

mpeg-DASH



Building of an Open-Source Demonstrator
Preliminary Analysis & Work

In collaboration with



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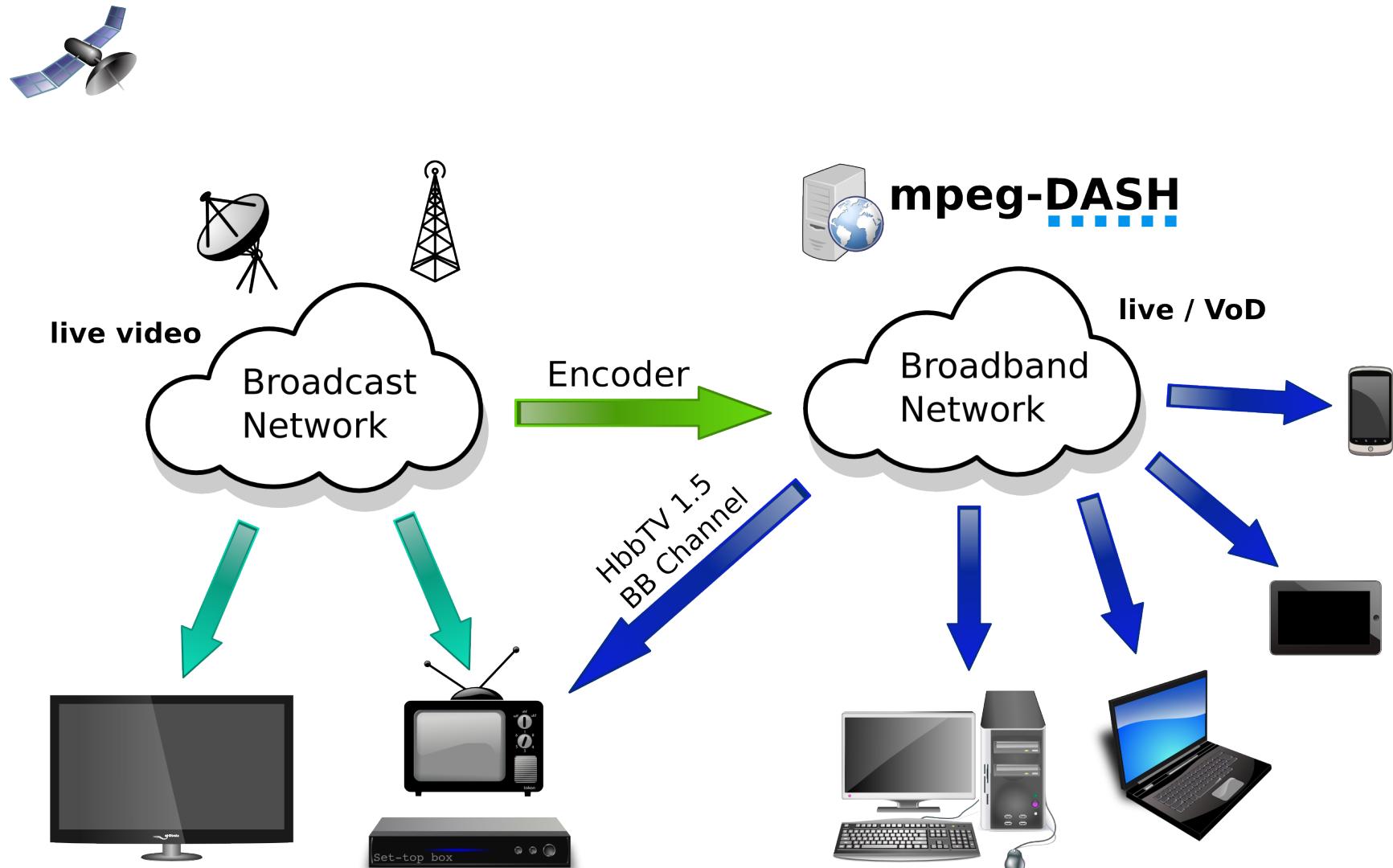
hepia

Haute école du paysage, d'ingénierie
et d'architecture de Genève

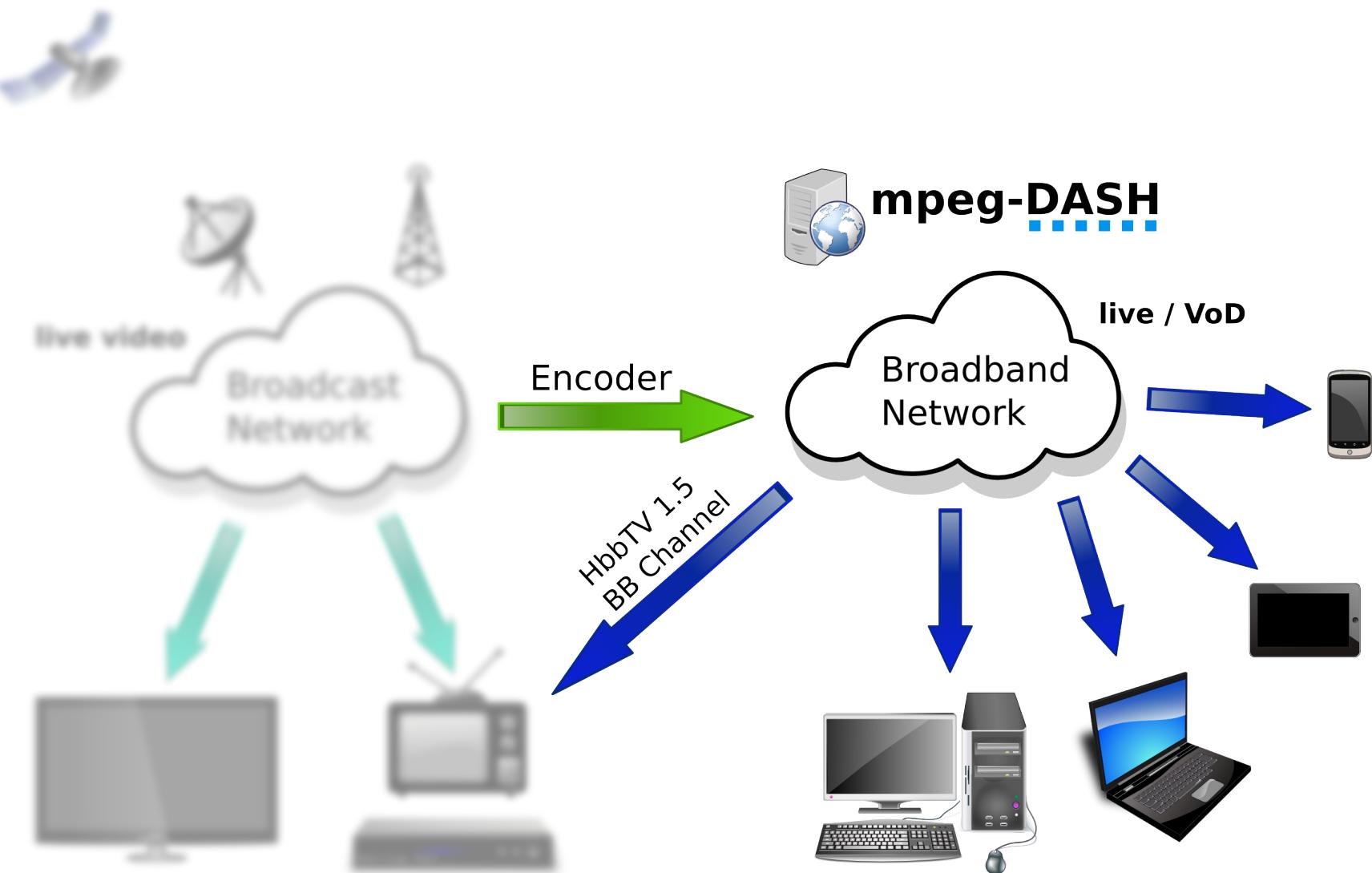
Plan

- Introduction
- Broadcasters Needs
- Broadband Streaming Technologies
- Dynamic Adaptive Streaming over HTTP
- DASH Open-Source Demonstrator
- Master HES-SO PA
- Conclusion
- Questions

