Stakeholders Forum on Quality of Service and Consumer Experience

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Understanding, Testing and Optimizing the Perceived Video Quality of OTT VoD Streaming Services

Christian Schmidmer, Joachim Pomy

cs@opticom.de, consultant@joachimpomy.de

OPTICOM, Germany

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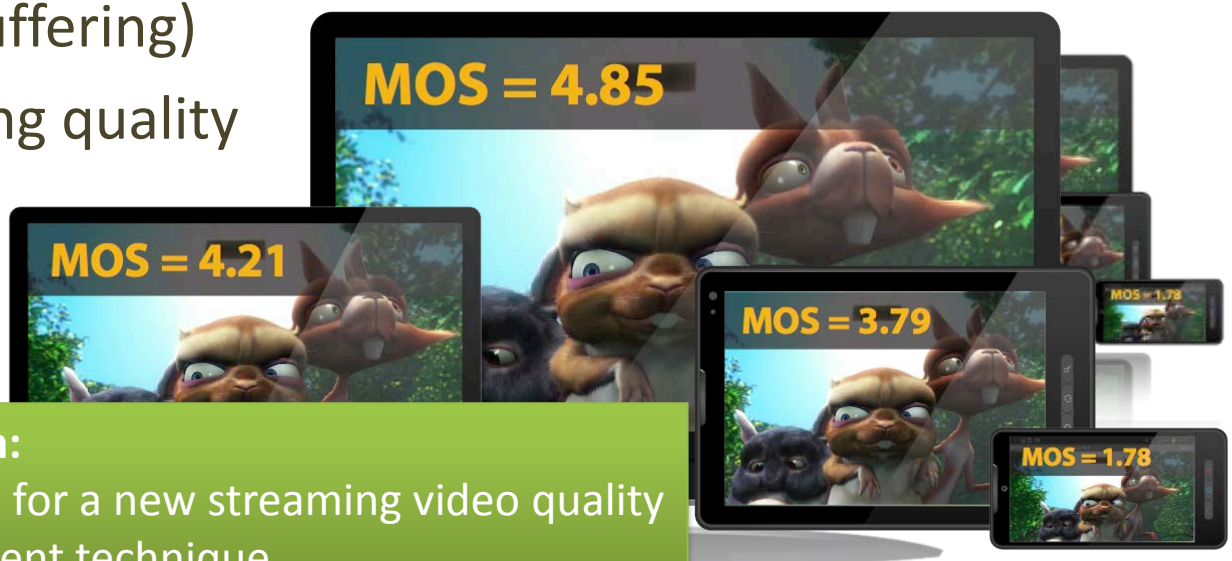
PEVQ® Perceptual Evaluation of Streaming Video Quality

