

› Making Smart TV Operator Apps Comparable with TV Boxes (STBs)

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<https://tnomedialab.github.io/>



SMART TVS AND SMART APPS ARE GROWING

- › For OTT service providers delivery via apps is the default method
- › Most IPTV operators still rely on the STB to deliver linear TV services to consumers
- › Several operators are considering moving towards app-based delivery, but adoption is still slow



What do operators need to move towards apps?

THE TECHNICAL CHALLENGES YOU CAN EXPECT AS AN OPERATOR

1) TV market fragmentation

- › Developing a smart TV app for all brands and platforms is not feasible for most operators

2) User Experience

- › Make UI similar across different TV operating systems and TV models
- › How to provide easy access to live TV, e.g. with “app-as-a-source”?

3) Quality control

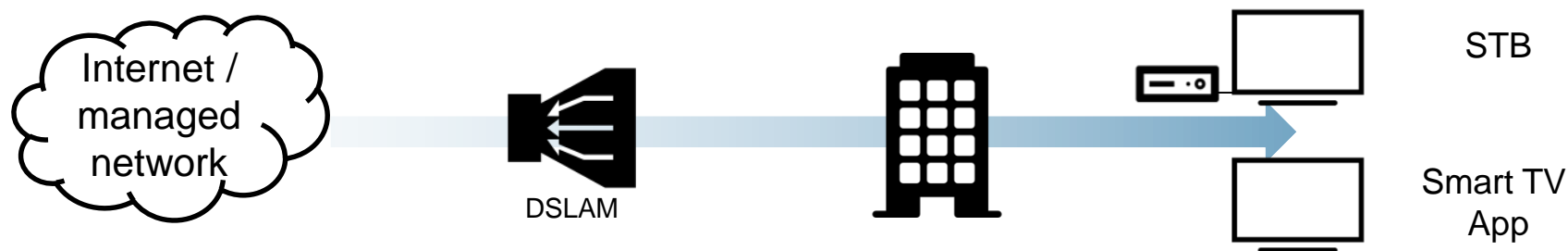
- › How to monitor and control the quality of service to make it comparable with STB based TV

4) Performance & experience

- › How to guarantee similar performance as the STB
- › E.g. zapping time and glass-to-glass latency



EXAMPLE CASE: CHANNEL CHANGE ON A SMART TV



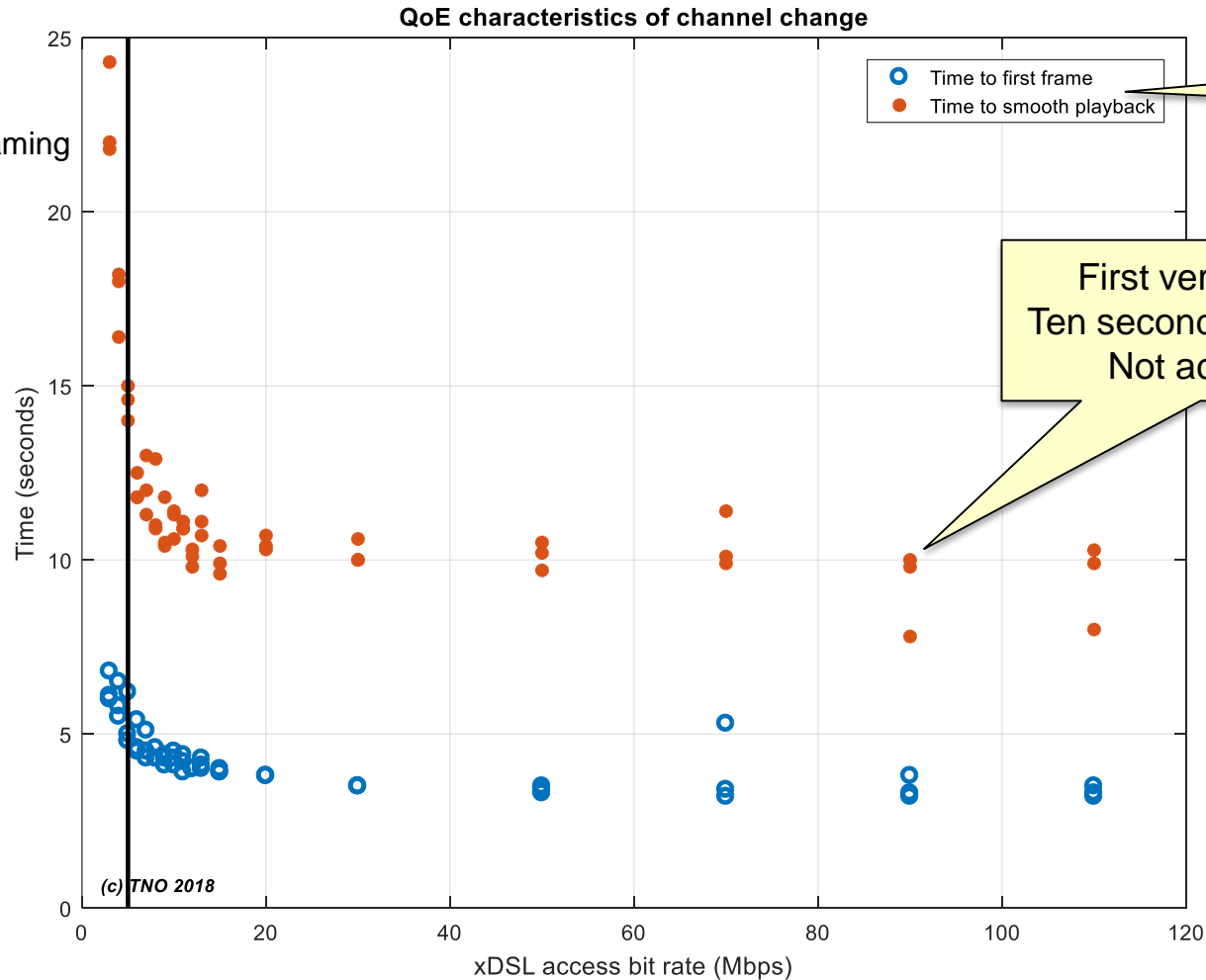
- › At TNO we were involved with testing a Smart TV App
 - › 1st Aim: measure and try and improve performance
 - › 2nd Aim: understand parameters that affect zapping time better

