

DASH-AVC/264

Towards an Interoperable OTT Video Delivery Solution

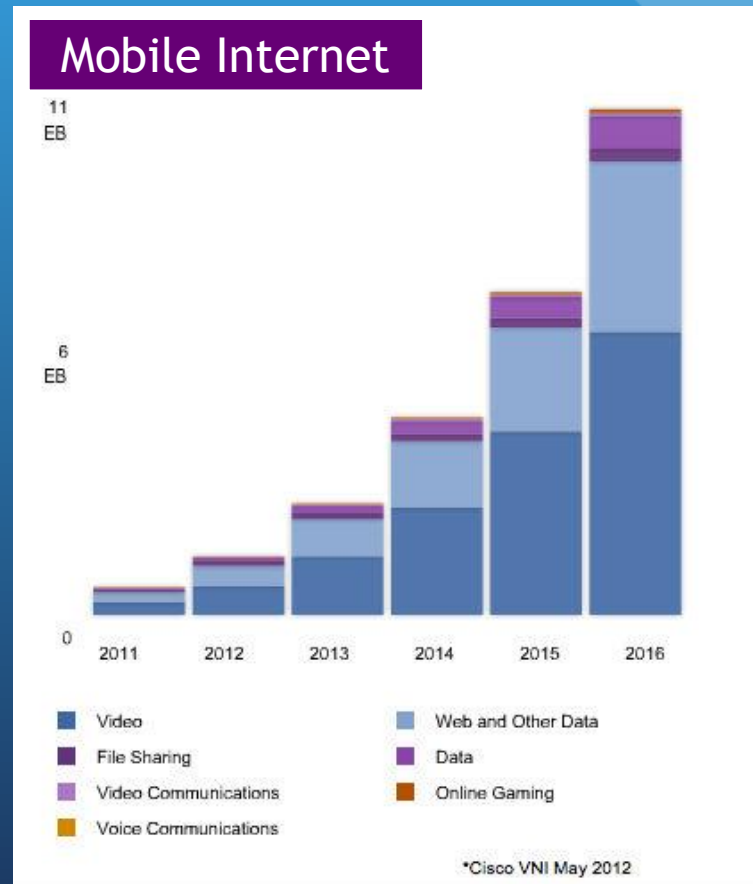
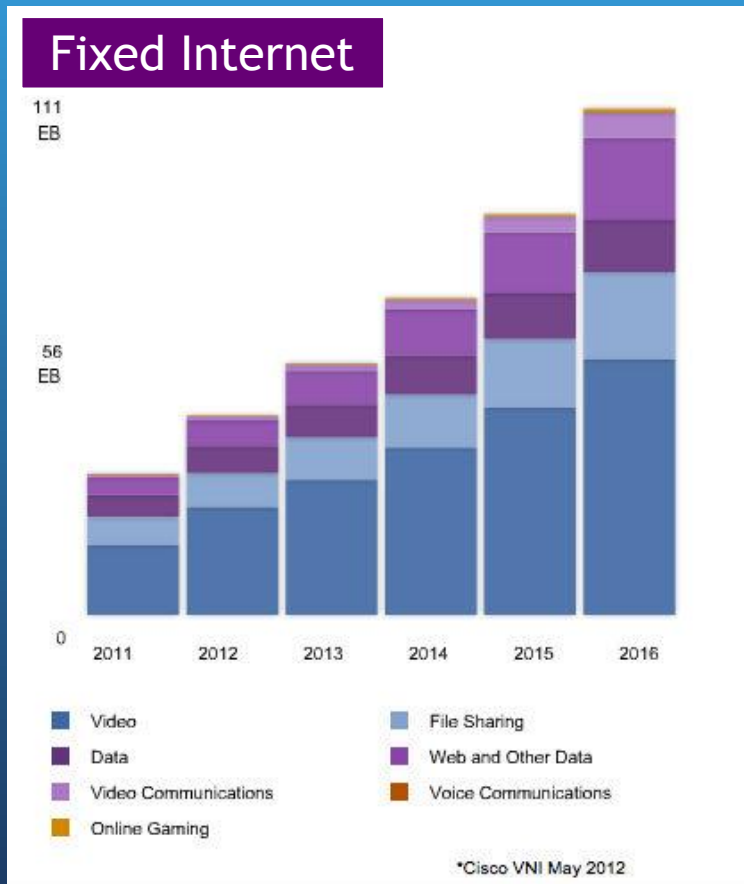
June 27, 2013

Background

OTT Video and Standardization Efforts

Video is dominating the Internet

- Internet: Real-time video is 50% of the traffic at peak periods
 - notably 30% from Netflix and 11% from YouTube
- Mobile: Video traffic is growing exponentially & is a large portion.



