



A prototype of Mininet-based system EmStream for emulation of Dynamic Adaptive Streaming over HTTP

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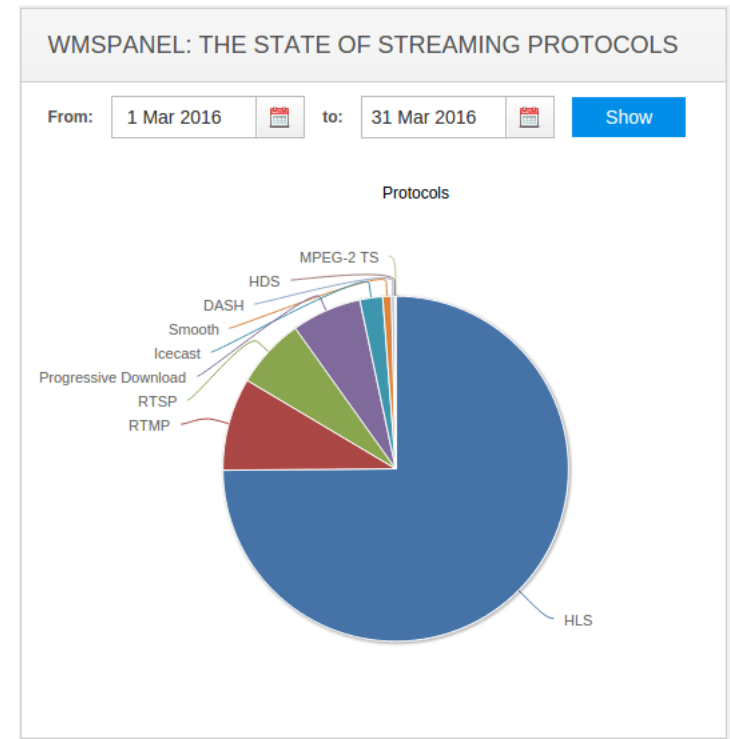
Video streaming



Video streaming is becoming more and more popular technology for media content delivery over the Internet.

Streaming protocols:

- HLS (from Apple)
- RTMP (from Adobe)
- RTSP
- HDS
- Smooth (from Microsoft)
- DASH





MPEG-DASH

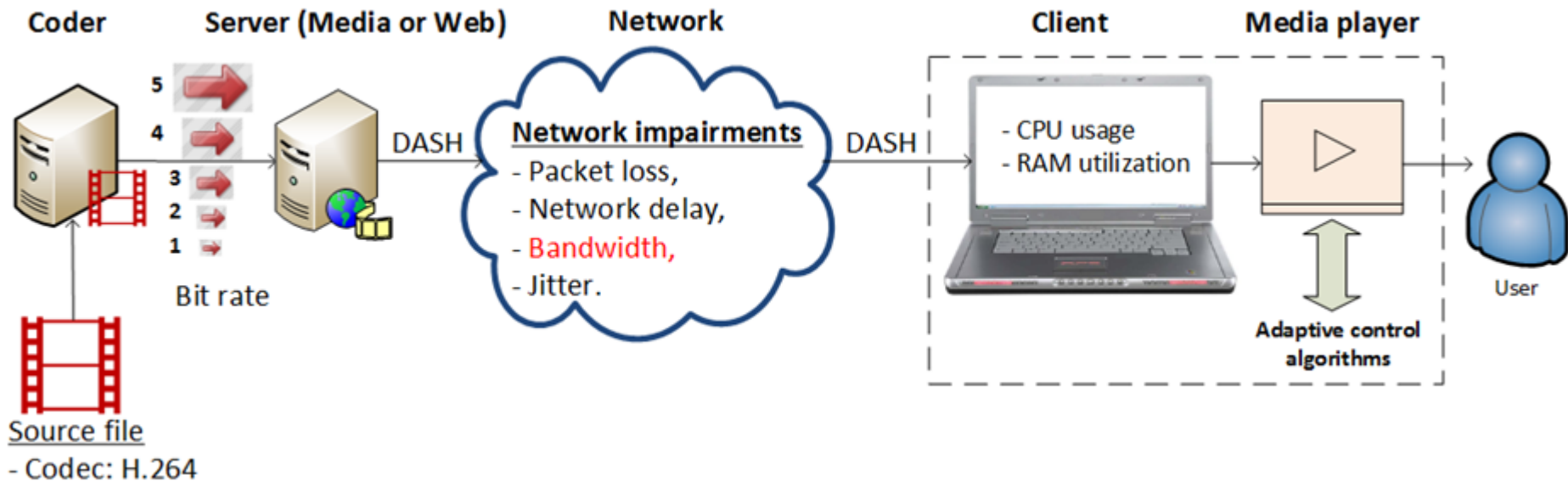
Dynamic Adaptive Streaming over HTTP (DASH), also known as MPEG-DASH, is the first bit rate adaptive HTTP based solution which became an international standard in 2012.

