The Open IPTV Forum's Declarative Application Environment – An Overview

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Abstract

This paper addresses the state of the art in one of the identified workshop topics, namely the "Survey of existing work in Web-like technology for TV services". The Open IPTV Forum's (OIPF) Declarative Application Environment (DAE), which offers a browser environment to network applications, is briefly reviewed. It is being implemented in many retail TVs by major manufacturers.

Introduction

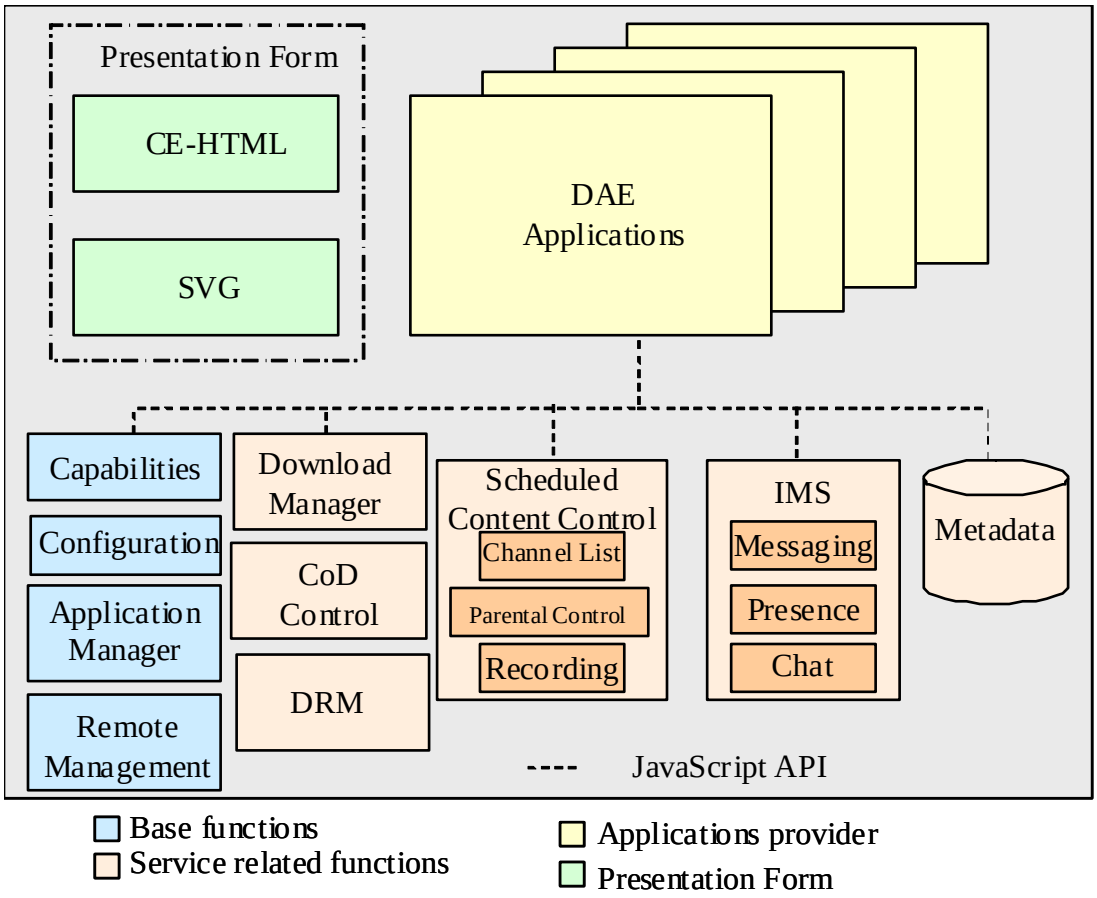
The OIPF's DAE has been designed keeping in mind the differences in the user interface (e.g., screen size, pointing devices etc.) between traditional browser usage, such as that on PCs/laptops, and that available to the TV. The OIPF defines functionality for control of on-demand media, remote control functions including key events and spatial navigation, control of IP and broadcast tuners, PVR management and others from a CEA-2014-A compliant browse, which includes a presentation environment based on CE-HTML and CSS

The DAE provides to service providers and content providers the capabilities of the terminal device so as to allow access to the following types of services (described very generically):

- Information services which are often associated with a content item and with which the user interacts (e.g., voting)
- Control of local and network-based PVR capabilities
- Support of network-based or local Content Guides, through JavaScript APIs that access the appropriate metadata
- Support of scheduled content delivered via IP multicast or via a DVB-S/C/T receiver
- Support for various forms of content download, including deferred download, background download and progressive download with HTTP adaptive streaming
- Integration with various communications services such as display of caller id, network notifications, instant messaging and chat
- Interaction with content protection systems for acquisition of rights for playback of protected media
- Support of service discovery and scanning of scheduled content

Architecture

The following figure shows the logical architecture of the DAE.



Two presentation environments are currently defined for the DAE – the first being what is called CE-HTML, which is the CEA's selection of the W3C's XHTML, CSS TV 1.0, DOM level 2 and XMLHttpRequest with some restrictions described by the referencing specification. The second presentation environemnt is Scalable Vector Graphics (SVG), based on SVG Tiny 1.2, either embedded within a CE-HTML document or as a standalone document.

DAE applications can make use of various functions, which are exposed by various Javascript objects, whose purpose is indicated in the following table:

High-level Function [which can include several embedded objects]	**Description**
Application Manager	Overall application management, behavior and tasking such as Support for multiple simultaneous applications, inter-application communication and application signaling

Capabilities	Access to the terminal's capability description
Configuration	Access to device configuration and user settings.
Remote Management	Access device diagnostics and perform remote management including trigerring upgrades
DRM	Integration with video and audio objects for communication with content protection systems and acquisition of content rights for protected content
CoD Manager	Control of presentation of unicast media, recordings and downloaded media items, including trick play as well as access to catalogues of on-demand content
Download Manager	Basic initiation of media download for protected and unprotected content as well as management of the media download queue and downloaded items
Scheduled Content	Control of broadcast video presentation including trick play & time-shifting & synchronization of applications to video
Parental Control Manager	Control of the parental control functionality in the receiver & PIN management for access control
Channel List Management	Discovery and management of channel lists and favorite lists, including channel scanning
Recording Management	Scheduling of local and network recordings and storage and retrieval of bookmarks
Metadata Management	Support for searching program guide information & VoD content catalogues

Possible Future Directionsfor the integration of the Web and TV

The following points are a list of different directions that could be taken for ensuring that the integration of Web and TV reach the expectations of all concerned parties.

1. Profiling of the web related standards to avoid duplications of methods.

2. Establish performance requirements. Simply having support of the latest standard does not ensure that the platform has the proper performance.

Possible areas for future OIPF-W3C collaboration

The following points are a list of possible areas of W3C collaboration with the OIPF.

1. Align the <video> tag for both HTML5 and SVG video control.

2. Define clear boundaries for other standard forums to extend W3C standards where it is necessary.

3. Create a new interface for the control of play out of time-shifted content.