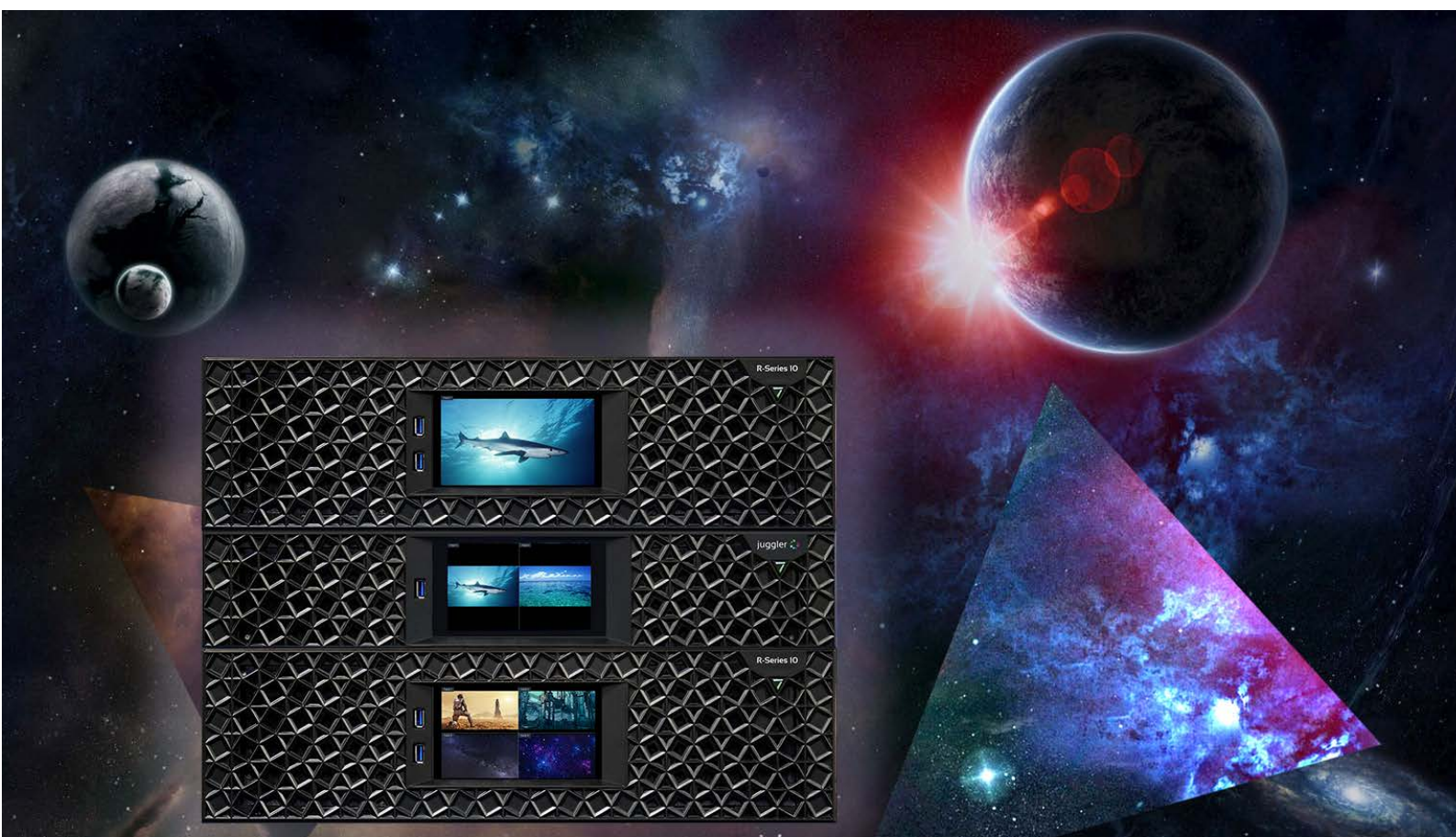




Delta Media Server

Managing Media for Delta

User Guide



Managing Media for Delta : User Guide

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Introduction

Introduction

There are a number of ways in which you can optimise media for running on DeltaServer, in order to get the best performance from your servers.

- [7th Image Format Plugins for Adobe and Nuke](#)⁽¹⁶⁾ enables read and/or write .7TH/STH format image sequences in popular 3rd party software.
- [Unwrapping NotchLC MOV to NotchLC7th Frames](#)⁽⁴⁴⁾ optimizes performance and stability for playing NotchLC movies.
- [Distributed File Manager](#)⁽⁴⁸⁾ (DFM) provides the means to convert compressed file formats into STH/7TH frame formats.
- [Delta Content Protection System](#)⁽⁷⁶⁾ (CPS) offers both encryption, and playback restriction to venues and time windows.
- [7thMovieViewer](#)⁽¹⁰⁶⁾ : view 7TH / STH, TGA and DPX movie files frame by frame.
- [7thFileVerifier](#)⁽¹¹²⁾ checks a folder of movie frame files to test validity against several variable parameters.
- [Carving Media for Dome Displays](#)⁽¹¹⁶⁾ : divide media up to only the area required for each channel.
- [BackPack Media Distribution](#)⁽¹³²⁾ is used to distribute files and folders to Delta Media Servers via the DeltaMonitor application resident on each server.

Basic Requirements for Media Shows

Basic Requirements for Media Shows

As initial guidance, this section provides a brief overview of media formats and other requirements that enable smooth running of Delta shows.

Movie Formats (E:\Movies)

Movies are typically held on the E:\ drive.

A movie consists of a single folder full of files, where each frame of the movie is a separate file.

You can load movies onto the server via the 'Movie Drive' Windows Share, or locally via a Windows-formatted USB external hard drive (USB3 is supported).

Note: TGA files should be placed in a single folder within the Movies folder of the Delta Media Server movie drive and named with a constant number of digits between 4 and 12 digits long, preceded by an underscore like this:

```
...  
my_movie_000008.tga  
my_movie_000009.tga  
my_movie_000010.tga  
my_movie_000011.tga  
...
```

- The frame number must be the last set of characters in the filename before the extension.
- If files are incorrectly named (or have fewer than 4 digits or greater than 12) there will be no output (playback will be black).

➤ See the [Delta Workflow Guide](#) for more detailed information about Delta media storage requirements.

Movie file dimensions in Delta

Movie dimensions matter. On older versions of Delta odd sizes may not run or run badly. From Delta 2.6.74 bad dimensions will generate an alert in the Resource Pool. Please be aware of these requirements:

4:2:2 8-bit must have a **width** divisible by 2

4:2:2 10-bit 7th (not DPX) must have a width divisible by 8

4:2:0 8-bit must have a **width** and **height** divisible by 2

YCoCg must have a **width** and **height** divisible by 4

Movie file formats supported in Delta

TGA sequences – or **7TH (STH)** (preferred)

24 bit RGB or 32 bit RGBA (8 bit per colour)

RLE lossless compression is optional (resolution / performance limits apply to RLE)

RGB colour space

DPX

From Delta 2.6, .dpx formats have been more reliably supported:

8-bit (4:4:4)

10-bit (YUV and 4:4:4)

12-bit (4:4:4)

full support of little- and big-endian

filled and packed types are both supported.

8- and 10-bit RGBA 4:4:4 is supported from Delta 2.7.

HDR is supported from Delta 2.7 build 7.

A7S / CIN / SGI / YUV

30 bit RGB (10 bit per colour) / 8 bit possible

RGB or XYZ colour space

JPG, JPG2000, BMP, TIFF, PNG

Image sequences cannot be played, but can be recorded (sliced / carved) from Delta or DFM utility.

7th420, 7th422, 7th444

Created by DFM or recording from Delta (Note – enable Optimize for SSD)

7th444 is completely lossless; 8-, 10- or 12-bit

7th422 is in YUV colour space, 33% space saved on disk

7th420 is YUV colour space, 50% space saved on disk

Codec filetypes (MXF, MOV, MP4, LXF, ASF, WMV, DV, MPEG-PS, MPEG-TS, GXF, FLV, AVI, MKV, WebM, HapQ, 7thHapQS) are all supported from Delta 2.5

With codec movie formats, the audio is in-built and speaker mapping is encoded in the file itself, so Delta audio control available is therefore only volume control (no channel mapping as is possible with separate audio files – see audio files below).

Note: codecs are supported for media prototyping type purposes only, and are never recommended as the final deliverable/show content.

Since codec playback in Delta is CPU-based, this typically allows only 1-2 movies at HD 60p or equivalent resolutions. For anything more, codec movies should be converted to image sequences using [Distributed File Manager](#)⁽⁴⁸⁾.

NotchLC is a Luma & Chroma (YUV) codec that achieves compression rates between 5:1 and 8:1 with minimal perceived quality loss, and is suitable for very large canvases. **From Delta 2.8**, NotchLC codec in .mov wrappers can be played, but note that audio is not enabled in this format. If exporting from Adobe Media Encoder, first deselect 'Export Audio'.

NotchLC is best converted to uncompressed frames using: [NotchLC to NotchLC7th](#)⁴⁴ utility.

A Note on Using Codecs (not recommended for final show content)

Consider the reality of codec (mp4, .mov etc.) playback on Delta servers. Although Delta software can now play these movies they are not optimised for this workflow. Uncompressed movies in the .7th format are a very reliable method of playback, as the files stay the same size, and are standardised, meaning they are very stable and predictable.

Codec movies (.mov, mp4, h264 etc.) come in many types, with different settings, bit rates and sizes. These variances makes it very difficult to predict server performance and stability, as the CPU overhead of the movie tends to fluctuate depending on the content.

Although a server can play a 3840 × 2160@60 fps movie perfectly in .7th format, this does not mean you will get the same result with a .h264 movie of the same resolution/refresh rate. When using codec you will need to do much more stability testing before a show to ensure playback is solid. This difference is due to the high CPU demand of codec movies. In contrast, uncompressed movie playback requires very little CPU at all, instead being processed on the GPU. (Note: video capture is also a high CPU task.)

If you intend to play codec movies rather than converting to .7th using DFM, you need to test the particular codec(s) (and settings) thoroughly. This testing should be conducted with the server fully loaded, driving all displays and captures.

For a stable and predictable codec workflow, use a professional conversion software to create your own customised and proven preset .mov or h264/5, then convert new movies using that profile, before playing them on the server. This will minimise playback issues, and reduce the need to thoroughly test each new movie.

Movie Guidelines – Will it Play?

The playback capability of servers is set by the disk and graphics configuration specified. Typically each server is configured to meet the customer requirements, playing fully uncompressed 4:4:4 unless otherwise specified.

Typical playback rates for common resolutions in 4:4:4

1080p30 = 180 MB/s

4k30fps = 760 MB/s

4k60fps = 1.52 GB/s

8k30fps = 3 GB/s

Delta Family Typical Playback

NanoSDI-1: **1 × 3G-SDI** output used as **HD30** or **60p** or **1 × 2K 30p** compressed or **1 × 2K 30p** uncompressed* or **1 × 2K 60p** uncompressed*

NanoSDI-4K: **1 × 6G-SDI** output used as **4K 30p SDI** or **1 × 2K 30p** or **1 × 4K 30p** (upgradable to **12G-SDI** output**): up to **1 × 4K 60p 4:2:2** uncompressed*)

* Disk upgrade required

** AES Audio not available for 12G

Nano-1: **1 × HD** (1920 × 1080), **WUXGA** (1920 × 1200) or **2K** (2048 × 1080) **30fps** in 4:4:4

Nano-2: **2 × HD**, **WUXGA** or **2K 30fps** in 4:4:4

Nano-3: **3 × HD**, **WUXGA** or **2K 30fps** in 4:4:4

Nano4K: **1 × WUXGA** or **2K 30fps** or **4K 24fps**

Proton: **5 × HD**, **WUXGA** or **2K 30fps** in 4:4:4

Nucleus: **2 × 4K 30fps** in 4:4:4

Infinity: up to **8K × 4K 60fps 10 bit** in 4:4:4

Playback of 2 layers of 2 × 1080p30 equates to 4 × 1080p simultaneously, which would specify the **Delta Proton** model as minimum, as the smaller units would not manage these requirements.

Movies can be any aspect ratio (example 12000 × 1080, 3200 × 3200) to best fit the resultant resolution of the display surface.

Movie Guidelines – Carving / Slicing

Up to Disk and Graphics limit – don't carve, just copy to all servers and they 'look' at the right part in real-time.

Above disk limit, carve via DFM or Delta recording to create server-specific portion or channel mapped media **or** choose 7TH422 or 7TH420 or reduce resolution.

Will it fit on the server?

Servers are specified to meet user media size requirements. Some examples of available movie disk space:

900 GB SSD RAID0 (4 × 240 GB disks)	= 850 GB safe free space
HD 444 30fps = 178 MB/s, so 850 / 0.178	= 4775s = 79 minutes at this resolution and frame-rate
Nano 225 GB : 205 GB free	= 19 minutes of 1920 × 1080 4:4:4 30 fps
Nano-2 450 GB: 424 GB free	= 20 minutes of 3840 × 1080 4:4:4 30 fps
Nucleus 900 GB : 850 GB free	= 20 minutes of 7680 × 1080 4:4:4 30 fps
Infinity : 1800 GB : 1695 GB free	= 18.5 minutes of 4096 × 2160 4:4:4 60 fps

➤ [File Size versus 'Size on Disk'](#): know the differences and why.

Usable disk capacity is not the number on the label

The raw capacity of an SSD (what it says on the box) can be 120 GB, 240 GB, 480 GB, 960 GB, 1920 GB, or 3840 GB. Part of this capacity is used for necessary overhead associated with partitioning and formatting. The result is that about 95% of the raw capacity is usable. For example, 2 × 120 GB raw disks would give around 225 GB formatted array. Beyond that, we only recommend utilizing about 95% of the *available* formatted capacity, because for many disk models, it is valuable for the disk's firmware to have some breathing room for activities that aid in the longevity of the disk's lifespan. So for example, we would recommend filling only about 214 GB of that formatted volume of around 225 GB.

Image Formats (Typically C:\Images)

JPG, JPEG2000, BMP, DPX, PSD, TIF, TGA, PNG, GIF, A7S. From Delta 2.7 build 7: DPX 2.0HDR.

PNG, TIFF and TGA can have 8-bit alpha plane

Up to 1920 × 1200 in size (Nano-1)

Up to 8192 × 8192 in size (Nano-2, Nano-3)

Up to 16384 × 16384 in size (Nucleus / Infinity)

Image sizes add up and will fill up RAM (normal Mode) – see Dynamic Image Loading

Audio Formats (Typically C:\Audio)

Mono WAV preferred

Can adjust Speaker Mapping for Mono files

Stereo, 5.1 and 7.1 also played

Note a 2 GB file size limit for WAV files

Can also play MP3, AIFF

Can adjust frame-rate compensation if required

Live Capture

Any Direct Show Compliant Capture Device

1 – 12 DVI Inputs (auto-detect most PC formats)

2 – 8 SDI inputs (manual HD format selection)

Composite, sVideo, Webcams

No HDCP available (DVD or BluRay players)

Number of possible inputs dependent on free slots in the server

Number of onscreen live inputs dependent on overall load (other content, graphics resolution)

Can ChromaKey, warp, position etc

Some capture cards can spoof DVI EDID: example is 3000 × 3000 30 Hz input

General Usage – Visual Media

For fullscreen media, match the size to the display canvas size.

Wrong size media means poor aspect ratio, fat or thin people!

Content should be supplied full size, do not let content creators carve it up, apply geometry or blends, or create overlap – Delta does all that.

7th Image Format Plugins for Adobe and Nuke

7th Image Format Plugins for Adobe and Nuke

7thSense Design offers free plugins for the popular design and compositing suites, Adobe® Media Encoder (and legacy After Effects), and Nuke® from The Foundry. These plugins add import and/or export ability to these software environments for select .7th format image sequences.

Current



[AdobeMediaCore7th Plugin](#) ⁽¹⁷⁾ uses the Adobe MediaCore API supported by Adobe Media Encoder. Available for Windows and MacOS (now supporting both Intel and Apple Silicon chipsets). It offers reading and writing of the latest and most all of the historically utilized .7th formats, so can be used very flexibly.



[Nuke7th Plugin v.2](#) ⁽³⁰⁾ is a Reader and Writer, with revised interface and increased read/write format range.

Legacy



[7th AfterEffects v.1 Plugin](#) ⁽³³⁾ is our original plugin for After Effects. It offers limit .7th formats for export, but no import.



[Nuke7th Plugin v.1](#) ⁽³⁷⁾ is our original plugin for Nuke. Offering export of 7th 4:2:2 format with the alternative ".sth" extension.

AdobeMediaCore7th Plugin

Introduced in 2021, this Adobe MediaCore plugin offers maximum flexibility. It reads .7th files and writes any format out to .7th formats, and is accessible in Media Encoder directly, which then is integratable with After Effects and Premiere Pro. For example, in After Effects, Choose File > Export > Add to Media Encoder Queue and Media Encoder will open. Your After Effects composition will appear in the Media Encoder queue, and Media Encoder can then do the rendering, freeing up After Effects to continue working.

Compatibility

Creative Cloud CC2019+ 64-bit for Windows 10/11 and MacOS Intel.
Creative Cloud CC2024+ 64-bit for MacOS Silicon.

Downloads:

Right-click to download (save link as):

- > [AdobeMediaCore7th Plugin \(Windows\)](#)
- > [AdobeMediaCore7th Plugin \(MacOS with Intel Chipset\)](#)
- > [AdobeMediaCore7th Plugin \(MacOS with Apple Silicon Chipset\)](#)

Formats supported

Format	Import	Export
8-bit YCoCg DXT5	✓	✓
8-bit YCbCr 4:2:0	✓	✓
8-bit YCbCr 4:2:2	✓	✓
8-bit RGB 4:4:4	✓	✓
8-bit RGBA 4:4:4+A	✓	✓
8-bit BGRA 4:4:4+A	✓	✗
10-bit YCbCr 4:2:2	✓	✓
10-bit RGB 4:4:4	✓	✓
12-bit RGB 4:4:4	✓	✓
12/10-bit YCbCr 4:2:2+A	✓	✓

.sth variants are also supported for IMPORT, but not export.

Installation (Windows)

1. Download and unzip the 2 files:

- Exporter7th.prm
- Importer7th.prm

2. Place these in C:\Program Files\Adobe\Common\Plug-ins\7.0\MediaCore.

Admin privileges are required to write to this folder.

If this subfolder does not exist, just create it first.

If installing over previously installed plugin version, preferences may not transfer correctly. It is best to delete the Adobe Media Encoder preferences file (typically under Users\[USERNAME]\Documents\Adobe\Adobe Media Encoder\[VERSION]\Presets\PresetTree.xml) and restart Media Encoder.

Installation (MacOS)

1. Download and unzip the 2 installation bundles:

- Exporter7th.bundle
- Importer7th.bundle

2. Open Terminal (as Administrator) and navigate to the directory where you unzipped.
Example:

```
cd /path/to/extracted/plugin/files
```

3. Remove quarantine flags:

```
xattr -d com.apple.quarantine Exporter7th.bundle  
xattr -d com.apple.quarantine Importer7th.bundle
```

NOTE:

This step is required for MacOS Gatekeeper because the .bundle plugins are not currently notarized. This means if downloaded via a web browser, macOS marks them as quarantined. Quarantined plugins will not load inside Adobe applications. Users will see the following error unless we run this command to manually remove the quarantine flags::



4. Copy files to the Adobe MediaCore Directory:

```
cp Exporter7th.bundle /Library/Application Support/Adobe/Common/Plugins/7.0/MediaCore
cp Importer7th.bundle /Library/Application Support/Adobe/Common/Plugins/7.0/MediaCore
```

If this subfolders does not exist, you can make it first.

If installing over an existing plugin, preferences may not display correctly. Hold down the Shift key while loading Adobe Media Encoder or Premiere Pro to delete the plugin cache.

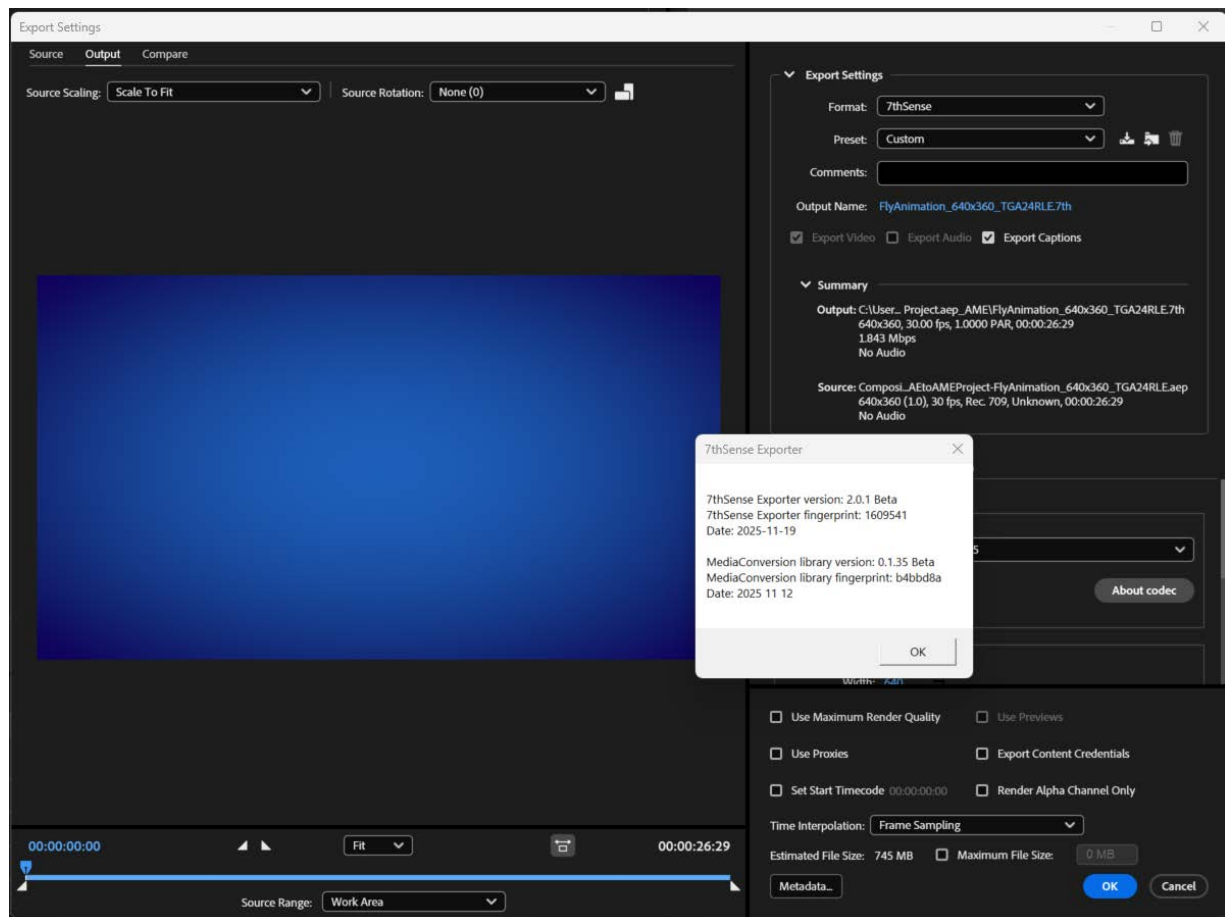
It may be necessary to use Extensions settings to enable and disable Apple and third-party extensions, and select extensions to include in the Share menu. Extensions, such as Markup, add extra functionality to apps, the Finder, and the Touch Bar. To change these settings, select Apple menu > System Settings, click Privacy & Security in the sidebar, then click Extensions on the right.

Verifying Installed Version

To verify the installed plugin version:

1. Open Adobe Media Encoder

2. Add any piece of content to the queue, then open the queue item's *Export Settings* (by clicking the blue text in the *Format* column of that queue item)
3. Choose *7thSense* from the format list.
4. Select the *Video* tab, then click *About Codec*



Testing and Operation in Media Encoder

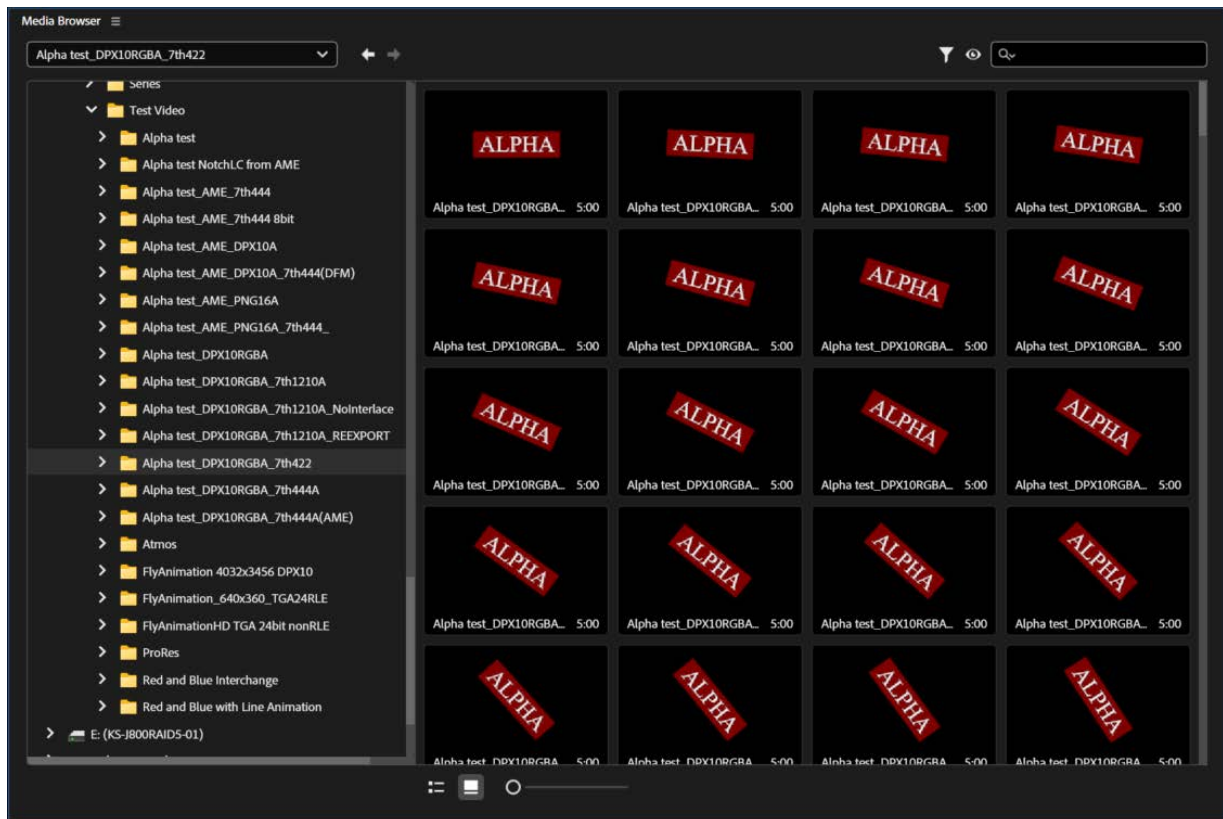
Importing

1. Open Media Encoder
2. Browse in the Media Browser to a folder that contains a .7th or .sth image sequence.

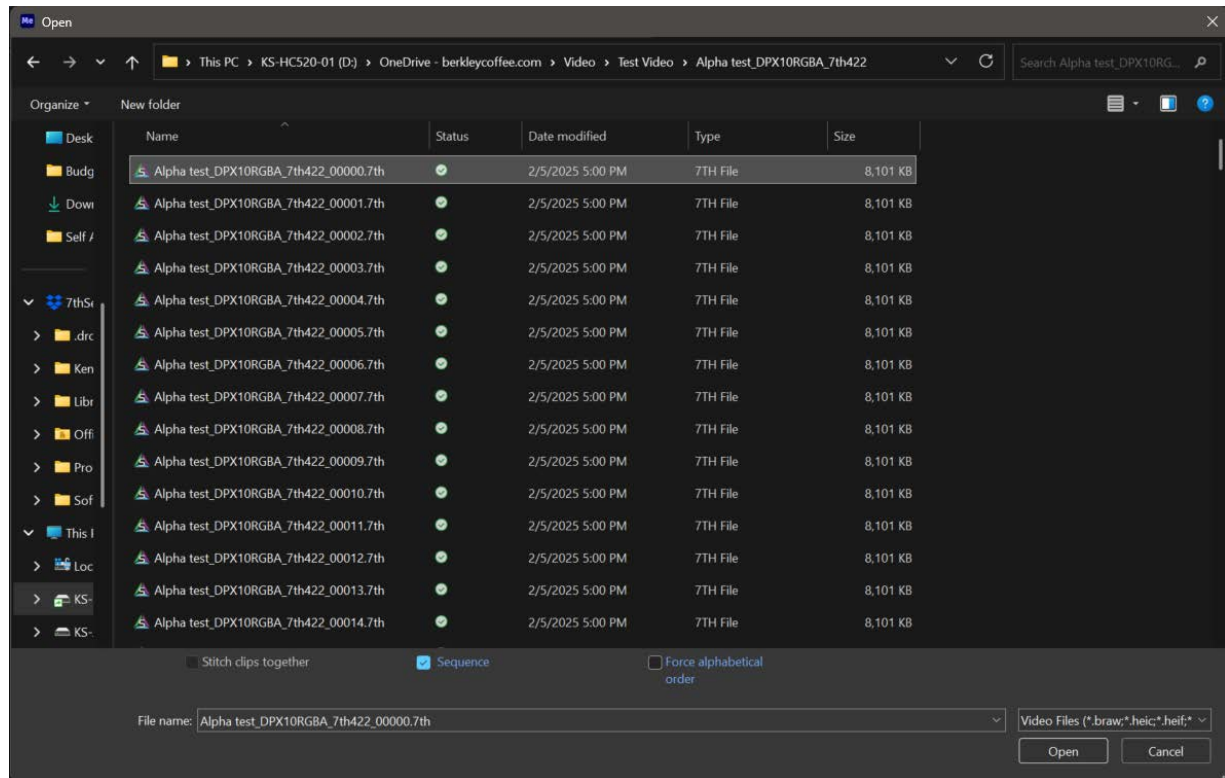
If you need content to test with, download and unzip this low resolution .7th 4:2:2 sequence: [DOWNLOAD](#)

You should see thumbnails generated for each frame in the Media Browser, which confirms that the import plugin is present.

HOWEVER, do not attempt to add a sequence to the Queue from the Media Browser, because this method does not support "Sequences"! AME will only allow you to import a single individual frame here.



3. INSTEAD, click *File* -> *Add Source*.
4. Browse to a folder that contains a .7th or .sth image sequence.
5. Single click just the FIRST indexed image file, ensure that the *Sequence* checkbox is checked, and *Open*.



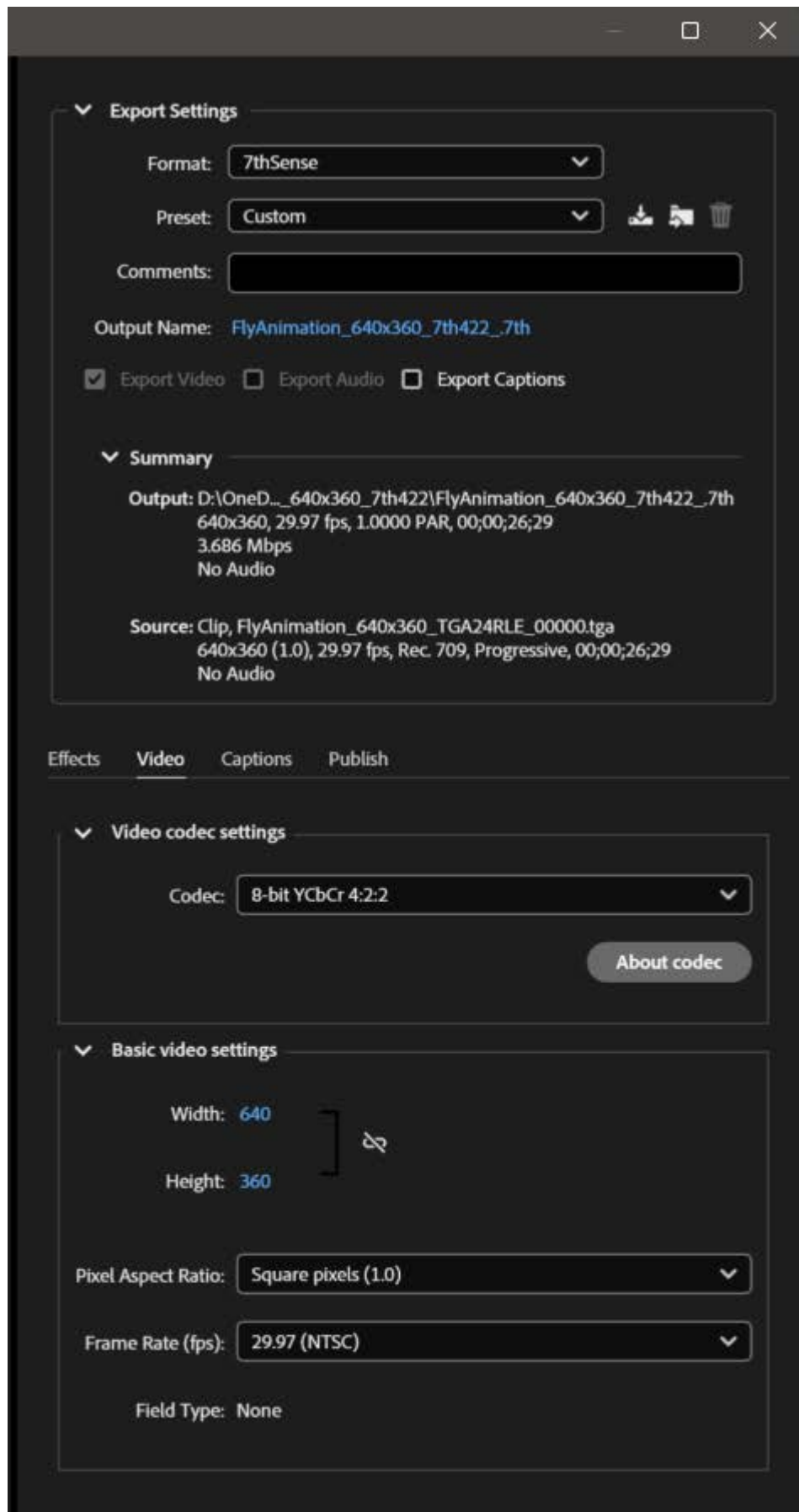
6. Open that Queue item's *Export Settings* (by clicking the blue text in its *Format* column).
7. Click the *Source* tab (upper-left corner), and drag the playhead around a bit. You should see the images rendered.

Exporting

1. Follow similar steps as written above to add ANY source movie/image sequence supported by Media Encoder to an After Effects Composition (and .7th sequences are now among those possibilities with our Import plugin installed.)

If you'd like to test conversion of TGA to .7th, download and unzip this low resolution TGA 24-bit RLE sequence: [DOWNLOAD](#)

2. Open that Queue item's *Export Settings* (by clicking the blue text in its *Format* column).



3. Choose *Format* -> *7thSense*.
4. Click the blue text beside *Output Name* to edit the export path and file naming. Remember that you are producing a sequence of images, so you should first create a new folder that will hold ONLY the new images, then enter that folder, and there set the base name of the image files will use. Upon export, AME will automatically add zero-padded frame index to whatever base name you choose. It is generally best practice to match the folder name and base name, but with an "_" added at the end of the base name (after which AME will add the frame index upon export.)
5. Under *Video codec settings*, choose a .7th subformat.
6. At this point you can just hit OK, unless you wish to intentionally change further parameters like scaling or frame rate. Note if you are converting FROM an image sequence TO an image sequence, it's value doesn't have to match the reality of the fps this clip is actually produced to play at. Just leave that setting as is and frames will enter and exit 1:1 with no rate conversation
7. Click Play button on the Queue

If the export produces any extraneous files in that sequence folder (e.g. ".xmp" files), you need to delete them before attempting to bring the resource into DeltaServer.

Testing and Operation in After Effects

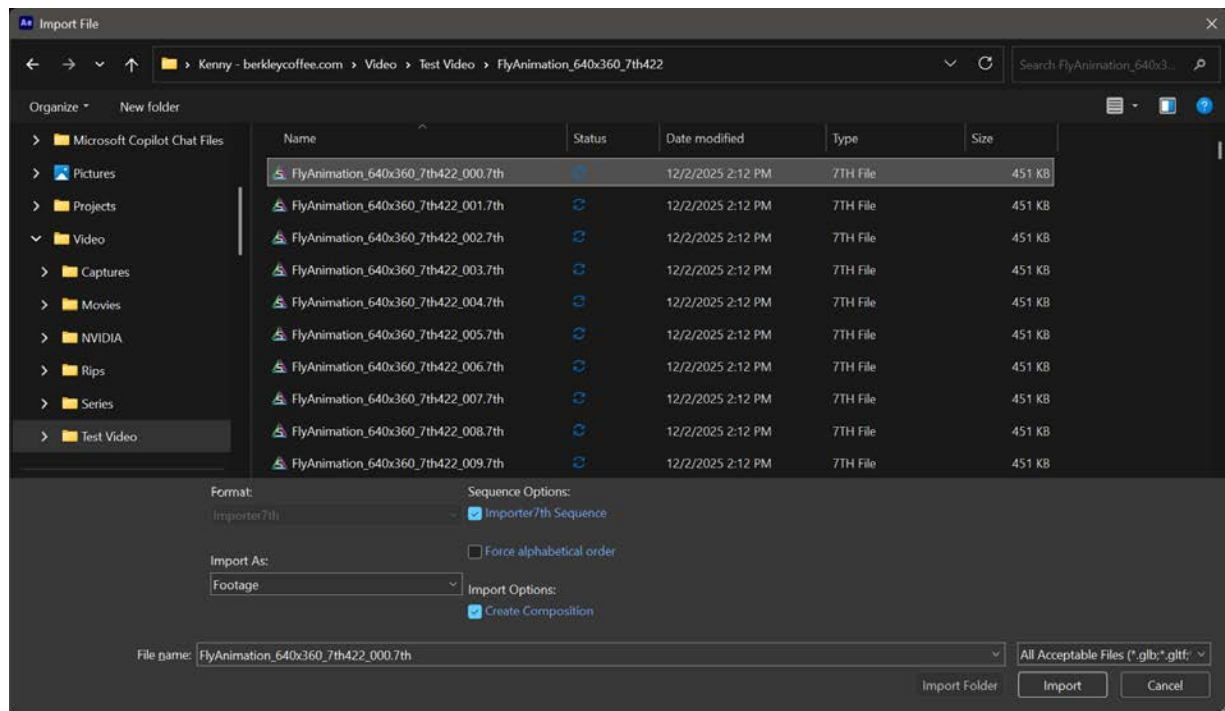
Importing

1. Run After Effects and Start a new Project,
2. Click *File* -> *Import* -> *Files*. Browse to a folder that contains a .7th or .sth image sequence.

