMX Digital Service Manager offer unmatched system availability and resiliency to the DTH operator.

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