

Ogg Vorbis

An introduction to Ogg Vorbis

Version: 1.0
Date: September 2009

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Revision History

Version	Author	Description	Distribution
1.0	AC	Initial release of this document (September 9, 2009)	Release

Preface

This document is an introduction to the Ogg Vorbis; a completely open, patent-free, professional audio encoding and streaming technology with all the benefits of Open Source. Ogg Vorbis is a new audio compression format. It is roughly comparable to other formats used to store and play digital music, such as MP3, AAC, and other digital audio formats. It is different from these other formats because it is completely free, open, and unpatented.

1 Introduction to Ogg Vorbis

Ogg Vorbis is an audio compression format. It is roughly comparable to other formats used to store and play digital music, such as MP3, AAC(+), and other digital audio formats. It is different from these other formats because it is completely free, open, and unpatented.

The Vorbis audio codec; most commonly used in conjunction with the Ogg container format and it is therefore often referred to as Ogg Vorbis. Vorbis is a lossy codec just like MP3, but sounds better than MP3.

Ogg Vorbis has been designed to completely replace all proprietary, patented audio formats.

1.1 How does Ogg Vorbis sound

To give an idea how Ogg Vorbis sounds, it only makes sense to compare it with the other “rival” formats, MP3 and AAC+.

To get a clear picture, both music and speech was encoded from uncompressed content into all three formats with different “bitrates”. Ogg Vorbis performs better when used in variable bitrate (VBR), which is also the mode used in these conversions. In this case we talk about typical bitrate.

Encoders Used

MP3 – Lame Encoder v3.98.2

(e)AAC+ (HE-AACv2 for stereo and HE-AAC v1 for mono) – Nero Encoder v1.3.3.0

Ogg Vorbis – oggenc2.exe (OggEnc v2.84)

Another interesting format comparison can be found on the official Ogg Vorbis website <http://www.xiph.org/vorbis/listen.html>

1.1.1 Music compression

The original uncompress file used for encoding is [m-original.wav](#) (12MB). The outputs obtained from encoding the music file are available in the table below. The filename itself contains information about sampling frequency, bitrates and number of channels. Encoding #5 is mono.

#	Ogg Vorbis	MP3	AAC+
1	m-stereo@44k1~45kbps.ogg Filesize: 358kB	m-stereo@44k1-48kbps.mp3 Filesize: 419kB	m-stereo@44k1-48kbps.m4a Filesize: 427kB
2	m-stereo@44k1~64kbps.ogg Filesize: 519kB	m-stereo@44k1-64kbps.mp3 Filesize: 558kB	m-stereo@44k1-64kbps.m4a Filesize: 566kB
3	m-stereo@44k1~96kbps.ogg Filesize: 767kB	m-stereo@44k1-96kbps.mp3 Filesize: 837kB	NA
4	m-stereo@44k1~128kbps.ogg Filesize: 1031kB	m-stereo@44k1-128kbps.mp3 Filesize: 1116kB	NA
5	m-mono@44k1~36kbps.ogg Filesize: 402kB	m-mono@24k-40kbps.mp3 Filesize: 349kB	m-mono@44k1-40kbps.m4a Filesize: 357kB

Listening and comparing the samples above, the following conclusions can be drawn:

- For comparable bitrates Ogg Vorbis sound better than MP3. This can also be reformulated as follows: The same (audible) quality audio in Ogg Vorbis requires less storage space (for files) and bandwidth (for stream) than MP3.
- eAAC+ (HE-AAC v2) sounds better than Ogg Vorbis in stereo for bitrates 48kbps and higher.
- AAC+ (HE-AAC v1) sound comparable to Ogg Vorbis in mono at ~40kbps.

1.1.2 Speech compression

Speech compression normally is done in mono and at lower bitrates. When going down in bitrate, there is a risk that the speech quality becomes so low that the speech is not clear anymore for the listener. For this test three different speeches were chosen; [speech1.wav](#) (4,47MB), [speech2.wav](#) (7,63MB) and [speech3.wav](#) (7,53MB), each speech being from a different speaker.

Just like for music, the filename itself contains information about sampling frequency, bitrates and number of channels.

Speech 1

#	Ogg Vorbis	MP3	AAC+
1	s1-mono-6k~8kbps.ogg Filesize: 70kB	s1-mono-8k-8kbps.mp3 Filesize: 53kB	s1-mono-44k1-8kbps.m4a Filesize: 60kB
2	s1-mono-11k~14kbps.ogg Filesize: 115kB	s1-mono-11k-16kbps.mp3 Filesize: 105kB	s1-mono-44k1-16kbps.m4a Filesize: 111kB
3	s1-mono-11k~20kbps.ogg Filesize: 168kB	s1-mono-16k-24kbps.mp3 Filesize: 157kB	s1-mono-44k1-24kbps.m4a Filesize: 163kB

Speech 2

#	Ogg Vorbis	MP3	AAC+
1	s2-mono-6k~8kbps.ogg Filesize: 114kB	s2-mono-8k-8kbps.mp3 Filesize: 90kB	s2-mono-44k1-8kbps.m4a Filesize: 100kB
2	s2-mono-11k~14kbps.ogg Filesize: 188kB	s2-mono-11k-16kbps.mp3 Filesize: 178kB	s2-mono-44k1-16kbps.m4a Filesize: 188kB
3	s2-mono-11k~20kbps.ogg Filesize: 282kB	s2-mono-16k-24kbps.mp3 Filesize: 267kB	s2-mono-44k1-24kbps.m4a Filesize: 277kB

