



Review OC1 experiment MEC4FAIRFEST

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FED4FIRE+ FEC3

Paris, 15th March 2018

vicomtech

visual interaction & communication technologies

Vicomtech is an applied research centre specialized in Computer Graphics, Visual Computing and Multimedia technologies
Founded in 2001 and based at San Sebastián Technology Park

Digital Media

Data Intelligence for Energy and Industrial Processes
Industry and Advanced Manufacturing
Intelligent Transport Systems and Engineering
eHealth and Biomedical Applications
Speech and Natural Language Technologies



VICOMTECH & NITLAB

MEC4FAIRFEST

OUTLINE



MEC4FAIRFEST EXPERIMENT

MEC4FAIRFEST RESULTS

IMPACT OF MEC4FAIRFEST

FEEDBACK



MEC4FAIRFEST EXPERIMENT: Concept



Adaptive Streaming over HTTP

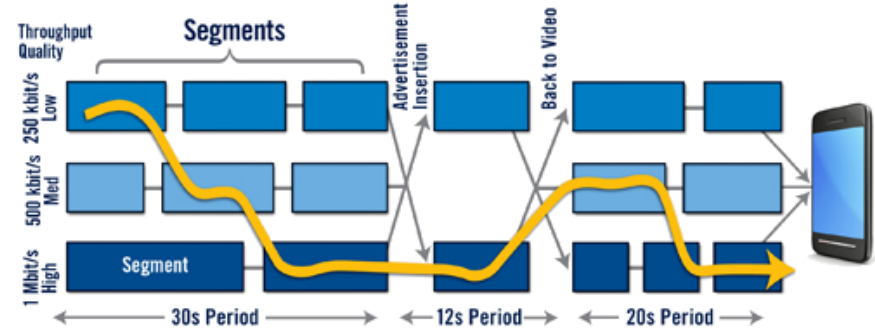
Media industry standard

- Wide display ecosystem
- Bandwidth optimisation
- Scalability
- Better QoE

Dense client cells

- Dynamic adaptation of media players in a distributed and uncoordinated way

