**Proposal for Total Multi-Platform Multi-Protocol Plug-in Based Video Player Solution**

**1. Project Overview**

The project is about to build a new Web Video Player (for browsers) to replace the client's current player (Flash based). The objective is to build a player that can work with all popular browsers (IE, Firefox, Google Chrome, Safari) on all popular platforms (PC, Mac, Android, iOS, SmartTV) that can support all currently popular streaming protocol (http, HLS, etc.) and upcoming protocol (DASH, HEVC). The design needs to be modular and flexible, plug-in based. New metadata library will need to be integrated.

The project can be extended to other native solutions for mobile platform which will required further development on each individual platform.

## 2. Obstacles/Requirements

The Codec of a web video player lie at the browser level. Different browsers support different codec and protocol. For example, Chrome best support MPEG-DASH while Firefox is having issues with it, or only Apple OS support HLS natively. Not all versions of one browser are the same. Streaming protocol also vary from platform to platform (Windows, iOS, Mobile, SmartTV, etc.) The new video player will need to be flexible enough to support all of them. Web-based player will not perform as well as native apps on mobile platform/TVs, but an acceptable performance is required.

The player needs to be able to support both Live Streaming and Video on Demands.

There is also the DRM risk where content can be stolen while being streamed. A DRM solution might also be needed.

The player might need to be able to display ads, for most modern monetizing model is implementing video ads.

The player needs to be able to display meta-data mid video.

## 3. Product Objectives:

## From our experience working with big client like DirecTV supporting their streaming services on multiple platforms we are familiar with the objectives and obstacles named above. We hereby suggest a few solutions that we think suited to requirement the best:

## -The player will at least support normal HTTP/HTML5 progressive streaming, Adaptive Streaming (MPEG-DASH), HTTP Live Streaming, RTSP.

## -The player will support Windows, Mac OS, Android, iOS, Linux operating systems.

## -Depends on the system and the browser (determined from the server side by dynamically reading the browser’s information at runtime), a suitable version of the player will be provided to best support the browser and the platform. When user make a http request to open the video player page to play a video, the server will analyze the capability of the browser to see if it can support the optimal video streaming protocol for that platform. If the browser cannot support the optimal player/protocol, a fallback solutions will be provided (fox example a Flash player for non-HTML5 browsers).

## -The player will be able to display Closed Captions, Subtitles, Ads, metadata.

## -The player will be able to collect user’s behavior and performance data for analytics purposes.

## -The player will be able to support multiple CDN and dynamic CDN change.

## -The player will be able to support DRM if required.

## 4. High Level Architecture:

## -The product will have two major components: the server side’s video player manager and the video player itself.

## -From the server, when the user make a request to play a video/stream, the server side’s manager will gather all available information required to determined the level of support the user’s browsers has for streaming. Up on this decision, when returning the HTML page to the user’s browser to render the website, appropriate code will be generated to provide the user the best video player based on the level of support the browsers have, the available quality and format the stream has and the platform the user is on. This model allows for a light weight footprint on the client side and guarantee absolute best performance.

## -The player itself will be a modular structure where everything centers a central video player controller. Each core player that meant for specific platform and additional features will be plug-ins to the controller. There will be players for DASH enabled browsers, HTML5 browsers, Mac/iOS browsers, Windows browsers, old browsers, etc. There will be ads components, CC components, Analytics components, etc. which operates separate to each other and will be able to be turned on/off freely.

## Components Diagram

## 4. Lower Level Architecture:

## -Ads Module will allow Ads insertion in multiple places during video streaming. The ads themselves will come from a third party source. The module will implement the third party’s API.

## -CDN Module will allow popular CDNs integration. It will work closely with DRM Module. It will return the appropriate URL/format/protocol for streaming.

## -Analytics Module will implement third party API. This module will provide analytics methods for logging events to be call in other places of the player.

## -Metadata Module will require a Metadata Web Service from the Content Provider. It can display the metadata of the movies while the video is playing.

## -UI Module allows easy changes of UI when desired. Everything related to UI will be in this module.

## -DRM Module will implements 3rd party DRM library.

## 4. Hardware/ Software requirement:

## -Depends on what features is required, different hardware/software will be required. For example DRM may need additional hardware on server side.

**5. Proposed Timeline**