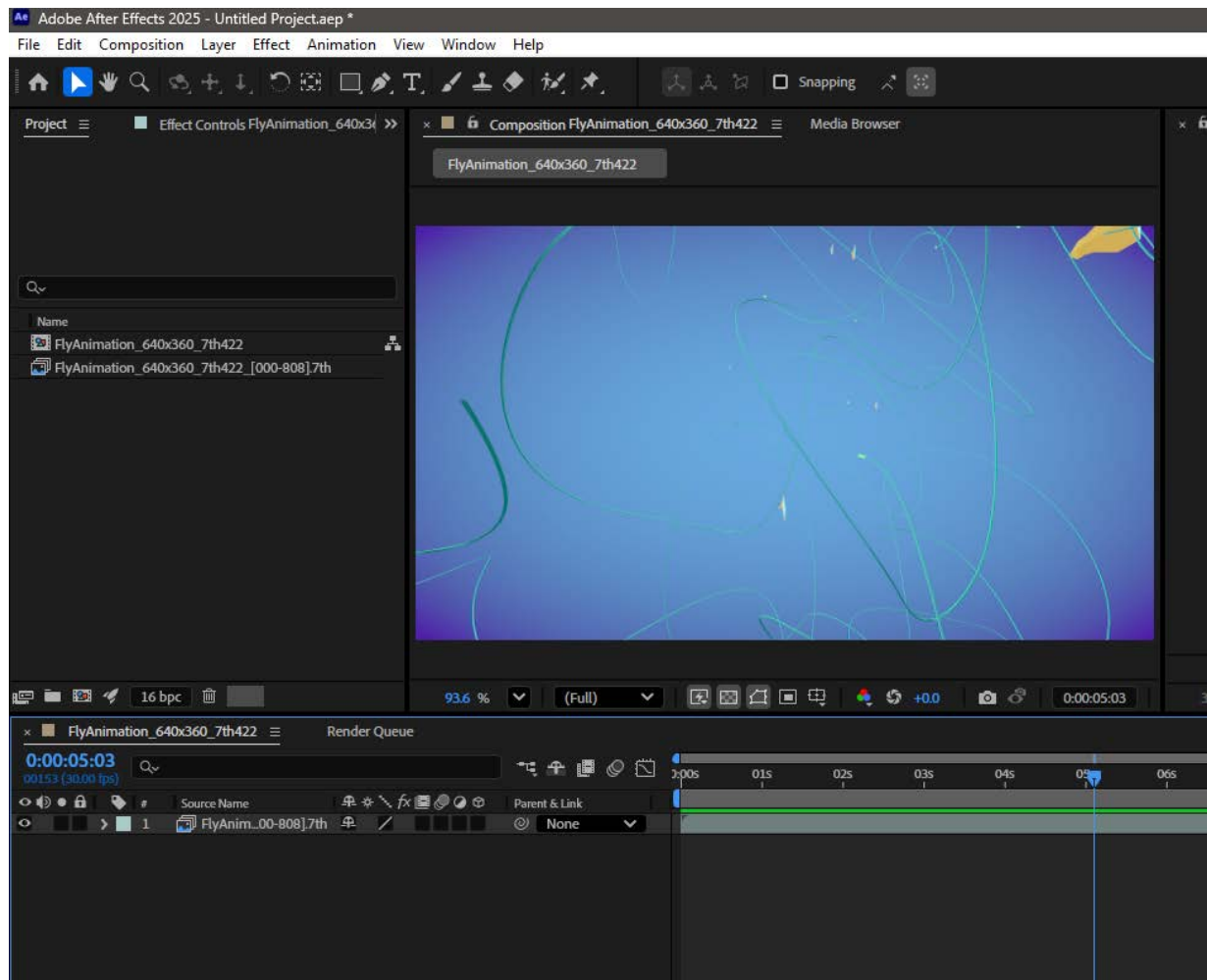
If you need content to test with, download and unzip this low resolution .7th 4:2:2 sequence: [DOWNLOAD](#)

NOTE: Similar to Media Encoder, the *Media Browser* pallet in After Effects does not support Import of image sequences. After Effects also does not render thumbnails for .7th frames.

3. Single click just the FIRST indexed image file, ensure that the checkbox *Import7th Sequence* is checked, as well as *Create Composition*, and then *Import*.



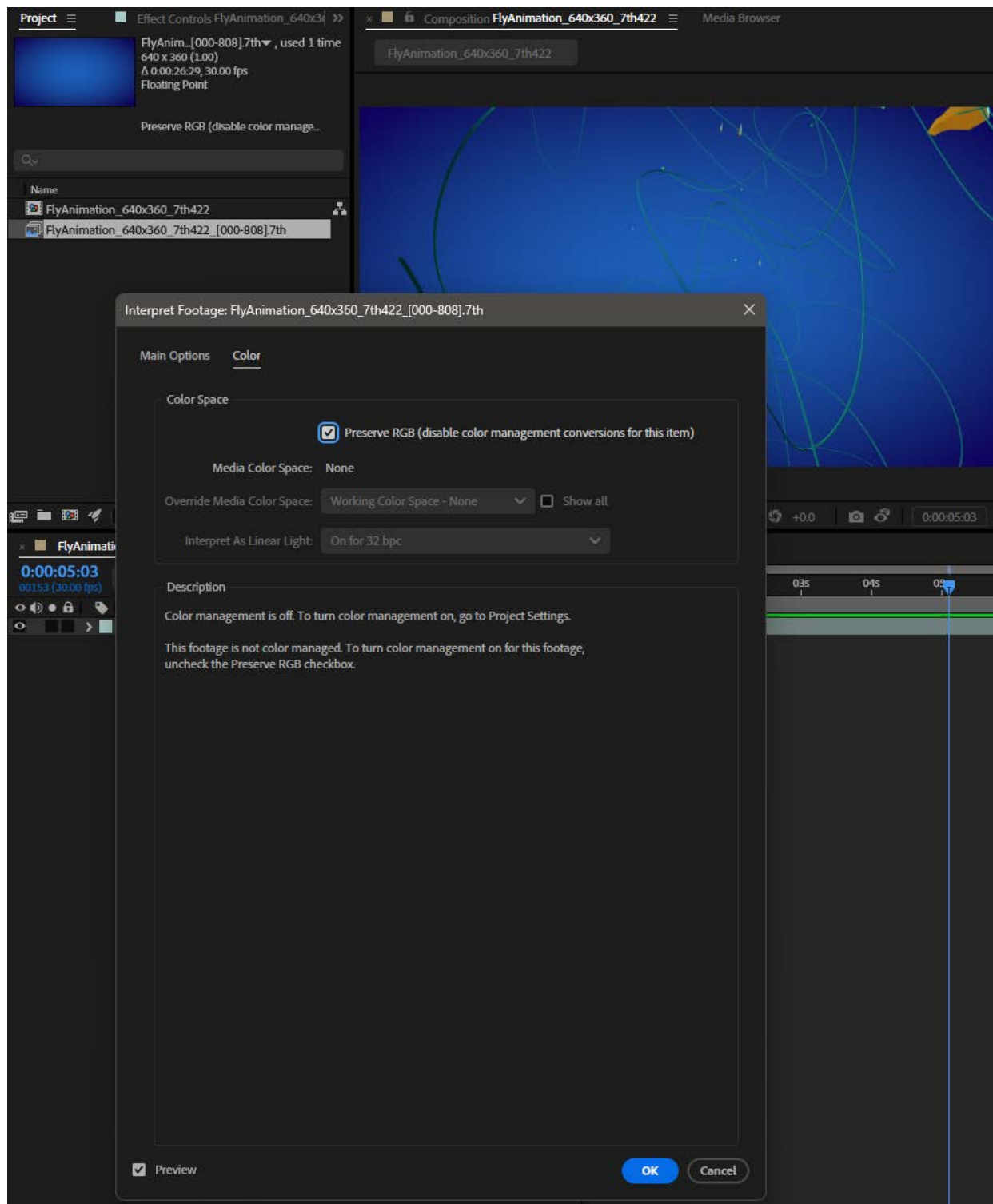
4. You should now see the .7th footage and a composition created based on that footage in the Project bin. Open that Composition and you should see the frames rendered in the Composition pallet.



IMPORTANT CONSIDERATIONS:

- If you are working with sequence with color bit depth beyond 8-bit, it's important to increase the project's working color depth in *File --> Project Settings --> Color* to "16 bits per channel" (the default being "8 bits per channel").
- AE will automatically applies some "Interpret Footage" settings to every given imported clip (and the Composition created based on those initial clip settings). For image sequences, it's important to review that both the *Frame Rate* and *Color Space* settings are appropriate. .7th files do not contain color space metadata, only the color bit values. So it's important to communicate with the media producer what color space the data was written to be interpreted as (e.g. Rec709). Also beware that After Effects is a color-managed workspace (configurable in *File --> Project Settings --> Color*). This means that all footage is conformed from its interpreted color space to the working color space for preview, composition, and ultimately export.

You can bypass color management for a given clip by checking *Preserve RGB* in its *Interpret Footage* → *Color* tab. This is generally what you should do if using AE for simple edit/format convert purposes. Notice how different (and more correct in this case) the same .7th image sequence looks from above after checking *Preserve RGB*.



-

Exporting

1. Follow similar steps as written above to add ANY source movie/image sequence supported by After Effects to a Composition (.7th sequence are now included among those possibilities with our Import plugin verified above.)

If you'd like to test conversion of TGA to .7th, download and unzip this low resolution TGA 24-bit RLE sequence: [DOWNLOAD](#)

2. Be sure to review *Project Settings*, and *Interpret Footage* settings for that clip (as discussed deeper in the Importing guidance.)
3. Select the composition in *Project* pallet, then in the top menu bar choose *Composition --> Add to Adobe Media Encoder Queue*. From here, just follow the instructions given earlier in this guide for Exporting in Adobe Media Encoder.

Troubleshooting

Adobe Media Encoder log files:

<https://helpx.adobe.com/uk/media-encoder/using/log-files.html>

Nuke7th Plugin v2

This 2023 rework of the Nuke reader/writer plugin expands the range of formats available, with a revised user interface.

Compatibility

Nuke 12.1v5, 12.2v2, 12.2v5, 13.0v2, 14.0v2 on Windows 10/11 and Linux CentOS 7.
Nuke 15.1v3 on Windows 10/11 and Linux Rocky 9

Downloads

Right-click to download (save link as):

- [Nuke7th Plugin v.2.3.2 for Nuke 15.1v3 \(Windows\)](#)
- [Nuke7th Plugin v.2.3.2 for Nuke 15.1v3 \(Linux Rocky 9\)](#)

- [Nuke7th Plugin v.2.3.1 for Nuke 14.1v5 \(Windows\)](#)
- [Nuke7th Plugin v.2.3.1 for Nuke 14.1v5 \(CentOS 7\)](#)
- [Nuke7th Plugin v.2.3.1 for Nuke 14.0v2 \(Windows\)](#)
- [Nuke7th Plugin v.2.3.1 for Nuke 14.0v2 \(CentOS 7\)](#)
- [Nuke7th Plugin v.2.3.1 for Nuke 13.0v2 \(Windows\)](#)
- [Nuke7th Plugin v.2.3.1 for Nuke 13.0v2 \(CentOS 7\)](#)
- [Nuke7th Plugin v.2.3.1 for Nuke 12.2v5 \(Windows\)](#)
- [Nuke7th Plugin v.2.3.1 for Nuke 12.2v5 \(CentOS 7\)](#)

Formats supported

Format	Import	Export
8-bit YCoCg DXT5	✓	✓
8-bit YCbCr 4:2:0	✓	✓
8-bit YCbCr 4:2:2	✓	✓
8-bit RGB 4:4:4	✓	✓
8-bit RGBA 4:4:4+A	✓	✓
8-bit BGRA 4:4:4+A	✓	✗
10-bit YCbCr 4:2:2	✓	✓
10-bit RGB 4:4:4	✓	✓
12-bit RGB 4:4:4	✓	✓

12/10-bit YCbCr 4:2:2+A	✓	✓
-------------------------	---	---

Installation

1. Download and unzip the appropriate package above.

The package contains all the files needed to load the plugins in Nuke.

<https://learn.foundry.com/nuke/developers/63/ndkdevguide/intro/pluginbuildinginstallation.html>

2. Windows: Extract and copy the contents of the downloaded zip package to Nuke user home folder, e.g. C:\Users\[USERNAME]\.nuke.
Linux: Extract and copy the contents of the downloaded zip package to Nuke user home folder, e.g. /home/[USERNAME]/.nuke.

Note the final compiled files are just these 2:

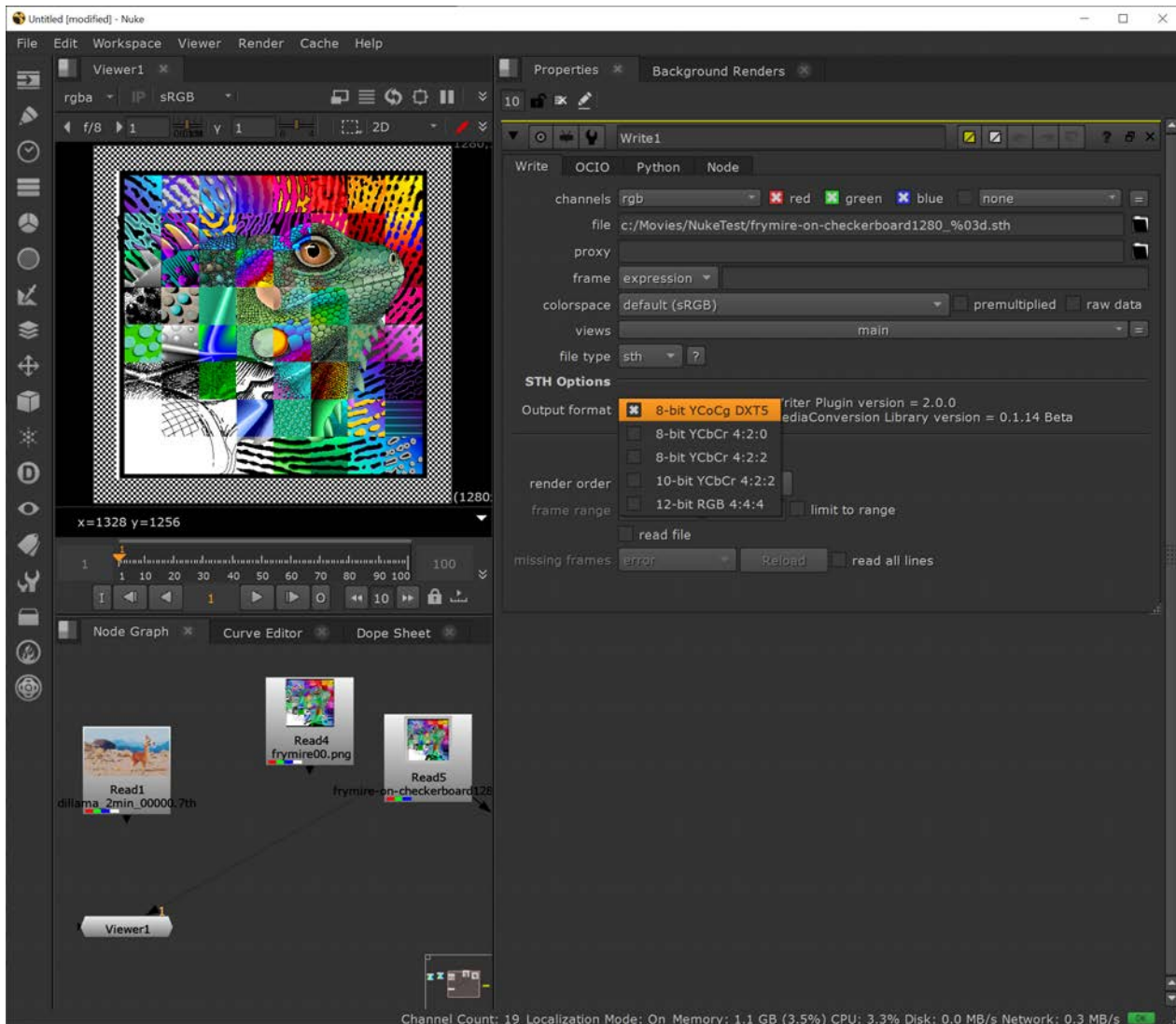
Windows: sthReader.dll and sthWriter.dll

Linux: sthReader.so and sthWriter.so

Operating the Reader/Writer

In Nuke, just select from the STH Options.

Nuke does not handle files with numeric characters well, so this exports to file extension .sth. Extensions .sth and .7th are equivalent in DeltaServer.



7th AfterEffects v.1 Plugin

Compatibility

Creative Cloud CC2019, 64-bit for Windows 10/11 and MacOS (Intel chipsets only).

Downloads

Right-click to download (save link as):

➤ [7th Adobe AfterEffects plugin \(Windows\)](#)

Formats supported

Format	Import	Export
8-bit YCbCr 4:2:2	✗	✓
10-bit YCbCr 4:2:2	✓	✓

Installation (Windows)

1. Download and copy *7thAE.aex* file should be copied to *C:\Program Files\Adobe\Common\Plug-ins\7.0\MediaCore*
2. Restart After Effects

Installation (MacOS)

Before CC 2019:

For a Mac installation using the latest Creative Cloud release, the *7thAE.plugin* package should be copied to the following After Effects plugin location:

/Library/Application Support/Adobe/Common/Plug-ins/[CS version]/MediaCore/

CC2019, verified with Catalina 10.15.1:

Add 7thSense plugin to path:

/Applications/Adobe After Effects CC 2019/Plug-ins/Extensions Start After Effects. It will fail, but click Cancel instead of moving it to the Bin. Shutdown After Effects.

Go to the 'Security & Privacy' panel, 'General' tab. This will show that the plugin was recently prevented from running. Click 'Allow Anyway'.

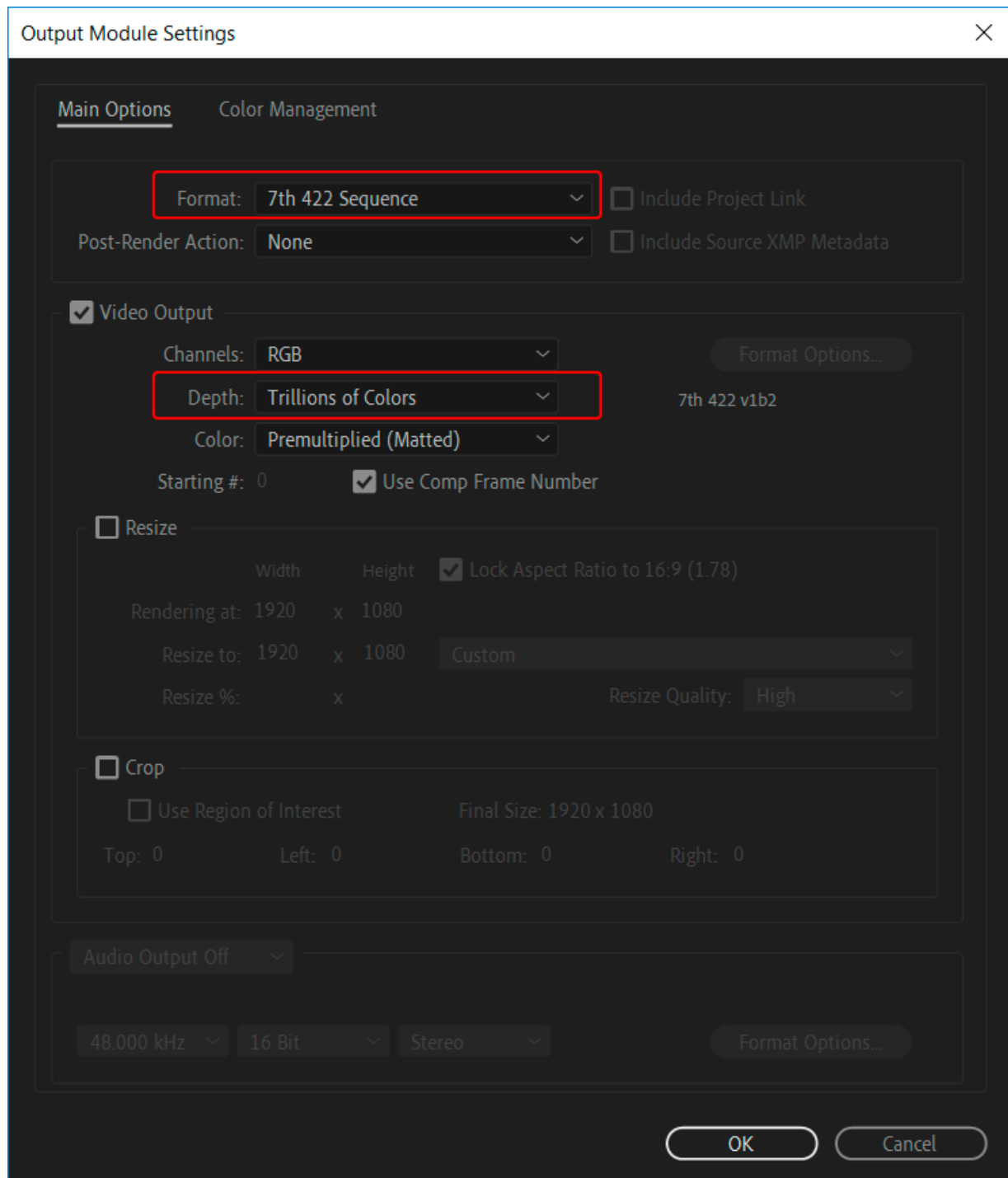
Run After Effects again. This time an extra option of 'Open' is shown, select this. After clicking open after effects will run and the plugin is seen.

Next time you start After Effects, you shouldn't see the prompt but the plugin should be available for use.

Operation

1. If you will be exporting at 10-bit color depth, it's important to increase the project's working color depth in *File --> Project Settings --> Color* to "16 bits per channel" (the default being "8 bits per channel").
2. Add your Composition to the Render Queue and open that Queue item's Output Module Settings.
3. Select "7th 422 Sequence" as the *Format*. (this is the only .7th format selection available).
4. To differentiate between 8-bit and 10-bit output options: either select *Video Output --> Depth:* "Millions of Colors" (for 8-bit) or "Trillions of Colors" (for 10-bit)

Output with Alpha (RGB+A) is not supported.



IMPORTANT CONSIDERATION:

AE will automatically apply some "Interpret Footage" settings to every given imported clip (and the Composition created based on those initial clip settings). For image sequences, it's

important to review that both the *Frame Rate* and *Color Space* settings are appropriate. .7th files do not contain color space metadata, only the color bit values. So it's important to communicate with the media producer what color space the data was written to be interpreted as (e.g. Rec709). Also beware that After Effects is a color-managed workspace (configurable in *File --> Project Settings --> Color*). This means that all footage is conformed from its interpreted color space to the working color space for preview, composition, and ultimately export.

You can bypass color management for a given clip by checking *Preserve RGB* in its *Interpret Footage --> Color* tab. This is generally what you should do if using AE for simple edit/format convert purposes. Notice how different (and more correct in this case) the same .7th image sequence looks from above after checking *Preserve RGB*.

Nuke7th Plugin v.1

Compatibility

Nuke 9, 10 and 11 for Windows 10/11, MacOS, Linux.

Formats supported

Format	Import	Export
8-bit YCoCg DXT5	✗	✓
8-bit YCbCr 4:2:2	✓	✓
10-bit YCbCr 4:2:2	✓	✓

Some Nuke systems don't not recognise numeric characters in filenames, so in Nuke there exist the option for .7th frames to be imported/exported with the .sth file extension.

Installation

Once built, your plug-in binary (a shared library with the appropriate .dylib/.so/.dll extension depending on your platform) will need to be placed in a path where NUKE scans for plug-ins on startup. On all platforms this will be either your ~/.nuke (i.e. <user home directory>/~.nuke/, where the dot prefix may mean it is hidden by default in your file browser), or somewhere in your NUKE_PATH which defaults to:

- macOS 64-bit: /Library/Application Support/NUKE/x.x/plugins/
- Linux 64-bit: /usr/local/NUKE/x.x/plugins/
- Windows 64-bit: C:\Program Files\Common Files\NUKEx.xplugins

Where <x.x> is the major.minor version of the NUKE in question. Conveniently, NUKE_PATH can be added to by setting an environment variable of the same name. This is often of use when building and testing plug-ins, because you can set an environment variable pointing at your build directory and then fire up NUKE to try it out.

It is recommended when packaging up NDK plug-ins for distribution that you use the NUKE_PATH directories, and install your bundle in an appropriately named subdirectory (since the default path is searched single level recursively).

There are several ways to add a plug-in to your current session.

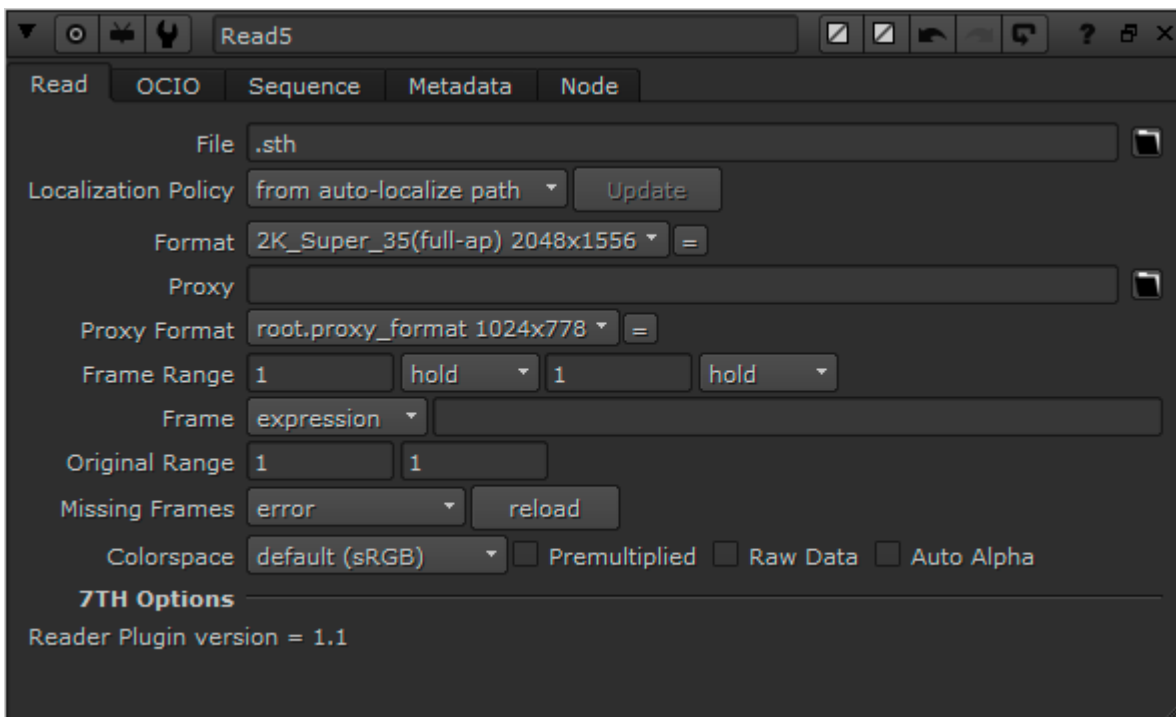
- Hit x to bring up the script command and type in the name of the plug-in and hit enter. If the plug-in is found in the various paths searched for the plug-in, an instance is added to the Node Graph. This is generally of most use when first setting up plug-ins. If this fails, you may want to try the script command 'load <my plug-in name>' which tests that the plug-in can be found and that dynamic loading works. The common reasons why this might not work is that the DD::Image::Op::Description is incorrect, or that the plug-in has been built against a different version of the NDK than that supported by the version of NUKE you're trying to load it into.

- Go to the Other > All plug-ins menu and hit update, or hit tab and type update-enter. Both of these add the full list of found plug-ins to the menu (and thus tab selector), allowing them to be added by the usual means. Again, this is generally of most use when first setting up plug-ins.

- You can add your own menu entry to the default toolbar by adding a menu.py file to the NUKE_PATH and following the guidelines laid out in the Python Reference Guide. This is recommended for packaging up plug-ins for distribution as it allows easy discovery of your tools. Additionally, any pre-requisite Python elements can be initialised in menu or init.py, including the usual icons and so on.

▼ Operation

Import .sth or .7th frames with the Reader component.

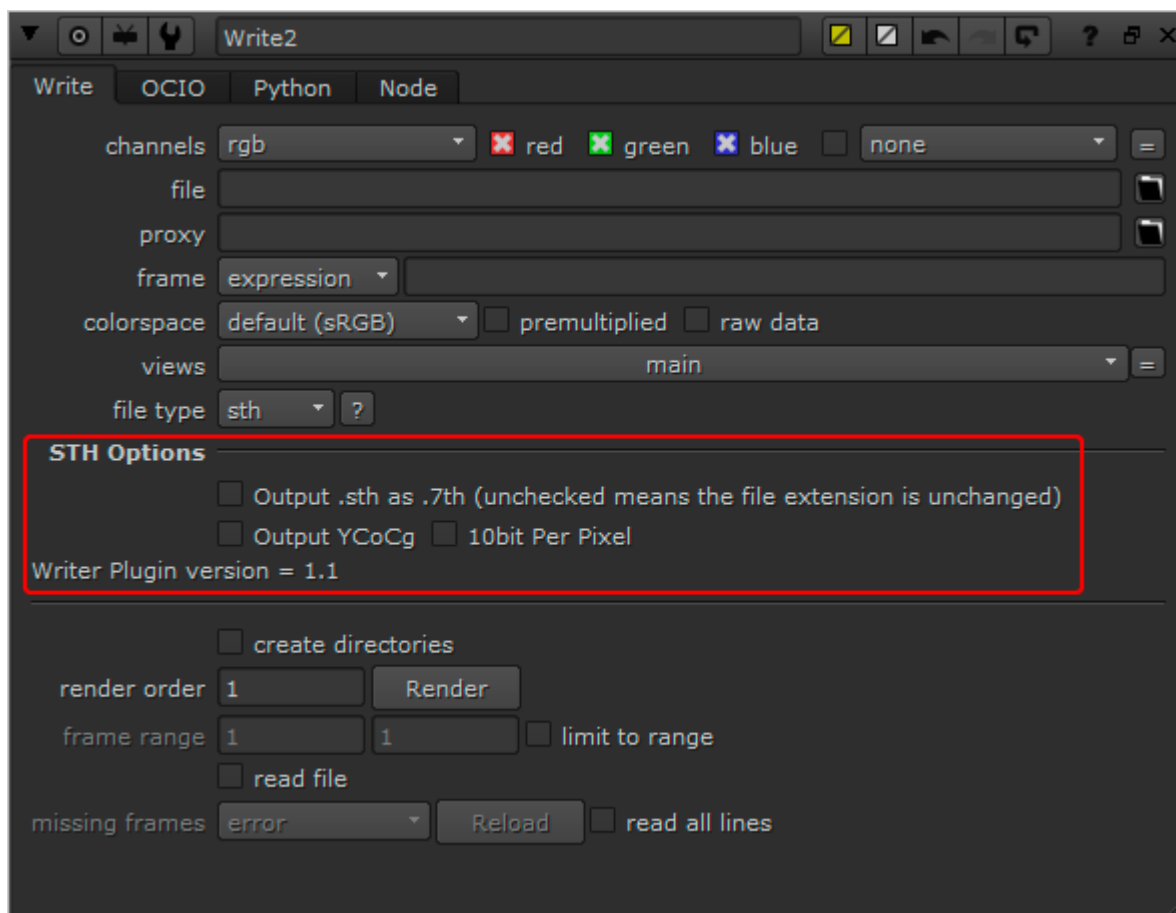


Export .sth or .7th frames with the Write component. Selection of file extension, bit-depth/compression options.

If neither of the two following options are ticked, output is 4:2:2 8-bit. Otherwise:

Output YCoCg (outputs .7th YCoCg compressed format)

Output 10bit Per Pixel (outputs 4:2:2 10-bit).



IMPORTANT CONSIDERATION:

When using the sth422Writer and sth422Reader to write your Nuke render to a .7th or .sth format, and then subsequently read it back into Nuke, you will see a change in the RGB values compared to your original in Nuke. The reason for this expected: Red, Green and Blue pixel values in Nuke as represented as 32-bit float, and when the data is saved to file, these values are converted to 8 or 10-bit. This is necessary to make them compatible with 8 or 10-bit .sth or .7th files. This process causes the original data to be approximated so the information can be encoded within the specified number of bits. When the data is then read back using the sth422Reader, it begins its conversion process at the saved approximated value. Therefore, after the reader has done its processing and fed that information back to Nuke, it will give slightly different RGB values to those originally created in Nuke.

For this reason, it is recommended that content creation and changes are done on the original Nuke node and not on a node that has been read from the sth422Reader. The reader should be used primarily for checking frames, not editing.

Unwrapping NotchLC MOV to NotchLC7th Frames

Unwrapping NotchLC MOV to NotchLC7th Frames

NotchLC is a lossy compression algorithm achieving data rate between 5:1 and 8:1 with mild perceived quality loss. **Supported as of Delta 2.8+**

NotchLC movies are produced by 3rd party tool (e.g. Notch, After Affects) exclusively in MOV-wrapped format. Delta will attempt to render this format, but doing so is not advised for performance purposes (as NO WRAPPED CODECS are advised for performance in Delta.)

Instead, we provide a tool 'NotchLCto7th' which unwraps NotchLC MOVs, extracts the frames from any LZ4 compression, and repackages each frame as a .7th image file in a sequence. The actual image data is unchanged, so this process maintains exact source image quality, and is relatively fast in processing versus full image data rendering.

'NotchLCto7th.exe' is installed with Delta Server 2.8.7+ installation packages. It resides at C:\Program Files\7thSense\Delta\Utilities\NotchLCto7th

Compatibility

Windows 10/11

▼ Operation

1. Open Windows command prompt (by pressing Windows Key + R, typing cmd, and pressing OK.
2. Navigate to the install directory:

```
cd "C:\Program Files\7thSense\Delta\Utilities\NotchLCto7th"
```

3. Run with input file and output path parameters. Example:

```
start NotchLCto7th.exe -in="E:\Movies\SourceFolder\MovieName.mov" -out="E:\Movies\DestinationFolder\SequenceName"
```

Command Line Argument	explanation
-in=SourceMovFileIncPath	Absolute path to the NotchLC codec to unwrap
-out=Target7thStubIncPath	Path to a folder where the unwrapped frames will be output

Note:

- Use backslashes ('\') as the separator between folder names, as this is required for Windows paths.
- Use quotes to enclose paths with spaces: "C:\Movies\Folder with Space\MyNotchLC7th".

Distributed File Manager

Distributed File Manager

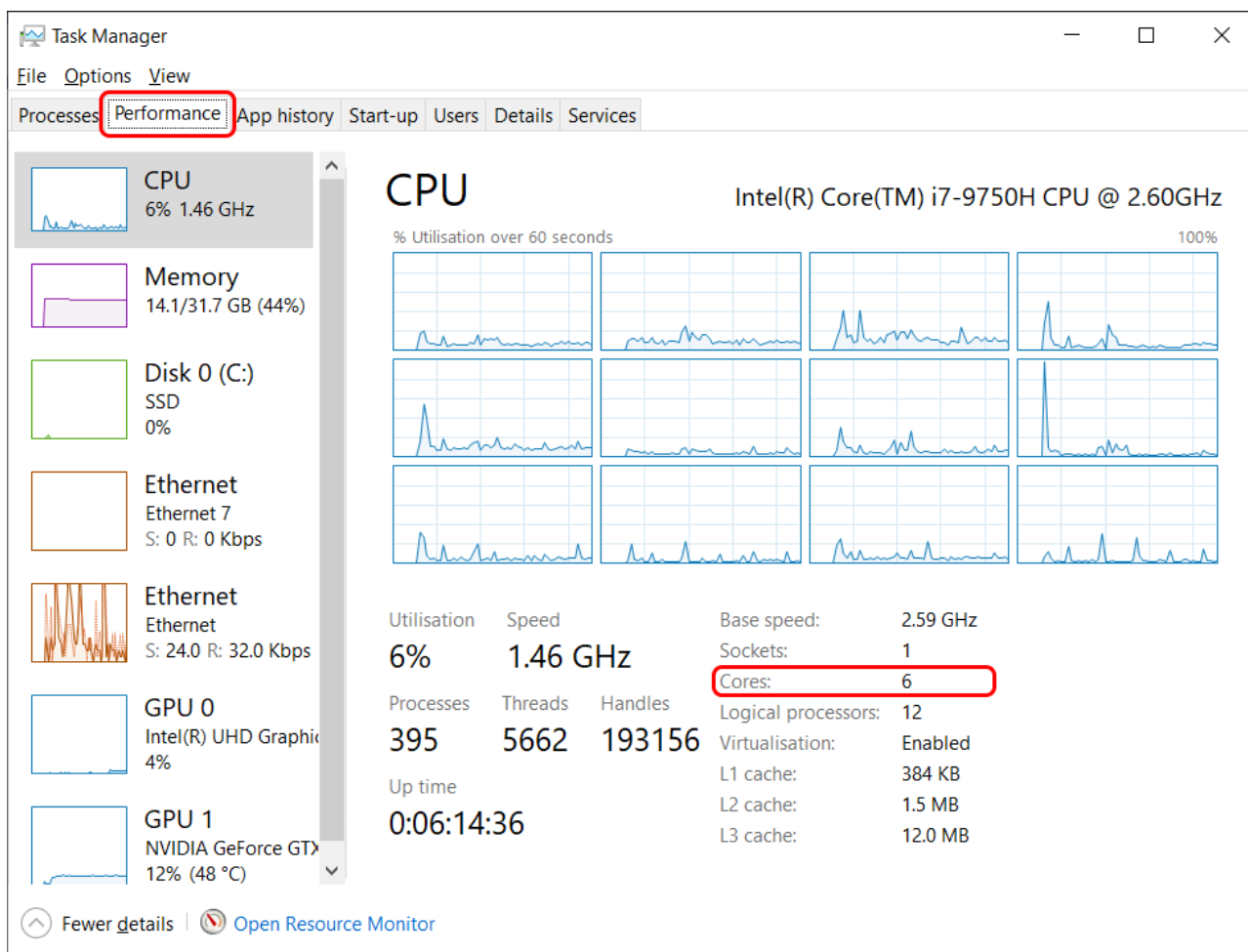
DFM (Distributed File Manager) is a single utility used to manage media for the Delta Media Server system. It is available in 32 bit and 64 bit versions for Microsoft Windows.

DFM can extract movie frames and audio from a compressed file format, into sequences of individual frames.

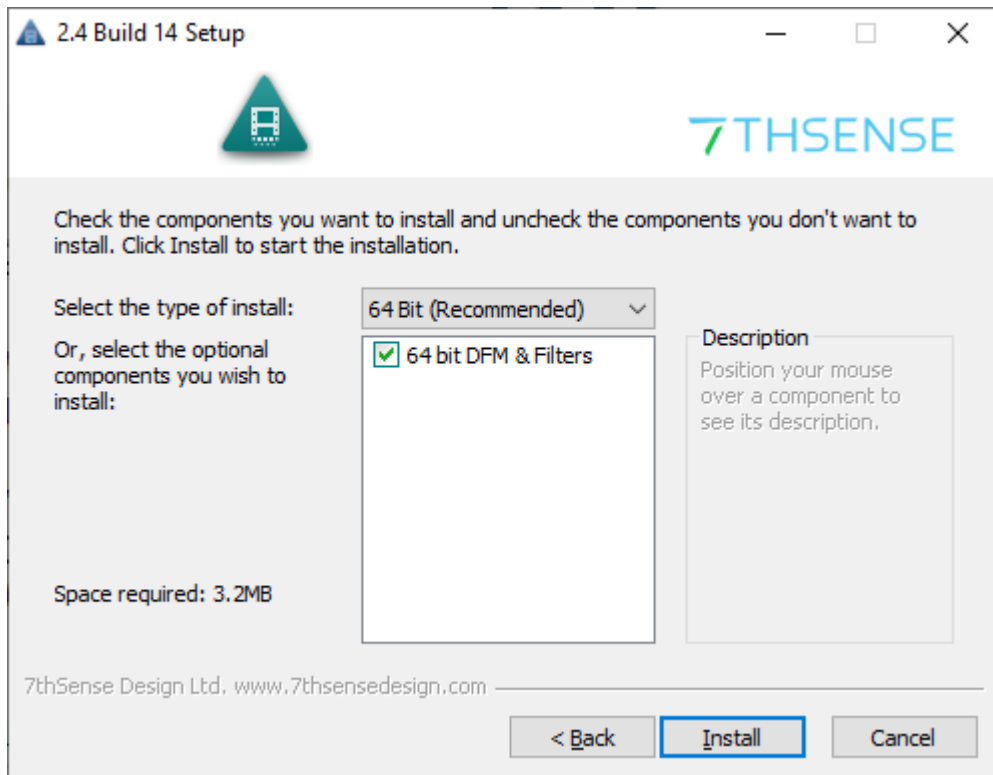
See also: [7th Image Format Plugins for Adobe and Nuke](#) ¹⁶

Installation: 32 vs 64 Bit

DFM can be demanding, and requires a minimum of four processing cores. Check in Windows Task Manager:



Install 'As Administrator':



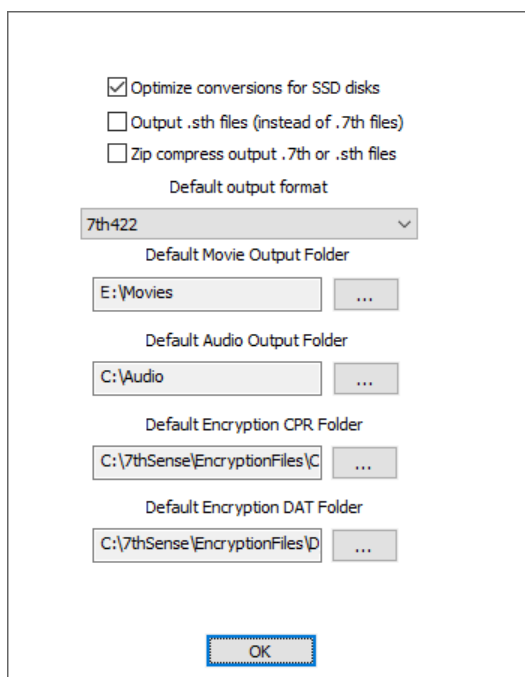
- 7thSense recommends that you install the 64 bit version of DFM if possible.
- 7thSense filters and the DFM application are available in both 32 bit and 64 bit versions.
- 32 bit DFM can be installed on 32 and 64 bit versions of Windows 7.