MPEG-DASH was specifically designed to deliver data streams to a user with the highest possible bit rate under the varying bandwidth conditions.

The DASH standard is being widely deployed , especially in live streaming video systems which means that the format will play an important role in this field.

mpeg-DASH
■ ■ ■ ■ ■

MPEG-DASH



How to test new adaptation algorithms?

How to test new representation sets of MPEG-DASH?

MPEG-DASH and Mininet



MPEG-DASH will soon be more actively used in real systems along with such new technologies and approaches as:

- Software-Defined Networking (SDN),
- Content Delivery Network (CDN),
- Content-Centric Networking (CCN).

To Investigate new technologies for streaming video in the existing communication networks is not always convenient or even feasible. Thus, to overcome the aforementioned obstacle network emulators are frequently used one of which is an open-sourced project Mininet.

Research goals

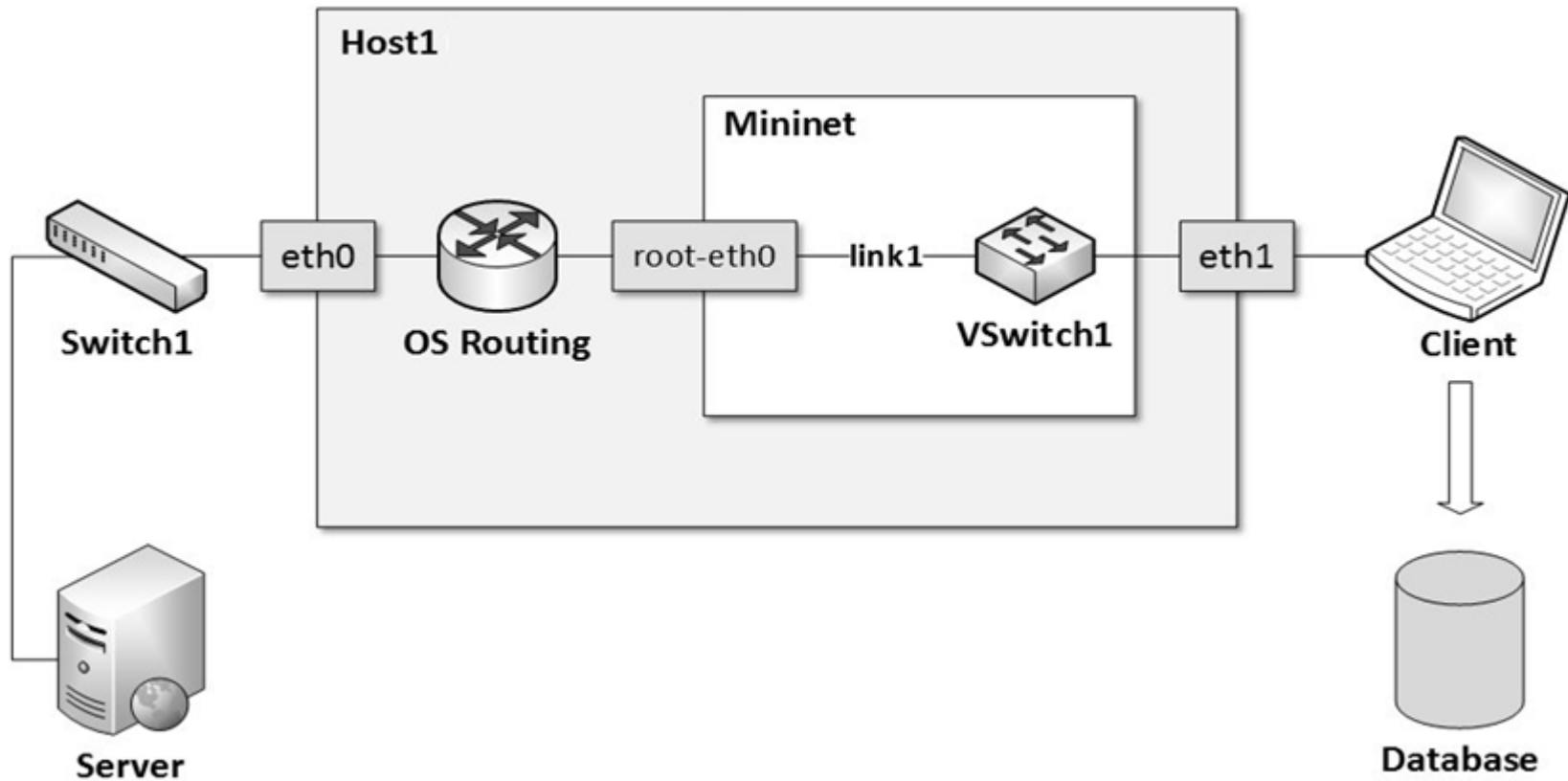


Developing methodology for setting Mininet virtual environment with bandwidth shaping functionality and interconnecting it with real media server and client pc.

Adding the ability of varying other link characteristics and creating REST API

