Mobile smart streaming

tremend

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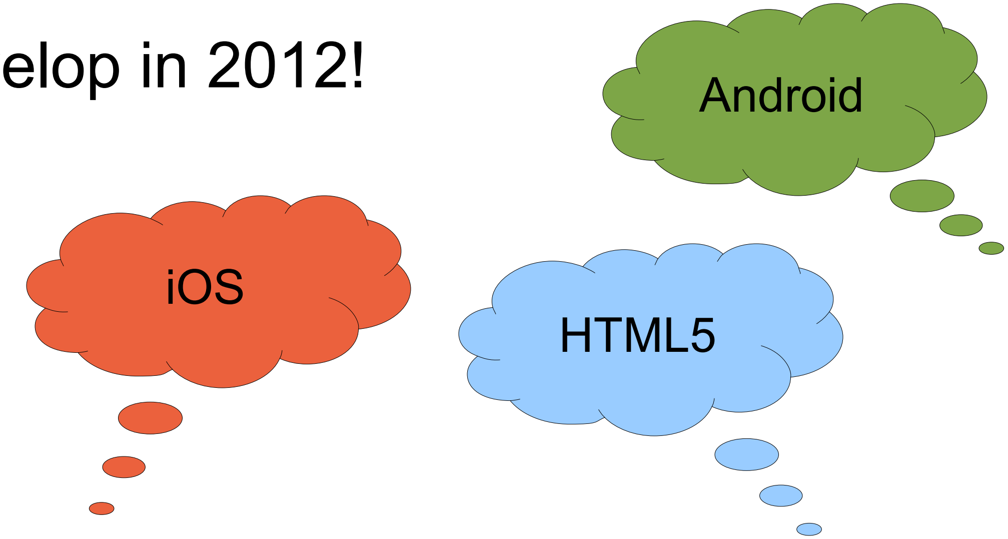
A brief history of rich media

Devices can play video and audio for a long time

...early '90s for PCs, early 2000 for mobile.

Yet still not easy to develop in 2012!

Today's buzzwords



Android

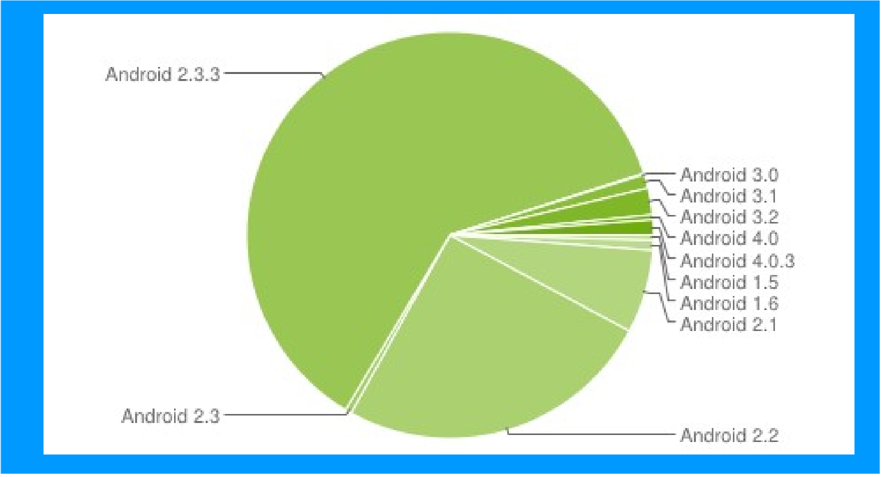
iOS

HTML5

...there are lots of other platforms. But consumers update their devices every 2-3 years

Know your market

- Deliver the right media to the right device
- Who are your users? What phone do they have?
- OS version number matters

iOS	Android
3.1.3 – Very few original iPhone users are left. 4.2.1 – Quite a few iPhone 3G users are still buying apps. 5.0+ – The mainstream that should be targeted	

What to deliver? Formats and codecs

- 3gp / mp4 – popular with all phones
  - video: some H.263 (DivX) H.264 (mp4).
  - audio: AMR-NB for voice, low bit rate
  - music: AAC, AMR-WB
  - Firefox won't touch it due to licensing – but this may change soon
- mp3. Everyone (but Mozilla) uses it
- Ogg / Theora / Vorbis. For the open source crowd.
- mov. Quicktime, Apple's favorite
- webM - Google's favorite. No Apple yet
- FLV - Flash is very much alive

