

Multimedia Framework Architecture in S60 Devices

Version 1.0; February 26, 2007

S60 devices have many audio and video codecs. The availability of these codecs and their performance are device-dependent. Also, there are several APIs that a third-party application can use to access these codecs.

- Audio decoders can be accessed using the following APIs: DevSound, CMdaAudioOutputStream, CMMFCodec, CmdaAudioPlayerUtility.
- Audio encoders can be accessed using the following APIs: DevSound, CMdaAudioInputStream, CMMFCodec, CmdaAudioRecorderUtility.
- Video decoders can be accessed using the following APIs: CVideoPlayerUtility (video and audio).
- Video encoders can be accessed using the following APIs: MDF DevVideoRecord, CVideoRecorderUtility (video and audio).

For more details on how to use these APIs, please see the following Forum Nokia resources:

- [Developing Mobile Music Applications for S60 Devices](#)
- [Mobile Video Development](#)
- [S60 Platform: Image and Video Captuing](#)

The APIs for accessing codecs can be classified into two types: low-level APIs and high-level APIs.

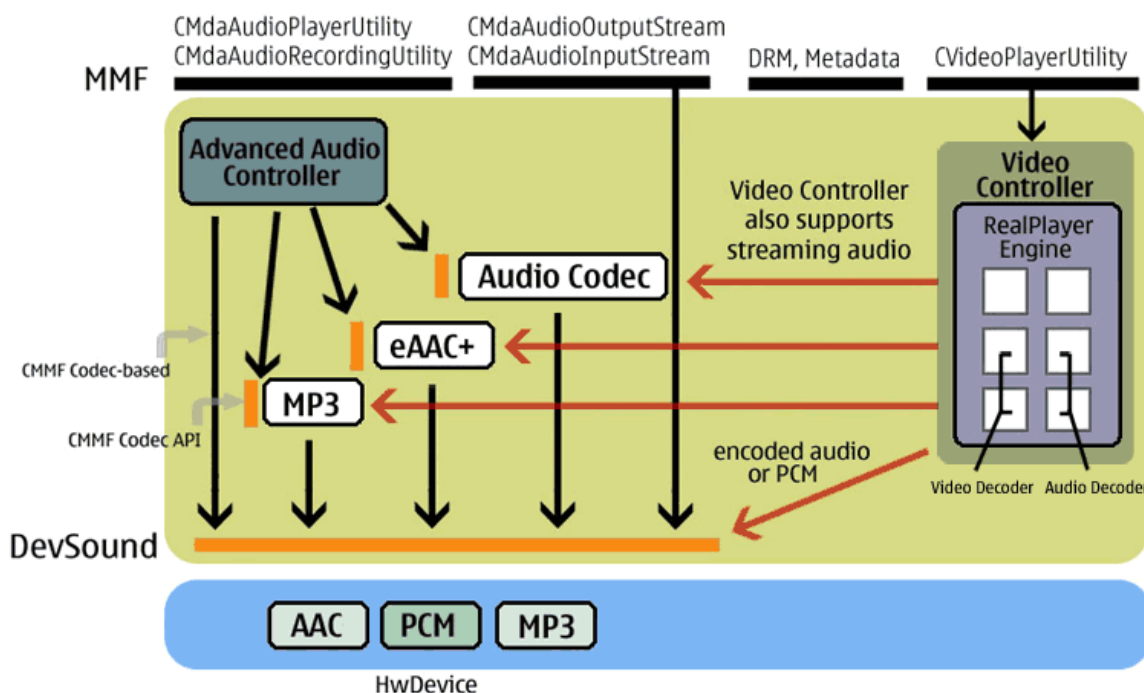
The low-level APIs are:

- MDF DevVideoRecord, used to access video encoders (and preprocessors);
- DevSound, used to access audio encoders and decoders.

MDF and DevSound codecs can be accelerated or all-ARM (which means they run fully in software). MDF and DevSound codecs, accelerated or not, are sometimes referred to as HwDevice.

Not all audio codecs are implemented below DevSound. Some audio codecs are implemented at the MMF level, using the CMMFCodec interface (see illustration below). Video decoders can be implemented inside RealPlayer Engine, fully in software, or using hardware acceleration.

Multimedia Framework (MMF) Architecture



The high-level APIs (also called MMF client APIs) are:

- `CMdaAudioOutputStream`, used to access DevSound decoders directly. This API acts like a pass-through API; all decoders available through DevSound are also available through `CMdaAudioOutputStream`.
- `CMdaAudioInputStream`, used to access DevSound encoders directly. This API acts like a pass-through API; all encoders available through DevSound are also available through `CMdaAudioInputStream`.
- `CMdaAudioPlayerUtility`, used to access a subset of all audio decoders (and file formats) for playing audio. This API is an interface to the MMF Controllers available on a device. An MMF Controller is able to use either a DevSound decoder or a `CMMFCodec` decoder. Some DevSound or `CMMFCodec` decoders may not have an MMF Controller that uses them, so in this case they are not available through the `CMdaAudioPlayerUtility` API.
- `CMdaAudioRecordingUtility`, used to access a subset of all audio encoders (and file formats) for recording audio to files. This API is very similar to `CMdaAudioPlayerUtility`, but it is used for encoding. The API is an interface to the MMF Controllers available on a device. An MMF Controller is able to use either a DevSound encoder or a `CMMFCodec` encoder. Some DevSound or `CMMFCodec` encoders may not have an MMF Controller that uses them, so in this case they are not available through the `CMdaAudioRecordingUtility` API.
- `CVideoPlayerUtility`, used to access the RealPlayer Engine, which uses a subset of audio decoders and a subset of video decoders (on most mobile devices it uses all the video decoders). Using this API, an application can play a file (if supported), or play a stream (if supported), but it cannot pass encoded memory buffers to the RealPlayer.
- `CVideoRecorderUtility`, used to access MMF Controllers that capture audio and video frames from a mobile device's camera, encode them, and store the encoded audiovisual streams to a file. Usually, there is only one such MMF Controller in a device. As stated before, an MMF Controller can access DevSound, MDF, and `CMMFCodec` decoders. The audio and video encoding combinations are limited.

