



Stitching Media in Vantage



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Note: This guide is written for video professionals who are familiar with using Vantage. To implement applications in Vantage, you should know how to create workflows and submit jobs. If you aren't familiar with Vantage, we suggest that you review the *Vantage User's Guide* and *Vantage Domain Management Guide* as needed.



Synopsis

Stitching media in Vantage is an easy way to process multiple, sequential input files in a workflow which produces a single output file—effectively, *stitching* them together.

Stitching is ideal for combining short clips, removing black sections, extracting sub-clips, stitching program segments together, or adding sponsorship (or black frames) in the middle of a clip. You can also use stitching for adding bumpers or trailers (or both), without resorting to a non-linear editor (NLE). A typical application is to create a thirty-minute program with a bumper, three segments with ads and a trailer, and submitting them to a workflow that combines them to produce an MPEG-2 production output file.

Vantage provides two methods of stitching files. To stitch interactively, you use Workflow Portal, a Vantage client application that allows operators to select media (and optionally trim it) and submit an automatically-generated EDL for processing. Interactive stitching enables an operator to review each clip and optionally select mark-in and mark-out points, creating a list of media segments which is stitched together and then encoded in the same or different format, in a single, automated job process.

Note: Workflow Portal is an optional, licensed feature. To use Workflow Portal requires a Transcode Connect or Transcode Pro Connect license. Stitching during an encode using an EDL file requires Vantage Transcode or Transcode Pro.

To stitch files automatically, you create and submit an EDL file to a fully-automated stitching workflow. Examples of both methods (each of which utilize the same, specially-formatted XML file known as a *TSEDL* file) are presented in this app note.

Stitching is performed during transcoding. Vantage supports video re-wrapping (direct convert) and transcoding; both performed via a Flip action in your workflow. (Audio is not direct converted; it is always decoded and re-encoded for normalization and fade.)

When direct converting, Vantage doesn't decode the source video. Instead, it passes the frames directly to the output file. With long-GOP media, Vantage creates new GOPs if original GOPs are broken. Otherwise, the original video essences are stitched without re-encoding. This is an extremely fast operation, and doesn't degrade video quality. To accomplish this, the Flip action is configured with a Direct Convert profile for the format being encoded. For example, three SD MPEG-2 files can be stitched with their original video essences entirely preserved, with new frames encoded only at stitch points as needed to repair broken GOPs, into a new SD MPEG-2 file.

Alternatively, Vantage can stitch input files together while encoding the video into a different format, in the same workflow. This allows you to encode the segments into any format supported by Vantage, as configured in the workflow's Flip action. For example, three SD MPEG-2 files can be stitched, and the media then re-encoded as a Windows Media file, or an MXF file.

Note: This app note assumes that you know how to create and configure workflows in Vantage and that you know how to submit jobs. If you don't know how to configure workflows or manually submit jobs, review the Vantage User's Guide for details.

Supported Formats for Stitching

Vantage supports stitching of files in the following formats.

Container	Video Essence	Audio Essence
MPEG2 Program Stream	MPEG-2	PCM/LPCM/MPEG-2 Layer 1
VOD/MPEG2 Transport Stream	MPEG-2	PCM/MPEG-2 Layer 1/Dolby E
MXF OP1A	MPEG-2(SD & HD, I-Frame and Long GOP)	PCM/MPEG-2 Layer 1/Dolby E
	DNxHD	
	DV (DV, DV50, DV100)	
	Sony XDCam	
	AVC Intra	
P2 MXF OPAtom	DVCProHD	PCM/MPEG-2 Layer 1/Dolby E
	AVC Intra	
AS02 MXF	JPEG2000	PCM/MPEG-2 Layer 1/Dolby E
QuickTime MOV	DV	PCM/Dolby E
	DVCPro	
	DVCPro HD	
	ProRes	
	DNxHD	
	MPEG-2	
	AVC Intra	
GXF	MPEG-2	PCM/Dolby E
	DV	
	DVCPro	
	DVCPro HD	
	AVCI	

Input video must be the same frame size and rate; audio tracks must be the same sample rate. The audio bit depth and number of channels in each source file does not need to match.

Note: If your input files are in different—or unsupported—formats, you can use additional encoders in your workflow (or create separate workflows) to make them compliant.

Processing VBI, VANC, and Captions

During stitching, VBI, VANC, and captions are passed from source files to the output file when supported. To preserve blanking data, both the input file decoder and the encoder you use in your workflow must support the required type of blanking data for the media format you're processing. Most encoders support blanking data when enabled in the encoder configuration. TSEDL processing does not support all possible types of blanking data for all possible input file types, but many of the most commonly used combinations are supported.

Gaps are spaces between files that can be specified in a TSEDL file ([Adding Black Frames](#)). To create gaps in the output file, black video is generated along silent audio data, and some form of blanking data: timecodes, captions, VANC, and VBI atoms. When creating caps, an empty VANC payload is provided. If the format is NTSC, a null caption packet is also produced. If the source has VBI lines (SD material only) blank or black VBI data is produced. If the sources are NTSC, null closed caption lines are synthesized onto line 21 in field 1 and field 2.

Note: To create gaps when stitching interactively, you need to supply a black clip of the same format, with blanking data present. If you need gaps of varying lengths, supply a black clip that is long enough for the longest gap, and trim it. You can use the same file multiple times; once for each gap.

Stitching Files Interactively

Interactive stitching uses Workflow Portal, where an operator browses a Vantage catalog and selects clips for stitching. (Optionally, the operator can also scrub clips and trim them as required).

