



Supported Media Formats

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This document describes the media codec, container, and network protocol support provided by the Android platform.

As an application developer, you can use any media codec that is available on any Android-powered device, including those provided by the Android platform and those that are device-specific. **However, it is a best practice to use media encoding profiles that are device-agnostic.**

The tables below describe the media format support built into the Android platform. Codecs that are not guaranteed to be available on all Android platform versions are noted in parentheses, for example: (Android 3.0+). Note that any given mobile device might support other formats or file types that are not listed in the table.

As stated in section 5 of the [Android Compatibility Definition](#) document, **all device implementations must support the core media formats specified on this page, except where explicitly noted.**

Audio support

Audio formats and codecs

Format / Codec	Encoder	Decoder	Details	Supported File Type(s) / Container Formats
AAC LC	•	•	Support for mono/stereo/5.0/5.1 content with standard sampling rates from 8 to 48 kHz.	<ul style="list-style-type: none">• 3GPP (.3gp)• MPEG-4 (.mp4, .m4a)• ADTS raw AAC (.aac, decode in Android 3.1+, encode in Android 4.0+, ADIF not supported)• MPEG-TS (.ts, not seekable, Android 3.0+)
HE-AACv1 (AAC+)	• (Android 4.1+)	•		
HE-AACv2 (enhanced AAC+)		•	Support for stereo/5.0/5.1 content with standard sampling rates from 8 to 48 kHz.	
AAC ELD (enhanced low delay AAC)	• (Android 4.1+)	• (Android 4.1+)	Support for mono/stereo content with standard sampling rates from 16 to 48 kHz	
AMR-NB	•	•	4.75 to 12.2 kbps sampled @ 8kHz	3GPP (.3gp)
AMR-WB	•	•	9 rates from 6.60 kbit/s to 23.85 kbit/s sampled @ 16kHz	3GPP (.3gp)
FLAC		• (Android 3.1+)	Mono/Stereo (no multichannel). Sample rates up to 48 kHz (but up to 44.1 kHz is recommended on devices with 44.1 kHz output, as the 48 to 44.1 kHz downsampler does not include a low-pass filter). 16-bit recommended; no dither applied for 24-bit.	FLAC (.flac) only

MIDI		•	MIDI Type 0 and 1. DLS Version 1 and 2. XMF and Mobile XMF. Support for ringtone formats RTTTL/RTX, OTA, and iMelody	<ul style="list-style-type: none">• Type 0 and 1 (.mid, .xmf, .mxmf)• RTTTL/RTX (.rtttl, .rtx)• OTA (.ota)• iMelody (.imy)
MP3		•	Mono/Stereo 8-320Kbps constant (CBR) or variable bit-rate (VBR)	MP3 (.mp3)
Opus		• (Android 5.0+)		Matroska (.mkv)
PCM/WAVE	• (Android 4.1+)	•	8- and 16-bit linear PCM (rates up to limit of hardware). Sampling rates for raw PCM recordings at 8000, 16000 and 44100 Hz.	WAVE (.wav)
Vorbis		•		<ul style="list-style-type: none">• Ogg (.ogg)• Matroska (.mkv, Android 4.0+)

Video support

Video formats and codecs

Format / Codec	Encoder	Decoder	Details	Supported File Type(s) / Container Formats
H.263	•	•	Support for H.263 is optional in Android 7.0+	<ul style="list-style-type: none">• 3GPP (.3gp)• MPEG-4 (.mp4)
H.264 AVC Baseline Profile (BP)	• (Android 3.0+)	•		<ul style="list-style-type: none">• 3GPP (.3gp)• MPEG-4 (.mp4)• MPEG-TS (.ts, AAC audio only, not seekable, Android 3.0+)
H.264 AVC Main Profile (MP)	• (Android 6.0+)	•	The decoder is required, the encoder is recommended.	
H.265 HEVC		• (Android 5.0+)	Main Profile Level 3 for mobile devices and Main Profile Level 4.1 for Android TV	<ul style="list-style-type: none">• MPEG-4 (.mp4)
MPEG-4 SP		•		3GPP (.3gp)
VP8	• (Android 4.3+)	• (Android 2.3.3+)	Streamable only in Android 4.0 and above	<ul style="list-style-type: none">• WebM (.webm)• Matroska (.mkv, Android 4.0+)
VP9		• (Android 4.4+)		<ul style="list-style-type: none">• WebM (.webm)• Matroska (.mkv, Android 4.0+)

Video encoding recommendations

The table below lists the Android media framework video encoding profiles and parameters recommended for playback using the H.264 Baseline Profile codec. The same recommendations apply to the Main Profile codec, which is only available in Android 6.0 and later.

	<u>SD</u> (Low quality)	<u>SD</u> (High quality)	<u>HD 720p</u> (N/A on all devices)
Video resolution	176 x 144 px	480 x 360 px	1280 x 720 px
Video frame rate	12 fps	30 fps	30 fps
Video bitrate	56 Kbps	500 Kbps	2 Mbps
Audio codec	AAC-LC	AAC-LC	AAC-LC

Audio channels	1 (mono) SD (Low quality)	2 (stereo) SD (High quality)	2 (stereo) HD 720p (N/A on all devices)
Audio bitrate	24 Kbps	128 Kbps	192 Kbps

The table below lists the Android media framework video encoding profiles and parameters recommended for playback using the VP8 media codec.

	SD (Low quality)	SD (High quality)	HD 720p (N/A on all devices)	HD 1080p (N/A on all devices)
Video resolution	320 x 180 px	640 x 360 px	1280 x 720 px	1920 x 1080 px
Video frame rate	30 fps	30 fps	30 fps	30 fps
Video bitrate	800 Kbps	2 Mbps	4 Mbps	10 Mbps

Video decoding recommendations

Device implementations must support dynamic video resolution and frame rate switching through the standard Android APIs within the same stream for all VP8, VP9, H.264, and H.265 codecs in real time and up to the maximum resolution supported by each codec on the device.

Implementations that support the Dolby Vision decoder must follow these guidelines:

- Provide a Dolby Vision-capable extractor.
- Properly display Dolby Vision content on the device screen or on a standard video output port (e.g., HDMI).
- Set the track index of backward-compatible base-layer(s) (if present) to be the same as the combined Dolby Vision layer's track index.

Video streaming requirements

For video content that is streamed over HTTP or RTSP, there are additional requirements:

- For 3GPP and MPEG-4 containers, the `moov` atom must precede any `mdat` atoms, but must succeed the `ftyp` atom.
- For 3GPP, MPEG-4, and WebM containers, audio and video samples corresponding to the same time offset may be no more than 500 KB apart. To minimize this audio/video drift, consider interleaving audio and video in smaller chunk sizes.

Image support

Format / Codec	Encoder	Decoder	Details	Supported File Type(s) / Container Formats
BMP		•		BMP (.bmp)
GIF		•		GIF (.gif)
JPEG	•	•	Base+progressive	JPEG (.jpg)
PNG	•	•		PNG (.png)
WebP	• (Android 4.0+) (Lossless, Transparency, Android 4.2.1+)	• (Android 4.0+) (Lossless, Transparency, Android 4.2.1+)		WebP (.webp)

Network protocols

The following network protocols are supported for audio and video playback:

- RTSP (RTP, SDP)
- HTTP/HTTPS progressive streaming
- HTTP/HTTPS live streaming [draft protocol](#):
 - MPEG-2 TS media files only

- Protocol version 3 (Android 4.0 and above)
- Protocol version 2 (Android 3.x)
- Not supported before Android 3.0

Note: HTTPS is not supported before Android 3.1.