In practice, MMF Controllers will cover a big subset of the available codecs on the device, but usually will not cover all codecs. Some codecs can be available as HwDevice (below DevSound) or

CMMFCodec, or even both. An MMF Controller will usually use the HwDevice version, if available, but the CMMFCodec can be present as well. In some use cases, an application must use nonaccelerated codecs even if a better-performing HwDevice is present on the device, because some hardware resources are reserved (not available, for example if some other accelerated codecs are running at the same time).

Video Codec Table	RealVideo 8,9,10	H.263 & MPEG-4	H.264
MDF DevVideoRecord (HW accelerated encoders)		30H1 30H3 31H1	
MDF DevVideoRecord (software encoders)		30H2 (2) 30H3 31H1 31H2	
CVideoPlayerUtility (RealPlayer codecs/wrappers)	30H1 (1) 30H2 30H3 31H1 31H2	30H1 (1) 30H2 30H3 31H1 31H2	30H1 (1)(3) 30H3 31H1 31H2

S60 3rd Edition

30H1: Nokia N71, N72, N73, N75, N80, N91, N92, E60, E61, E70

30H2: Nokia 3250, 5500, E50, E62

30H3: Nokia N93

S60 3rd Edition Feature Pack 1:

31H1: Nokia N95

31H2: Nokia 6290

Video codecs

(1) RealVideo, H.263/MPEG-4 and H.264 decoders in S60_3rd_HW1 are HW accelerated

(2) Without (not in): Nokia E62

(3) Without (not in): Nokia E-Series phones (Nokia E60, E61, E70)

Audio codecs

(1) CMMFCodec-based AAC encoder present, but there is no MMF Controller to use this codec alone. AAC encoding used in capturing video from mobile phone's camera, or getting AAC encapsulated inside mp4 file format (without video).

(2) Not in Nokia N80, N91

(3) Not in Nokia 5500

(4) Not in Nokia E60, E61, E65, E70, N91

(5) Not in Nokia N92,

(6) Not in Nokia N91

(7) Not in Nokia E60, E61, E70

(8) Not in Nokia 5500, E50,

(9) Not in Nokia 5500

(10) Not in Nokia E62

Audio Codec Table	AMR-WB truetones	RealAudio 1, 7	Real Audio10	mp3	AAC (both LC and LTP)	AAC+, eAAC+	WMA	AMR-NB	G.711, iLBC, G729	SBC
DevSound, CMdaAudioOutputStream (HW accelerated decoders)	30H1 30H3 31H1	30H1	30H1	30H1 30H3 31H1	30H1 30H3 31H1			30H1 30H3 31H1	30H1 30H3 31H1	
DevSound, CMdaAudioOutputStream (software decoders)	30H2 31H2			30H2 31H2				30H2 31H2		
DevSound, CMdaAudioInputStream (HW accelerated encoders)					30H3			30H1 30H2 30H3 31H1 31H2	30H1 30H3 31H1	
DevSound, CMdaAudioInputStream (software encoders)										30H1 30H2
CVideoPlayerUtility (RealPlayer codec/wrapper)	30H1 30H2 30H3 31H1 31H2	30H1 30H2 30H3 31H1 31H2	30H1 30H2 30H3 31H1 31H2	30H1 30H2 30H3 31H1 31H2				30H1 30H2 30H3 31H1 31H2		
CMdaAudioPlayerUtility (supported by MMF)	30H1 30H2 30H3 31H1 31H2			30H1 30H2 30H3 31H1 31H2	30H1 30H2 30H3 31H1 31H2	30H1 30H2 30H3 31H1 31H2	30H1 (7) 30H2 (1) 30H3 31H1 31H2	30H1 30H2 30H3 31H1 31H2		
CMdaAudioRecorderUtility (supported by MMF)					(1)			30H1 30H2 30H3 31H1 31H2		
CMMFCodec (decoder)	30H1 (2) 30H2 (3) 30H3 31H1 31H2			30H1 (6) 30H2 (9) 30H3 31H1 31H2	30H1 (5) 30H2 30H3 31H1 31H2	30H1 30H2 30H3 31H1 31H2	30H1 30H2 30H3 31H1 31H2	30H1 (4) 30H2 (8) 30H3 31H1 31H2		
CMMFCodec (encoder)					30H1 30H2 30H3 31H1 31H2			30H1 (4) 30H2 (8) 30H3 31H1 31H2		

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