DFM Defaults

The first time DFM is launched, a defaults dialog will appear, as shown below. To revisit this dialog, see *Settings > Conversion Defaults*.

Most Delta media systems operate with a consistent file format and media location. The options selected will be the default selections from this point on for all new media added into DFM for extraction.

Note that the output format '**7th 6to1**' is legacy and whilst it will play, should now be avoided.



Optimize Conversions for SSD disks checkbox

Unchecked for **HDD storage**: movie frames are stored 10 per file

Checked for **SSD storage**: movie frames are stored individually – 1 frame per file

Output .sth files (instead of .7th)

Avoid the numeric file extension: for Nuke users.

Zip compress output .7th or .sth files

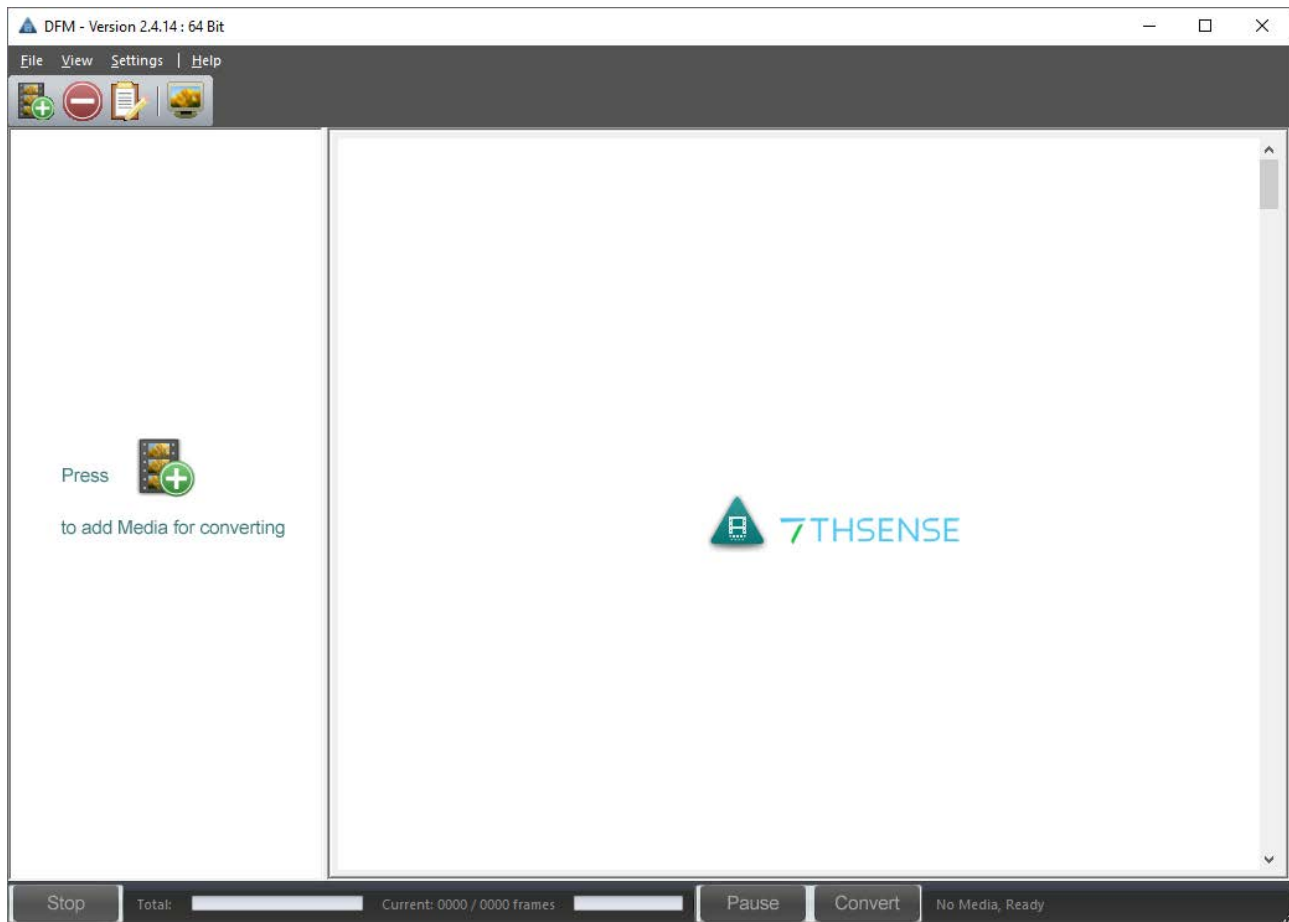
Apply internal colour-bit compression. This saves on file size, but will demand more CPU on playing.

Select the correct Movie drive

Delta servers: For optimal functionality, we recommend that movies are stored on your server's **E:** drive, whilst all other images, sounds etc. are stored on the **C:** drive. Users of [DeltaOffline](#) or working on a separate PC, may need movies to go to their local **C:** drive.

It is possible to override this for each independent media file in DFM on an individual file basis as necessary.

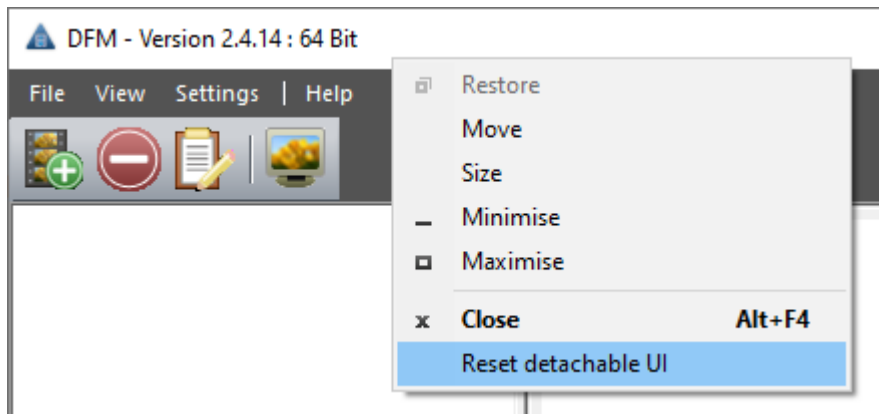
When you open DFM, the initial screen will look like this:



Toolbar



The toolbar is detachable to float or be redocked at the side, and reset from the Windows title bar:



The buttons, in order: add media to the list, remove media from the list, view conversion log, and monitor frames during conversion.

Control bar



The control bar is shown here during conversion, showing progress, and offering Pause and Stop.

File Menu

The list of items to convert and their settings can be saved to a .DFM file, and reused.

New

Clear the current list and settings.

Open

Open a saved media list and settings file.

Save As

If the current list and settings are based on a saved .DFM file but edited, save the new list and settings.

File Extraction and Conversion

DFM can take movie files or sequences of images in a variety of formats and convert these to the 7TH, 7TH 420, 7TH 422, 7TH 444 proprietary file formats. These file formats feature various levels of compression allowing high-resolution movies to be streamed from disk in real-time: Movie images can be resized, cropped and scaled during this process if required.

DFM will also process audio files, whether contained within a movie file or in a separate audio file, such as an mp3 file. Audio is split out into separate mono files for each channel suitable for import into Delta media server.

If your computer has a codec to support the movie or audio files you want to convert, DFM can convert your files.

With DFM version 2 and beyond, batch processing is supported. Multiple files can be queued up ready for conversion.

The process can take some time, depending on hardware capability and movie size.

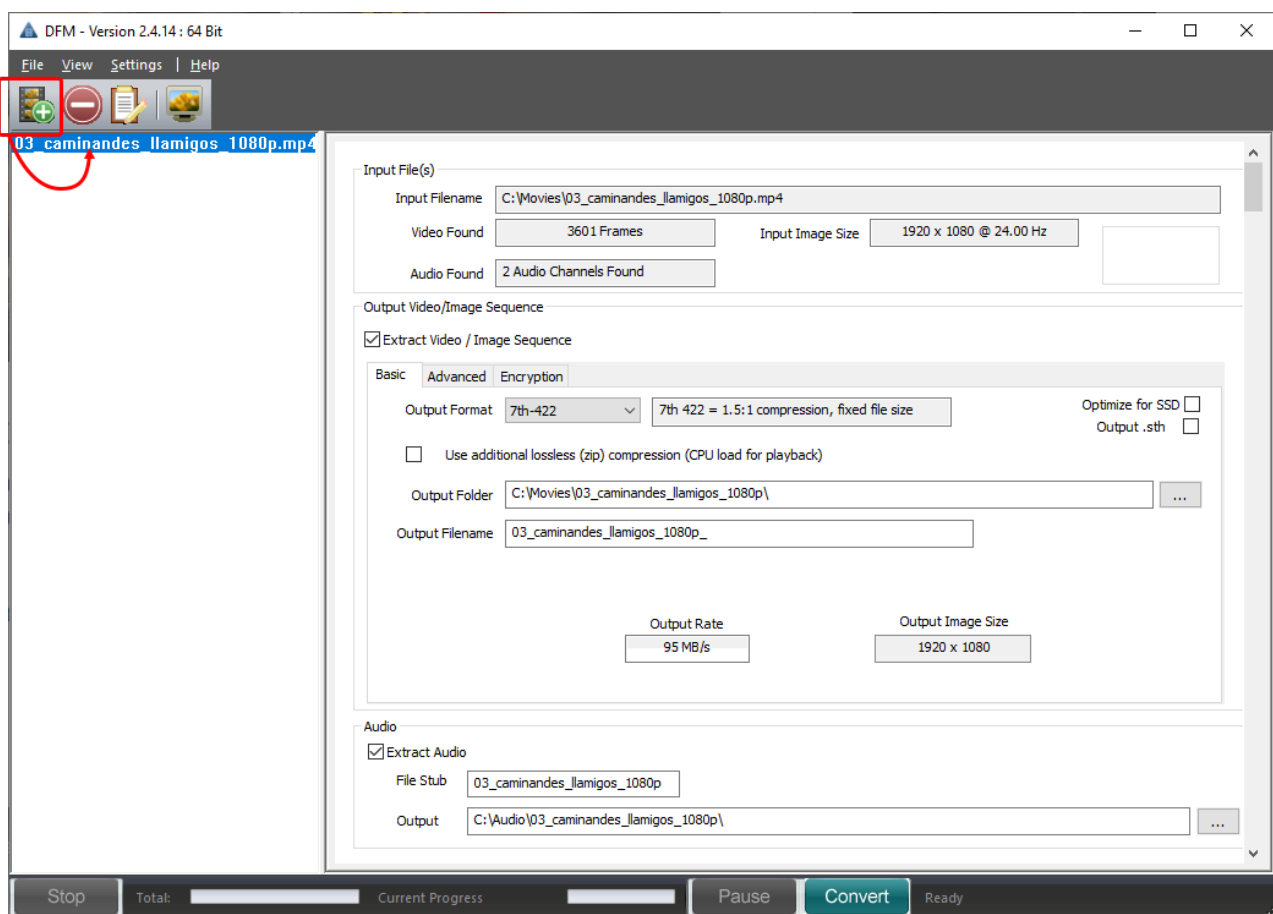
Extract a Movie

You can convert bitmap sequences or HapQ, MPG, AVI or WMV files to the 7TH (STH) file formats. Audio files, such as mp3 files are also supported. Follow these basic instructions; for more detail, see the sections on the [\[Basic Tab](#) ⁶¹], [\[Advanced Tab](#) ⁶³] and [\[Audio](#) ⁶⁸].

- [Add Media to Extract](#) ⁵⁵
- [Extract Audio](#) ⁵⁶
- [Selective Extraction and Conversion \(Advanced Tab\)](#) ⁵⁷
- [Run conversion](#) ⁵⁸

Add Media to Extract

Click the add media button on the toolbar to add input files (movies) to the queue. If selecting an image sequence, any file in the sequence can be selected.

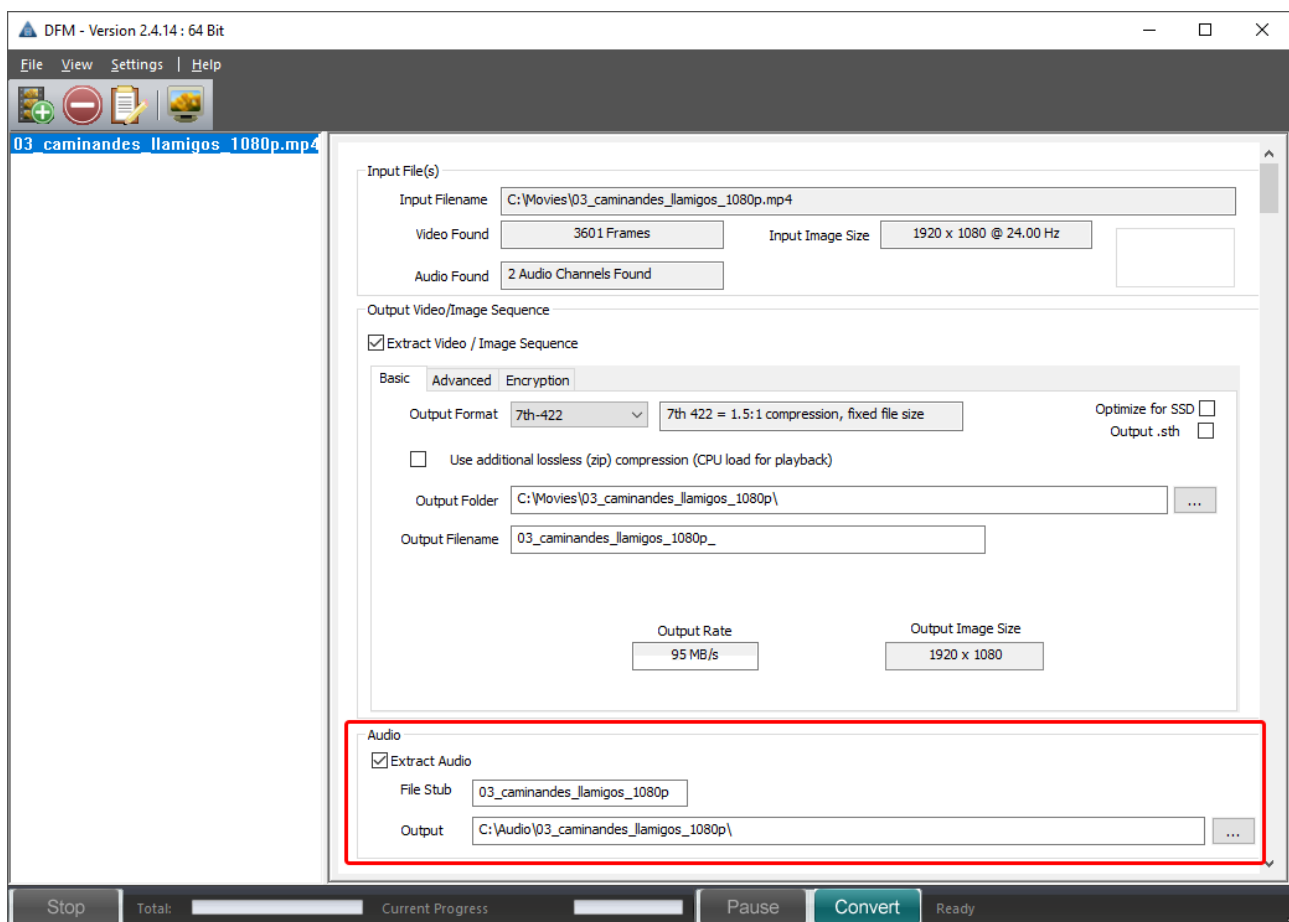


The [\[Basic Video/Image\]](#) tab shows the selections that you made in the initial setup. Check and amend as necessary. If required, click to select to extract the video/image sequence from this file:

- Select your output format and check/uncheck **Optimize for SSD** (according to your storage device – all SSD-based servers should have this checked).
- Additional compression is available by selecting the zip option. This format is lossless, and reduces file size, but will increase CPU demand on playback.
- Tick **Output .sth** if you want this file extension (it is the same format as .7th).
- Update the output folder location if necessary. A new folder will be created if required.
- Update the output file name if required.
- Resolve any warnings.

Extract Audio

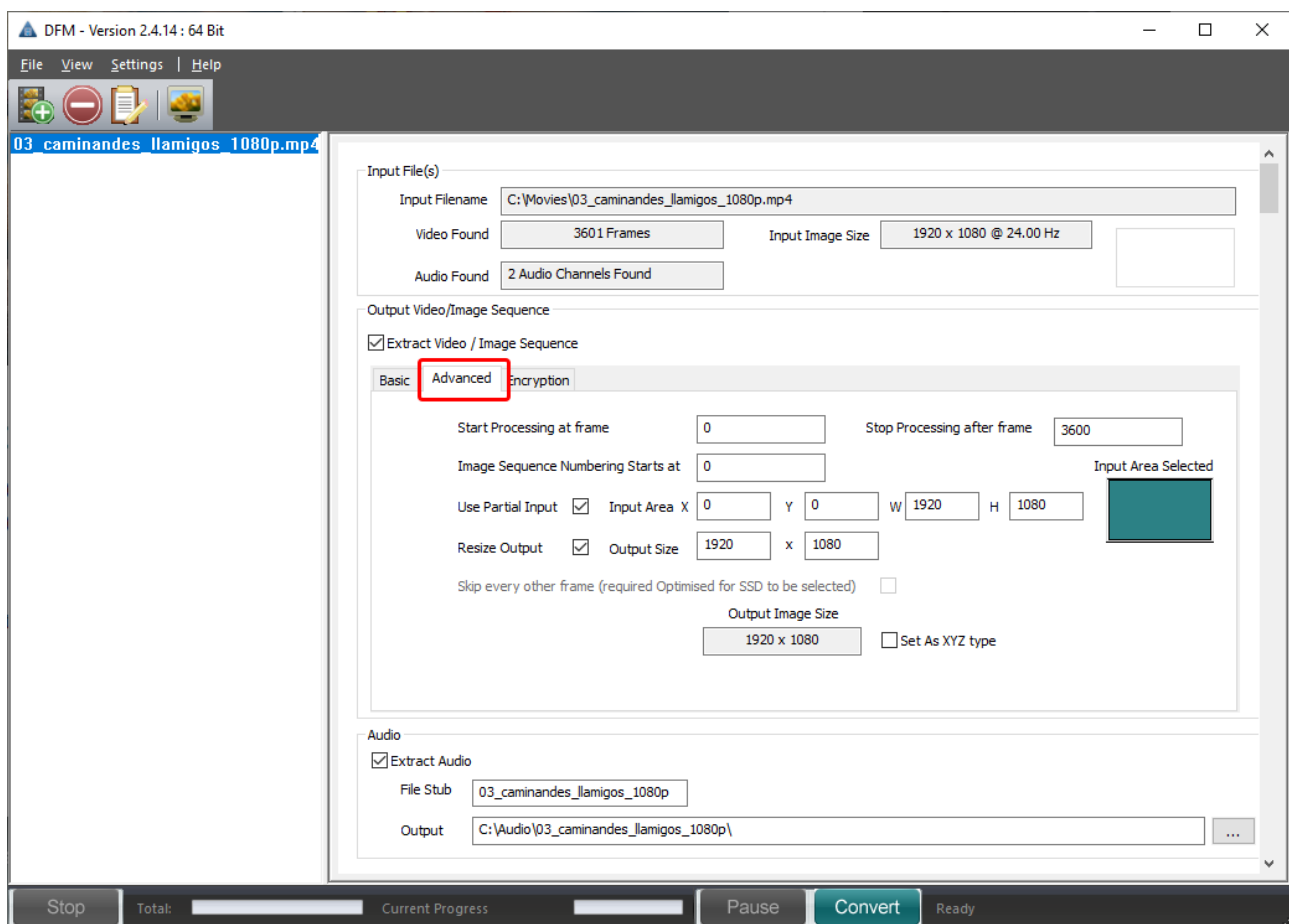
If the file contains audio, select whether to extract audio from this file. Update the file stub name and output folder as required:



Selective Extraction and Conversion (Advanced Tab)

If extracting a video or image sequence, the advanced tab provides the ability to select a section of the image sequence to convert, select an area of the file to convert, and choose the output size of the file to convert to. It is also possible to select a range of input frames to convert and choose the output number to start at.

An option to skip every other frame is available for advanced users who are using SSD storage. This can be used for de-multiplexing stereo movies or halving the frame rate of images sequences.



Encryption

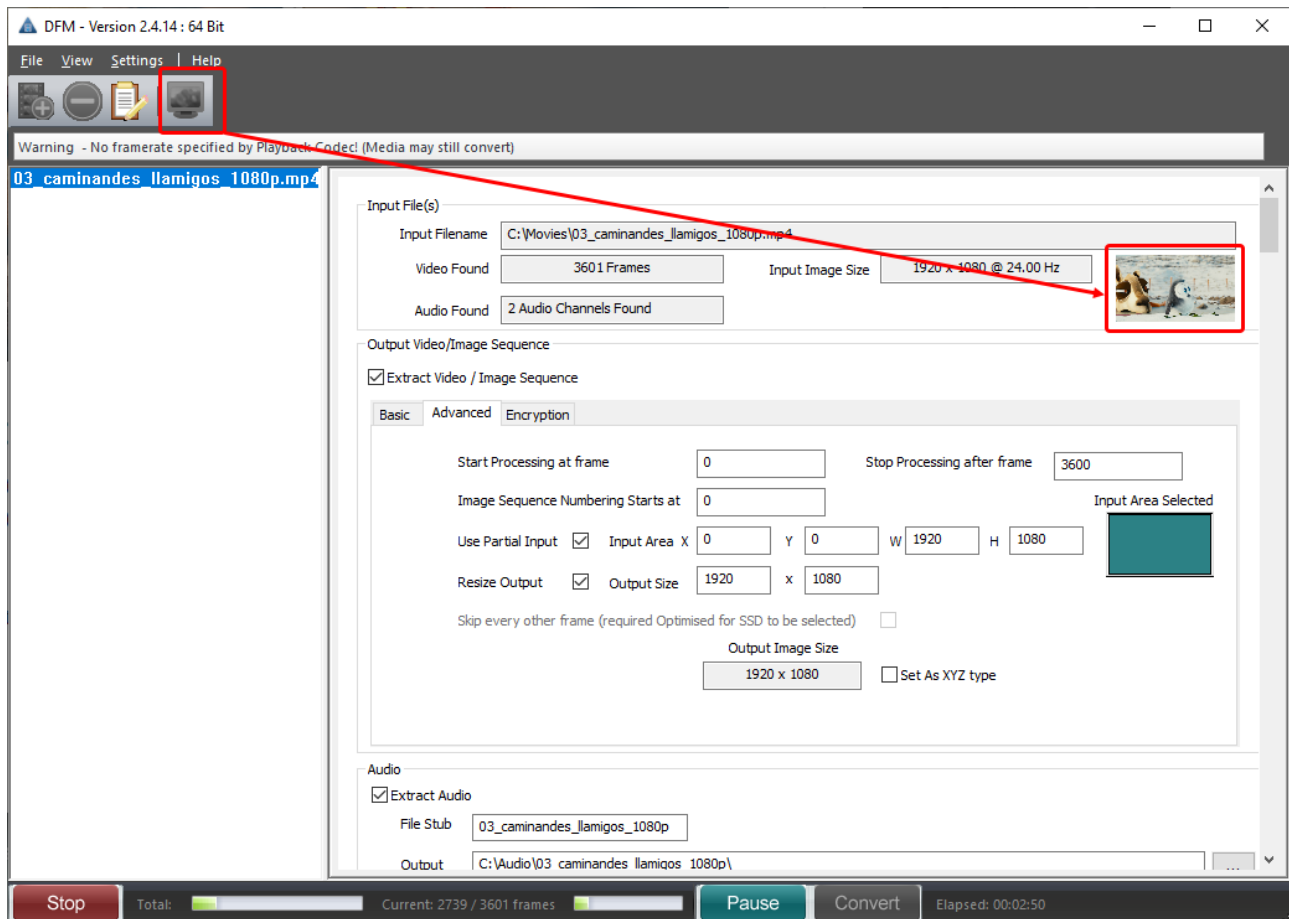
If converting a video or image sequence, encryption can be added to the output image sequence.

This feature is only available with a 7th Encryption licence.

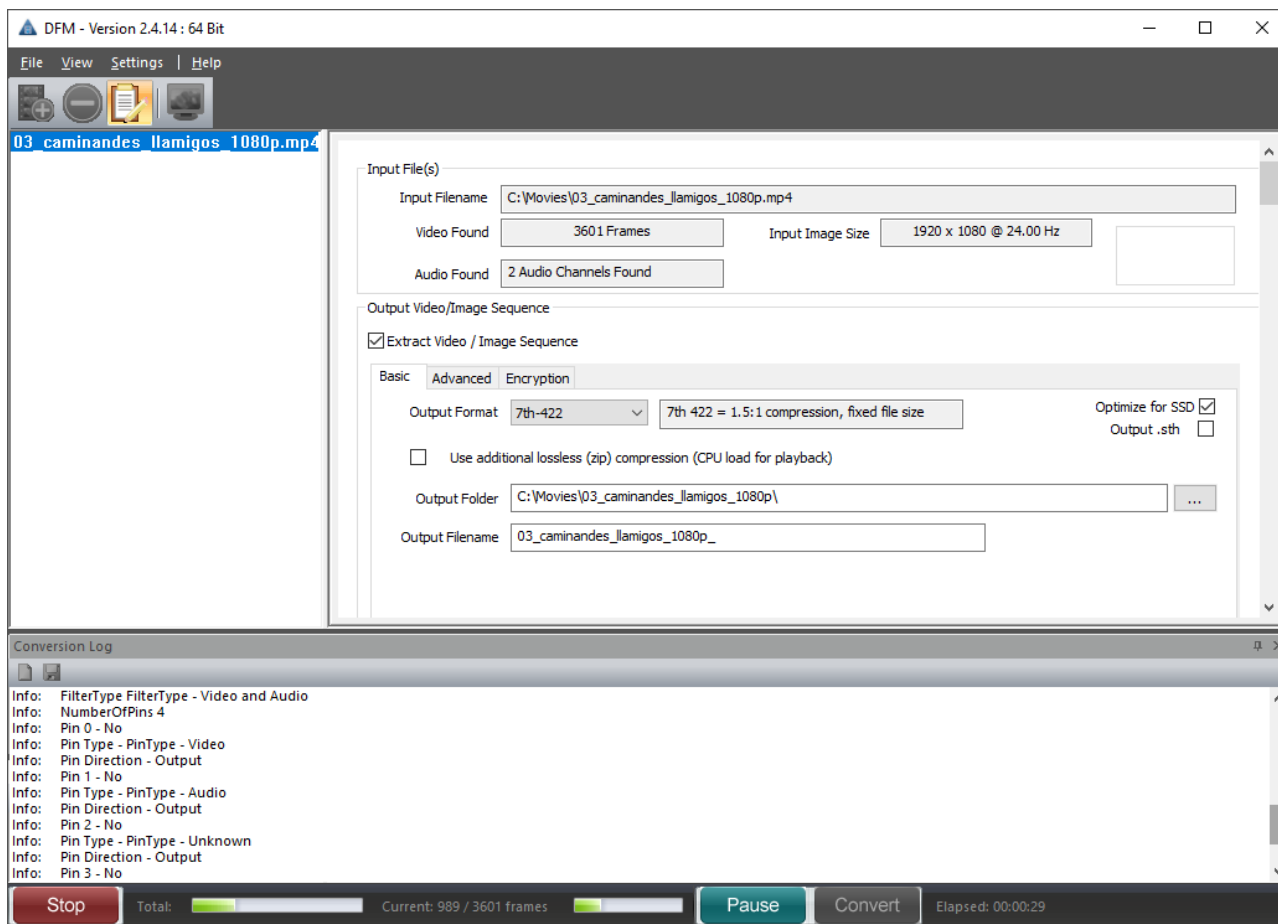
➤ [Encryption Option](#) ⁶⁵

Run conversion

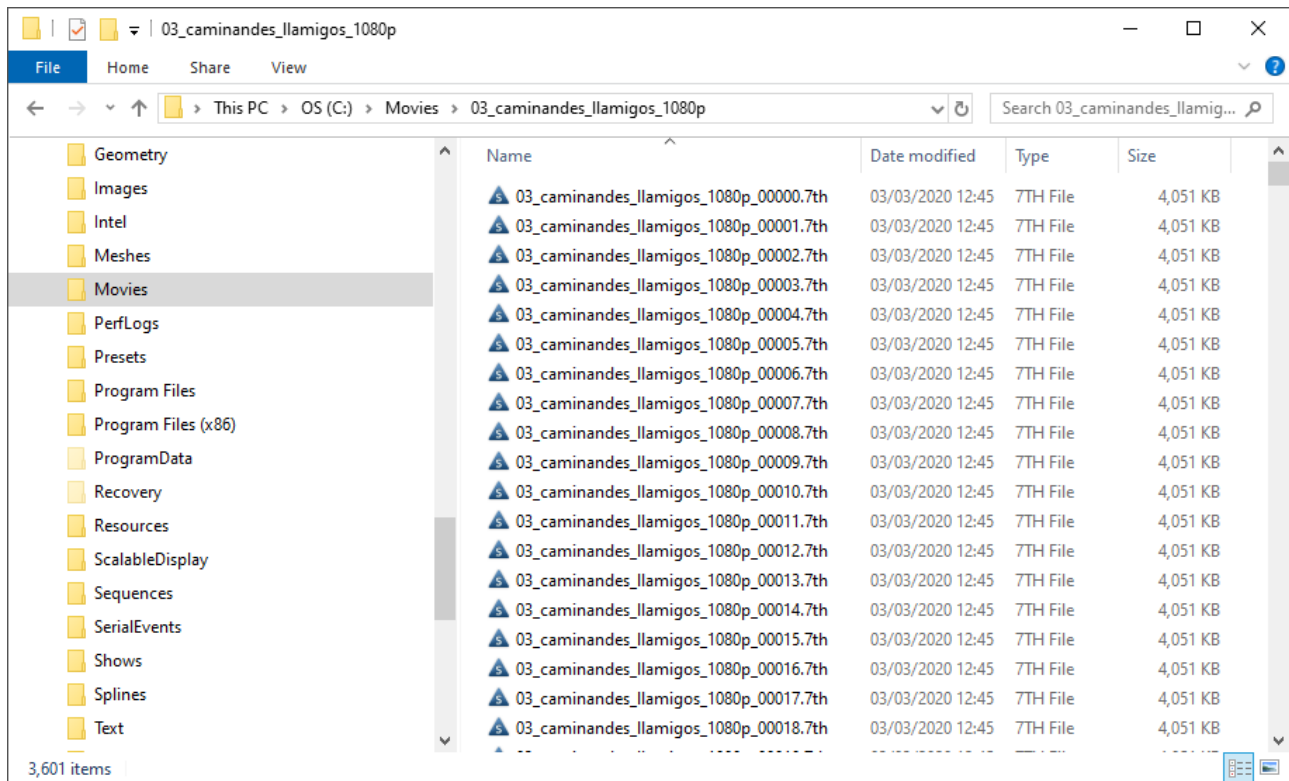
For a small preview of frames through the conversion process, click the monitor toolbar icon before converting:



Add more media as required and click the green **Convert** button. The **Pause** and **Stop** buttons become active until conversion is complete. Progress bars for Total and Current track the progress of the conversion. Other controls are deactivated, but the log can be viewed.



Once complete, the Convert button will be reactivated, whilst Stop and Pause buttons are greyed out. The image files will have been converted; check the destination movie drive to view the new file set.

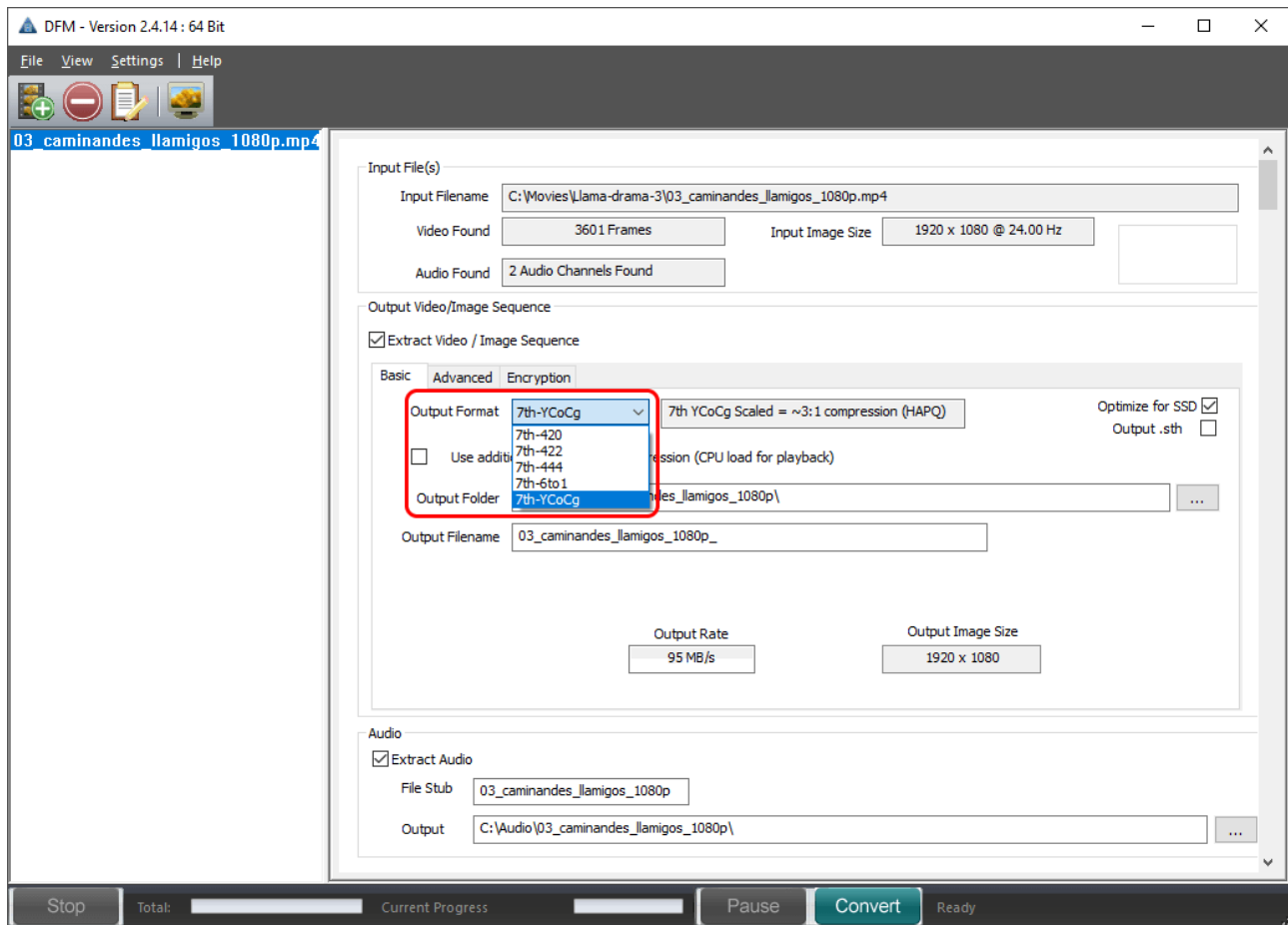


Basic Tab

Output Formats

Select the required output format from the drop-down list.

Basic File Format	Details
7th-YCoCg	3:1 Compression 7th files are a fixed file size for a specific resolution. This format is equivalent in quality to the best HapQ standard.
7th-420	2:1 Compression 7th-420 formats are equivalent to MPEG2 video standard, and compress the chrominance portions of the signal in both axes. These files have the best compromise between image quality and hardware requirements.
7th-422	1.5:1 Compression 7th-422 formats are equivalent to broadcast video standard, and compress the chrominance portions of the signal. These files have the best compromise between image quality and hardware requirements.
7th-444	1:1 (No compression) This is perfect image quality, though largest file size.
7th-6to1	6:1 Compression – an old file type that is rarely used now. 7th files are a fixed file size for a specific resolution, and are the best solution for normal movie playback due to the file size reduction. These files are typically the smallest and require the least performance in the PC to play back.



Output File Name

The output file name is chosen based on the first file found in the folder (03_caminandes_llamigos_1080p_ in the example above). You can edit this in the Basic tab to change the base name of the output files if you prefer. We recommend you leave a trailing underline for clarity.

Advanced Tab

Image Sequence Numbering Starts at

Normally, the output 7TH files are numbered 0000.7TH, 0010.7TH, 0020.7TH etc. Files are output sequentially in 'Optimize for SSD' mode.

Start processing at frame

If you enter a frame number in here, DFM will ignore any frames previous to that number and start conversion from that frame.

Stop Processing after frame

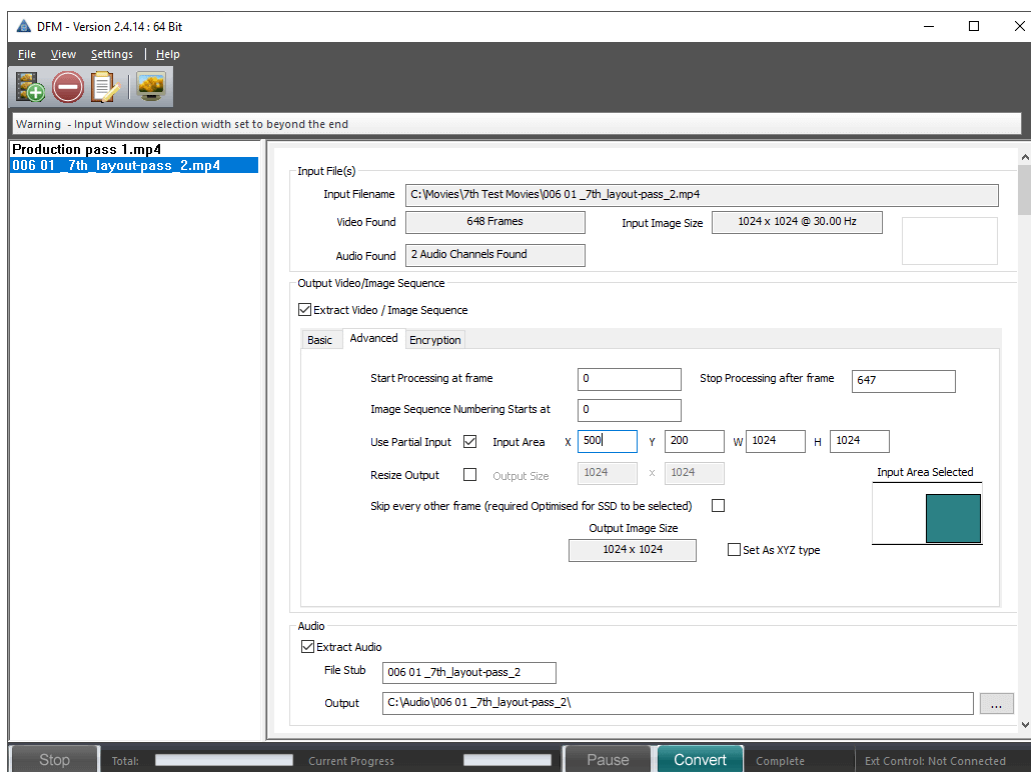
You can stop converting after the number of frames in this box to only convert a section of movie.

