Cisco MXE 3000 Media Experience Engine

General

Q. What is the Cisco® MXE 3000 Media Experience Engine?

A.

- The Cisco MXE 3000 is an easily deployed media-processing device that allows you to share media across the network from any source to any type of endpoint.
- The solution allows the IT administrator to significantly lower operating expenses (OpEx) and capital expenditures (CapEx) by reducing the complexities of media transcoding and processing.
- It offers a suite of postprocessing features that optimize the quality of the content while improving user experience.
- The Cisco MXE 3000 also integrates with other Cisco media applications to extend their capabilities to deliver “any-to-any” video collaboration.

Q. How does it work with other Cisco solutions?

A. The Cisco MXE 3000 smoothly integrates into the Cisco Digital Media System (DMS) architecture with its ability to push content dynamically to DMS displays. It searches Cisco MXE 3000 processed content through DMS search libraries, selects Cisco MXE 3000 produced content on DMS enterprise TV menus, and displays Cisco MXE 3000 content on the Cisco DMS Video Portal (on a PC).

Q. What formats does it support as input and output?

A.

- Input: H.264, QuickTime, MPEG1, MPEG2, AVI, Windows Media, VC-1, H.264, and tape capture
- Output: MPEG2 transport streams (standard definition [SD] and high definition [HD]), MPEG4 and H.264 transport (SD and HD) streams, AC-3 Audio, Layer II Audio, Windows Media Proxy, MPEG1, and MPEG 2

Q. How much video expertise is required to administer the Cisco MXE 3000?

A. The Cisco MXE 3000 includes precanned templates that allow administrators with minimal video expertise to perform media transcodes and postproduction activities.

Q. What level of automation is offered?

A. The Cisco MXE 3000 includes precanned templates that allow you to simply move files to a “watch folder” from which “jobs” are initiated and completed without any user intervention.

Q. What are the critical parameters for capacity planning?

A. They include the amount of video content, percentage of video content that needs to be transcoded, types of endpoints targeted, and turnaround time required for processed content.

Q. Where are Cisco MXE 3000 engines typically deployed?

A. They are typically deployed in the data center.

Q. Does the Cisco MXE 3000 support live transcoding?

A. It performs file-to-file transcoding, not real-time streaming.

Q. Is it just a transcoder?

A. No. In addition to transcoding content, the Cisco MXE 3000 allows you to:

- Perform complex video editing that includes the modification of visual attributes (for example, color or contrast)
- Stitch clips to form a single contiguous clip, voice overlays, etc.
- Make graphic overlays that include the addition of title slides, captions, logo insertions, watermarking, etc.

Q. How do graphics features complement the media-processing capabilities of the Cisco MXE 3000?

A.

- Dynamic graphics updates occur during transcoding.
- The Cisco MXE 3000 supports multiple simultaneous transcoding sessions with customized graphics.
- The solution overlays graphics on all output formats, including logo insertion, watermarking, title overlays, etc.
- The solution supports Flash 8 Pro template authoring.
- The Cisco MXE 3000 supports Web Services and XML application programming interfaces (APIs)

Media-Processing Functions

Q. How can I monitor encoding jobs?

A. Status of encoding jobs is provided in a web-based status monitor. You can open the status monitor in a web browser at http://hostname/mxeui, and then double-click a job to see the tasks that make up the encoding job or to see errors if the job failed.

Q. Can I receive email notifications when a job has completed?

A. Yes. You can configure the Cisco MXE 3000 to send email messages when a job completes, is successful, or fails. You must configure a valid Simple Mail Transfer Protocol (SMTP) server on the System page at http://hostname/mxe/administration/system.asp and add a Notification tab to the job profile.

Q. Are there any log files that I can review?

A. Log files for the control system and encoders are available in C:\Program Files\Cisco\Media Experience Engine\logs. The control system logs are named ecs-xx.log and the encoder logs are labeled lcs-xx,log, where xx is the day of the month. Log files for the Folder Attendant service are available in C:\Program Files\Cisco\MXE Folder Attendant Service\bin\logs. The log for the current day is named fa.log, and logs for past days are labeled fa.logxx, where xx is the day of the month.

