MEC4FAIRFEST – Multi-Access Edge Computing for Fair Media Streaming Manifest

GOALS

Better manage the video distribution under HAS (HTTP Adaptive Streaming) in dense client environments.

Currently, there is a bandwidth competition that produces radio congestion and unfair channel utilisation.

Multi-access Edge Computing (MEC) allows deploying application services at the edge of mobile network addressing this issue.

CHALLENGES

Improve QoE in video streaming in dense client environments.

Enable subscription-based models involving SLAs.

Provide an efficient solution without overheads.

Standard compliance:

- Dynamically influence the selection of video representation
- Transparency: No impact on service, CDN infrastructure nor media player.
- Compatible with encrypted media delivery

DEMO SETUP

NITOS Testbed from **NITLAB**: Indoor deployment with 40 nodes that feature LTE in an RF-isolated environment.

SDR testbed that consists of OpenAirInterface software stack of the eNodeB and EPC.

Live and on-demand MPEG-DASH and HEVC representing applications that require low-latency ultra-broadband service.

Multiple clients compete for bandwidth across a bottleneck link causing instability in the selected bitrate, bottleneck-link under-utilization, and disproportional shares of available bandwidth.

MEC4FAIRFEST service gets eNodeB CQI statistics with close to zero delay and awareness of the radio status.

MEC4FAIRFEST remove or add back representations from the MPD media manifest according to CQI reports avoiding signalling overheads.

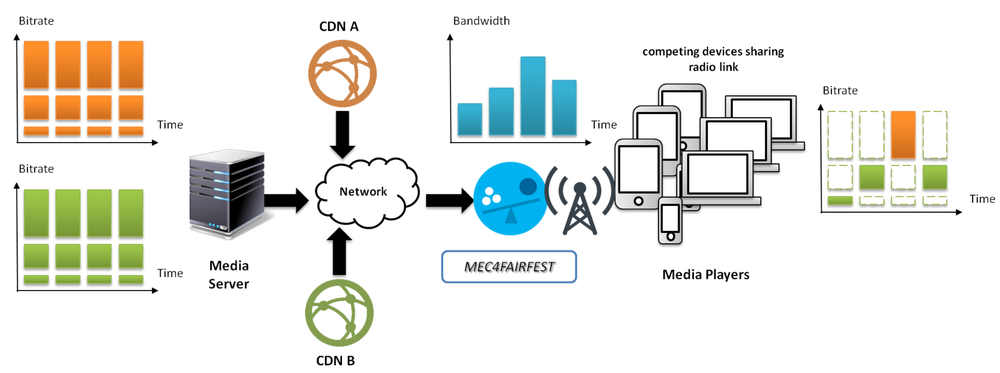
RESULTS

MEC4FAIRFEST provides holistic and real-time vision of the density of traffic, expected utilisation and effective available bandwidth on a radio link.

The eMOS (QoE) is enhanced up to 25% when the MEC4FAIRFEST comes into play.

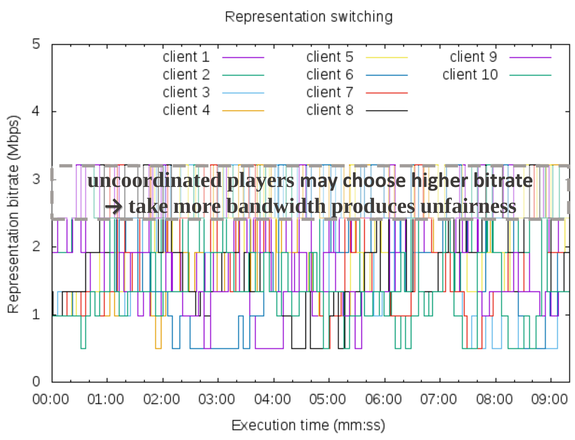
Media issues are less frequent and shorter:

- Initial buffering delay
- Temporal interruptions or pauses
- Video resolution changes