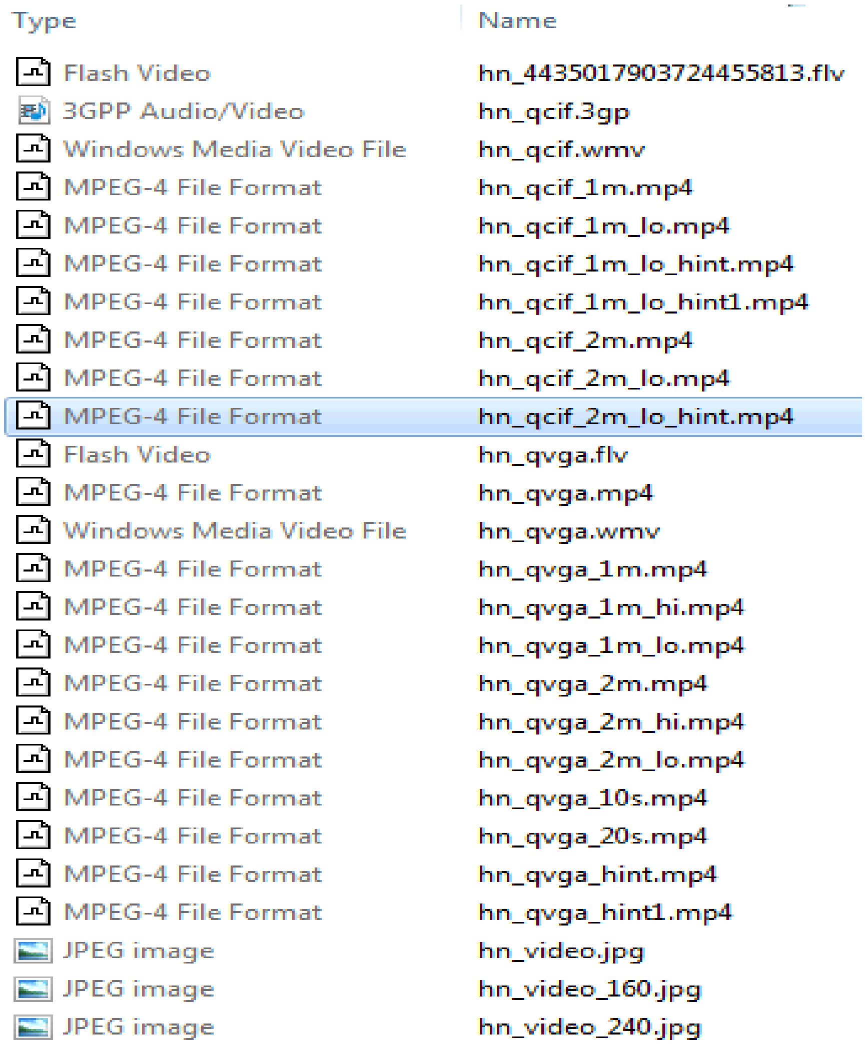
Who uses what?

	MP4	Ogg	WebM	MP3	AAC	WAV
Android	3.0	2.3	2.3	✓	✓	✓
iOS	✓			✓	✓	
IE	✓		✓	✓	✓	✓
Firefox		✓	✓			✓
Chrome	✓	✓	✓	✓	✓	

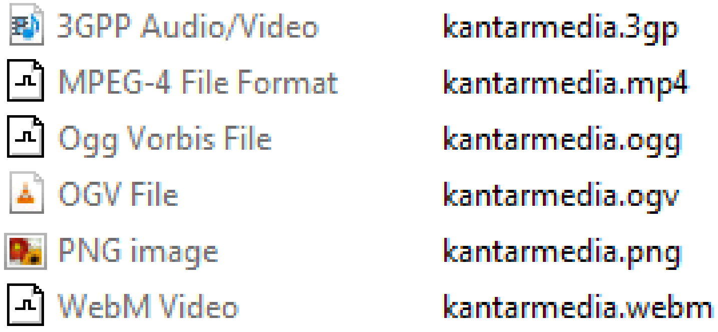
Useful tools for the web:

- WURFL – to detect the capabilities of the device
- Video.js – HTML5 player with FLV fallback
- Legacy fallback: A low rate 3gp for phones, a Flash FLV for desktop.