Q. How can I produce an audio-only file from a file that has both audio and video?

A. In the client user interface, right-click the Encoder tab, and check the Audio only option.

Q. How does the Cisco MXE 3000 handle video that does not contain audio?

A. You can use two techniques to encode video that has no audio. Some encoders support video-only output. In the client user interface, right-click the Encoder tab, and check the Video only option. If the format does not support video only (in the client user interface the video only option is grayed out), you can add a silent audio track on the Preprocessor tab.

Q. Why do video files that have no audio fail to encode by default?

A. Video files typically have audio tracks. Failing jobs that do not have audio as a default setting is a technique to ensure that all video has an audio track. If this behavior is not the desired behavior, on the Preprocessor tab, Audio subtab, check the Add a Silent Audio Track box. If an audio track is present, it will be maintained. If no audio is present, a silent audio track will be added.

Q. Does the frame rate of my output files have to match the frame rate of my input files?

A. No. The Cisco MXE 3000 adds or drops frames of video as required to equal the output frame rate requested. To ensure the smoothest possible output, video frame rates should be divided or multiplied by even numbers.

Q. Can the Cisco MXE 3000 convert frame rates from 25 to 29.97 fps or 29.97 to 25 fps?

A. Yes. The Cisco MXE 3000 adds or drops frames of video as required to convert video from 25 to 29.97 fps, or conversely. Although this frame-rate method provides acceptable quality, the conversion is not a vector-based frame-rate converter. If the video has fast-moving motion, the picture may appear jittery.

Q. Can I increase or decrease the frame size of my output video when compared to my input video?

A. Yes. Reducing the frame size of the video is a common technique used to improve perceived video quality at lower bit rates. You can also increase the frame size from the original, but you will see a corresponding reduction in video quality. This reduction is often acceptable if the video content is compelling and a larger frame size is required to match the video display method. An example is increasing the size of video captured with a cell phone to play back on TV

Q. Can I convert video with a 4 x 3 aspect ratio to video with a 16 x 9 aspect ratio?

A. Yes. The Cisco MXE 3000 offers three methods to convert 4 x 3 video to 16 x 9 video. You can add curtains (black bars are added on each side of the video) or a nonlinear stretch that increases the width of objects that are not in the center of the video frame, or you can apply a linear stretch that increases the width of all objects equally. You can preview the effect of each of these options in the Preview window when creating job profiles.

Q. Can I convert video with a 16 x 9 aspect ratio to video with a 4 x 3 aspect ratio?

A. Yes. You can crop 16 x 9 video to remove the video on the edges of the screen to change the aspect ratio of the video to 4 x 3. You can also letter-box the video (add black bars above and below the video). The video has a 4 x 3 aspect ratio, but the content maintains a 16 x 9 aspect ratio.

Video Preprocessing

Q. What is video preprocessing?

A. Traditional transcoding solutions produce transcoded content that is only as good in quality as the source footage. However, when video is acquired outside studio settings, the quality of the source footage can be less than ideal. The Cisco MXE 3000 supports a variety of

preprocessing features that allow you to significantly improve the quality of the transcoded content relative to the source footage. These preprocessing features can edit video in a variety of ways.

Q. What type of video editing features does the Cisco MXE 3000 support?

A.

- Selecting footage to process from a larger file: You can mark the point in time, relative to the beginning of the clip, to start encoding. You can mark “in points” and “out points” (expressed as time intervals) on video footage to encode only a section of a larger file. After these parameters are specified, the Cisco MXE 3000 knows to discard the portions of the video prior to the in point and following the out point.
- Inserting transitions between clips: You can determine the number of seconds to fade in from black to full brightness at the beginning of the video clip or fade out at the end of the clip. You can append the specified fade-in time to the beginning of the preprocessed file, including any bumpers that you add, but you should append the fade-out time to the end of a trailer.
- Cropping: Use crop settings to trim unwanted material from the outer edges of the incoming video image.
- Bumpers and trailers: If you need to append clips before or after video footage, you can apply bumpers and trailers. You can specify the file to be used as a bumper or trailer at the introduction or conclusion of the encoded clip, respectively. You can use movie files of any Cisco MXE 3000 supported format or still files as bumpers and trailers.

