



Delivering Using EasyDCP

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For projects requiring Digital Cinema Package (DCP) or Interoperable Master Format (IMF) mastering for digital cinema or broadcast distribution, DaVinci Resolve can be integrated with Fraunhofer's easyDCP application in order to master these files, play them back for testing, and generate Key Delivery Messages (KDMs) for theatrical distribution, all directly within Resolve. This means you can encode a DCP master straight from your program's source media, all within the 32-bit floating point image processing pipeline of Resolve, for the highest possible quality result.

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Licensing EasyDCP

DaVinci Resolve and DaVinci Resolve Studio includes a demo version of easyDCP. Details of operation and restrictions of the demo version can be found later in this chapter. The fully functional version of easyDCP operates via licensing modules purchased from <http://www.easyDCP.com> (info@easyDCP.com) and every new DaVinci Resolve system (server) needs its own license and specific certificates for DCP and KDM generation and for playback of DCPs.

Requesting Your Server Certificate Set

For your DaVinci Resolve system to generate DCPs and KDMs you need to request a specific set of configuration files called the Server Certificate Set. To begin, first purchase your encoding, encryption, decoding and decryption modules from easyDCP. They will provide a password to access your easyDCP.com account.

Then, from the Resolve file menu, select easyDCP, Request Server Certificate Set. Fill in the detail listed on the request form and save the form to your desktop or somewhere it can be easily found. This html file can be emailed to info@easyDCP.com. After sending the html, a customized Server Certificate Set for your installation will be generated and made available for download in your easyDCP Website User Account.

The Server Certificate Set generated for your DaVinci Resolve will contain files based on your purchased modules and your specific Resolve server hardware. The table below shows the modules and the licenses and certificates generated, followed by a brief description of each item.

	License	Server Certificate	Signer Certificate
DCP Encoder	X		X
DCP Encoder with Encryption	X	X	X
DCP Player	X		
DCP Player with Encryption	X	X	

- **License:** The License is used to activate the purchased modules on a specific hardware server.
- **Server Certificate:** Each DCP render (referred in the industry as an 'Instance') using encryption or decryption has an individual server certificate. This certificate is required to be able to receive Key Delivery Messages (KDMs), which unlock encrypted DCPs.
- **Signer Certificate:** A Signer Certificate is used to sign certain files within a DCP package and/or Key Delivery Message (KDM) to verify which authority generated the DCP instance.

Importing Your Server Certificate Set

Once generated and downloaded to your DaVinci Resolve server, the Server Certificate Set needs to be imported into Resolve.

To import your server certificate:

- 1 Choose File > easyDCP > License and Certificates.
- 2 Use the Import Server Certificate dialog to select the file, enter your Certificate Set password, then click Import.
- 3 To verify your easyDCP license and the Server Certificates, choose easyDCP > About easyDCP.

From this point onward, you can use the controls from within the Settings window, the Deliver page, and the File menu to master and play DCPs.

DaVinci Resolve includes a demo version of easyDCP

DaVinci Resolve and DaVinci Resolve Studio includes a demo version of easyDCP. The demo version of the DCP encoder embeds visible DaVinci Resolve and easyDCP logo watermarks in the rendered Digital Cinema Package (DCP) images. The demo version does not include encryption so these DCPs can be used for screening in a digital equipped cinema. The demo version of the DCP playback module will play 15 seconds in full quality. After that playback quality reduces drastically. Furthermore, audio won't be rendered after 15 seconds of playback.

EasyDCP Color Management

The Color Management panel of the Project Settings has a Timeline Colorspace pop-up menu that is enabled for EasyDCP encoding regardless of whether or not Resolve Color Management is used for the current project (the same setting is used for both color management tasks). You should set this to the color space used by your current Resolve timeline. If, for example, you are grading using a Rec. 709 monitor for television deliverables but also wish to make a DCP, select Rec. 709 Gamma 2.4 and Resolve will render the DCP with the correct Rec. 709 to XYZ matrix.

EasyDCP Output in the Deliver Page

To master to a DCP in the Deliver page, use the following procedure, which walks you through all of the easyDCP settings that are available in the Render Settings list.

To master a DCP or IMF:

- 1 Set "Render timeline as" to Single clip.
- 2 Choose easyDCP from the Video Format pop-up.
- 3 Choose the appropriate option from the Codec pop-up that corresponds to the type (DCP or IMF) resolution (2K or 4K), and aspect ratio (native, scope, or flat) of your intended output.
- 4 Set the Composition Name. This field is intended to hold a standardized name for the DCP being encoded. You can either type a name into this field directly, or you can press the "..." button to open the easyDCP Composition Name Generator window. An editable Film Title field appears, along with a number of pop-up menus that let you select various DCP attributes such as content type, aspect ratio, language of audio and subtitles, and so forth. As you populate each attribute, the name being generated appears at the top of the window, and clicking OK copies the resulting Composition Name into the Composition Name field of the Render Settings.
- 5 If necessary, set the desired "Maximum DCP bit rate" by either typing or dragging within the field (the range is 50 to 250 Mbit/sec). If you're not sure what data rate to use, consult the client or distributor to whom you're delivering the DCP.

