Digital Signage & Digital TV Out Of Home (DOOH)
1. Digital Signage: Market and use case

2. About Innes

3. Technologies and Standards
3 large segments

Broadcast

Institutional

Mass Market

3 main sectors:
- Point of wait,
- Point of sale,
- Point of transit,
Point of Wait: Corporate, Education, Hospitality, Healthcare, Banking

The primary contact for point-of-wait projects is often the system integrator or value-added resellers that bring together the different skills to meet the needs of the customer.
External communication projects where the goal is a recognized ROI are generally controlled by advertising agencies or screen network operators.
The “transportation” projects are often supported by the system integrator in connection with the public service delegator transport operator. The main difficulties of the sector is the need to conform to many standards (EN50155, …). Unlike the previously described sectors, the equipment onboard, such as media players or display must endure a high temperature range (for instance -25° C/+70° C) and to be anti-vibration.
Innes: Manufacturer of Richmedia players and encoders
Peer to peer usage

Mono – user

Composer + Scheduler

Player
Server usage (many people use the system)
Technology : What are we trying to solve?

- **Audience Metric**
  - How many people view screen for how long?

- **Placement Metric**
  - How do I buy a unit of advertising on a screen?

- **Proof of Performance**
  - How many times my ad actually played and when?

- **Technology Interoperability**
  - Screen / Player / Server
Digital Signage: Architecture of a « open » player

User Application

X86 Linux
X.ORG Server 7.X

ARM9 / Cortex A8 eLinux

Rich Media Engine
AV Framework + Web Framework (Gecko, Webkit, ...)

Direct X
Kronos API (OpenGL, Open VG, OpenMAX, ...)

SMIL+, JavaScript, CSS3, HTML5, XPATH, XSPF, XMP, iCal, Device API...

WS-*

SOAP
DPWS
WS-Management

Popai Play-log

X86 Windows

Intel 9xx
Intel Poulsbo
Nvidia

Davinci
ARM9 + DSP C64
OMAP
CortexA8 + DSP
...
SMIL (pronounced "smile") stands for "Synchronized Multimedia Integration Language" and defines scheduling ("Synchronized"), video, audio, images, text ("Multimedia"), multi-zone screen layout ("Integration") in an XML-based text file format ("Language"). It is an open specification (royalty-free to use) created by the W3C, the same organization responsible for defining the HTML5 language, an open standard for the Internet.

As the digital signage market expands out of the "emerging" status, mainstream customers demand compatibility and interoperability among products from different vendors: SMIL appears to be an ideal technology to answer the needs of the industry.

Digital Signage products that utilize SMIL are available from leading companies such as Iadea, Advantech, Scala, Spinetix, Stinova, Innes, etc.

http://www.w3.org/AudioVideo/
http://www.a-smil.org/index.php/Main_Page
Innes proposal: SMIL + CSS3 + JavaScript

- The power of a declarative language (easy for authoring software)
- The power of a style language like CSS3 (layout, animation,…)
- The power of a script language known for a large public (web designer) and a collection of APIs (device, canvas, webgl,…)

The Open Pluggable Specification (OPS) is supported by industry leaders in digital signage, including Microsoft, NEC Display Solutions and the Taiwan Digital Signage Special Interest Group (Axiomtek, Advantech,…).

The Open Pluggable Specification was created to address fragmentation in the digital signage market and simplify device installation, use, maintenance and upgrades.

With the specification, digital signage manufacturers will be able to deploy interchangeable systems faster and in higher volumes, while lowering costs for development and implementation.
POPAI Digital Signage Standards committee has released a reference system and a glossary on common terminologies that are available for download from POPAI site or following hypertext.

- Content Standards
- Screen-Media Formats
- RFI Working Template
- POPAI Digital Signage Device RS-232 Standards
- POPAI Digital Signage Playlog Standards V 1.1
- Digital Control Commands
- Industry Standards of Digital Signage Terms
- Work-in-Progress: Server-Player API Standard
Unambiguously object media definition

What are the formats that can be played by the player?

- POPAI Screen-Media Formats

- RFC4281: The Codecs Parameter for "Bucket" Media Types
“Popai Playlog is a collection of record or information created from the digital signage system reflecting the content played, the system performance and other data. (Synonyms: billing log, performance log, audit log, proof-of-play report)”
Two candidates:

- SNMP (set, get, trap primitives commands)
- WS-Management (object model)

**Pro of the second solution:**
WS-Management is available with Microsoft PowerShell architecture
Use HTTP/HTTPS
Easy to integrated with a DPWS (Device Profile for Web Service) stack
Device API

- Battery status
- Media Capture (camera, microphone)
- Messaging (SMS, MMS, emails)
- Sensor API
- Calendar (iCalendar, ISO-8601)
- Permissions for Device API Access
- Systems info and events (CPU, network, etc.)
- ....
Server-Player API Standard

- Object Media downloader
- Player language downloader
- Software downloader

Some tracks:
- REST HTTP,
- HTTP cache API like Manifest HTML5
- SOAP
- FUMO FOTA (Firmware Over the Air) (Open Mobile Alliance, )
Player - Monitor:
AV Signal Transport, Monitoring and commands

- Proprietary protocol like Samsung MDC
  RS232, Ethernet

- VESA Monitor Command Control Set (MCCS) and DDC/CI
  I2C on DVI, VGA, HDMI, Display Port, HDBaseT

- Signal transport TCP/IP oriented (SMPTE 2022 FEC)

Diagram:
- Player to AV encoder via HDMI
- AV decoder to Monitor via HDMI
- IP connection between AV encoder and AV decoder

AV MpegTS AAC/H264, Monitor status and command?