Q. How can the Cisco MXE 3000 improve video quality?

A. The ambient conditions of the area in which you acquire the video source are often less than ideal, possibly because of the quality of the video equipment or environmental factors such as lighting. The Cisco MXE 3000 offers a suite of preprocessing features that allow you to control a variety of color adjustments to improve quality relative to the video source. The following color adjustments are supported:

- Brightness: Adjusts luminance as measured against the source video
- Contrast: Adjusts separation between the blackest black and the whitest white
- Hue: Adjusts hue of colors in the video from red (decrease) to green (increase)
- Saturation: Adjusts the amount of color in the video image expressed as a percentage of source video color
- GammAdjusts the midrange (gray) luminance values of the video (adjusts the luminance of midrange colors, leaving black and white values unchanged)

Q. Are any noise-reduction capabilities supported?

A. Yes. Another effective tool for improving the quality of video footage during the preprocessing stage is to use noise-reduction controls to minimize and control video imperfections. The Cisco MXE 3000 supports the following noise-reduction features:

- Temporal smoothing: Temporal smoothing defines how frames are combined for interframe smoothing. This setting specifies the number of input frames to average when constructing an output frame.
- Blur: Blur specifies how much to blur the source footage. It is generally used at lower bit rates to reduce image detail, thereby improving the overall appearance of the finished clip at high compression rates. Blurring degrades the image but enables better compression.

- Noise reduction: This feature is used to remove small, irregular detail from the source video.
- Unsharping: Unsharping is used to enhance edge detail in the image without enhancing other detail. Unsharp mask reduces compression efficiency, but can improve the perceived quality of the image. This feature is recommended for some video formats, such as VHS, and for multigenerational images where a sharper image is desired.

Q. Can I change the aspect ratio?

A. Yes. The Aspect Ratio Conversion tools provide several methods for scaling media between various formats. For example, an image with a 4:3 aspect ratio can be converted to a 16:9 aspect ratio, or conversely. The Cisco MXE 3000 uses pixel aspect-ratio information in the conversions and uses default assumptions about the pixel aspect ratio based on the pixel dimensions of an image. For example, an image size of 720 x 480 or 720 x 486 is assumed to be SD NTSC, and is assigned the NTSC pixel aspect ratio of 0.9. For complete control, you can explicitly set both the input media pixel aspect ratio and the pixel aspect ratio for the preprocessor output image. The input dimensions are read from the input mediThe preprocessor output dimensions are set by the encoder that receives the preprocessed video.

Q. Is watermarking supported?

A. Yes. Most organizations have explicit corporate policy surrounding distribution restrictions of company confidential content. Visible watermarking is a method by which you can mark video content as material that must comply with corporate distribution guidelines. The Cisco MXE 3000 allows you to apply highly customizable watermarks during the preprocessing stage so the consumer of the content is aware of how the content must be handled. An example of how visible watermarks appear on the video footage is shown below [[where? Don't use "below" Figure 1? Where is it?]]. Customization parameters include adjustments to placement, text, and appearance of the watermark.

Q. What are sample use cases for graphics applications?

A.

- Advertising: Overlays provide a unique opportunity to associate advertisements with content to offer a level of targeting. For profitability the process needs to be automated and scalable.
- Cross promotion: Graphic overlays provide space for advertisements or cross promotions of other events and services. Similar to the methods used for broadcast television, on-demand content with branded lower-third titles are used to promote other shows and upcoming featured events. Overlays need to be refreshed as new events become available.
- Lower-third titles: Lower-third titles must be created for every news clip produced by local, national, and international news bureaus. The requirements are for branded content with relevant content (reporter, event, story, and location) that must be produced. Today, news bureaus rely on very expensive and time-consuming processes that are either manually produced in edit rooms or integrated with base-band broadcast-chain hardware. Both of these techniques limit output of the content by causing bottlenecks in the production workflows.
- Branding: Networks have multiple channels for content, television, on-demand, web, and mobile, as well as multiple brands within channels (MTV and VH1). The text is identical for all of the output formats, but the layout, font, and size are different for each one. These

networks need a way to produce graphics that match the requirements of each device and delivery system in a low-cost, efficient way.