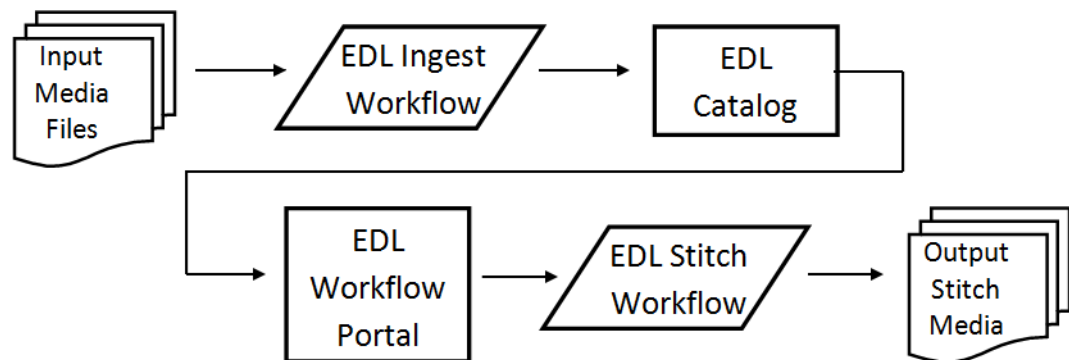
Topics

- [Overview](#)
- [Creating an EDL File Catalog](#)
- [Creating an EDL Source Ingest Workflow](#)
- [Creating a Stitching Workflow](#)
- [Creating a Workflow Portal Configuration for Stitching](#)
- [Validating Your Stitching Application](#)

Overview

Using Workflow Portal to perform file stitching requires two workflows: one—an EDL source ingest workflow—to encode source media intended for stitching, and register the media files in the Vantage catalog. The other—a stitching workflow—to stitch the files together and encode them into a single output file.

As the operator assembles each file, an EDL is automatically being created. The operator then submits the resulting EDL to the stitching workflow for processing.



To implement interactive stitching, you first create these components in Vantage:

- Vantage EDL catalog
- An EDL source ingest workflow
- A stitching workflow
- A stitching Workflow Portal configuration.

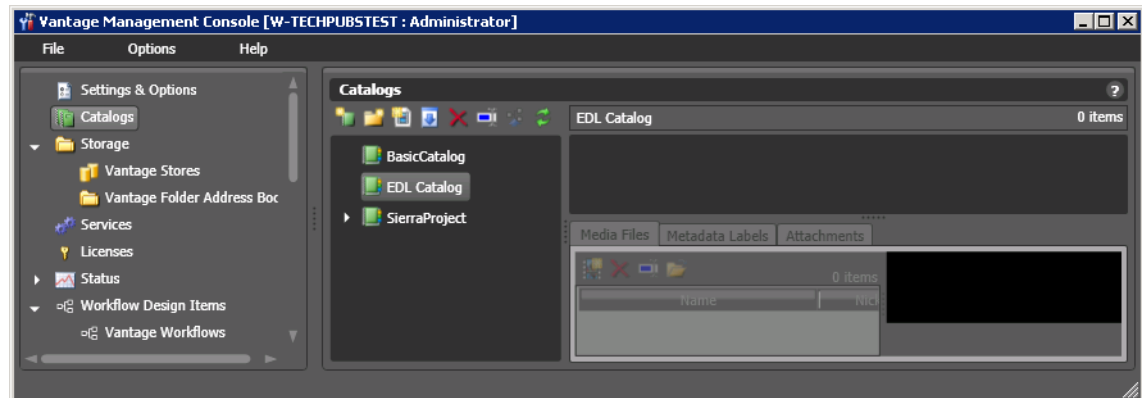
Note: To create gaps when stitching interactively, you need to supply a black clip. If you need gaps of varying lengths, supply a black clip that is long enough for the longest gap, and trim it. You can use the same file multiple times; once for each gap.

The processes which follow provide step-by-step details to help you create the catalog and workflows, set up a Workflow Portal configuration for stitching, and validate your work. In your own environment, you'll name each these components appropriately for your application, and configure the actions to suit your workflow requirements, as noted in these examples.

Creating an EDL File Catalog

To create a Vantage catalog where you can register media, follow these steps:

1. Open the Vantage Management Console.
2. Select Catalogs, and click the Add New Catalog icon. Vantage creates the new catalog, and selects the name for editing.
3. Name the new catalog appropriately for your application (*EDL Catalog* in this example).



Now you have a catalog where the ingest workflow can add catalog entries (binders) for new media it processes, to be used in your EDL application.

Creating an EDL Source Ingest Workflow

To create a workflow that encodes source media for stitching and registers the media files into a Vantage catalog, follow these steps:

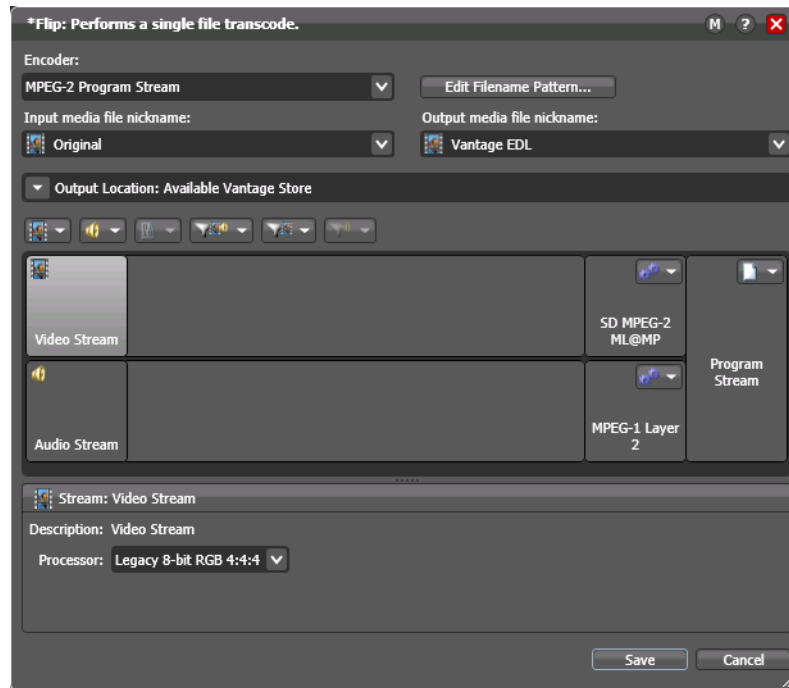
1. To create the workflow, open Vantage Workflow Designer.
2. In a category of your choice, create a new workflow (File > Create New Workflow), and name it *EDL Ingest*, for example. (For your own ingest workflow, name it as appropriate.)
3. Drag five actions—Watch, three Flip actions, and Register—onto the Workflow Design area and connect them to create the workflow depicted here.