Speech 3

#	Ogg Vorbis	MP3	AAC+
1	s3-mono-6k~8kbps.ogg Filesize: 109kB	s3-mono-8k-8kbps.mp3 Filesize: 88kB	s3-mono-44k1-8kbps.m4a Filesize: 98kB
2	s3-mono-11k~14kbps.ogg Filesize: 185kB	s3-mono-11k-16kbps.mp3 Filesize: 176kB	s3-mono-44k1-16kbps.m4a Filesize: 186kB
3	s3-mono-11k~20kbps.ogg Filesize: 273kB	s3-mono-16k-24kbps.mp3 Filesize: 264kB	s3-mono-44k1-24kbps.m4a Filesize: 273kB

Listening and comparing the samples above, the following conclusion can be drawn:

- Ogg Vorbis sound better than MP3 and AAC+ (HE-AACv1) in mono at low bitrates.

1.1.3 Audio recordings

It is for certain application important to record audio content, for archiving purposes or for later transmissions. When PC encoder are used, it is mostly possible to record the stream locally on your PC. Encoders such as Simplecast offer this feature. It is also possible to record audio streams on distribution platforms, such as Streamit's Curchradio Platform (CRP). To give an idea on how an ogg vorbis recording would sound, all three speech samples above were played after each other and were recorded locally (mp3@24kbps) using simplecast and on the CRP (Ogg Vorbis stream from SAS200). The resulting recordings can be found on the table below:

#	Ogg Vorbis	MP3
1	rec-ogg-8k~16kbps.ogg Filesize: 892kB*	rec-mp3-24kHz-24kbps.mp3 Filesize: 1316kB*

*Both recordings contain all three speeches used above, playing one after the other. Because of the settings used during recording both recordings start with the speeches (~4 min) then ~3.5min of silence follow.

Listening and comparing the samples above, the following conclusion can be drawn:

- Recording of Ogg Vorbis at 16kbps sounds comparable to recording of MP3 at 24kbps.

1.2 What do I need to be able to play ogg vorbis streams and files

Microsoft Windows is the most commonly used OS for normal PC users. Other platforms included MacOS and Linux etc. To play audio and video on a PC a number of software players that can be used, with Winamp, WMP and VLC being the most commonly known. A great number of software players do support Ogg Vorbis.

1.2.1 Software for windows

1.2.1.1 Free Software

Name	Description
Songbird	Player from the guys at Mozilla, etc. Plays all major formats, including ogg.
Coolplayer	A very small player
Mediaportal	Home theater software
Mpeg audio collection (MAC)	Organizer for music collection.
mediamonkey	Easy-to-use player/tagger/media library with built-in ripper & burner which can even encode & transcode to Ogg Vorbis
Jajuk	Jajuk is software that organizes and plays music. It is a full-featured application geared towards advanced users with large or scattered music collections.

1.2.1.2 Proprietary software

Winamp	Very popular player supporting many formats
foobar2000	Freeware audio player with complex options and support for Ogg Vorbis, MP3, WAV and more.
quintessential player	Freeware player with support for Ogg Vorbis, MP3, WAV and audio cds which also includes cd ripping.
dBpoweramp Music Converter:	Freeware audio conversion software with Ogg Vorbis and FLAC support and also includes cd ripping
XMPlay	An audio player, supporting the OGG / MP3 / MP2 / MP1 / WMA / WAV / CDA / MO3 / IT / XM / S3M / MTM / MOD / UMX audio formats, and PLS / M3U / ASX / WAX playlists. A load more formats are also supported via plugins.
Zinf Audio Player	Zinf supports MP3, Ogg/Vorbis, WAV and Audio CD playback.
VUPlayer	Multi-format freeware audio player with very easy interface.
Directshow filter	Adds support for Ogg Vorbis, Ogg Speex, Ogg Theora, Ogg FLAC, and native FLAC to any directshow-compliant player such as windows media player and bsplayer
musikCube	Freeware player. Ogg vorbis support can be added via plugin.
Visonair.tv player	Freeware player – plays Ogg Vorbis and Theora streams
jetAudio Basic	Freeware player with Ogg Vorbis and FLAC support
Huelix Audio Recorder	Audio recording software with support for Ogg Vorbis, WMA, MP3, and WAV formats.
huelix audio converter	audio conversion software to convert among Ogg Vorbis, WMA, MP3, and WAV formats
CorePlayer Pro	By the makers of TCPMP

1.2.2 Multi platform

1.2.2.1 free software

VLC Media Player	Open Source media player and streaming server that support virtually every video and audio format
Mplayer	Open Source video player that supports also many audio formats
wxMusik	Open source player with support for Ogg Vorbis, as well as MP3, WAV, AIFF and WMA.
jOggPlayer	Open Source Java GUI Vorbis Player. It features the usual basics needed to enjoy your files and internet streams

1.2.2.2 Proprietary software

JOrbisPlayer	Java Player that uses the JOrbis Java decoder
jGui	A Winamp clone for Java
RealPlayer	Proprietary player from RealNetworks (version 10 does not play Ogg
Microsoft Windows Media Player	Freeware player from Microsoft (version 10 needs DirectShow filter; see Windows players, above). Runs on both Windows and Macintosh platforms.

1.2.3 Other software and platforms

For a complete list of players for different platforms, you can visit the official Ogg Vorbis wiki on software players <http://wiki.xiph.org/VorbisSoftwarePlayers>.