Developing a prototype of Emstream system, a practical solution to investigate the delivery of media content over the Internet using the MPEG-DASH technology.

EmStream



Methodology and experimental setup



EmStream shaper

Low-High-L

Low-High-L

	Number of Stage	Duration(sec)	Bandwith(Kbps)	Delay(ms)	Packet loss(%)
0 <input checked="" type="checkbox"/>		30	9000	25	0.06
1 <input checked="" type="checkbox"/>		30	5000	37	0.09
2 <input checked="" type="checkbox"/>		30	4000	50	0.07
3 <input checked="" type="checkbox"/>		30	2000	75	0.1
4 <input checked="" type="checkbox"/>		30	1000	100	0.16

Add state

Save

Delete



Methodology and experimental setup



Experiment info

Duration:

Number:

Description:

Video source:

Player:

bitdash dashjs

Protocol:

MPEG-DASH

Link characteristics/ Bandwidth shaper

Start Experiment

Methodology and experimental setup



(Web-based management interface with the media player)

Experiment info

Duration:

150

Number:

1

Description:

bitdash test

Video source:

<http://stream.petrus.ru/bitcodin>

Player:

bitdash dashjs shaka

Protocol:

MPEG-DASH HLS

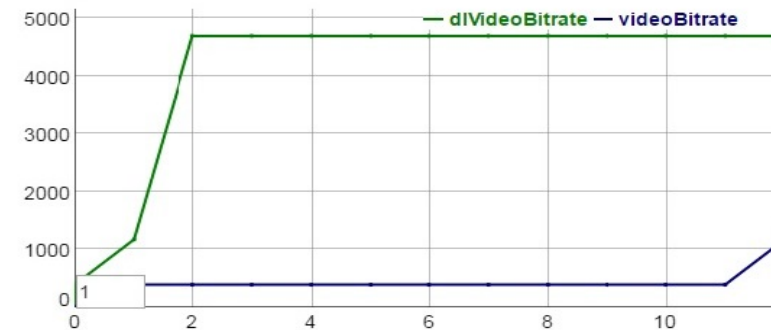
Link characteristics/ Bandwith shaper

Low-High-L



Countdown Timer:

