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

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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
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.
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.
## Methodology and experimental setup

**EmStream shaper**

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<th>Number of Stages</th>
<th>Duration (sec)</th>
<th>Bandwidth (Kbps)</th>
<th>Delay (ms)</th>
<th>Packet loss (%)</th>
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<td>30</td>
<td>1000</td>
<td>100</td>
<td>0.16</td>
</tr>
</tbody>
</table>
Methodology and experimental setup

Experiment info

Duration:
150

Number:
2

Description:
bittash test

Video source:

Player:
- bittash
- dashjs

Protocol:
- MPEG-DASH

Link characteristics/ Bandwidth shaper
Low-High-L

Start Experiment
Methodology and experimental setup

(Web-based management interface with the media player)
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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