Traditional Broadcast vs. Internet TV

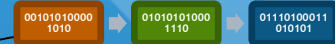
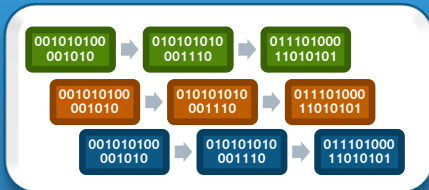
- ❑ Internet TV is better than traditional TV in 7 out of 8 experience categories, according to younger consumers
- ❑ While traditional TV surpasses Internet TV **only in quality**, it delivers better “overall experience”
- ❑ **Quality Factors** of Internet TV
 - Rebuffering/stalls
 - Audio-visual quality
 - Start-up latency
 - end-to-end delay
- ❑ Other relevant factors:
 - scalable and cost-efficient delivery infrastructure
 - protection of assets

Internal Survey of Younger Consumers:
When comparing traditional and Internet TV, which option is better for the following factors?

	Traditional	Internet
Content	7%	➤ 79%
Timing Control	7%	➤ 83%
Quality	➤ 80%	16%
Ease of Use	23%	➤ 52%
Control (FF, etc.)	9%	➤ 77%
Portability	4%	➤ 92%
Interactivity	31%	➤ 52%
Sharing	33%	➤ 56%
Overall Experience	➤ 53%	33%

HTTP Adaptive Streaming

- 1** Encode each segment at multiple bitrates
- 2** Split the video into small segments
- 3** Encrypt each segment using CENC Specification
- 4** Make each segment addressable via a HTTP-URL
- 5** Client makes decision on which segment to download
- 6** Client acquires a license for encrypted content
- 7** Client splices together and plays back



Media Capture & Encoding

DRM Encryption Server

Media Origin Servers

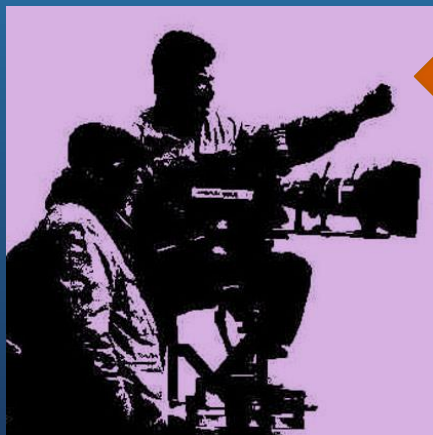
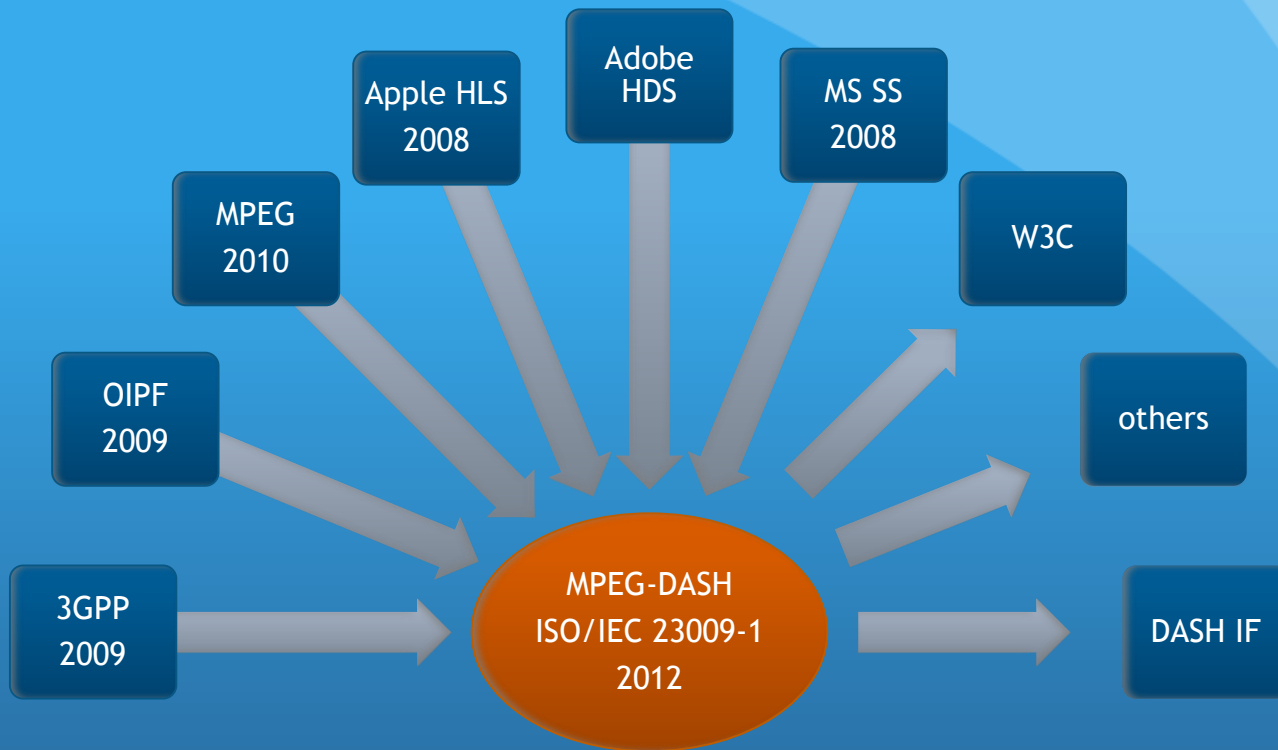
HTTP Cache Servers

