Building a Future-Proof Web Video Player

by Robert Reinhardt

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The capabilities of HTML5 web browsers, both on mobile devices and desktops is changing rapidly. As a video content producer, you need to have a video player that can respond to these changes as browser vendors release new features. But how do you plan for uncertainty? In this workshop, we review popular video player frameworks such as those provided by jPlayer (jQuery plug-in), MediaElement.js, VideoJS, JWPlayer, and others. You also learn how to pick the proper media encoding strategy for your video distribution needs, and how to plan for scaling video content types as browser features such as MPEG-DASH begin to emerge.
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what does “future-proof” mean?
“future-proof” can mean you currently have:

- a Flash-only web video player
- a sub-optimal HTML5 video player
- no video player but you have video content
Planning for uncertainty

- Invest in H.264 technology
- Invest in standards when the need fits
- Use an encoding strategy that is future-proof
- Forecast your CDN deployment
Invest in H.264 technology

- Widest adoption across all aspects of the video industry
- Apple uses it. Ergo we will abide.
- All adaptive streaming tech has a place for H.264
Web standards *today*

- WebM is license free, but lacks vendor support
- MPEG-DASH looks promising, but lacks availability
- Use standards when you need the widest reach for marketing content
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Future proofing your video player

- Encode video for segmented delivery (CBR, fixed GOP)
- Use a configurable framework for player architecture ($)
- Use a 3rd party to manage a player & your assets ($$)
- Build your own custom framework that you control ($$$)
- Stay current with research (See JW Player HTML5 report)
Encoding strategies

- Know your demographics (market share is relative)
- Encode to your deployments
- Customize your encoding workflow
Deployment strategies

- Marketing
  - Free video, YouTube, Vimeo

- Product demos & support
  - Free video, YouTube, Vimeo

- Monetization
  - Subscriber only video, pay per view/download
  - Content ownership (no one controls my video!)
Knowing your formats

- H.264
  - Nearly 50% of the HTML5 browser market share
- WebM
  - Nearly 50% of the HTML5 browser market share
- HLS
- MPEG-DASH
Knowing your player options

- HTML5 `<video>` element
- jPlayer (jQuery plug-in)
- MediaElement.js
- VideoJS
- JWPlayer
- FlowPlayer
- Kaltura
- Adobe Strobe Media Playback
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Problems with prepackaged players

- Adaptive streaming not a priority
- Poor documentation or slow customer support
- Varying degrees of customization
- It’s not your own code
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HTML5 `<video>` element

- It's getting better as browsers improve
- May suffice for mobile deployments
- Adaptive streaming only supported in Safari Mac (desktop), iOS, and recent Android releases
- Thoroughly test targets
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W3C Media Events Test

http://www.w3.org/2010/05/video/mediaevents.html
## HTML5 `<video>` `<source>` type

<table>
<thead>
<tr>
<th>Video Format</th>
<th>MIME type</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP4</td>
<td>video/mp4</td>
</tr>
<tr>
<td>WebM</td>
<td>video/webm</td>
</tr>
<tr>
<td>M3U8 (HLS)</td>
<td>application/x-mpegURL</td>
</tr>
</tbody>
</table>
## HTML5 `<video>` `<source>` type

<table>
<thead>
<tr>
<th>Video Codec &amp; Profile</th>
<th>Hex Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>H.264 Baseline</td>
<td>42E0</td>
</tr>
<tr>
<td>H.264 Main</td>
<td>4D40</td>
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<tr>
<td>H.264 High</td>
<td>6400</td>
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</table>
### HTML5 `<video>` `<source>` type

<table>
<thead>
<tr>
<th>Audio Codec</th>
<th>Value</th>
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<tbody>
<tr>
<td>AAC-LC</td>
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<tr>
<td>HE-AAC</td>
<td>mp4a.40.5</td>
</tr>
<tr>
<td>MP3</td>
<td>mp4a.40.34</td>
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<tr>
<td>Vorbis</td>
<td>vorbis</td>
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</table>
## HTML5 `<video>` `<source>` type

<table>
<thead>
<tr>
<th>H.264 Level</th>
<th>Hex Value</th>
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</thead>
<tbody>
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<tr>
<td>2.1</td>
<td>15</td>
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<tr>
<td>2.2</td>
<td>16</td>
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<tr>
<td>2.3</td>
<td>17</td>
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<tr>
<td>3.0</td>
<td>1E</td>
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<td>3.1</td>
<td>1F</td>
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<td>4.0</td>
<td>28</td>
</tr>
<tr>
<td>4.1</td>
<td>29</td>
</tr>
</tbody>
</table>
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HTTP
  └── HTML
      ├── H.264
      │    ├── Safari 5+
      │    └── VP8
      │         └── Chrome 3+
      ├── VP8
      │    └── Chrome 6+
      └── webm
            └── Firefox 4+

MediaElement.js
  └── Video.js
      └── JWPlayer
          └── flowplayer
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- **Apple HLS**
  - H.264
  - MPEG-4 AVC

- **Adobe HDS**
  - H.264

- **MPEG-DASH**
  - VP8
  - webm

The diagram shows the compatibility and support for different video formats across various browsers and platforms. MediaElement.js (Limited) is supported in Safari 5+ and iOS. JWPlayer (Premium only) is supported for Adobe HDS. N/A indicates no support for MPEG-DASH in Chrome 25+ without Media Ext.
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RTMP → H.264 MPEG-4 AVC → MediaElement.js

RTMP → H.264 MPEG-4 AVC → jPlayer

Adaptive RTMP → H.264 MPEG-4 AVC → JWPLAYER

RTSP → H.264 MPEG-4 AVC → Media Player

Direct link in HTML
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jPlayer (jQuery plug-in)

- [http://jplayer.org](http://jplayer.org)
- Great for jQuery based sites
- Open source JavaScript code
- Open source Flash code (fallback)
MediaElement.js

- [http://mediaelementjs.com](http://mediaelementjs.com)
- Integrated Flash fallback
- Simple HTML integration
- Several add-ins available
- Source code available for JavaScript and Flash and Silverlight
VideoJS

- http://videoJS.com
- Nice GUI for “live” code
- No licensing fees
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JWPlayer 6

- http://jwplayer.com
- Long history of Flash Player video architecture
- Commercial licensing subscription
- Better adaptive streaming via Flash & iOS HTML5
- Supports HLS in Flash playback
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FlowPlayer

- http://flowplayer.org
- Commercial license
Adobe Strobe Media Playback

- [http://www.osmf.org/strobe_mediaplayback.html](http://www.osmf.org/strobe_mediaplayback.html)
- Flash only solution
- Based on OSMF
- Can work in tandem with custom HTML5 codebase
- Can use for live streaming too
thank you.
Robert Reinhardt, Founder, videoRx.com

- **Inventor:** Developer, video solutions architect for multi-screen delivery
- **Writer:** original *Flash Bible* series, *Video for Flash Studio Techniques*
- **Instructor:** Corporate training for Disney, global design agencies
- **Entrepreneur:** Online video services at videoRx.com
- **Contributor:** Online articles, calculators, tutorials.