Cisco MXE 3500 Media Experience Engine

Product Overview

The Cisco® MXE 3500 Media Experience Engine is a powerful and flexible network appliance in the Cisco line of media transformation products. As a central component of the Cisco architecture for optimizing medianet for video, the Cisco MXE 3500 delivers a comprehensive set of media-transformation services to help capture, transform, and share video. These services make video content findable, accessible, and easy to consume anytime, anywhere, on any device.

The media-transformation services delivered on the Cisco MXE 3500 include:

- Any-to-any media adaptation
- Media postproduction
- Cisco Pulse® video analytics

These services combine professional quality and options with consumer-grade ease of use, enabling anyone in an organization to produce effective videos. With media-transformation services, organizations can accelerate communications, enhance training and educational activities, and make meetings more productive.

Any-to-Any Media Adaptation

With any-to-any media adaptation, recorded and live video content is automatically adapted from a range of incompatible media formats, resolutions, and speeds, from standard definition (SD) up to high definition (HD), so you can view the content on demand or live with a wide variety of playback devices and applications.

The Cisco MXE 3500 supports workflow automation for adapting source multimedia streams and files according to highly customizable rule sets, or profiles, providing a "set it and forget it" approach to recurring adaptation jobs.

The Cisco MXE 3500 supports live streaming by ingesting live video IP streams, such as live Windows Media streams up to full HD, and transcodes the streams into common formats for live-to-live and live-to-file adaptation. You can transcode live IP source streams into one or more live webcast streams for consumption through streaming servers on devices that support Windows Media, Flash, and H.264 formats. You also can transcode live IP source streams into live H.264 in MPEG-2 TS Transport Streams to display on Cisco Digital Media Players and Cisco Digital Signage solutions.

In addition to live streams, the Cisco MXE 3500 can ingest video through an automated workflow from a broad range of video content creation devices, encoders, software, and recorders, such as the Cisco TelePresence® Content Server. This tightly integrated workflow extends to many applications for video management and distribution, such as Cisco Show and Share® and Cisco Digital Signage solutions, as well as a variety of external streaming servers and content-distribution networks located anywhere on the network.

Media Postproduction

The media postproduction capabilities of the Cisco MXE 3500 offer several innovative professional studio-quality video features that can be fully automated and applied to source media files. For example, you can insert an

introductory video (bumper) before the source file with fades to transition in and out. You can use any graphic file with a transparent alpha channel as a watermark and apply it anywhere in the video or live IP stream, with fully customizable transparency and duration. You can append a video trailer to the end of the source file with a fade in and fade out. In addition, support for graphic overlay options allows layering of a fully animated graphic on top of the source video, commonly referred to as a lower-third. This capability is widely seen in production TV to add important information to a video, such as the speaker's name and the subject. This option supports sophisticated multimedia effects such as time-line–based fades and smooth animation. You can use graphic overlays to add dynamic multilayered titles, branded graphics, subtitles, captions, and animations directly on top of video.

Pulse Video Analytics

Cisco Pulse Video Analytics delivers a powerful new way to find and view video quickly and easily, allowing you to get the most out of the videos you need to search for specific content or speakers.

- Automatic tag and index capabilities so you can search videos by spoken phrase or word, making video content easy to find and navigate
- Automated vocabulary creation for spoken-word tagging based on a customized list of relevant terms
- Automatic speaker identification so you can quickly locate and view relevant content by who is speaking

Cisco Pulse Video Analytics integrates with the Cisco Show and Share application, a webcasting and video-sharing application that helps organizations create secure video communities to share ideas and expertise; optimize global video collaboration; and personalize the connections among customers, employees, and students with
user-generated video content.