Each client strives to optimise its individual QoE

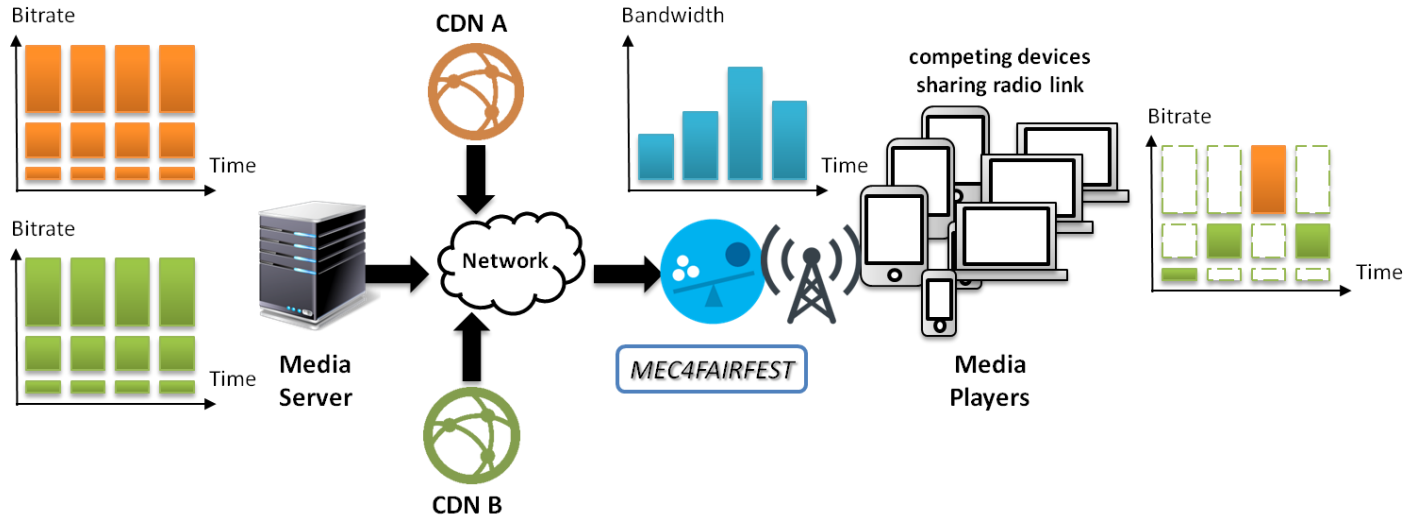


MEC4FAIRFEST EXPERIMENT: Motivation

Edge Awareness Video delivery Analytics

5G ETSI standard on **Multi-access Edge Computing** allows deploying application services at the edge of the mobile network:

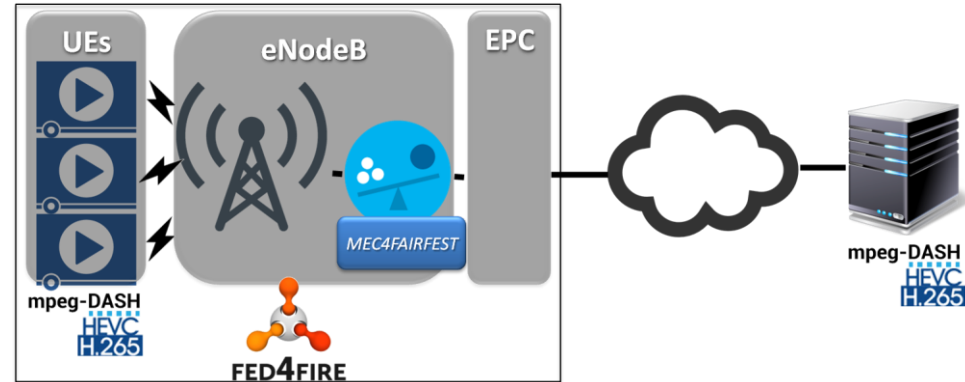
- Zero Latency
- Capillary
- Distributed



MEC4FAIRFEST EXPERIMENT: Set-up

Active component of the video delivery chain at the **mobile edge**

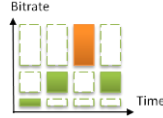
Responsible for **dynamically controlling** HAS video representations available for delivery



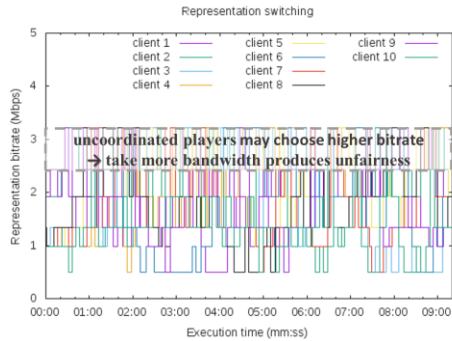
- Real UEs LTE
- eNodeB+EPC OpenAirInterface
- DASH-parsing Proxy

MEC4FAIRFEST RESULTS

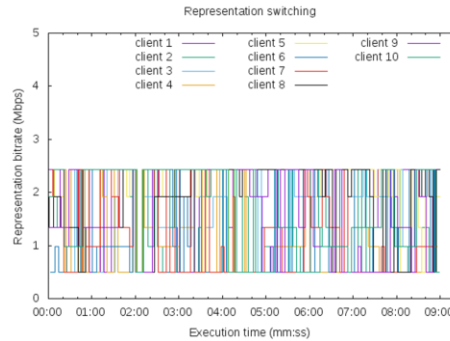
Representation switching decisions



Without MEC4FAIRFEST



With MEC4FAIRFEST

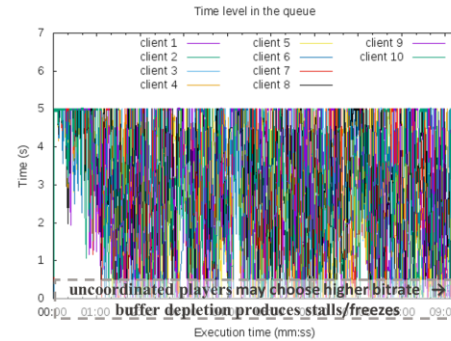


- More frequent video resolution changes.
- Autonomous, Distributed and Unfair media experience.

