

Split ABR Encoding with Appliances

Feb 2019

Note

This document is for using split encoding when you have appliances (boxes with Controller and EL) for distributed/compact instructions, please check [here](#).

As of v11 (v11.0.1.4) it is possible to do [Split ABR Encoding](#) using both [IP TS](#) and [SDI](#) inputs.

Overview

When encoding ABR Profiles, there can be times when the number and complexity of profiles exceeds the capabilities of a single server, for example:

```
3840x2160p50@20Mbps
1920x1080p50@6Mbps
1920x1080p50@3Mbps
1280x720p50@2Mbps
1280x720p50@1.5Mbps
720x576p50@1Mbps
544x576p50@800Kbs
384x576P50@300Kbs
```

This profile list could not be produced by a single server (at the time of writing) and so two or three servers might be required, but as this is ABR, and all the profiles need to be I-Frame aligned, we need a way to achieve this.

To overcome this we can use Split ABR encoding, where we can use several servers to encode different parts of the profile list, but still aligned in time. For this to work we need the following:

Requirements

Servers must be time synchronised

A multicast is used for synchronisation, if using the MGMT port the MGMT switch must support multicasts.

Interfaces on all servers must be identical in name and operation (so if eth1 is the IP input, all servers must use the name eth1 for the interface, and it must be the input interface)

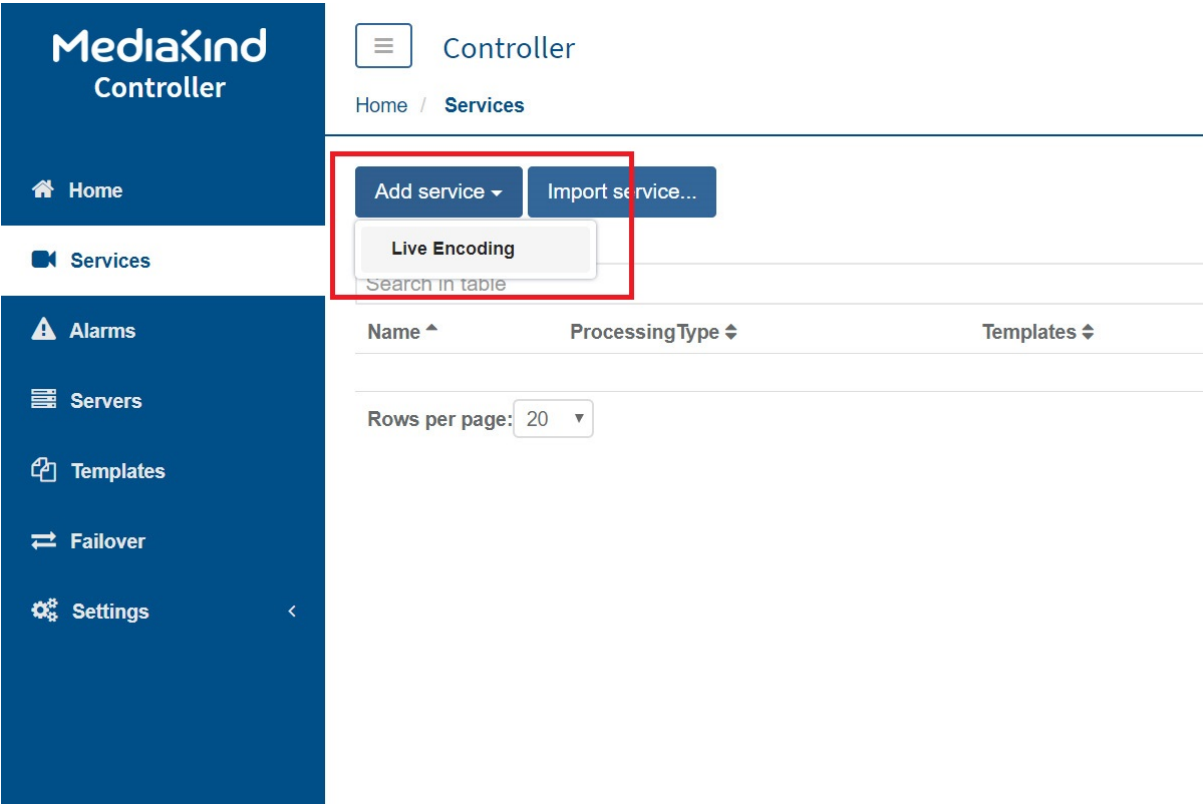
While it is possible to do this on appliances, it is much simpler to do this on a distributed system with a centralised Controller

