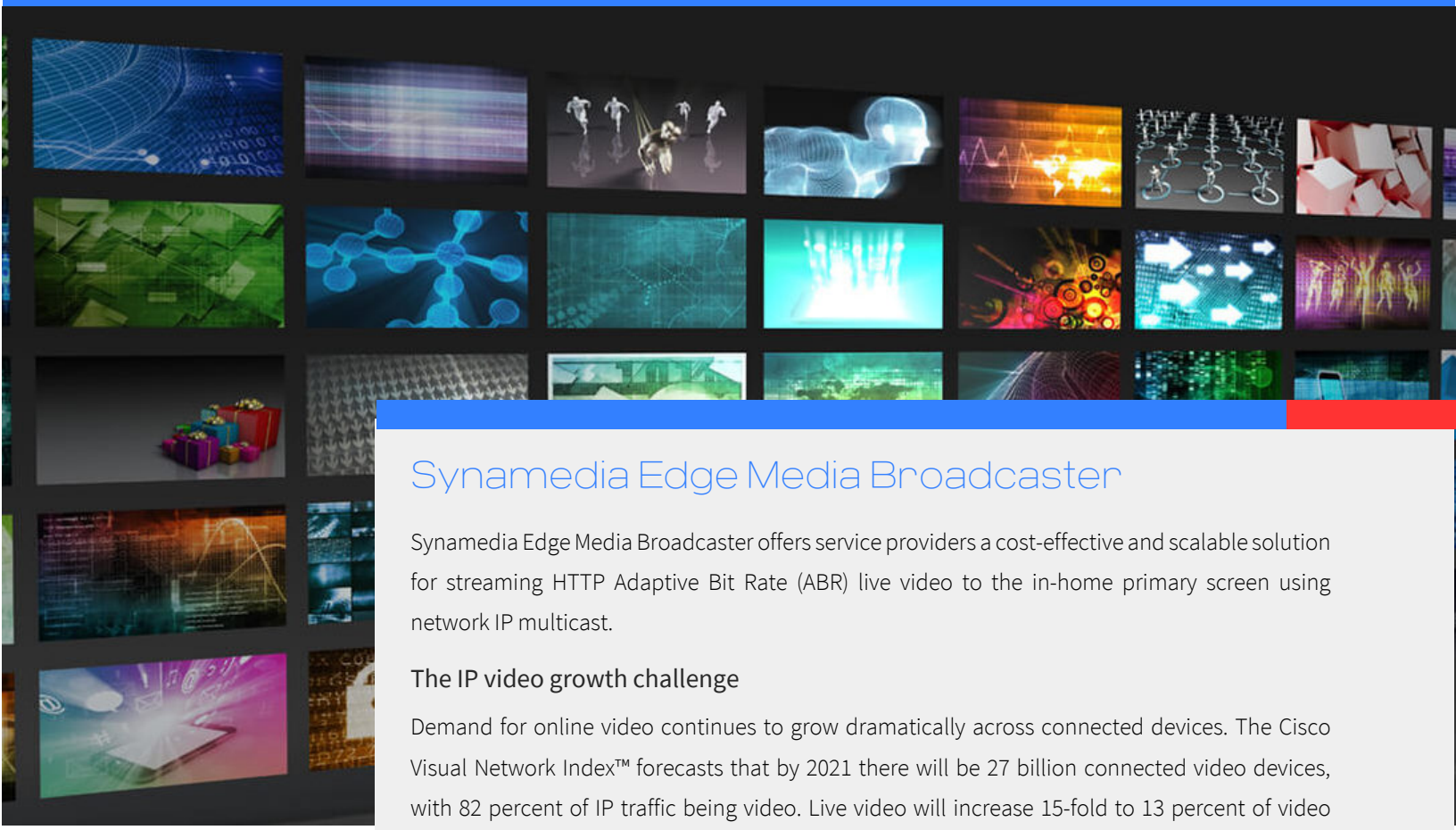


Synamedia Edge Media Broadcaster

Synamedia Edge Media Broadcaster offers service providers a cost-effective and scalable solution for streaming HTTP Adaptive Bit Rate (ABR) live video to the in-home primary screen using network IP multicast.

The IP video growth challenge

Demand for online video continues to grow dramatically across connected devices. The Cisco Visual Network Index™ forecasts that by 2021 there will be 27 billion connected video devices, with 82 percent of IP traffic being video. Live video will increase 15-fold to 13 percent of video traffic, and ultra-HD IP video is forecasted to reach 21 percent of all video traffic.

The market trends presents some major challenges for video service providers:

- The shift to mobile adaptive bit rate (ABR) clients requires service providers to operate two parallel delivery systems and headends: MPEG2TS for the legacy set-top boxes and IP ABR for mobile devices. This duplication has significant CapEx and OpEx cost implications.
- Streaming ABR using unicast requires a separate session for each viewer. This delivery method cannot scale to the forecasted load of live video, especially for popular live events such as the football or soccer finals as well as sensational news events with burst viewership.
- Because of the nature of unicast streaming, the increase in video traffic volume will require significant infrastructure investment at the edge of the network to absorb the load.

