# Digital Signage Network Playlog Standards

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## Abstract

*This document is initiated by the POPAI Digital Signage Standards Committee and collaborated among many digital signage industry leaders for the purpose of forming a standard for the playlog.*

*Playlog, according to the released POPAI glossary, is a record of information created from the digital signage system players reflecting the content played, the system performance and other data. A well-defined playlog format provides necessary information for digital signage network users to audit, monitor and act on the intelligence. A standardized format provides credibility to the digital signage users by ensuring the required information is present and by making the sharing of such information easier among digital signage service providers.*

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# Document History

| Revision | Date | Comment |
|---|---|---|
| 1.0 | 10-31-05 | Straw-man discussion proposal for committee members, including 3M, ActiveLight, Avocent, Convergen, Cox, Digital View, DS-IQ, FocusInfo, Harbor Industry, hytekmfg, Matrox, Minicom, NEC Display, OmniVex, Pointsmith, PRN, Scala, Schawk, ShopToCook, SharpUSA, SignStorey, Vestcom & VIS-display |
| 2.0 | 12-19-05 | 2nd revision for review, including comments from Scala, 3M |
| 3.0 | 2-17-06 | 3rd revision for review, including comments from AGNPro |
| 4.0 | 3-14-06 | 4th revision for review, validate design pattern from existing systems (Scala, 3M, BroadSign and Webpavement) |
| 4.1 | 4-6-06 | Minor revision, including comments from Symon |
| Release 1.0 | 5-30-06 | Document released for public |
| Release 1.1 | 8-23-06 | Clarify various XML tag usage, including comments from Triveni Digital. |

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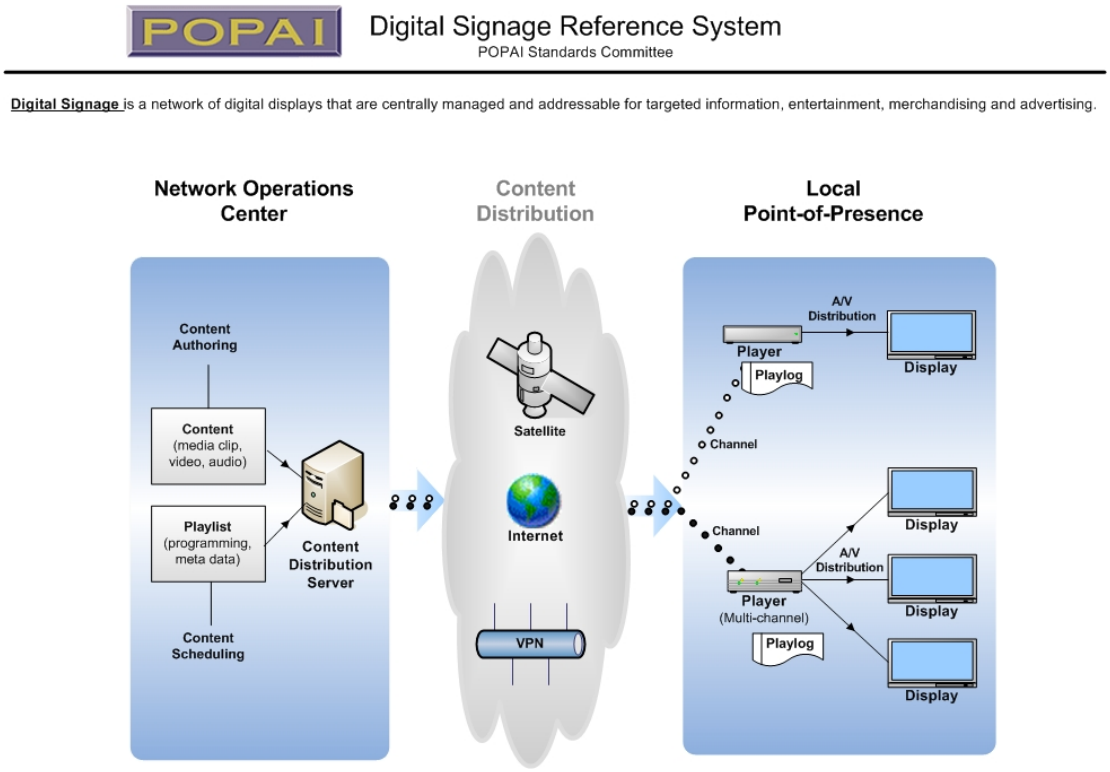
# 1. Background

POPAI Digital Signage Standards committee has released a reference system and a glossary on common terminologies that are available for download from POPAI site. The reference system calls for each player to generate a Playlog report. This document defines the committee's recommended format in the playlog report.




According to the glossary definition:

> *"**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)"*

A piece of content can be an audio, a video or any media items distributed by the content distribution server over one or multiple content channels to one or more players with each player generating a playlog file. Often each individual player-generated playlog is sent back to the content distribution server for further consolidation before presented to the user and other reporting/analytics services.