User Interface

The Cisco MXE 3500 supports two types of GUIs: basic and advanced. The basic interface, also called the Video Conversion User Interface, provides quick and easy access to the most common adaptation and post-processing features. For example, it allows you to upload any multimedia file; add a bumper, trailer, watermark, and user-customized graphic overlay; and select targeted playback device(s) and destinations. The Cisco MXE 3500 adapts and post-processes the file and provides links for downloads and streams, as well as a one-click button that automatically posts the video into your Cisco Show and Share account.

For larger-scale implementations, an administrator can use a more advanced GUI to apply the adaptation and postproduction capabilities of the Cisco MXE 3500 to source multimedia files by graphically assigning jobs and predefined profiles to workflows. The resulting workflows can be triggered by using many mechanisms, including the Cisco MXE 3500 application-programming interface (API), or by simply placing multimedia files in preconfigured Watch Folders that are automatically monitored by the Cisco MXE 3500 software.

Infrastructure Overview

The Cisco MXE 3500 is delivered on a high-performance 1-rack-unit (1RU) Cisco Unified Computing System™ (Cisco UCS™) C220 M3 Rack-Mount Server preloaded with media-transformation software services. The system is designed to handle the most demanding media-processing requirements for quality, flexibility, and throughput. At the heart of the system are dual Intel Xeon E5-2600 series multicore processors, 64 GB of memory, and 2.4 terabytes of disk drive space.

The Cisco MXE 3500 also supports a scheduling module that can manage a single Cisco MXE 3500 or a cluster of up to 10 appliances providing reliability, scalability, and performance.

Table 1 lists features and benefits of media transformation on the Cisco MXE 3500.

Table 1. Features and Benefits of Media Transformation on Cisco MXE 3500

Feature or Capability	Benefit
File-based inputs	With support for the most common source formats, the Cisco MXE 3500 can play a central role in virtually any file-to-file transcoding workflow. File-based transcoding takes place with impressive speed, thanks to powerful CPUs and efficient workflow-management routines.
File-based outputs	Source multimedia assets can be transcoded and transrated for playback on a wide variety of networks and devices. The Cisco MXE 3500 includes preconfigured and customizable support for the most popular web and mobile output devices and formats, including WMV, Flash, Real, QuickTime, and H.264. You can upgrade the software-based CPU-driven transcoding system to support future devices and formats, helping ensure investment protection.
Transcode and transrate	The Cisco MXE 3500 can perform both transcode (change format) and transrate (change speed) actions to source files and produce one or many outputs. Inputs and outputs can range from audio-only to SD and full HD resolutions and bit rates.
Enhancements	Source videos can be automatically enhanced, including the application of color corrections, cropping, scaling, and more. The system can automatically add introductory bumpers and trailer videos and transparent watermarks before creating the transcoded output files. Watermarks can also be placed anywhere within the video to mark content confidential or provide copyright notices or other messaging.
Easily deployed as a 1RU rack-mounted appliance	Built on the high-performance, high-reliability Cisco UCS C220 M3 Server, the Cisco MXE 3500 provides a self-contained solution that is easy to deploy, manage, and operate.
Workflows combined with the highest-quality adaptation and postprocessing	Use file data and associated metadata (received and triggered through APIs) to alert the Cisco MXE 3500 Watch Folder attendant to initiate preconfigured jobs that include adaptation and postprocessing elements.
High-throughput, high-quality processing	The Cisco MXE 3500 is designed to maximize throughput, performing many transformation jobs at once, speeding the time to output without compromising on capabilities or output quality.
Administrator-defined device profiles	The Cisco MXE 3500 ships with a library of default device profiles that represent the most common network and playback devices. Administrators can freely modify these profiles, or create new profiles, to meet virtually any application requirements for formats, resolutions, and speeds.
Administrator-defined output destinations	After videos are processed, they can be automatically copied or moved to external locations using transfer protocols such as FTP, Secure FTP (SFTP), HTTP, and network file sharing.
Highly effective graphic overlay option	User-customizable graphic overlays, in the common SWF format, can be superimposed onto video files, providing easily automated, studio-quality special effects. All graphic effects are "burned-into" the videos and will play back fully synchronized on any device that can play the output formats of the Cisco MXE 3500 platform. The same input source can have different graphics applied, and the outputs can be directed to different destinations, making it easy to repurpose the same source for multiple audiences. The optional graphics overlay feature provides customizable multimedia graphics to be layered on top of the source video for a highly professional, studio design.
Live IP stream ingest and output option	With support for MPEG-2 TS and Windows Media (unicast and multicast), the Cisco MXE 3500 can ingest live IP streams from devices such as the Cisco TelePresence Content Server, Cisco Digital Media Encoders, Cisco Scientific Atlanta encoders, and many other third-party encoders. The powerful transcoding engine of the Cisco MXE 3500 can output live streams in Windows Media, Flash 8, and H.264 to compatible external streaming servers as well as MPEG-2 TS (unicast or multicast) for use with Cisco Digital Media Players and Digital Signage solutions.
Processing and media preparation	Video: Bumpers and trailers, color space conversion, contrast enhancement, cropping, de-interlacing and interlacing, and fade in and fade out. In and out trimming: Field frame control, gamma correction, hue rotation, inverse telecine, noise reduction, saturation, support for 16: 9 and other ratios, add and remove letter boxing and curtaining, temporal smoothing, video frame rate conversion and resizing with anti-alias filtering, watermarking, automated thumbnail extraction, and speech-to-text captioning.
Workflow automation	Profile building: An automated system that allows you to quickly apply customized processing settings to new jobs. Monitoring: A summary screen that provides insight into the status of new jobs. Automated Folder Attendant: A program that facilitates integration between external systems and the Cisco MXE 3500 platform.
Highly scalable clustering option	With the optional Cisco MXE 3500 clustering option, up to 10 Cisco MXE 3500 devices can be clustered to provide faster file-to-file processing, higher live ingest and output concurrency, and higher availability, helping