2010 vs. 2012



Type	Name
Flash Video	hn_4435017903724455813.flv
3GPP Audio/Video	hn_qcif.3gp
Windows Media Video File	hn_qcif.wmv
MPEG-4 File Format	hn_qcif_1m.mp4
MPEG-4 File Format	hn_qcif_1m_lo.mp4
MPEG-4 File Format	hn_qcif_1m_lo_hint.mp4
MPEG-4 File Format	hn_qcif_1m_lo_hint1.mp4
MPEG-4 File Format	hn_qcif_2m.mp4
MPEG-4 File Format	hn_qcif_2m_lo.mp4
MPEG-4 File Format	hn_qcif_2m_lo_hint.mp4
Flash Video	hn_qvga.flv
MPEG-4 File Format	hn_qvga.mp4
Windows Media Video File	hn_qvga.wmv
MPEG-4 File Format	hn_qvga_1m.mp4
MPEG-4 File Format	hn_qvga_1m_hi.mp4
MPEG-4 File Format	hn_qvga_1m_lo.mp4
MPEG-4 File Format	hn_qvga_2m.mp4
MPEG-4 File Format	hn_qvga_2m_hi.mp4
MPEG-4 File Format	hn_qvga_2m_lo.mp4
MPEG-4 File Format	hn_qvga_10s.mp4
MPEG-4 File Format	hn_qvga_20s.mp4
MPEG-4 File Format	hn_qvga_hint.mp4
MPEG-4 File Format	hn_qvga_hint1.mp4
JPEG image	hn_video.jpg
JPEG image	hn_video_160.jpg
JPEG image	hn_video_240.jpg



3GPP Audio/Video	kantarmedia.3gp
MPEG-4 File Format	kantarmedia.mp4
Ogg Vorbis File	kantarmedia.ogg
OGV File	kantarmedia.ogv
PNG image	kantarmedia.png
WebM Video	kantarmedia.webm

How to deliver? Streaming

- HTTP progressive – play while media is downloaded

  Cannot seek forward, or stream live

- RTMP - proprietary Flash protocol
- HTTP live streaming. A draft standard pushed by Apple. Android jumps on this since 3.0
- RTSP/RTP - supported by lots of phones, standalone players, Apple Quicktime, and Android. But not by <video> tag in most browsers.

  Not HTTP - check your firewall and proxy settings.

Prepare your stream

- HTTP downloads or streaming – any HTTP server
  - Have to prepare the stream manually. Apple provides the tools - mediastreamsegmenter.
  - Flash Media Server, Wowza do that for you, and support live broadcasts.
- RTMP – use Flash Media Server, Wowza, Red5
- RTSP – Darwin/Apple Quicktime, Wowza
  - Apple requires “hinted” streams to play RTSP.
- Use ffmpeg to convert between formats.

Apple is a picky publisher

- Streams delivered over 3G must be <64kbps
  - Use Apple's mediastreamvalidator
- How large is your app?
- Do you respect the interface guidelines?
- Do you have the license to play the music?
- Do you ask users to pay for the music?
- Do you offer prizes?

More than playback – record!

- Limited formats, fewer encoders than decoders
  - Especially older Androids – AMR-NB suitable for voice only
  - Some processing needed – trim silence, convert mono to stereo
- Easy to sync two locally stored media. Hard to sync two streams, or recording with playback.
- Beware of cheap plastic cases! Speaker sounds feed back to the microphone and they are hard to filter.
- Flash – still the king of the desktop browser.

More than playback – just play!

- We tried sound processing, and altering playback rate.
  - PhoneGap / Apache Cordova – great cross-platform tool
- High level player frameworks support few effects
  - playback rate altering for AVAudioPlayer in iOS5.0
  - none at all for MediaPlayer in Android
- Sound processing requires uncompressed audio
  - AVQueueServices in iOS, AudioTrack / OpenSL ES in Android
- Cannot use standard hardware decoders. Need own implementation (software, libmpg123)

More than playback – just play!

- Android fragmentation matters
- Software audio decoders are CPU intensive.
  - 80% CPU usage on Vodafone Smart from Huawei
  - But only 15% of one out of 4 cores on Asus Transformer
- Use Android Native SDK for performance and features
- Cheap devices lie about capabilities
- Expensive devices may lie as well

  (OpenSL ES playback rate effects in Android 2.x)

Thank you!

Any questions?