Many digital signage vendors have provided playlogs for various purposes: billing, performance monitoring, auditing and proof-of play, to name a few. Some systems record what has been actually played and others only record exceptional situations. Some systems automatically provide the playlog as part of the digital signage software installation; others may require additional setup to enable the log after. This document does not cover the deployment issues of the playlog as how the playlog is stored, distributed or utilized. The focus of the document is primarily on the information that are of interest to its potential users and applications.

The standards provided here are intended to be used as a guideline highlighting the important aspects of the playlog. It is versioned in a way that would allow future revision as the industry

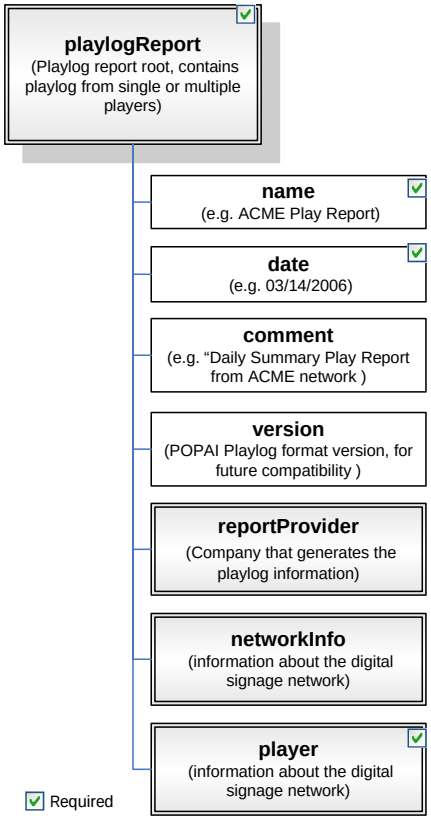
evolves over time. Like any other industry standard, it is created with the following requirements in mind:

- *Adaptability* – it can cover broadly what people care about and adapt to most of the existing implementation with little change
- *Manageability* – it can be used as the key information in managing a digital signage network
- *Extensibility* – it allows future expansion for various digital signage applications
- *Scalability* – its existence does not provide a hardship when the network scales large
- *Easy to implement* – the effort to generate such log and any value-added services (e.g. reporting, analytics) are reasonable

The success of such a standard requires many vendors' participation. Given the widely varying usage for Playlog, XML is adopted as the basic format. This will permit extraction and presentation in customized forms for any purpose, and will also allow extensibility as the applications grow. It is known to be fairly straightforward to convert an XML document into some other formats.

# 2. Introduction

The standard playlog recommended by POPAI Digital Signage Standards committee covers a wide-range of usage possibilities. It contains a small set of required fields that are mandatory to provide baseline playlog report for proof of performance at a per content item level. A simple sample file is available in this document to illustrate this concept. The standard format also has many optional fields that are useful for many other more specific purposes beyond simple proof for performance.




## 2.1 Top-level Playlog Report Structure

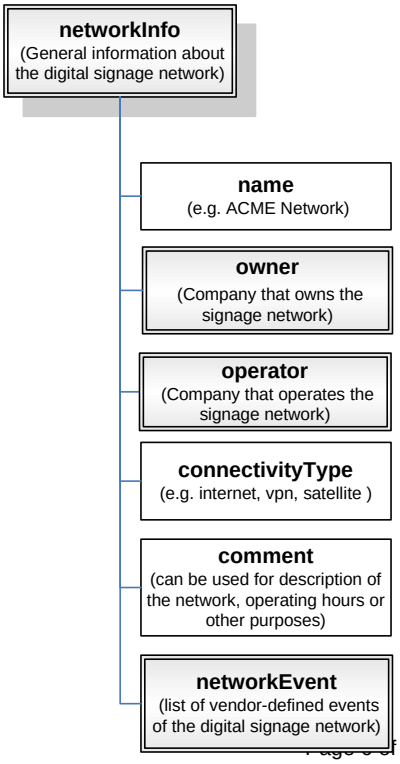
A Playlog Report can consist of play reports from one or more players. At a minimum, the report name, date of reporting and at least one player report are required. Optionally, the report provider can add comments as well as general information of the digital signage network.

The report is typically generated from the content authoring, scheduling, management and distribution software. The software may be developed by an independent software vendor or by the network operator. Vendor that provides the software can add their company information as part of report information.

A POPAI standards compliant XML playlog starts with a root element ***playlogReport***. It contains ***name***, ***date***, ***comment***, ***version***, ***reportProvider***, ***networkInfo*** and ***player*** as its member elements. Only ***name***, ***date*** and ***player*** elements are required. ***Version*** information is important, it defaults to 1.0 if is left out.

## 2.2 Network Information

General information about the digital signage network can be provided as a convenience, though not required. If provided, it gives a at-a-glance view of who owners the network, who handles the operations of the network, network connectivity type and list of events that may be of interest for the reader that needs to know more about the health or performance aspects of the network. In addition, a ***comment*** field is provided for extra information regarding the detail description of the network (e.g. number of players, number of channels, operating hours, etc.)