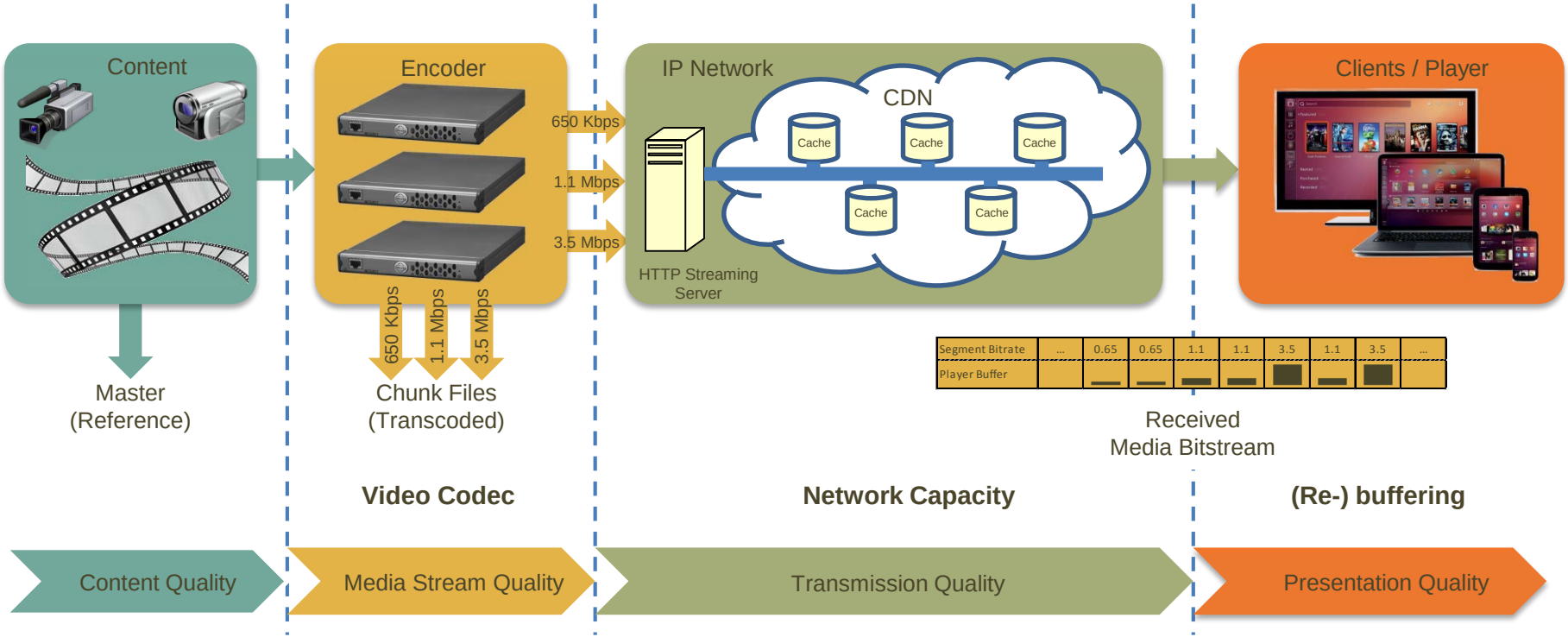
What is Different with Adaptive Streaming?

- TCP (or TCP-like)-> No packet loss
- Stalling effects (rebuffering)
- Highly variable coding quality
- Resolution changes
- Long sequences
- Many codecs
- Many devic