This guide assumes you know how to create a standard ABR output service

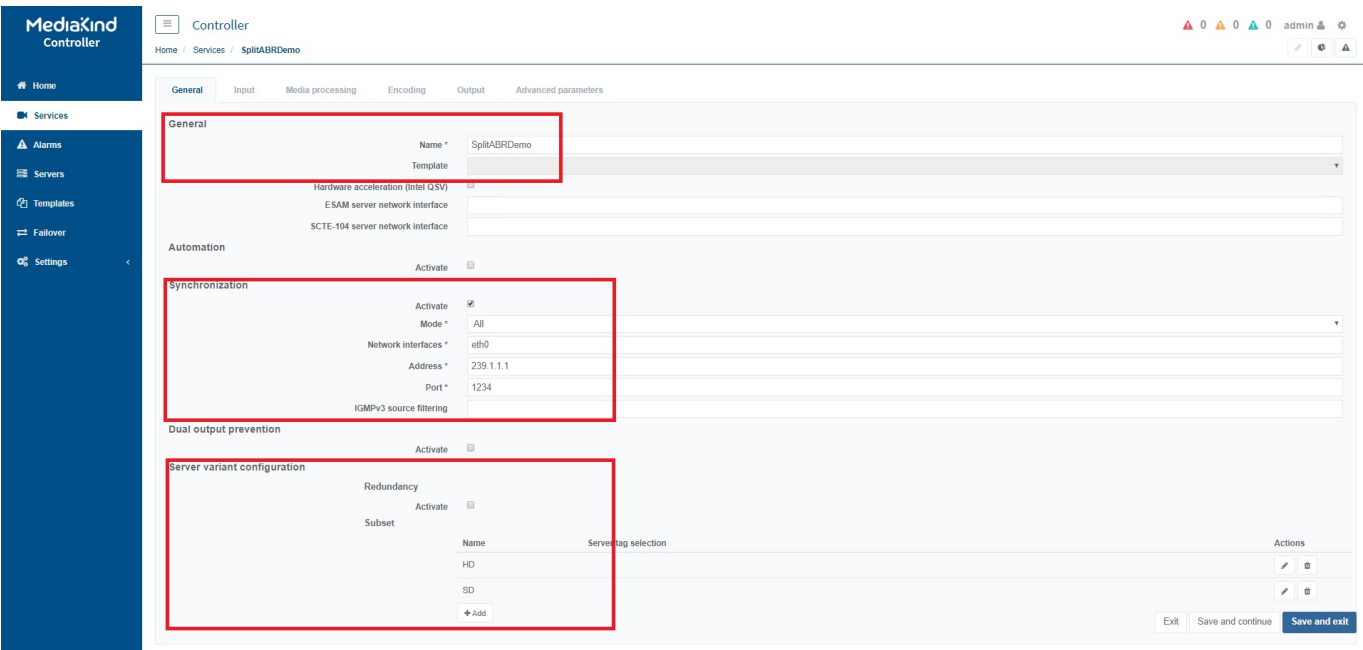
Configuration

General Tab

On the PRIMARY Encoding Live Add a new service as normal.



Set the following in your new Service:



Name (SplitABRDemo in this example)

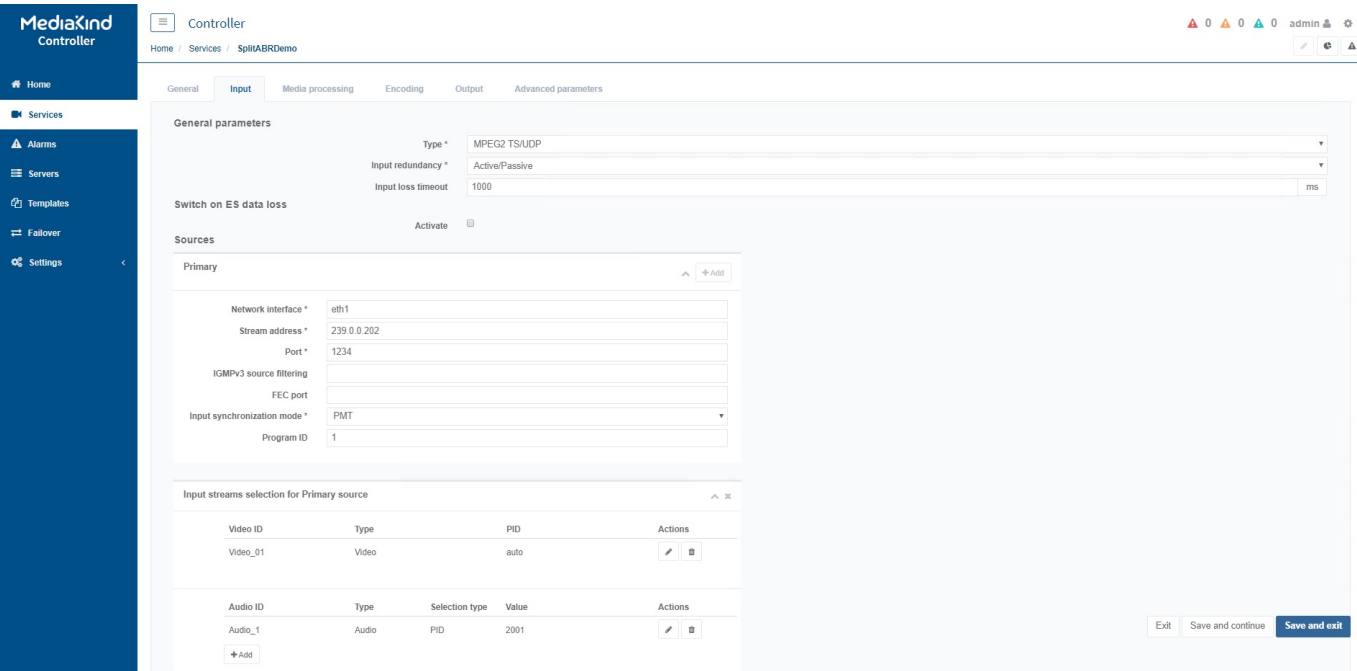
Synchronization
Select **Activate**
Mode **All**
Network Interface for sync (**eth0**) (normally management interface) (switch has to support multicasts)
Address (**239.1.1.1**) (unique address for sync messages)
Port **1234**

