MainConcept 2GO OTT File Transcoder HLS
User Guide

Contents

1. Introduction

The MainConcept 2GO OTT File Transcoder HLS is an optimized Docker container for transcoding file-based media archives into adaptive streaming format Apple HLS as AVC/H.264 in MPEG-2 Transport Stream and HEVC/H.265 in fMP4 for playback on iOS and Android devices. The included packager creates ready-to-use manifest and playlist files that are ready for uploading to a CDN (Akamai & CloudFront) or HTTP servers.

Features:
- Adaptive Bitrate Stream Encoding to HLS up to 4K
- HLS Layers Packaging and playlist generation
- Wide range of ingest codecs and formats
- Hybrid playlist generation and packaging for HLS AVC and HEVC

Presets:
- HLS AVC (TS)
- HLS HEVC (fMP4)

2. Installation

Before installing MainConcept 2GO, please ensure Docker is installed correctly.

2.1 Installing Docker

To download and install Docker on your server, please follow the instructions here:
www.docker.com/community-edition
After successful installation you should be able to run the Docker "hello-world" container.
Example output from the Docker hello-world container:

```
$ docker run hello-world

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub. (amd64)
3. The Docker daemon created a new container from that image which runs the executable
that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it to your
terminal.
```

If you see different output, please refer to the Docker installation guide.

2.2 Resources for Docker

On Windows machines there is a default limitation of resources available for Docker. It could be adjusted in the "Settings > Advanced" section. For more information, please check the official website: docs.docker.com/docker-for-windows.

2.3 Installing MainConcept 2GO

1) **Extract the MainConcept 2GO package**
   To install your MainConcept 2GO product, first unpack the ZIP file you downloaded into a new folder on your computer. The files within the folder depend on the 2GO product.

```
total 40
drwxrwxr-x 2 thomas thomas  4096 Apr 10 14:23 docker
-rw-rw-r-- 1 thomas thomas 17835 Apr 10 14:23 EULA.txt
-rw-rw-r-- 1 thomas thomas    77 Apr 10 14:23 info.txt
-rw-rw-r-- 1 thomas thomas  2721 Apr 10 14:23 readme.txt
-rw-rw-r-- 1 thomas thomas  4096 Apr 10 14:23 scripts
-rw-rw-r-- 1 thomas thomas  4096 Apr 10 15:10 volume
~/MainConcept/2GO/mc_2go_ mc_2go_ott_file_transcoder_hls_demo# █
```

2) **Install the MainConcept 2GO docker image**
   To install the MainConcept 2GO image in your local Docker environment, "cd" into the docker folder and run the "install_image" script:

```
~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo# cd docker/
~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo/docker# ./install_image.sh
Installing MainConcept 2GO in your local Docker environment...
e6bc3d95b8d4: Loading layer [============================>] 28.87MB/28.87MB
Loaded image: mc_2go_ott_file_transcoder_hls_demo:latest
~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo# █
```

Verify whether the 2GO container is installed properly by using the "docker image ls" command:

```
~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo/docker# docker image ls
REPOSITORY                           TAG      IMAGE ID      CREATED       SIZE
mc_2go_ott_file_transcoder_hls_demo  latest   2e15d1d96bd9  3 hours ago   39.9MB
~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo/docker# █
```

> **NOTE:**
> *For using both the demo and full version of MainConcept 2GO, you must allow the server running MC2GO a connection to https://taas-reporting-srv.mainconcept.com.*
>
> *If you want to use the products offline (i.e. without internet connection), please contact customer.care@mainconcept.com. We will get in touch with you about the necessary steps.*

3. Settings

3.1 Supported Input Codecs & Formats

MainConcept 2GO OTT File Transcoder HLS supports the following input codecs and formats:

- **Video:** MPEG-1/2, MPEG-4 Part 2, H.263, VC-1, HEVC/H.265, AVC/H.264, DV / DVCPRO, JPEG 2000, Apple ProRes, DNxHD, DNxHR
- **Audio:** PCM / LPCM, MPEG Layer 1/2/3, AAC / HE-AAC, WMA, AMR, RAW / WAV, DV, AC-3, E-AC-3
- **Container:** Elementary Streams, MPEG-2 Program Stream / Transport Stream, MP4, 3GP, F4V, ASF, DV, DIF, MJ2, MXF, RAW, MOV

3.2 Supported Output Formats

MainConcept 2GO OTT File Transcoder HLS has support for the following output formats.