Use Partial Input

If you only want to output a section of the movie, select this option and type in the rectangle which you want to convert. With this option off, the whole input movie is output.

Input Area

If you check the User Partial Input checkbox you are able to edit the input area (X, Y, width and height of the images)



Resize Output

If checked, you can type in any size you wish into the Output Size boxes but the **output width** will always round up to the nearest multiple of 4: for example, if you type in a width

of 2057, this will automatically reset to 2060. This minor scaling feature improves playback performance in Delta.

Output Size

The default nominal output width and height is shown here unless you check the Resize Output checkbox to amend (as above).

Encryption Option

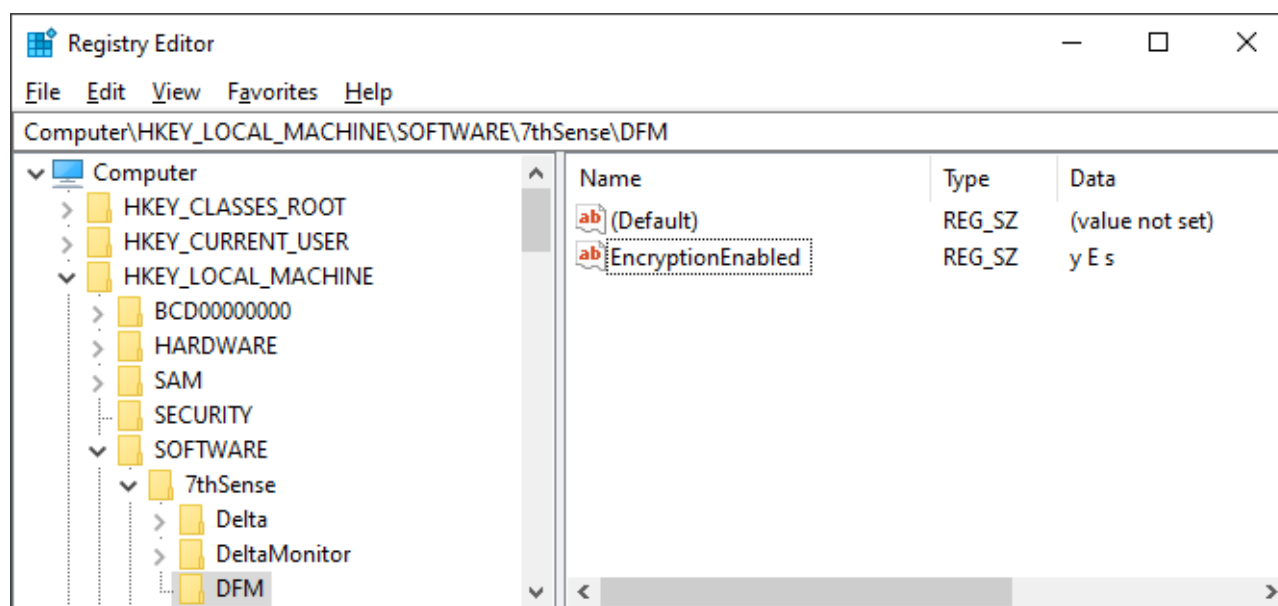
Delta Content Protection System (CPS) is a content encryption and decryption system whereby content imported onto a Delta Media Server can only be played back if certain criteria are met.

Delta CPS has the ability to allow the content creator to encrypt 7TH movie format files, selecting a playback date-range and/or venue codes, so that their content will only play back within the dates specified or the venue they choose.

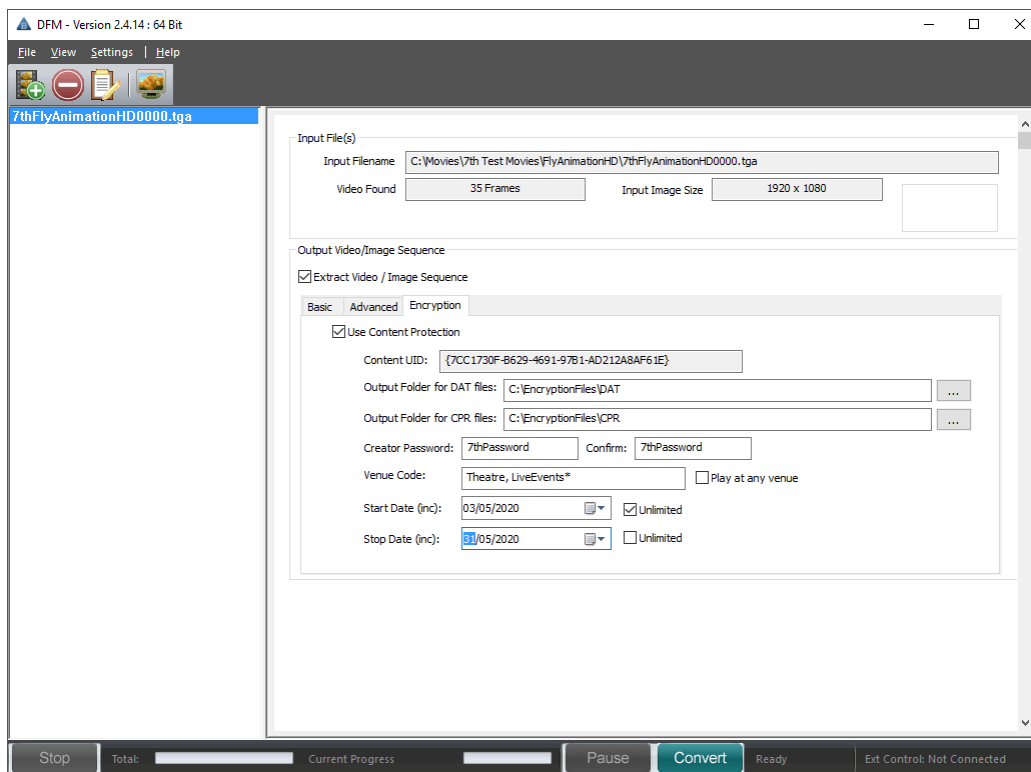
Notes:

- Content protection playback requires use of an additional licence.
- To encrypt media requires a registry key setting.

Using Regedit, edit the value of HKEY_LOCAL_MACHINE > SOFTWARE > 7thSense > DFM > EncryptionEnabled key, to y E s:



This enables, a third tab under Output:



In DFM, check 'Use Content Protection' to enable the settings.

DAT file location

This contains the playback security information and must accompany the media in order to decode it on the playback server.

CPR file location

The content creator can modify the movie protection details remotely, using the 7thSense Content Protection Manager application, to produce a revised DAT file that can be sent, extending dates or venues.

Password

Add a password and ensure that you note it securely.

Venue Code / any venue

To restrict play, uncheck 'Play at any venue' and enter a venue code or codes. In this example, the movie will play at a venue coded Theatre, and *also* at any venue with code beginning LiveEvents (e.g. LiveEvents1 and LiveEvents2 etc. – * is a character wildcard).

Date control

Uncheck 'Unlimited' to apply start and/or end dates.

For full details, see: *Delta Content Protection System*.

Input File Warnings

Examples of warnings that you may get include:

Missing file(s) after frame N

If there are gaps in the numbering (e.g. file_100.jpg ,file_101.jpg, file_104.jpg) indicating missing files, you cannot convert them, as this would lead to a black frame at that point. Files must be sequential and present.

Note: you may get this error if viewing a Mac formatted drive which has a number of small files with the same name (prefixed with a dot) as the actual images.

Filenames have different digit size

If files are named File1_0001.jpg to File_0100.jpg but the 50th file had an extra digit (e.g. File_00050.jpg) it would cause problems: **all filenames must have the same number of fixed digits.**

Audio

If a Windows movie file containing audio is loaded and the codecs are present to render the audio stream, the 'Extract Audio' area will be visible and available.

Audio is extracted into a set of WAV files (one for each channel) and placed into an 'Audio' sub-directory of the specified output directory.

Suffixes applied for the channels (up to 8) are as follows:

_SUB	subwoofer
_RSIDE	right side
_RS	right surround
_R	right
_LSIDE	left side
_LS	left surround
_L	left
_C	centre

External Control

DFM can be controlled remotely via Ethernet, normally using a telnet interface on port 33, although this is configurable within DFM: *Settings > External Control*.

To configure DFM, select *Settings > External Control* and type in the port over which you wish to communicate with DFM.

The full range of file conversion steps detailed in the File Convert section above is available through external control via these commands:

LOAD "fullpath"	Load the DFM files in this path
INPUTFILE "fullpath"	Set the input file for a single file movie
INPUTFOLDER "fullpath"	Set the path to find image sequence files
INPUTFILETYPE type	jpg, tif, tga, dds, bmp, png
OUTPUTFOLDER "fullpath"	Set the output path for converted files
OUTPUTFILETYPE type	7th (currently)
OUTPUTFILENAME	Override the automatic output filename
INPUTIMAGESIZE X Y W H / NATIVE	Specify which part of the image to use, or use the whole image (default) by choosing Native
OUTPUTIMAGESIZE W H	Override the automatic output image size
OUTPUTSTARTSAT frame	The output file numbering starts with this number (has to be divisible by 10)
STOPAFTERFRAME frame	Stop converting after this frame number
CONVERT	Start the conversion process
CANCEL	Cancel the conversion process
STATUS	Return DFM status
SHORTSTATUS	Return short DFM status : canconvert frame framecount mode width height skipexisting
WARNINGS	Return any warnings
TIMEDSTATUS Y / N	When Y, output the current frame and the total frame count after every 10 frames.
QUIT	Quit the application
QUITAFTERCONVERT	Quit the application once the current conversion has ended.

MINIMIZE	Minimize dialog and playback window
RESTORE	Restore dialog and playback window
HELP	This help information

The various commands are not case sensitive, and are actioned by Carriage Return (character 13). The strings OK or BAD are returned after each command indicating syntax success or failure.

A typical sequence would be:

```
INPUTFOLDER "c:\mymoviefolder\beach movie"  
OUTPUTFOLDER "c:\mymoviefolder\beach movie\output"  
INPUTFILETYPE jpg
```

You can now see if there were files found using STATUS – this returns full status information such as:

```
INPUT:          c:\mymoviefolder\beach movie\*.JPG  
OUTPUT:         c:\mymoviefolder\beach movie\output\*.7th  
FRAME:          0  
FILECOUNT:     198  
INPUTSIZE:      0 0 512 768  
OUTPUTSIZE:     1024 x 768  
DEINTERLACE:    Off  
MODE:           Stopped  
CANCONVERT:     Yes  
SKIPEXISTING:   No  
QUITAFTERCONVERT: No
```

Note the CANCONVERT flag: if this is No, then it could be no files were found (**FILECOUNT** will be 0) or there are problems with the files found. Check this by sending **WARNINGS** you get back (for example):

Files 'Stargaze_00014.jpg' and 'Stargaze_0002.jpg' have different digit size!

or

Missing file(s) after frame 14 !

Correct these problems, and then send **REFRESH** to update the status information.

You can set the **OUTPUTFILENAME** which overrides the one chosen by DFM, but be aware that any of the other commands causes this to be reset to the automatic one, so issue this command last before sending **CONVERT**.

While conversion is progressing, you can check it by requesting **STATUS** to see the current frame increasing, or request **SHORTSTATUS**, which returns a string such as this:
1 0 198 0 1024 768 0

These numbers represent these facts:

Digit	Description	
1	Canconvert	0 = No, 1 = Yes
2	Frame	Current frame number
3	Framecount	Number of files found
4	Mode	0 = Stopped, 1 = Converting
5	Width	Output image width
6	Height	Output image height

You can send **CANCEL** at any time to stop conversion.

Command-Line Interface

In a similar fashion to telnet, DFM can be operated via a command line. To run DFM from the command line, specify the file name (i.e. DFM.exe), followed by some combination of the following flags and parameters:

/if "fullpath"	Set the path to find image sequence files – this should be the full path to one of the image sequence files*
/in "fullpath"	Full path of windows movie file (mpg, wmv, etc.)*
/of "fullpath"	Set the output path for converted files*
/oft type	7th (currently)
/on "filename"	Override the automatic output filename
/inputimage X Y W H	Specify which part of the image to use.
/ossd	Optimise for SSD
/outsize W H	Override the automatic output image size
/outstart frame	The output file numbering starts with this number (must be divisible by 10)
/stopafter frame	Stop converting after this frame number

* Denotes a required parameter

For example:

```
DFM /if C:\Frames\Source /ext jpg /of C:\Movies\Test /on crosshatch /oft 7th-444 /outstart 100 /stopafter 1000 /inputimage 0 0 10 10 /outsize 768 768
```

This command line specifies the following:

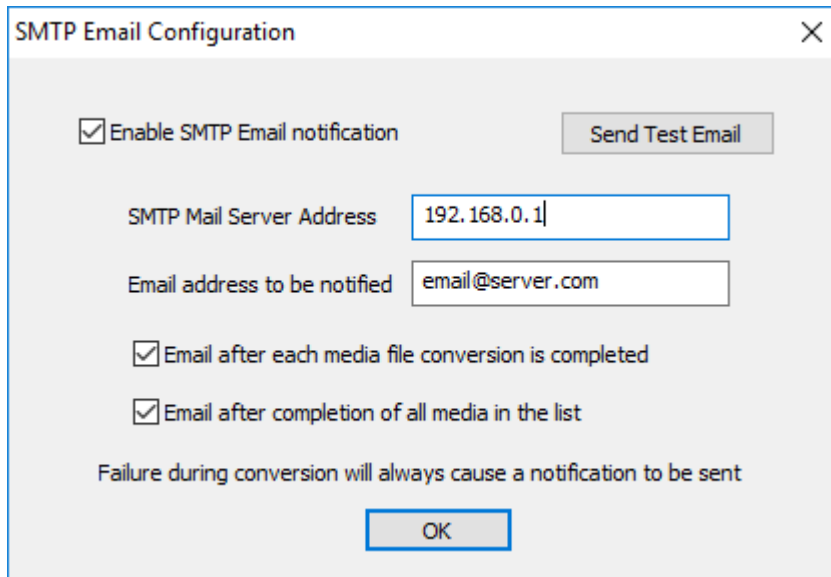
All JPG files (matching the name of the first JPG found) from C:\Frames\Source will be converted into 7TH-444 format and placed into C:\Movies\Test\crosshatch_XXXXX.7th files (where XXXXX is the output number).

Only the top left 10 pixel square will be used from each input frame and the frame written to the output will be blown up to 768 × 768.

Output files will start at crosshatch_00100.7th, followed by crosshatch_00110.7th, crosshatch_00120.7th, etc., until either all frames have been written, or the first 1000.

SMTP Email

DFM can be set to send email notifications on completion of file conversions: *Settings > SMTP Configuration*.



The image shows a 'SMTP Email Configuration' dialog box with a close button (X) in the top right corner. It contains the following elements:

- A checked checkbox labeled 'Enable SMTP Email notification' with a 'Send Test Email' button to its right.
- A text field labeled 'SMTP Mail Server Address' containing the value '192.168.0.1'.
- A text field labeled 'Email address to be notified' containing the value 'email@server.com'.
- Two checked checkboxes:
 - 'Email after each media file conversion is completed'
 - 'Email after completion of all media in the list'
- A text label: 'Failure during conversion will always cause a notification to be sent'.
- An 'OK' button at the bottom center.

Codecs

DFM2 uses Direct Show Filters for all its conversions. The following formats are supported natively.

File formats:	
MXF	MPEG-PS
MOV	MPEG-TS
MP4	GXF
LXF	FLV
ASF	AVI
WMV	MKV
DV	WebM

This includes unencrypted DCP packages with MXFs and JPEG 2000 streams.

Audio Codecs:	Video Codecs:	Image Sequence Formats
AAC	DVCPRO	DPX (10,12,16 bit per pixel)
MP2	M-JPEG	TGA (24 bit and 32 bit per pixel)
MP3	MPEG-1	PNG
WMA	MPEG-2	BMP
Vorbis	MPEG-4	GIF
FLAC	H.264	JPG
	AVC	TIFF (8, 16 bit per pixel)
	VC-1	
	VP8	
	VP9	
	HuffyUV	
	DNxHD	
	ProRes	
	H.265	

If the format of your media is not one of the above, then please make sure the correct direct show codecs are installed, and that they are capable of decoding the media you wish to convert.

Windows comes with a variety of codecs as standard for converting files such as WMV, AVI.

DFM installs the codec pack 'FFDShow'. This extends DFM's capabilities to allow conversion of XviD, MPEG-1, MPEG-2, MPEG-4, H.263, MJPEG.

Delta Content Protection System

Delta Content Protection System

Delta Content Protection System (CPS) is a content encryption and decryption system whereby content imported onto a Delta Media Server can only be played back if certain criteria are met.

Traditionally, Delta plays back its own native movie format (STH/7TH files) which are optimized for streaming uncompressed movies from standard hard disks or newer solid state drives.

Delta CPS has the ability to allow the Content Creator to encrypt the STH/7TH movie files selecting a playback date-range and/or venue codes, so that their content will only play back within the dates specified or the venue they choose.

This manual should be read in conjunction with the **Delta User Guide**, which explains the basic concepts of adding and working with content on the timeline, also the **DFM User Guide**, this explains the content conversion process.

Delta Content Protection System Architecture

What You Need

Encrypted Content Creation

The tools needed for the content creation are the 7thSense **DFM Utility** with a **Delta CPS Encryption licence** (USB key), plus a manual Registry key setting.

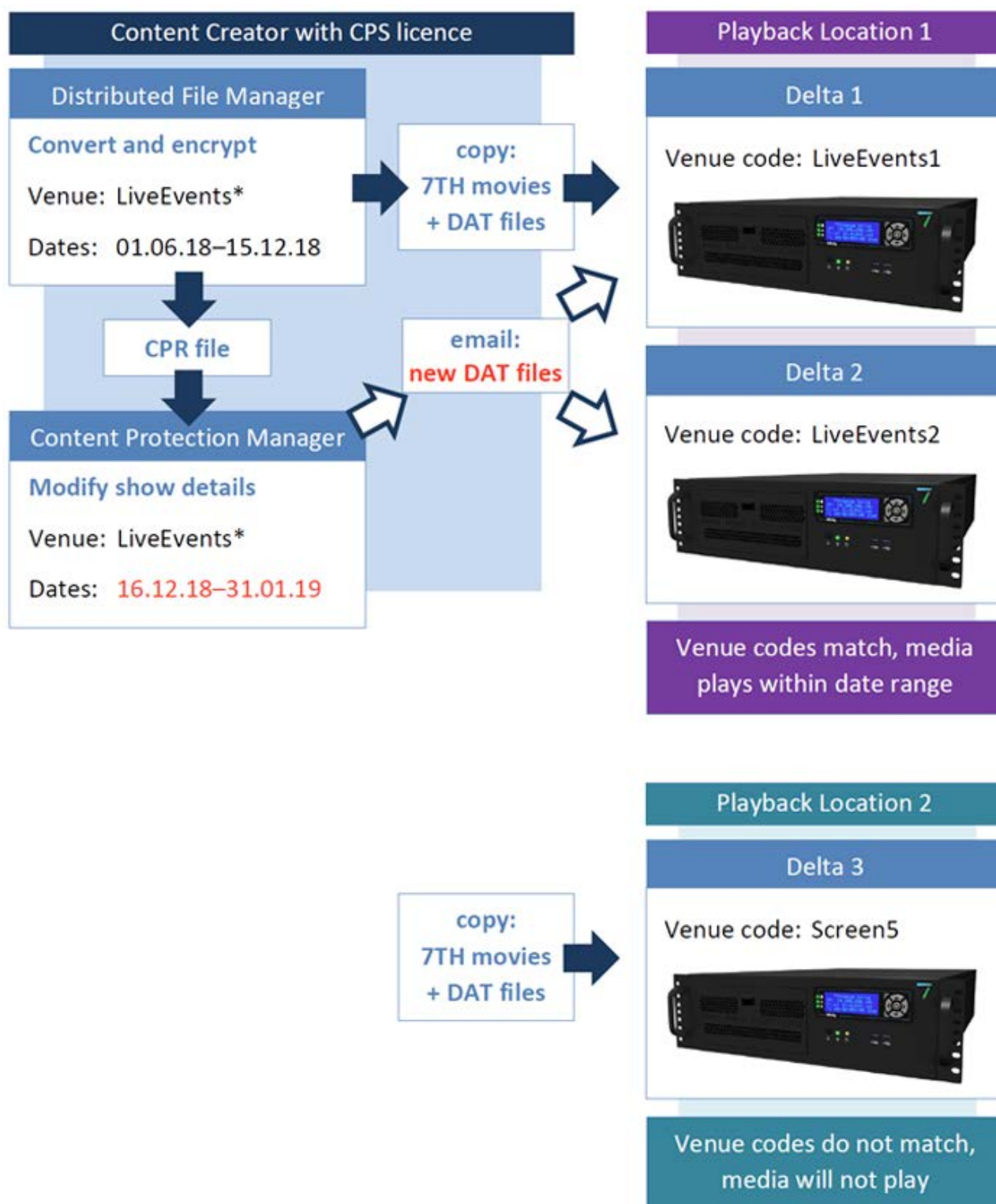
Encrypted Content Playback

To playback the encrypted content, the **7thSense Delta Media Server Software** with associated **Delta licence** is required.

Managing Content Licences Remotely

To change any previously produced encryption criteria, the **7thSense Content Protection Manager**, **Delta CPS Encryption licence** and the original **CPR file** are required.

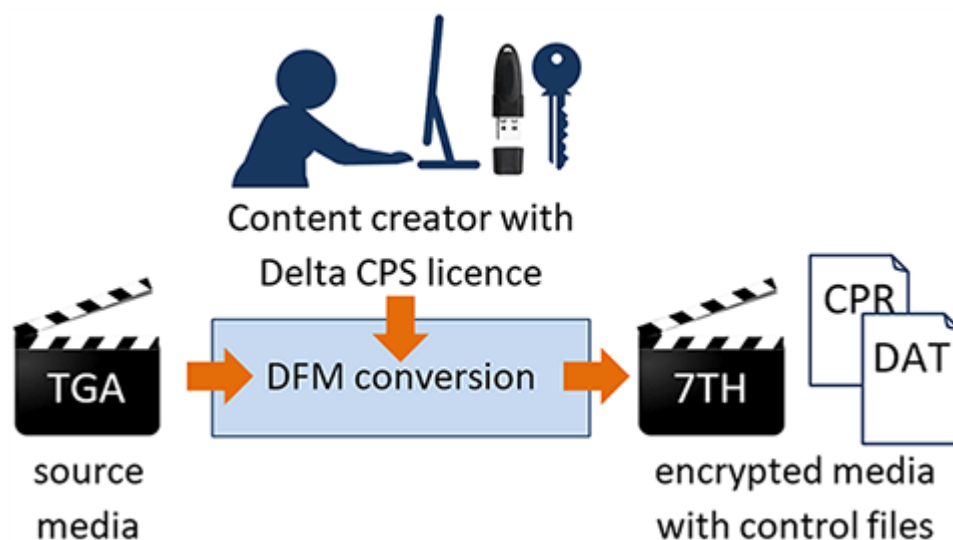
Workflow



The Content Encryption Process

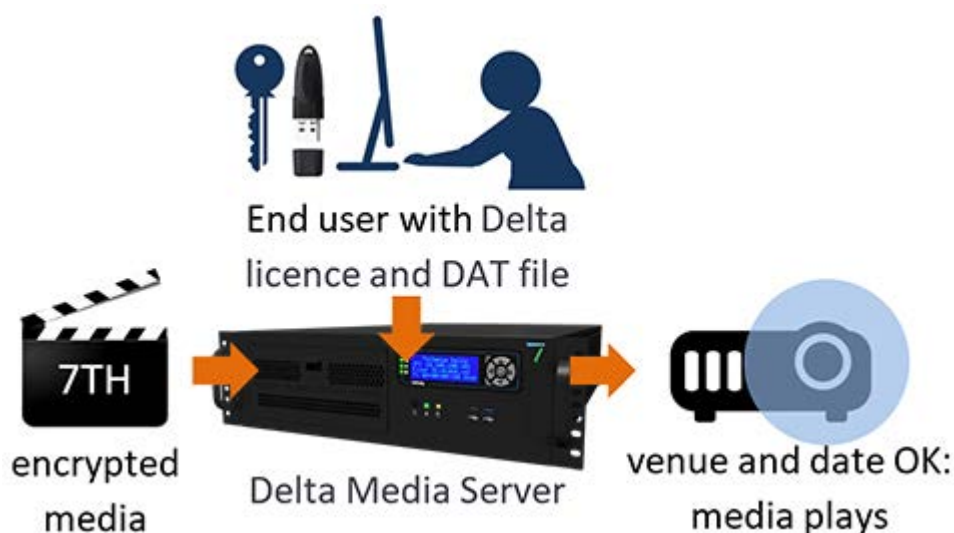
Delta licences are purchased with a specific Venue Code burned in, for example '7thSense'.

Using the **7thSense DFM Utility**, the Content Creator can encrypt the source movie content and the supporting information is held within a DAT file.



Encrypted Content on the Delta Media Server

The creator can now send the movie (7th files) and a copy of the DAT file on a USB hard drive to their customer, secure in the knowledge that the movie will only play back between the chosen dates and if the Venue Code matches the Delta licences on site.



If any of the security criteria are not met, the movie is scrambled onscreen and cannot be decoded.

Security criteria that will prevent the movie from being viewed include:

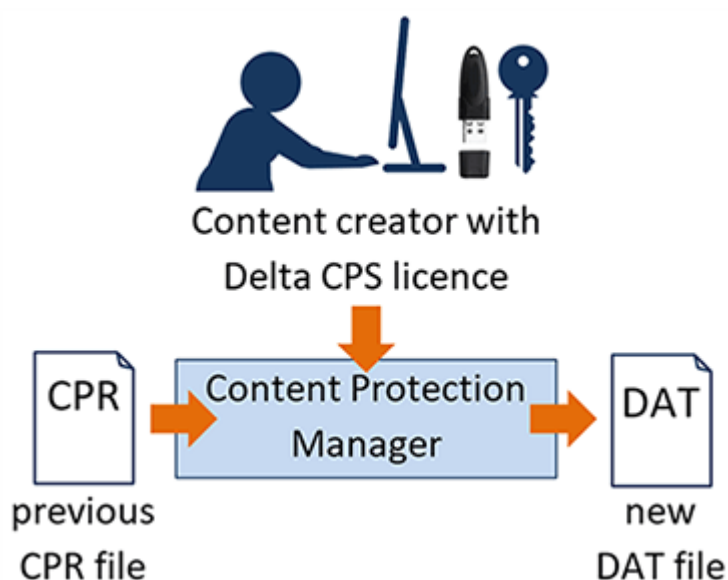
- DAT file missing
- DAT file Venue Code does not match the Delta USB key Venue Code
- PC Date not within DAT file's Start to End Date
- Time source has been tampered with
- Delta not licensed for encryption playback

Remotely Updating an Encrypted Configuration

If the Content Creator wants to remotely extend a show's dates or change it to play at any or other venues, they can use the **7thSense Content Protection Manager**. This is accomplished by the Creator editing the originally created CPR files held locally.

Using this program, the Creator can change the venue code, start or end date. Wildcards can also be used for the Venue Code, so for example setting it to LiveEvents* would allow this show to play on a Delta server licensed with LiveEvents1, LiveEvents2 and so on.

The output of this Manager is a modified DAT file that can be easily emailed to the site, and placed on the Delta PCs, changing the playback criteria immediately.



Creating Encrypted Content using DFM

The items needed for the encryption process are:

- the Source Movie
- the 7thSense DFM Software Utility and
- a Delta CPS licence.

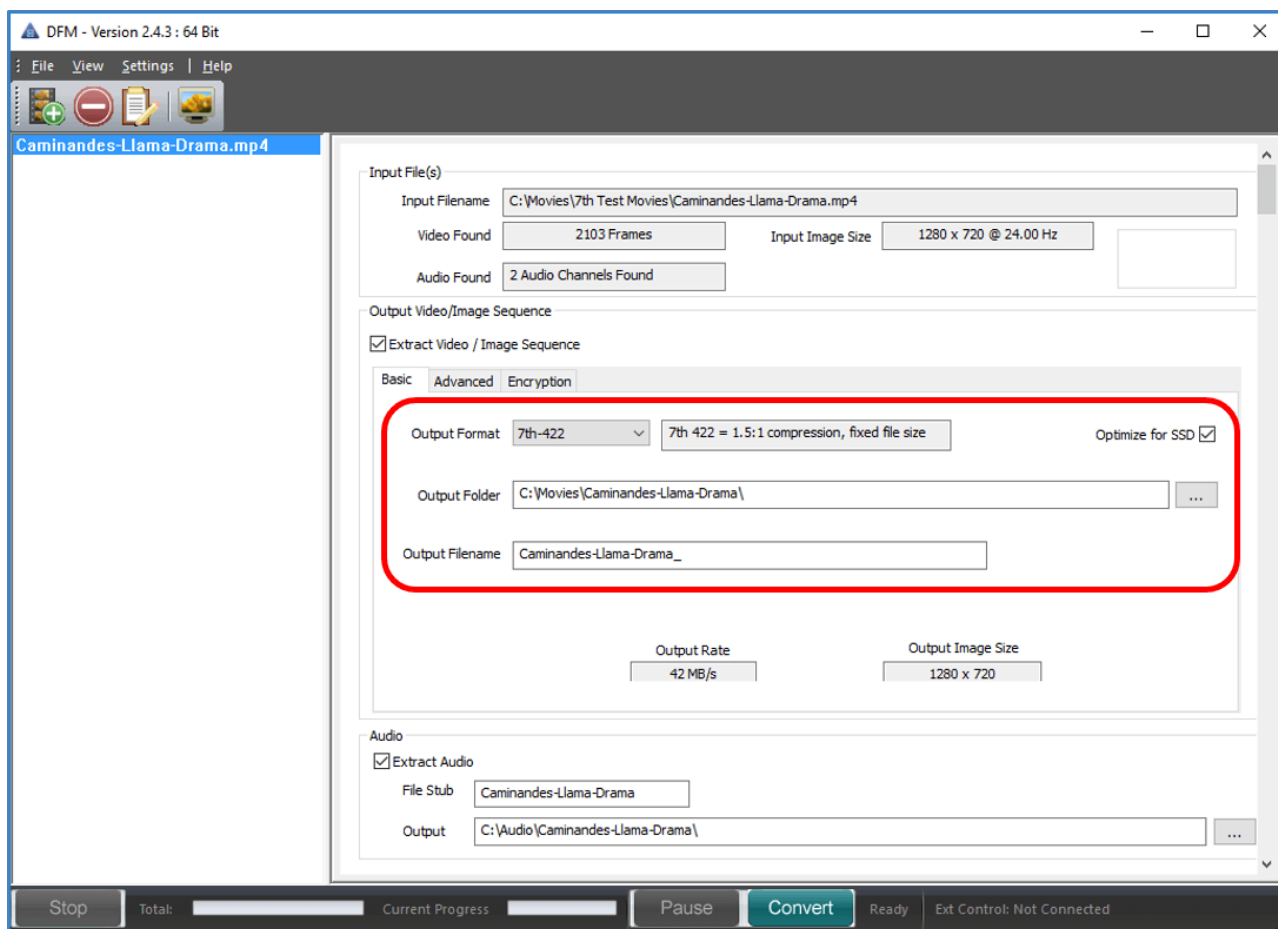
Note that DeltaGUI will not recognise the CPS licence if it is on a second dongle: ensure that it is on your main server licensing dongle.

Prepare Configuration

On the PC used for encrypting the movie content:

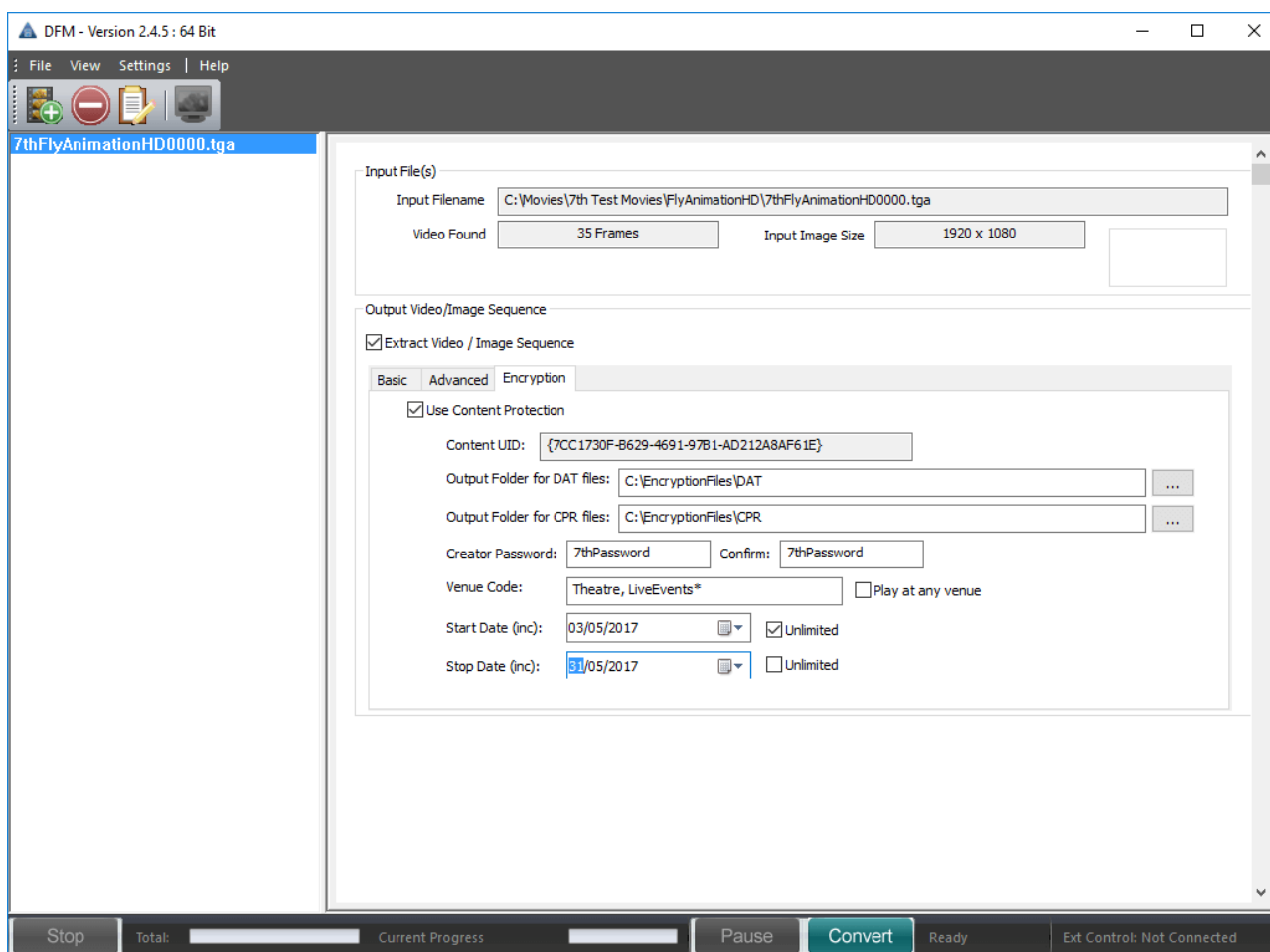
- Install **DFM**
- Insert the **USB Delta CPS Licence Key**
- Confirm the movie content to encrypt is accessible from this PC
- Start **DFM**

Drag and drop a single movie file into DFM, selecting an appropriate location for the converted files to be output. (Note: DFM will pick up the rest of the movie for conversion.)



More information on DFM file conversion is in the DFM User Guide.

To encrypt the converted files, click on the **Encryption** tab. By default, content protection is not active in DFM; check the **Use Content Protection** checkbox. A new **Content UID** will be generated automatically.



- Create a location to store the **DAT** and **CPR** files in by using the browse button or typing the location in the relevant box.
- Create a password and retype to confirm.

Venue and Date Configuration

Venue Configuration

- To set to playback at a specific Venue location, add the Venue name in the **Venue Code** box. The venue name is the ID within the **venue specific Delta USB key** at the Delta playback location. For example, the Venue ID might be **LiveEvents1**.

Multiple venue codes can be entered, separated with a **Comma**, **Space** or **Semi-Colon** so for example, to play the media on all Delta Media Servers at the venue named **LiveEvents**, type in **LiveEvents***. The asterisk is a wild card so will pick up all servers named LiveEvents[n].

- Make sure the **Play at any venue** checkbox is **unchecked**. If checked, media will not be limited to your selection and will be allowed to play at all venues.

Date Range Configuration

- To have the movie to play within certain dates, uncheck the checkbox next to either the **Start date (inc)** or the **Stop date (inc)** or both. Type the start/stop dates in the appropriate boxes.

Notes:

- Venue codes are **not** case sensitive and MUST match the venue code that is recorded on your licence
- Dates are inclusive, so for a licence with a stop date of 31/05/2018, the content will play up to midnight on the 31 May 2018.

Run the Encryption

Once you have added your media and configured your preferences for Encryption, press Convert and the movie will start converting into the 7TH format. The progress bars at the bottom of the screen demonstrate the conversion progress. You can Pause or Stop the process at any time.



Once completed, the encrypted movie content is stored as a CPR and a DAT file.

The movie content files (7TH movie files that were created within DFM from the original) and the DAT file can then be sent to the End User for installing and ingesting on the Delta Media Server.

The CPR file and known password should be kept **with the creator** for future amendments.

Installing the Encrypted Content onto Delta

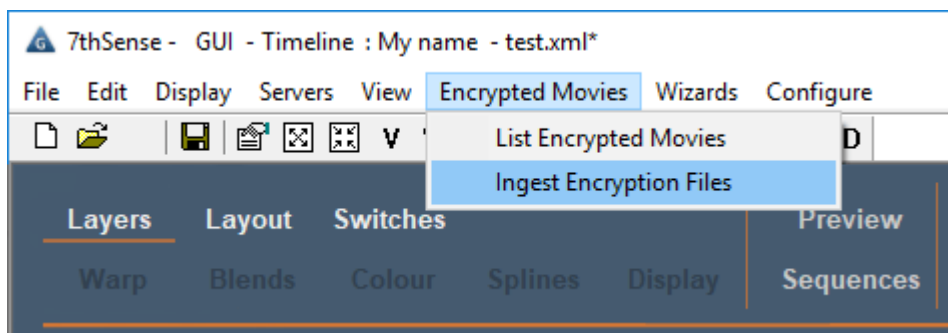
- Add the **Encrypted Content** as you would for non-encrypted content (information on how to do this is in the Delta User Guide).
- Add the DAT file in a known location on the Delta Media Server.
- Confirm the Delta Venue licence is plugged in to a USB port on the Server.

Note: if you have a separate Delta Licence already plugged in (often internally), your second dongle will not be recognized and the GUI will not have the appropriate **Encrypted Movies** menu. Remove your first dongle if necessary!