Server Variant Configuration

You can think of server variants as groups. Normally we would use something like UHD, HD and SD
Add two or three variants (**HD** and **SD** in this example)

Input Tab

There is nothing special to set on the input tab, just configure this as you normally would, either SDI or IP input will work.



Encoding Tab

Again this is fairly standard, couple of things to look out for:

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Controller

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Advanced parameters

General parameters

Export type Internet TV

Video encoding

Video_01	Codec	Rate control	Resolution/Bitrate (kbits)	Frame rate	Blackout	Actions
Video_01_enc_1	H.264 Main Standard	CBR	1920 x 1080 / 6000	Regular (25/29.97)		
Video_01_enc_2	H.264 Main Standard	CBR	720 x 576 / 3000	Regular (25/29.97)		
Video_01_enc_3	H.264 Main Standard	CBR	544 x 576 / 2000	Regular (25/29.97)		
Video_01_enc_4	H.264 Main Standard	CBR	352 x 288 / 1000	Regular (25/29.97)		

+ Add

Audio encoding

Audio_1	Codec	Bit rate	Channel mode	Sampling rate	Blackout	Actions
Audio_1_encoded_1	HE-AAC	96 kbps	Stereo	48 kHz		

+ Add

Subtitles encoding

No subtitles selected.

Metadata encoding

No metadata selected.

Blackout configuration

	SCTE-35 input	Trigger	Timeout	Image URL	
No blackout configured.					

+ Add

Exit Save and continue Save and exit

General Parameters Export Type **Internet TV**
Video Encoding **Create your desired UHD/HD/SD profiles (all of them, not just the ones for this server)**
Audio **Create your desired audio config**
Create any other configs such as subtitles etc.

Output Tab

Create your General and Common MPEG-2 TS parameters as you normally would.

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Advanced parameters

General parameters

Transport protocol * MPEG2 TS/UDP

Synchronize ☒

Network interface * eth1

TTL * 64

ToS * 0

GOP signaling EBP based

EBP on audio ☐

Source address

Source port

Common MPEG-2 TS parameters

Standard * DVB

PMT PID * 3001

PCR PID 1001

Target PCR period * 30

Target PSI period * 100

Program number * 1

Service name SplitABR

Service provider MK

Maximum bitrate insertion in PMT ☐

Video stream dropped on input loss ☐

Video frames alignment on PES packets ☒

LATM encapsulation for AAC ☐

Broadcast ID insertion ☐

Encoding info insertion ☐

Splice countdown insertion ☐

One AU per PES on audio splices ☐

Output streams

Exit Save and continue Save and exit

Now you can start to add your outputs, these are the same as you would normally do, but with one exception, you have to configure an extra field called **Subset**.

Output stream

IP Address *239.100.100.1

Port *6001

ECC☐

SubsetHD

Stream	Description	PID	
<input checked="" type="checkbox"/> Video_01_enc_1	H.264 Main Standard 1920x1080 6000Kbps Regular (25/29.97)	1001	dec
<input type="checkbox"/> Video_01_enc_2	H.264 Main Standard 720x576 3000Kbps Regular (25/29.97)	121	dec
<input type="checkbox"/> Video_01_enc_3	H.264 Main Standard 544x576 2000Kbps Regular (25/29.97)	121	dec
<input type="checkbox"/> Video_01_enc_4	H.264 Main Standard 352x288 1000Kbps Regular (25/29.97)	121	dec
<input checked="" type="checkbox"/> Audio_1_encoded_1	HE-AAC Stereo 96Kbps 48Khz	2001	dec

Cancel

Ok

The **Subset** names come from the **Server variant configuration names** set earlier in this process (under the **General Tab**).