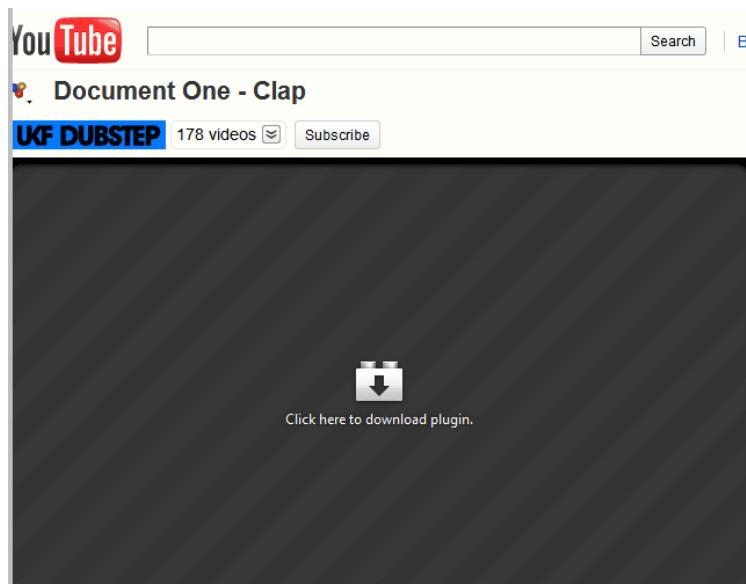
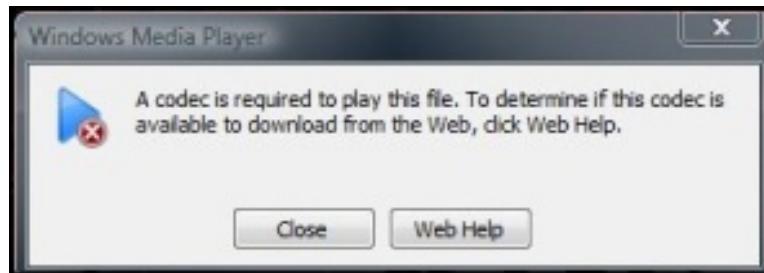
Introduction - Context



Introduction - Context



Introduction - Problematic



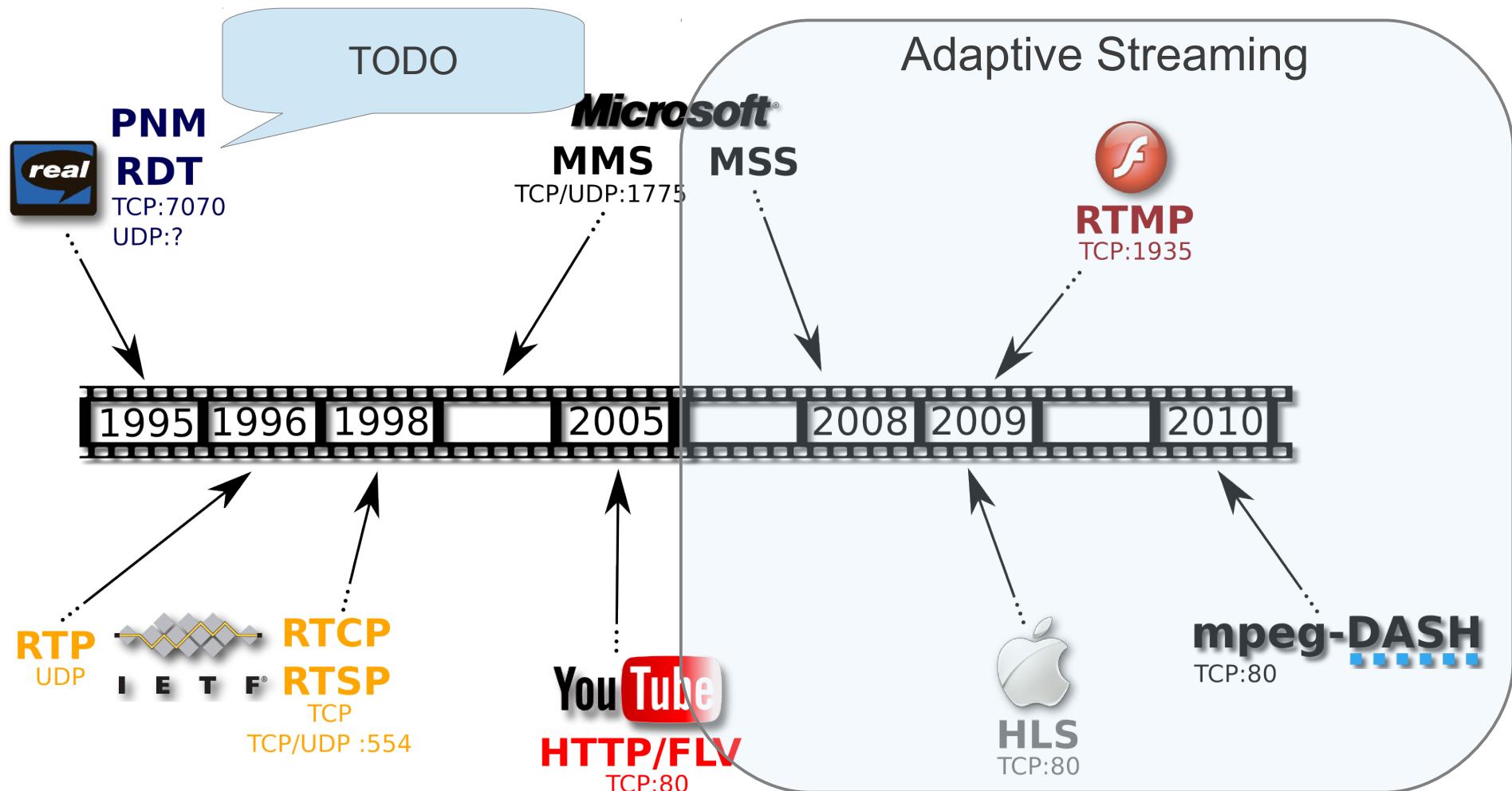
Broadcasters Needs

- Maximise the quality & availability of the service
- Provide these kind of services to their audience :

	Live TV	Time-shift TV	Catch-up TV	Video on Demand
End-to-end latency	Lowest	Lower	Low	Low
Media encoding	Online	Online	Online or Offline	Offline
Media publishing	Real-time	Real-time	~1 day	No requirements
Type of playback	Linear	Non linear	Non linear	Non linear

- And the possibility to provide multi-view, DRM, subtitles, ...