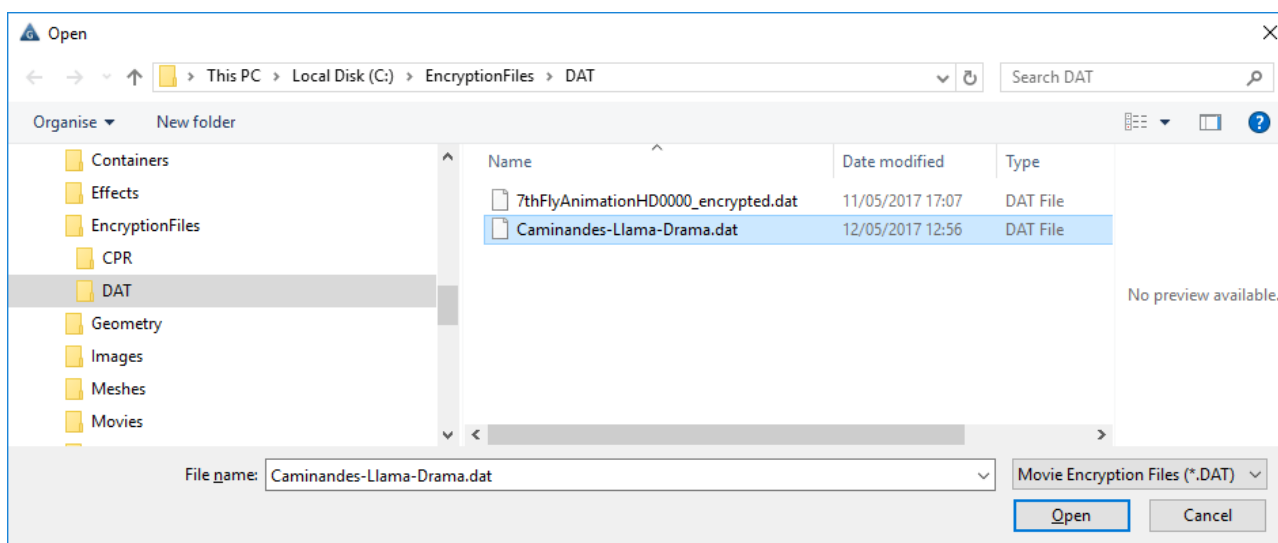
- Run the DeltaServer and DeltaGUI software.

Ingest the Media

To ingest the DAT file, click on the **Encrypted Movies** tab at the upper left of DeltaGUI, then click **Ingest Encryption Files**.



- Browse to the location where the DAT files are stored
- Select the DAT file to Ingest.
- Click **Open** button to ingest the DAT file.



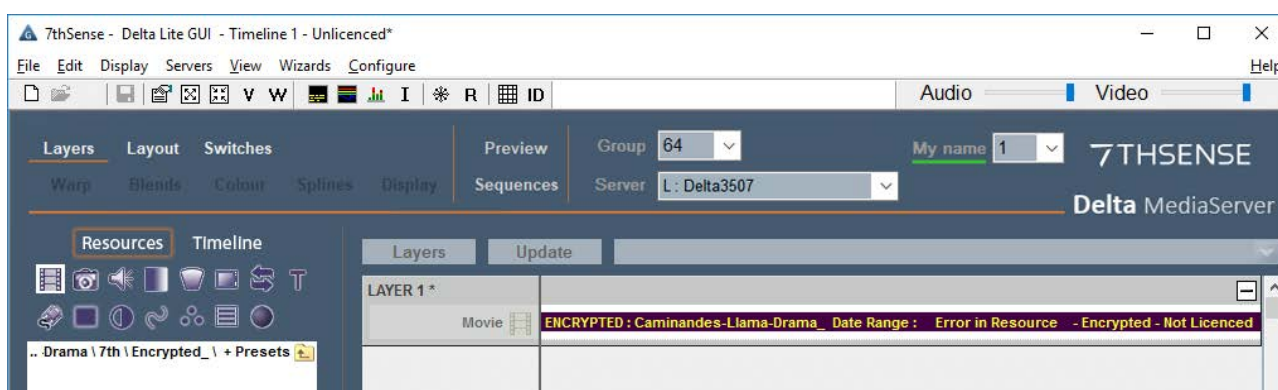
DAT File Ingested will show briefly on the DeltaGUI message bar when ingested:



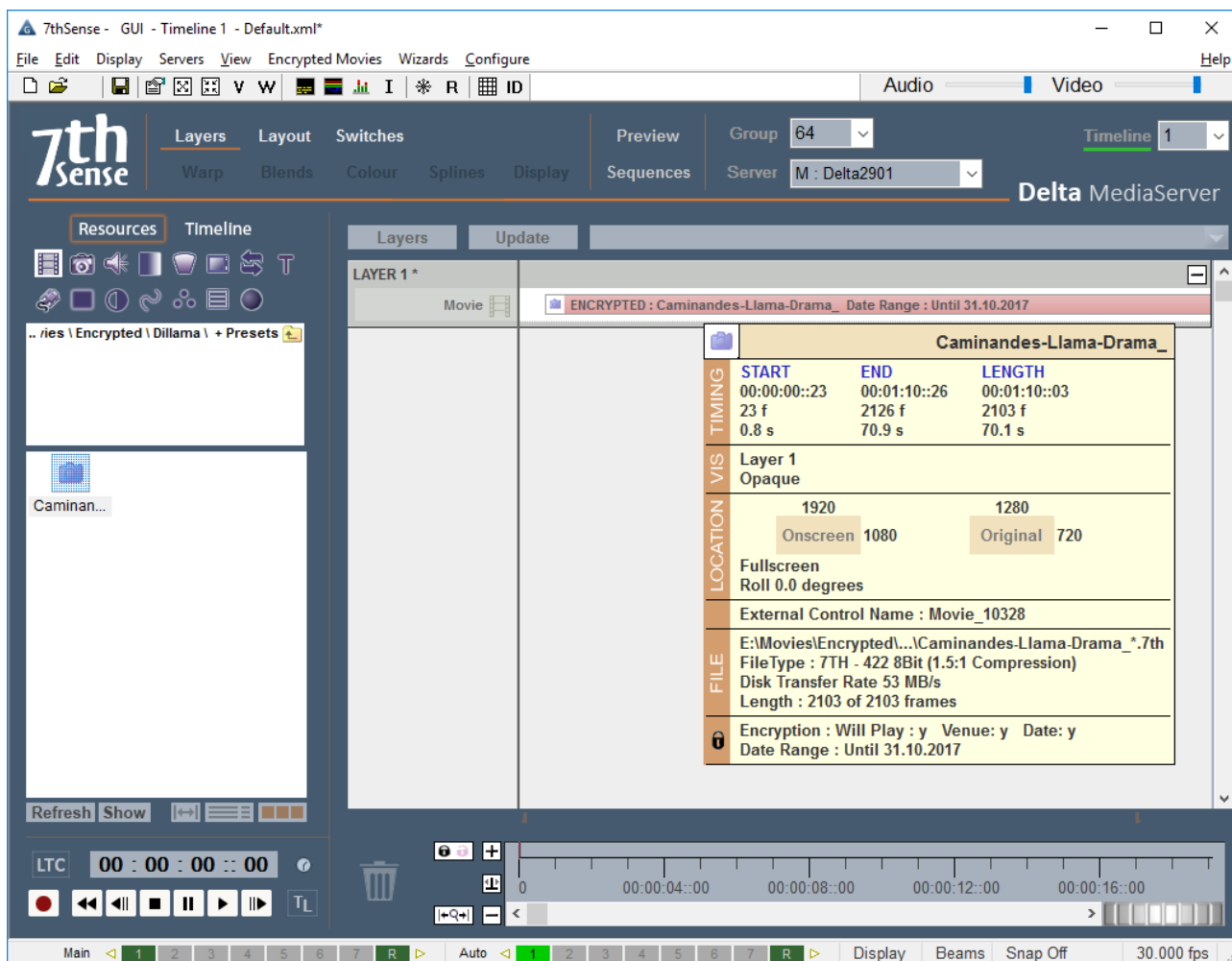
To confirm the content and movie will work at this venue, click on the **Encrypted Movies** tab, then **List Encrypted Movies**.

The list shows the encrypted movies Delta can locate. It will also show the status of each movie, when and whether it is able to play at this venue.

Note: the encrypted movie won't play if the venue doesn't match the licence or the current date is not within the encryption date limits. If either case is preventing the resource to run, when dropped onto the timeline the movie will look like this:



However, if the encryption properties are within range and Delta is able to play the movie at this venue, when dragged onto the timeline, the movie will be pink and play in the same way as non-encrypted movies. If you hover over the resource, you are able to see further details of the Encryption status and dates range (if appropriate).

**Important:**

Encryption *playback* requires this Registry key setting, which may require editing:

\HKEY_LOCAL_MACHINE\SOFTWARE\7thSense\Delta\Graphics\MediaGrabsUseGLMemDirectly = 0

Manage Shows Remotely

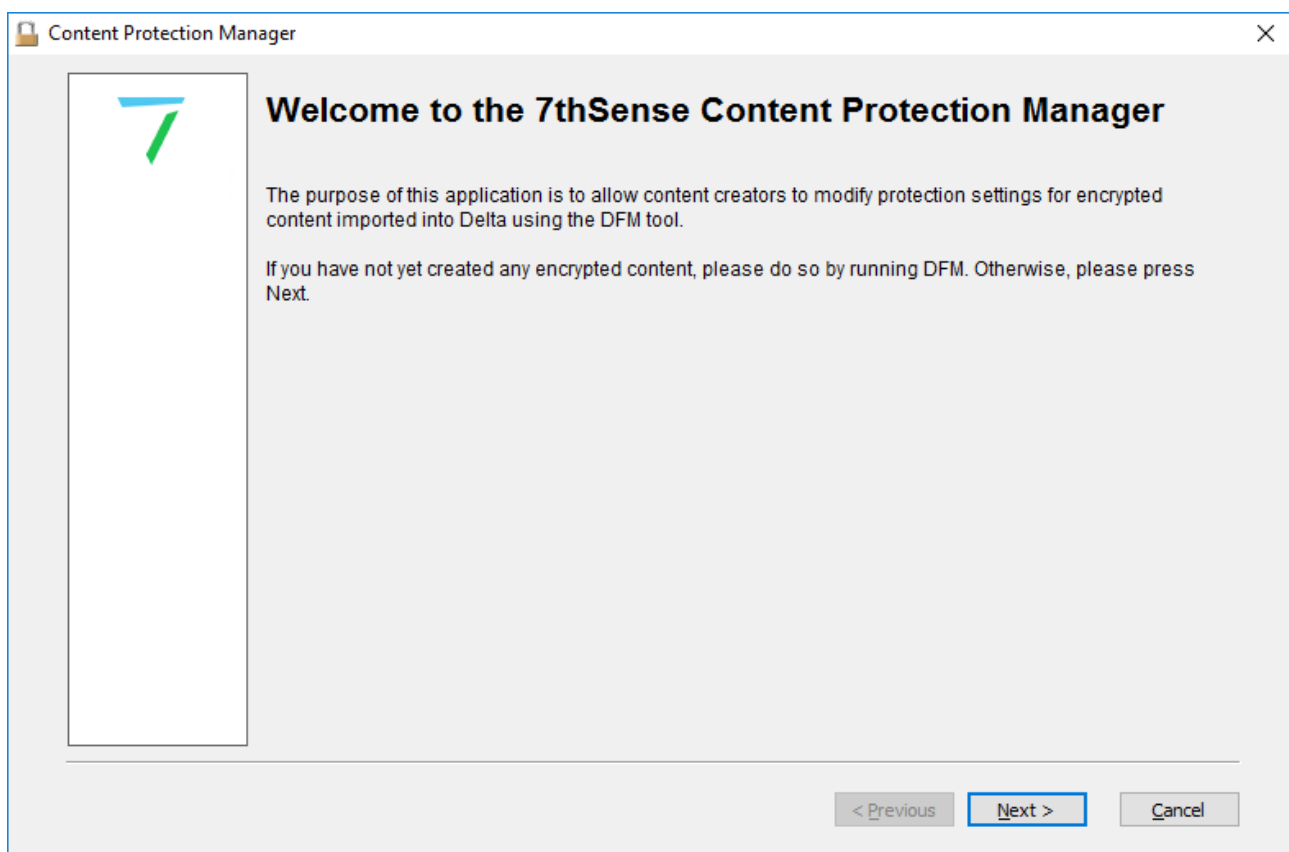
If the Content Creator wants to remotely make changes to the encryption properties (such as change dates or venue details) they need the **7thSense Content Protection Manager** application.

The items needed for the remote management process are the **originally created CPR file**, the **Content Protection Manager Software Utility**, the **Delta CPS licence** and the **Creator password**.

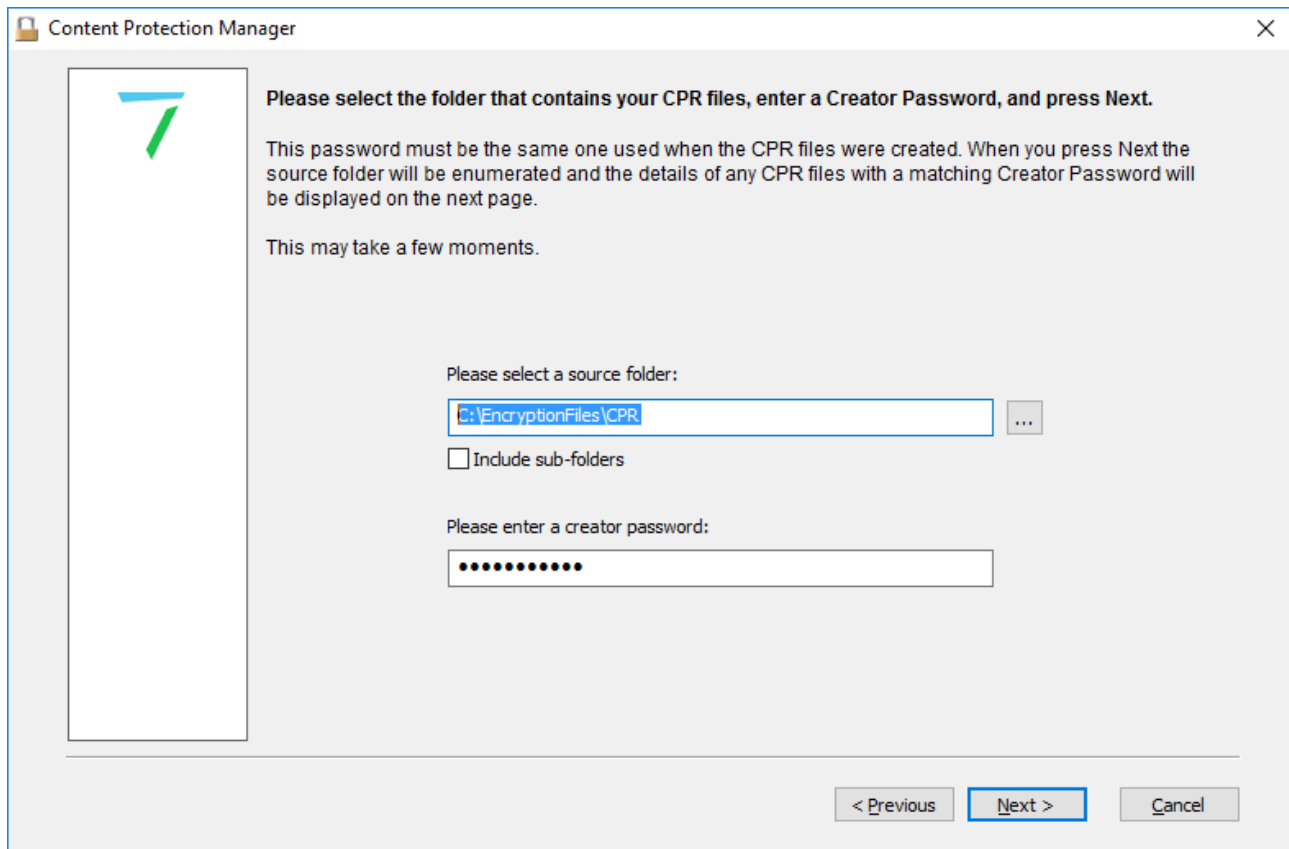
On the PC that is to be used for encrypting the movie content:

- Install Content Protection Manager
- Insert the USB Delta CPS Licence Key
- Load/confirm the original CPR is present.

Start the **Content Protection Manager**

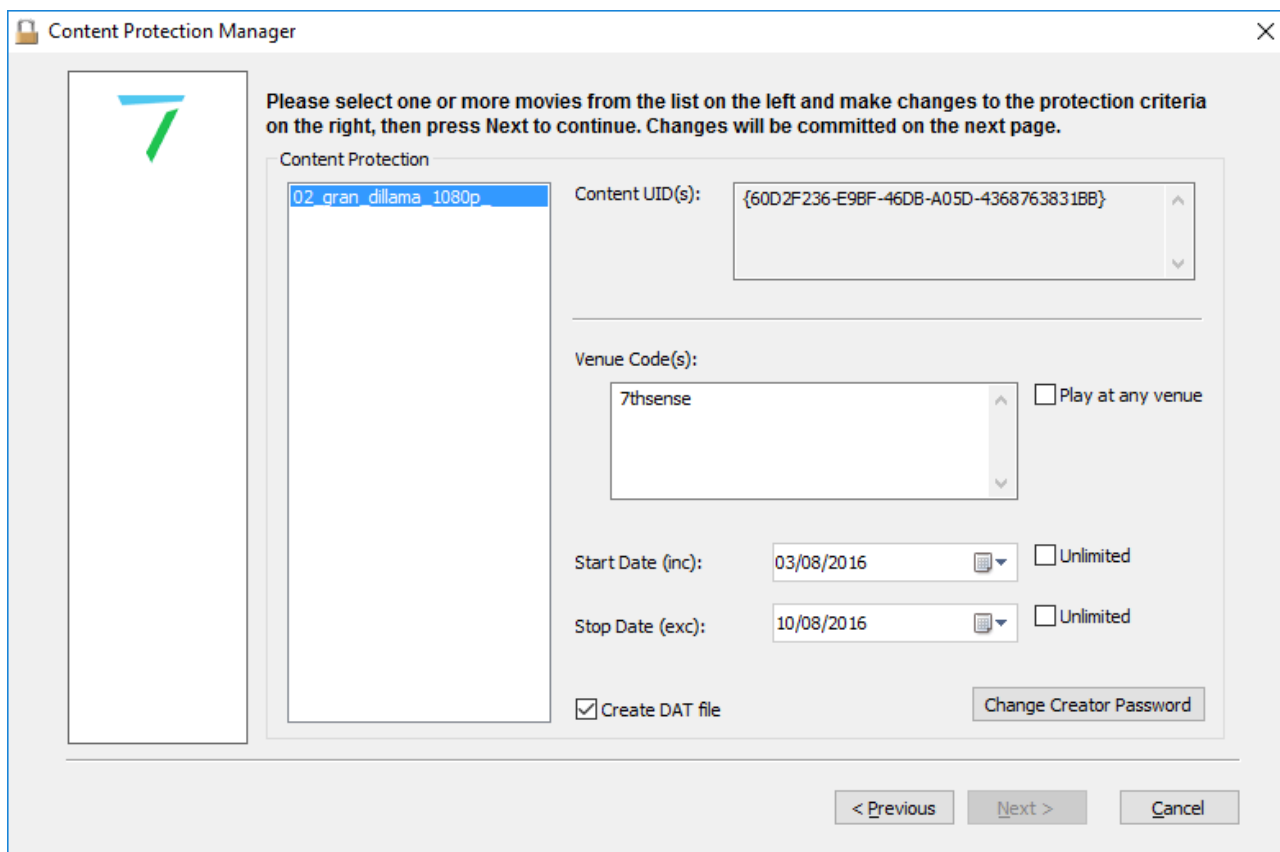


Click **Next** to continue



- Browse and select the source folder of the CPR file in C:\EncryptionFiles\CPR
- Check the Include sub-folders checkbox if the file is in a sub folder of the current folder.
- Type the password that was used to create the original CPR, in the creator password box.
- Once the next button is pressed, the Manager will search for CPR files that are related to the password entered.
- If any CPRs are found relating to the password, the Manager will open a new window showing all relevant CPRs.

Select the CPR to manage:



The screenshot shows the 'Content Protection Manager' window. On the left, a list of movies is displayed, with '02_gran_dillama_1080p' selected. The right side of the window contains fields for 'Content UID(s)', 'Venue Code(s)', 'Start Date (inc)', 'Stop Date (exc)', and a checkbox for 'Create DAT file'. The 'Content UID(s)' field contains the value '{60D2F236-E9BF-46DB-A05D-4368763831BB}'. The 'Venue Code(s)' field contains '7thsense'. The 'Start Date (inc)' field is set to '03/08/2016' and the 'Stop Date (exc)' field is set to '10/08/2016'. Both date fields have a calendar icon and an 'Unlimited' checkbox. The 'Create DAT file' checkbox is checked. A 'Change Creator Password' button is located at the bottom right. Navigation buttons '< Previous', 'Next >', and 'Cancel' are at the bottom of the window.

Please select one or more movies from the list on the left and make changes to the protection criteria on the right, then press Next to continue. Changes will be committed on the next page.

Content Protection

02_gran_dillama_1080p

Content UID(s): {60D2F236-E9BF-46DB-A05D-4368763831BB}

Venue Code(s): 7thsense

Start Date (inc): 03/08/2016

Stop Date (exc): 10/08/2016

☒ Create DAT file

Change Creator Password

< Previous Next > Cancel

The relevant details will be displayed for your selected movie.

Note that if you have set the movie to play at any venue with unlimited dates (all checked) no Venue Code will be visible and the dates will default to 01/01/2000 and be greyed out.

Please select one or more movies from the list on the left and make changes to the protection criteria on the right, then press Next to continue. Changes will be committed on the next page.

Content Protection

02_gran_dillama_1080p

Content UID(s): {97358CB5-264D-4EFF-8773-2B8801B17F95}

Venue Code(s):

☒ Play at any venue

Start Date (inc): 01/01/2000 ☒ Unlimited

Stop Date (exc): 01/01/2000 ☒ Unlimited

☒ Create DAT file

Change Creator Password

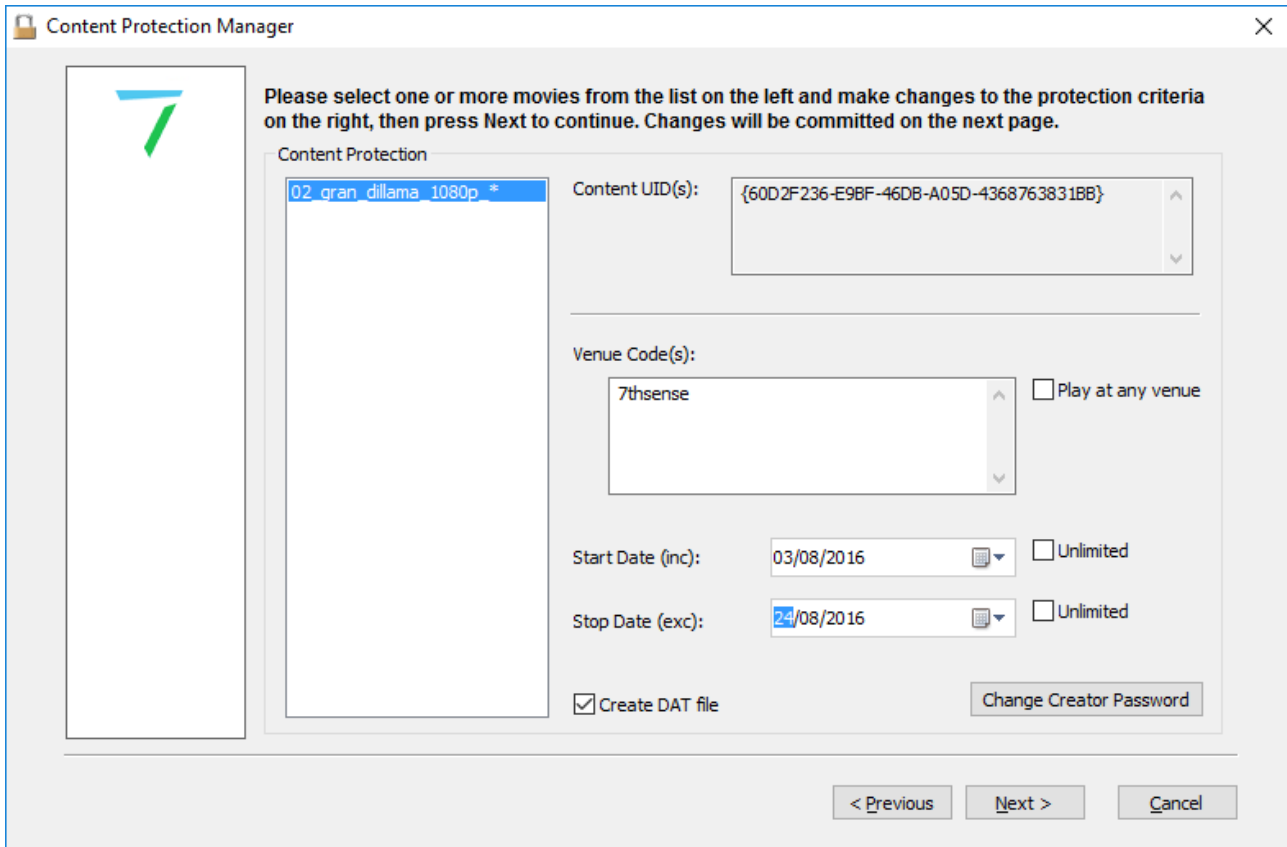
< Previous Next > Cancel

Note: You can select multiple CPRs and add the same protection information to multiple CPR's simultaneously.

The encryption information may now be edited if required:

- To set to playback at a different Venue location, change the Venue name in the **Venue Code(s)** box.
- To play at any venue, check the **Play at any venue** checkbox.
- To have the movie play within certain dates, uncheck the checkbox (if checked), next to either the **Start date (inc)** or the **Stop date (inc)** or both. Type the start/stop dates in the appropriate boxes.
- To set unlimited start and stop dates, check the **Unlimited** checkboxes next to the relevant dates.
- Pressing the change Creator password button allows you to change the currently saved password for the selected CPR. Type in the old password and then the new one.
- To create and new DAT file for the encrypted content, check the **Create DAT file** checkbox.

If you make changes to the encryption details, the **Next** button will become active:



The screenshot shows the 'Content Protection Manager' window. On the left is a list of content items, with '02_gran_dillama_1080p_*' selected. The main area on the right contains configuration options: 'Content UID(s)' is set to '{60D2F236-E9BF-46DB-A05D-4368763831BB}', 'Venue Code(s)' is '7thsense', 'Start Date (inc)' is '03/08/2016', 'Stop Date (exc)' is '24/08/2016', and 'Create DAT file' is checked. There are also checkboxes for 'Play at any venue' and 'Unlimited' for both start and stop dates. A 'Change Creator Password' button is at the bottom right. Navigation buttons '< Previous', 'Next >', and 'Cancel' are at the bottom.

Please select one or more movies from the list on the left and make changes to the protection criteria on the right, then press Next to continue. Changes will be committed on the next page.

Content Protection

02_gran_dillama_1080p_*

Content UID(s): {60D2F236-E9BF-46DB-A05D-4368763831BB}

Venue Code(s): 7thsense

Start Date (inc): 03/08/2016

Stop Date (exc): 24/08/2016

☒ Create DAT file

☐ Play at any venue

☐ Unlimited

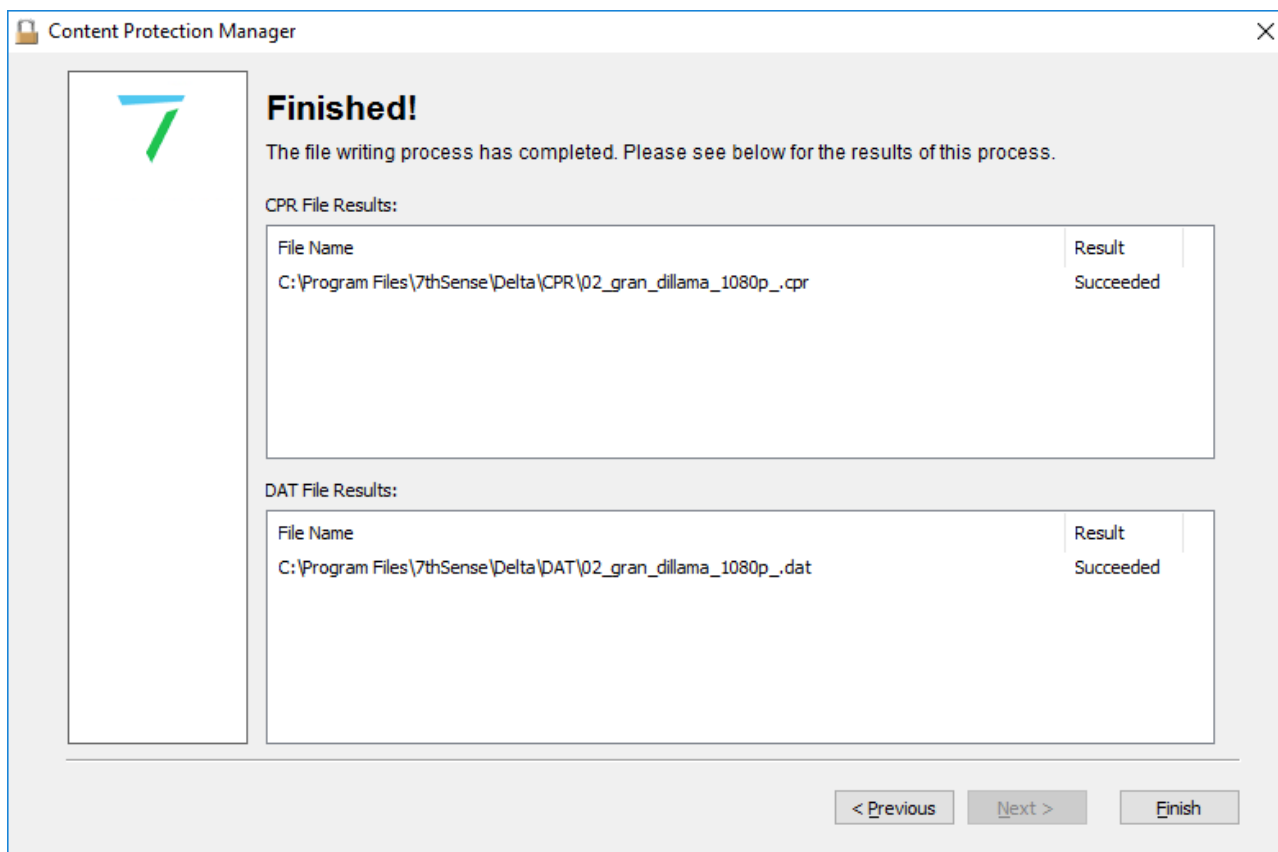
☐ Unlimited

Change Creator Password

< Previous Next > Cancel

Click **Next** to show a window asking for you to select new output folders for modified CPR and DAT files. This is to enable you to maintain previous as well as create new – else the system will overwrite your previous files.

Click **Next** once you have selected where you want your DPR and DAT files to be stored.



Click the **Finish** button to close the Management program.

The newly-created DAT file can now be sent to the Venue for installing on the relevant Delta Media Server. The CPR file should be kept with the Content creator for any further possible changes.

FAQs

Does it also encrypt the audio?

No, only the video is encrypted.

Can the content and DAT file also be used on another Server?

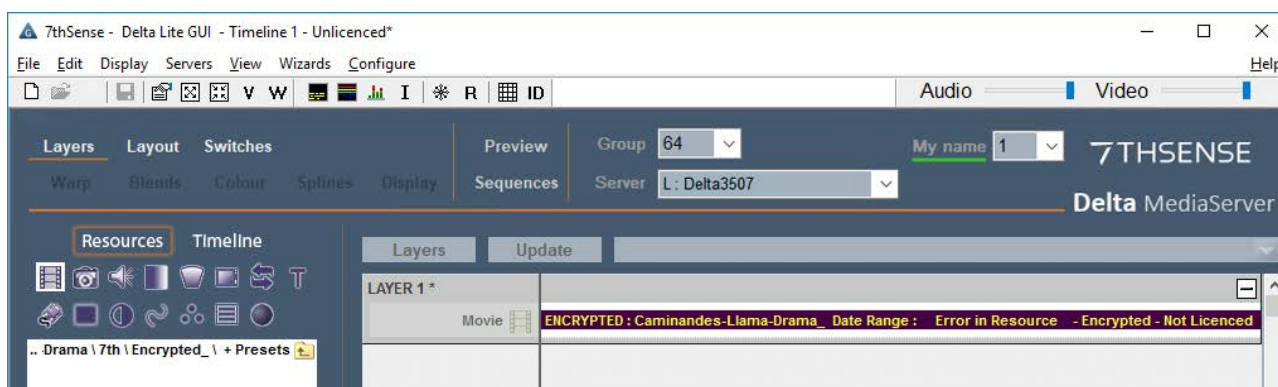
Yes, providing the correct licensing criteria are met.

Do I need to keep the DAT file once it's been ingested?

Yes, this needs to reside in the DAT folder.

What happens if I try and play a movie that is not allowed at my venue?

The output from Delta will be scrambled and the resource in timeline will show in purple with yellow text stating why the resource won't play:



I have lost the DAT file before ingesting it. Can I get another one?

The Content Creator can create a duplicate DAT file from the original CPR file

I have forgotten my management password, what can I do?

The content will need to be re-encrypted.

Batch Export to TGA in Adobe After Effects

Batch Export to TGA in Adobe After Effects

If supplied with movie media that has a transparency (alpha channel), you can use DFM to convert that media to .7th 444A for RGB+A support, or strip out independently the RGB or alpha channels. The benefit of the latter, for example, is if you have transparent media that is intended to be a luma key only and do not need the full RGB information, but only the alpha channel. This can result in a significant savings of storage and bandwidth requirement for playback.

DFM natively supports 32-bit TGA (RGB+alpha) content for this process (and Delta supports native playback of 32-bit TGA). Other transparent media, however, will need to be converted to 32-bit TGA before ingesting into DFM to convert to .7th 444A. The following steps are an example of how to convert from a PNG image sequence with transparency, to 32-bit TGA using Adobe After Effects CC.

Steps to Export as 32-bit TGA

1. Import your media with transparency into a new After Effects project
2. Right-click the image sequence and select 'New Comp from Selection'
3. Verify the settings are correct – note that source framerate at this point is irrelevant as we are doing a frame for frame conversion.
4. With the new composition opened in After Effects, select the *Composition > Add to Render Queue*
5. In the Render Queue output settings, do the following:
 - a. Set 'Render Settings' to Best Settings
 - b. Click on the current option next to Output Module to open the 'Output Module Settings' window.
 - c. Set Format to Targa Sequence, select RGB + Alpha from the Channels menu, and then verify that 32 bits/pixel is selected under the 'Format Options...' button.
 - d. Click OK in both windows
 - e. Set your preferred file name
6. Press 'Render'

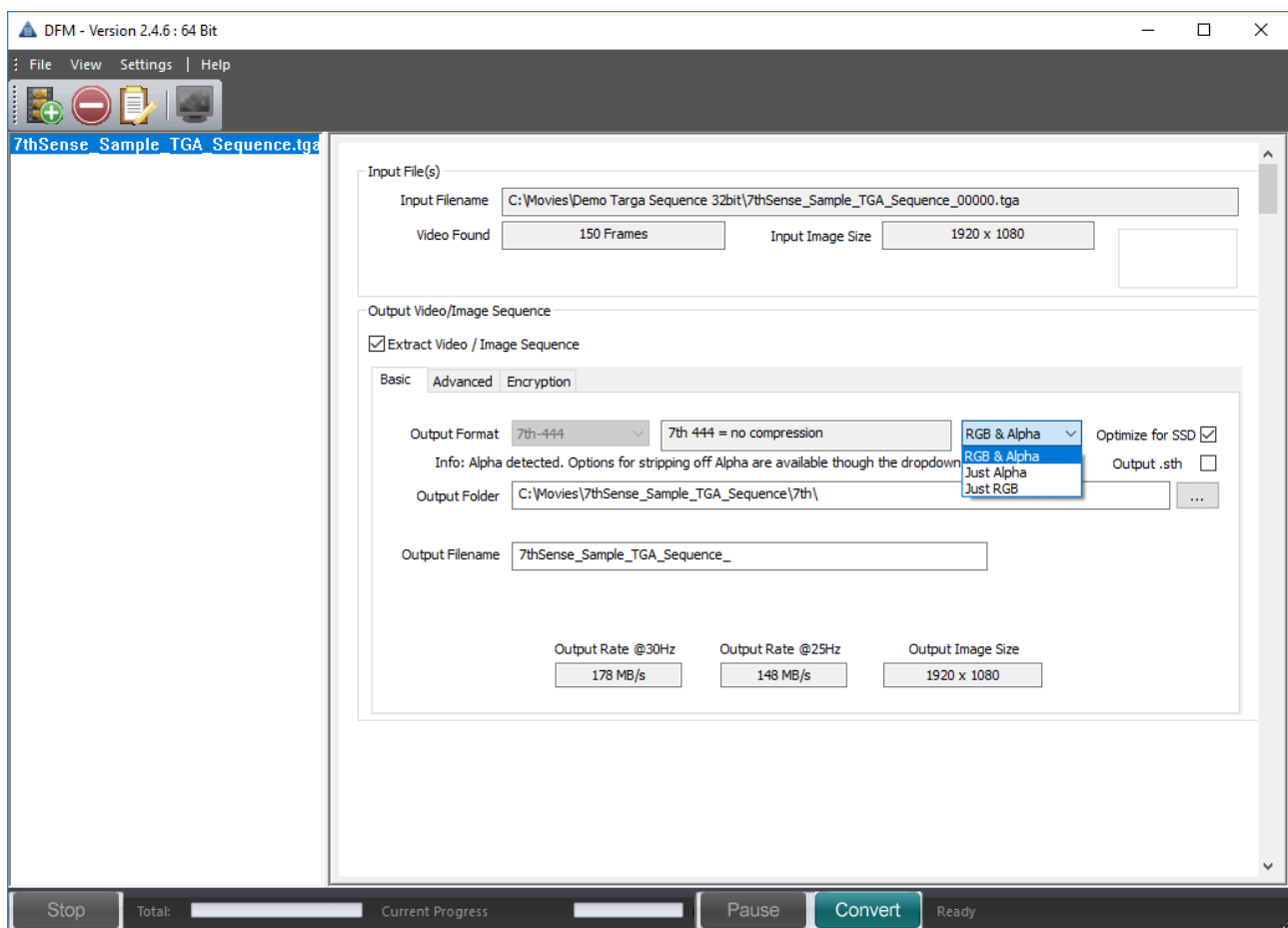
Once the render is complete, you will have a 32-bit RGBA TGA image sequence. Delta can play this back natively and, depending on the composition of the show, you may not need to use DFM. However, if you would like to convert to .7th to render only the alpha channel, you can do so by following these steps in DFM.

Convert TGA to 7TH Using DFM

Open DFM and load the media into the queue by selecting the 'add media' button in the top menu bar.

Find your newly created TGA sequence and select the first file, then Open.

Once loaded into the queue, you will note that DFM defaults to 444 where you would normally have the option of 444, 422, and 420, and adds a pull-down menu that defaults to RGB & Alpha.



- Using the pulldown menu, select RGB & Alpha, Just Alpha or Just RGB as required
- Ensure the other settings are correct (such as 'Optimize for SSD') and then press Convert at the bottom of the screen.

DFM will convert your media as required.

Video Capture Options

Video Capture Options

Video capture features allow Delta Media Servers to composite live feeds into the Delta Server output. This could be from another physical device such as a video camera, or over the network as a video share using Spout, or in the form of a live web page, or a broadcast stream. The following are some example use-cases.

➤ Search keyword 'capture' in the [Delta User Guide](#).

Hardware capture

The project requires a multiple server solution in a theme park for a stage show, and as visitors walk into the arena, their reactions are to be captured and composited within the main display. The Delta Media Server driving the display will have a capture card capable of taking two HDMI inputs from two separate video cameras. On screen there will be two overlaid images showing what the cameras can see.