- 6 There are two DCP package types you can output, determined by the “Use Interop packaging” checkbox:

The standard package conforms to the “Interop” specifications for DCPs, which is turned on by default. With “Use Interop packaging” turned on, however, the frame rate of your output is limited to either 24fps or 48fps, so you need to make sure that your timeline conforms to these frame rates.

If you want to generate DCP packages with other frame rates to match your timeline, you need to turn “Use Interop packaging” off to generate a SMPTE-standard DCP. This supports additional frame rates including 25, 30, 50 and 60 fps. However, SMPTE-Standard-DCPs are not supported on all JPEG2000-based playback systems so it’s generally recommended to use the Interop standard unless you know the player supports the SMPTE-Standard DCPs.

- 7 Turn on the “Encrypt package” checkbox to encode an encrypted DCP. This sets the encoder to generate a Digest containing the keys used during encryption. This Digest will allow you to play the resulting DCP on your system, and to generate KDMs to allow that DCP to be played on other servers.

NOTE: If you do not encrypt the DCP it can be played on any DCP player/decoder without restriction.

- 8 Set the Subtitles Path. If you have a properly formatted subtitle file, click the Browse button to link to it.
- 9 If you’re including an audio mix in the DCP, go to the Audio section, turn on the Render audio checkbox, and choose the number of channels in the “Render channels of audio” pop-up menu that corresponds to the number of Audio Mixer output channels defined in the Edit page.
- 10 Click the Browse button under the “Render to” field, and choose a location for the resulting DCP. Make sure you pick a drive with enough room for the estimated size of the final DCP.
- 11 Choose all necessary options from the Output Options to ensure the quality you need.
- 12 Click the Add Job to Render Queue button, and then click Start Render to create your DCP. A DCP will be created and placed at the location you chose, ready for playback or delivery.

KDM Generation and Management

Key Delivery Messages (KDMs) are required to allow an encrypted DCP play on a designated projector at a particular theater at a specified time. DaVinci Resolve is capable of creating KDMs, which is convenient for exporting KDMs for select screenings, but commercial distributors may require thousands of KDMs. Fortunately, easyDCP allows you to use external Distribution KDM (DKDM) utilities to generate KDMs for your clients, so you don't have to tie up your Resolve workstation with this task.

Publishing Your Encrypted Digital Cinema Package

While you can play your encrypted DCP on the same DaVinci Resolve system that generated it, if you wish to publish the DCP so other players can decode and play you need to generate a KDM to send to the player. The user of the other player, or players, will need to generate a Server Certificate for each of their players and send this to you so when you generate the KDM it will be just for those players.

Select the DCP in the Media page Library. Right-click and select Generate KDMs. From the pop-up select the location of the Server Certificate file if the KDM is for one player, or folder for multiple players. Set the start and end dates that the KDM will be valid for, an output folder to place the KDM, and then select Generate.

You can now send your DCP and the KDMs to the player you authorized. The user there will import the KDM and the DCP will play between the start and end dates.

Playing Your Digital Cinema Package

To play a DCP you've output from Resolve, use the Media page to add it to the Media Pool and edit it into a timeline like any other clip.

Decoding the JPEG2000 images embedded within the DCP in real time is computationally intensive. If your system is underpowered you can reduce the decoded resolution of the files by selecting Half or Quarter Resolution Decode from the File > easyDCP menu. A smaller, less bandwidth-intensive version of the JPEG2000 files will be decoded by discarding some levels of the wavelet stage inside the decoder, which will directly increase the playback performance.

Playing Third Party Digital Cinema Packages

To play a non-encrypted DCP simply select the DCP in the Media page like any other clip. To play an encrypted DCP from a third party you first must publish your Server Certificate. They use the certificate to generate KDMs for their DCP to play on your DaVinci Resolve system. From the File menu select easyDCP, then select Export Server Certificate, and on the pop-up menu choose a location to save the file. Send this to the third party for KDM generation.

When you receive a KDM or a Digest for an encrypted DCP you must first import the file into your DaVinci Resolve system. Using the File, easyDCP menu select Import KDM/Digest, and then select the file. Then simply select the encrypted DCP in the Media Page Library to play.