Advanced Parameters Tab

We need to add one **Advanced Parameter**, under the **Advanced Parameters** tab click **Add**.

MediaKind Controller

Controller

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General Input Media processing Encoding Output **Advanced parameters**

Parameter name	Value	Variants	Actions
synchronizer.poolname.prefix	SplitABR	Subset HD SD	<input checked="" type="checkbox"/> <input type="checkbox"/>

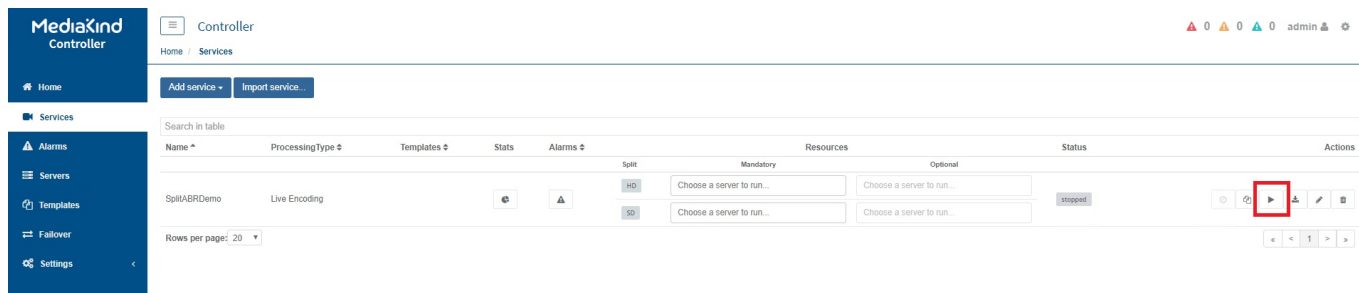
+Add

Parameter name **synchronizer.poolname.prefix**
Value **SplitABR** (Can be any name you like)
Variants **Tick ALL Variants**

Export Configuration

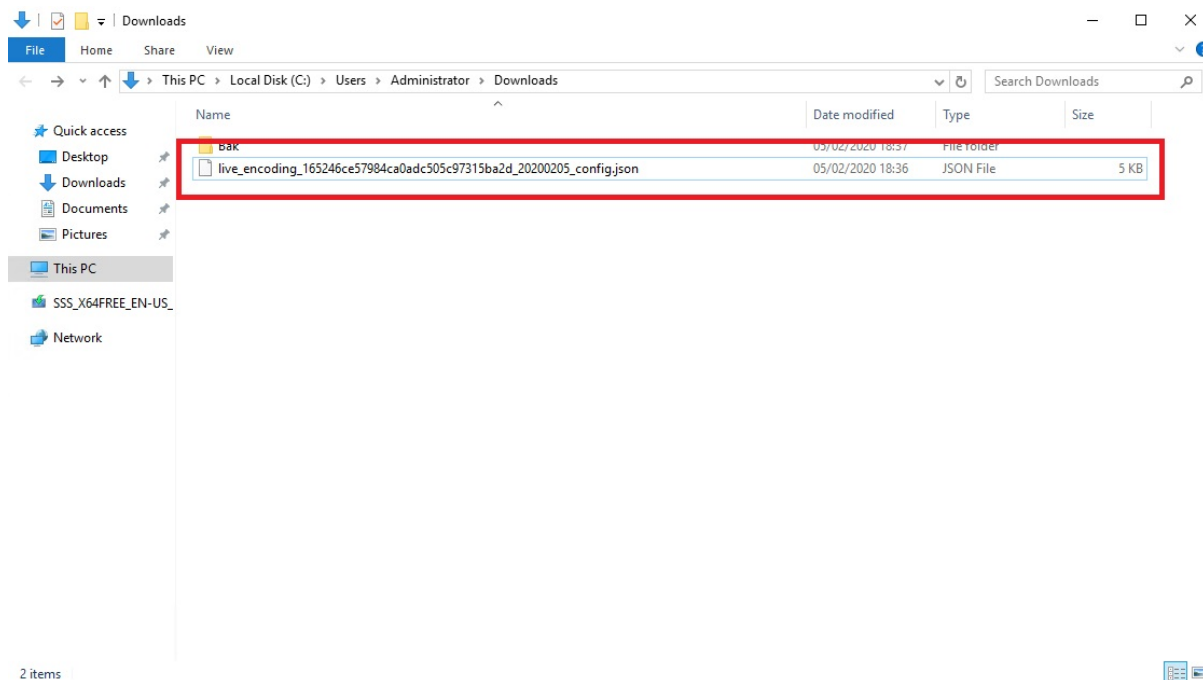
Before we make any more configuration settings, we need to export the configuration. This will make setting up the other servers in the system much simpler.