Delta Media Server supports capture cards from the following manufacturers, that will accept inputs from various live or playback devices and sources:

- Datapath*
- Matrox
- Magewell
- Blackmagic

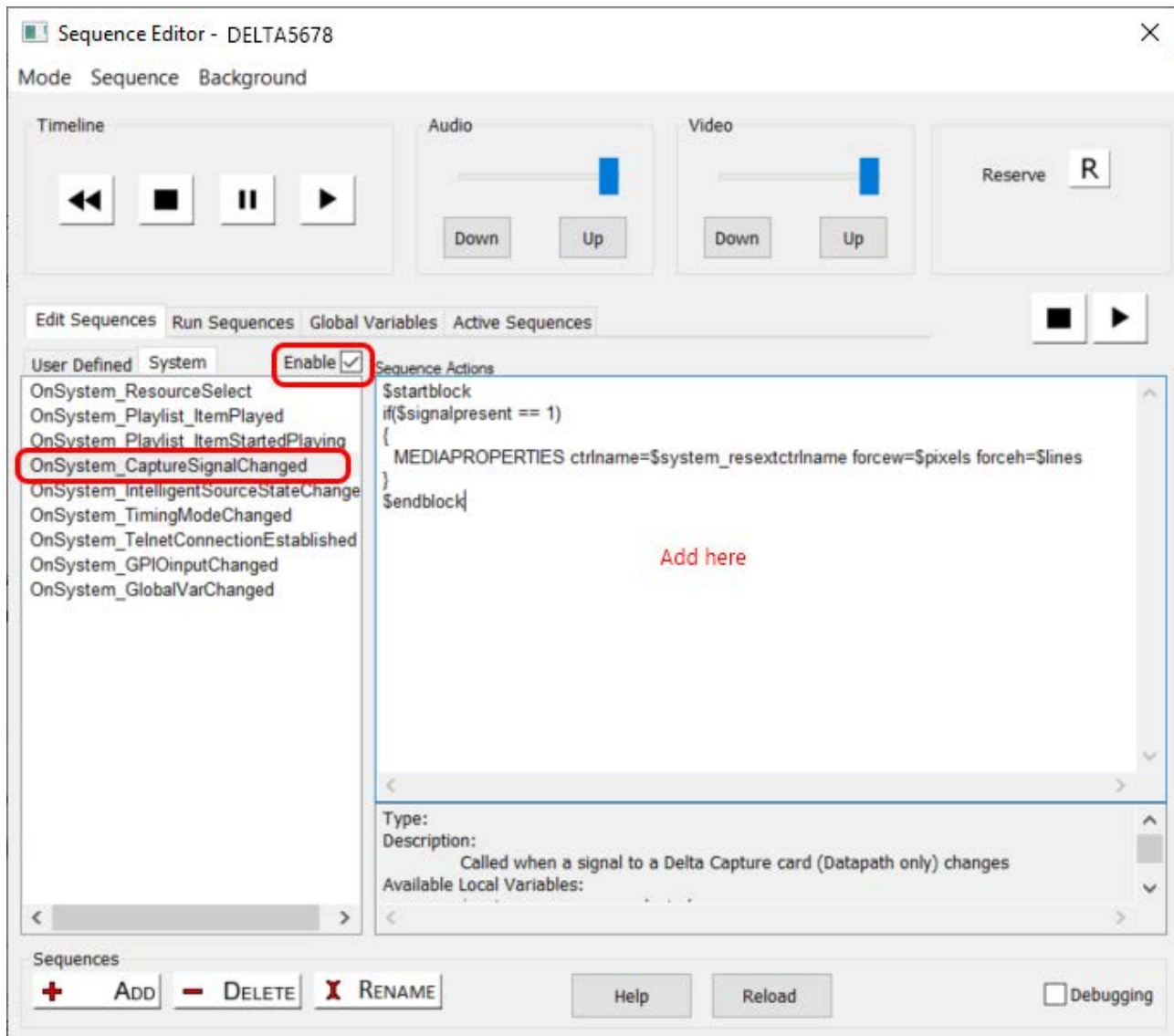
* Datapath DisplayPort Cards: Variable Resolution Capture

If the capture source connected to a Datapath DP capture card changes, Delta will interpret the incoming feed at an incorrect frame rate (for example when set up for a 3840 × 2160@60 fps source, a replacement source of 1920 × 1080@60 fps when forced to the same height and width, may be interpreted down to 15 fps).

This can be resolved by monitoring the capture feed resolution by editing a Delta System Sequence and enabling it with the System Sequences checkbox. Copy and paste this block:

Sequence name: OnSystem_CaptureSignalChanged

```
$startblock
if($signalpresent == 1)
{
    MEDIAPROPERTIES ctrlname=$system_resextctrlname forcew=$pixels forceh=$lines
}
$endblock
```



Web capture

Stadium managers for a football game are using a Delta Media Server to drive a massive live coverage display using camera feeds to a capture card. They want to overlay results from a web page and the home team's Twitter feed. The camera capture resource is in full-screen mode. By adding 'Web Capture Resources' to the Delta timeline, with URL addresses for the additional feeds, these can be re-sized/positioned to suit and switched in or out during the match.

Streaming service

A number of TV channels offer encrypted streaming services; a venue wants to be able to incorporate one using [Zixi Broadcaster and Reciever](#). By using a Stream capture resource on the Delta timeline, the broadcast can be composited as a window in the playback display. All that is required is the Zixi licence and the relevant URL.

NDI (Network Device Interface)

A project for a live video games conference requires four PC gamers to be seen playing against each other, with each of their displays to be composited within a main background display from a Delta Media Server. By placing all sources on the same network as the server, this becomes a suitable application for Newtek NDI* tools to pull in a stream from each player desktop and composite them live within the main display. Just set up the correct ports and add NDI capture resources to the Delta timeline using the NDI stream names.

* The protocol created by Newtek that allows for capture over IP. Designed with broadcast quality in mind, it has low frame latency and is well-suited to switching between inputs.

7thMovieViewer

7thMovieViewer



7TH / STH, TGA and DPX* movie sequences can be played or viewed frame by frame in 7thMovieViewer. Since Delta 2.6 this is installed with DeltaServer as a Delta Utility. If you have an older version of DeltaServer, contact support@7thsense.one for a copy of the application.

To use the viewer regularly, create a desktop shortcut from C:\Program Files\7thSense\Delta\Utilities\7thMovieViewer64.exe.

7thMovieViewer version 1.0.11

File > Open

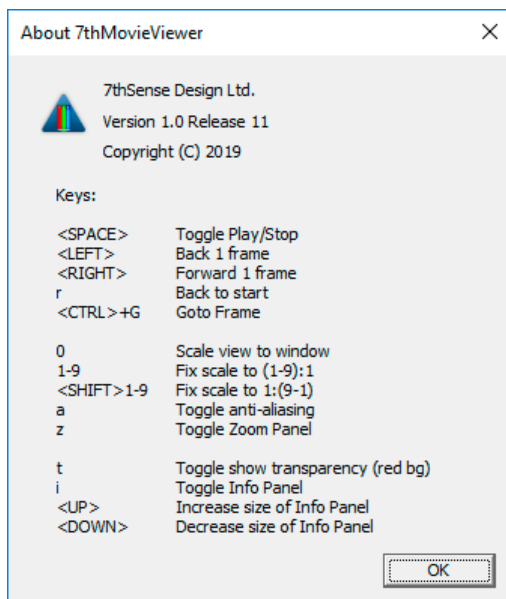
Browse and open any frame in a folder sequence of .7th, .sth, .tga or .dpx* files, and as soon as you play or move frame, the viewer will jump to the first frame in the folder sequence.

* DPX 10-bit 4:2:2 and 10, 12 and 16-bit 4:4:4 are supported

Note that **older 6:1 compression** 7th/sth images will not render in 7thMoveViewer. (See [Delta Server user guide: Movie formats](#).) If you have these, they can be recorded out to a different format from DeltaServer (see [Real-Time Recording](#)). To find the format of any 7th files, place a movie on the Delta timeline and hover over the file for the metadata:

7thSenseDefaultMovie_7th_444_			
TIMING	START	END	LENGTH
	00:00:00::15	00:00:36::14	00:00:36::00
	15 f	914 f	900 f
	0.6 s	36.6 s	36.0 s
VIS	Layer 5 Opaque Render Order : 0 (0 to 255)		
LOCATION	11520		1920
	Onscreen	4320	Original 1080
	Fullscreen Roll 0.0 degrees		
	External Control Name : Movie_10536		
FILE	C:\Movies\7thSenseDefau... \7thSenseDefaultMovie_7th_444_*.7th		
	FileType : RGB 444 8Bit (No Compression)		
	Disk Transfer Rate 148 MB/s		
	Length : 900 of 900 frames		
	Hold On Last Frame: N		

Movies can be played, viewed frame by frame, and also scaled / zoomed. Click the question icon or the *Help > About* menu for a list of shortcut keys:

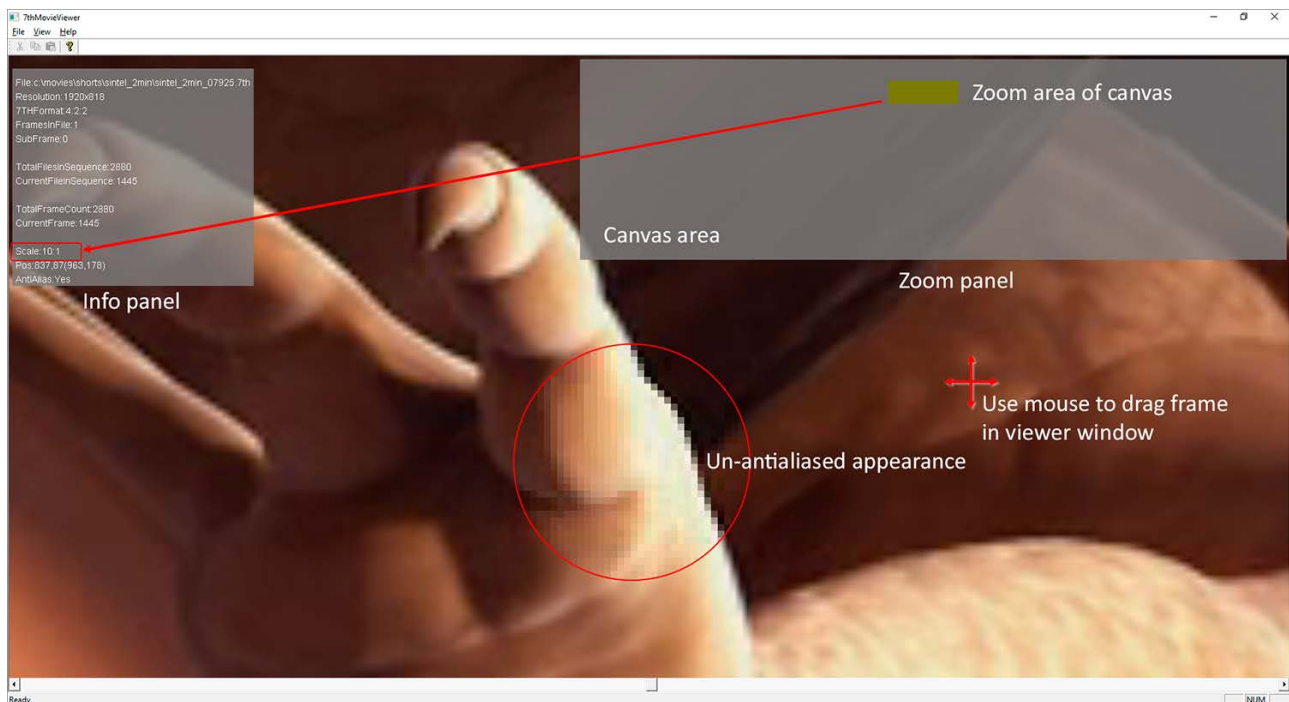


Play controls

Start and stop play of a movie sequence with the space bar. Use the left/right arrow keys to step through frame by frame. Use the bottom scrollbar to move rapidly to any play position.

View > Goto frame (or the 'g' key) enables you to go to a specific frame number (in the current sequence, starting 0).

Features



Scale controls

Zooming in or out is based on the cursor position. Press 0 to refit to the window at any time.

Zoom in: from the View window, or using the number keys, choose 0 (zero) scale to fit the frame to the viewing window, or scale up from full size ($\times 1$) to $\times 9$.

Zoom out: from the View window, or using the Shift+number keys, scale down from full size in the same stages.

Using the mouse wheel, zooming in and out is smooth and unlimited.

To smooth the high-level zoom image, add antialiasing (View menu or shortcut key 'a').

Zoom panel

From the View menu, or key 'z', show where the zoomed area (green) is located in relation to the full frame (grey). In any zoom selection, the movie frame can be dragged around in the viewer window using the mouse.

This panel is resized with the up/down arrow keys.

Info panel

This can be toggled on and off from the View menu, or the 'i' key. It shows the file properties and frame-sequence position, and the current view settings. The frame count is not derived from filenames, but represents the count within the current available sequence, starting at 0.

Pos: shows the coordinates of the top left frame pixel in the viewing window, and in brackets, the coordinates of the mouse cursor within the media.

This panel is resized with the up/down arrow keys.

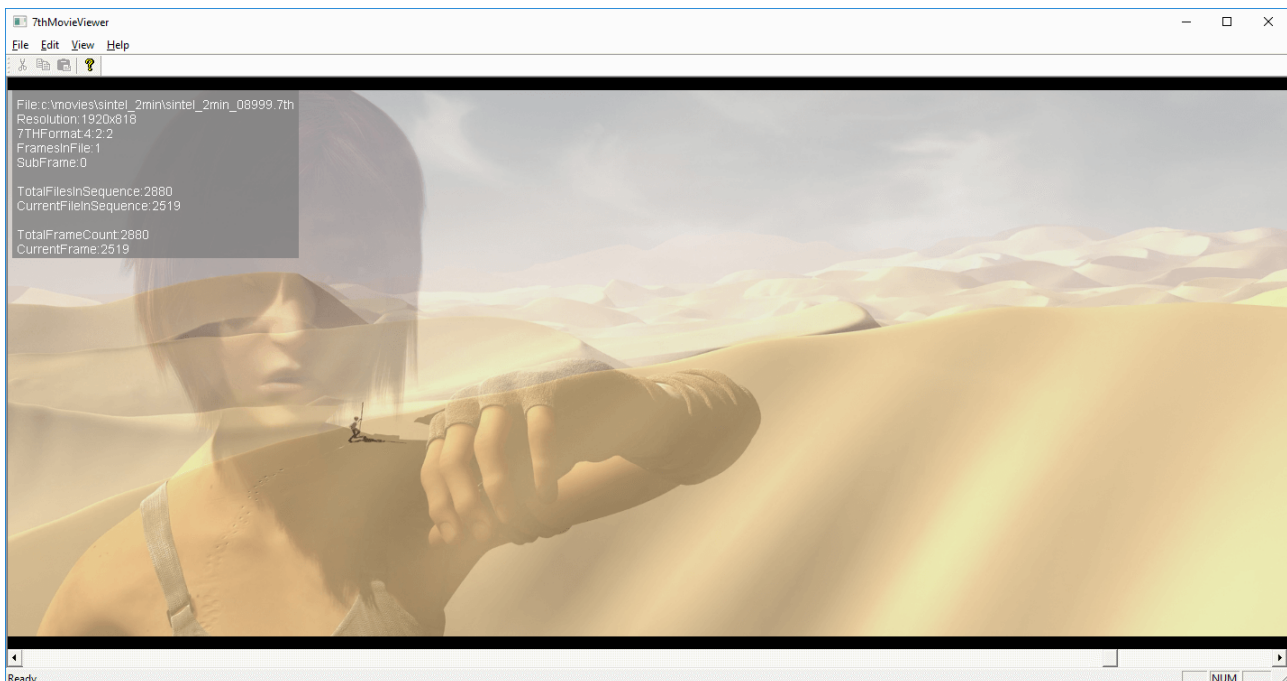
Background/transparency

To make it easier to see transparent areas of a frame or the frame edge, the background can be switched from black to red: *View > Show Transparency (Red Bg)* or use the 't' key toggle.

Installation (users pre Delta 2.6)

If you were previously provided with an earlier version of 7thMovieViewer, unzip the file on the PC on which you want to view the files. Note: the zlib1.dll file is required to run 7thMovieViewer.

Version 1.0.6 of 7thMovieViewer had no scale and zoom, so shows less file information:



Movie and frame data are shown overlaid. Move through frames with the cursor keys, or scroll with the lower scroll bar.

7thFileVerifier

7thFileVerifier

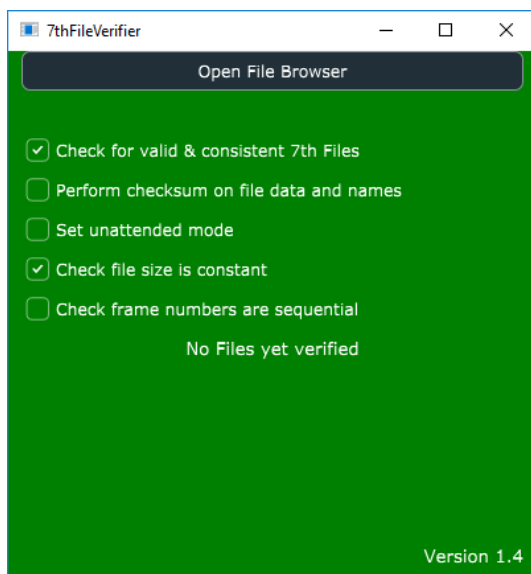
Function of 7thFileVerifier

7thFileVerifier is an app that allows you to check a folder of movie frame files to test validity against several variable parameters. These currently include:

- whether the file is a valid .7th file
- to perform a checksum on the files data and name
- check the file size remains constant throughout the whole folder
- check frames are sequential.

How to Use

Run 7thFileVerifier.exe.



1. There are several options to choose depending on the type of verification you would like to do (multiple options can be chosen). These are explained in detail further into this guide.
2. Click 'Open File Browser' and go to the path of the folder containing the frames to be verified.
3. You will then see the application go through each file and output a message depending on what has been found.

As well as writing to the application window, a log file will also be created in the same directory as the executable itself, called 7thFileVerificationLog.txt. This writes whatever would also be displayed in the application window, so you can look at this to confirm the results, even after the application has finished running.

Options

Check for valid and consistent 7th File

This is defaulted to ticked when the application opens.

This option checks the file data header of each file for a valid .7th file format: it isn't just checking the file extension.

This option also checks consistency of the 7th files. For example, if the width, height or compression of the files changes within the sequence, this will be highlighted.

If this option is not checked, then header information will not be checked. You can therefore check other formats, such as TGA for sequential integrity or other options.

Perform checksum on file data and names

This option is defaulted to off.

Perform a checksum on the files' data and name. An example usage would be to run this before and after a file transfer, and verify that the checksum on each file is the same. If it is not, then you know some corruption has occurred during transfer. An example output for one file would be:

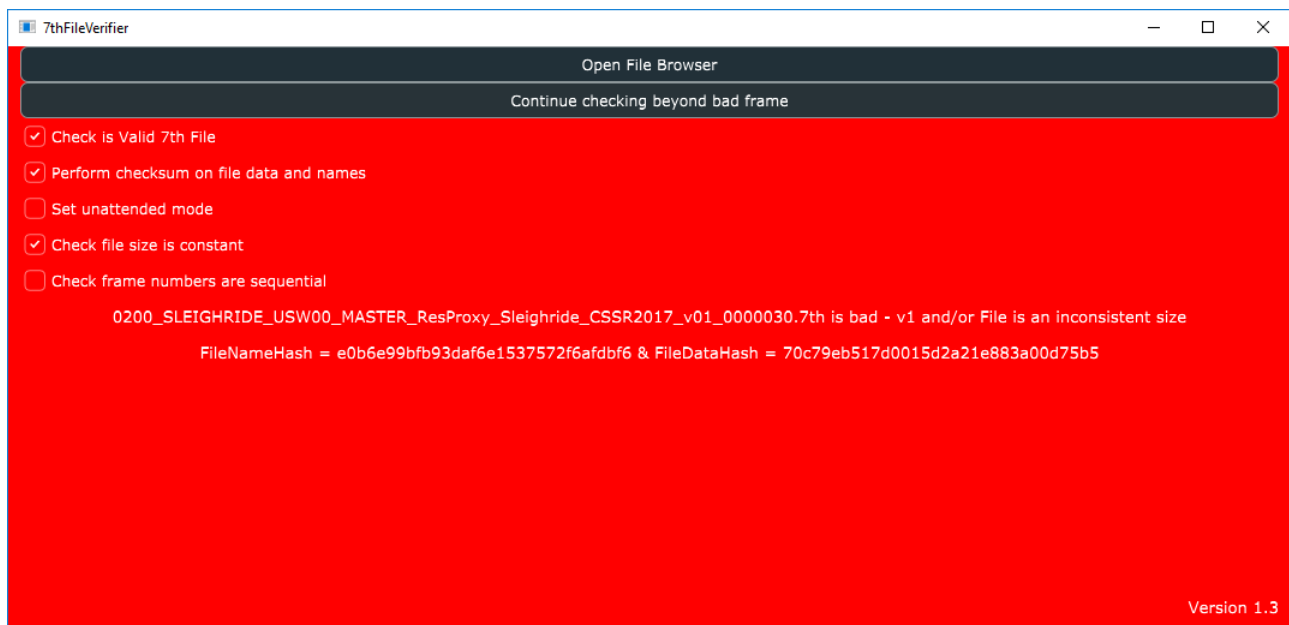
```
7thFlyAnimationHD0000_00549.7th is good - v1 *** FileNameHash =  
1bedf202fa8c0988820e0eed44163401 & FileDataHash = 72edd075c1489d3d85effa0c30699025
```

- The first section says that file 7thFlyAnimationHD0000_00549.7th is good. The v1 part indicates it is a version 1 header, the other option is 2.
- FileNameHash – This is a checksum on the name of the file.
- FileDataHash – This is a checksum on the data within the file.

This operation will take some additional time, so it is recommended to be unticked if you don't need to test this.

Unattended Mode

If not in unattended mode, the application will stop and the background will go red to indicate a problem file has been found. Click on 'Continue checking ...' to resume checking beyond the bad frame:



In unattended mode the interface will continue verifying even when it encounters a bad frame. The purpose here is that you can compare log files at some point afterwards and know that a problem with all the files will be marked. The interface will not pause on the red state with this checkbox ticked.

Check file size is constant

This option is defaulted on.

This option will compare the file size of each file being verified, against the first file in the folder, if they are not the same then the file will be flagged as bad.

Check frame numbers are sequential

This is defaulted off.

This option checks the frame number increases by one compared with the previous file. If not, then the file is flagged as bad.

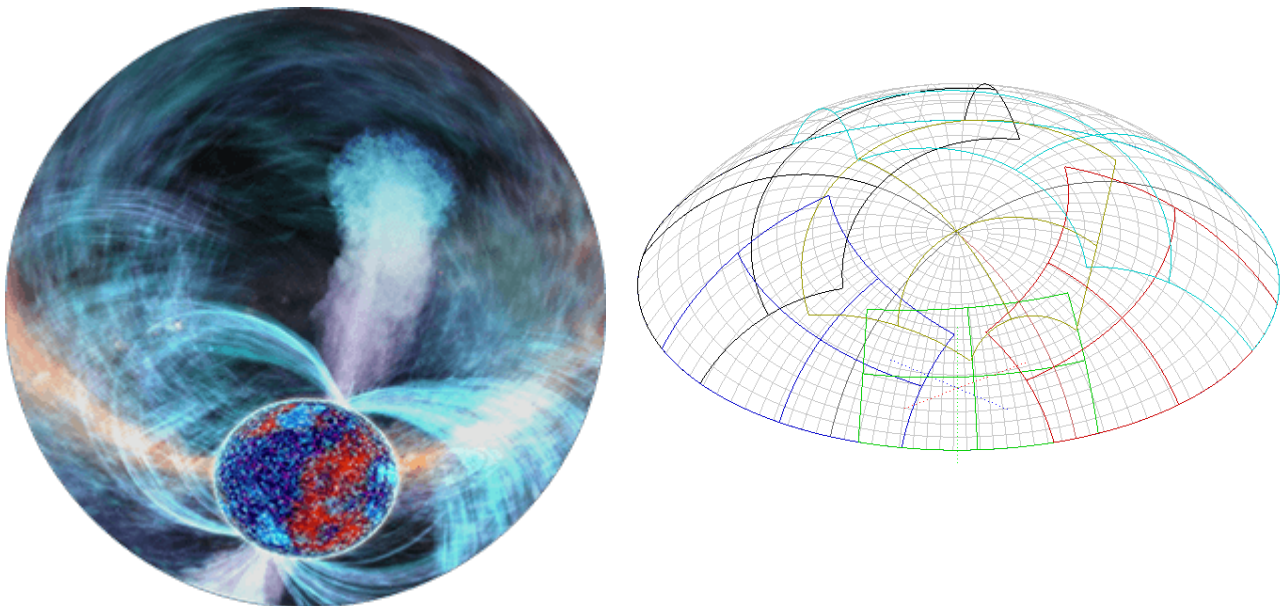
Carving Media for Dome Displays

Carving Media for Dome Displays

The more channels are used to display on a dome, the smaller proportion each channel needs to project. When more than one server is being used, each does not need more than the slice(s) of media required for its channel(s). To lighten server loads, we can carve each frame of the media down to only that part needed for each channel, instead of full frames.

Allowing for overlap and blend, carved frames will tolerate small positional changes from projector maintenance. If projectors are substantially displaced, however, gaps may be introduced, requiring a fresh carving of the media to be done.

To see the saving, compare the complete fisheye media frame with a 6-projector dome map (each colour outline represents a channel's coverage), if spread over several servers (e.g. three servers controlling 2 channels each):



Media credit: NSC Creative

Carving is a process of re-recording each channel's segment of the media in turn, to be run on this, and only this, display arrangement.

This guide assumes that you have already set up your server network and aligned your channels/projectors, and have the media available on your timeline ready to carve.

Show Setup for Carving

Important

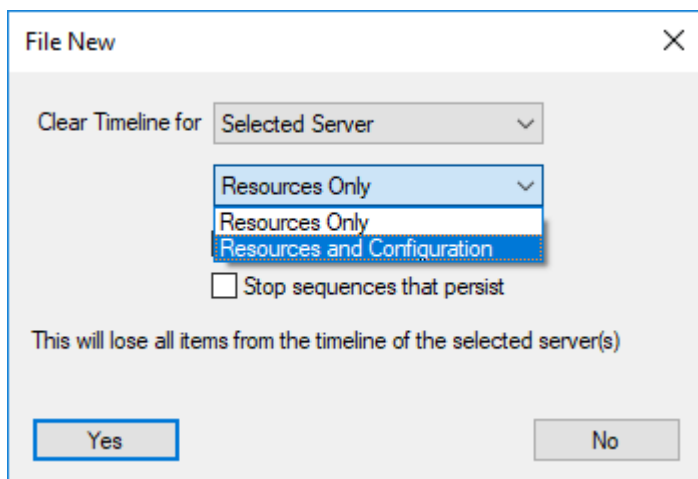
When sharing media across multiple servers, each controls its own channel(s). For media to be carved effectively, the settings for each channel must be set according to the individual projection requirements. If the projectors are subsequently moved, and are realigned, carved channels may no longer overlap and blend correctly. In these circumstances, the media would have to be re-carved with new channel settings.

The instructions show how to carve media on a Leader server then share across Leader/Follower servers, using manual calibration. See the alternative instructions for [Domes with Scalable Auto-alignment](#)⁽¹²⁶⁾.

Note: if the whole movie is too large to fit on the server disk in a single session, carve your media in 'batches' of files/frames.

Show Setup: DeltaGUI

Create a new show on your Leader server, where you will carve the media:



Click *File > New* and Select 'Resources and Configuration' and 'Clear Background' to clear down all previous configurations.

Choose *Display > Dome Mode*.

If you are unfamiliar with working in Dome Mode (previously termed Frustum Mode in earlier DeltaGUI versions), please refer to the [Delta User Guide](#) in the appropriate version for your system.

Channel Setup (Manual Alignment)

Follow the normal procedures for setting up your projector channels for Dome Mode (see the main *Delta User Guide*). Click on the Defaults Wizard to set initial Dome Mode Defaults. If aligning manually, the settings you use may come from a CAD 3D model.

Dome Mode Defaults

Channel Size

☐ Use Existing Size

☒ Force Size **L**

Aspect

H Shift

V Shift

Zoom

Pitch

Roll

Channels Used

☒ Force n Channels

☐ Use Existing Channels ☒ Include Cap

Screen

☐ Set Screen Radius

☒ Use Existing Screen

Spacing

☐ Degrees

☒ Calculate

Channel Arrangement

☐ Projectors at Dome Centre

☒ Projectors at Screen Edge

☐ Projectors inside Screen

☐ Projectors outside Screen

At Radius

Apply **Done**

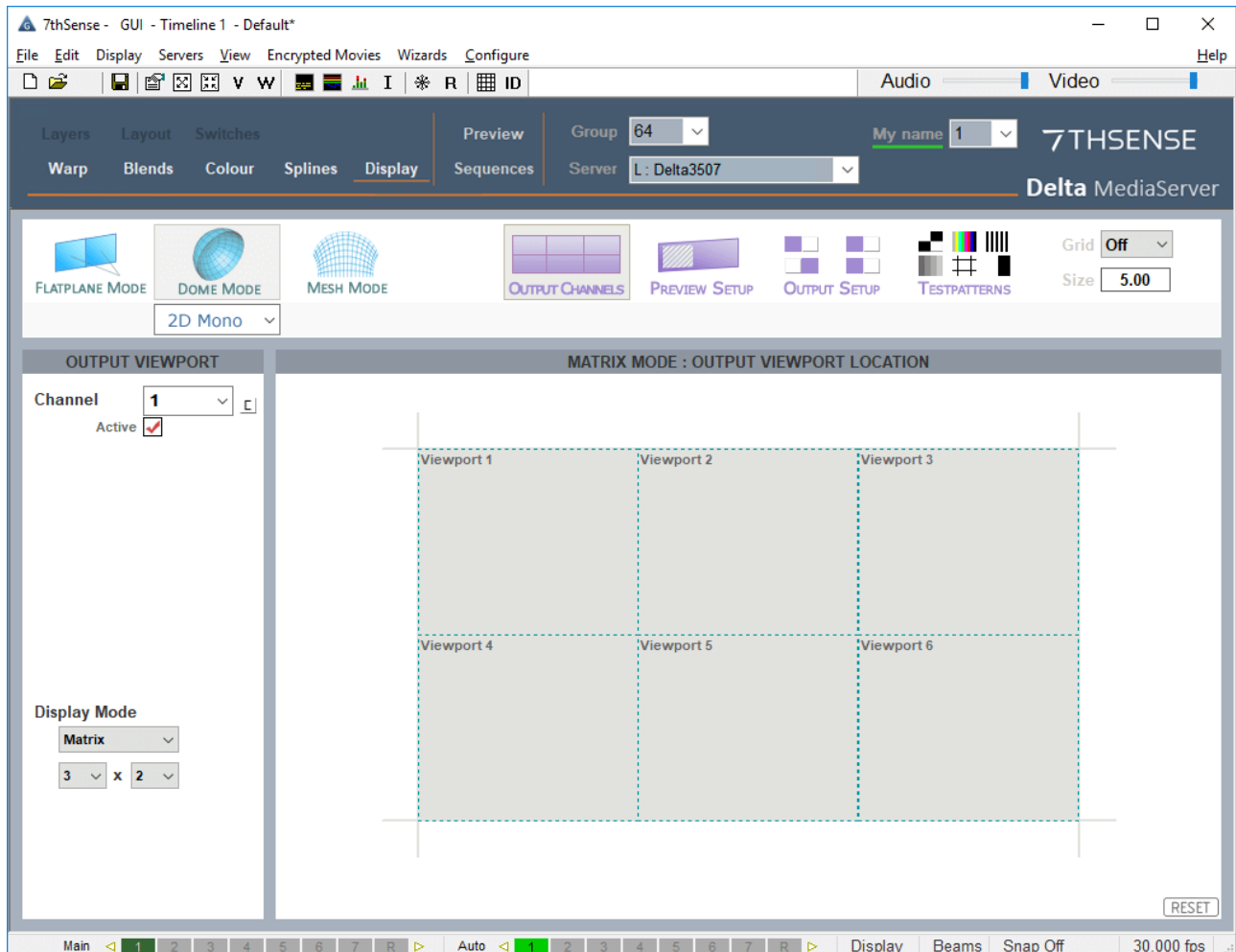
Select 'Force n Channels' and the number of channels that you are using, and other settings, then click 'Apply' and 'Done' to close.

When you have finished a manual alignment, with small adjustments in the Dome Mode Channel panel, make a note of these final settings for each channel. Minor movements in projectors from regular maintenance may again be made manually.

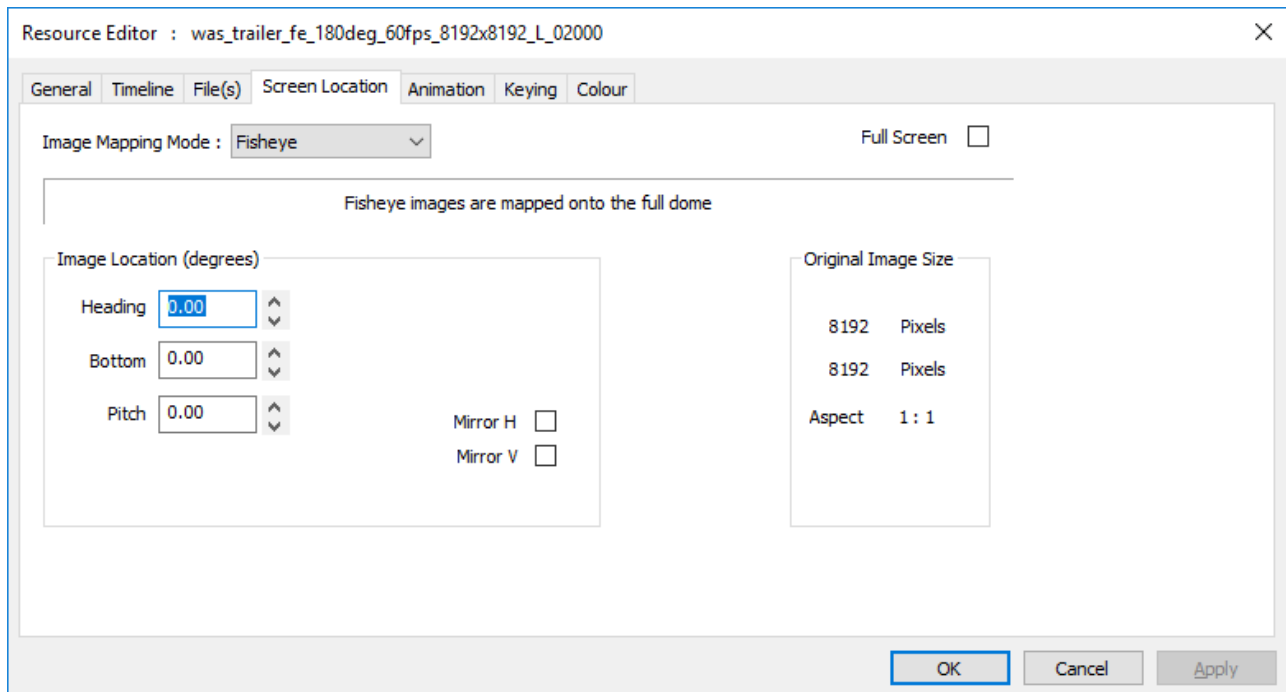
When you carve media to these configurations, the result will only apply to them, with a small amount of tolerance. More substantial realignment may require re-carving of the media.

Output Setup: Display Mode

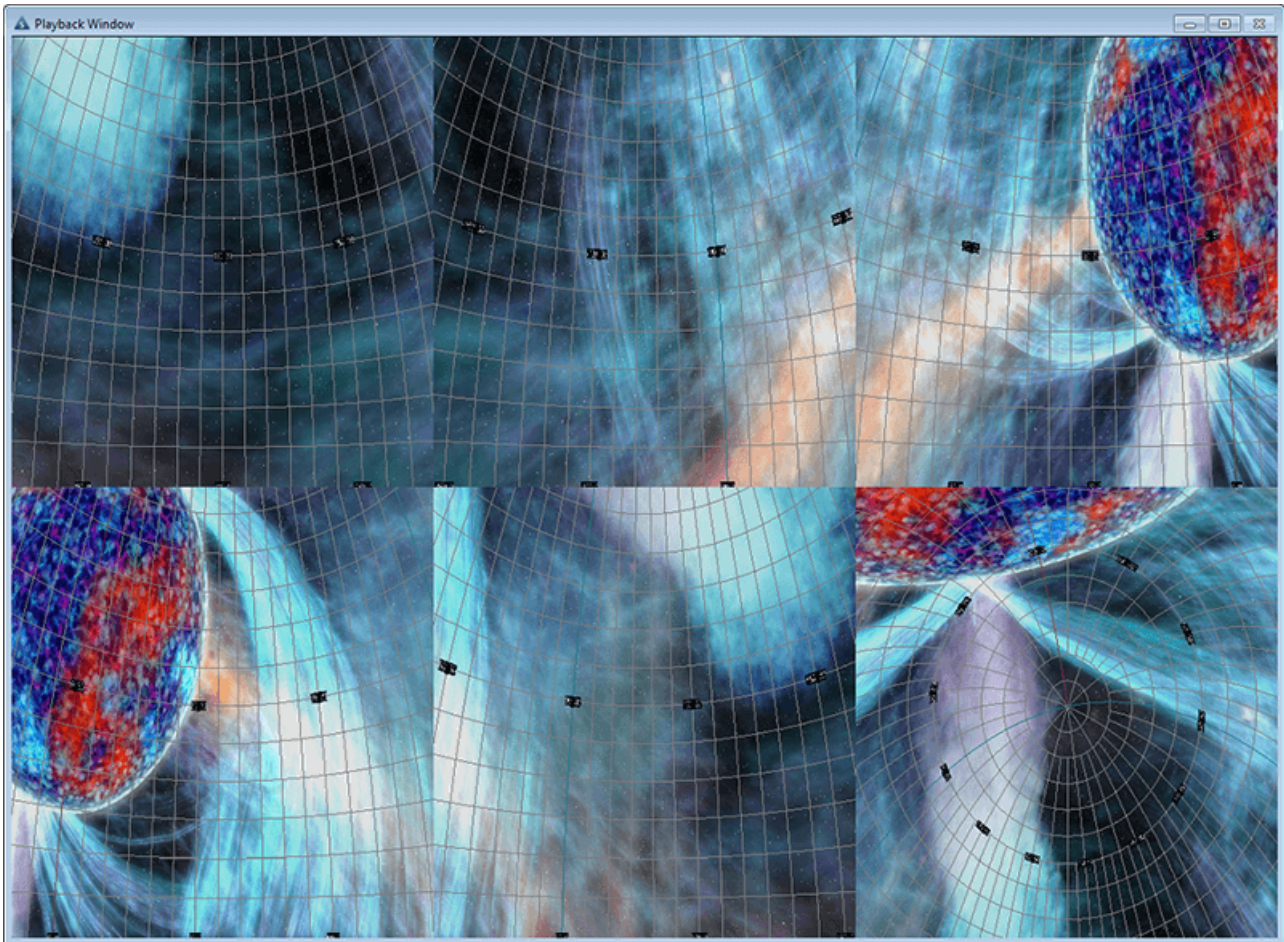
Select 'Output Channels' and set the **Display Mode** to Matrix, to match your graphics card desktop: in this case, Matrix Mode (2D Array) of 3×2 . Matrix mode enables you to have a better view of the channels on the Playback Window rather than seeing channel views all in a row.



Now drop your media onto your timeline. Fisheye media **mapping mode** is normally detected automatically, but check in the timeline resource properties, Screen Location tab:



Fisheye media in the Playback window will be now divided like this (same media as in the introduction to this section):



Media credit: NSC Creative

Carving the Media (Leader Server)

Please note: From 2020 7thSense deprecated the terms master and slave for the dependencies between devices. We now refer throughout to 'Leader' and 'Follower' in our products.

To maintain functionality, both terminologies continue to work internally, but our documentation no longer uses the former terms. Users of pre-2020 products will need to observe the equivalence and continue to use the previous legacy terms.

Carving follows the [normal method of recording](#). With the media active (enabled) in the Timeline, click the red Record button (bottom-left in DeltaGUI), and configure the output for each channel, in your movie drive:

The screenshot shows the 'Recording' dialog box with the following details:

- Tabs:** Record Show / Carving (selected), Preview Recording, ArtNet Recording.
- Buttons:** Add Job, Delete Job, Select All, Deselect All, Resolution Templates, Channel Names, Record Help, RECORD, OK, Cancel, Apply.
- Job List:**

Job	Path	Start Frame	Stop Frame
<input checked="" type="checkbox"/> 1	e:\movies\Stars\left\{channelName\}-\{resName\}\@@_0000	0	7141
<input checked="" type="checkbox"/> 2	e:\movies\Stars\Right\{channelName\}-\{resName\}\@@_0000	0	7141
- Channels:**

	1	2	3	4	5	6
FullRes (1920 x 1080)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Proxy (192 x 108)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- File Type:** 7TH-422 (dropdown), 1.5:1 Compression.
- Options:**
 - ☐ Skip Existing
 - ☐ Filter Movies
 - ☒ Force Patterns, Grid, Statistics & Graph Off when Recording
 - ☐ Pack 7th Files in 10s
- Footer:** Record / Carving is non-realtime. Recording format is defined above and each recorded channel's location is defined in Config - Display.