- HLS AVC (AVC/H.264 (8-bit) video and AAC LC audio) including fMP4 and MPEG-2 TS packaging and playlist / master playlist file generation
- HLS HEVC (HEVC/H.265 (8-bit) video and AAC LC audio) including fMP4 packaging and MPD / manifest file generation
- Hybrid playlist generation with AVC in TS and HEVC in fMP4

4. Configuration

With Docker installed most of the MainConcept 2GO configuration is complete. However, some 2GO products require shared folders, or specific parameters at startup.

4.1 Configuring shared folders

To read and write files located on the host computer, MainConcept 2GO uses shared volumes to access the filesystem of the host. Docker uses mounted volumes to share host folders with 2GO containers.

The "run" convenience script in the scripts folder runs the MainConcept 2GO container and automatically maps the required folders from your host computer into the 2GO container.

5. Usage

5.1 Starting MainConcept 2GO

Make sure you have successfully installed your MainConcept 2GO product on the computer by following the Installation instructions.

The "run" script inside the scripts folder makes starting MainConcept 2GO easy and lets you understand how 2GO docker containers are actually run. If you plan to run MainConcept 2GO through container management tools like Docker Compose, Kubernetes or Docker Swarm, it is recommended that you understand the parameters required for 2GO containers by reading the "run" script.

MainConcept 2GO products require passing configuration parameters to the container at startup. These can include input and output filenames, serial keys, shared volume folders or external URLs. These parameters can be specified in a properties file or via the command line.

5.2 Using job description file

MainConcept 2GO v2.1 introduces a REST API and provides users an interface that is more suitable for integration with their existing environment or tools. This API covers functionality to create jobs and query their status using standard REST API over HTTP. A job description file is posted to the endpoint, which must be in JSON format. This JSON file must contain all the necessary parameters required for the submitted jobs.

Option	Sample value	Description
INPUT		Source filename for audio conversion; must be in or under SHARED_PATH_IN
OUTPUT	test.mp4	Target filename for encoded output; the file extension will be created by 2GO; must be in or under SHARED_PATH_OUT File Extension (AVC): *.ts File Extension (HEVC): *.mp4
PRESETNAME	Apple Hybrid HLS AVC TS HEVC fMP4 Audio	Preset name for Apple HLS generation when using original MainConcept preset(s) included with the Docker container. Note: When PRESETNAME is used, PRESET must not be used.
PRESET	<folder_in_shared_path>/Apple Hybrid HLS AVC TS HEVC fMP4 Audio.mps	Custom preset file(s) (MPS); must be in or under SHARED_PATH_IN volume outside of the Docker container. Note: When PRESET is used, PRESETNAME must not be used.

VIDEO_LEVELS	v3-avc,v5-avc,v7-avc,v4-hevc,v8-hevc	• Video levels / layers in the preset files. For non-hybrid preset, only v1,v2,v3, etc.is used.
AUDIO_LEVELS	a1	Audio levels / layers in the preset files.
VERBOSITY	SILENT	Sets verbose level. Available options are: • SILENT (0) - Prints only error messages • DEFAULT (1) - Default level if verbose level is not specified. Prints information about input file, output file, preset. Prints information about REST API calls (target URLs with parameters, no BODY info). • FULL (2) - Prints all available information, including processing status, file transfer, REST API calls (target URLs with parameters with BODY info), complete information from processing step.
EP_CONTENT	TRUE	Prevents deletion of temporary content (e.g. downloaded, transcoded). Default value is FALSE.
TRIM_IN	3.330s	In point in seconds (e.g. 3.330s) or in frames (e.g. 250f). Regarded as the start point if specified.
TRIM_OUT	250f	Out point in seconds (e.g. 3.330s) or in frames (e.g. 250f). Regarded as the end point if specified.
LOGO_PATH		Path to the file. Overlays PNG image onto video stream. Note: Path to local file should be relative to SHARED_PATH_IN.
LOGO_OFFSET_LEFT	123	Horizontal offset from left-top corner of the frame in pixels.
LOGO_OFFSET_TOP	45	Vertical offset from left-top corner of the frame in pixels.
LOGO_BEGIN_TIME	3.330s	The time from which the logo appears in seconds (e.g. 3.330s).
LOGO_END_TIME	8.330s	The time from which the logo disappears in seconds (e.g. 8.330s).