The Watch action detects new input files and submits a job. The three Flip actions create three different types of output files, all required to perform stitching in Workflow Portal. The Register action registers the media associated with each job, in the EDL catalog, for use in Workflow Portal.

4. To configure the Watch action, double-click it to open its inspector.
5. Navigate through the inspector panels to select *Any Media* and *Windows File System* and then enter the path for the watch folder, where you will drop your input EDL files for processing. (Of course, you must configure the Watch action in your application as required.)
6. Click Next to display the Configuration panel. The default settings are correct for this example—click Next, and then click Finish to save your settings and close the inspector.

7. The first Flip action ensures that media to be stitched is provided to the stitching workflow in a supported format. To configure this action, open its inspector.



8. Specify the following:

Encoder—Select one of the supported formats (QuickTime MOV, for example). For the complete list, see [Supported Formats for Stitching](#).

Input media file nickname—*Original*

Output media file nickname—*Vantage EDL*.

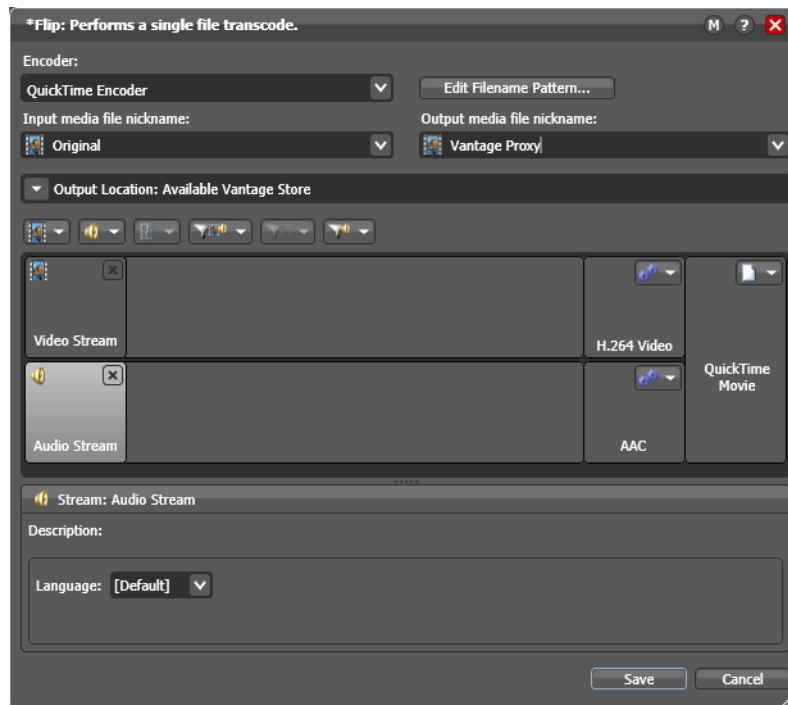
The nickname *Vantage EDL* is assigned, so that, as the operator adds each binder to the EDL, Workflow Portal can identify which version of media in the binder to specify for stitching. (Conversely, if you select *Vantage EDL* as a nickname, Workflow Designer won't allow you to select an unsupported encoder.)

No configuration is required for this example. In your own workflow, configure as required.

9. Click Save to save the Flip action and close the inspector.

Note: If the input media files don't require transcoding (they are already in a supported format), you can use a Copy action in place of this Flip action to assign the correct nickname and place the files in a known location. Or, you can assign the correct nickname on the Watch action and leave the ingest file in the hot folder. You don't need to encode them, but you must to set the nickname to *Vantage EDL*. You must also add an Identify action to the workflow, to perform a Media Properties analysis on these files. This adds a summary of the media to the binder, so that Workflow Portal knows the frame size and frame rate of the media.

- The second Flip action creates a proxy for preview in Workflow Portal. QuickTime H.264 media is required for previewing proxy files. You can scrub this proxy to create mark-in and mark-out points in the stitching workflow. To configure this encoder, open its inspector.



- Specify the following:

Encoder—*QuickTime*

Video Stream—*H.264*

Input media file nickname—*Original*

Output media file nickname—*Vantage Proxy*.