If content is 3D, you will need two Jobs: once for each eye.

Apply the settings and click **RECORD**. This button will turn solid red **RECORDING** until complete. Click again if you need to stop recording. The process can take some time.

SAVE your show file to maintain the channel settings and use them to project media accordingly from each of the group of servers.

The process will have carved each media file (frame) into channel segments, distributed into individual folders, one for each channel.

You **MUST** maintain all files/folders for efficient playback, but can now distribute the folders between servers so, when played back from the Leader server, media will appear as if being shown from a single server.

Autoalignment systems and multiple servers

Each server needs the same channel settings to be applied from the server used for show setup and autoalignment. The precision of settings from auto-alignment will be much higher, so it is better to carve media for just those channels controlled by each server, from each server in turn.

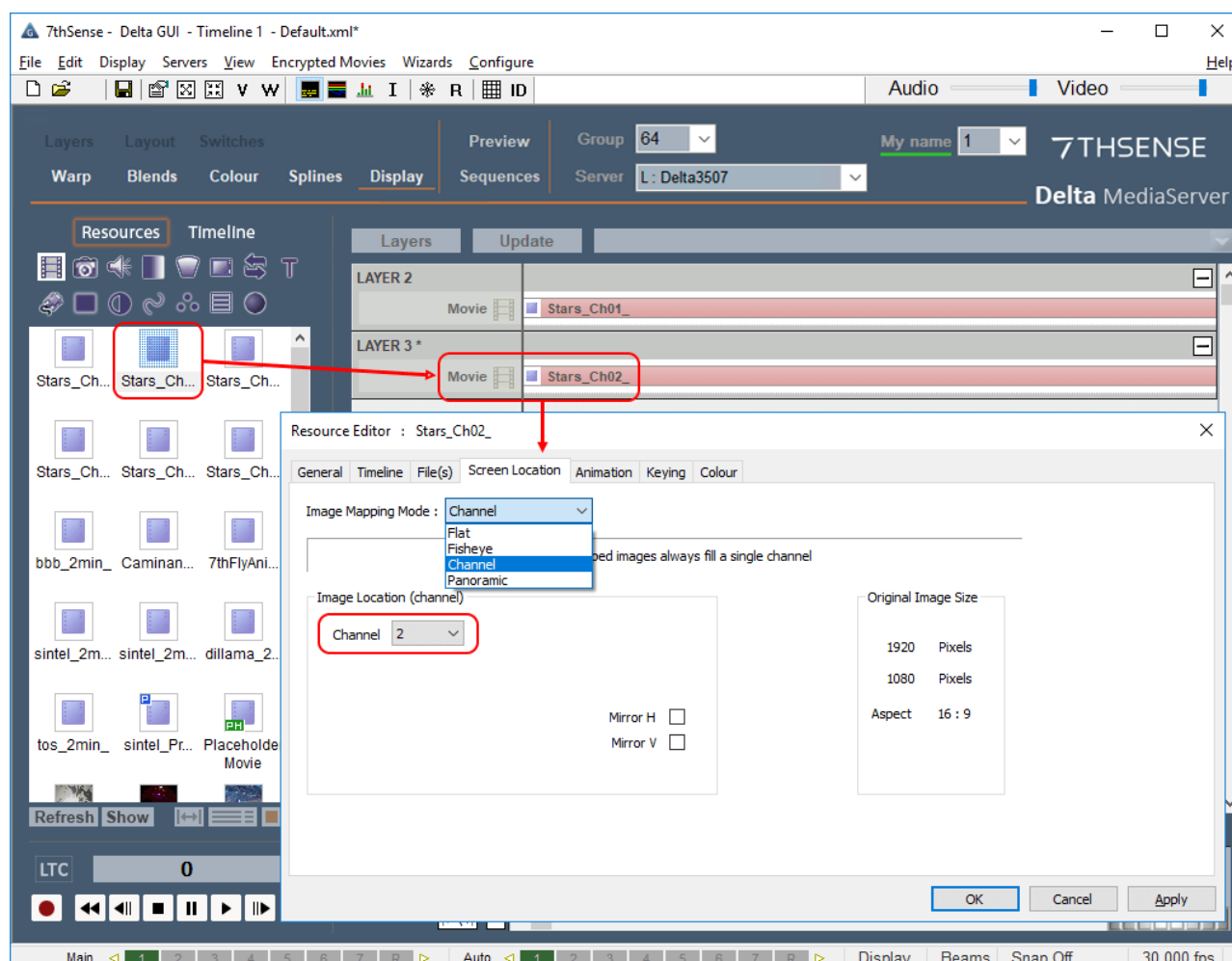
Distribute Carved Media to Correct Servers

Start a new show on each server, and copy the original show file settings across to each, so that **all channel settings** are available. (This is more efficient than setting up channels again manually on each server, and enables servers to be swapped in and out more easily if required.)

On each server, **activate only the channel(s) that it will use**, e.g. 1 & 2; 3 & 4; 5 & 6 – for 6 channels distributed among 3 servers – and check that the final channel settings are the same as from the server used for the manual alignment.

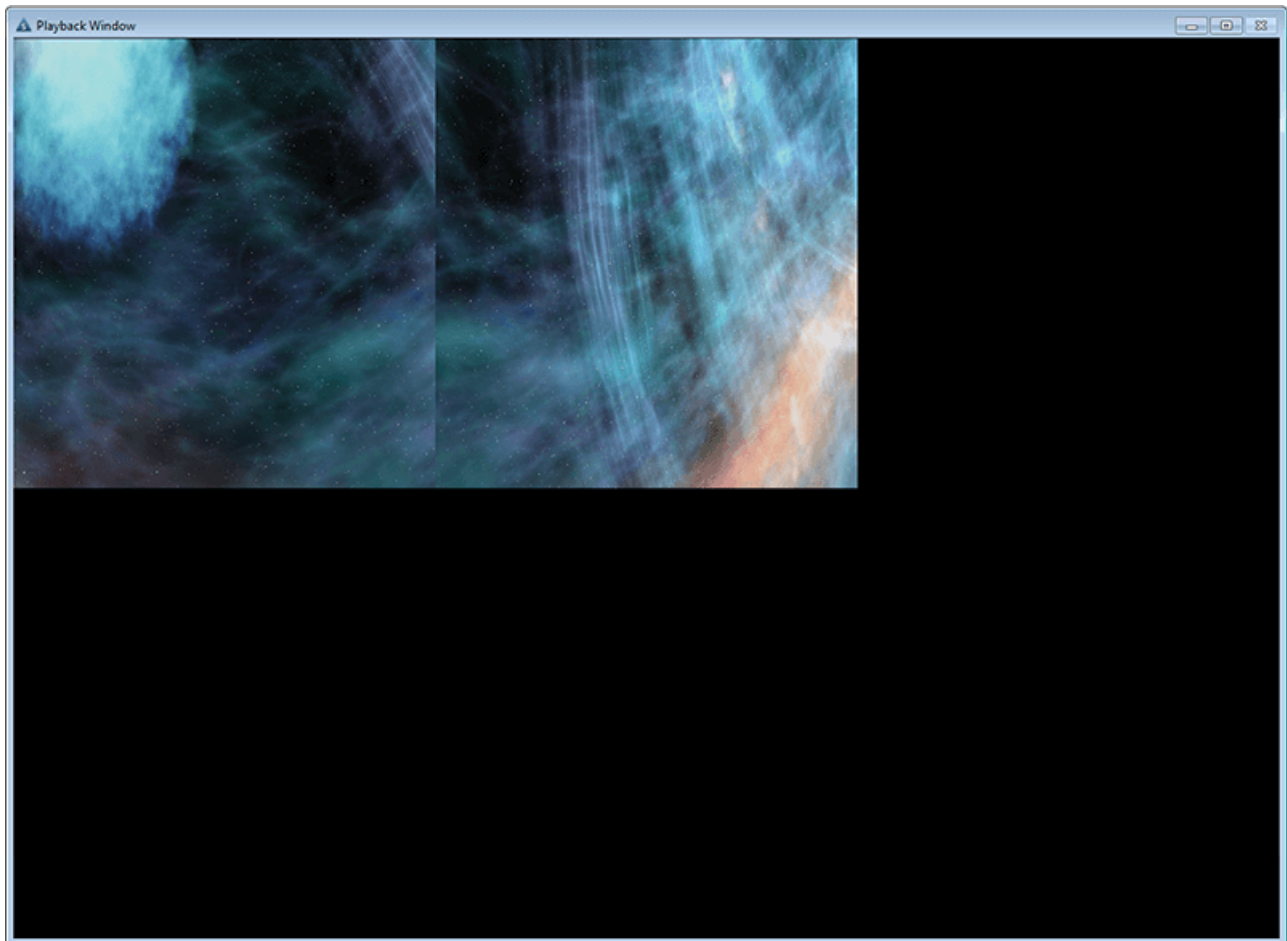
Each server only requires the carved media for the channels it controls. Copy the relevant folders **from the carving server** and refresh the resources in the **destination server** in DeltaGUI.

Drag the new, carved and channel-specific, movie resource(s) onto the timeline for each server, and access the media properties. Here is the server controlling channels 1 and 2:



In this example, media carved for channel 2 has been assigned Channel mapping mode (not fisheye now), and located in channel 2.

The Playback window will now show just these 2 channels in the correct position. Each other server maps its parts of the dome to display the whole, but now each server is only delivering a fraction of the original media volume.



Domes with Scalable Autoalignment

The process is mostly the same as for manually-aligned domes, but it is better to carve channel media from the servers that control them.

Scalable Display Manager, Leader server

- Run Scalable Display Manager as normal.
- Get all settings correct so the dome is mapped.
- In the *Perspective* menu, click 'Override Frustums' and add 5 degrees to all angles: up, down, left and right.
- Click 'Update Calibration'.

Carving media in Delta, for each server

- **Import** Auto-alignment frustums, geometry and blends into DeltaGUI.
- **Fisheye-map** the Leader media properties in the *Resource Editor > Screen Location* tab.
- **Disable** auto-alignment geometry (and blends) in DeltaGUI (*Preferences > Startup*), to just leave the over-scanned frustum data in the channel definitions (it will look very wrong on the dome!)
- **Record** out the timeline on each server to a new folder per channel, at the required resolution and format (on the E:\ Movie Drive) as described above for any [carving](#)¹²².

Reassemble carved media in DeltaGUI

Delete the fisheye media from the timeline (you may want to remove the original media as well, to save drive space).

Drag the newly-sliced carved media onto the timeline, then channel-map (*Resource Editor > Screen Location* tab) to match the frustums (separate eye channels, if 3D) as described [here](#)¹²⁴.

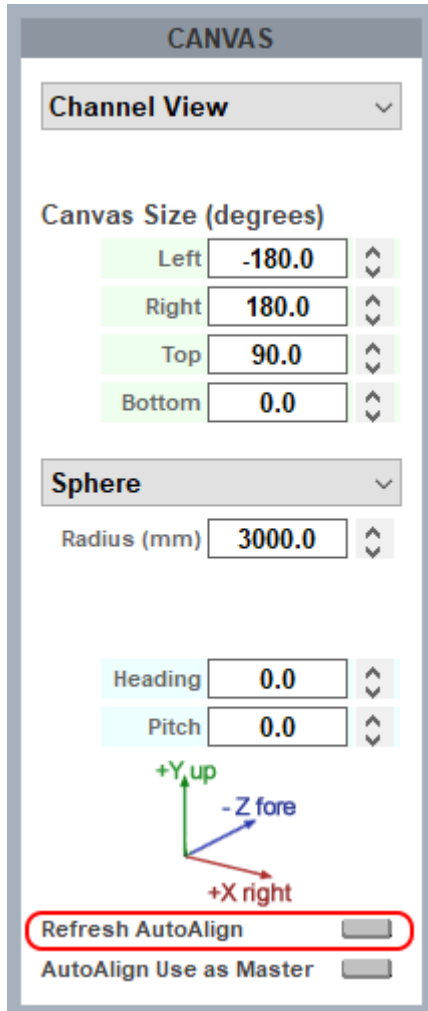
Re-enable 'Use Autoalignment' option in DeltaGUI (*Preferences > Startup*).

After subsequent realignments in Scalable

Next time you run Scalable, run as normal, but make sure that the 'Override Frustum' option remains ticked on the perspective page, and click 'Update Calibration' again to take into account the new camera location or projector movements (within the 10 degrees 'padding' that was added for overlap allowance).

Refresh in DeltaGUI

In *Display > Dome Mode*, refresh the AutoAlign in the Canvas panel:



Using Networked Movie Storage (NAS)

Using Networked Movie Storage (NAS)

It is possible to render frames in DeltaServer from a network SMB (Server Message Block protocol) storage share, rather than the local movie storage volume. DeltaServer cannot currently be pointed directly at the \\share style path to that share though, and even if you letter-mount that SMB path and set that as the movie drive in Delta, DeltaServer will still not correctly render the frames off that remote storage. Please see below instructions for the only known method for making that work.

Please also note that this approach is generally intended for **non-realtime** frame rendering, such as step-through preview, programming, or using the standard 'Record' tool to produce carves or show recording. Playing back movies in realtime at the high bandwidths typically utilised in DeltaServer, would require a very powerful and carefully-tuned NAS or SAN to guarantee high enough and consistent enough throughput for successful buffering. Please contact us at info@7thsense.one if realtime playback from network storage seems like the best approach for your application, and we will be happy to discuss it.

Using a symbolic link for a NAS

Delta requires a physical drive reference – mapped network drives will not show up in DeltaGUI. Here is how to address the NAS using a symbolic link (symlink).

Create a symbolic directory link on the server C:\ drive via the command prompt (right-click and run as administrator):

```
mklink /D C:\movies \\[NAS IP]\folder]
```

Example:

```
mklink /D C:\movies \\10.100.100.123\movies
```

meaning: 'create a symbolic directory link between destination and target' so that C:\movies becomes an advanced shortcut to the actual destination. For the NAS target path, use its IP (or host name) and the required folder.

The symbolic link acts as a redirect, so copying files and folders to C:\movies will place them instead on the NAS in the designated folder.

Note: The 'mklink /d C:\Movies' command will fail if a C:\Movies folder (or previously-created symbolic link) already exists at that 'C:\Movies' location. If so, before running mklink, you should delete that in Windows Explorer, or run this command to delete:

```
if exist "C:\Movies" rmdir "C:\Movies" /s /q
```

Protected SMB shares

If a NAS is password protected, the following command must be added:

```
net use [drive_letter]: \\[NAS IP]\folder] /user:[username] [password] /persistent=yes
```

BackPack Media Distribution

BackPack Media Distribution

BackPack is a DeltaGUI application, used in a networked server environment, to distribute files and folders to Delta Media Servers via the DeltaMonitor application resident on each server.

BackPack.exe can be found in C:\Program Files\7thSense\Delta\Utilities.

➤ For overall **server backup and restore**, see: [Stack Backup and Restore](#).

Main Menu

Config and Media settings are stored in an .xml file, so need not be saved for future use. The server filter being too dynamic, is not.

File

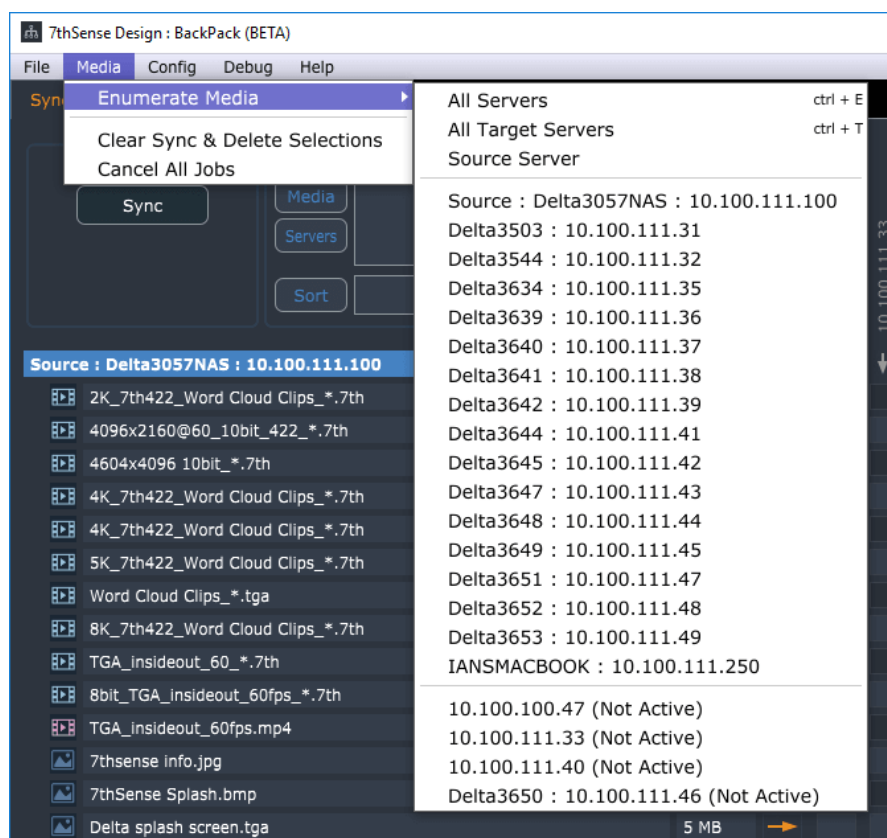
Quit

Quit BackPack (any pending jobs are lost, any In Progress jobs continue).

Media

Enumerate (Ctrl-E)

You can enumerate media on all servers or a single server. Note that this could take a long time if there are many files or folders. Pressing Ctrl+E at any time enumerates on all servers, as shown here:



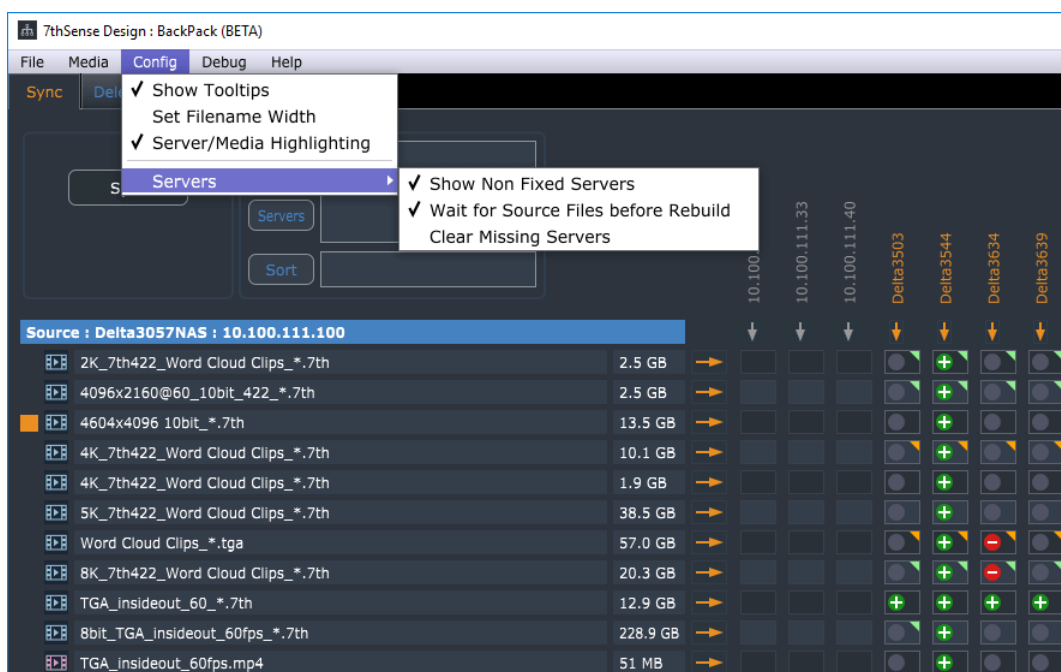
Clear Sync & Delete Selections

Clear all tick boxes / pending jobs on Sync and Delete pages.

Cancel All Jobs

Cancel all In-Progress jobs on all servers.

Config



Show Tooltips

Tooltips default is off: enable them here.

Set Filename Width

Set the width in pixels (default 350) of the filename area on the left for the source files.

Server/Media Highlighting

Adds a square orange marker to highlight the current (mouse-over) row when viewing lists of servers or of media.

Servers > Show Non Fixed Servers

Default off – show servers on the Sync page which are not in the Fixed Server List (as configured on the Config page).

Servers > Wait for Source Files before Rebuild

When you request *Media > Enumerate > All Servers*, if this option is ticked, the files / servers grid on the Sync page is not rebuilt until the Source server's files are sent back. This speeds up the redrawing of the grid of tick-buttons.

Servers > Clear Missing Servers

Hide missing or disabled servers from the Sync page.

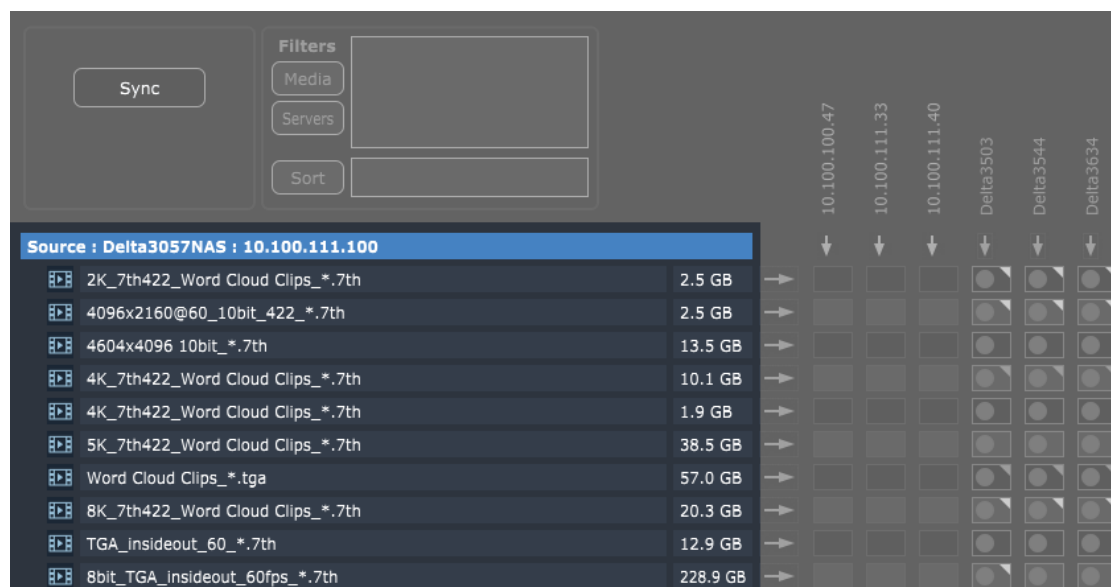
Help

About

Show the version information for BackPack.

Sync Page

A single Delta server is set as the Source server (or as a proxy to a network based source drive), with its movies, images, codec movies and audio shown in columns below:



- **Media Type** icon: Movie, Codec, Image or Audio.
- **Filename** (hover over here to see the full path to this file)
- **Media Size** (hover over here to see the actual number of bytes)

To the right are a series of columns, one for each server, with the server name shown vertically. The list of servers is sorted by name, with non-active servers shown in grey:

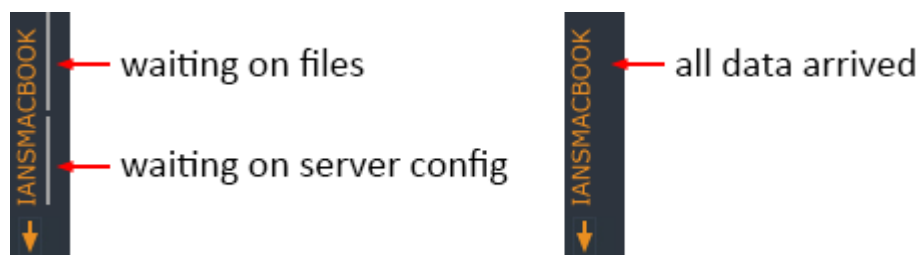


For each file / server location, there is an tick box / indication box to select.

Server Name

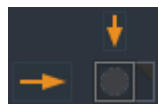
The server initially shows as the IP address only, then when the config data arrives, will change to the server's machine name. You can hover over the server name to see the IP Address.

While loading, there are 2 grey bars, the lower grey bar indicates waiting on the config data, the upper grey bar indicates waiting on the file list. As the specific data arrives, the lines will disappear.



Note that the **Waiting on Files** indicator bar will be shown again if you use **Media > Enumerate** until the fresh file list arrives, then it will disappear as before.

Toggle Rows / Columns



For each file row, there is a horizontal arrow button. This **selects the whole row** of tick boxes (active servers only) for this file. Also, Ctrl-Click the button to view the Copy / Delete / Clear dialog which will apply to the whole row.



When the cursor is over a row, the row is indicated with an orange row marker on the left (switchable from main menu: *Config > Server/Media Highlighting*).

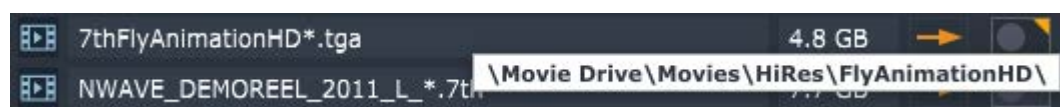
For each server column, there is a vertical arrow button. This **selects the whole column** of tick boxes (active servers only) for this server. Also, Ctrl-Click the button to view the Copy / Delete / Clear dialog which will apply to the whole column.

Other Areas

Source server name and IP Address shown:



Tooltip showing full path when hovering over filename:



Tooltip showing number of bytes when hovering over file size:



Hovering over a red disk error indicator shows the error:



Tick Box States



Unticked state & no file present (note that background colour of the tick box is alternated to you can follow rows along, there is no difference).



Non-active server: tick button is hidden.



Unticked state, with orange corner **Files Present** marker showing there are matching filenames present on this server, but not a match in bytes compared to the source server.



Unticked state, with green corner **Files Present** marker showing there are matching filenames present on this server, and a match in bytes compared to the source server.



Job Error state – hover over the red indicator to see the actual error.



Job Complete / Enumeration Pending state. Shows that the copy or delete action completed, to see the finished state, this server needs Enumeration.



Ticked / Copy Pending state.

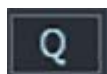


Ticked / Delete Pending state.



In Progress state with orange bar graph indicating percentage of job complete. Press this to cancel the job.

Note that all active copy processes (default is 8 in parallel) will complete before the cancel is acknowledged.



In queue. Indicates that progress on an actioned tickbox is not greater than 0%. Click to cancel.

Default Tick Actions

Ticking an unticked button will default to Delete Pending if there are any files present, or Copy Pending if there are no files present as shown on the corner Files Present indicator.

Unticking a ticked button will default to removing the Delete or Copy Pending state.

Select + Ctrl

Holding down Ctrl when clicking a grid tick button or row/column button offers a small dialog where you can choose to Copy, Delete or Clear, regardless of the state of the Files Present indicator.





This means you can choose to re-copy over existing media or finish the copy of partial movies, or Delete media which you know to be there, but which BackPack is not yet aware of. Note that to copy over existing files, on the Sync confirmation dialog, you need to choose **Overwrite Target Files**.

Sync Page: Using Copy/Delete


Once configured (see [Config Page](#)¹⁴⁸), servers will automatically populate until the server set as Source is found, at which point its files are shown in the left column, with file present indicators for each server / file tick box.

You can tick a single tick box or use the horizontal / vertical arrow buttons to select a whole row or column of tick boxes.

Ticking a tick box which has files present (orange or green corner indicator) adds the file on that server to the Delete list and shows the red-minus **Delete Pending** state: .

Ticking a tick box which has no files present (no corner indicator) adds the file on that server to the Copy list and shows the green-plus **Copy Pending** state: .

Press **Sync**. This pops up a confirmation dialog where you can see all the pending copy or delete jobs:


Confirm Copying & Deleting Media
 Press GO to start the copying and deleting of media.

Action	Size	Type	Target	Source
Copy	3GB	Movie	10.100.111.250\7thSense Data\Movies_F\2K_7th422_Word Cloud Clips\	10.100.111.100\7thSense Data\Movies_F\2K_7th422_Word Cloud Clips\
Copy	3GB	Movie	10.100.111.250\7thSense Data\Movies_F\4096x2160@60_10bit_422\	10.100.111.100\7thSense Data\Movies_F\4096x2160@60_10bit_422\
Copy	10GB	Movie	10.100.111.250\7thSense Data\Movies_F\4K_7th422_Word Cloud Clips\	10.100.111.100\7thSense Data\Movies_F\4K_7th422_Word Cloud Clips\
Copy	3GB	Movie	10.100.111.41\7thSense Data\Movies_E\2K_7th422_Word Cloud Clips\	10.100.111.100\7thSense Data\Movies_F\2K_7th422_Word Cloud Clips\
Copy	3GB	Movie	10.100.111.41\7thSense Data\Movies_E\4096x2160@60_10bit_422\	10.100.111.100\7thSense Data\Movies_F\4096x2160@60_10bit_422\
Copy	13GB	Movie	10.100.111.41\7thSense Data\Movies_E\4604x4096 10bit Test 2\	10.100.111.100\7thSense Data\Movies_F\4604x4096 10bit Test 2\
Copy	10GB	Movie	10.100.111.41\7thSense Data\Movies_E\4K_7th422_Word Cloud Clips\	10.100.111.100\7thSense Data\Movies_F\4K_7th422_Word Cloud Clips\
Copy	2GB	Movie	10.100.111.41\7thSense Data\Movies_E\4K_7th422_Word Cloud Clips\7th\	10.100.111.100\7thSense Data\Movies_F\4K_7th422_Word Cloud Clips\...
Copy	39GB	Movie	10.100.111.41\7thSense Data\Movies_E\5K_7th422_Word Cloud Clips\	10.100.111.100\7thSense Data\Movies_F\5K_7th422_Word Cloud Clips\
Copy	57GB	Movie	10.100.111.41\7thSense Data\Movies_E\8K_Targa_MiniClips\	10.100.111.100\7thSense Data\Movies_F\8K_Targa_MiniClips\
Copy	20GB	Movie	10.100.111.41\7thSense Data\Movies_E\8K_Word Cloud Clips_7th422\	10.100.111.100\7thSense Data\Movies_F\8K_Word Cloud Clips_7th422\
Copy	13GB	Movie	10.100.111.41\7thSense Data\Movies_E\TGA_insideout_60\	10.100.111.100\7thSense Data\Movies_F\TGA_insideout_60\
Copy	229GB	Movie	10.100.111.41\7thSense Data\Movies_E\TGA_insideout_60fps\	10.100.111.100\7thSense Data\Movies_F\TGA_insideout_60fps\
Covv	52MB	Codec	10.100.111.41\7thSense Data\Movies_E\TGA_insideout_60fps.mp4	10.100.111.100\7thSense Data\Movies_F\TGA_insideout_60fps.mp4

Server	Copy Size	Warnings
Delta3644 : 10.100.111.41	389GB	\7thSense Data\Movies_E : > 4237.3% Full of 120GB
IANSMACBOOK : 10.100.111.250	15GB	\7thSense Data\Movies_F : > 133.9% Full of 639GB

Copy Mode
 Merge Source With Target Files

Copy 33 file/folder(s), Delete 0 file/folder(s)

GO Clear List Cancel

In this dialog, all Copy jobs and all Delete jobs, with these columns:

Action

Copy or Delete

Size

File size, rounded to MB or GB

Type

The type of media

Target

The target server IP / Share / Path / Filename (if any) to copy or delete.

Source

The source server IP / Share / Path / Filename (if any) for a copy action.

Disk Space Warnings

Below this, any warnings will show (as illustrated above). This will show where there is insufficient space on the designated disk for a media item to be copied.

Note that proceeding with the copy is allowed, which may fill up the disk. Also note that the warning does not account for the size of any files in the queue which are to be deleted.

Copy Mode

Copy Mode is one of two types:

Merge Source with Target Files

Only copy files to the target which are not already there.

Overwrite Target Files

Copy all files even if they exist on the target.

Press **Clear List** to clear all tick boxes and remove all jobs from this dialog.

Press **GO** to start the copy & delete process, note there is no further check, **it starts immediately on pressing GO and there is no Undo**, though there is a cancel button for longer jobs.

You can **Cancel** the dialog at any time, jobs are left as they were, add or remove jobs by ticking the tick boxes and then press Sync to check the job list again.

Once the GO button is pressed, each job will change from the red or green tick box to the Q button. When the job starts copying, it will change to a blue cross with an orange bar graph indicator to the right. This will increment as the job progresses until the job is complete, then the blue cross button will disappear.


Note that jobs are done one at a time, with all others queued up, and quick jobs (single files or deletes) will complete quickly after starting, with no bar graph shown.

Note that after a copy or delete, the files present indicators are set to Pending Enumeration state, you would need to use the Media Menu – Enumerate (All Servers, or choose one) to ask that server to update its list of media and send to BackPack, at which time the files present indicators will be correct.

Delete and Sync Page: Filters

There may be many thousands of media assets and 40+ active servers all connected to BackPack, so filters are necessary to find the subset of interesting media / servers to work on.

Press the Media Filter button to show the media filter dialog.



Change Media Filters

Select the media filters below.

Minimum file size (e.g. 100KB or 12GB)

Maximum file size (e.g. 1GB or 3MB)

Path (e.g. green & blue)

Name (e.g. testmovie | testaudio)

Extension (e.g. 7th | jpg)

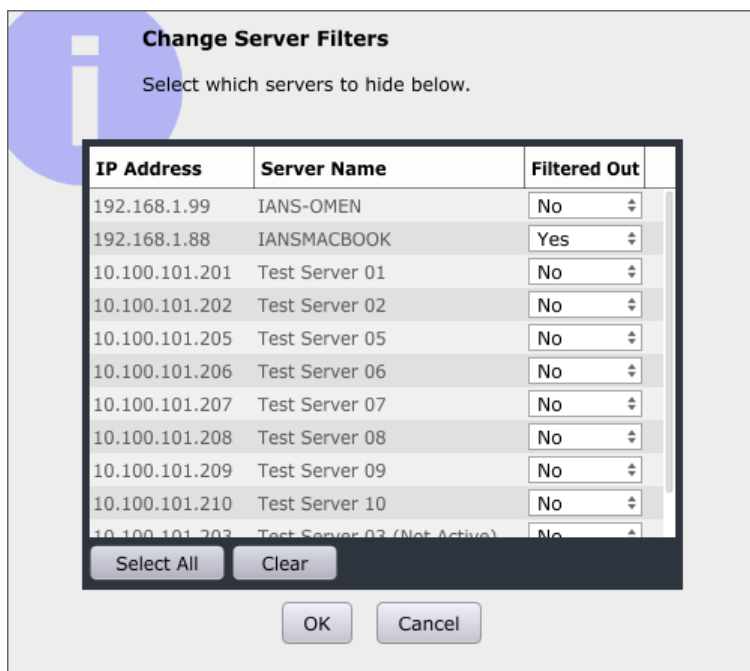
Media Type

Shares

Filter	Examples
Minimum File Size	100KB 1MB 12GB
Maximum File Size	3MB 10GB
Path	Green Green Blue Green & Blue
Name	TestMovie TestMovie TestAudio Test & Audio
Extension	7th TGA 7TH
Media Type	Movie, Codec, Image or Audio
Shares	Any of the Own Shares for the server

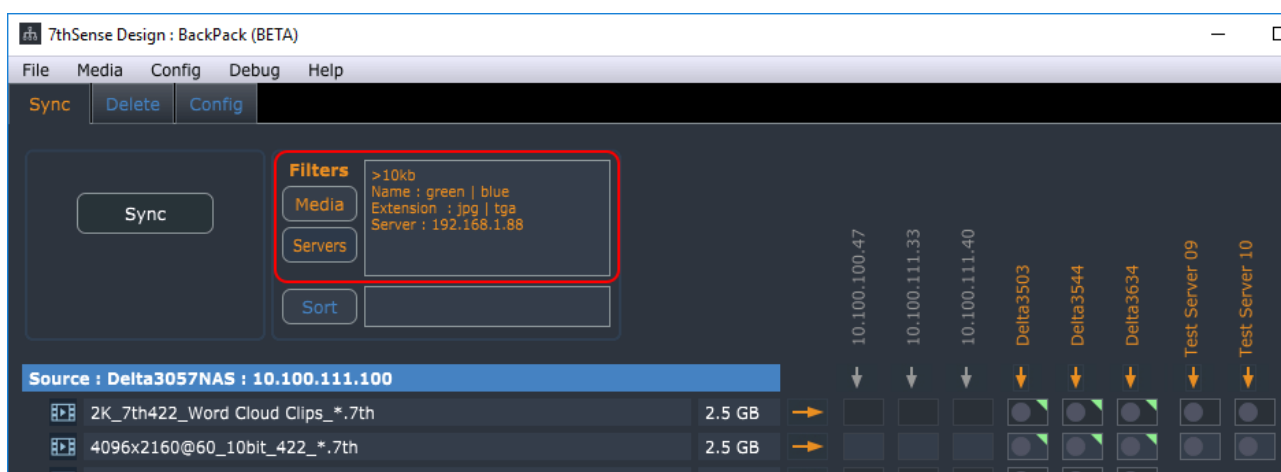
To clear filters, remove the text from the box and choose 'Any Media Type' / 'Any Share' drop-down selections. Pressing OK will apply these filters to the page and show only the subset of media matching the filter criteria.

Press the Server Filter button to show the server filter dialog. This shows a list of servers (active and non-active) and whether they are filtered out or not. To alter a single server, scroll it into view, then choose the Filtered-Out status. You can press Select All or Clear to select / deselect all.

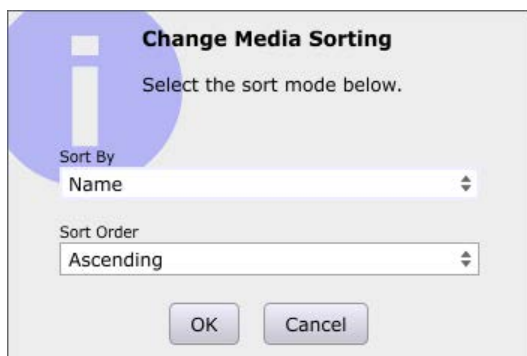


Press OK to apply the server filters and hide servers marked as Filtered Out.

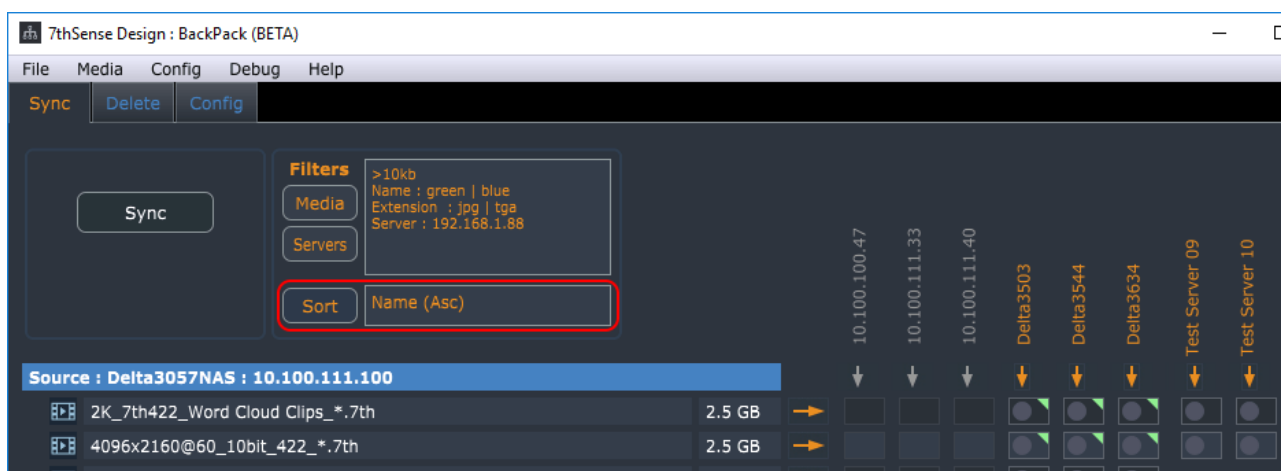
The active filters are shown in the filter box in orange when active:



Pressing the **Sort** button shows the Change Media Sorting dialog – you can choose to sort by Name, Path, Extension or Media Type, in Ascending or Descending order. Default sorting is by Path, Ascending:



The chosen Sort Mode (if any) is shown in orange in the sort box when active:



Delete Page

All servers can be previewed for available space by checking 'Show Summary':

The screenshot shows the 'Delete' page in the 7thSense Design Backpack (BETA) application. The interface includes a menu bar (File, Media, Config, Debug, Help) and a sub-menu (Sync, Delete, Config). A 'Delete' button is visible, along with a 'Show Summary' checkbox. A table of media assets is displayed, with columns for Source, Media Assets, and Free Space. The table is color-coded: purple for source servers, blue for no disk space alerts, orange for < 15% free space, dark red for < 5% free space, and bright red for < 1% free space.