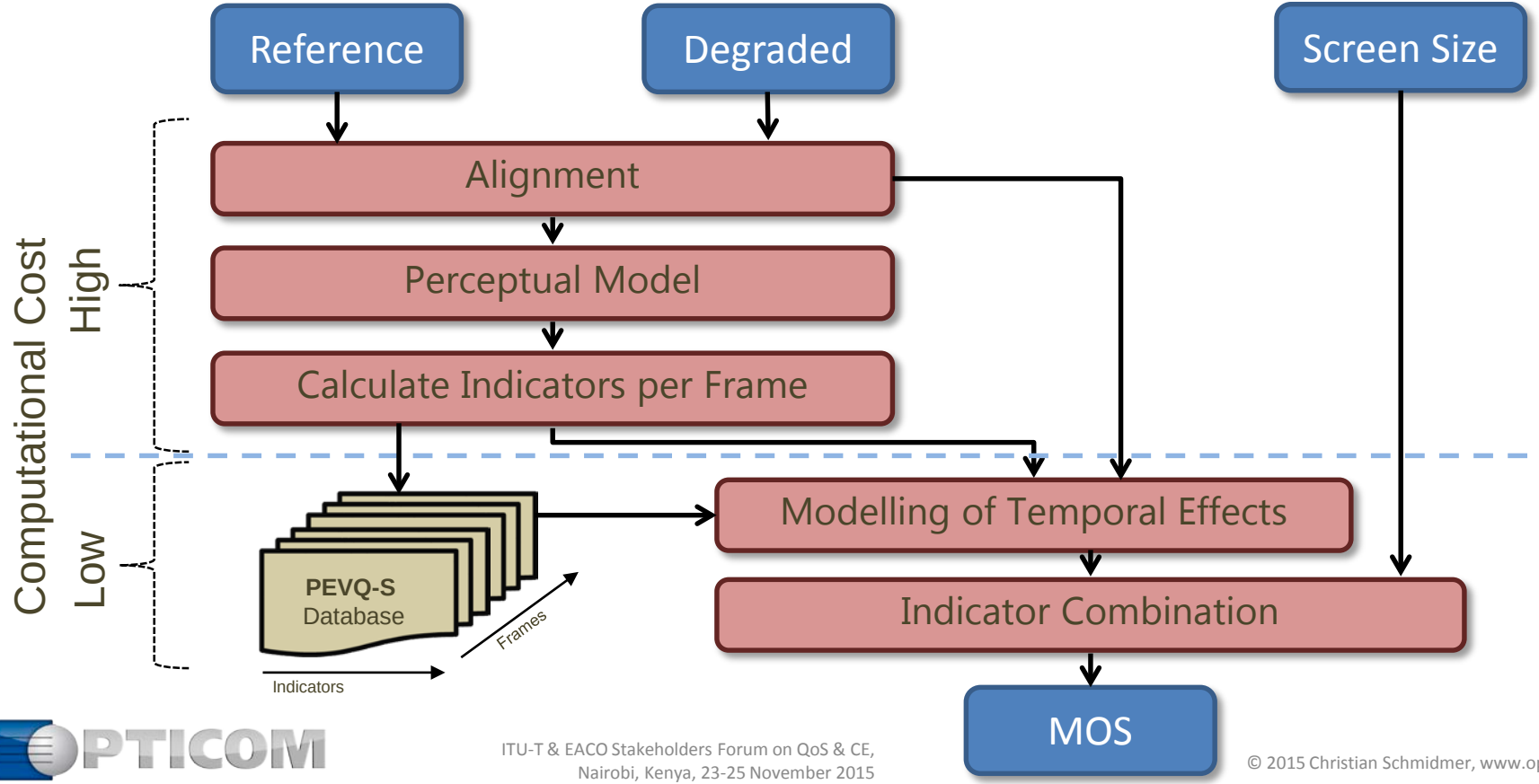


Conclusion:
Clear need for a new streaming video quality measurement technique

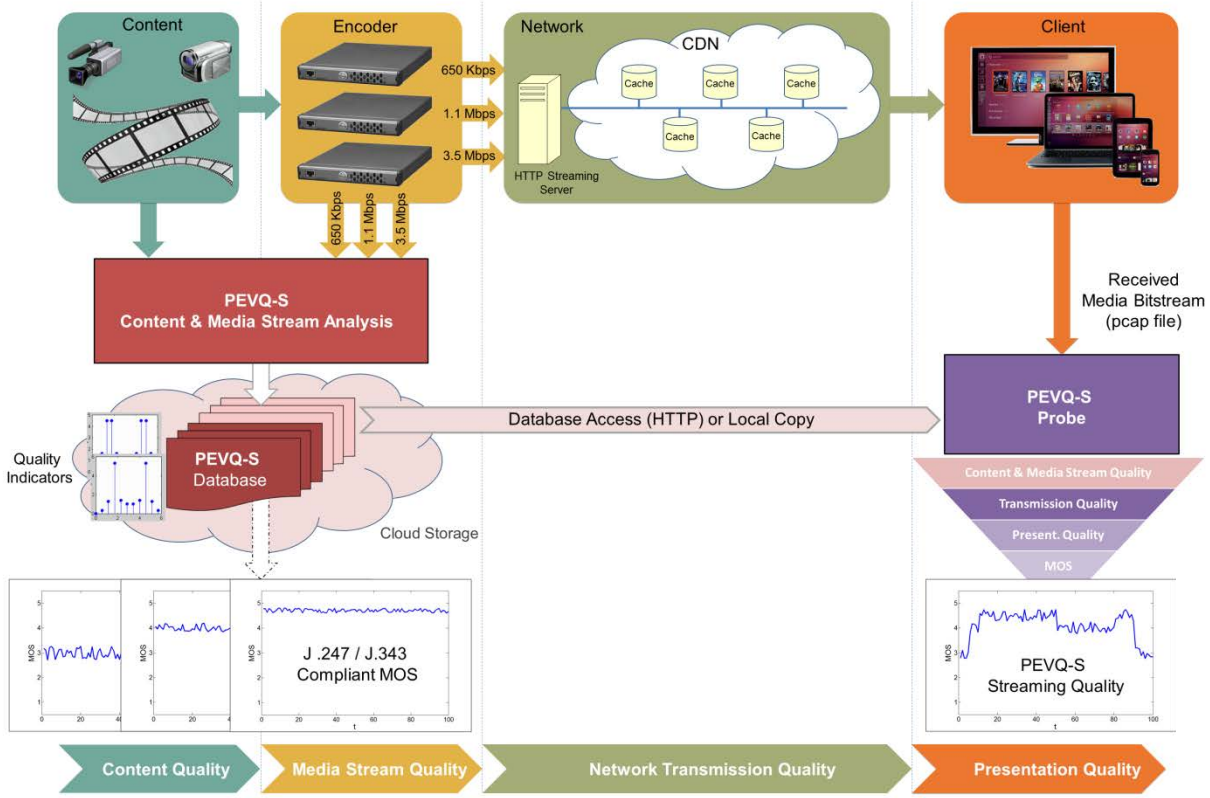
Adaptive Streaming Concept



PEVQ Structure



PEVQ-S in the Chain

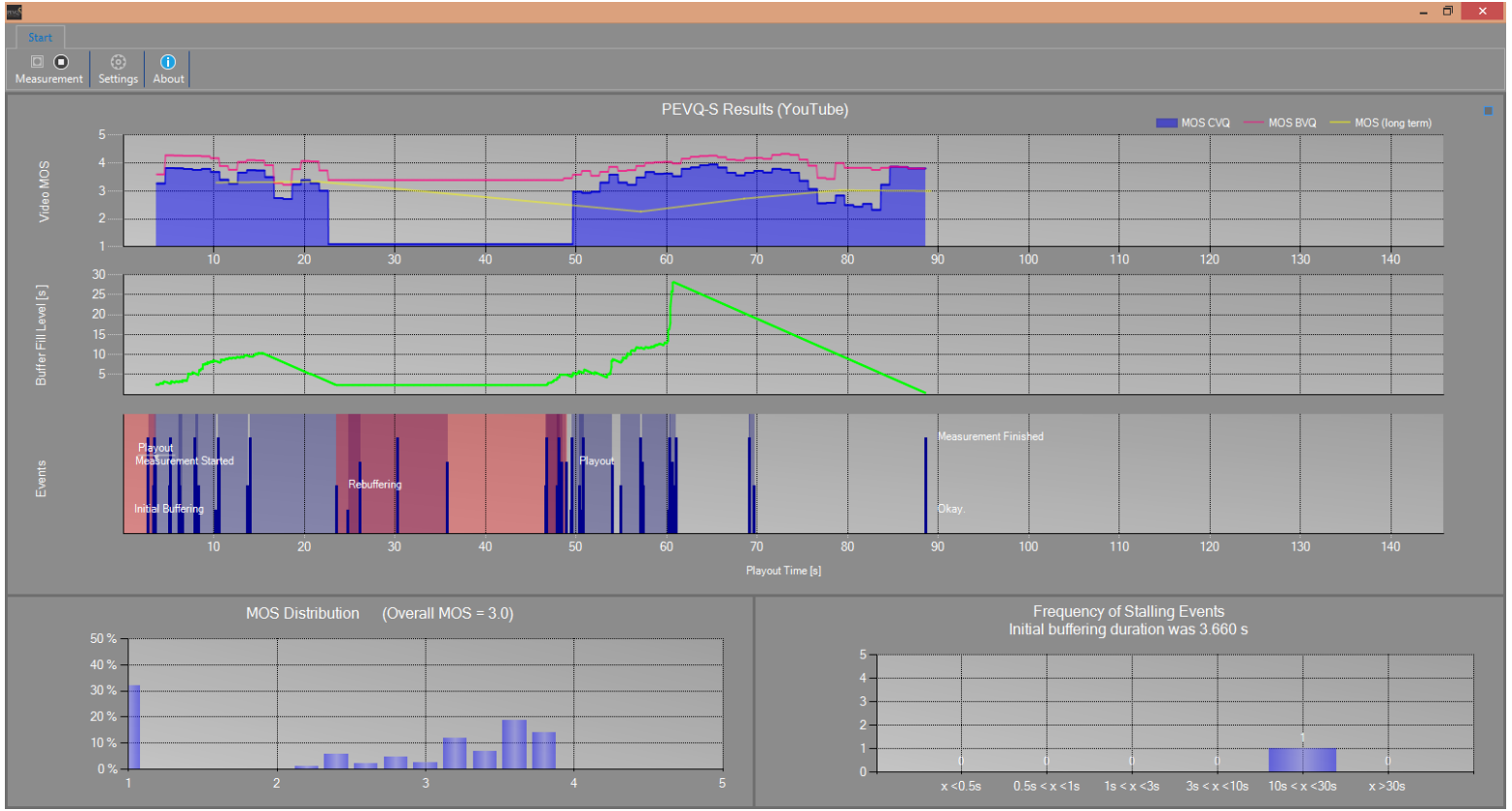