Client Devices

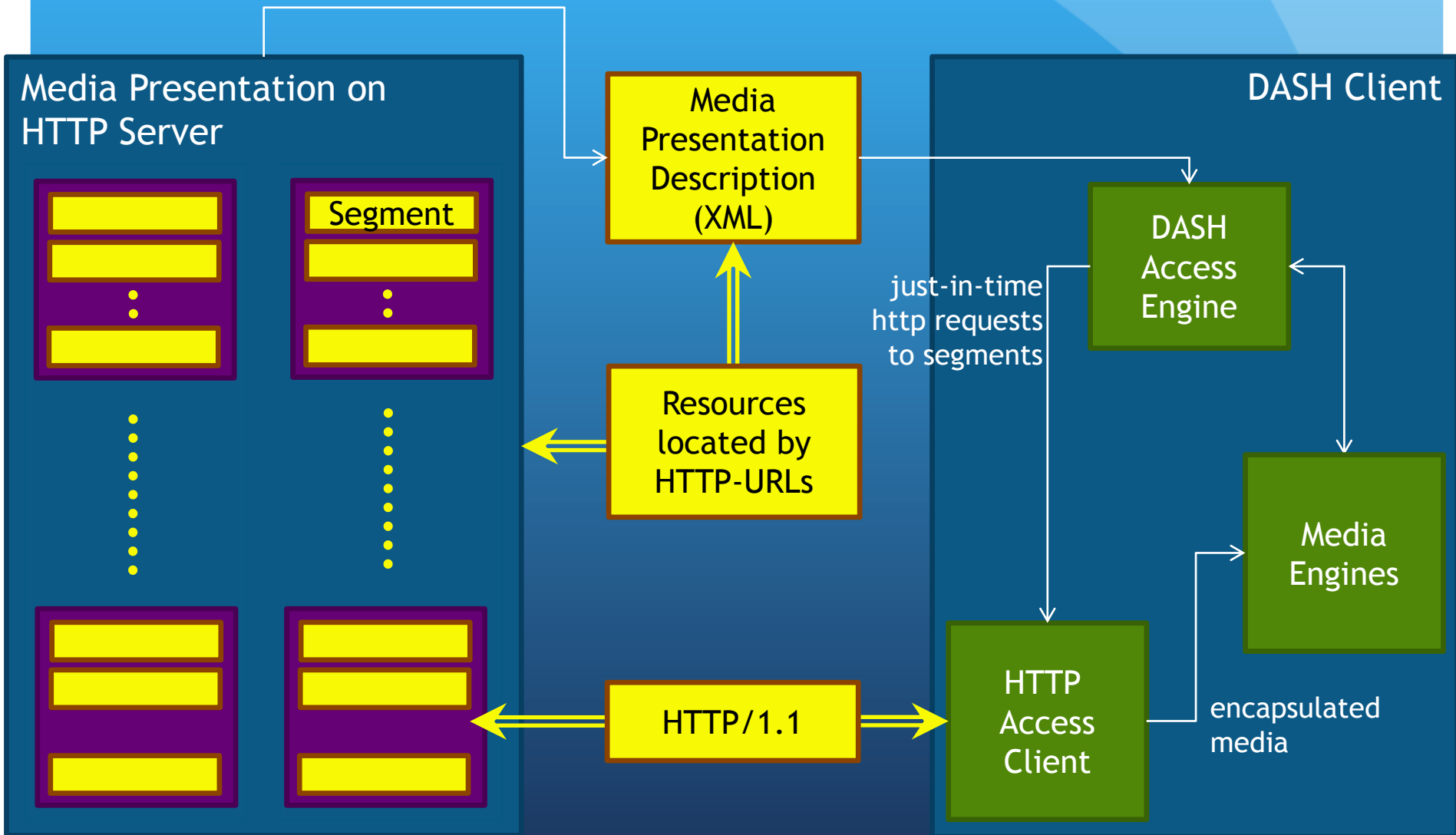
DRM License Server

A close-up photograph of chocolate ingredients. The scene is filled with cocoa beans, cinnamon sticks, chocolate shavings, and a bar of chocolate with the 'Gilles' logo. The lighting is warm and golden, highlighting the textures of the ingredients. The text 'Why Standards?' is overlaid in white on the left side of the image.

Why Standards?



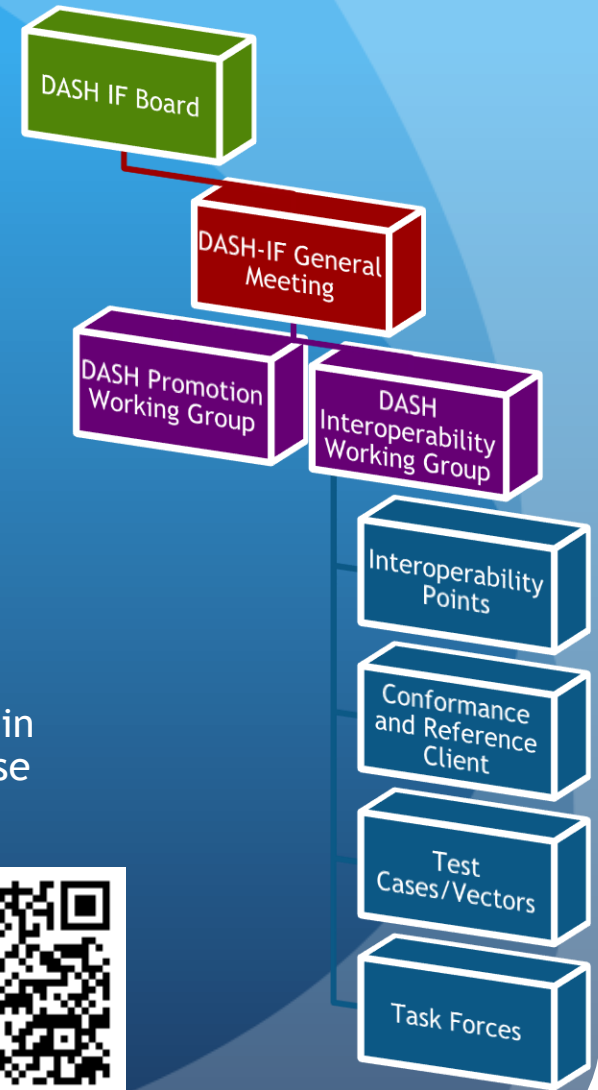
What is **specified** - and what is **not**?



DASH Industry Forum



- ❑ Founded with completion of MPEG standard in 08/12
- ❑ Mission
 - Addressing the dramatic growth of broadband video by recommending a universal delivery format that provides end users with the best possible media experience by dynamically adapting to changing network conditions.
- ❑ Objectives:
 - Promote and catalyze market adoption of MPEG-DASH
 - Publish interoperability and deployment guidelines
 - Facilitate interoperability tests
 - Collaborate with standard bodies and industry consortia in aligning ongoing DASH standards development and the use of common profiles across industry organizations
- ❑ Please check and join at <http://dashif.org>



Members (67)



Achievements



- ❑ Established a mediator role among different communities: standardization organizations, fora, interoperability groups, larger and smaller business entities, researchers, open source community, different players in eco system, public/press
- ❑ successful demonstrations & events at IBC'12, MWC'13, NAB'13
- ❑ published DASH-AVC/264 Interop Guidelines (details follow)
- ❑ Established online repository including collection of profile and metadata identifiers: <http://dashif.org/identifiers/>
- ❑ Conducted European Broadcasters survey <http://goo.gl/Az2sw>
- ❑ established formal and informal communication with MPEG, HbbTV, IMTC, DVB, 3GPP, ATSC, NGMN, DTG, W3C, etc.



