FlipFactory[®] Delivering Multi-bitrate HTTP Streaming Files for iPhone



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Synopsis

HTTP live streaming enables video and audio to be sent from a Web server to iPhones, iPods, desktop computers, and other networked devices.

FlipFactory enables you to create and distribute these files. Media streams are encoded, segmented into smaller media files of equal duration, inventoried in an index file, then distributed (with the index file) to a selected destination.

Apple provides an iPhone media streaming guide (*HTTP Live Streaming Overview*) that explains: how the technology works, what formats are supported, how to set up live broadcast or VOD sessions, how to implement encryption and authentication, and how to set up alternate bandwidth streams. This guide can be downloaded from Apple's Web site at: *http://developer.apple.com/iphone*, then select *iPhone Development Guide*.

The purpose of this app note is to explain how to setup a factory to create iPhone files using FlipFactory. The iPhone files are created using the *IPTV Transport Stream* product for transcoding (multiple products required for multiple rates), segmented using the *iPhone Stream Segmenter Destination* in FlipFactory, then indexed with multiple streams combined by the IPhone notify.

For more information on how to transcode using the *IPTV Transport Stream*, see *Telestream App Note FlipFactory Encoding for IPTV & VOD Applications*, which can be downloaded from the Telestream Web site.

Creating iPhone Multi-bitrate Files

Note: This app note assumes you know how to create and configure factories in FlipFactory and how to submit jobs. Review the FlipFactory User's Guide for details. You will need an IPTV encoder license to create iPhone files. Please contact Telestream at licensing@telestream.net for assistance.

To create single-bitrate iPhone streams, only one FlipFactory factory is required. However, to produce multi-bitrate iPhone streams, two factories are required: one factory to perform transcoding at the various required rates (containing a separate IPTV product instance for each bitrate), and another factory to deliver the iPhone multi-bitrate file segments.

Note: In order for the first factory to have an existing target for its notification process (the delivery mechanism), the second factory must be created first and the Flip Engine restarted.

There are four main steps that must be taken to create and deliver multi-bitrate iPhone files:

- Build a factory to deliver iPhone segments with an associated index file to a local or remote destination: 1. Delivering iPhone Files (page 3)
- Create a configuration file for each desired bitrate using the Main Concept H.264 configuration program: 2. Creating Configuration Files (page 4)
- Build a FlipFactory factory to use IPTV products (one for each bitrate) to transcode input media sources: 3. Transcoding Media Input Sources (page 6)
- Submit an input media file to be ingested by the two-factory workflow: 4. Submitting Input Media Files (page 8)

1. Delivering iPhone Files

1. Create a factory with a Duplicate Original product. Add a Local Folder destination (or, optionally, a remote destination), then browse and create a new folder. Click the Save icon to save the factory:



2. The Flip Engine service must be restarted to activate the registry changes. On the desktop click Start > Run, then enter *services.msc* and click OK:

Run	? 🗙	1
1	Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.	
Open:	services.msc	——— Enter services.msc
		Click OK
	OK Cancel Browse	

3. In the Services window, select Flip Engine from the list of services and click Restart:

File Action View	Help				
← → 💽 🖆					
🍓 Services (Local)	Services (Local)	-			
	Flip Engine	Name #	Description Provides m		
	Stop the service	FLEXnet Licensing S	This servic		Select Flip Engir
	Restart the service	Google Software U Health Key and Cer	Google Up Manages h	~	- Click Restart
	Extended / Standard /	<	3		

2. Creating Configuration Files

1. Start up the Main Concept configuration tool by navigating to *C*:*Program Files**Telestream**FlipFactory**bin*, then run the application file *H264Configuration.exe*:

🔁 bin		
File Edit View Favorites	Tools Help 🥂	
🕒 Back 🝷 🕥 - 🏂 🍃	🔎 Search 🛛 😥 Folders 🛛 🛄 🗸	
Address 🛅 C:\Program Files\Teles	stream\FlipFactory\bin 🛛 💌 🛃 Go	Navigate to bin directory
Name 🔺	Size Type	
GXDecoder.ax	614 KB AX File	
GXEncoder.ax	733 KB AX File	
BI H264Compr.dll	467 KB Application Ext	
H264Configuration.exe	450 KB Application	Run configuration program
H264Encoder.ax	844 KB AX File	
HXEncoder.ax	593 KB AX File	
🔊 icudt221.dll	8,176 KB Application Ext	
🔊 icuin22.dll	596 KB Application Ext	
🔊 icuuc22.dll	520 KB Application Ext	
<	>	

2. When the Notice dialog box displays, Click OK:

Votice	X
This program launches a utility provided by MainConcep This utility was shipped with a Telestream product to pr this utility will all cases create a video essence compa MainConcept configuration files in their products be tho Telestream support.	CombH that generates a configuration file to control the Main Concept h.264 video compression libraries. svide an additional tool to help our customers create h.264 files. Telestream does not guarantee that libe with its products. Telestream recommends that all workflows and outputs generated using oughly tested by the user prior to operational deployment. For further assistance, please contact

3. Select H264_iPOD_640x480 from the Preset drop-down list, click the Basic Settings tab, and set the bitrate:

MainConcept AVC Video Encoder Dialog	? ×	
CANCER THE Gades Property AVC/H-264		Select H264 iPOD 649x480
Preset: H264_IPOD_640x480		
Basic Settings Advanced Settings		Click Basic Settings
Chroma Format 4:2:0	7	
Bit-depth Luma 8 bits]	
Bit-depth Chroma 8 bits] _	
Bitrate		
Bitrate Mode Variable Bitrate		
Target Bitrate (bps) 970048		Set bitrate, etc.
Max bitrate (bps) 1200000		
Units		
Bitrate buffer [bytes], VBV buffers [%]		
Bitrate buffer [bits], VBV buffers [bits]		
	2 💌	

