

# Web and TV: Convergence, Devices, and Applications

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## 1. Introduction

Web Browsers, Smartphones, Tablets, Smart TVs etc, combined with Cloud Services and widespread adoption of both wired and wireless broadband access, have created the opportunity for service providers to offer customers a broad range of services over a broad range of devices. In this environment AT&T has launched U-verse, the first video home entertainment service providing Linear Video, Video on Demand and Applications over a totally IP, IPTV platform. In addition AT&T is a leading provider of high speed internet, wired and wireless services, and end-user devices such as Smartphones including the iPhone. Today, AT&T must deploy different application platforms for each device (TV, PC, Smartphone, Tablet etc.) due to the lack of standardized device interfaces. This creates delays in introducing new devices and well as delays in delivering new services to existing devices. AT&T believes that HTML5 with appropriate extensions from the Web and TV Interest Group has the potential to be the standard that overcomes this issue. While HTML5 contains much of what is needed in terms of HTML and APIs, key areas that must be addressed include DRM, Codec support, Adaptive Streaming and operation in Home Networks.

## 2. Use Case: Converged Platform

HTML5 with appropriate extensions should enable a common server platform to provide common services across a variety of devices. Key elements of such a server platform are:

- Common set of back-end systems for content ingestion and content management

- Common set of HTML5 User Application Servers that drive user interaction for viewing content and using value added applications such as Weather, traffic, games, etc
- Device Management and Adaption layer considering device capabilities, delivery context (e.g. type of network, current performance), and media/service requirements in order to adapt media streams and user interactions as appropriate
- Capability to transcode to device required codec as needed
- Support for emerging devices and media types, yet to be defined
- Synchronization of dynamic application elements in any configuration of devices.

The converged platform should demonstrate support for the following device classes:

- Standard Definition and High Definition Televisions using HTML5 STBs
- Smart TVs with HTML5 Web Clients
- Smartphones with HTML5 Web Clients
- Tablets with HTML5 Web Clients
- PCs with embedded HTML5 Browsers and/or Web Clients
- M2M type terminal devices as part of an HTML5 driven user experience
- Multiple orchestrated devices with HTML5 clients.

The converged platform should demonstrate support for the following operational environments:

- Wired or Wi-Fi connection within a layer 3 only Home Network
- Wired or Wi-Fi connection within a DLNA Home Network, displaying content from DLNA DMS
- Wireless 3g or 4g connection
- Connection to Wi-Fi hotspot
- Handoff between similar connections and different connection types.

### 3. Enhancements needed

- DRM

HTML5 should enable a DRM agnostic approach that allows Service Providers to load the DRM required for the content being viewed.

- Codec Support

Transcoding content is costly for the service provider or end user. HTML5's audio/video media support needs to include requirements for a codec set that supports a variety of end user devices ranging from 65"+ HDTVs using the latest 4K format, to small Smartphone screens. The codecs must also provide compression options that accommodate scenarios where bandwidth or disk space is limited.

- Adaptive Streaming

Variations in device capability, transmission conditions, congestion etc all lead to a requirement to be able to adapt the video stream in real time to the prevailing conditions. Some examples of the need for adaptation are variable transmission conditions for customers using wireless technology, or customers seeking to increase the number of streams beyond the capacity of their IP service at the current stream rate. In both cases, a method to change the quality and bandwidth of the stream may be required.

- Browser Synchronization

Complex application environments incorporating multiple dynamic components, both internal to one HTML5 client and across multiple HTML5 clients, will require synchronization to drive a coherent user experience. Technology convergence will make available new converged application types, and complex user experiences will emerge. HTML5 should be able to accommodate emerging application environments in addition to existing ones.

## 4. Conclusion

HTML5 with the enhancements being proposed by the Web and TV Interest Group has the potential to accelerate the already growing market for converged IP Video Services. AT&T is proposing a short use case that we hope can be used to help evaluate HTML5 specifications against some of the key requirements to enable this acceleration.