EXAMPLE CASE: CHANNEL CHANGE ON A SMART TV



App:

- Native TV player
- MS SmoothStreaming (over HTTP)
- 2 sec. segments



Two aspects

First version of App:
Ten seconds zapping time
Not acceptable !

DON'T EXPECT STB PERFORMANCE FROM TODAY'S SMART-TV APPS DIRECTLY “OUT OF THE BOX”!



Live-TV/linear-TV via Apps is different from Video-on-Demand with stricter requirements on zapping time and end-to-end latency

NETFLIX

Quality expectations for TV Apps may be (unconsciously) based on good performance of OTT VoD services such as Netflix/YouTube



Apps may use default player as provided by TV manufacturer

- Could typically be optimized/developed for non-live viewing
- Little information/control of detailed video parameters, (ex. buffer sizes, time-to-live-edge)
- Almost no leverage to change parameters (in particular on existing TV models)

ADDRESSING THE CHALLENGES WITH STANDARDS

1+2) TV Market Fragmentation & User Experience



3) Quality Monitoring and Control



4) Performance and Experience



TV MARKET FRAGMENTATION & USER EXPERIENCE

- › HbbTV OpApps is designed to be a virtual set-top Box
- › Works on all TVs supporting the standard* developed by HbbTV
- › An OpApp running on the TV has all the benefits of the STB, without the hassle of cabling and multiple remotes



Key benefit of a set-top box

Delivers an operator branded experience on all TVs. For a smart TV app to be a true virtual STB it should have these features too.



Panasonic



QUALITY MONITORING AND CONTROL

- › Topic of discussion in different bodies
 - › EBU, CTA WAVE,
- › QoE control essential for offering good service to consumers
 - › Being able to predict or react in case of QoE degradations
- › Access to video QoE metrics precondition for network and media integration
 - › <https://github.com/cta-wave/R4WG20-QoE-Metrics>



PERFORMANCE AND EXPERIENCE

- › Standardized adaptive bitrate (ABR) streaming
 - › Successfully deployed at scale for VoD (e.g. YouTube, Netflix)
 - › OTT linear TV is also done with ABR (e.g. Hulu in the US)
- › Recent developments:
 - › **CMAF standard**
 - › Convergence HLS and DASH on segment formats and codecs, broad industry support
 - › **Network assistance for enhanced performances DASH SAND**
 - › Integration of Networks and Media instead of only “client-pull”



SUMMARY AND CONCLUSION

- › Smart TV apps are happening
 - › Increasingly demanded by consumers who are used to OTT app like delivery
 - › Appealing to have STB-less (linear) TV
- › Opportunity of delivering TV via smart TV comes with challenges, related to:
 - › TV market fragmentation
 - › User Experience (UX)
 - › Quality monitoring and control
 - › Performance & Quality of Experience
- › Standards such as HbbTV OpApp play a crucial role in addressing the challenges

Standards will help make Smart TV apps comparable with “standard” TV boxes

A nighttime photograph of a city street. On the left is a multi-story brick building with many lit windows. In the center, a modern, curved pedestrian bridge with a glass railing spans the street. A tram is moving across the bridge, creating long, vibrant green and yellow light trails. In the background, more city buildings are visible under a dark sky.

› **THANK YOU**

Take a look:
TNO.NL/TNO-INSIGHTS

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