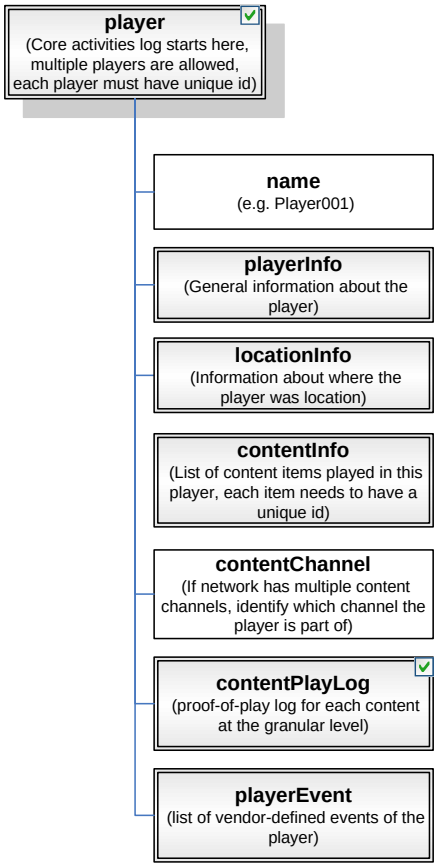

Network information is represented in the ***networkInfo*** element in the XML definition. It contains ***name***, ***owner***, ***operator***, ***connectivityType***, ***comment*** and ***networkEvent*** sub-elements. None of the information is mandatory.

Only one network is recommended to be included for each playlog report.

## 2.3 Player Information and Play Logs

### 2.3.1 player Element

The ***player*** element is a mandatory element in the playlog schema. It encapsulates the core information for the content play activities happening at the player level. Multiple players can be aggregated into one report with each player corresponding to one ***player*** element under ***playlogReport*** root element.




There are a couple of important XML attributes associated with the ***player*** element.

- ***id*** – Each player must be uniquely identifiable by a unique ID. This may or may not be the same as the computer name if PC is used as a form factor. The ID is also different than the player ***name*** which is an optional user-friendly displayable name in UI.

- ***multi-channel*** – certain player (referred as multi-channel player) has the capability of distributing AV to multiple display devices. A multi-channel player may show content differently than a dedicated player and it is useful to know from reading the playlog report. The multi-channel attribute, if not set explicitly, is default to 'no'.

At a minimum, ***player*** element contains a list of play log entries with each entry corresponding to one content item played at a given time period. It can optionally include the general information of the player, where it is located, a list of content stored or played in the player, the content channel the player is part of and a list of vendor specific player events.

### 2.3.2 playerInfo Element

The ***playerInfo*** element can be used to describe the player's manufacturer, model and native format and capabilities. If a player is connected to multiple display devices (i.e. multi-channel player), the ***displayDeviceCount*** sub-element represents how many displays involved in the playlog report. The ***displayDevice*** sub-element, one for each display device, provides general information of display's ***manufacturer***, ***model***, native ***format*** and other characteristics.

### 2.3.3 locationInfo Element

The ***locationInfo*** element can be used to describe the physical location and characteristics of the demographic clustering information where player is located. This information can be a convenience if playlog is intended to be used for further customer behavior tracking and market analysis.

### 2.3.4 contentInfo Element

The ***contentInfo*** element consists of a list of content items that the player knows about. Each content item has a set of meta-data associated with it (who created the content, which advertiser does the content belong to, when was it created, what is the ***duration*** of the content, where is the original data source and the content's native ***format, resolution, filetype, etc.***). The information can

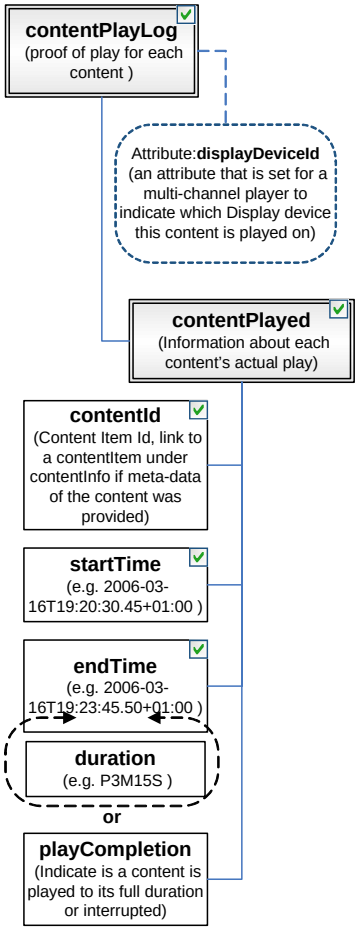
be useful to a reporting application for display content information without additional support of an external database source. Vendor is free to extend the schema on their own or use ***comment*** field for any meta data that may be of interests.

### 2.3.5 contentChannel Element

The ***contentChannel*** element is only used in a digital signage network where multiple content channels are deployed. Each player belongs to one and only one content channel. Therefore, information about the content channel that the player is assigned to provides additional insight on the content's exposure to its target audience. If omitted, it defaults to a single channel.