PEVQ® Perceptual Evaluation of Streaming Video Quality

Supported Services/Platforms

	Windows	Linux	Android
YouTube	Supported	Supported	Supported
Amazon Instant Video	Supported	Supported*	In Progress
HLS	Supported for proprietary server	Supported for proprietary server	Supported for proprietary server
Videoload	Supported	Supported	Not yet supported

PEVQ-S Measurement



Benchmarking VoD Streaming Services

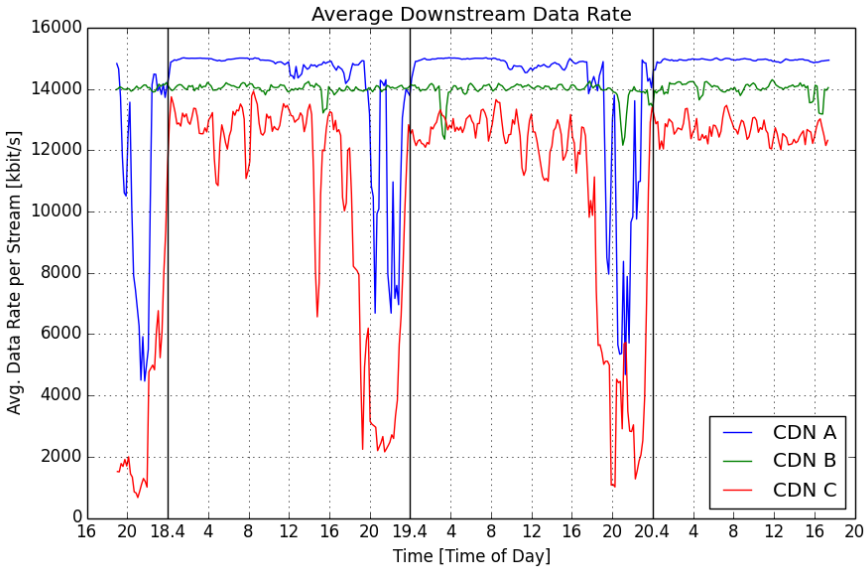
Are data rates, considerably higher, or at least above the maximum video bit rate, a good enough prospect to achieve good video quality?