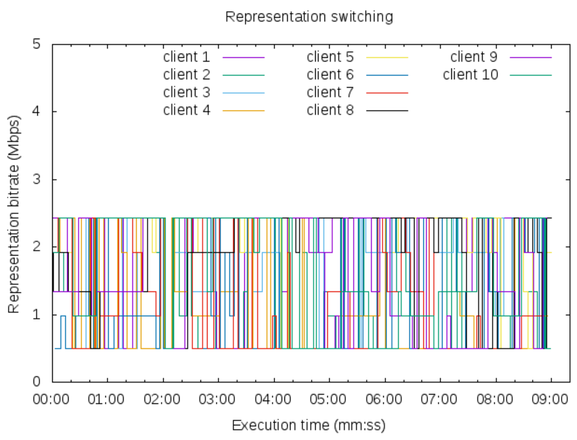
MORE RESULTS

Without MEC4FAIRFEST



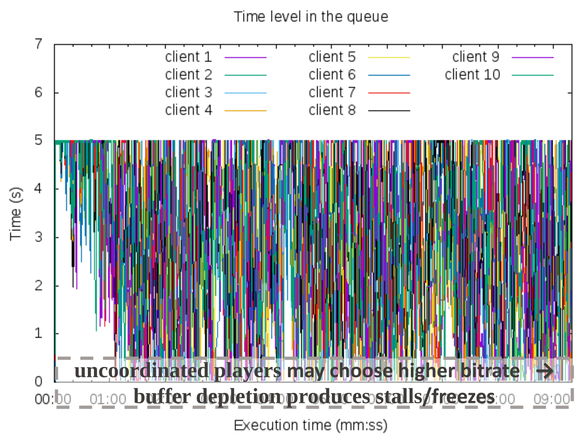
- More frequent video resolution changes.
- Autonomous, Distributed and Unfair media experience.

With MEC4FAIRFEST



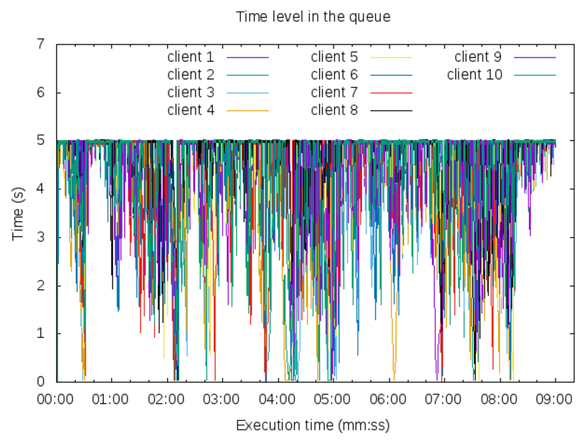
- More stable video resolution.
- Scalable, Coordinated and Fair media experience.

Without MEC4FAIRFEST



- Higher initial buffering delay.
- More frequent temporal interruptions.

With MEC4FAIRFEST



- Lower initial buffering delay.
- Less frequent temporal interruptions.

CONCLUSIONS

MEC4FAIRFEST achieves fair and efficient utilization of a shared link among mobile users concurrently consuming media streaming services.

Network-assistance for bitrate and CDN selection on a radio link makes the difference.

MEC approach is feasible, scalable and with a clear viability from the business model perspective.

Realistic radio behavior on bootstrapping is often ignored on simulated experiments which can have a significant impact on the results.

SDN & SDR technologies will catalyze agile network revolution boosting service performance

POST MORTEM

MEC4FAIRFEST is a scalable, transparent and close to zero delay service to grant fair and efficient media experiences on dense client environments

Outcome results submitted to (2018/02/06):

Martin, A., Viola, R., Zorrilla, M., Florez, J., Montalban, J. (2018). Hybrid MEC and Client Adaptation for Fair and Efficient Media Streaming in SDR Mobile Networks. IEEE ACCESS.

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