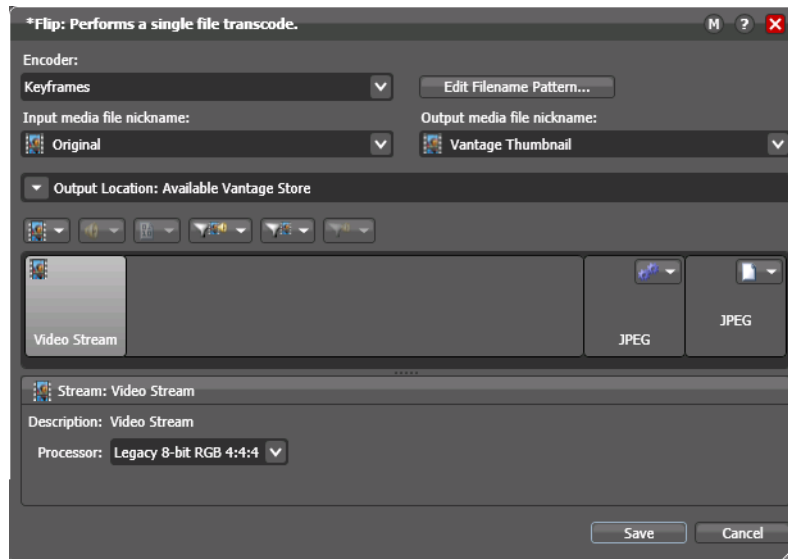
The nickname *Vantage Proxy* is assigned, so that Workflow Portal can identify which version of media in the binder should be displayed in the proxy player.

No configuration is required for this example. In your own workflow, configure as required.

Note: Make sure that the video frame rate of your proxy matches the frame rate of the Vantage EDL file you created in the first Flip action so that any mark-in and mark-out points you make are frame accurate.

- Click Save to save the Flip action and close the inspector.

13. The third Flip action generates a JPEG thumbnail for viewing in the EDL catalog, in Workflow Portal. To configure this encoder, open its inspector:



14. Specify the following:

Encoder—*Keyframes*

Input media file nickname—*Original*

Output media file nickname—*Vantage Thumbnail*.

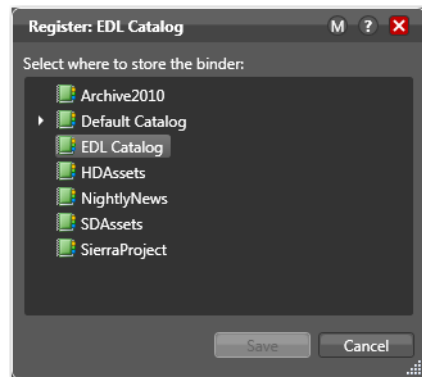
The nickname *Vantage Thumbnail* is assigned so that Workflow Portal can display media in the binders using thumbnails.

No configuration is required for this example. In your own workflow, configure as required.

Note: It's worth noting that none of the files created by the three Flip actions are explicitly moved or copied into a known location. Your workflows may require locating these output files in a known location, rather than a default store. To accomplish this, use a Move action or configure the Output Location in each Flip action to specify a destination. Regardless of how you store the files (automatically or explicitly), the binder created by each job has the fully-qualified path to the assets.

15. Click Save to save the Flip action and close the inspector.

16. To configure the Register action, open its inspector:



17. Select *EDL Catalog* (in this example) from the list.

The Register action creates a new record (called a *binder*), in the selected catalog. One binder is created for each job that runs. Each binder tracks three types of assets: media files, attachments, and metadata labels. The media files list has one record for each media file that exists at the end of execution (including its file name, nickname in the job, and fully-qualified path), so that Workflow Portal can access them.

18. Click Save to save the action and close the inspector.

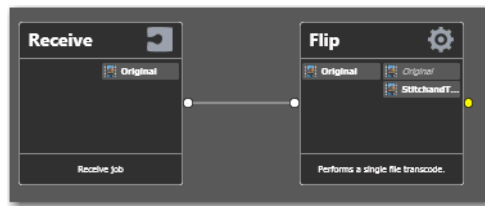
19. Activate this workflow.

20. Submit all of the media (drop it in your EDL ingest workflow's watch folder) that you plan to stitch together to this workflow, to be processed and registered in the catalog. As each job completes, the workflow's output from the job is available for use in Workflow Portal.

Creating a Stitching Workflow

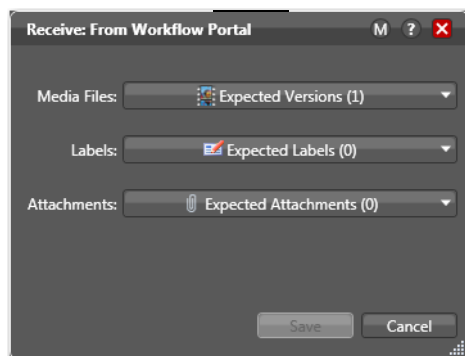
To create a workflow that stitches (and optionally trims) the files together and encodes them into the specified output file format, follow these steps:

1. Open Vantage Workflow Designer.
2. In the same category as your first workflow, create another new workflow, and name it *Stitching* for this example. (Name your own workflow appropriately.)
3. Drag two actions—Receive and Flip—onto the Workflow Design area and connect them to create the workflow depicted here.