### 2.3.6 contentPlayLog Element

The ***contentPlayLog*** element is the actual proof of play section. Each played content log is described by a ***contentPlayed*** element with ***startTime***, ***endTime***/***duration***, ***playComplete*** information. More than one contentPlayLog elements can be created for multi-channel player where each display device can be represented by its own contentPlayLog. The ***displayDeviceId*** attribute for ***contentPlayLog*** is an optional attribute that allows the identification of which display device the playlog belongs.




## 2.4 Common Data Type

### 2.4.1 Date and Time

The ***dateTime*** type is adopted from W3C ISO 8601 standard. See W3C ISO 8601 standard for detail. http://www.w3.org/TR/NOTE-datetime It has the following format:

> ***YYYY-MM-DDThh:mm:ss.sTZD***
> (E.g. 2006-03-16T19:20:30.45+01:00)

### 2.4.2 Date

The ***date*** type has a similar format as *dateTime* except it does not minutes and seconds. It has the following format:

> ***YYYY-MM-DD***
> (E.g. 2006-03-16)

### 2.4.3 Duration

The ***duration*** type is a primitive XML data type and it represents the time interval between a start time and an end time. It has the following format:

> **P*n*Y*n* M*n*DT*n*H *n*M*n*S**
>
> Where *n*Y represents the number of years, *n*M the number of months, *n*D the number of days, 'T' is the date/time separator, *n*H the number of hours, *n*M the number of minutes and *n*S the number of seconds. The number of seconds can include decimal digits to arbitrary precision. (e.g. P1347Y, PT30S), see W3C ISO 8601 for detail http://www.w3.org/TR/xmlschema-2/

### 2.4.4 Location information

The ***location*** type contains a list of information that describes the physical ***address*** and characteristics of a place. Each location must have a unique ID. In addition, it has the following optional fields:

| Fields | Format | Comment |
|---|---|---|
| ***name*** | string | Name of the location |
| ***country*** | string | Country of the location |
| ***State*** | string | State name |
| ***city*** | string | City name |
| ***address*** | string | Address of the location |
| ***zipCode*** | string | Zip code |
| ***region*** | string | Regional name (if applicable) |
| ***district*** | string | District name (if applicable) |
| ***cluster*** | string | Any geographical, demographical or lifestyle cluster information of the location |
| ***comment*** | string | Any additional notes or comment |

### 2.4.5 Company Information

The ***companyInfo*** type contains a list of information used to find out more about a company. Each company must have a unique ID. In addition, it has the following optional fields:

| Fields | Format | Comment |
|---|---|---|
| ***name*** | string | Name of the company |
| ***companyURL*** | anyURI | URL to the company's web site |
| ***location*** | location | Location information (see location data type) |
| ***contactInfo*** | anyType | Company's contact email alias or URL |

### 2.4.6 Event information

The ***event*** type contains a list of information that describes vendor-defined events for information, waning or error, etc. Each event must have an ID. In additional, it has the following optional fields:

| Fields | Format | Comment |
|---|---|---|
| ***eventType*** | enumeration | *Informational*, *warning*, *critical* or *other* |
| ***eventName*** | string | Descriptive name of the event |
| ***eventSummary*** | string | Event description in short sentence |
| ***eventURL*** | anyURI | Additional information for this event |

## 2.5 Sample Playlog

The following is a very basic playlog that demonstrates 2 content items that were played in a loop.

```
<?xml version="1.0" encoding="utf-8" ?>

<!-- This is a very basic sample playlog that records 2 content items played -->
<!-- in a loop on a single channel player digital signage network.          -->

<playlogReport xmlns="http://popai.org/XMLPlaylogSchema">
   <name>Sample Playlog</name>
   <date>2006-03-15</date>
   <reportProvider id="company_1">
      <name>Sample Software Company</name>
```

```
    <contactInfo>contact@samplecompany.com</contactInfo>
  </reportProvider>

  <!—General information about this network, this is an optional section →
  <networkInfo>
    <name>Sample Digital Signage Network</name>
    <owner id="company_3">
      <name>Sample Retail Company</name>
    </owner>
    <operator id="company_2">
      <name>Sample Network Operator Company</name>
    </operator>
    <comment>This section is for general network-wide information</comment>
  </networkInfo>
  <player id="player_001">
    <contentInfo>

      <!-- 2 content items are played in this player , this is an optional section -->
      <contentItem id="content_01">
        <name>1st Sample content</name>
        <advertiser id="advertiser_1">
          <name>Advertiser Company 1</name>
        </advertiser>
        <duration>PT30S</duration>
        <format>portrait</format>
        <ratio>16:9</ratio>
        <fileType>MPEG 2</fileType>
        <comment>Sample content to promote XYZ brand</comment>
        <contentURL>http://www.samplecompany.biz/content_store/content_01.mpg</contentURL>
        <thumbnailURL>http://www.samplecompany.biz/content_store/content_01.jpg</thumbnailURL>
      </contentItem>

      <contentItem id="content_02">
        <name>2nd Sample content</name>
        <advertiser id="advertiser_2">
          <name>Advertiser Company 2</name>
        </advertiser>
        <duration>PT60S</duration>
        <format>portrait</format>
        <ratio>16:9</ratio>
        <fileType>MPEG 2</fileType>
        <comment>Sample content to promote MNO brand</comment>
        <contentURL>http://www.samplecompany.biz/content_store/content_02.mpg</contentURL>
        <thumbnailURL>http://www.samplecompany.biz/content_store/content_02.jpg</thumbnailURL>
      </contentItem>
    </contentInfo>

    <!-- Proof of play log starts here -->
    <contentPlayLog>
      <contentPlayed>
        <contentId>content_01</contentId>
        <startTime>2006-03-16T19:20:30.45+01:00</startTime>
        <endTime>2006-03-16T19:21:00.45+01:00</endTime>
      </contentPlayed>
      <contentPlayed>
        <contentId>content_02</contentId>
        <startTime>2006-03-16T19:21:00.45+01:00</startTime>
        <endTime>2006-03-16T20:22:00.45+01:00</endTime>
      </contentPlayed>
      <contentPlayed>
        <contentId>content_01</contentId>
        <startTime>2006-03-16T19:22:00.45+01:00</startTime>
        <endTime>2006-03-16T19:22:30.45+01:00</endTime>
      </contentPlayed>
      <contentPlayed>
        <contentId>content_02</contentId>
        <startTime>2006-03-16T19:22:30.45+01:00</startTime>
        <endTime>2006-03-16T20:22:30.45+01:00</endTime>
```