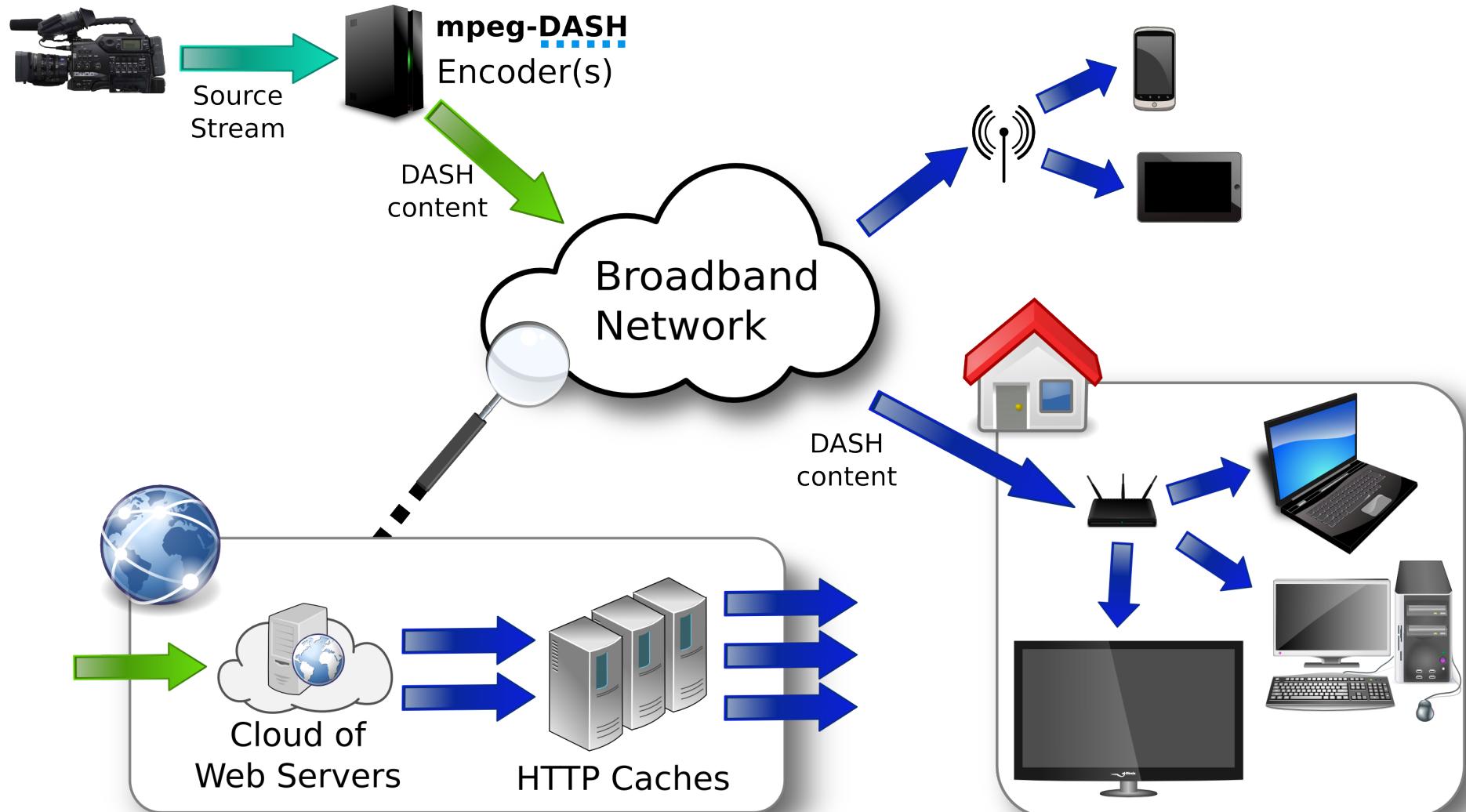
Broadband Streaming Technologies



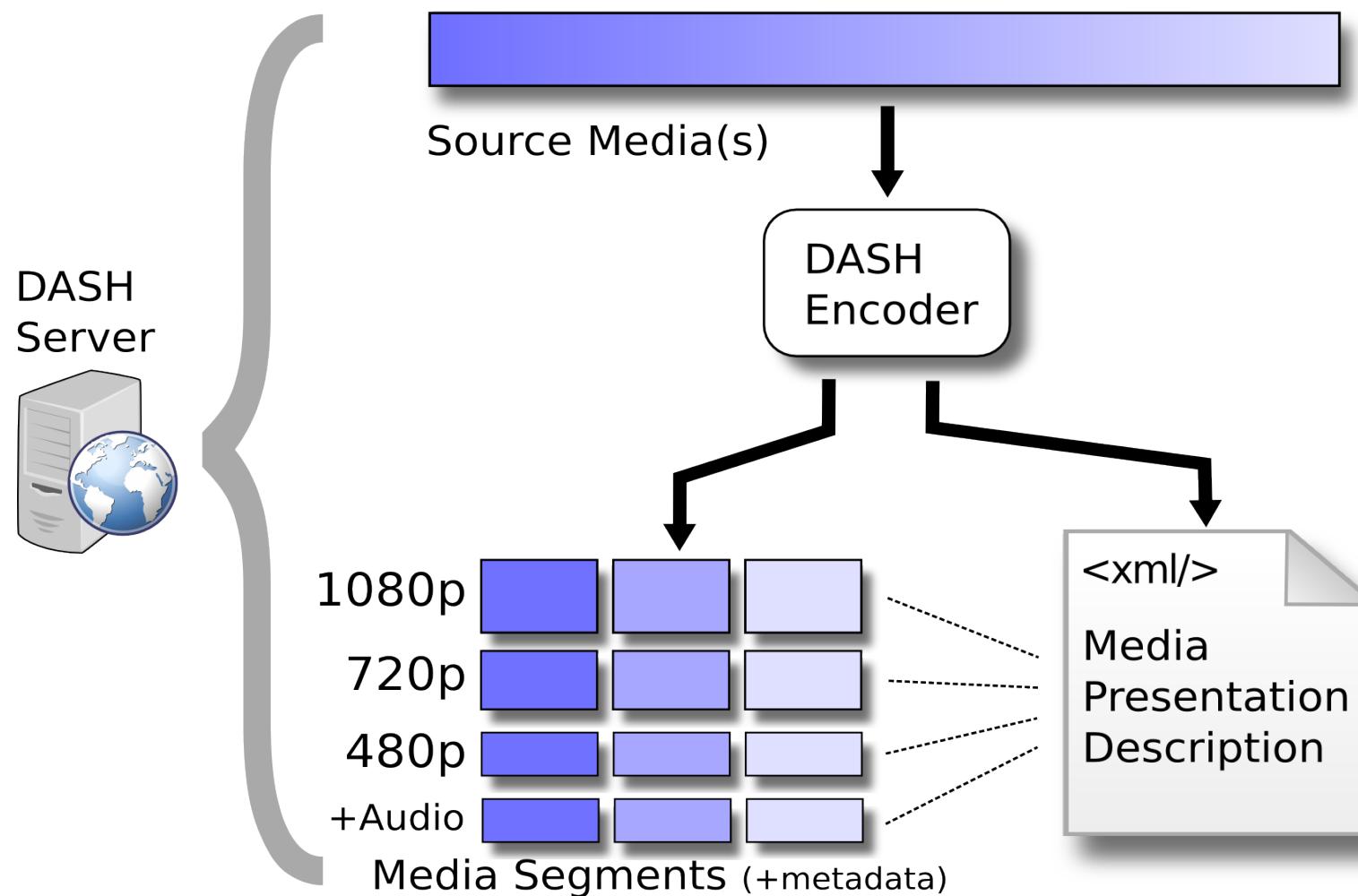
Adaptive Streaming Comparison

Technology / Specificity	Adobe Dynamic HTTP Streaming	Apple HTTP live Streaming	Microsoft Smooth Streaming	MPEG-DASH
Streaming modes	VoD / Live	VoD / Live	VoD / Live	VoD / Live
Adaptive bit-rates	Yes	Yes	Yes	Yes
Segmenter software	Free	Include on OSX	Expression Encoder 4 pro	Free
Media container	MPEG4-part 14 /FLV	MPEG2-TS	MPEG4-part 14	MPEG 2-TS /MPEG4-part 14
Video codecs	H.264	H.264	Agnostic	Agnostic
Default fragment length	4 [s]	10 [s]	2 [s]	Flexible
Maximum bit-rates	Unlimited	1.6 [Mbps]	Unlimited	Unlimited
Caching support	Yes	Yes	Yes	Yes
End-to-end Latency	6 [s]	30 [s]	>1.5 [s]	Flexible