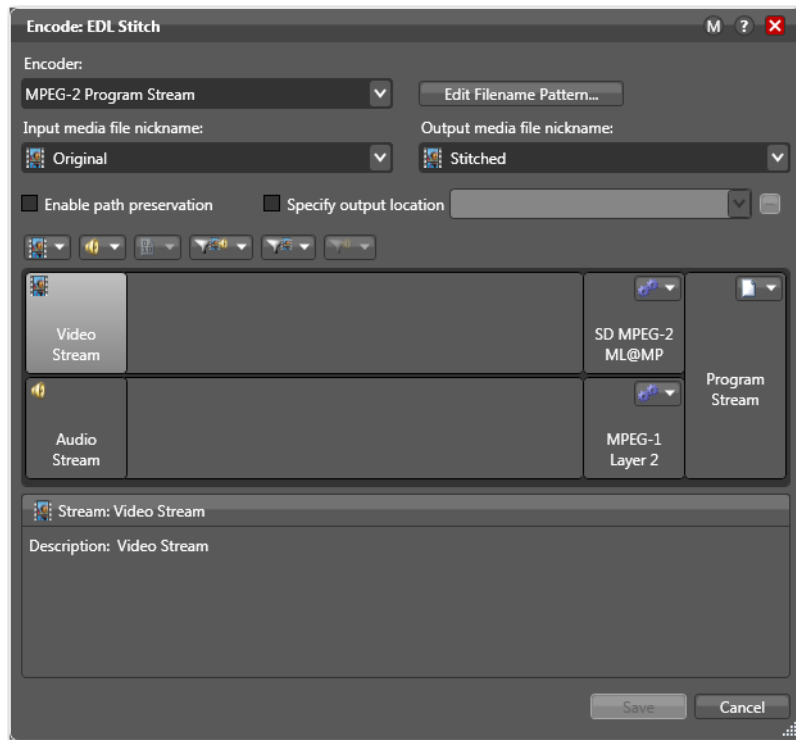
The Receive action starts a job for each EDL forwarded to this workflow from Workflow Portal by the operator. (Receive actions are used in place of Watch actions for workflows that are triggered by Workflow Portal or other programs). The Flip action performs the file stitching and trimming and encodes (or direct converts) the output file as specified. (Audio is not direct converted; it is always decoded and re-encoded for normalization and fading.)

4. To configure the Receive action, open its inspector:



5. Check *Original* in the Media Files menu so that this workflow knows to expect one input file from the sending system (Workflow Portal).
6. Click Save to save your workflow and close the inspector.

7. To configure the Flip action, open its inspector.



8. Select an encoder from the Encoder menu.

For a full transcode stitch, you can select any encoder and codec, and configure them as appropriate for your application.

For a direct convert stitch (essence re-wrapping), use an appropriate encoder, depending on the format of your EDL ingest files. Set the video and audio codec to a *Direct Convert* profile. (Audio is not direct converted; it is always decoded and re-encoded for normalization and fading.)

9. Click Save to save the action and close the inspector.

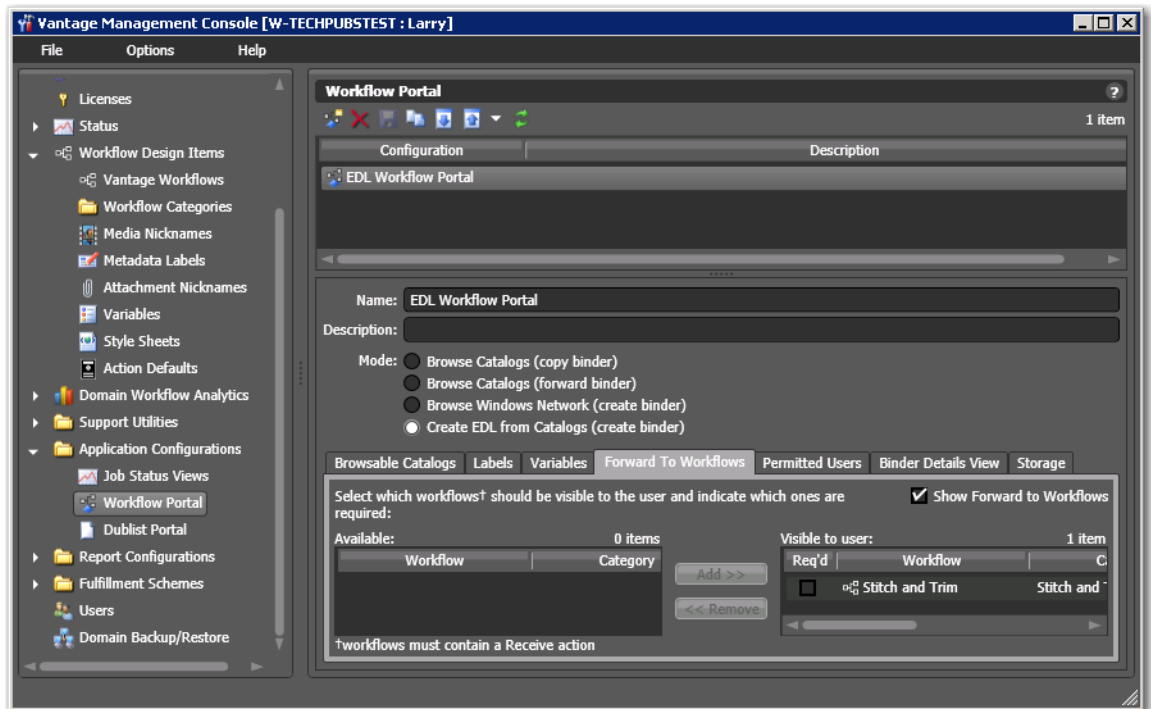
10. Activate this workflow so that it can accept jobs from Workflow Portal.

Note: The Receive and Flip actions are the minimal requirements for this workflow. You can add file transport actions and any other processing that your require on your stitched output, to meet your application’s requirements. You might also add a proxy Flip action and a Register action to this workflow, so that you can view the proxy in Workflow Portal again, to validate each job.

Creating a Workflow Portal Configuration for Stitching

To create a Workflow Portal configuration for performing stitching operations, follow these steps:

1. Open Vantage Management Console.
2. Select *Application Configurations > Workflow Portal*.
3. Click the *Create New Configuration* button and name the configuration *EDL Workflow Portal* (name your own configurations as appropriate).