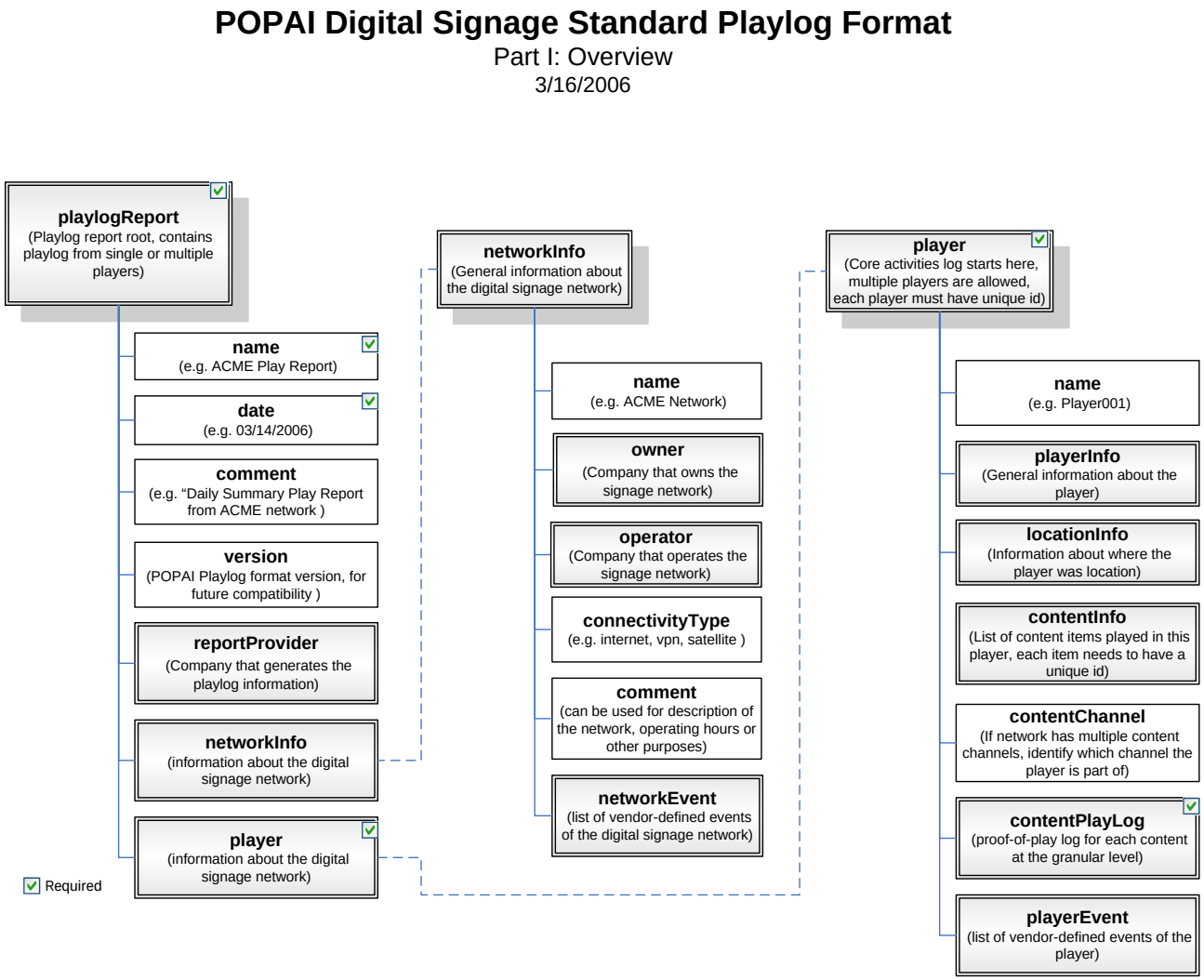
```
        </contentPlayed>

        <!--   (content_01 & content_02 are played in a loop thereafter until it is aborted)    -->

        <contentPlayed>
           <contentId>content_02</contentId>
           <startTime>2006-03-16T23:22:30.45+01:00</startTime>
           <endTime>  2006-03-16T23:59:59.59+01:00</endTime>
           <playCompletion>aborted</playCompletion> <!-- The last record is only partially played -->
        </contentPlayed>
      </contentPlayLog>
   </player>
</playlogReport>
```