DASH-AVC/264

Interoperability for DASH-based Video Services

Motivation

- MPEG-DASH provides significant flexibility, but at the same time is not a complete specification as it is agnostic of codecs, DRM and other functionalities
- Building a service and client based on DASH poses questions and challenges, e.g.
 - Which codec do you support in your DASH client?
 - What segment encapsulation should the encoder generate?
 - How should DRM be signaled?
 - What closed captioning format do you support?
- Hence, the DASH-IF decided to take initiative
 - filling these gaps and create baseline recommendations
 - creating interoperability efforts to spur fast adoption and accelerate growth
 - striving for compatibility with consortia standards
- DASH-IF believes that DASH-AVC/264 supports the Internet streaming main use cases better than any existing proprietary solution

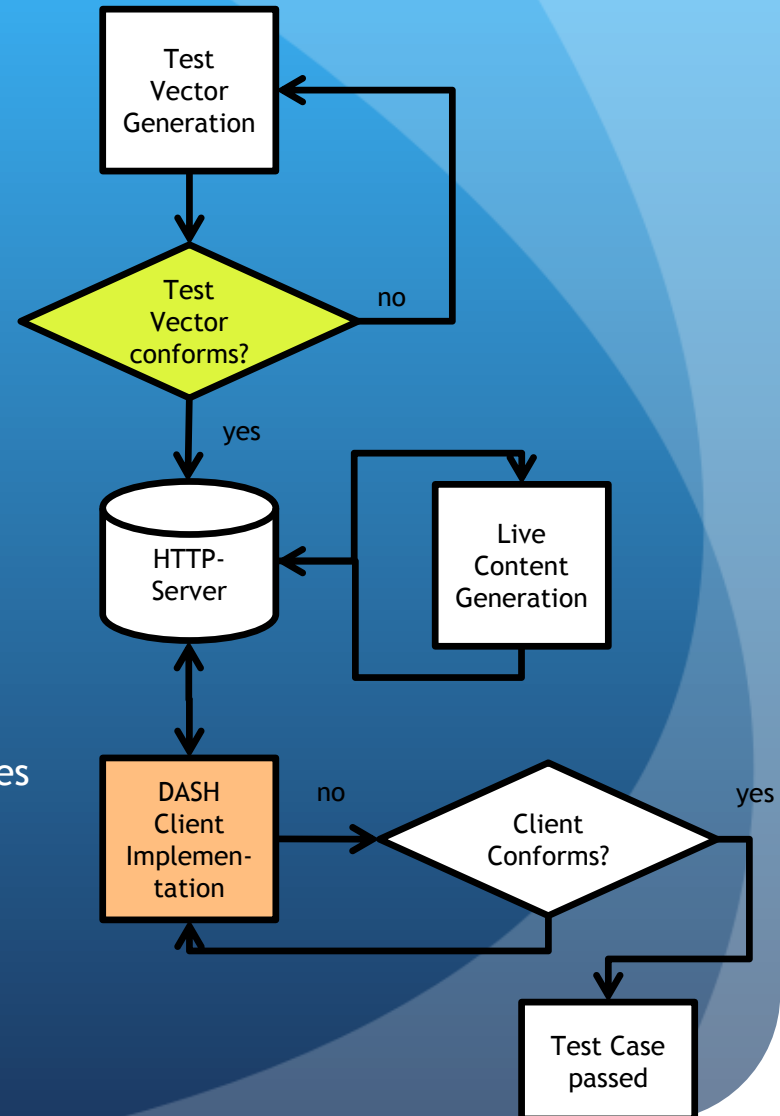
Use Cases and Functionalities

- The initially considered use cases/functionalities are:
 - support for On-Demand, live and catch-up (network PVR) services
 - support for bitrate adaptivity by seamless Representation switching
 - support for high-definition AV-quality based on established and broadly supported codecs
 - support for basic accessibility (e.g. subtitles, closed captions)
 - support for content protection without committing to one DRM
 - support for easy and efficient delivery over HTTP-CDNs
 - support for late-binding, i.e. individual delivery of components
 - basic support for ad insertion and trick modes

- Enhancements are considered in extensions, e.g.
 - Audio-visual enhancements (1080p, multichannel audio)
 - advanced codecs, advanced ad insertion, etc.