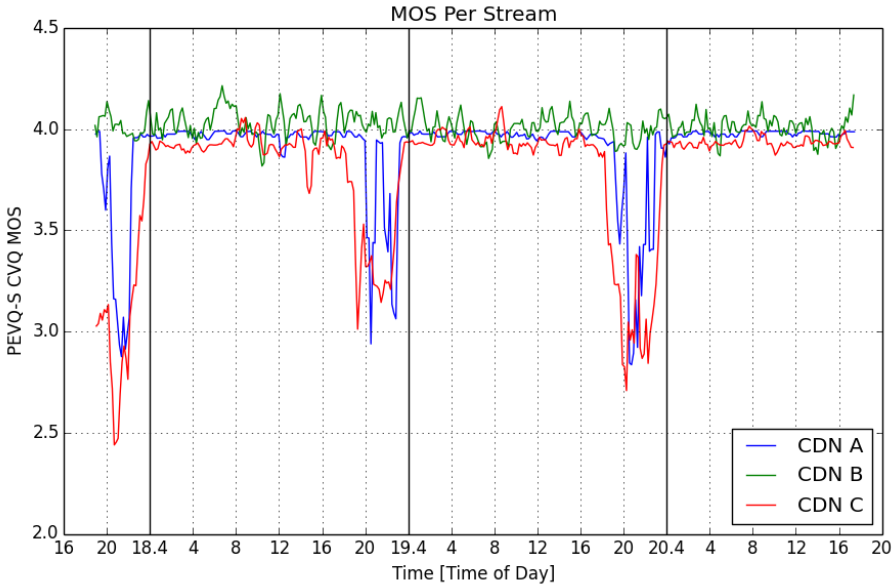
Stress testing of AIV using PEVQ-S

- 16 Mbit/s ADSL (copper)
- 32 Mbit/s ADSL (copper)

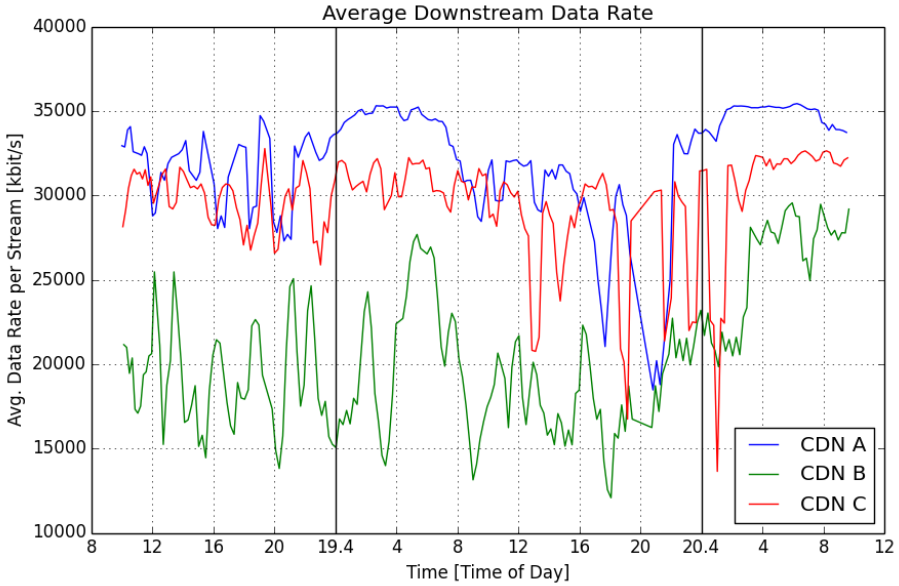
150 seconds video containing quality levels up to 1080p at a bit rate of 10 Mbit/s