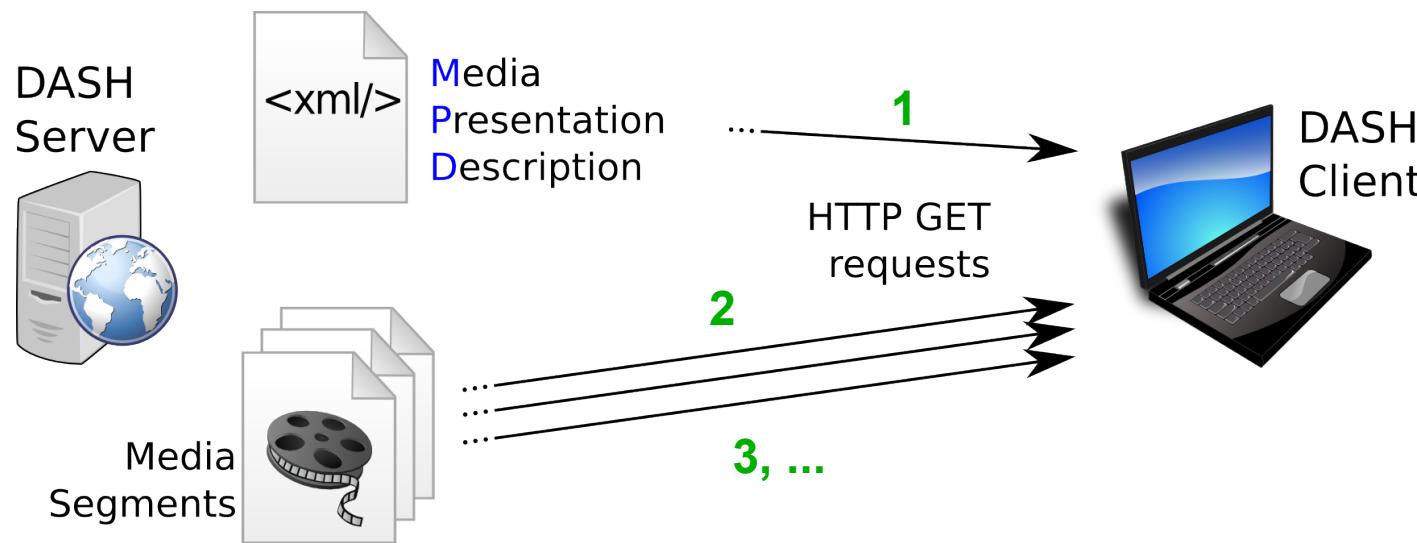
DASH BB Network



DASH Server (Encoder)