Interoperability Points in DASH-IF

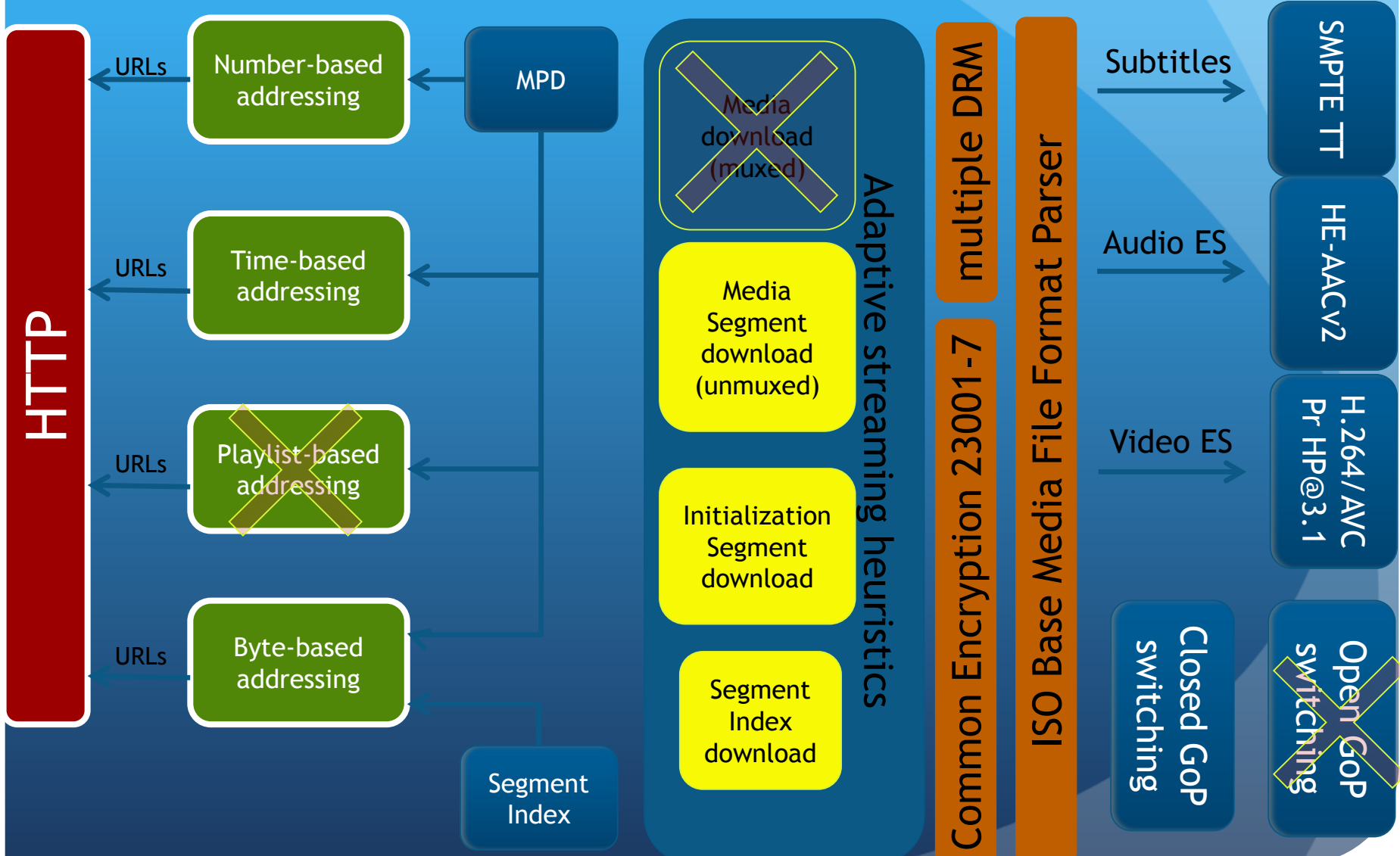
- ❑ Relevant collection of features that are considered for deployment scenarios
- ❑ Interoperability Points provide Guidelines for content authors and client implementers on relevant features
- ❑ Process to define IOPs in DASH-IF
 - define high-level summary, justification, use cases
 - identify supporters
 - provide technical description
 - define test cases
 - implement conformance and reference software
 - provide conforming test vectors and test services
 - define real-life test scenarios
 - define testing process and success criteria