To edit the parameters of the JSON file, use a text editor. Here are some examples:

```
{
    INPUT": "ftp://10.144.41.202:2121/test.mp4",
    "OUTPUT": "ftp://10.144.41.202:2121/test/123AB0CD",
    "PRESETNAME": "Apple Hybrid HLS AVC TS HEVC fMP4 Audio",
    "VIDEO_LEVELS": "v3-avc,v5-avc,v7-avc,v4-hevc,v8-hevc",
    "AUDIO_LEVELS": "a1",
    "KEEP_CONTENT": "TRUE",
    "VERBOSITY": "FULL"
}

{
    "INPUT": "/volume/test.mp4",
    "OUTPUT": "/volume_out/123AB0CD",
    "PRESET": "Apple Hybrid HLS AVC TS HEVC fMP4 Audio.mps",
    "VIDEO_LEVELS": "v3-avc,v5-avc,v7-avc,v4-hevc,v8-hevc",
    "AUDIO_LEVELS": "a1",
    "KEEP_CONTENT": "TRUE",
    "VERBOSITY": "FULL"
}
```

5.3 Preset Usage

Apple Hybrid HLS AVC TS HEVC fMP4 audio.mps:

MC2GO value	Video Settings	Audio Settings	Muxer Settings
v1-avc	Layer 1: AVC/H.264, 8-bit, 416x234, 145 kb, 16x9		TS
v2-avc	Layer 2: AVC/H.264, 8-bit, 480x270, 365 kb, 16x9		TS
v3-avc	Layer 3: AVC/H.264, 8-bit, 640x360, 730 kb, 16x9		TS
v4-avc	Layer 4: AVC/H.264, 8-bit, 768x432, 1100 kb, 16x9		TS
v5-avc	Layer 5: AVC/H.264, 8-bit, 960x540, 2000 kb, 16x9		TS
v6-avc	Layer 6: AVC/H.264, 8-bit, 1280x720, 3000 kb, 16x9		TS
v7-avc	Layer 7: AVC/H.264, 8-bit, 1280x720, 4500 kb, 16x9		TS
v8-avc	Layer 8: AVC/H.264, 8-bit, 1920x1080, 6000 kb, 16x9		TS
v9-avc	Layer 9: AVC/H.264, 8-bit, 1920x1080, 7800 kb, 16x9		TS

v1-hevc	Layer 1: HEVC/H.265, 8-bit, 416x234, 145 kb, 16x9		fMP4
v2-hevc	Layer 2: HEVC/H.265, 8-bit 480x270, 300 kb, 16x9		fMP4
v3-hevc	Layer 3: HEVC/H.265, 8-bit, 640x360, 660 kb, 16x9		fMP4
v4-hevc	Layer 4: HEVC/H.265, 8-bit, 768x432, 990 kb, 16x9		fMP4
v5-hevc	Layer 5: HEVC/H.265, 8-bit, 960x540, 1700 kb, 16x9		fMP4
v6-hevc	Layer 6: HEC/H.265, 8-bit, 1280x720, 2400 kb, 16x9		fMP4
v7-hevc	Layer 7: HEVC/H.265, 8-bit, 1280x720, 3200 kb, 16x9		fMP4
v8-hevc	Layer 8: HEVC/H.265, 8-bit, 1920x1080, 4500 kb, 16x9		fMP4
v9-hevc	Layer 9: HEVC/H.265, 8-bit, 1920x1080, 5800 kb, 16x9		fMP4
v10-hevc	Layer 10: HEVC/H.265, 8-bit, 2560x1440, 8100 kb, 16x9		fMP4
v11-hevc	Layer 11: HEVC/H.265, 8-bit, 3840x2160, 11600 kb, 16x9		fMP4
v12-hevc	Layer 12: HEVC/H.265, 8-bit, 3840x2160, 16800 kb, 16x9		fMP4
a1		Layer 1: AAC-LC, stereo, 128 kbps, 48 khz, 16-bit	TS*/fMP4*

* For HLS AVC in TS as well as for HLS HEVC in fMP4, video and audio are muxed into separate containers.

