Ogg Vorbis

Audio Compression Format

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What is Ogg Vorbis?

- **Audio compression format**
- **Comparable to MP3, VQF, AAC, TwinVQ**
- **Free, open and unpatented**
- **Broadcasting, radio station and television by internet (= Streaming)**

About the name…

- **Ogg = name of Xiph.org container format for *audio, video and metadata***
- **Vorbis = name of specific audio compression scheme designed to be contained in Ogg**

FOR MORE INFO...

https://www.xiph.org

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Some comercial characteristics

- **The official mime type was approved in February 2003**
- **Posible to encode all music or audio content in Vorbis**
- **Designed to not be proprietary or patented audio format**
- **Patent and licensed-free**
- **Specification in public domain**

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Audio Compression

- **Two classes of compression algorithms:**
  - **Lossless**
  - **Lossy**

FOR MORE INFO...

http://www.firstpr.com.au/audiocomp

Lossless algorithms

- **Produce compressed data that can be decoded to output that is identical to the original.**
- **Zip, FLAC for audio**

Lossy algorithms

- **Discard data in order to compress it better than would normally be possible**
- **VORBIS, MP3, JPEG**
- **Throw away parts of the audio waveform that are irrelevant.**

Ogg Vorbis - Compression Factors

- **Vorbis is an audio codec that generates 16 bit samples at 16KHz to 48KHz, providing variable bit rates from 16 to 128 Kbps per channel**

FOR MORE INFO...

"Introduction to Data Compression," K. Sayood. Pages 291-294

Compression Factors

	Ogg Vorbis	Mp3	CD Stereo
Audio Compress.	Lossy	Lossy	Lossless
Bit\Sample	16	16	16
Sampling (kHz)	16 – 48	16 – 48	44.1
Bit Rate (Kbps)	16 - 128	32 -192	1411

Encoding phase

- **Three Phases:**
  - **Analysis**
  - **Codification**
  - **Streaming**

Decoding phase

- **Three Phases:**
  - **Stream decomposition**
  - **Decodification**
  - **Synthesis**
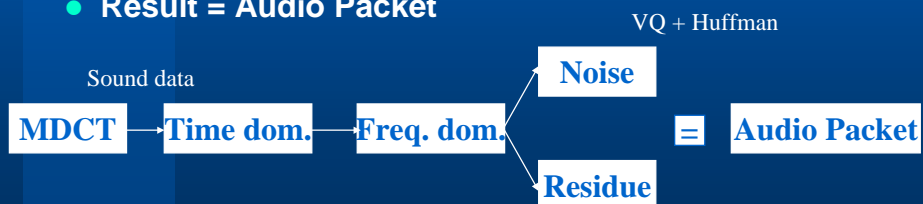
Encoding

- **Audio codec based on MDCT**
- **DCT coefficients quantized using VQ**
- **This quantized coefficients are then entropy coded (Huffman)**
- **Result = Audio Packet**

VQ + Huffman

Sound data

MDCT → Time dom. → Freq. dom. → Noise / Residue = Audio Packet

Bitstream Format

- **Four types of packets exist in the bitstream**
  - **Three types of header packets**
  - **One audio packet**

Header packets   Audio packets

Id header	Comments header	Setup header	Audio Packets		

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