	ensure that the Cisco MXE 3500 can scale with customer requirements.

Integration with Cisco Devices and Applications

You can easily and tightly integrate the Cisco MXE 3500 with many Cisco multimedia devices and applications, including those listed in Table 2.

Table 2. Cisco MXE 3500: Integration with Other Cisco Devices and Applications

Cisco Solution	Capability Overview
Cisco Show and Share application	When the Cisco MXE 3500 is integrated with Cisco Show and Share software, videos uploaded into the Cisco Show and Share software that do not meet the Cisco Show and Share playback criteria are automatically transcoded so that they can be viewed within the Cisco Show and Share application. If the Cisco Pulse Video Analytics feature is enabled, videos can also be automatically analyzed for spoken keywords and speakers so Cisco Show and Share users can find and navigate videos based on what was said or who spoke. When joined with the Cisco TelePresence Content Server, you can automatically have videos created in the Cisco TelePresence Content Server be enhanced by the Cisco MXE 3500 and published in the Cisco Show and Share application under your user account.
Cisco TelePresence Content Server	You can use the Cisco MXE 3500 with the Cisco TelePresence Content Server to enhance and transcode recorded video calls for distribution and playback on any devices or formats that the Cisco MXE 3500 supports. When joined with the Cisco Show and Share application, you can automatically have videos created in the Cisco TelePresence Content Server be enhanced by the Cisco MXE 3500 and published in Cisco Show and Share under your user account.
Third-party devices and applications	You can easily and tightly integrate the Cisco MXE 3500 with many third-party multimedia devices and applications.
Cisco MXE 3500 APIs	For customers who want the ultimate in customization, the Cisco MXE 3500 has a comprehensive REST-based API that you can use with the capabilities of the Cisco MXE 3500 platform in virtually any multimedia environment and application.

Specifications

Table 3 lists specifications for live IP ingest.