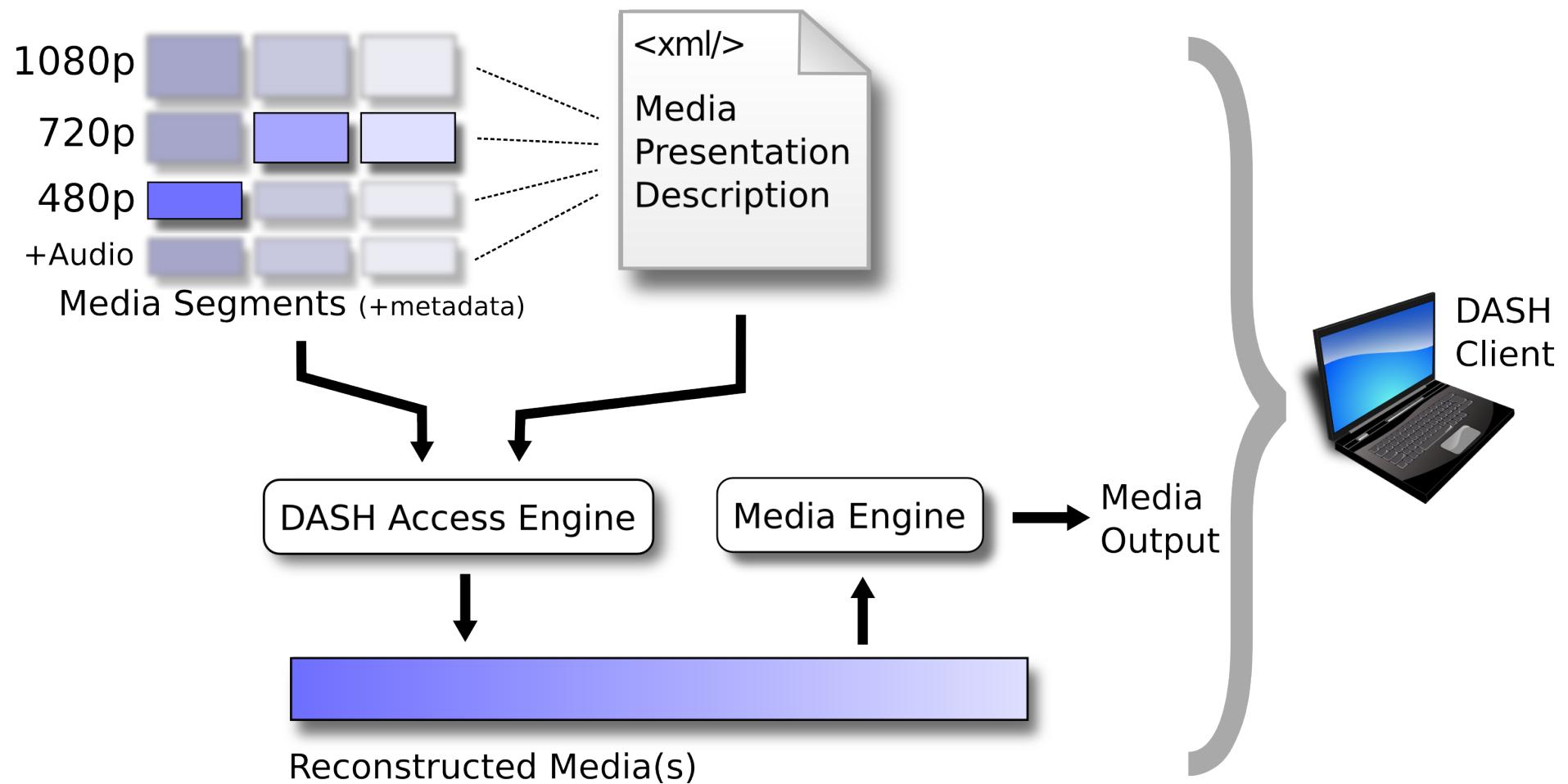


DASH Communication

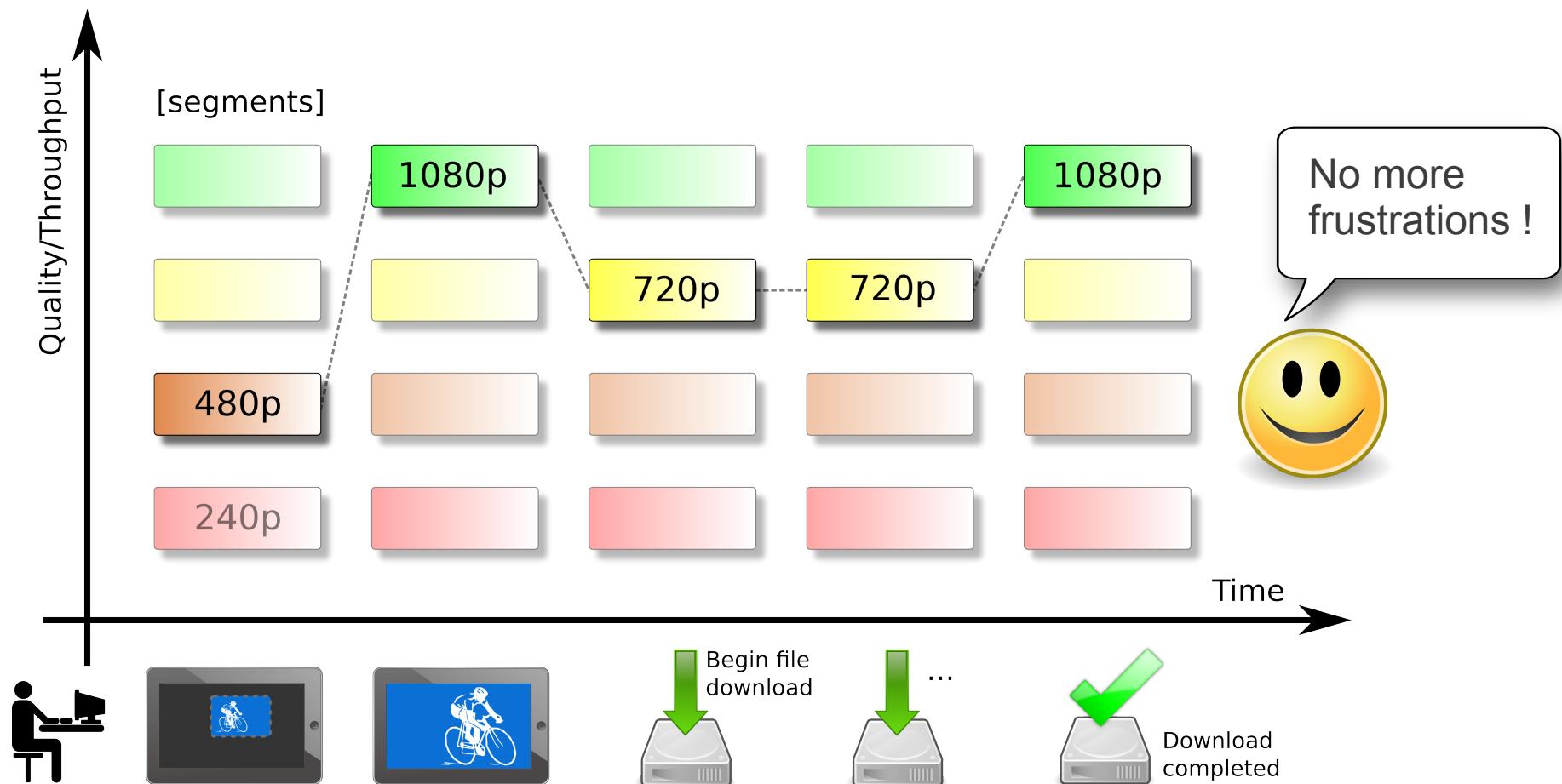


Filter: http && ip.addr==143.205.176.132						
No.	Time	Source	Destination	Protocol	Length	Info
18	0.101929	10.1.1.47	143.205.176.132	HTTP	161	GET /ftp/datasets/mmsys12/DashVlcAndroid/RedBullPlayStreets_4s_DASH_VLC_Compatible_3-Representatins_720p.mpd HTTP/1.1
562	1.296201	143.205.176.132	10.1.1.47	HTTP	100	HTTP/1.1 200 OK (text/plain)
575	1.412234	10.1.1.47	143.205.176.132	HTTP	161	GET /ftp/datasets/mmsys12/RedBullPlayStreets/redbull_4s/redbull_4sec_2500kbit/redbull_2500kbit_dash.mp4 HTTP/1.1
578	1.457126	143.205.176.132	10.1.1.47	HTTP	1755	HTTP/1.1 206 Partial Content (video/mp4)
594	1.572610	10.1.1.47	143.205.176.132	HTTP	161	GET /ftp/datasets/mmsys12/RedBullPlayStreets/redbull_4s/redbull_4sec_2500kbit/redbull_4sec1.m4s HTTP/1.1
602	1.660062	143.205.176.132	10.1.1.47	HTTP	396	HTTP/1.1 206 Partial Content (text/plain)
617	4.792651	10.1.1.47	143.205.176.132	HTTP	161	GET /ftp/datasets/mmsys12/RedBullPlayStreets/redbull_4s/redbull_4sec_1500kbit/redbull_4sec2.m4s HTTP/1.1
1071	8.096710	143.205.176.132	10.1.1.47	HTTP	1224	HTTP/1.1 206 Partial Content (text/plain)
1086	8.794720	10.1.1.47	143.205.176.132	HTTP	161	GET /ftp/datasets/mmsys12/RedBullPlayStreets/redbull_4s/redbull_4sec_2500kbit/redbull_4sec3.m4s HTTP/1.1
2200	12.265505	143.205.176.132	10.1.1.47	HTTP	941	HTTP/1.1 206 Partial Content (text/plain)
2215	12.798887	10.1.1.47	143.205.176.132	HTTP	161	GET /ftp/datasets/mmsys12/RedBullPlayStreets/redbull_4s/redbull_4sec_2500kbit/redbull_4sec4.m4s HTTP/1.1
3221	15.900657	143.205.176.132	10.1.1.47	HTTP	176	HTTP/1.1 206 Partial Content (text/plain)
3237	16.804587	10.1.1.47	143.205.176.132	HTTP	161	GET /ftp/datasets/mmsys12/RedBullPlayStreets/redbull_4s/redbull_4sec_2500kbit/redbull_4sec5.m4s HTTP/1.1
4057	19.979212	143.205.176.132	10.1.1.47	HTTP	257	HTTP/1.1 206 Partial Content (text/plain)

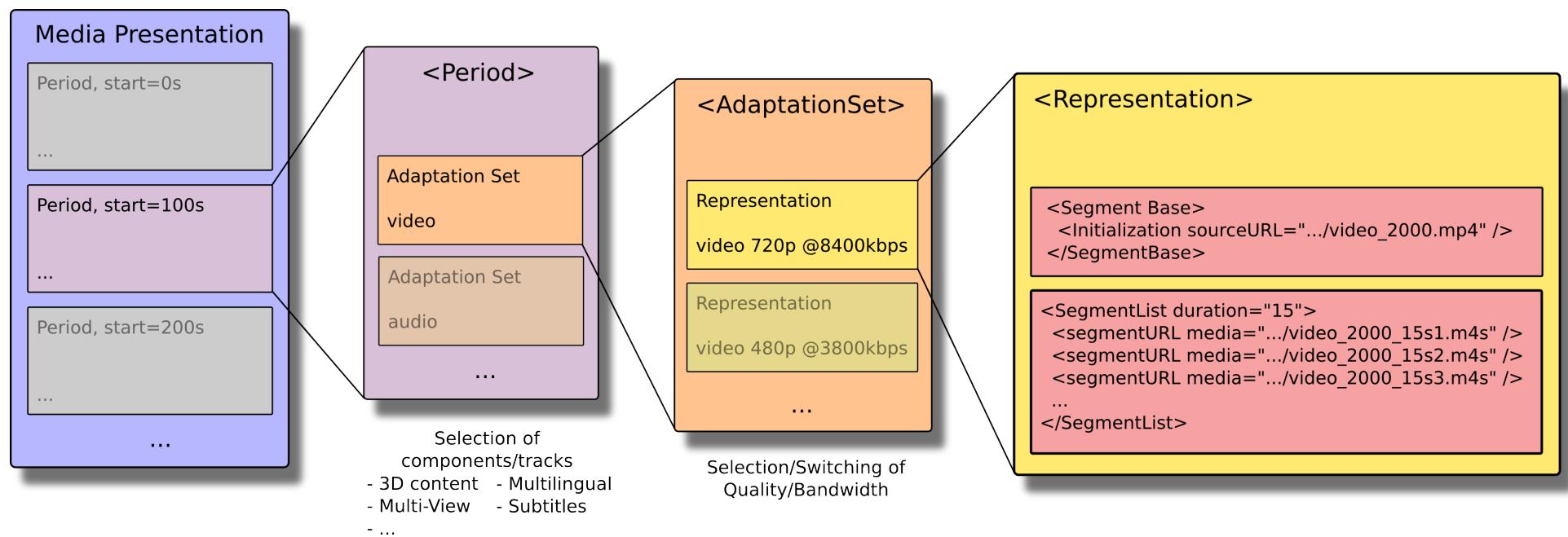
DASH Client



DASH an illustrative scenario



<Media Presentation Description/>



DASH Profiles

Subsets of the standard based on use-cases

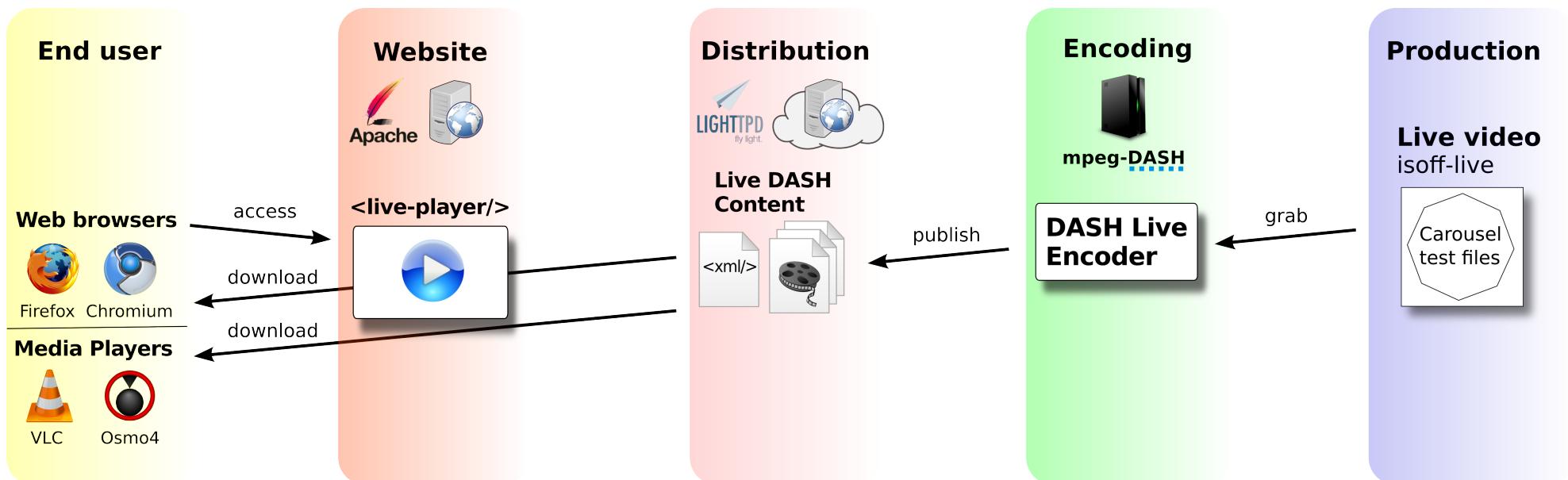
- ISO BMFF Full
- ISO BMFF Live
- ISO MBFF On Demand
- MPEG2-TS Main
- MPEG2-TS Simple
- + DASH264 (draft)