# 3. Reference Hierarchy

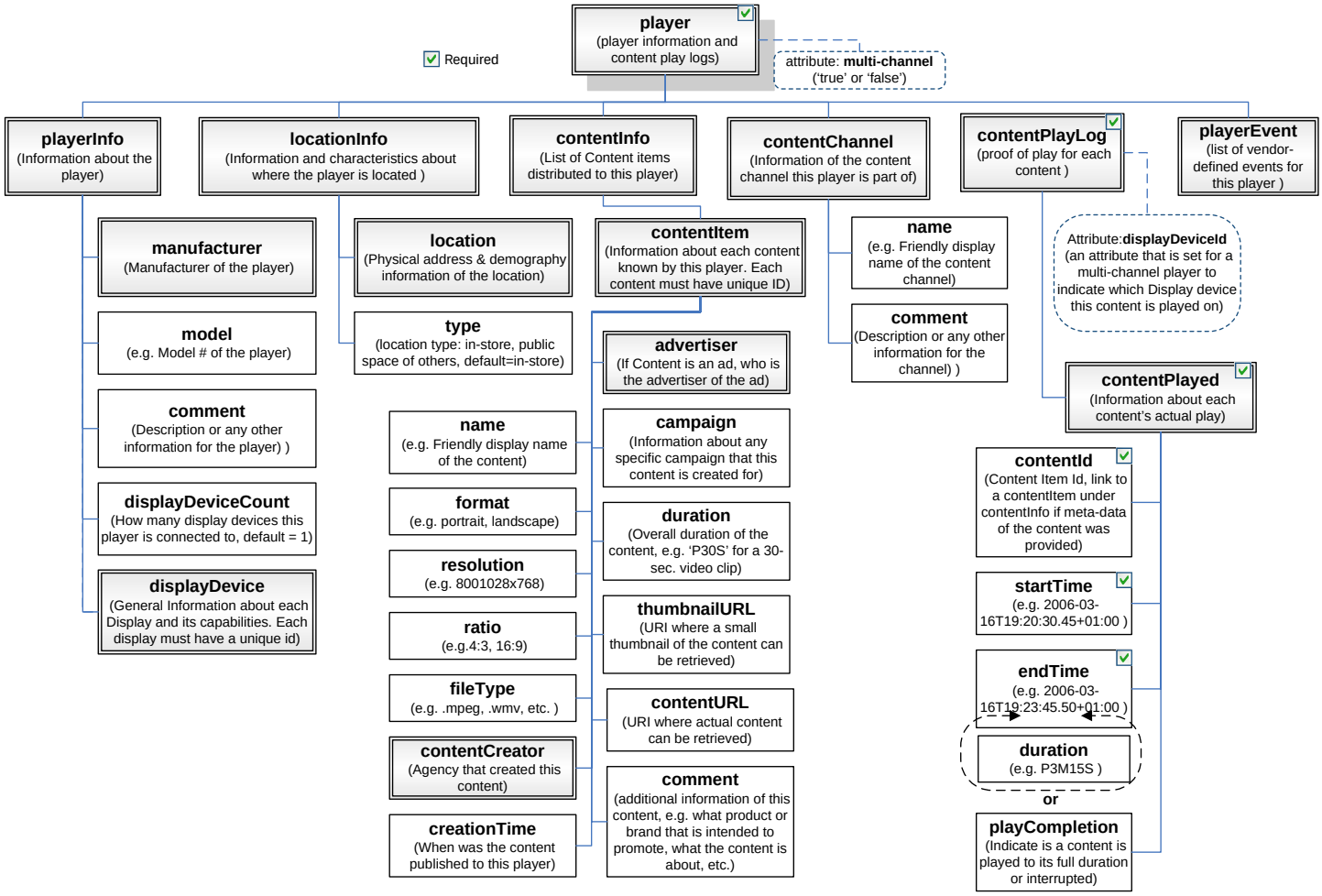
The entire playlog format can be represented in a hierarchical manner. This hierarchy is meant for easy to reference and not intended to replace the actual XML schema. The detail XML schema is included in section 4.



# POPAI Digital Signage Standard Playlog Format

Part II: Player and Content Play Log Detail

8/23/2006



# 4. XML Schema Reference

The XML schema is included for reference and can be downloaded from POPAI. It is a working XML schema that can be loaded into a typical XML-enabled development environment. For a detail explanation of how XML works, please reference W3C at http://www.w3.org/ .