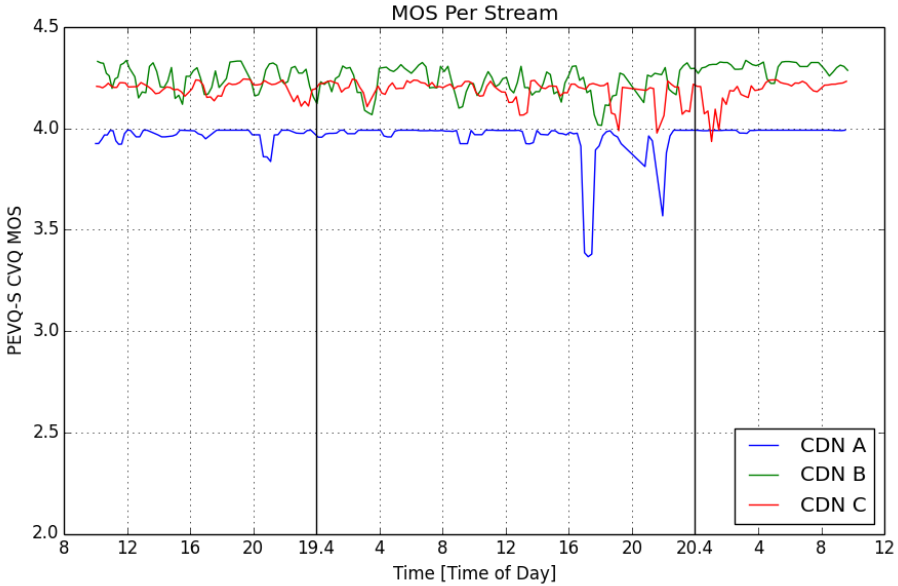
AIV over 16Mbit/s ADSL





AIV over 32Mbit/s ADSL





Conclusions

- Clear need for a streaming video quality measurement technique for highly variable bitrates and resolutions as well as longer than 10s streaming sessions
- Currently, no standardized subjective and objective VQM standard exists for ABR video streaming for the above setting
- PEVQ-S is proposed to resolve this shortcoming, based on advancing existing standards, while maintaining maximum backward-compatibility and validated accuracy
- PEVQ-S is suited to evaluate different OTT quality layers:
  Content, Media Stream, Transmission and **Presentation Quality**

Thank You!

More info: www.opticom.de

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PEVQ®
Perceptual Evaluation of
Streaming Video Quality

Amazon Instant Video (1)

Bitrate [Mbit/s]	Resolution	Framerate	Codec		
10	1920x1080	24	H.264		
6	1280x720	24	H.264		
4	1280x720	24	H.264		
2.5	1280x720	24	H.264		
2	720x404	24	H.264		
1.3	720x404	24	H.264		
0.9	720x404	24	H.264		
0.6	720x404	24	H.264		
0.45	512x288	24	H.264		
0.3	512x288	24	H.264		
0.2	512x288	24	H.264		
0.15	512x288	24	H.264		

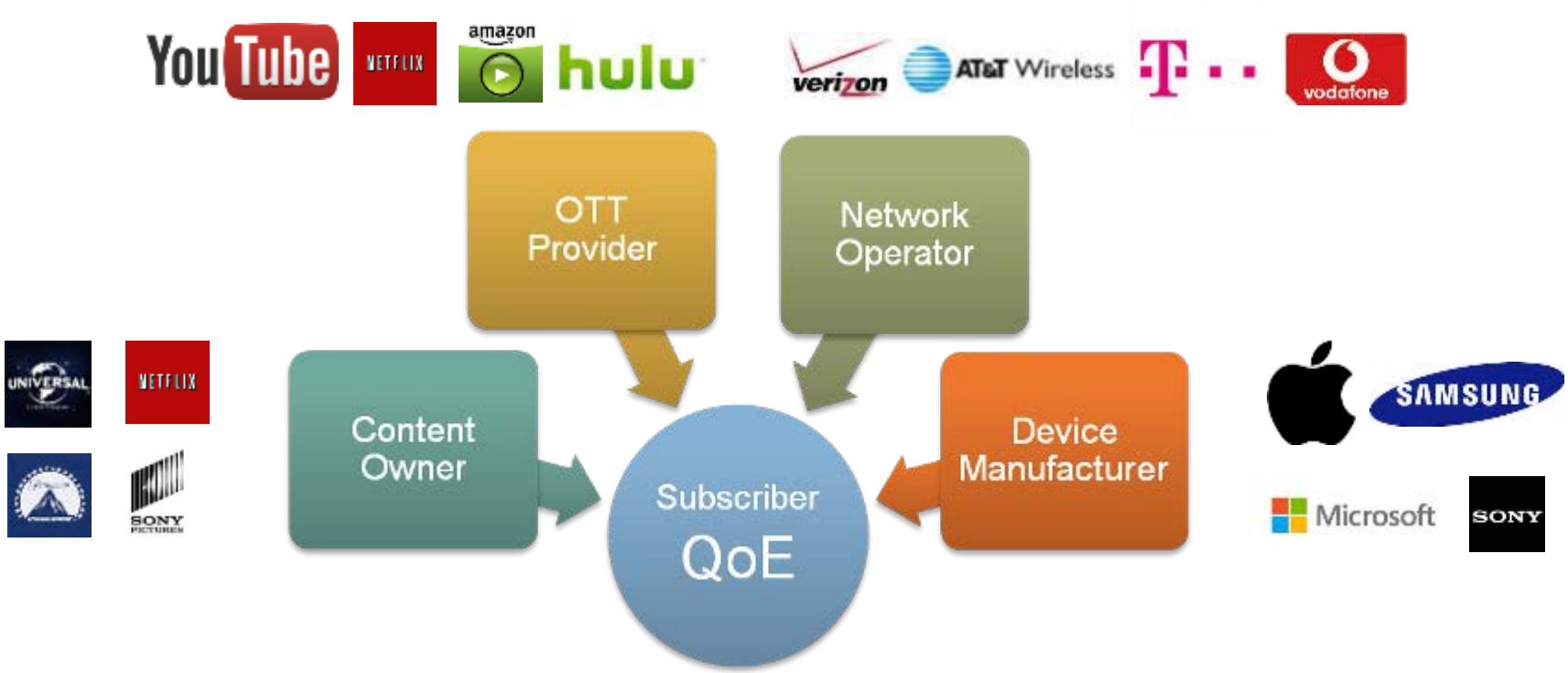
Netflix (1)