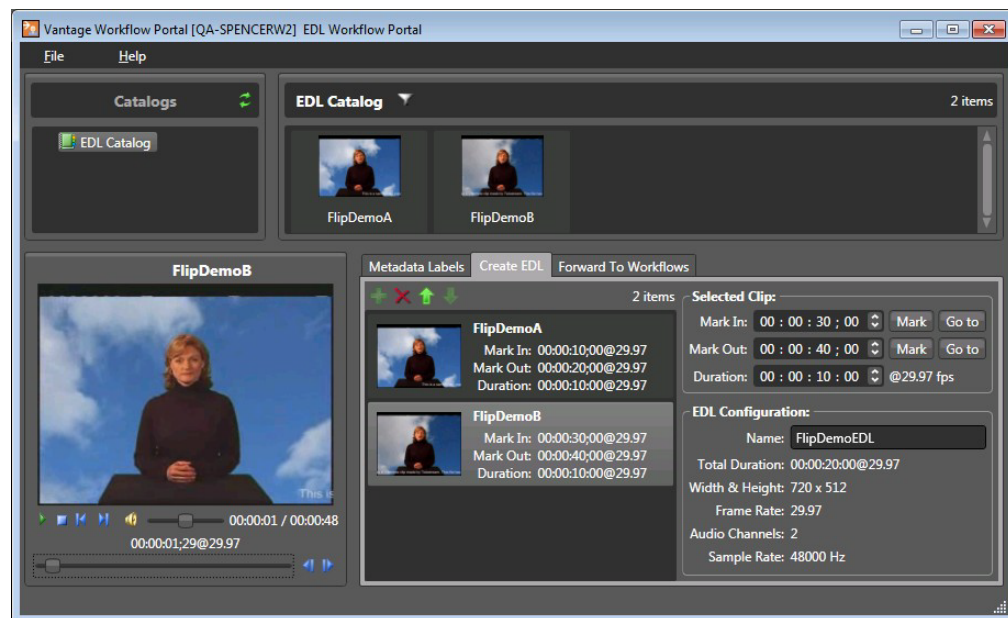


4. Select the *Create EDL from Catalogs* mode to enable stitching, and on the *Browsable Catalogs* tab, add *EDL Catalog* to the *Visible To User* list on the right.
5. On the *Forward To Workflows* tab, add the *Stitching* workflow to the *Visible To User* list.
6. Click the *Save* icon in the toolbar at the top of the window to save this configuration.

Validating Your Stitching Application

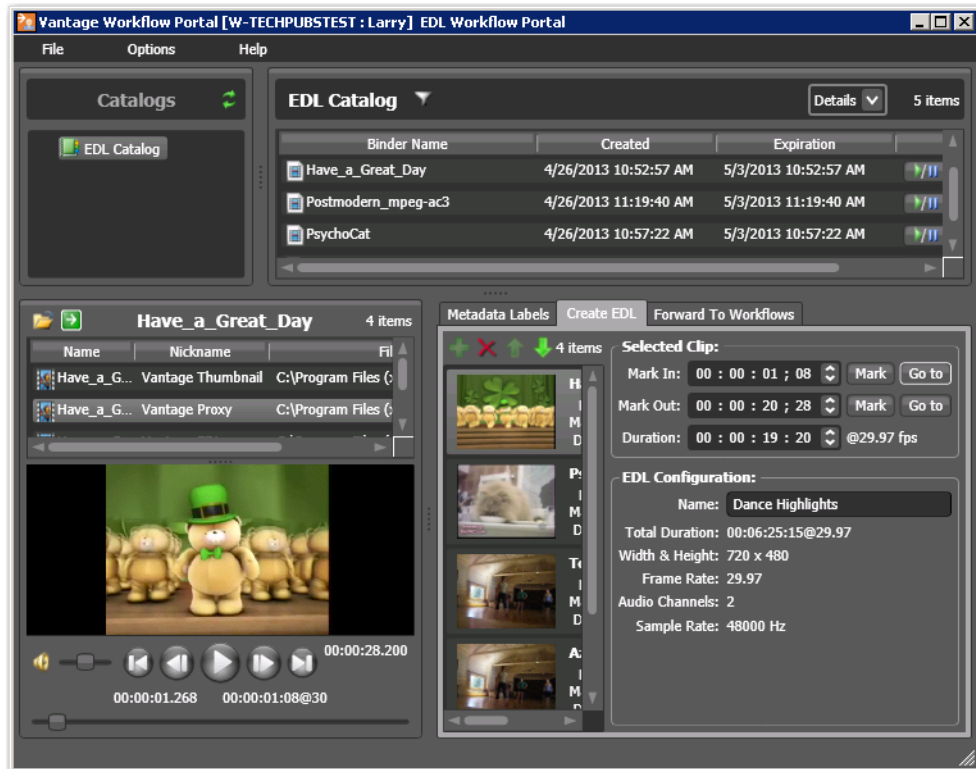
To validate your stitching application, create an EDL and submit a stitching job in Workflow Portal. Follow these steps:

1. Drag two or more media files into the Watch action's hot folder to submit them as source media to the EDL ingest workflow that begins your stitching operation.
2. In Workflow Designer, click on the Job Status tab and verify that all the jobs you submitted complete successfully. If not, fix the problems and re-submit the media.
3. Open Workflow Portal and load the *EDL Workflow Portal* configuration you created earlier, in the Management Console.



4. Select *EDL Catalog* from the Catalogs list. Note the binders that have been added to the EDL catalog by the EDL Ingest jobs that just finished processing. You may have to refresh the catalog list to view the binders from the latest jobs.
5. To add an Vantage EDL asset from the EDL Catalog, display the *Create EDL* tab. Then, for each binder you select in the EDL Catalog, click the plus (+) button on the Create EDL tab. (Alternately, you can click and drag the binder down onto the tab to add them. You can also multi-select binders and drag them onto the tab to add them.)
6. Adjust the order of the assets by using the up and down arrows.
7. Scrub the media, and optionally—on at least one clip—create Mark In and Mark Out points in the clip. Or, enter the values manually. (Note that Mark In points are inclusive and Mark Out points are exclusive.) The preview display on the left side of the window can also be used to create mark in and out points. This is accomplished by finding a desired in/out point on the time-line and clicking the appropriate Mark button.