- Content cataloging and slate production: New networks sell high-resolution versions of their content by placing low-resolution proxies onto a web-accessible catalog. These clips carry ID numbers burned in overlays, bumpers, or trailers. Networks need an efficient and automated system for labeling the clips.
- Shopping: Shopping networks have the greatest need for real-time graphics updates to their product clips. Special promotions, sales statistics, and seasonal changes all require changes to the overlays. Updates are constant and must be precise, and automation is required to meet volume and accuracy needs.
- Subtitle and caption burn-in
- Real-estate and want ads

Q. When and how are graphics applied to video content?

A. Graphics are applied during transcoding. Through XML, the Cisco MXE 3000 provides an external control mechanism for managing the graphics overlay content and appearance.

Q. Is the application of graphics a complex procedure?

A. Cisco MXE 3000 Graphics replaces the manual process in the editing suite with an automated transcoding workflow that reduces production costs and creates new custom messaging opportunities. Within the Cisco MXE 3000, the Flash overlays are templates that contain dynamic variables and allow you to automate the application of graphics. Variables values are updated with XML. Therefore, graphics templates are reusable for different shows, cross promotions, advertisements, branding, and sponsorship applications.

Encoders

Q. I am having interlacing problems when I set multiple encoder outputs. What can I do?

A. When you create job profiles, make certain that you do not mix interlaced and single-field output formats in the same job profile; in other words, do not put an MPEG worker in the same job profile as a Flash 8 worker. The preprocessor is much better at de-interlacing than the encoders. When mixed types of output formats are in a job profile, the system must create an interlaced output, so the encoder is forced to perform the de-interlacing.

Q. What does immediate mode do?

A. It encodes the file without writing a preprocessor file to a disk. It uses RAM instead to buffer the preprocessor data to the encoding worker, thereby accelerating the entire transcoding process.

Flash 8

Q. What is the difference between a Flash 8 FLV and SWF formats?

A. You can edit the Flash 8 FLV format using Adobe's Flash editing tools. The FLV format is also the format required by most Flash streaming servers. The SWF file format cannot be edited, and it requires the entire video to be downloaded before it can be played.

Q. Do Flash 8 output files carry the duration metadata?

A. Yes.

Q. Why is my Flash 8 encoder so slow?

A. A Flash 8 encoder takes longer than some other encoders..

MPEG2

Q. Why is the MPEG encoder producing stereo audio when I created a profile that specifies joint stereo?

A. This production of stereo audio is by design. For each 1152 samples, the system checks to see if there are enough bits to encode in stereo at or better than the no-noise threshold. If not, it reverts to joint stereo.

QuickTime

Q. Can I specify the length of my audio or video track to determine the length of the QuickTime output?

A. QuickTime files can have video and audio tracks of different lengths. On the QuickTime encoder tab, change the Master Stream drop-down menu from the default of none to audio or video to set which track will control the length of the final output video.

Real

Q. Can I encode from Real to MPEG?

A. This encoding is currently not supported.

Windows Media

Q. Is anamorphic output supported in Windows Media video files?

A. Yes, on the Windows Media tab, under Video Formatting, check the Aspect Ratio box and select the desired aspect ratio from the drop-down menu.

Q. Can the Cisco MXE 3000 do multi-bit rate Windows Media encoding?

A. Yes.

Ordering

Q. How can I order the Cisco MXE 3000?

A. Ordering is made easy by delivering packaged hardware and software solution. The ordering information is contained in the table below:

Product Name	Part Number
Cisco MXE 3000 Media Experience Engine Appliance (hardware only)	MXE-3000
Cisco MXE 3000 Media Experience Engine Software Version 2.0 (software only)	MXE-3000-LIC

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV
Amsterdam, The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

Printed in USA C67-511523-00 12/08