The MeeGo Multimedia Stack
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MeeGo Intro

Architecture

Development

GStreamer
Quick MeeGo Intro

- MeeGo = Moblin + Maemo
- Linux distribution for CE devices
  - Netbook, Phone (Handset), Connected TV, In-Vehicle
- http://meego.com
- Linux Foundation hosted project
Architecture

http://meego.com/developers/meego-architecture

MeeGo.com Handheld UX
MeeGo.com Netbook UX
MeeGo.com <Other> UX

MeeGo API

MeeGo Core OS

Middleware

Hardware Adaptation Interfaces
Architecture - Multimedia

- Kernel
  - V4l2, Alsa
- Middleware
  - GStreamer, Pulseaudio, GUPnP
- API
  - Qt, Qt Mobility Multimedia, Qt GStreamer
Development

- Hardware Adaptation
- Core OS Platform
- Applications
Development – HW Adaptation

- Linux Kernel
  - Drivers
  - user space libraries (alsa, v4l2)
- Middleware plugins
  - GStreamer plugins (Codecs, Camera, Video)
Development - Platform

- libraries from the Linux ecosystem
- GStreamer, GUPnP, PulseAudio, Xiph codecs, ...
Development - Applications

- QT interfaces are the official one
- Lower level interfaces might have less stability guarantees
GStreamer – Use Cases

- Media Playback
- Voice and Video Call
- Camera Still and Video Capture
- Video Editing
- Media Transcoding
- Metadata Indexing and Thumbnailing
GStreamer - Framework

GStreamer tools
- gst-inspect
- gst-launch
- gst-editor

multimedia applications
- media player
- VoIP & video conferencing
- streaming server
- video editor
- (...)

GStreamer core framework
pipeline architecture
- media agnostic
- base classes
- message bus
- media type negotiation
- plugin system
- utility libraries
- language bindings

GStreamer plugins
- protocols
  - file:
  - http:
  - rtsp:
  - ...
- sources
  - alsa
  - v4l2
  - tcp/udp
  - ...
- formats
  - avi
  - mp4
  - ogg
  - ...
- codecs
  - mp3
  - mpeg4
  - vorbis
  - ...
- filters
  - converters
  - mixers
  - effectcs
  - ...
- sinks
  - alsa
  - xvideo
  - tcp/udp
  - ...

GStreamer includes over 150 plugins

3rd party plugins
Media Playback

- MeeGo OS:
  - GStreamer playbin2
  - GStreamer components for streaming, parsing, demuxing and rendering

- Vendor specific:
  - Hw accelerated codecs
VoIP / Video Call

• MeeGo OS:
  • Telepathy
  • Lots of GStreamer components
• Vendor specific:
  • Accelerated voice and video codecs
Camera Still and Video capture

- **MeeGo OS:**
  - GStreamer camerabin
  - GStreamer elements for format conversion, metadata (XMP, EXIF), muxing, data routing

- **Vendor specific:**
  - Camera source :/
  - Accelerated video and image encoders
Video Editing

- MeeGo OS:
  - GStreamer gnonlin
  - GStreamer components for muxing, demuxing, format conversion, ...

- Vendor Specific
  - Accelerated codecs
Metadata Indexing & Thumbnailing

• MeeGo Core OS:
  • Tagreadbin (experimental)
  • GStreamer components for parsing, demuxing

• Vendor specific:
  • nothing
Hot Topics

- s/XVideoOverlays/TextureStreaming/ ?
- Bitstream passthrough
- Camera APIs
- Performance optimizations
- Accelerated Codecs & Filters
- Easy to use high level APIs
Hot Topic – Video Rendering

• Xvideo interface is getting old
  • Inherent memcpy
  • Hard to integrate with alpha in Uis
• Classic GL is not well suited either
  • Texture upload
  • Texture streaming needed
Hot Topic – Bitstream passthrough

- GStreamer normally renders RAW A/V locally
- Remote devices can also decode
  - BT Headsets, HDMI TV, SPDIF → Receiver
- Initial support in PulseAudio from Intel
- GStreamers playbin2 needs work
Hot Topic – Camera APIs

• Phone cameras != USB webcams
• V4l2 needs to abstract features better
• Lots of work on GStreamers camerabin(2)
Hot Topic - Performance

- better performance = longer use time
  - camera recording, music/video playback, call
- locking is slow on ARM
  - overhead for audio part in calls
- low memory footprint = more stuff cached
Hot Topic – Accelerated Plugins

- Software Codecs and Filters
- GStreamer uses ORC to enable CPU SIMD use
- OpenCL would be interesting for GPU use
Hot Topic – High Level API

- Qt Mobility Multimedia
  - Mediaplayer API
  - Audiocapture API
  - Camera API
- More feedback needed

http://doc.qt.nokia.com/qtmobility-1.0/multimedia.html
Thanks!

Any Questions?