DASH Open Implementations

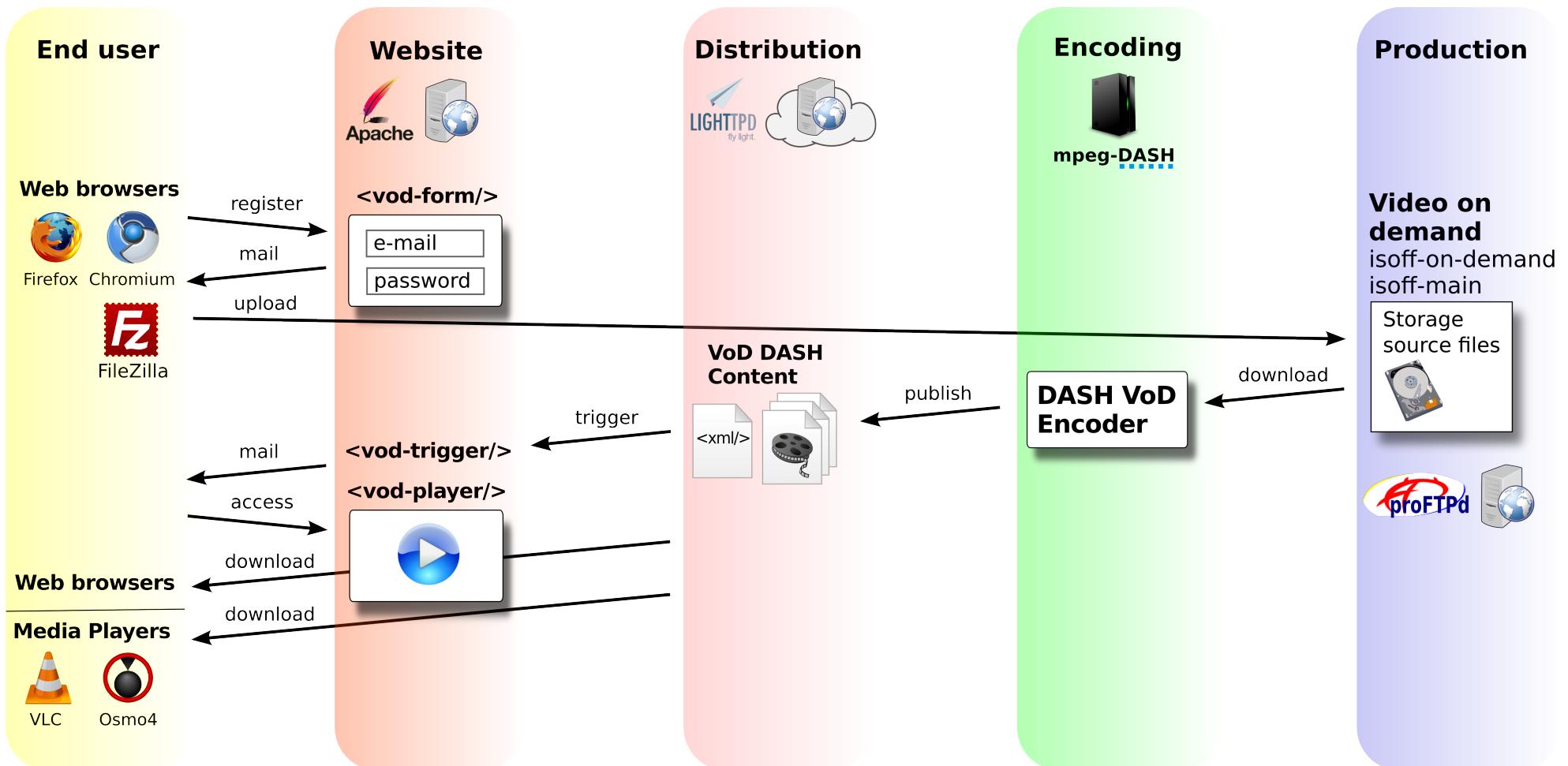
Software Encoders / Profiles DASH	GStreamer	DASHEncoder	GPAC (MP4Box)	FFmpeg
ISOBMFF				
Full profile	Z	Z	X	Y
On demande	Z	X	X	X
Live	Z	Z	Z	Y
Main	Z	X	X	X
MPEG2-TS				
main	Z	Y	X	Y
simple	Z	Y	X	Y
Release	0.11.90	V 1.0	0.4.6/4030	0.10.2
Licence	LGPL	LGPL	LGPL	LGPL / GPL*
Repository	GIT	SVN	GIT	GIT