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema targetNamespace="http://popai.org/XMLPlaylogSchema" elementFormDefault="qualified"
    xmlns="http://popai.org/XMLPlaylogSchema" xmlns:mstns="http://popai.org/XMLPlaylogSchema"
    xmlns:xs="http://www.w3.org/2001/XMLSchema">
    <xs:element name="playlogReport">
        <xs:complexType>
            <xs:sequence>
                <xs:element name="name" type="xs:string" minOccurs="1" maxOccurs="1" />
                <xs:element name="date" type="xs:date" minOccurs="1" maxOccurs="1" />
                <xs:element name="comment" type="xs:string" minOccurs="0" maxOccurs="1" />
                <xs:element name="reportProvider" type="companyInfo" minOccurs="0" maxOccurs="1" />
                <xs:element name="networkInfo" minOccurs="0" maxOccurs="1" >
                    <xs:complexType>
                        <xs:sequence>
                            <xs:element name="name" type="xs:string" minOccurs="0" maxOccurs="1" />
                            <xs:element name="owner" type="companyInfo" minOccurs="0" maxOccurs="1" />
                            <xs:element name="operator" type="companyInfo" minOccurs="0" maxOccurs="1" />
                            <xs:element name="connectivityType" minOccurs="0" maxOccurs="1">
                                <xs:simpleType>
                                    <xs:restriction base="xs:string">
                                        <xs:enumeration value="internet" />
                                        <xs:enumeration value="vpn - broadband" />
                                        <xs:enumeration value="satellite" />
                                        <xs:enumeration value="vpn - modem" />
                                        <xs:enumeration value="other" />
                                    </xs:restriction>
                                </xs:simpleType>
                            </xs:element>
                            <xs:element name="comment" type="xs:string" minOccurs="0" maxOccurs="1" />
                            <xs:element name="networkEvent" type="event" minOccurs="0" maxOccurs="unbounded" />
                        </xs:sequence>
                    </xs:complexType>
                </xs:element>
                <xs:element name="player" minOccurs="1" maxOccurs="unbounded">
                    <xs:complexType>
                        <xs:sequence>
                            <xs:element name="name" type="xs:string" minOccurs="0" maxOccurs="1" />
                            <xs:element name="playerInfo" minOccurs="0" maxOccurs="1">
                                <xs:complexType>
                                    <xs:sequence>
                                        <xs:element name="manufacturer" type="companyInfo" minOccurs="0" maxOccurs="1" />
                                        <xs:element name="model" type="xs:string" minOccurs="0" maxOccurs="1" />
                                        <xs:element name="comment" type="xs:string" minOccurs="0" maxOccurs="1" />
                                        <xs:element name="displayDeviceCount" type="xs:nonNegativeInteger" minOccurs="0" maxOccurs="1"
default="1" />
                                        <xs:element name="displayDevice" minOccurs="0" maxOccurs="unbounded" >
                                            <xs:complexType>
                                                <xs:sequence>
                                                    <xs:element name="name" type="xs:string" minOccurs="0" maxOccurs="1" />
                                                    <xs:element name="manufacturer" type="companyInfo" minOccurs="0" maxOccurs="1" />
                                                    <xs:element name="model" type="xs:string" minOccurs="0" maxOccurs="1" />
                                                    <xs:element name="comment" type="xs:string" minOccurs="0" maxOccurs="1" />
                                                    <xs:element name="format" type="displayFormat" minOccurs="0" maxOccurs="1" />
                                                </xs:sequence>
                                                <xs:attribute name="id" type="xs:string" use="required" />
                                            </xs:complexType>
```