Table 3. Live IP Ingest Specifications for Cisco MXE 3500

Specification	Description
MPEG SS (System Stream)	Video: MPEG-1 Audio: MPEG-1 Layer 2
MPEG-2 PS (Program Streams)	Video: MPEG-2 all profiles and levels, excluding scalability extensions Audio: MPEG-1/2 Layer 2 audio, Dolby Digital, Dolby 5.1
MPEG-2 TS (Transport Stream)	Video: MPEG-2 all profiles and levels, excluding scalability extensions Audio: AAC (MPEG-2 (ISO/IEC 13818-7) and MPEG-4 (ISO/IEC 14496-3, including Amd.1:2003-HE AAC v1 and Amd.2:2004 - HE AAC v2) MPEG-1/2 Layer 2, Dolby Digital, Dolby 5.1. LPCM, and MPEG Layer-3
MPEG ES (Elementary Streams)	Video: MPEG-1 and MPEG-2, all profiles and levels, excluding scalability extensions
Windows Media	Video: Windows Media v9 (up to full HD resolution) Audio: Windows Media Audio

Table 4 lists specifications for live IP output.

Table 4. Live IP Output Specifications for Cisco MXE 3500

Specification	Description
Live output	WMV H.264 Flash
MPEG-2 TS (Transport Stream)	Video: MPEG-2 all profiles and levels, excluding scalability extensions, and H.264/AVC (Baseline, Main, and High Profiles, 4:2:0 8-bit) Audio: AAC (MPEG-2 [ISO/IEC 13818-7] and MPEG-4 [ISO/IEC 14496-3], including Amd.1:2003-HE AAC v1 and Amd.2:2004-HE AAC v2) MPEG-1/2 Layer 2, Dolby Digital, Dolby 5.1. LPCM, and MPEG Layer-3

Table 5 lists specifications for file ingest.

Table 5. File Ingest Specifications for the Cisco MXE 3500

Specification	Description
Windows Media	WM7, WM8, WM9, and VC-1
Flash	Video: On2 VP6, Sorenson Spark, H.264 Audio: ADPCM, NellyMoser, Speex, AAC
DV Stream	Video: DV25, DVCPro25, and DVCPro50 Audio: PCM
3GP	Video: H.264/AVC, MPEG-4, and H.263 Audio: AAC-LC, AMR-NB
MP4	Video: H.264/AVC, MPEG-4, and XDCAM EX Audio: AAC-LC, PCM
AVI	Video: Uncompressed, Microsoft DV, Radius Cinepak, Intel Indeo video, Microsoft PCM, and Franhofer IIS Audio: MPEG Layer-3, Microsoft IMA ADPCM, Microsoft ADPCM, and Microsoft CCITT G.711 (a-law and u-law)
QuickTime	Video: MPEG-4, H.264, H.263, H.261, Apple Pixlet, Animation, Cinepak, Component Video, DV, DVC Pro, DVC Pro 50, DVC Pro HD, JPEG 2000, Graphics, Motion JPEG, Photo JPEG, Sorenson Video 2, Sorenson Video 3, IMX, HDV, XDCAM, and XDCAM HD Audio: LPCM, AAC (MPEG-4 Audio), HE-AAC, Apple Lossless, AMR Narrowband, QDesign Music 2 Qualcomm PureVoice (QCELP), IMA 4:1, and iLBC
MXF OP1a	Video: MPEG-2, IMX, DV25, DVCPro25, DVCPro 50, and JPEG 2000 Audio: PCM and MPEG 1/2 Layer 2
WebEx	ARF
WebM	Video: VP8 Audio: Vorbis
Audio-only	MP3, WAV, WMA, AIFF, and MPA

Table 6 lists specifications for file output.