X = implemented, Y = not tested, Z = not proven

DASH Demonstrator : Live Scenario

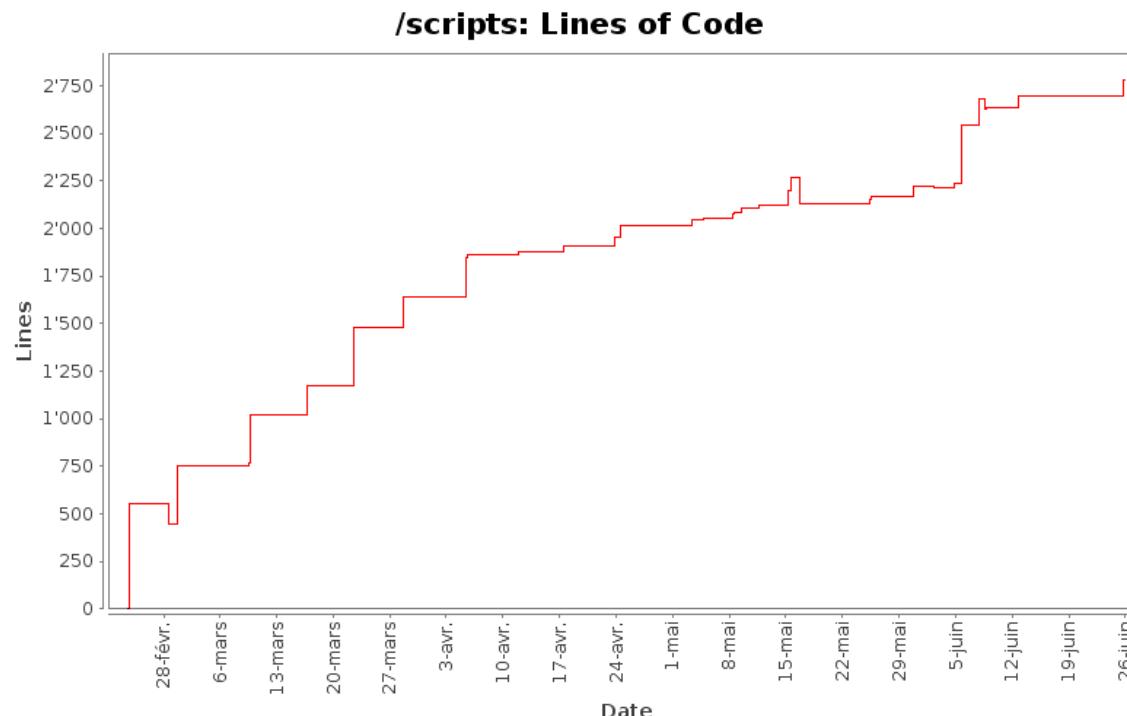


DASH Demonstrator : VoD Scenario

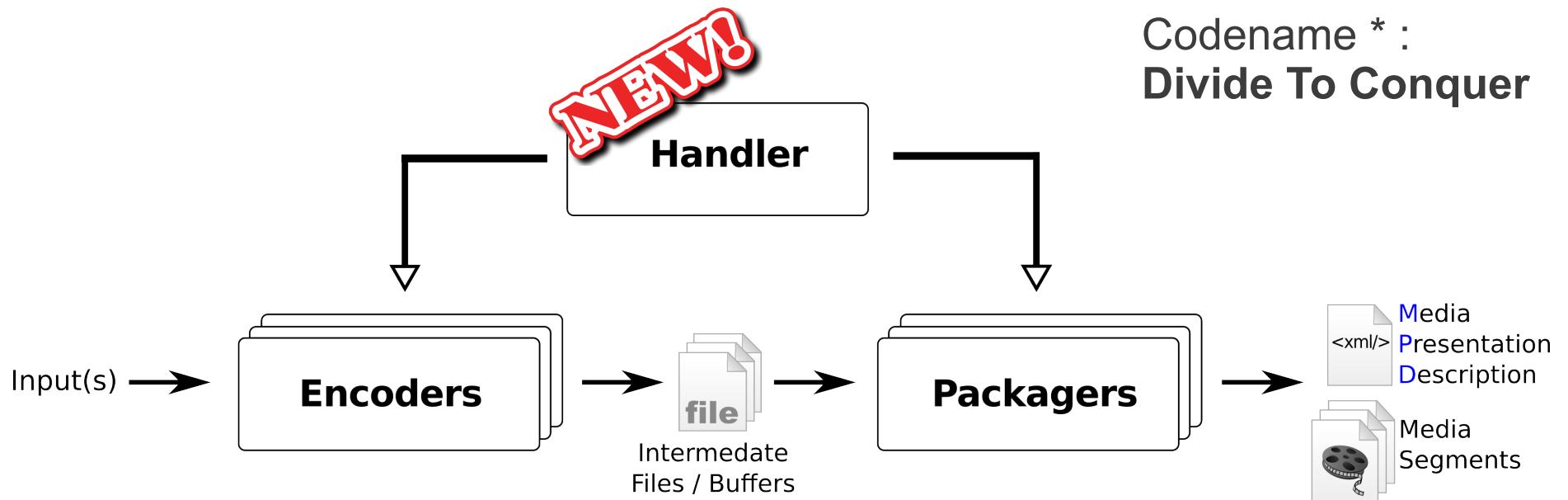


DASH Demonstrator : Preliminary Work

- Investigations (open-source tools, norms, ...)
- Scripting (installation, compilation, tests, ...)
- New ideas (management, cloud, ...)



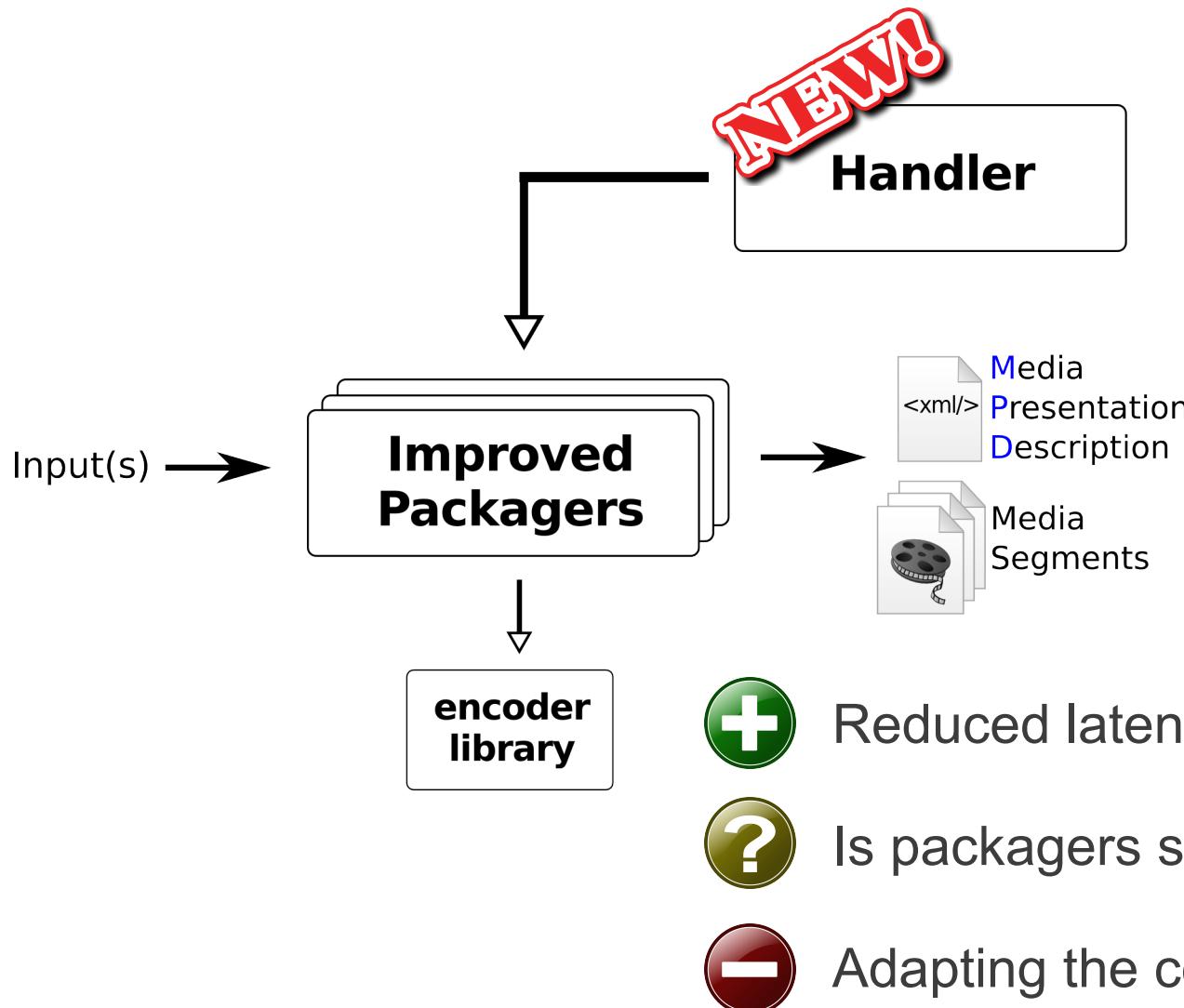
DASH Demonstrator : Work to be done



- ⊕ A few lines of code (Handler)
- ⊕ Robustness of the system
Segments meta data !
- ⊖ Latency (intermediate files)

* can be changed

DASH Demonstrator : Work to be done

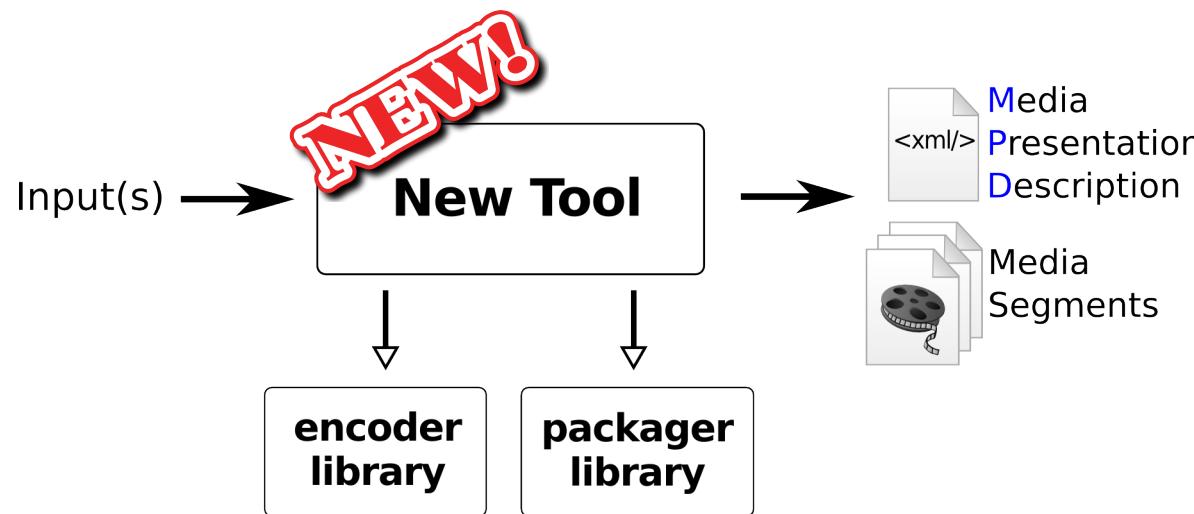


Codename * :
May The Best Man Win

* can be changed

- ⊕ Reduced latency (no intermediates)
- ⊕ Is packagers source code readable ?
- ⊖ Adapting the code to tools updates