Bitrate [Mbit/s]	Resolution	Framerate	Codec		
5.8	1920x1080	24	H.264		
4.3	1920x1080	24	H.264		
3.0	1280x720	24	H.264		
2.3	1280x720	24	H.264		
1.7	853x480	24	H.264		
1.0	853x480	24	H.264		
0.75	682x384	24	H.264		
0.55	682x384	24	H.264		
0.37	512x288	24	H.264		
0.23	426x240	24	H.264		

YouTube (1)

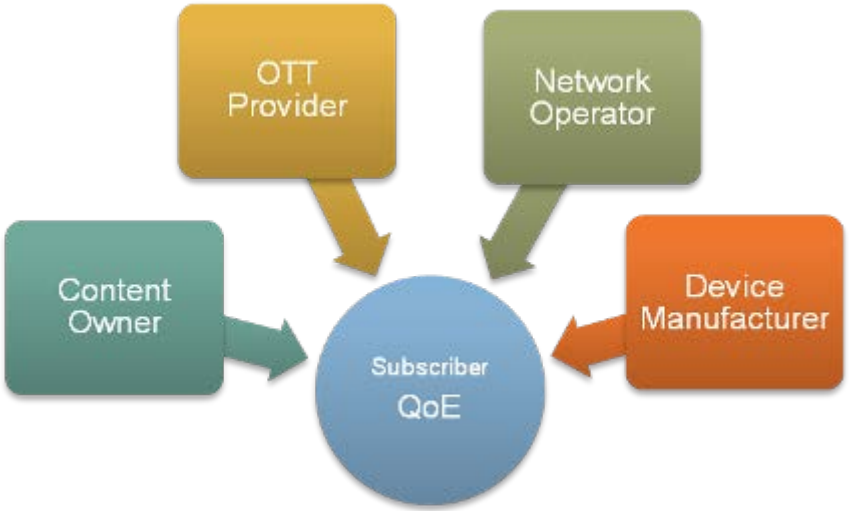
Bitrate [Mbit/s]	Resolution	Framerate	Codec		
3	1920x1080	24	H.264		
1.6	1280x720	24	H.264		
0.8	854x480	24	H.264		
0.4	640x360	24	H.264		
0.25	426x240	24	H.264		
0.1	256x144	12	H.264		
1.8	1920x1080	24	VP9		
0.9	1280x720	24	VP9		
0.45	854x480	24	VP9		
0.25	640x360	24	VP9		
0.13	426x240	24	VP9		
0.07	256x144	12	VP9		

Players Involved in OTT QoE Rivalry



Stakeholders' Different Quality Views

Stakeholders for OTT QoE…



…and related quality layers