Apple HLS AVC TS 16x9.mps:

MC2GO value	Video Settings	Audio Settings	Muxer Settings
v1	Layer 1: AVC/H.264, 8-bit, 416x234, 145 kb, 16x9		TS
v2	Layer 2: AVC/H.264, 8-bit, 480x270, 365 kb, 16x9		TS
v3	Layer 3: AVC/H.264, 8-bit, 640x360, 730 kb, 16x9		TS

MC2GO value	Video Settings	Audio Settings	Muxer Settings
v4	Layer 4: AVC/H.264, 8-bit, 768x432, 1100 kb, 16x9		TS
v5	Layer 5: AVC/H.264, 8-bit, 960x540, 2000 kb, 16x9		TS
v6	Layer 6: AVC/H.264, 8-bit, 1280x720, 3000 kb, 16x9		TS
v7	Layer 7: AVC/H.264, 8-bit, 1280x720, 4500 kb, 16x9		TS
v8	Layer 8: AVC/H.264, 8-bit, 1920x1080, 6000 kb, 16x9		TS
v9	Layer 9: AVC/H.264, 8-bit, 1920x1080, 7800 kb, 16x9		TS
a1		Layer 1: AAC-LC, stereo, 128 kbps, 48 khz, 16-bit	TS**

** For HLS AVC in TS, video and audio are muxed into a single container.

Apple HLS HEVC fMP4 16x9.mps:

MC2GO value	Video Settings	Audio Settings	Muxer Settings
v1	Layer 1: HEVC/H.265, 8-bit, 416x234, 145 kb, 16x9		fMP4
v2	Layer 2: HEVC/H.265, 8-bit, 480x270, 300 kb, 16x9		fMP4
v3	Layer 3: HEVC/H.265, 8-bit, 640x360, 660 kb, 16x9		fMP4
v4	Layer 4: HEVC/H.265, 8-bit, 768x432, 990 kb, 16x9		fMP4
v5	Layer 5: HEVC/H.265, 8-bit, 960x540, 1700 kb, 16x9		fMP4
v6	Layer 6: HEC/H.265, 8-bit, 1280x720, 2400 kb, 16x9		fMP4
v7	Layer 7: HEVC/H.265, 8-bit, 1280x720, 3200 kb, 16x9		fMP4
v8	Layer 8: HEVC/H.265, 1920x1080, 4500 kb, 16x9		fMP4
v9	Layer 9: HEVC/H.265, 1920x1080, 5800 kb, 16x9		fMP4

v10	Layer 10: HEVC/H.265, 8-bit, 2560x1440, 8100 kb, 16x9		fMP4
v11	Layer 11: HEVC/H.265, 8-bit, 3840x2160, 11600 kb, 16x9		fMP4
v12	Layer 12: HEVC/H.265, 8-bit, 3840x2160, 16800 kb, 16x9		fMP4
a1		Layer 1: AAC-LC, stereo, 128 kbps, 48 khz, 16-bit	fMP4***

*** For HLS HEVC in fMP4, video and audio are muxed into separate containers.

5.4 Using properties file

The easiest way to start MainConcept 2GO is by editing the "properties.txt" file to your needs and then executing the "run" script with this file.

```
~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo# ./scripts/run.sh
scripts/properties.txt
```

The MainConcept 2GO OTT File Transcoder HLS supports the following configuration options:

Option	Sample value	Description
ACCEPT_EULA	YES	Required
CUSTOMER_ID		User's unique identifier, provided by MainConcept after purchase. Customer ID parameter can also be specified more concisely as `CID`
SHARED_PATH_IN	/path/source_folder	Optional: Folder where the input file is located
SHARED_PATH_OUT	/path/target_folder	Optional: Folder for the encoded output file
JOBS	/path/to/json_file	Optional: Specify a job JSON file for immediate processing
PORT	8082	Specify port for REST API. Default value is 8080.
AUTOSTART	TRUE, FALSE	Disable/enable job queue processing when Docker runs. FALSE sets the service to a stopped state after the Docker runs. Default value is TRUE.
VERBOSITY	SILENT	Sets verbose level. Available options are: - SILENT (0) - Prints only error messages

		- DEFAULT (1) - Default level if verbose level is not specified. Prints out the copyright/version information - FULL (2) - Higher verbose level. Prints all available information including command-line parameters INPUT / OUTPUT / PRESETS / SERIAL
TRIM_IN	3.330s	In point in seconds (e.g. 3.330s) or in frames (e.g. 250f). Regarded as the start point if specified.
TRIM_OUT	250f	Out point in seconds (e.g. 3.330s) or in frames (e.g. 250f). Regarded as the end point if specified.
LOGO_PATH		Path to the file. Overlays PNG image onto video stream. Note: Path to local file should be relative to SHARED_PATH_IN.
LOGO_OFFSET_LEFT	123	Horizontal offset from left-top corner of the frame in pixels.
LOGO_OFFSET_TOP	45	Vertical offset from left-top corner of the frame in pixels.
LOGO_BEGIN_TIME	3.330s	The time from which the logo appears in seconds (e.g. 3.330s).
LOGO_END_TIME	8.330s	The time from which the logo disappears in seconds (e.g. 8.330s).