DASH Demonstrator : Work to be done

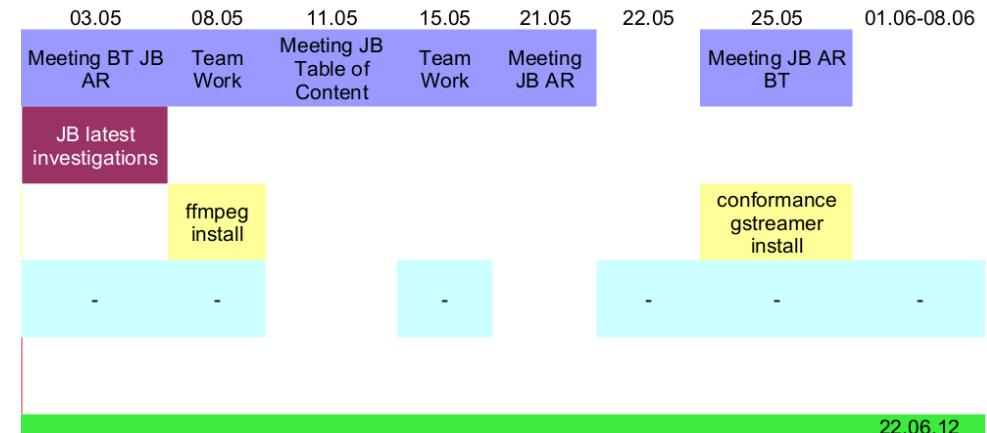


Codename * :
A New Start

- ⊕ Powerfull dedicated tool (optimizations, customization)
- ⊕ Is it really necessary to do that much work ?
- ⊖ Yet another project ...

* can be changed

Master HES-SO PA - Planning



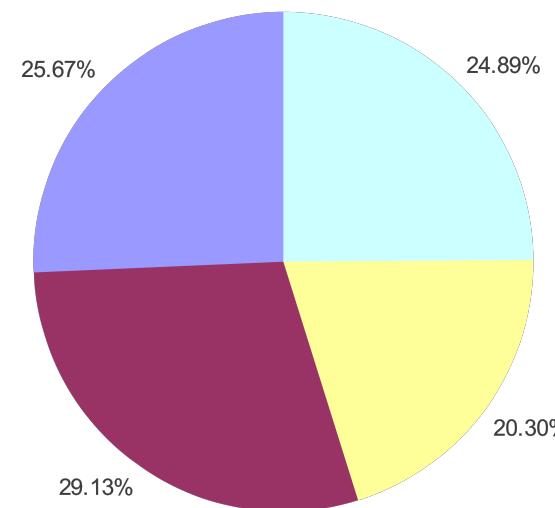
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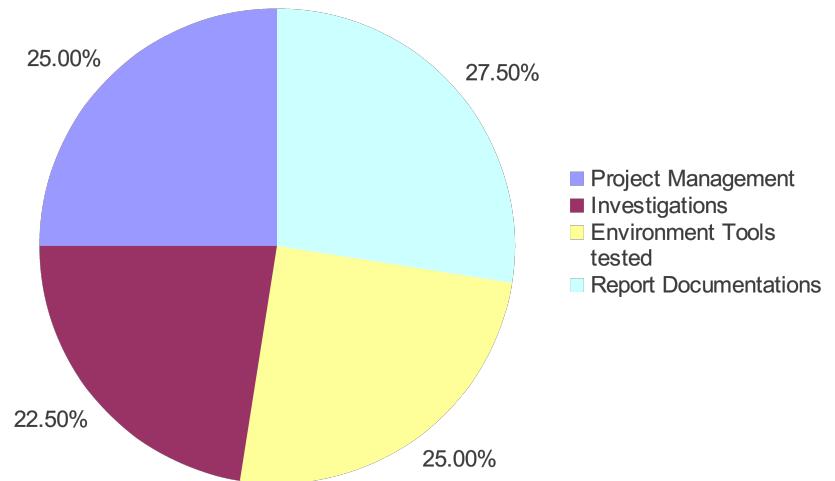
Master HES-SO PA - Skills

- **Project Management**
 - Meetings, mails
 - Team work, svn, ...
 - Goals refinement
- **Investigations**
 - Norms
 - Forums
 - Source-code
- **Environment, Tools & Tests**
 - Scripting
 - Installation
 - Compilation, ...
 - Various tests
- **Documentation**
 - Report, Presentation
 - README, INSTALL, ...
 - Source-code comments

TIC Profile



Matches ?

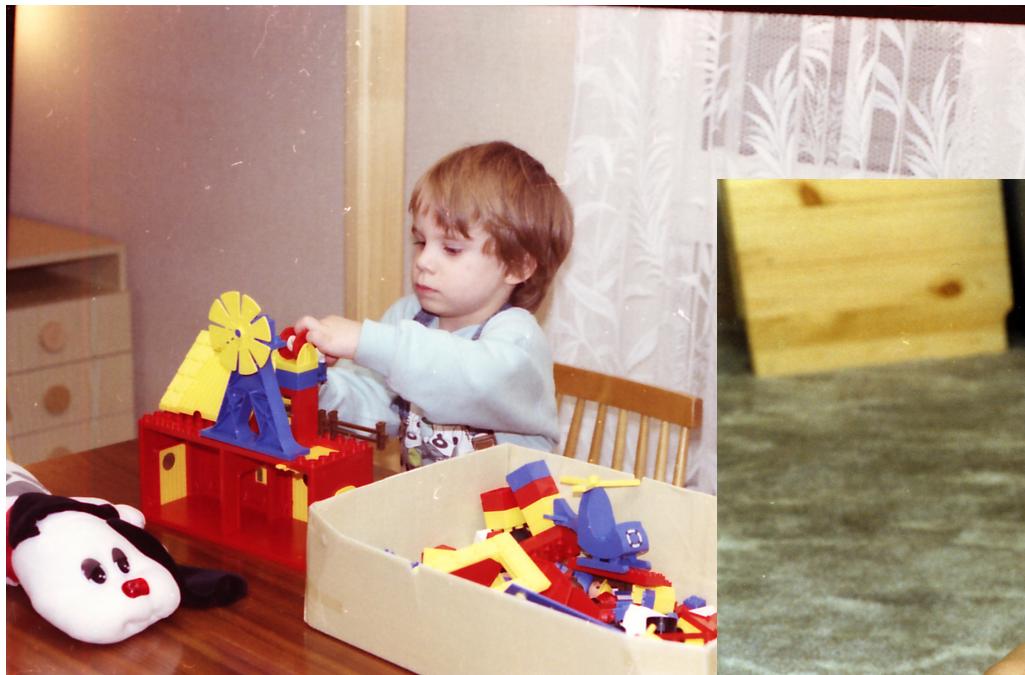


This Project

Conclusion

- DASH is a promising standard
 - Promoted by the industry leaders
 - Solve common problematics to improve QoE
 - Reuse widely deployed HTTP infrastructure
 - In the way to be implemented in Open-Source
- This preliminary work give directions for :
- The building of an Open-Source demonstrator
 - Proof of concept : Open-Source based DASH distribution chain
 - Add management features to distribution chain
 - Add scalability features to the distribution chain

Questions & Answers



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