Synamedia Edge Media Broadcaster solution overview

The Synamedia® Edge Media Broadcaster solution provides service providers a next-generation solution for streaming HTTP ABR video to the in-home primary screen using network router IP multicast to achieve broadcast-efficient distribution. It integrates with the existing ABR delivery system without a need for any modifications to the video headend components (for example, encoder, packager, content delivery network) or to the ABR clients. The solution ingests unicast video from the origin server, converts it into multicast data, and distributes it all the way to the home router or set-top box, where it is converted back to unicast video. The solution is implemented to be fully transparent to both the ABR client and the ABR headend.

Because the solution is independent of the existing video delivery infrastructure, it can be integrated with any existing video headend or CDN provider. The solution is highly available and scalable and can support millions of viewers at once.

The solution offers:

- **Efficient live ABR video distribution** to stream to millions of homes with one IP multicast session.
- **Cost reduction**, which enables convergence to all ABR headend and all ABR clients
- **Transparent** with no change to the ABR video headend infrastructure, CDN, and ABR players
- **Reliable transmission** with forward error correction (FEC) unicast retransmit
- **Optimized network utilization** and reduction of CDN resources compared to Live unicast ABR

Edge Media Broadcaster is part of the Synamedia Open Media Distribution (OMD) suite of products. OMD includes the Media Streamer CDN solution. The Media Streamer content delivery platform is designed to deliver immersive multiscreen video experiences to managed and unmanaged devices across telco, cable, and mobile access networks. The Media Streamer scales cost-effectively to distribute terabits per second (Tbps) of live, on-demand, and time-shifted video.

Synamedia Edge Media Broadcaster advantages

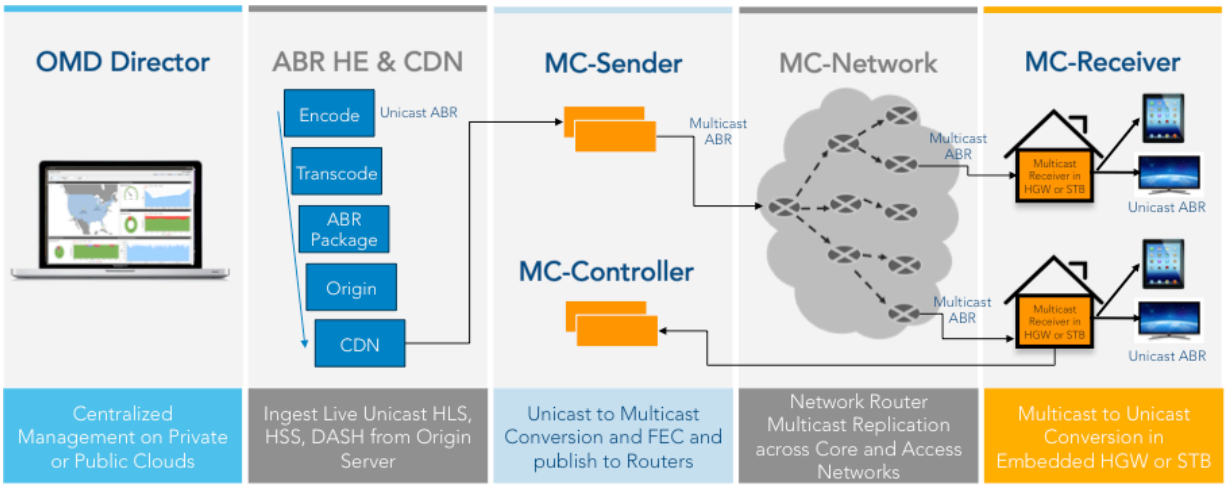
The Synamedia Edge Media Broadcaster solution's primary design goals are to achieve:

- **Transparent to ABR media players:** does not require modifications of the ABR media player
- **Transparency to existing ABR headend:** requires no modifications of encoder, packager, or CDN
- **Transparent switching** of unicast and multicast streaming in customer premises equipment (CPE)
- Centralized or distributed deployments of MC-sender
- **Transparent error repair** for packet loss, employing both in-band FEC and unicast retransmit
- **Support for IPv4, IPv6, IGMP2 and IGMPv3** to be compatible with existing multicast standards
- **Flexible CPE strategy:** ability to integrate the MC-receiver client into an STB or HGW
- **Rapid channel change** using unicast client buffer filling from CDN or MC-receiver cache
- **Low Latency** based on Chunked Transfer Encoding and CMAF technologies

Solution architecture

Synamedia Edge Media Broadcaster is based on a Cable Labs reference architecture for a multicast ABR video distribution solution released in 2015–2016.