From the services page, find the service you just created.



Under Services you should see your config, click the Export button to save. The file will be downloaded to your local computer (Downloads folder if you are using Windows).

Locate the file you just downloaded.



The exported config file is a .json file, its plain text to easy to work with. We need to do two things with this file:

1. **Make a copy** (we need one file for each server we are using)
2. **Edit each copy** (we need to edit the UUID of the file, the UUID appears in two places in the file, remember **only edit the copy(s)**)

The filename contains the UUID, and you need to find this in the .json file, here is an example:

live_encoding_165246ce57984ca0adc505c97315ba2d_20200205_config_01.json So in this example the UUID is 165246ce57984ca0adc505c97315ba2d.

Open the file to edit (you can use Notepad) and change one of the numbers/letters in the UUID.

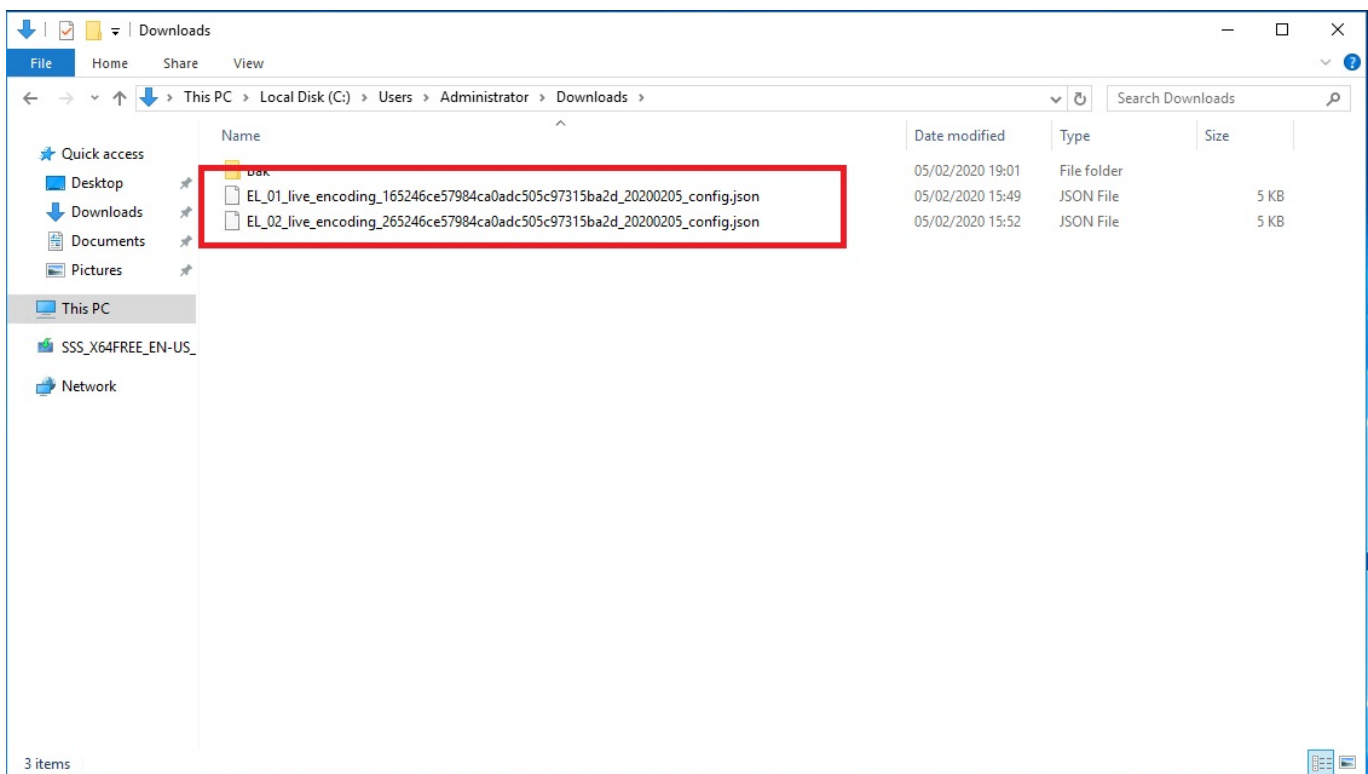
```
live_encoding_165246ce57984ca0adc505c97315ba2d_20200205_config_02.json - Notepad
File Edit Format View Help

{"config":{"processings":[{"streams":[{"videoQualityExperience":"humanVisual","bitRate":6000000,"id":"Video_01_enc_1","vuiTimingInfo":true,"rateControlMode":"cbr","dynamicRangeMode":"followInput","resolution":[1920,1080],"frameRate":"regular","codingMode":"progressive","useQsv":false,"chunkStrategy":"distribute","keyFramePeriod":2000,"input":"Video_01","type":"video","gopPolicy":"auto","videoDelayMode":"standard","frameFieldCodingMode":"auto","detailEnhancement":"none","aspectRatioAdjustment":{"type":"dynamic","left":0,"bottom":0,"top":0,"right":0},"codec":"h264","videoQualityMode":"standard","insertActiveFormatDescription":false,"bFrames":"auto","profile":"main","insertClosedCaptions":false},{"videoQualityExperience":"humanVisual","bitRate":3000000,"id":"Video_01_enc_2","vuiTimingInfo":true,"rateControlMode":"cbr","dynamicRangeMode":"followInput","resolution":[720,576],"frameRate":"regular","codingMode":"progressive","useQsv":false,"chunkStrategy":"distribute","keyFramePeriod":2000,"input":"Video_01","type":"video","gopPolicy":"auto","videoDelayMode":"standard","keyFramePeriod":2000,"bitRate":2000000,"aspectRatioAdjustment":{"type":"dynamic","left":0,"bottom":0,"top":0,"right":0},"codec":"h264","videoQualityMode":"standard","insertActiveFormatDescription":false,"bFrames":"auto","profile":"main","insertClosedCaptions":false},{"rateControlMode":"cbr","detailEnhancement":"none","id":"Video_01_enc_3","vuiTimingInfo":true,"videoQualityExperience":"humanVisual","dynamicRangeMode":"followInput","resolution":[544,576],"frameRate":"regular","codingMode":"progressive","useQsv":false,"chunkStrategy":"distribute","frameFieldCodingMode":"auto","input":"Video_01","type":"video","gopPolicy":"auto","videoDelayMode":"standard","keyFramePeriod":2000,"bitRate":2000000,"aspectRatioAdjustment":{"type":"dynamic","left":0,"bottom":0,"top":0,"right":0},"codec":"h