Source	Media Assets	Free Space
Delta3057NAS : 10.100.111.100	30 Media Assets	(Free : 97%/21TB, 36%/118GB)
Delta3503 : 10.100.111.31	26 Media Assets	(Free : 90%/3TB, 70%/117GB)
Delta3544 : 10.100.111.32	24 Media Assets	(Free : 97%/3TB, 72%/117GB)
Delta3632 : 10.100.111.33	24 Media Assets	(Free : 98%/3TB, 72%/117GB)
Delta3634 : 10.100.111.35	25 Media Assets	(Free : 96%/3TB, 68%/117GB)
Delta3640 : 10.100.111.37	21 Media Assets	(Free : 98%/3TB, 72%/117GB)
Delta3641 : 10.100.111.38	25 Media Assets	(Free : 91%/3TB, 69%/117GB)
Delta3642 : 10.100.111.39	25 Media Assets	(Free : 91%/3TB, 69%/117GB)
Delta3643 : 10.100.111.40	24 Media Assets	(Free : 98%/3TB, 72%/117GB)
Delta3644 : 10.100.111.41	24 Media Assets	(Free : 8%/117GB)
Delta3647 : 10.100.111.43	24 Media Assets	(Free : 98%/3TB, 70%/117GB)
Delta3648 : 10.100.111.44	24 Media Assets	(Free : 98%/3TB, 69%/117GB)
Delta3649 : 10.100.111.45	25 Media Assets	(Free : 91%/3TB, 70%/117GB)
Delta3651 : 10.100.111.47	21 Media Assets	(Free : 92%/3TB, 68%/117GB)
Delta3652 : 10.100.111.48	66 Media Assets	(Free : 2%/639GB)
Delta3653 : 10.100.111.49	62 Media Assets	(Free : 1%/624GB)
10.100.100.47 (Not Active)	0 Media Assets	
10.100.111.36 (Not Active)	0 Media Assets	
10.100.111.42 (Not Active)	0 Media Assets	
Delta3650 : 10.100.111.46 (Not Active)	21 Media Assets	

Colour key

Purple: Source server

Blue: no disk space alerts

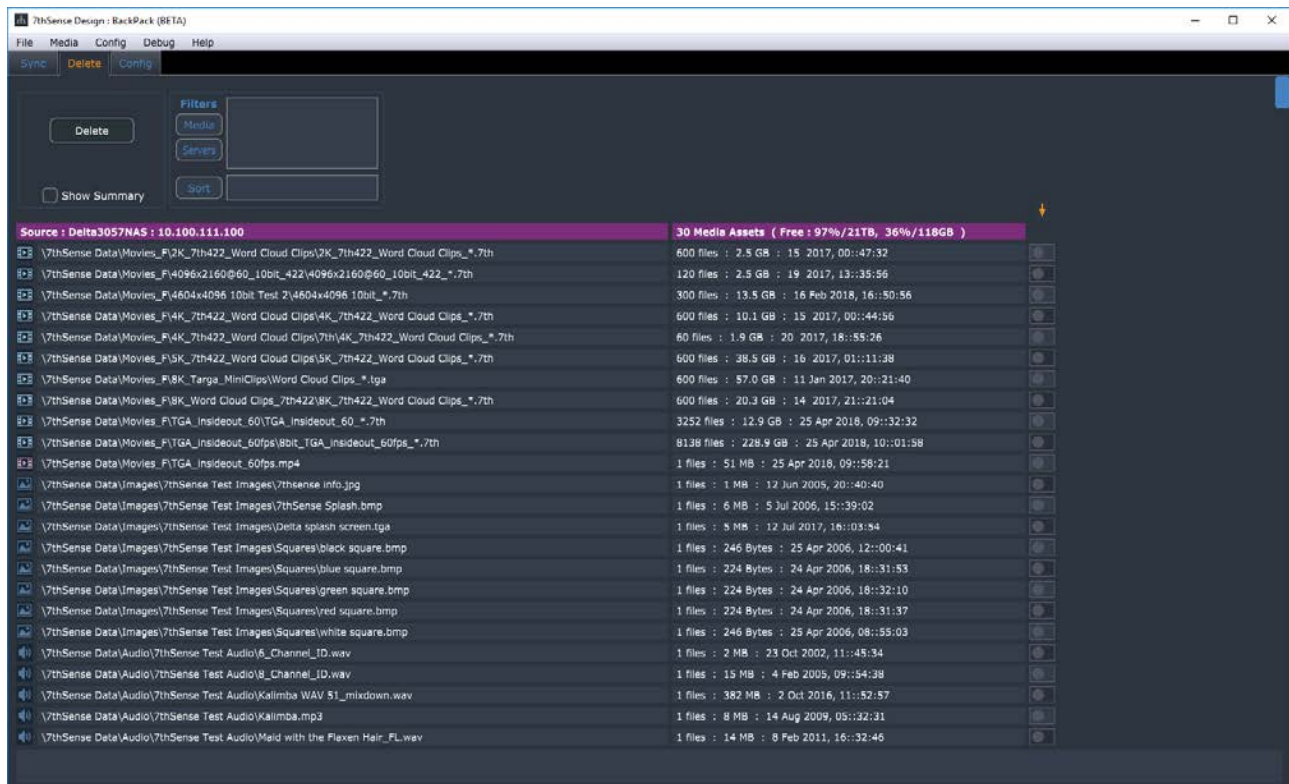
Orange: < 15% free space

Dark red: < 5% free space

Bright red: < 1% free space

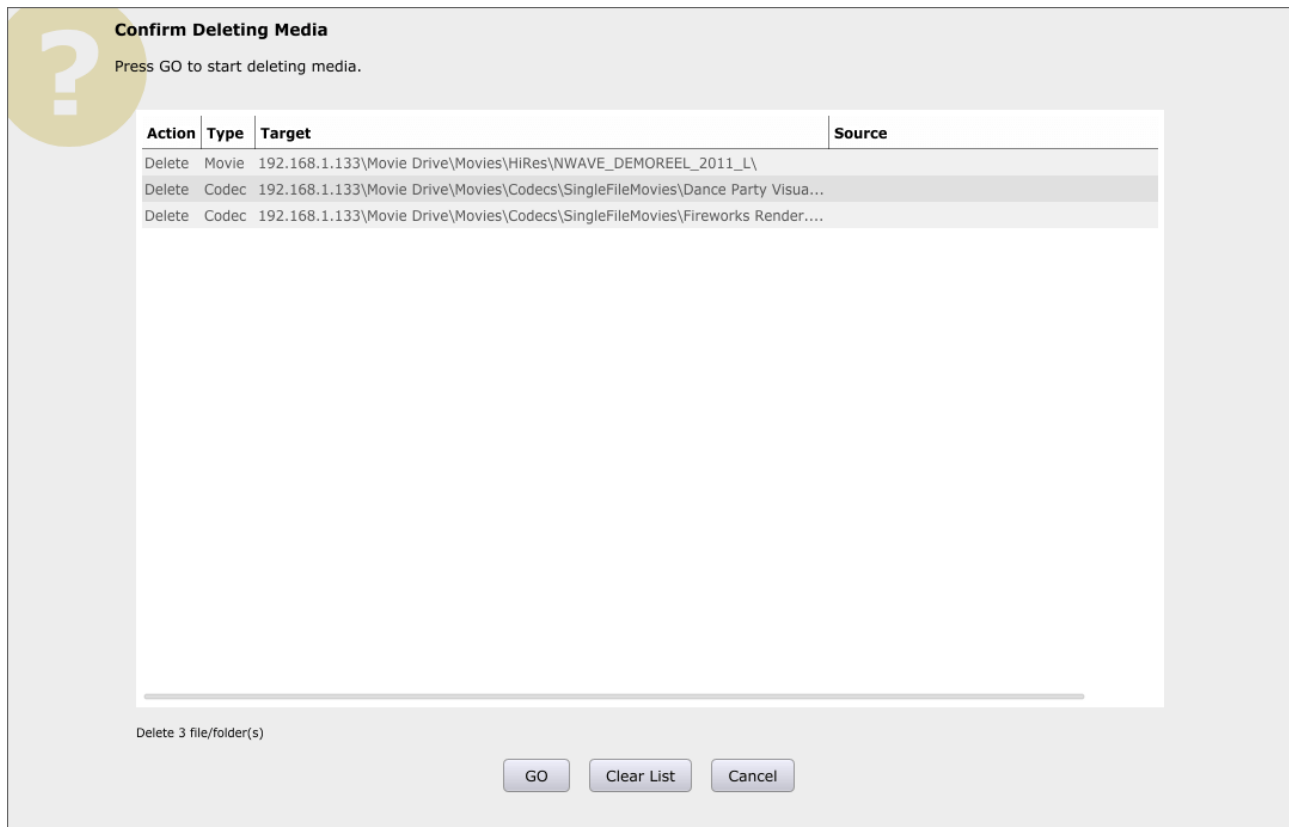
This page shows all media for a selected server in a single list, with the server name and IP Address shown in the purple bar, and its media listed below.

For each piece of media, the full path and filename is shown, then the number of files (movies have multiple), then the file size and file date of the first file found in that folder:



You can apply filters and sorting as before to show a subset of media in the desired order.

Ticking a tick box beside the filename adds it to the Delete list, and when you press the Delete button, the confirmation dialog is shown as below.



Press Go to start the delete process, Clear List to remove all ticked items and cancel to hide the dialog.

Note: there is no further check after pressing GO.

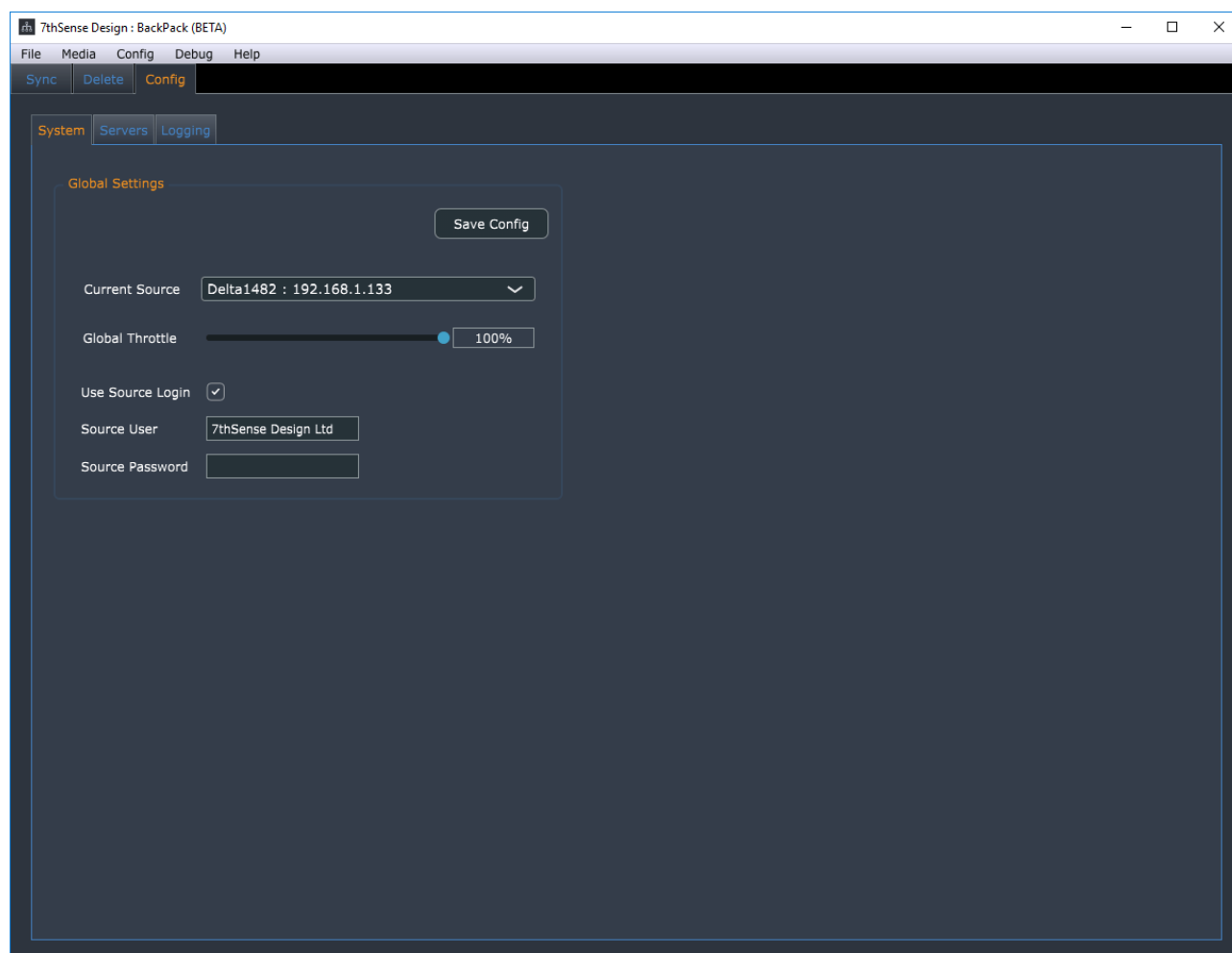
Config Page: Systems

On the *Config > System* page, use the Current Source dropdown to select the source server. Once you press Save Config, the selected server is set as Source, all other servers are set as Targets, then the config is sent down to all connected servers and stored in Config.xml, which is found in \Program Files\7thSense\Delta\System.

On this page, you can set the global throttle from 1 to 100%. After clicking Save Config, the new global throttle is set (and saved in Config.xml) on all servers. This works with the local server throttle value, to set the overall rate at which media is downloaded to that server.

You can also set whether a target server will use a username and password to login to the Source server. This global setting can be on or off, and you can set the username and password. In the example below, the username is '7thSense Design Ltd', with no password, which is the default.

Note: These 4 characters cannot be used in share passwords: * | ? :



Config: Servers Tab

There are two tables, one a **Fixed Server List** and the other a **Non-Fixed Server List**.

A server in the **Fixed** table will be shown in the Sync/Delete pages whether it has connected or not (it is greyed out until connected). This allows you to have a known set of servers in the list even if they have not yet appeared.

All other servers not in the Fixed table will be shown in the **Non-Fixed** table as they come online – you can move them into the fixed list as required, by selecting them in the Non-Fixed table, then clicking **Add to Fixed List** (above the table). You can remove a fixed server from that list by selecting it and clicking **Remove** (above the table).

Click **Add Manually** to add any IP address to the Fixed list.

Fixed Server List

Mode	IP Address	Server Name	Media Source	MB/s	Shares
Target	10.100.111.31	Delta3503	10.100.111.31	100	Movie\7thSense Data\Movies
Target	10.100.111.32	Delta3544	10.100.111.32	100	Movie\7thSense Data\Movies
Target	10.100.111.33	Delta3632	10.100.111.33	100	Movie\7thSense Data\Movies
Target	10.100.111.35	Delta3634	10.100.111.35	100	Movie\7thSense Data\Movies
Target	10.100.111.40	Delta3643	10.100.111.40	100	Movie\7thSense Data\Movies
Target	10.100.111.41	Delta3644	10.100.111.41	100	Movie\7thSense Data\Movies
Target	10.100.111.43	Delta3647	10.100.111.43	100	Movie\7thSense Data\Movies
Target	10.100.111.44	Delta3648	10.100.111.44	100	Movie\7thSense Data\Movies
Target	10.100.111.45	Delta3649	10.100.111.45	100	Movie\7thSense Data\Movies
Target	10.100.111.46	Delta3650	10.100.111.46	500	Movie\7thSense Data\Movies
Target	10.100.111.47	Delta3651	10.100.111.47	100	Movie\7thSense Data\Movies
Target	10.100.111.48	Delta3652	10.100.111.48	100	Movie\7thSense Data\Movies
Target	10.100.111.49	Delta3653	10.100.111.49	100	Movie\7thSense Data\Movies
Source	10.100.111.100	Delta3057NAS	10.100.111.100	1000	Movie\7thSense Data\Movies
*Missing	10.100.100.47			No Limit	
*Missing	10.100.111.36			No Limit	
*Missing	10.100.111.37	Delta3640	10.100.111.37	100	Movie\7thSense Data\Movies
*Missing	10.100.111.38	Delta3641	10.100.111.38	100	Movie\7thSense Data\Movies
*Missing	10.100.111.39	Delta3642	10.100.111.39	100	Movie\7thSense Data\Movies
*Missing	10.100.111.42			No Limit	

Non-Fixed Servers List

Mode	IP Address	Server Name	Media Source	MB/s	Shares
Target	10.100.111.250	IANSMACBOOK	10.100.111.250	100	Movie\7thSense Data\Movies

Delta3057NAS : 10.100.111.100 Shares

Type	Own Share	Source Share Alias
Movie	7thSense Data\Movies_F	
Codec	7thSense Data\Movies_F	
Image	7thSense Data\Images	
Audio	7thSense Data\Audio	

Delta3057NAS : 10.100.111.100 Share Info (Media - Enumerate to refresh)

Own Share	Total GB	Free GB	Free %	Sector Bytes	Error
7thSense Data\Movies_F	21460.4	20729.4	97%	512	OK
7thSense Data\Movies_F	21460.4	20729.4	97%	512	OK
7thSense Data\Images	117.5	42.0	36%	512	OK
7thSense Data\Audio	117.5	42.0	36%	512	OK

Once you press **Save Config**, the Fixed List of servers will be saved to all servers (Config.XML), but this list is only read from the Source server once it arrives.

In the table, the Media Source IP and MB/s (local server throttle) can be set for each server by clicking in the MB/s box and editing its value.

Note that the Fixed List comes only from the Source server, so the Sync grid of tick boxes will not show until the source server arrives. To see Non-Fixed servers any time, choose *Menu >*

Config > Servers > Show Non Fixed Servers.

Media Source

A Source server will usually have the Media Source set to its own IP so that it finds media assets on itself. However, to use a server as a **Proxy** to another server (or some other SAN / NAS), enter the remote Media Source for that server. This can be an IP Address (10.0.1.223) or a DNS Name (MyNAS), but bear in mind the network infrastructure must resolve the DNS Name to an IP for this to work.

When a different Media Source to the server's own IP is set, that server will show:

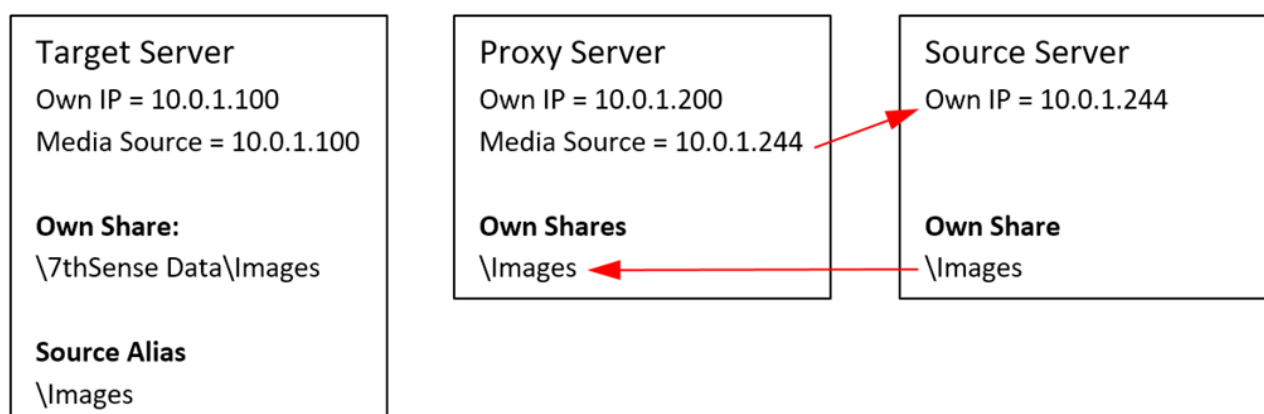
Server Name : Own IP Address (Src=Source IP Address).

examples:

10.0.1.200 : Delta Nano1 (Src=10.0.1.244)

10.0.1.200 : Delta Nano1 (Src=MyNAS)

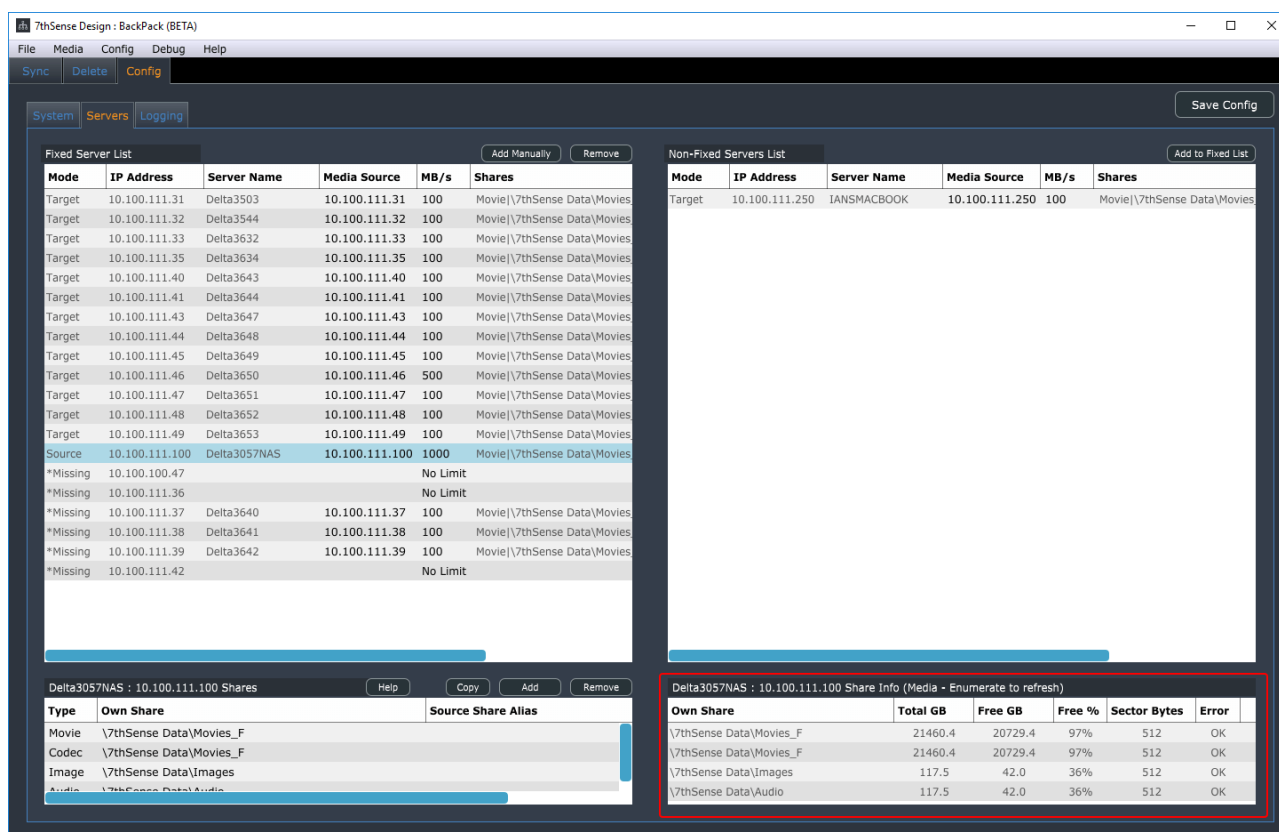
When a server is used as a proxy, it will ignore its own media assets and enumerate from the Source IP server, so this server must be active when DeltaMonitor starts or is asked to Enumerate from BackPack's Media menu. The Own Shares as described below should be set to shares that exist on the Source IP server, as shares on the proxy server will be ignored.



See below for Share Aliases.

Shares

By clicking on any of the servers in the Fixed or Non-Fixed server lists, the Shares table is shown as below.



Share Information Panel

This panel displays the free disk space, sector bytes and any Windows System Error Codes (see [Microsoft: System Error Codes](#)). Example: error 53 means network path not found, error 54 means network busy. Note that for a share which is not there, inaccessible or spelled wrong in BackPack, it will likely return one of a few different error codes, but they all indicate the same thing, that it can't access the share.

This share information is updated when you Save Config, when the server first arrives, and after an enumeration of that server.

When DeltaMonitor starts, it enumerates (gathers a list) of media as found in the Share list, so for example, on the 192.168.1.133 server, Media is arranged via Window Shares named like this:

\\192.168.1.133\Movie Drive\Movies\Common	(Movie media)
\\192.168.1.133\Movie Drive\Movies\Codecs	(Codec media)
\\192.168.1.133\Images	(Image media)
\\192.168.1.133\Audio	(Audio media)

When this server starts up, it works through these shares and finds relevant media types, then keeps this is a list until BackPack requests it.

Note that the shares are entered by hand as below, so they must exist on the server for this to function. You can check by using Windows Explorer with the IP Address / Share to see if it

exists. If you get no media or missing media, try *Menu > Media > Enumerate* (choose server), also check the share exists and can be accessed without logging in with a username / password.

Add

Adds a share at the end (or after a selected share), then edit the media type and share location

Remove

Removes the selected share

Copy

Copy shares from another server.

This is only saved to servers after pressing **Save Config**.

Source Share Alias

If all servers share the same path structure, then comparing and copying / deleting files would work without any aliases. However, it is common for differently configured devices to have a partially different path structure so that it makes sense on the device. Aliases allow the target server file / folder to be compared to the source server file / folder even if they have different share structures.

Example with identical structure (no alias required)

Source Server	Source Share	Source File	Target Server	Target Share	Target File
192.168.1.100	\Movies\Common	Animate_*.7TH	192.168.1.88	\Movies\Common	Animate_*.7TH
192.168.1.100	\Images	Colours\Blue.jpg	192.168.1.88	\Images	Colours\Blue.jpg
192.168.1.100	\Audio	Mp3s\loud.mp3	192.168.1.88	\Audio	Mp3s\loud.mp3

Since the source and target shares match identically, the command to copy source onto target will work without any aliases in the share.

Example with different structure (alias required)

Source Server	Source Share	Source File	Target Server	Target Share	Target File
192.168.1.100	\Movies\Common	Animate_*.7TH	192.168.1.88	\Movies_E\Common	Animate_*.7TH
192.168.1.100	\Images	Colours\Blue.jpg	192.168.1.88	\7thSense Data\Images	Colours\Blue.jpg
192.168.1.100	\Audio	Mp3s\loud.mp3	192.168.1.88	\7thSense Data\ Audio	Mp3s\loud.mp3

Since the source and target shares do not match, but these files are the same, we need to tell BackPack and the server about the differences. This is done by entering a Source Share Alias for each share on the Target (non-Source) servers:

Source Server 192.168.1.100 (note no Source Share alias required for Source server)

Media	Own Share	Source Share Alias
Movie	\\Movies\\Common	
Image	\\Images ↘	
Audio	\\Audio	

Target Server 192.168.1.88

Media	Own Share	Source Share Alias
Movie	\\Movies_E\\Common	\\Movies\\Common
Image	\\7thSense Data\\Images	↖ \\Images
Audio	\\7thSense Data\\ Audio	\\Audio

So now, the target server will enumerate its own media from its own shares and BackPack compares against the source in its different shares:

Target


\\192.168.1.88\\Movies_E\\Common\\Animate_*.7TH
 \\192.168.1.88\\7thSense Data\\Images\\Colours\\Blue.jpg
 \\192.168.1.88\\7thSense Data\\Audio\\Mp3s\\loud.mp3

Source

= \\192.168.1.100\\Movies\\Common\\Animate_*.7TH
 = \\192.168.1.100\\Images\\Colours\\Blue.jpg
 = \\192.168.1.100\\Audio\\Mp3s\\loud.mp3

Note that if the Source Share Alias is not correct or missing, the comparison for identifying if files are present or not will fail and any Copy or Delete job will fail, since the source location will not match the shares on the Source server.

In a system with one Source server (with different share structure to the Target servers) & multiple Target servers (all the same), set the Source servers shares, then a single Target server's shares and aliases and use the **Copy** dialog to copy to a Target server:


Copy Shares
 Press GO to copy shares from the selected server.

Type	Own Share	Source Share Alias
Movie	\Movies\HiRes	\Movie Drive\Movies\HiRes
Movie	\7thSense Data\Movies\FullRes	\FullRes
Movie	\7thSense Data\Movies\Proxy	\Proxy
Movie	\7thSense Data\Movies\Common	\Common
Codec	\7thSense Data\Movies\Codecs	\Codecs
Image	\Images	
Audio	\Audio	

Server to Copy To : Delta1482 : 192.168.1.133
 Server to Copy From : IANS-OMEN : 192.168.1.99

Note - press Save Config to save all changes to servers.

GO
 Cancel

All shares and share aliases are stored locally on each server in Config.XML after you press Save Config.

RAID7th

For Delta servers configured with a 7thSense-specific RAID7th drive configuration, movie files within a single source folder are distributed on multiple separated drives within the server. These are not accessible via a network share as normal, but by using a special placeholder within the share name to indicate that files should be stored according to the RAID7th algorithm.

In order to configure RAID7th on a specific share, use the following {RAID7TH} syntax for the Own Share on the server which has been configured for RAID7th (using the Delta GUI). Note you have to restart Delta Monitor after making any changes to the RAID7th drive configuration in Delta GUI.

Example share mapping for RAID7th:

Own Share:
 \{RAID7TH}\Movies

Source Share Alias:
 \Movies

Delta1482 : 192.168.1.133 Shares			Help	Copy	Add	Remove
Type	Own Share	Source Share Alias				
Movie	\\{RAID7TH}\\Movies	\\Movies				
Audio	\\Audio	\\Audio				
Image	\\Images	\\Images				

Note that if you omit the {RAID7TH} placeholder, BackPack will attempt to use a normal Windows share to copy into, and if you omit a matching Source Share Alias, this is an incorrect configuration and all files will be copied into a single folder, instead of using the RAID7th algorithm. Compare how RAID7th disks are displayed for a server, with the RAID7th drive letters rather than drive shares:

7thSense Design : BackPack (BETA)

FileMediaConfigDebugHelp

SyncDeleteConfig

SystemServersLogging

Save Config

Fixed Server List

Add ManuallyRemove

Mode	IP Address	Server Name	Media Source	MB/s	Shares
Target	10.100.111.31	Delta3503	10.100.111.31	100	Movie\\7thSense Data\\Movies
Target	10.100.111.32	Delta3544	10.100.111.32	100	Movie\\7thSense Data\\Movies
Target	10.100.111.33	Delta3632	10.100.111.33	100	Movie\\7thSense Data\\Movies
Target	10.100.111.35	Delta3634	10.100.111.35	100	Movie\\7thSense Data\\Movies
Target	10.100.111.40	Delta3643	10.100.111.38	100	Movie\\7thSense Data\\Movies
Target	10.100.111.40	Delta3643	10.100.111.39	100	Movie\\7thSense Data\\Movies
Target	10.100.111.43	Delta3647	10.100.111.41	100	Movie\\7thSense Data\\Movies
Target	10.100.111.44	Delta3648	10.100.111.43	100	Movie\\7thSense Data\\Movies
Target	10.100.111.45	Delta3649	10.100.111.44	100	Movie\\7thSense Data\\Movies
Target	10.100.111.46	Delta3650	10.100.111.45	100	Movie\\7thSense Data\\Movies
Target	10.100.111.47	Delta3651	10.100.111.46	500	Movie\\7thSense Data\\Movies
Target	10.100.111.48	Delta3652	10.100.111.47	100	Movie\\7thSense Data\\Movies
Target	10.100.111.49	Delta3653	10.100.111.48	100	Movie\\7thSense Data\\Movies
Target	10.100.111.49	Delta3653	10.100.111.49	100	Movie\\7thSense Data\\Movies
*Missing	10.100.100.47		10.100.111.100	1000	
*Missing	10.100.111.36			No Limit	
*Missing	10.100.111.37	Delta3640		No Limit	Movie\\7thSense Data\\Movies
*Missing	10.100.111.38	Delta3641	10.100.111.37	100	Movie\\7thSense Data\\Movies
*Missing	10.100.111.39	Delta3642	10.100.111.40	100	Movie\\7thSense Data\\Movies
*Missing	10.100.111.42			No Limit	

IANSMACBOOK : 10.100.111.250 Shares

HelpCopyAddRemove

Type	Own Share	Source Share Alias
Movie	\\{RAID7TH}\\Movies	\\Movies
Codec	\\7thSense Data\\Movies\\Codecs	\\Movies
Image	\\7thSense Data\\Images	\\Images
Audio	\\Audio	\\Audio

Non-Fixed Servers List

Add to Fixed List

Mode	IP Address	Server Name	Media Source	MB/s	Shares
Target	10.100.111.250	IANSMACBOOK	10.100.111.250	100	Movie\\{RAID7TH}\\Movies\\M

IANSMACBOOK : 10.100.111.250 Share Info (Media - Enumerate to refresh)

Own Share	Total GB	Free GB	Free %	Sector Bytes	Error
RAID7TH0~O	624.1	9.3	1%	512	OK
RAID7TH0~P	624.1	9.3	1%	512	OK
RAID7TH0~Q	624.1	9.3	1%	512	OK
RAID7TH0~R	624.1	9.3	1%	512	OK

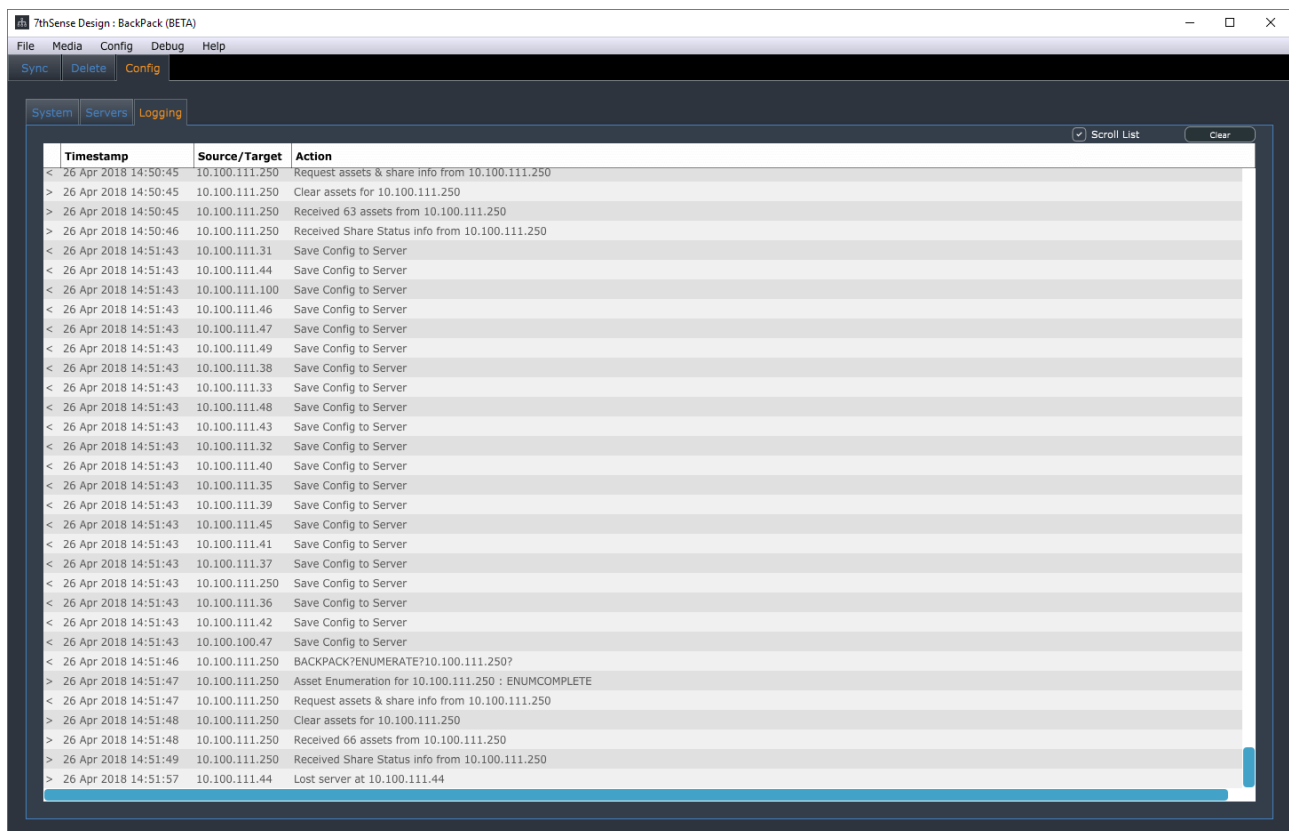
RAID7th is only applicable to sequential Movie resources, so images, audio or codec movies should not be configured for RAID7th.

Config: Logging Tab

The log table shows log entries for servers arriving, enumerating, disappearing and job status as it arrives.

Clear will clear the list.

Scroll List (if checked) will scroll the list to the most recent entry.



Communication

DeltaMonitor will by default bind to any available IP/NIC on the server, but with multi-NIC setups, this may be undesirable. In order to force DeltaMonitor to bind to a specific NIC, first configure the NIC with the required IP address, then edit the C:

\Program Files\7thSense\Delta\System\BackPack.xml to have the UDP_BindIP field as that IP address.

```
<UDP_BindIP>10.0.1.123</UDP_BindIP>
```

You can also force this and other related comms parameters by using a comms.ini file, which should be located in the same folder as DeltaMonitor.exe (\Delta\Utilities). Note that settings in comms.ini override anything in BackPack.xml.

Sample comms.ini file

```
[UDP Discovery]
UDP port=9999
UDP Binding IP=10.0.1.123
UDP Broadcast interval=100
[ZMQ]
Port number=5553
Connection timeout=2000
ping connected time=1000
heartbeat check time=50
poll timeout=300
```

BackPack will find DeltaMonitor on any available NIC.

Bind IP / Media Source IP and Separating Networks

In complex setups, a faster network is used for the media transfer and a slower control network is used for communication between BackPack and DeltaMonitor. This requires multiple NICs in each server and the network setup so BackPack can see the control network.

Server Role	Own Bind IP (DeltaMonitor)	Media Source IP
	Slow 1GB network	Fast 10G network
Source (using a Proxy)	192.168.55.100	192.168.99.10 (separate NAS)
Target	192.168.55.101	192.168.99.101 (self)
Target	192.168.55.102	192.168.99.102 (self)

In this example, all servers have 2 x NICs, and each Target server views and copies files over the 10G (192.168.99.x) network, but it communicates to BackPack over the 1G (192.168.55.x) network, keeping control and media separate. The Source is setup as a source proxy, viewing a NAS on 10G at 192.168.99.10.

General Notes

Throttles should be set so that the network is not saturated with traffic – if it is saturated, there is a possibility that BackPack will temporarily lose connection to servers (in progress jobs are unaffected). Using separate networks as above can help with this.

The Source server (or NAS via a proxy server) needs to allow many simultaneous network connections, since asking 30 servers to copy media will result in at least 30 parallel connections to the Source IP. Note that Windows 7 and 10 Professional are limited to 20 parallel SMB connections, Windows Server is unlimited.

Document Information

Document Information

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July 2017	1	DFM 2.4.10, CPS 1.0, 7thMovieViewer 1.0.6	New release	Andie Davidson
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