

Theora

as you might not know it

Outline

- What is Theora
- “Free and Open”
- Using Theora

Theora: what is it?

Theora

- lossy video compression format
- normally found inside Ogg files (.ogg, .ogv)
- open and royalty-free

In the beginning...

- VP3 codec produced by On2 Technologies
- On2 donated VP3 to Xiph.Org

Technical characteristics

- block based lossy transform
- 8x8 Discrete Cosine Transform (DCT)
- block-based motion compensation
- intra (key) and inter (diff) frames

Technical characteristics

- half-pixel precision motion compensation
- YUV pixel formats: 4:4:4, 4:2:2, 4:2:0
- in-loop deblocking filter
- superset of On2's VP3 codec

Can we compare?

So, Is MPEG-4 ASP / XviD/DivX5/etc. better?

- Well...

OK, but MPEG-4 AVC / H.264 is better, right?

- OK, let's see...

Theora vs. MPEG-4 ASP

- no B-frames
- only half-pixel precision motion compensation
- no global motion compensation
- deblocking filter
- more pixel formats

Theory vs. Practice

- legacy of On2's VP3.1 implementation
- not all features currently used
- sub-optimal implementation

Current state

- 1.0 beta 3
- bitstream format frozen
- decoder - rewritten and more optimized

Current state

- encoder - bugs fixed
- kept compatibility
- kept implementation

Goals

- new encoder - Thusnelda
 - bitrate management
 - motion estimation
 - block mode selection
 - ... more still coming! (Go Monty!)

Back to reality

- current/old encoder
- Ogg muxing complexity
- effect: low popularity and adoption

Theora: “Free and Open”

Why use Theora?

- not because it's suited for internet content delivery
- not because it's cross-platform
- not because you can use it with Vorbis, Speex or FLAC
- not because the new encoder will rock!

Because Theora is Open

- open specification
- open implementation
- ... and both are here to stay

Because you can

- ...improve it, too!

Because Theora is Free

- no licensing fees, both private and commercial use
- reference implementation - BSD-style licence
- On2 granted unrevocable free licence on patents related to VP3

Theora: using it

libtheora API: encoding

- initialize theora structs
- flush header packets
- in a loop:
 - submit one YUV frame of video
 - receive one packet of compressed data

Frameworks: Gstreamer

- two simple examples:

```
v4l2src ! theoraenc ! Oggmux ! \  
filesink location=webcam.ogv
```

```
filesrc location=in.any ! decodebin ! \  
theoraenc ! oggmux ! filesink location=out.ogv
```

Frameworks: other systems

- Windows : oggdsf + graphedit/...
- Mac OS X: XiphQT + qt_tools/...

Editing

- PiTiVi
- Cinelerra

Converting

- ffmpeg2theora (+ frontends)
- Thoggen
- VLC

Playing

- Totem
- MPlayer
- VLC
- DemocracyTV / Miro
- Elisa Media Center

In your browser

- Cortado
- GStreamer plugin
- VLC plugin
- direct browser support with codecs installed
- native support in FireFox hopefully soon!

Web served

- just files - just works
- Apache + mod_annotex
- Itheora
- mv_embed

Streaming

- VLC
- Icecast
- Flumotion

Services

- V2V, Miro
- Metavid
- Wikimedia Commons
- Theora Sea

Questions?

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