8. Name the EDL configuration, which provides the base name for the output media file encoded by the workflow. (The EDL file name is determined by the first clip added to the EDL.)
9. When you have finished creating the EDL, display the Forward To Workflows tab.

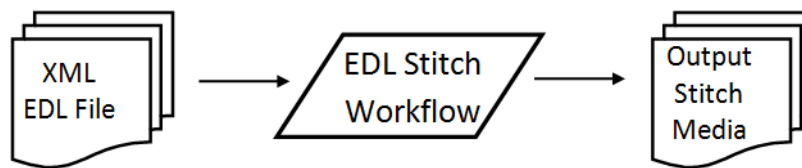


10. Check the *EDL Stitch Workflow* check-box and click the *Submit* button:
11. Once submitted, the Workflow Portal forwards the EDL to the activated *Stitching* workflow where the files are stitched into one output file.
12. Open Workflow Designer, and on the Job Status Tab, follow the process of your stitching job and determine that it completes successfully.
13. You've just Stitched and Trimmed your first media!

Stitching Files Using a TSEDL File

In addition to stitching files using Workflow Portal, you can also stitch files by creating and submitting a Telestream EDL (TSEDL) file directly to a stitching workflow, to be automatically processed—without operator intervention. Before submitting a TSEDL for processing, you must first create and format the XML file correctly, and provide it with a *.tsedl* extension. These files can be created (and submitted) manually or programmatically.

You submit a TSEDL file like a media file—by dropping it into a folder monitored by the Watch action in a stitching workflow, or by submitting it manually or with an SDK-based program to perform job submission.



A stitching workflow that processes TSEDL files automatically begins with a Watch action, and minimally, has a Flip action, each configured appropriately (see [Creating a Stitching Workflow](#)). This workflow is no different than any other transcoding workflow that utilizes a Flip action. It ingests the TSEDL file and produces a stitched file according to the specifications in the file.

Sample TSEDL File

```
<?xml version="1.0" encoding="utf-8"?>
<VantagePlayList>
  <Name>NewEdlClip</Name>
  <File uuid="fe364478-116e-47d1-b692" path="d:\EDL\clip1.mxf"/>
  <File uuid="9E04A0DC-5E4D-4d7d-B015" path="d:\EDL\clip2.mxf"/>
  <EDL>
    <AudioFade name="Parameters" duration = "100" type = "cross"/>
    <Edit type="file" sequence="0" timecode_in="12:55:04:03@25"
      timecode_out="12:55:05:08@25" markin="700" markout="1300"
      file="fe364478-116e-47d1-b692">
      <ChannelMap>
        <Channel>
          <Source>2</Source>
          <Output>1</Output>
        </Channel>
        <Channel>
          <Source>SILENT</Source>
          <Output>2</Output>
        </Channel>
      </ChannelMap>
    </Edit>
  </EDL>
</VantagePlayList>
```

TSEDL Schema

<VantagePlayList>—One (Required). Topmost element. No attributes. Contains Name, File, and EDL elements.

<Name>—One (Required) Child of VantagePlayList. Provide a text string to be used as the base name for the encoded output file.

<File>—Required; child of VantagePlayList. Provide one or more <File> elements to identify each source file to be stitched.

uuid. Provide a Guid or other unique string to identify the file logically, which is used to reference the file in the <Edit> element.

path. Provide a fully-qualified path and filename of the source file.

<EDL>—Required. Provide one <EDL> element which defines the edit decision list; contains the <AudioFade> and <Edit> elements.

<AudioFade>—Optional. Child of EDL. Provide one, when you want to control audio fading. Fading is performed at every clip transition in the output file, including fading in the first clip and fading out the last clip.

duration. Fade duration is specified in milliseconds. When an <AudioFade> element is present, a normal in/out fade is performed automatically (left on the first clip; right on the last clip). The fade on each is for half the duration specified. Default is 40 ms normal fade. For no fade, specify 0 duration. When the value is 0, the audio is untouched.

type. For Cross fade, specify the keyword *cross*. For V-fade or no fade, enter any other string (for example, *vfade*, but it is not required). The entire fade is for the duration specified.

<Edit>—Required. Child of EDL. Contains ChannelMap element. Provide one or more <Edit> elements to identify each source file in ordinal order, and how it is to be trimmed. When using *type = fill*, do not specify the file attribute.

type. Specify the keyword *file* when referencing a clip to insert in the output. Specify keyword *fill* when adding black frames between (or before or after) other clips.

sequence. Specify the ordinal position of this clip in the output file, starting with 0.

timecode_in. Optional; this value is ignored.

timecode_out. Optional; this value is ignored.

markin. Specify the integer value of the mark-in frame, inclusive. Counting starts at 0, not 1.

markout. Specify the integer value of the mark-out frame, exclusive.

Note: If you do not know the total number of frames in a clip, specify *markout = -1* to write all frames remaining in the clip (you may or may not be trimming the front of a clip.) You can not specify -1 in MPEG2 Program or Transport stream files, because the exact duration can't be identified.

file. Specify the UUID of the file being referenced, only when specifying a type = file <Edit>.

<ChannelMap>—Optional. Child of Edit. Contains Channel element. Provide one <ChannelMap> element to identify the channels you plan to re-map.

<Channel>—Required. Child of ChannelMap. Contains Source and Output elements. Provide one <Channel> element per channel to re-map (max. 32).

<Source>—Required. Child of Channel. Provide one <Source> element and provide the integer value of the source file channel, or the keyword SILENT if you want zero decibel sound. The base channel is 1, not 0.