To edit the parameters, use a text editor:

```
1   ACCEPT_EULA=Y
2   SHARED_PATH_IN=~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo/volume
3   SHARED_PATH_OUT=~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo/volume
4   JOBS=~/path/to/json_file
5   PORT=8082
6   AUTOSTART=TRUE
7   CUSTOMER_ID=xxx
8   VERBOSITY=DEFAULT
```

Using command line options

Instead of editing a properties file, all configuration parameters can also be specified on the command line directly.

```
~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo/docker# ./scripts/run.sh \
>    ACCEPT_EULA=Y \
>    SHARED_PATH_IN=~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo/volume \
>    SHARED_PATH_OUT=~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo/volume \
>    JOBS=~/path/to/json_file \
>    PORT=8082 \
>    AUTOSTART=TRUE \
>    CUSTOMER_ID=xxx \
>    VERBOSITY=DEFAULT█
```

Using docker-compose

Docker Compose lets you start multiple replicas of the same image. It also significantly simplifies starting MainConcept 2GO products.

Docker Compose is a separate tool that must be installed in addition to Docker. Please refer to the documentation about how to install and setup Compose: docs.docker.com/compose/

To run MainConcept 2GO with Docker Compose you create a compose file in YAML. All parameters to run the 2GO product via Docker Compose are specified inside this YAML file. To simplify deployment of MainConcept 2GO containers, setting environment variables for the 2GO configuration and then using them in the YAML file is recommended.

This is a basic "docker-compose.yml" file showing how to configure MainConcept 2GO.

```
1  version: '2.2'
2  services:
3    2go:
4      image: 2go_ott_file_transcoder_hls_demo
5      network_mode: host
6      volumes:
7      -${2GO_VOLUME}:/volume
8      environment:
9      -2GO_PARAMS=${2GO_PARAMS}
```

It uses two environment variables 2GO_VOLUME and 2GO_PARAMS. These must be set before starting docker-compose.

```
~# export 2GO_VOLUME=~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo/volume/
~# export 2GO_PARAMS="INPUT=avchd_camera_testfile.mts OUTPUT=out_file
PRESET=presets/Apple HLS HEVC fMP4 16x9.mps SERIAL=serials.txt"
```

After that starting 2GO using Docker Compose is as easy as:

```
~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo# docker-compose up -d
Starting mc2goottfiletranscoder_hlsdemo_2go_1 ...
Starting mc2goottfiletranscoderhlsdemo_2go_1 ... done
~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo#
```

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5.5 Stopping MainConcept 2GO execution

MainConcept 2GO containers should be stopped using the convenience "stop" script provided in the scripts folder.

To execute the script on an active container you first need to know the container ID. This can be found from the first column of the docker ps command:

```
~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo# docker ps
CONTAINER ID  IMAGE                                COMMAND              CREATED
bc45686deb0e  mc_2go_ott_file_transcoder_hls_demo "/opt/bin/reporting_..." 4seconds ago
```

Then use the convenience "stop" script in the scripts folder to abort the 2GO execution:

```
~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo# ./scripts/stop.sh bc45686deb0e
Stopping the OTT File Transcoder HLS...
OTT File Transcoder HLS stopped.
~/MainConcept/2GO/mc_2go_ott_file_transcoder_hls_demo# █
```

If you are using the REST API, you also have the opportunity to shut down the container by using DELETE /service. If a job is currently active, the container is not shut down and this function is ignored. In this case you need to abort the job first using POST /jobs/{jobID}/abort

6. Technical Support

If you need additional assistance, the MainConcept Technical Support team is standing by to help. Send an e-mail to apps.support@mainconcept.com or go to the MainConcept Support page and we'll assist you as quickly as possible.

7. Credits

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Fraunhofer Institute for Integrated Circuits IIS
Attention: Audio and Multimedia Departments - MC AAC LL
Am Wolfsmantel 33, 91058 Erlangen, Germany
www.iis.fraunhofer.de/amm
amm-info@iis.fraunhofer.de

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