```
                    </xs:element>
                </xs:sequence>
            </xs:complexType>
        </xs:element>
        <xs:element name="locationInfo" minOccurs="0" maxOccurs="1">
            <xs:complexType>
                <xs:sequence>
                    <xs:element name="location" type="location" minOccurs="0" maxOccurs="1" />
                </xs:sequence>
                <xs:attribute name="type" use="optional" default="in-store">
                    <xs:simpleType>
                        <xs:restriction base="xs:string">
                            <xs:enumeration value="in-store" />
                            <xs:enumeration value="public-space" />
                            <xs:enumeration value="other" />
                        </xs:restriction>
                    </xs:simpleType>
                </xs:attribute>
            </xs:complexType>
        </xs:element>
        <xs:element name="contentInfo" minOccurs="0" maxOccurs="1">
            <xs:complexType>
                <xs:sequence>
                    <xs:element name="contentItem" minOccurs="0" maxOccurs="unbounded">
                        <xs:complexType>
                            <xs:sequence>
                                <xs:element name="name" type="xs:string" minOccurs="0" maxOccurs="1" />
                                <xs:element name="advertiser" type="companyInfo" minOccurs="0" maxOccurs="1" />
                                <xs:element name="campaign" type="xs:string" minOccurs="0" maxOccurs="1" />
                                <xs:element name="duration" type="xs:duration" minOccurs="0" maxOccurs="1" />
                                <xs:element name="format" type="displayFormat" minOccurs="0" maxOccurs="1" />
                                <xs:element name="resolution" type="xs:string" minOccurs="0" maxOccurs="1" />
                                <xs:element name="ratio" type="xs:string" minOccurs="0" maxOccurs="1" />
                                <xs:element name="fileType" type="xs:string" minOccurs="0" maxOccurs="1" />
                                <xs:element name="comment" type="xs:string" minOccurs="0" maxOccurs="1" />
                                <xs:element name="contentURL" type="xs:anyURI" minOccurs="0" maxOccurs="1" />
                                <xs:element name="thumbnailURL" type="xs:anyURI" minOccurs="0" maxOccurs="1" />
                                <xs:element name="creationTime" type="xs:dateTime" minOccurs="0" maxOccurs="1" />
                                <xs:element name="contentCreator" type="companyInfo" minOccurs="0" maxOccurs="1" />
                            </xs:sequence>
                            <xs:attribute name="id" type="xs:string" use="required" />
                        </xs:complexType>
                    </xs:element>
                </xs:sequence>
            </xs:complexType>
        </xs:element>
        <xs:element name="contentChannel" minOccurs="0" maxOccurs="1">
            <xs:complexType>
                <xs:sequence>
                    <xs:element name="name" type="xs:string" minOccurs="0" maxOccurs="1" />
                    <xs:element name="comment" type="xs:string" minOccurs="0" maxOccurs="1" />
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                <xs:attribute name="id" type="xs:string" use="required" />
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        </xs:element>
        <xs:element name="contentPlayLog" minOccurs="1" maxOccurs="unbounded">
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                <xs:sequence>
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                    <xs:element name="contentPlayed" minOccurs="1" maxOccurs="unbounded">
                        <xs:complexType>
                            <xs:sequence>
                                <xs:element name="contentId" type="xs:string" minOccurs="1" maxOccurs="1" />
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```
                                        <xs:element name="startTime" type="xs:dateTime" minOccurs="1" maxOccurs="1" />
                                        <xs:choice minOccurs="1" maxOccurs="1">
                                            <xs:element name="endTime" type="xs:dateTime" />
                                            <xs:element name="duration" type="xs:duration" />
                                        </xs:choice>
                                        <xs:element name="playCompletion" minOccurs="0" maxOccurs="1" default="completed"
type="playCompletion" />
                                    </xs:sequence>
                                </xs:complexType>
                            </xs:element>
                        </xs:sequence>
                    </xs:complexType>
                </xs:element>
                <xs:element name="playerEvent" type="event" minOccurs="0" maxOccurs="unbounded" />
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            <xs:attribute name="id" type="xs:string" use="required" />
            <xs:attribute name="multi-channel" type="xs:boolean" use="optional" default="false" />
        </xs:complexType>
    </xs:element>
    <xs:element name="version" type="xs:decimal" minOccurs="0" maxOccurs="1" default="1.0" />
  </xs:sequence>
 </xs:complexType>
</xs:element>
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  <xs:restriction base="xs:anyType">
   <xs:sequence>
    <xs:element name="name" type="xs:string" minOccurs="0" maxOccurs="1" />
    <xs:element name="companyURL" type="xs:anyURI" minOccurs="0" maxOccurs="1" />
    <xs:element name="location" type="location" minOccurs="0" maxOccurs="1" />
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   <xs:attribute name="id" type="xs:string" use="required" />
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 </xs:complexContent>
</xs:complexType>
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      <xs:restriction base="xs:string">
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       <xs:enumeration value="warning" />
       <xs:enumeration value="critical" />
       <xs:enumeration value="other" />
      </xs:restriction>
     </xs:simpleType>
    </xs:element>
    <xs:element name="eventName" type="xs:string" minOccurs="0" maxOccurs="1" />
    <xs:element name="eventSummary" type="xs:string" minOccurs="0" maxOccurs="1" />
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   </xs:sequence>
   <xs:attribute name="id" type="xs:string" use="required" />
  </xs:restriction>
 </xs:complexContent>
</xs:complexType>
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 <xs:complexContent>
  <xs:restriction base="xs:anyType">
   <xs:sequence>
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                <xs:element name="state" type="xs:string" minOccurs="0" maxOccurs="1" />
                <xs:element name="city" type="xs:string" minOccurs="0" maxOccurs="1" />
                <xs:element name="address" type="xs:string" minOccurs="0" maxOccurs="1" />
                <xs:element name="zipCode" type="xs:string" minOccurs="0" maxOccurs="1" />
                <xs:element name="region" type="xs:string" minOccurs="0" maxOccurs="1" />
                <xs:element name="district" type="xs:string" minOccurs="0" maxOccurs="1" />
                <xs:element name="demographyCluster" type="xs:string" minOccurs="0" maxOccurs="1" />
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            </xs:sequence>
            <xs:attribute name="id" type="xs:string" use="optional" />
        </xs:restriction>
    </xs:complexContent>
  </xs:complexType>
  <xs:simpleType name="playCompletion">
    <xs:restriction base="xs:string">
        <xs:enumeration value="completed" />
        <xs:enumeration value="aborted" />
        <xs:enumeration value="unknown" />
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="displayFormat">
    <xs:restriction base="xs:string">
        <xs:enumeration value="portrait" />
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        <xs:enumeration value="other" />
    </xs:restriction>
  </xs:simpleType>
</xs:schema>
```