264","videoQualityMode":"standard","insertActiveFormatDescription":false,"bFrames":"auto","profile":"main","insertClosedCaptions":false},{"rateControlMode":"cbr","detailEnhancement":"none","id":"Video_01_enc_4","vuiTimingInfo":true,"videoQualityExperience":"humanVisual","dynamicRangeMode":"followInput","resolution":[352,288],"frameRate":"regular","codingMode":"progressive","useQsv":false,"chunkStrategy":"distribute","frameFieldCodingMode":"auto","input":"Video_01","type":"video","gopPolicy":"auto","videoDelayMode":"standard","keyFramePeriod":2000,"bitRate":1000000,"aspectRatioAdjustment":{"type":"dynamic","left":0,"bottom":0,"top":0,"right":0},"codec":"h264","videoQualityMode":"standard","insertActiveFormatDescription":false,"bFrames":"auto","profile":"main","insertClosedCaptions":false},{"type":"audio","id":"Audio_1_encoded_1","codec":"heaac","samplingRate":48000,"channelMode":"stereo","bitRate":96000,"input":"Audio_1"},"exportType":"itv","id":"Processings_0"}],"inputs":[{"streams":[{"type":"video","sources":[{"type":"video","pids":["auto"]},"id":"Video_01","preprocessing":{"spatialDenoisingFilter":"off","deblockingFilter":false,"crosstalkFilter":false,"useQsv":false},"type":"audio","decodingCapability":{"mode":"2.0","codec":"ac3"},"sources":[{"type":"audio","pids":["2001"]},"id":"Audio_1","preprocessing":{"type":"mpeg2tsUdp","sources":[{"port":1234,"sourceAddresses":["239.0.0.202"]},"id":"input_1","redundancy":{"mode":"activePassive"},"signalLossTimeout":1000},"id":"265246ce57984ca0adc505c97315ba2d","synchronization":{"port":1234,"interfaces":{"eth0":{"mode":"all","address":"239.1.1.1"},"name":"SplitABRdemo","advancedSettings":{"synchronizer.poolname.prefix":{"variants":{"subset":"HD"},"subset":"SD"},"value":"SplitABR"},"variants":{"values":{"id":"HD","serverTagSelection":[]},"id":"SD","serverTagSelection":[]},"id":"subset"},"outputs":[{"mpeg2ts":{"useLatmEncapsulationForAac":true,"pmtPid":3001,"psiPeriod":100,"pcrPeriod":30,"standard":"dvb","serviceProvider":"MK","serviceName":"SplitABR","alignVideoFramesToPesPackets":true,"pcrPid":1001,"programNumber":1},"type":"mpeg2tsUdp","tos":0,"ttl":64,"gopSignaling":"ebp","transportStreams":[{"port":6001,"variant":{"subset":"HD"},"address":"239.100.100.1","streams":[{"pid":1001,"input":"Video_01_enc_1"},"pid":2001,"input":"Audio_1_encoded_1"}]},"port":6002,"variant":{"subset":"SD"},"address":"239.100.100.1","streams":[{"pid":1001,"input":"Video_01_enc_2"},"pid":2001,"input":"Audio_1_encoded_1"}]},"port":6003,"variant":{"subset":"SD"},"address":"239.100.100.1","streams":[{"pid":1001,"input":"Video_01_enc_3"},"pid":2001,"input":"Audio_1_encoded_1"}]},"port":6004,"streams":[{"pid":1001,"input":"Video_01_enc_4"},"pid":2001,"input":"Audio_1_encoded_1"},"address":"239.100.100.1","variant":{"subset":"SD"}]},"interface":"eth1","id":"Output_1","synchronized":true}],"config_version":"11.0","service_id":"265246ce57984ca0adc505c97315ba2d","service_type":"live_encoding"}]
```