<Output>—Required. Child of Channel. Provide one <Output> element and provide the integer value of the output channel. Multiple output channels can refer to the same source channel. The base channel is 1, not 0.

Audio Fading Options

When stitching files with audio, you can fade the audio in 3 ways: no fade, V-fade, or cross-fade. Each method is described below.

Performing No Fading (Required with Dolby E Audio)

To prevent fading from being applied, add an `<AudioFade>` element and set duration to 0. When duration is set to 0, the transcoder leaves the audio untouched, and simply clips it along with the clip's markin/markout points as necessary.

Note: Media with Dolby E audio does not allow fading. If you don't add an `<AudioFade>` element with duration = 0 to your TS EDL file, the default fade is applied, thus damaging the Dolby E audio, rendering the audio unusable.

Performing Default V-Fading

When no `<AudioFade>` element is present, a 40ms duration V-fade operation is performed by default, as depicted below.



The V-fade is performed between clips in your output file, plus a 20ms fade at the start of the first and the end of last clip. This default fade operation can only be used for PCM audio.

Modifying the Duration of a V-Fade

To provide custom audio V-fading, add one `<AudioFade>` element as the first element in the `<EDL>` element, as shown in the example below.

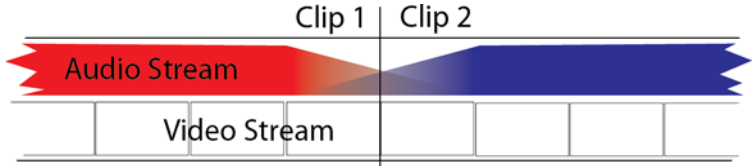
```
<AudioFade name="Audio Fade" duration = "80" type = "vfade" />
```

You can change the length of the fade by adjusting the duration value (in ms). You must set the type value to a term other than the keyword *cross*. For example, *vfade*. The fade out duration at the end of each clip is one half the duration (in this example, 40ms); the fade in duration at the beginning of each clip is also one half the duration. Thus, in a V-fade between clips, the total fade is equal to sum of the fade out and fade in duration—80 ms in this example.

Performing a Cross-Fade

Cross-fading can also be performed, by specifying the keyword *cross* in the type attribute. Cross-fading is performed between clips in your output file, plus a V-fade of 1/2 the duration specified, at the start of the first and the end of last clip.

Cross-fading can only be performed when adequate leader and trailer media is present in each clip beyond the clip's mark points. For example, if you specify a cross-fade of 160ms duration, you will need at least 80ms leader in front of your mark-in point on each clip, and an 80ms trailer at the beyond the mark-out point of each clip, from which to preserve the audio for the cross-fade operation. That is, there is an 80ms extension of audio before and after each clip's mark-in and mark-out point to create the audio cross-over.



To provide a cross-fade, add one `<AudioFade>` element as the first element in the `<EDL>` element, and set the type attribute to the keyword `cross`, as shown in the example below.

```
<AudioFade name="Audio Fade" duration = "160" type = "cross"/>
```

You must specify the length of the fade in the duration attribute (in ms).

Audio Channel Mapping

During stitching, you can remap audio channels by adding the `<ChannelMap>` element to the `Edit` element for each clip, as described in the example XML file above. Use `Channel` elements in the `ChannelMap` element to control each audio channel. You can not provide more than 32 audio channels in the output file, which is controlled by the number of channels identified in the source files (and the highest amount specified in the `Edit` element).

The encoder must be configured to provide the required audio channels. For each `Channel`, provide a source and output value in the corresponding `Source` and `Output` elements. Or, use the keyword `SILENT` in the source (`<Source>SILENT</Source>`) for zero decibel sound in the output channel.

If an `<Edit>` element does not have a `<ChannelMap>` element, the channels in the source file are output without being remapped. A `<ChannelMap>` element overrides the number of channels in the source. Thus, if a source has 12 channels, but the `<ChannelMap>` only specifies outputs for channels 1 through 6, the output will only have 6 channels. You can also create more channels via a `<ChannelMap>` than exist in the source. In this case, some channels will either be filled with silence (`SILENT`) or must to be duplicated from the input as determined by the `<ChannelMap>` specifications.

A null `<ChannelMap>` element (`<ChannelMap></ChannelMap>`) is not valid.

To delete all the audio in a source, create a simple channel map that maps `SILENT` to channel 1. For example:

```
<ChannelMap>
  <Channel>
    <Source>SILENT</Source>
    <Output>1</Output>
  </Channel>
</ChannelMap>
```

If multiple `<Channel>` elements refer to the same output channel, only the last `<Channel>` referring to that output channel applies.

Controlling Timecode

The TSEDL file format enables you to set the output media's starting timecode with a `<Timecode>` element as the first element in the `<EDL>` element. This timecode is used to override the timecode in source files. The timecode is then incremented throughout the stitched output file.

If the timecode is not specified with the `<Timecode>` element, the starting timecode in the output media is set to 0.

Adding Black Frames

You can add black frames to your output for headers and trailers, or to create gaps between clips for ad insertion, for example. To add black frames, choose one of these methods:

- Add an <Edit> fill-type element to the clip sequence.

```
<Edit type="fill" sequence="1" markin="0" markout="300"/>
```

Add the Edit element between the clips where you want the black added; make sure you increment the sequence value of this element and all succeeding Edit elements. Specify the keyword *fill* in the type attribute, supply the proper sequence number, and then supply the markin and markout values, specifying 0 for markin, and number of frames to add. (Recall that markin is inclusive; markout is exclusive.)

- Modify an <Edit> element in the clip sequence.

When the clip is not being trimmed, you can add the number of frames to add to the existing markout value.

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