

Screen-Media Formats

A POPAI Digital Signage Standards Document



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Artisan Complete	DS-IQ	LG	Symon
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Standardized content format does not imply right-to-use. Lawful usage of digital signage content should be analyzed on a case-by-case basis. The authors and POPAI recommend that users of digital-signage content obtain advice from legal counsel.

Introduction

This standard is the first of a group of POPAI standards to address the need for interoperability between different providers of Digital Signage systems. The core objective is to establish a foundation or baseline of performance and behavior that all standard signage systems will follow. The business case is clear: fewer projects with wasted efforts and lower barriers to adoption of standardized systems. All suppliers are encouraged to exceed the standard, each with their own blend of performance and innovation.

This standard establishes a baseline set of standard formats for media intended for use in digital signage applications. The baseline consists of support for all the formats listed as 'standard' profiles. By establishing a set of standard formats, content can be provided in these formats to multiple distinct networks in the expectation that each network can and will display the content accurately. Performance above the baseline is encouraged to support formats shown in the Extended profiles.

Goals & Use of this standard

There are multiple overlapping goals for this standard:

- To provide a finite list of standard formats for use in digital signage. Standard players will then be defined as units capable of displaying the standard formats and optionally some subset of the Extended profiles.
- To establish minimum performance standards, allowing standards-compliance along with optional features or capabilities above and beyond the standard.
- To utilize existing standards in related fields as much as possible.
- To actively avoid systems, formats, or contexts which are exclusively proprietary or which have expensive royalty structures. Proprietary formats will be included if there are open-source or inexpensive alternative implementations easily available.

Use of this standard should prevent a variety of issues which are not uncommon in current practice. When expressed positively, these are:

- Content creators can be confident that if they use these standards, their content will play successfully across multiple signage networks.
- Aggregators can be confident that content will play successfully on compliant networks.
- Software vendors can certify that their software properly displays media in these formats.
- Player manufacturers can certify that their players properly display media in the standard format and possibly some extended profiles.

Definitions

Term	Definition	Examples
Audio	File with recorded sound, usually associated with specific video or image content	.mp3, AC3, AAC, PCM, A-law, U-law
Codec	A protocol for encoding/decoding information, identified by a specific 'FourCC' character code.	DivX, Xvid, x264, wmv3, avc1, wvc1
Still Image	A single visual image	.bmp, .gif, .jpg, .png
Vector	Scalable resolution-independent images and/or animations	.flv, .swf
Video	Animation or movie containing a sequence of visual images which appear to move and change over time	Divx, 3iv1, x264,
Wrapper	Media-file format which 'contains' one or more encoded media files (video, audio, still images, sub-	.avi, .qt, .mov, .asf .ogv, .mp4, TS, PS

titles, and/or metadata).

Screen Media Content Standards

For many files, especially video, raw content is compressed by a codec into a particular file format. This compressed content is included, often with other associated information, in a container file format. Containers are often associated with specific codec types, but in principle any container can contain content in a variety of formats - so specifying a container isn't sufficient for specifying interoperability. The following tables shows a list of standard codecs and containers.

Table 1: Video Codecs & Containers					
Standard Profile #	Type	Codec Name	FourCC	File Extension	Valid Containers
S1	Image	JPEG		.jpg, .jpeg	JPEG
S2	Image	JPEG		.jpg, .jpeg	JPEG
S3	Image	JPEG		.jpg, .jpeg	JPEG
S4	Audio	MPEG-1 Layer 2		.mpeg, .mpg	MPEG
S5	Audio	MPEG-1 (MP3)		.mp3, .mpeg, .mpg	MPEG, MP3
S6	Video	MPEG-1		.mpg, .mpeg	MPEG
S7	Video	MPEG-1		.mpg, .mpeg	MPEG
S8	Video	MPEG-1		.mpg, .mpeg	MPEG
S9	Video	MPEG-2		.mpg, .mpeg, .vob	MPEG, VOB
S10	Video	MPEG-2		.mpg, .mpeg, .vob	MPEG, VOB
S11	Video	MPEG-4 AVC	H.264, avc1	.mp4, .m4v	MP4
S12	Video	MPEG-4 AVC	H.264, avc1	.mp4, .m4v	MP4
Extended Profile #	Type	Codec Name	FourCC	File Extension	Valid Containers
E1	Image	PNG		.png	PNG
E2	Image	PNG		.png	PNG
E3	Image	PNG		.png	PNG
E4	Video	SMPTE VC-1 SD	wmv3, wvc1	.ogm, .mk4, .mkv, .wmv	OGM, MK4, ASF
E5	Video	SMPTE VC-1 HD	wmv3, wvc1	.ogm, .mk4, .mkv, .wmv	OGM, MK4, ASF
E6	Video	MPEG-2		.mpeg, .vob	MPEG, VOB
E7	Video	MPEG-4, Part 2	divX, xvid, fmp4, 3ivx	.divx, .xvid, .mp4, .m4v	MP4
E8	Video	MPEG-4 AVC	H.264, avc1	.mp4, .m4v	MP4
E9	Vector	FL3		.swf	SWF
E10	Vector	Flash7		.swf, .flv	SWF
E11	Vector	Flash9		.swf, .flv	SWF
E12	Video	Motion JPEG	MJPG	.mjpg	AVI