In the above example I changed 165246ce57984ca0adc505c97315ba2d to 265246ce57984ca0adc505c97315ba2d

Save the file and close your text editor.

I renamed my .json files so it was obvious which file was for which Encoding Live.



Repeat these steps for each Encoding Live in your Split ABR system.

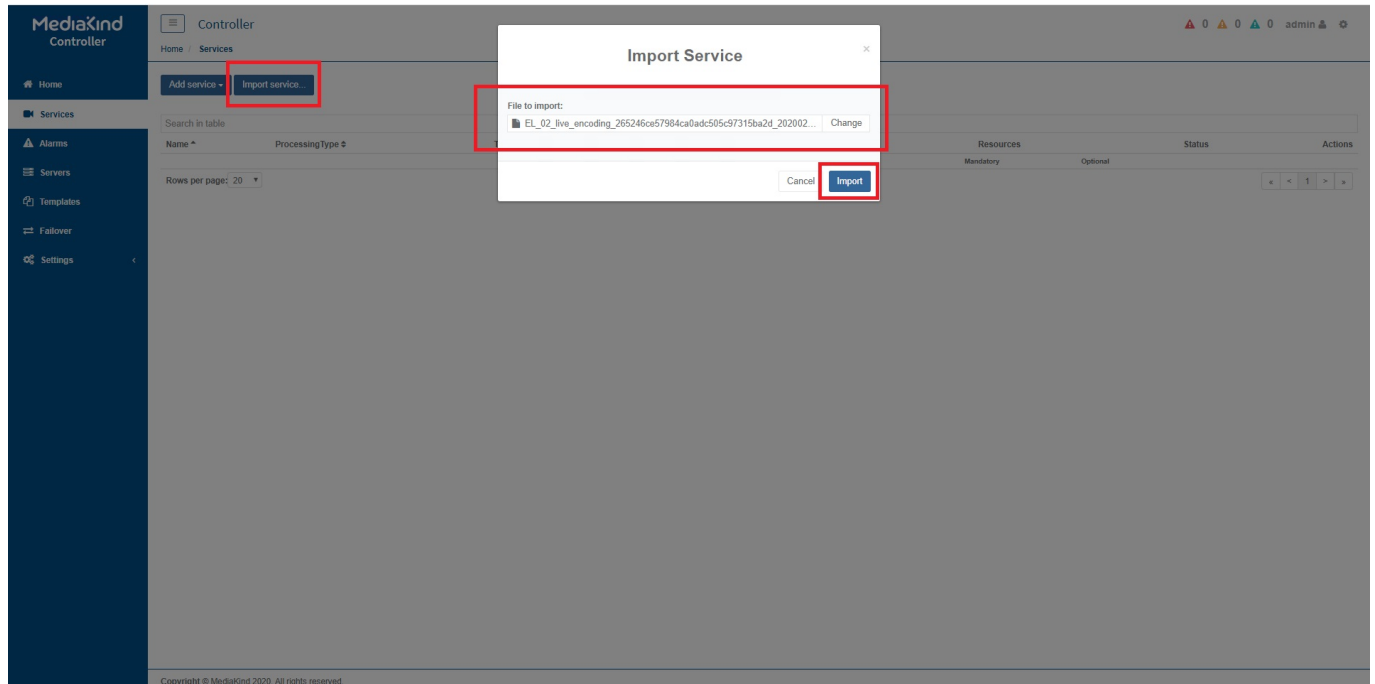
Upload Config to Encoding Live

Now that you have created some copies of the config from the primary Encoding Live server, you can upload each copy to your other Encoding Live servers.

In this example I am using two servers, so only need to upload one file.