Table 6. File Output Specifications for Cisco MXE 3500

Specification	Description
Windows Media	WM7, WM8, WM9, and VC-1
Flash	Video: Flash 8 - VP6 Audio: MP3 audio
DV Stream	Video: DV25, DVCPro25, and DVCPro50 Audio: PCM

Specification	Description
3GP	Video: H.264/AVC, MPEG-4, and H.263 Audio: AAC-LC and AMR-NB
MP4	Video: H.264/AVC, MPEG-4, and XDCAM EX Audio: AAC-LC and PCM
AVI	Video: Uncompressed, Microsoft DV, RADIUS Cinepak, Intel Indeo video, Microsoft PCM, and Franhofer IIS Audio: MPEG Layer-3, Microsoft IMA ADPCM, Microsoft ADPCM, and Microsoft CCITT G.711 (a-law and u-law)
QuickTime	Video: MPEG-4, H.264, H.263, H.261, Apple Pixlet, Animation, Cinepak, Component Video, DV, DVC Pro, DVC Pro 50, DVC Pro HD, JPEG 2000, Graphics, Motion JPEG, Photo JPEG, Sorenson Video 2, Sorenson Video 3, IMX, HDV, XDCAM, and XDCAM HD Audio: LPCM, AAC (MPEG-4 Audio), HE-AAC, Apple Lossless, AMR Narrowband, QDesign Music 2 Qualcomm PureVoice (QCELP), IMA 4:1, and iLBC
MXF OP1a	Video: MPEG-2, IMX, DV25, DVCPro25, DVCPro 50, and JPEG 2000 Audio: PCM and MPEG 1/2 Layer 2
Audio-only	MP3, WAV, WMA, AIFF, and MPA

Table 7 lists physical dimensions and operating specifications for the Cisco MXE 3500.

Table 7. Dimensions and Environmental Operating Ranges for Cisco MXE 3500

Specification	Description
Physical dimensions (H x W x D)	1RU 1.7 x 16.9 x 27.8 in. (4.3 x 42.9 x 70.6 cm)
Operating temperature	50 to 95℉ (10 to 35℃)
Nonoperating temperature	–40 to 149℉ (–40 to 65℃)
Operating humidity	5 to 93% noncondensing
Nonoperating humidity	5 to 93% noncondensing
Operating altitude	0 to 10,000 ft (0 to 3,000m); maximum ambient temperature decreases by 1℃ per 300m) (984 ft)
Nonoperating altitude	40,000 ft (12,000m)

Table 8 lists safety and regulatory compliance specifications for the Cisco MXE 3500.

Table 8. Safety and Regulatory Compliance Specifications for Cisco MXE 3500

Specification	Description
Safety	• UL 60950-1 No. 21CFR1040 • CAN/CSA-C22.2 No. 60950-1 • NOM-NYCE • NOM-10-SCFI-10993 • IRAM IEC60950-1 • CB IEC60950-1 • EN 60950-1 • IEC 60950-1 • GOST IEC60950-1 • SASO • SABS/CB IEC6095-1 • CCC*/CB GB4943-1995 • CNS14336 • CB IEC60950-1 • AS/NZS 60950-1 • GB4943

Specification	Description
EMC: Emissions	• 47CFR Part 15 (CFR 47) Class A • AS/NZS CISPR22 Class A • CISPR2 2 Class A • EN55022 Class A • ICES003 Class A • VCCI Class A • EN61000-3-2 • EN61000-3-3 • KN22 Class A • CNS13438 Class A
EMC: Immunity	• EN50082-1 • EN61000-6-1 • EN55024 • CISPR24 • EN300386 • KN61000-4 Series

Service and Support

Cisco and our partners provide a broad portfolio of intelligent, personalized services and support that can help you realize the full value of your video investment and increase business agility and network availability. This portfolio of services promotes business transformation through a network-based collaboration platform that enables businesses to collaborate anywhere, anytime. For more information about these services, please visit: http://www.cisco.com/go/services/digitalmedia.

For More Information

For more information about the Cisco MXE 3500 platform, visit http://www.cisco.com/go/mxe or contact your local Cisco account representative.

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