DASH-AVC/264 Base IOP Overview

- ❑ ISO base media file format Segments
 - ISO/IEC* 14496-12*: ISO Base Media File Format
 - ISO/IEC* 14496-14*: MP4 File Format
 - ISO/IEC* 14496-15*: Advanced Video Coding (AVC) file format with avc[1-4]
- ❑ Video: H.264/AVC Progressive HP@ level 3.1
 - DASH264 SD: H.264/AVC MP@ level 3.0
- ❑ Audio: HE-AACv2
- ❑ Subtitles: SMPTE Timed Text
- ❑ DRM baseline: ISO/IEC 23001-7 Common Encryption
- ❑ DASH: Restricted Version ISO BMFF Live & On-Demand profile
- ❑ HTTP Protocol Features (support for byte ranges, etc.)

Overview DASH-AVC/264 Client



Under Development

- ❑ Test Case/Vector/Service document is under development, publication expected by 07/13 for community review
 - Includes around 25 test cases that cover the features of DASH-AVC/264
 - covers also real-world test scenarios for bitrate variation
- ❑ Conformance Software is under development, publication expected by 07/13 for community review
 - Cover conformance checks for DASH-AVC/264 features
- ❑ Reference Client is under development → next slide

Reference client

- ❑ Delivered as an open source player, hosted on Github
<https://github.com/Dash-Industry-Forum/dash.js>
- ❑ Leverages the Media Source Extensions and Encrypted Media Extensions of the W3C. Enabled in Chrome v23+ and IE11+
- ❑ Free to use and extend. Released under the BSD-3 license.
- ❑ Supports the test vectors of DASH-AVC/264, along with adaptive, late-binding, multi-bitrate playback.
- ❑ Example player here:
<http://dashif.org/reference/players/javascript/index.html>



DASH-AVC/264 in HTML5

- ❑ W3C HTML5 extensions to use system level media engines: Media Source Extensions (MSE) & Encrypted Media Extensions (EME)
- ❑ MSE & EME allow
 - A DASH JavaScript player to stream the content without any need for plug-ins
 - The player to be downloaded as part of the webpage
- ❑ IE 11 supports both MSE & EME
- ❑ Chrome already supporting EME
- ❑ DASH.JS: DASH-AVC/264 open source JavaScript reference player

Ongoing Work & Plans



- ❑ Continue ongoing technical, promotional and support activities
- ❑ Publication of Interoperability Guidelines:
 - DASH-AVC/264 Interoperability Point
 - published baseline version
 - published HD & Multichannel audio version for community review
 - publish test cases/vectors, conformance software and reference client by 07/13 for community review
 - publish initial DASH-HEVC/265 by 07/13 for community review
- ❑ Ongoing Technical Support work
 - Ad Insertion and Events
 - Improved Supported Live Services
 - High-Quality Formats with DASH-HEVC/265
 - DRM Backend Interfaces
- ❑ Collecting and addressing new use cases and scenarios

Why DASH and DASH-AVC/264?

□ DASH:

- only international open standard, developed and published by ISO
- adopted and referenced by many application standards
- addresses a multitude of simple and advanced use cases
- enables highest-quality for multiscreen distribution and dynamic adaptive switching with maximum efficiency
- enables reuse of existing content, devices and delivery infrastructure

□ DASH-AVC/264

- commitment from many vendors and service providers to support and enable deployment based on a single Interoperability Point
- simple but powerful initial feature set of DASH, DRM and codecs to address urgent deployment use cases
- backed by rigorous testing, conformance and reference software
- enables revenue generation and differentiation based on solid footings

Thank you

Q & A

- Upcoming Events
 - IBC 2013 - Sep 13-17, Amsterdam, with DASH-IF event on Sep 13, 6pm
 - SCTE CableTec expo in Atlanta, Oct 21-24
 - InterBEE 2013 - Nov 13-15, Tokyo, Japan with DASH event on Nov 13