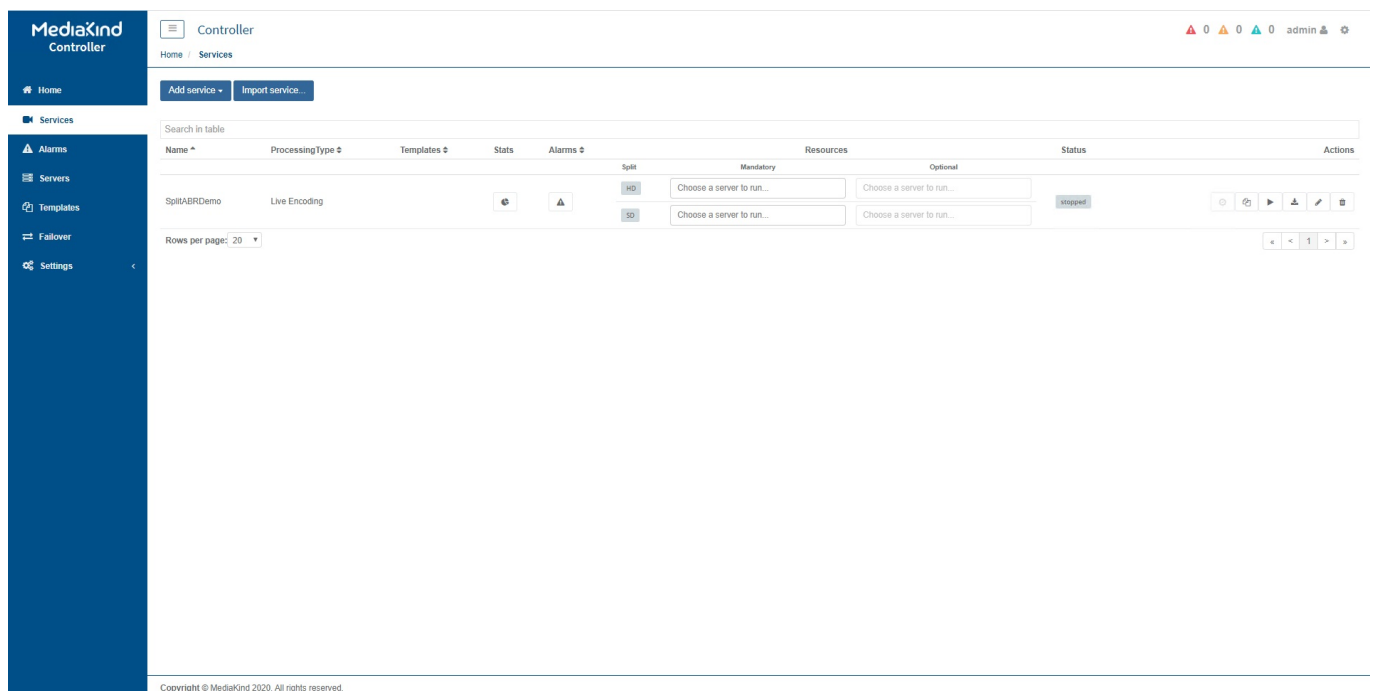
Web browse to your second Encoding Live server.

From the [Services page](#), click [Import Service](#).



Select the file you just edited and import it.

The second Encoding Live Service page will now look identical to Encoding Live Server 1.



All we have to do now is to set the server allocation.

Allocate Servers

The final part is to assign a server to each of the **Server Variants** (UHD/HD/SD) so that we force each Encoding Live server to only encode the profiles in their assigned Variant.

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Add service - Import service...

Search in table

Name	ProcessingType	Templates	Stats	Alarms	Split	Mandatory	Optional	Status	Actions
SplitABRDemo	Live Encoding				HD SD	<div>standalone X</div> <div>Choose a server to run...</div>	<div>Choose a server to run...</div> <div>Choose a server to run...</div>	stopped	

Rows per page: 20

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Search in table

Name	ProcessingType	Templates	Stats	Alarms	Split	Mandatory	Optional	Status	Actions
SplitABRDemo	Live Encoding				HD SD	<div>Choose a server to run...</div> <div>standalone X</div>	<div>Choose a server to run...</div> <div>Choose a server to run...</div>	stopped	

Rows per page: 20

On the Primary Encoding Live, set the server (standalone is the standard name for an appliance) standalone in the top variant/sever (HD). Set the standalone server in the bottom SD variant/server.

Now start the service on both Encoding Live server, and if all is well, you will have a Split ABR system with no errors.

Sync Alarm

If you see this alarm, or similar
Timestamps synchronization messages are not being received or are not synchronize for
service=2f73015aa94040ceb39b3cbffa37d2e3;;sdt=SplitABRTTest
If everything is configured okay, and you are using SDI input, SDI sync is not supported before around v10.3, so check your Encoding Live version.

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http://cameraangle.co.uk/doku.php?id=split_abr_encoding_with_appliances

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