# FOSS in Broadcast

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# Why such little use of FOSS in broadcast?

- Worse than days of Wintel dominance in the server room
  - Broadcast has large budgets and prefers big engineering solutions
  - A history of using hardware from the analogue days – some broadcast engineers don't like computers
- The majority of consumer devices and some professional hardware uses Linux and other FOSS but does not expose it to the end-user.

# So what's the upside?

- Broadcast chain is segmented so FOSS applications can be slotted in place
- Convergence with the IT industry so more use of IT standards
  - IPTV is more aware of FOSS than "traditional" broadcasting
- **Passionate and dedicated FOSS enthusiasts who make things happen**

# Social Aspects (1)

- FOSS has been good at making **tools** that fit well with the UNIX philosophy. In broadcast, where **shinystuff™** wins.
- Market segmentation leads to preconceptions about product based on features and price.
- Again, finding the right people (usually in small/mid-sized broadcasters) who can push FOSS adoption.

# Social Aspects (2)

- FOSS must fit around commercial/technical restrictions – people will not rebuild their broadcast chain or make major day-to-day changes.
- Requires dictatorial attitude in order to avoid catering for every persons niche case and becoming a “jack of all trades, master of none” – less is more

# Some current FOSS projects in broadcast

- CasparCG
  - Production graphics system created by SVT (Swedish TV) and used 24/7.
- Dirac
  - Created by the BBC as a production codec and used in the Beijing Olympics
  - Fair to say not as successful technically or commercially as it could have been

# Open Broadcast Encoder (1)

- There have been a couple of in-house FOSS broadcast encoders
- Built on the x264 encoder, used all over in Blu-Ray (Warner), web (Youtube/Facebook) etc.
- Lacked the “head and tail”
- In collaboration with various broadcasters, set out to build a top-end broadcast encoder usable on commodity hardware. Top-end encoders are around $50k for HD.

# Open Broadcast Encoder (2)

- Developed on production broadcast chains
  - In some cases video sent all the way to the home
  - More resources at disposal than proprietary rivals
- Fits into current broadcast use-cases
  - “Distribution” encoding to the home
  - “Contribution” encoding from e.g. sports ground to control room (high bitrate)
  - Low-latency (~200ms) encoding for interviews

# Technical Stuff

- OBE is Linux only for now, though much use of POSIX HR clocks
  - May start using kernel APIs for timed packet release to have near-zero jitter
- x264 and ffmpeg/libav have heavy use of x86 and ARM SIMD. GCI students (highschoolers) have written SIMD in the last two years.
- Transparent Huge Pages are an easy optimisation but don't work (help?)
  - THPs for file based mmaps if it comes?
- TODO: Other x264 optimisations, a good AAC encoder etc

# Why not VLC/Gstreamer etc...?

- Many hacks required to implement broadcast features that 99.9% don't care about.
  - Enough hacks in consumer formats already.
- Psychology – VLC is **too successful** and is associated as a tool to get routine things done and not for high-end broadcast.
- OBE tries to return as much code as possible to FFmpeg/libav (e.g swscale optimisations, lxf demux).
- Regrettable that there has to be some work duplication but are proud to be standing on the shoulders of giants

# Patents? Theora/VP8? etc

- Patent royalties left to the broadcaster to deal with since OBE is (almost-always) source-code only distributed.
- Patents could be a source of FUD in the future though it is only Dolby that refuses to license to FOSS (breaking terms of RAND licensing)
- Lots of people ask about Theora/VP8 etc. The answer is simple – They're not used in broadcast and almost certainly will not ever be. There was probably a window of opportunity for Vorbis many years ago. Possibility for Opus but development is very internet focused.

# A special announcement

- This week Norwegian community TV station Frikanalen has just launched what we believe to be the first long-term Digital Terrestrial channel encoded with FOSS.

# Any questions?

- Come and speak to me afterwards
- Email me at kierank@ob-encoder.com