Figure 1. The solution architecture and main components



The solution consists of three main components:

The Multicast Sender (MC-sender): The MC-sender is a software application running on a Linux operating system (bare metal, virtualized or containerized) in the service provider's headend. The primary functions of the MC-sender are:

- Acquire a live ABR stream from the CDN or origin server using unicast HTTP/TCP requests
- Encapsulate the video data and FEC for multicast distribution
- Transmit with rate-pacing multicast data packets to the multicast address group, optional QoS (DSCP)

The Multicast Receiver (MC-receiver): The MC-receiver is integrated into the STB or HGW as a software application running in a CPE middleware's operating system. The primary functions of the MC-Receiver are:

- Stream HTTP/TCP (HLS, DASH, HSS_ unicast video to HTTP ABR media player
- Acquire (ingest) ABR video using multicast or unicast, with transparent switching
- Packet error repair using combination of FEC and unicast request retransmission

The Multicast Controller (MC-controller): The MC-controller is a software application running on a Linux operating system (bare metal, virtualized or containerized) in the service provider headend. The primary functions of the MC-controller are:

- Distribute configuration information to the MC-sender and MC-receivers

- Receive stream status messages from MC-receivers containing channel viewing and streaming statistics
- Provide policy-based or popularity-based configuration of streams to multicast.
- Export data to OMD Director element management system for Analytics and Notifications

Product specifications

Table 1. Table 1 outlines the main features of Synamedia Edge Media Broadcaster.

Description	Specification
Supported ABR Formats	Apple HTTP Live Stream (HLS) MPEG Dynamic Adaptive Streaming over HTTP (DASH ISO-BMFF) MPEG1, MPEG2, MPEG4/H264/H265 Microsoft HTTP Smooth Streaming (HSS)
Network standards	Supports IPv4, IPv6, IGM2, IGMP3, PIM-SM, PIM-SSM
Transparent to ABR headend, CDN, and ABR media players	Does not require modification of encoding, packaging, origin server, CDN, or clients in order to multicast standard ABR segments Use your existing CDN or combine with Synamedia Open Media Distribution CDN for complete Synamedia solution
Compatible with TSTV and trick modes	Does not interfere with existing CDVR solutions and supports client pause, resume, FF, RWD functions (with unicast CDN support for TSTV)
Low Latency	Support low latency live streaming using HTTP Chunked Transfer Encoding (HCTE) and CMAF technologies
Transparent unicast to multicast switching	Transparently switch between unicast and multicast video stream ingest
Content distribution policies	Supports both policy-based and popularity-based stream distribution Policy-based preconfigures streams to multicast, typically most popular Popularity-based dynamically switches on/off multicast streams, based on viewership popularity
Reliable video with error correction	FEC (Reed Solomon) for in-band FEC repair in STB or HGW Fallback to unicast HTTP retransmission from CDN
QoS marking	Supports DSCP marking of multicast streams for network QoS enforcement
Supported CPE Platforms	Multicast receiver (embedded client) can be deployed in any Linux based home gateways or set-top box for flexible deployment options
Security	Synamedia Edge Media Broadcaster supports any existing DRM HTTPS messaging between application servers Secure OMD Director GUI

Ordering Information

Table 2. Table 1 outlines the main features of Synamedia Edge Media Broadcaster.

Product ID	Description
R-OMD-PRCL-K9	Open Media Distribution Software
L-OMD-MGM-SW-PSS	SW LIC, OMD Director Management & Control, Perpetual
SW-OMD-BCST-SW-P	SW LIC, Edge Media Broadcaster Software, Includes 20 Licenses of L-OMD-BCST-MSCU-P
L-OMD-BCST-MSCU-P	SW LIC, Multicast Sender or MC Controller (per server) additional
L-OMD-BCST-SB100-P	SW LIC, Edge Media Broadcaster Subscriber License - 100,000 subscribers
L-OMD-BCST-SB500-P	SW LIC, Edge Media Broadcaster Subscriber License - 500,000 subscribers
L-OMD-BCST-SB1M-P	SW LIC, Edge Media Broadcaster Subscriber License - 1,000,000 subscribers
L-OMD-BCST-CHNL-P	SW LIC, Edge Media Broadcaster per Live Channel License
L-OMD-ANL-10GLD-P	SW LIC, Analytics Capacity, 10 Gbyte Log per Day, Perpetual
L-OMD-ANL-100GLD-P	SW LIC, Analytics Capacity, 100 GBLog/Day, Perpetual

Services

Synamedia offers a wide range of service programs to accelerate customer success. These innovative service programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Our Services help you protect your video network investment, optimize your operations, and prepare you for the future of video.

For more information about Synamedia Services, contact your partner or Synamedia representative.

About Synamedia Open Media Distribution

Synamedia Open Media Distribution portfolio is ideal for any PayTV operator or media company that is offering a multi-screen experience to the consumer. Our solutions includes everything you need to provision, distribute, monitor, and analyze IP media flows for high quality and efficient delivery of service. The Synamedia Open Media Distribution portfolio provides comprehensive IP unicast and IP multicast solutions to distribute IP video to any screen.

For more information

For more information about the Synamedia video solutions, visit www.synamedia.com, contact your Synamedia sales representative or Synamedia channel partner

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