- For details please visit us at <http://dashif.org>



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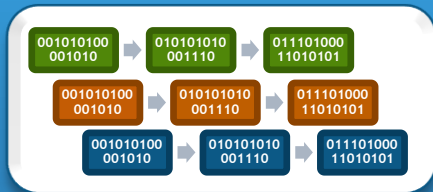
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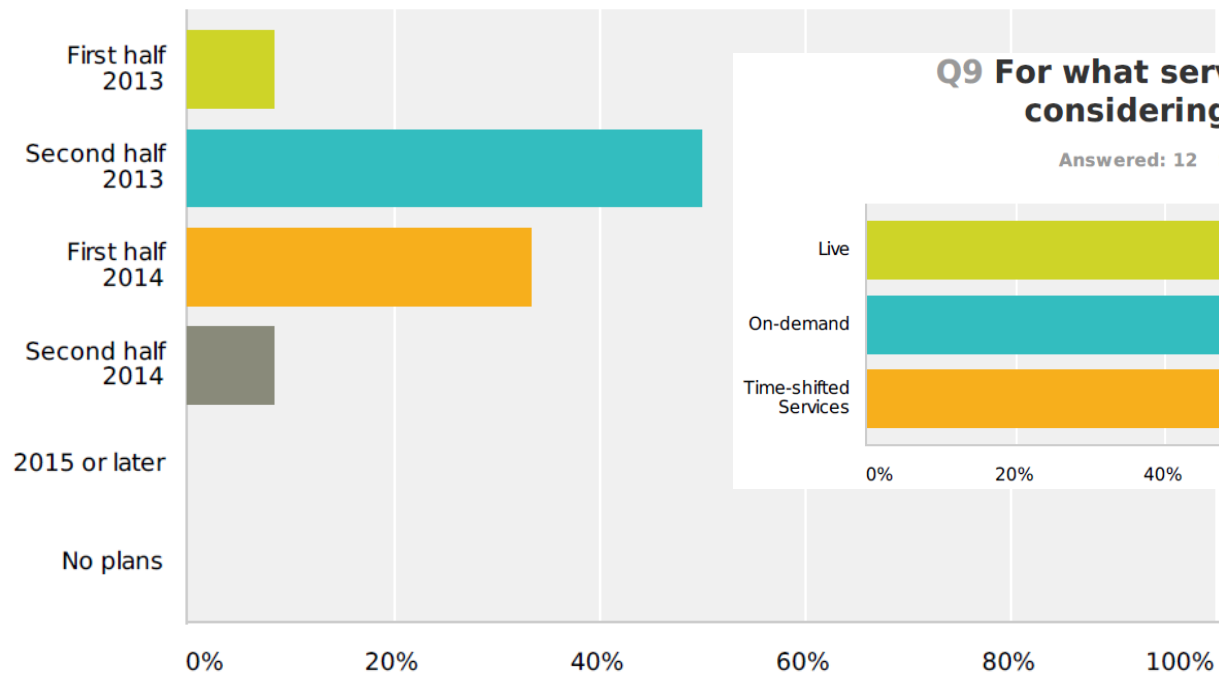
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European Broadcasters Survey March 2013

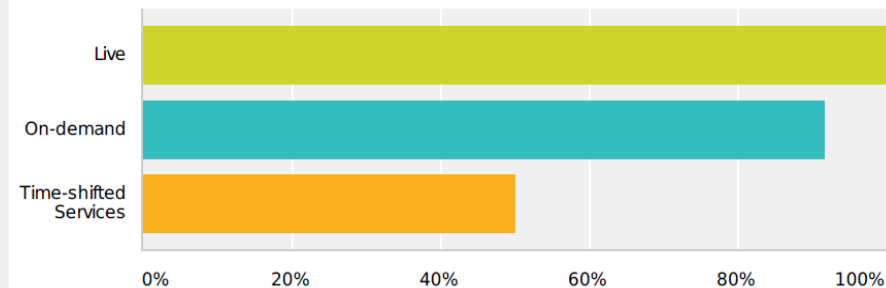
Q1 When are you considering a DASH deployment?

Answered: 12 Skipped: 0



Q9 For what services are you considering DASH?

Answered: 12 Skipped: 0



Full report can be found at <http://dashif.org/white-papers/>

DASH-IF IOP Group - Ongoing Work

- ❑ DASH-AVC/264 Interoperability Point
 - ❑ published baseline version (more details to follow)
 - ❑ published HD & Multichannel audio version for community review
 - ❑ will publish test cases/vectors, conformance software and reference client by 07/13 for community review

- ❑ Task Forces on the following topics
 - ❑ Ad Insertion and Events
 - ❑ Live Services
 - ❑ DASH-HEVC/265
 - ❑ DRM Backend Interfaces
 - ❑ Reference Client

- ❑ Communication with MPEG, 3GPP, HbbTV, ATSC, IMTC, DVB, ...