136





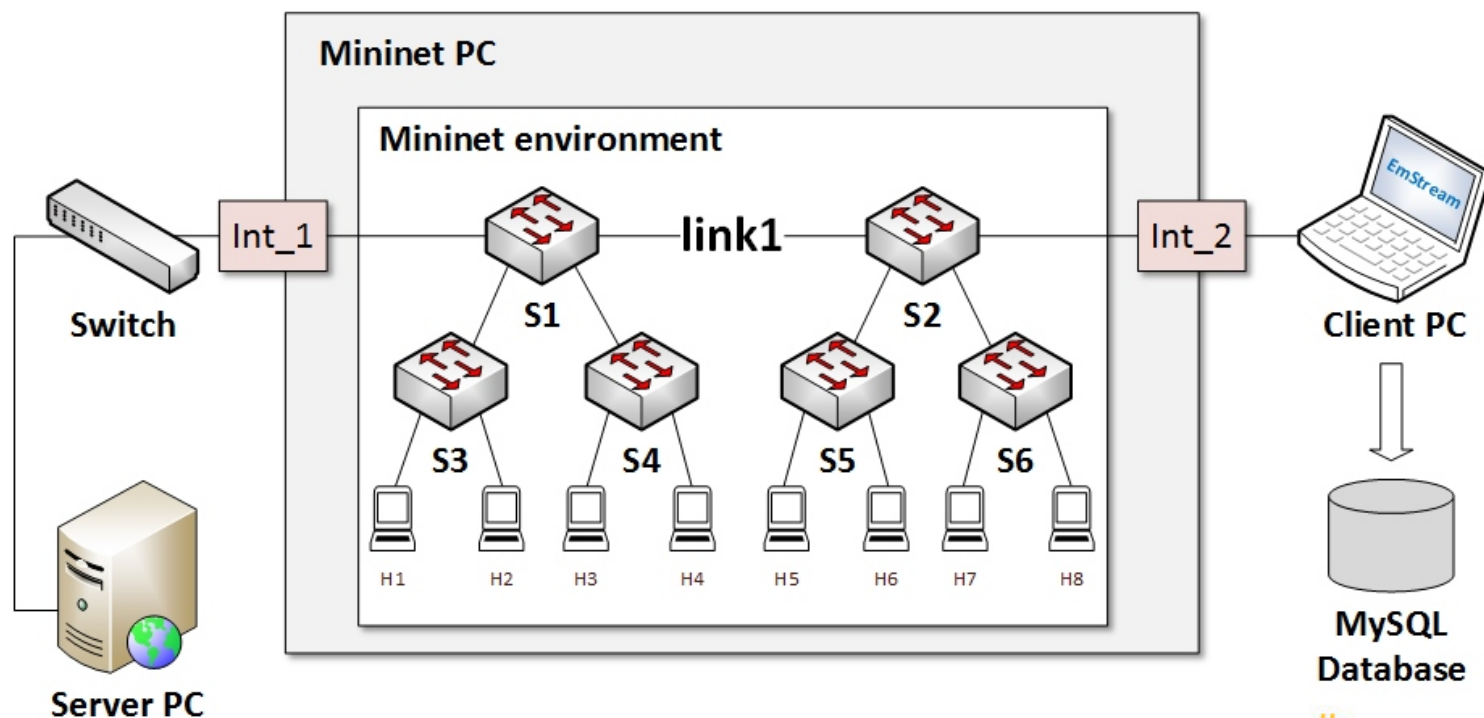
Conclusion

- We have developed experimental setup which interconnects two parts: a virtual environment established with Mininet and a real IP-network.
- We developed Emstream prototype a practical solution to investigate the delivery of media content over the Internet using the MPEG-DASH technology.



Future plans

- In our future research we are planning to implement support of different media players.
- Incorporate complex network topologies within Mininet environment. To conduct experiments and present results.





Thank you for your attention!

We'll be glad to answer your questions:

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