4. Select the Advanced Settings tab, select *Baseline* from the Profile drop-down list and 3.0 from the Level drop-down list, then click the Save icon:

MainConcept AVC Video Encoder Dialog	? ×
CHART THE CASE PROVING AVC/Ho264	
Preset: H264_POD_640x480	
Basic Settings Advanced Settings	Select Advanced Settings tab
Profile: Baseline	Select Baseline
Level: 3.0 💌	Select 3.0
GOP Structure	
Enable scene detection	Click the Save icon to save the file
I-frame interval 32	
Min. I-frame distance	
Mark every 1 - I-frame as IDR.	
Fixed I-frames distance	
B-frame settings	
Adaptive B-frame placement	
8	
1	

Note: H264_iPOD_649x480 forces a specific configuration of settings. Other configurations can be created by modifying these settings as needed.

5. When the Save dialog box displays, enter a .cfg file name and click Save:

Save Config File		×	
V Telestream + Transcode +	· bin • 🔹 🛃	Search	
File name:			Enter a .cfg file name
Save as type: Config Files (*.cfg *.ini)		•	
	N		Click Save
Browse Folders	1	Save Cancel	

6. Repeat steps 4 and 5 above to create other required configuration files (one for each desired bitrate), then click the green check mark to close the configuration program:

GOP Structure	
I-frame interval 33 荣 💌	
	Click green check mark to close

3. Transcoding Media Input Sources

To create a factory and configure it to produce multi-bitrate iPhone files, follow these steps:

- 1. Create a new factory and name it (*Multirate iPhone*, for example), then add a monitor that will detect media files to be submitted.
- 2. Add an *IPTV Transport Stream* product to transcode the input media file. This does not encode the media into the iPhone format, which is accomplished in the next section 1. Delivering iPhone Files (page 3):

	FlipFactory Manage		1
C	Manage Factories		
	🙁 💥 🖪 💿 🗏 🏀 🔝	1 Product	
		IPTV Transport Stream Keyframe Matrox MPEG Layer-3 Elementary Stream V	— Add IPTV Transport Stream
	Process/Analyze Products Product Notifications	Matrox MPEG Layer-3 Elementary Stream	

3. Select *H.264 Configuration File Import* for the Video Codec. Browse to and select the configuration file for the desired bitrate:

FlipFactory Manage		
Manage Factories		
P ☐ demo (Demo)	lptv Stream	
P C iphone Monitors Process/Analyze	H.264 Configuration File Import	Select H.264 Configuration File Import
Products P C IPTV Transport Stream (10)	Configuration File	Pre-import
P ☐ (PTV Transport Stream)	C/10.cfg Browse	configuration file
Filters	Insert Closed Captions	
C ☐ Notifications	Program Map Table PID	
T.	481 PMT PID Value	
	16 8190	
	3	

 Scroll down in the IPTV configuration window to Audio Streams and check Stream 1 (and make sure the other streams are unchecked), then click the < icon to open Stream 1 configuration:

Audio Format Selection		
Audio Re-encode	_	
Audio Sample Rate		Check Stream 1
48000	▼ Hz	
Audio Streams		Uncheck Streams 2-4
🖌 Stream 1	«	1
Stream 2	«	Click < icon
Stream 3	« ·	
Stream 4	≪	

5. Set Audio Codec to Advanced Audio Coding (AAC):

Audio Sample Rate	
48000 V Hz	
Audio Streams	
✓ Stream 1 🛛 👋	
Audio Codec	
Advanced Audio Coding (AAC)	Set Audio Codec to Advanced
Audio Profile	Addio County (AAC)
Stereo	
Audio Bit Rate	
128000 vits/second	

6. Add an iPhone Stream Segmenter destination for <u>each</u> IPTV Transport Stream product. In each iPhone Stream Segmenter destination, browse to and select the location of the destination folder. Set the location of the index file, then set the length of each segment and the bitrate:



Note: The Base URL is usually the same for multiple bitrates, but not required. The Filename suffix is used to distinguish files of different bitrates and should be unique for each bitrate.

7. Add additional IPTV products (one for each bitrate), as needed:

FipFactory Manage		
Manage Factories		
demo (Demo) fibone Monitors Process/Analyze Products Products Proflex Products Products	iptv Stream Video Codec H.264 Configuration File Configuration File C110.cfg Insert Closed Captions Insert Closed Captions Program Map Table PID 431 PMT PID Value 16	Add more IPTV products,

 To make the results of this factory available to the second factory, add the iPhone Multi-Rate Forward notification and select the iPhoneMR factory. Browse to and create the Variant Index folder where the index file is stored:

FlipFactory Manage		
Manage Factories		 Add iPhone Multi-Rate notification
• • • • • • • • • • • • • • • • • • •	iPhone Multi-Rate Forward Priority 10 Low High Account Username demo Factory babageMP	Salact iPhoneMP factory
	Account Password Create Variant Index in Folder C:liphonemr Index suffix main	Browse to and create the Variant Index folder

4. Submitting Input Media Files

1. To test this two-factory workflow, submit a media file to the monitor folder of the first factory:



2. Open the job status window and wait for both factories to report Complete:



3. Examine the destination folder to ensure the iPhone segmented files are present:



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