Each Profile will support resolutions and data-rates up to the defined maximum limits shown in Table-2

Table 2: Screen Resolution & Data-rates

Standard Profile #	Type	Codec Name	Max Resolution	Max Data-rates	Other Parameters	Notes
S1	Image	JPEG	720x480		24bpp	
S2	Image	JPEG	1280x720		24bpp	
S3	Image	JPEG	1920x1080		24bpp	
S4	Audio	MPEG-1 Layer 2		384 kb/s CBR	MPEG-1 Audio	A
S5	Audio	MPEG-1 MP3		384 kb/s CBR	MPEG-1 Audio	B
S6	Video	MPEG-1	352x240 352x288 320x240	3 Mbps CBR	"SIF"	C
S7	Video	MPEG-1	640x480 720x480 720x576	10 Mbps CBR	"Extended 480p"	
S8	Video	MPEG-1	1280x720	15 Mbps CBR	"Extended 720p"	
S9	Video	MPEG-2	640x480 720x480 720x576	6 Mbps CBR	"Constrained" MP@ML	D
S10	Video	MPEG-2	1280x720	12 Mbps CBR	"Extended" MP@ML	
S11	Video	MPEG-4 AVC	640x480 720x480 720x576	6 Mbps CBR	Main Profile (MP) Level 2	
S12	Video	MPEG-4 AVC	1280x720	10 Mbps CBR	Main Profile (MP) Level 2	E
Extended Profile #	Type	Codec Name			Specific Parameters	
E1	Image	PNG	720x480		32bpp (24bpp w/ transparency)	
E2	Image	PNG	1280x720		32bpp (24bpp w/ transparency)	
E3	Image	PNG	1920x1200		32bpp (24bpp w/ transparency)	
E4	Video	SMPTE VC-1 SD	720x480/30 720x576/25		Main Profile@ML,	
E5	Video	SMPTE VC-1 HD	1920x1080		Main Profile@HL (wmvhd)	
E6	Video	MPEG-2	1920x1080	20 Mbps	MP@HL	
E7	Video	MPEG-4, Part 2	640x480 720x480/30 720x576/25	10 Mbps CBR 10 Mbps CBR		F
E8	Video	MPEG-4 (AVC)	1920x1080	20 Mbps CBR	High Profile (HiP), Level 3 or 4	G
E9	Vector	FL3			To be developed	
E10	Vector	Flash7			To be developed	H
E11	Vector	Flash9			To be developed	H
E12	Video	Motion JPEG	320x240 640x480	>=15fps		

Notes:

A http://en.wikipedia.org/wiki/MPEG-1_Audio_Layer_II

B <http://en.wikipedia.org/wiki/Mp3>

C <http://en.wikipedia.org/wiki/MPEG-1>

D <http://en.wikipedia.org/wiki/Mpeg-2>

E <http://en.wikipedia.org/wiki/Mpeg-4>

F http://en.wikipedia.org/wiki/MPEG-4_Part_2

G http://en.wikipedia.org/wiki/Comparison_of_container_formats

H <http://www.adobe.com/devnet/swf/>

Playback Quality

Playback quality is not simple to specify in an easily quantifiable manner, particularly without standard examples. For this reason, the POPAI digital committee is providing standard examples of content for the formats listed in this specification (www.popai.com/DS/ContentSamples). Compliance and certification are to be based on the faithful replication of these pieces of standardized content.

Compliance

For the purposes of this specification, digital signage products are in compliance with this standard if they replicate the media content with no obvious or easily noticeable flaws. More specifically:

Video content:	No dropped frames Playback frame-rate not noticeably different from original No noticeable variation in frame-rate
Audio:	No noticeable distortion from original
Still-images:	No noticeable distortion from the original

Certification

Suppliers of digital signage products are expected to evaluate the performance of their own products to determine compliance. Suppliers with compliant products may file a self-certification agreement with POPAI (form available at www.popai.com/DS/cert_form). Companies which have completed the certification agreement are then permitted to use the 'POPAI-Compliant' logo on their compliant products.

To self-certify a product, a supplier will freely list any additional requirements for the product to meet compliance. For example, a vendor of digital signage software will list the player hardware requirements (minimum CPU, RAM, and graphics). Similarly, hardware providers will list the software packages which can be utilized to generate compliant output.

In the case where a product complies with some of the standard profiles but not all of them, compliance can be shown by listing the profiles which are supported:

This player complies with POPAI Screen-Media Formats, when used with 'ACME Great-Signs'¹ Software (Standard Profiles S1-S10 and Extended profiles E1-E3, E6, and E7).

Or

This software complies with POPAI Screen-Media Formats, when running on Dual-core player hardware with at least 1GB RAM and a 3rd-party graphics card (All Standard Profiles S1-S12, and Extended profiles E1-E9).

POPAI reserves the right to revoke the usage of the POPAI logo by any supplier shown to self-certify performance of non-compliant products.

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¹ Example only, not a known current signage product
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