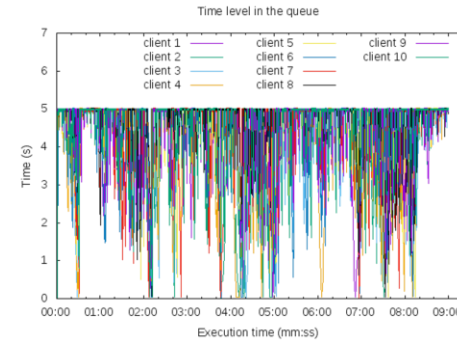
- More stable video resolution.
- Scalable, Coordinated and Fair media experience.

Impact on buffering time

Without MEC4FAIRFEST



With MEC4FAIRFEST



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

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

MEC4FAIRFEST RESULTS



Without MEC4FAIRFEST



With MEC4FAIRFEST



MEC4FAIRFEST RESULTS: Lessons Learned



MEC4FAIRFEST achieves **fair** and **efficient** utilisation 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 behaviour on bootstrapping is often ignored on simulated experiments which can have a significant impact on the results

5G SDN & SDR technologies will **catalyse** agile network revolution **boosting service performance**

IMPACT OF MEC4FAIRFEST

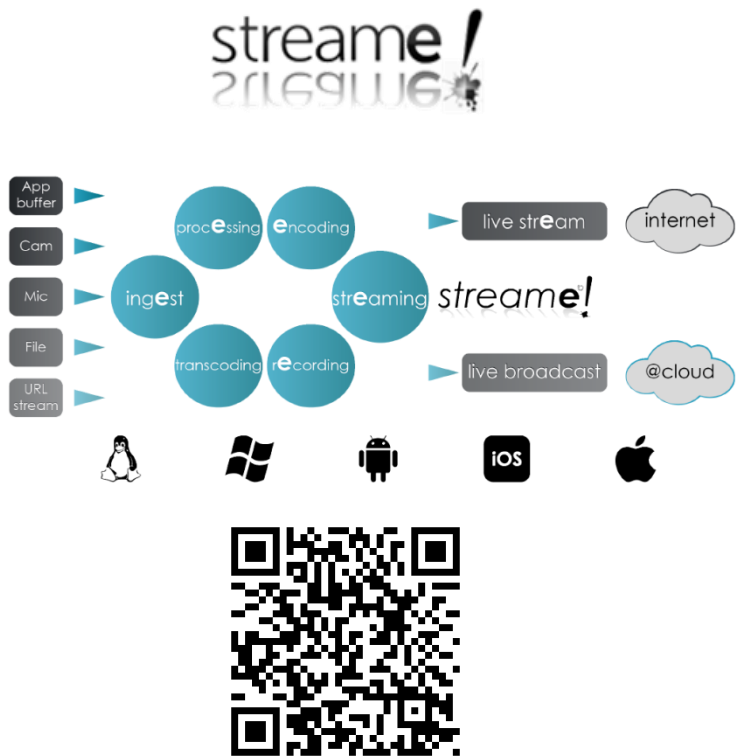


MEC4FAIRFEST impacts on different stakeholders:

- Video streaming technology providers for media services
- Telecom operators
- CDN operators
- Wireless networks vendors
- Dense event performances



IMPACT OF MEC4FAIRFEST: *streame!*



Business Benefits:

- Simplify streaming media delivery
- Boost prototyping
- Overcome multiple streams
- Synchronisation to provide richer experiences
- Deliver low latency streams

Features:

Streaming:

- RTP, RTSP, RTMP, HTTP, HLS, MPEG-DASH, WebRTC

Encoders:

- H.264 MP, HEVC/H265, AAC-LC/HC

Resolutions:

- 4K & UHD & HDR

Platforms:

- iMX HW support

HW Optimization:

- GPU coding

Use Cases:

- Second/Multi-screen apps
- Live media sharing
- Accurate timestamp based apps
- Synchronisation of multiple live stream
- Low latency
- Video calls
- Remote surveillance
- Factory supervisory control and data acquisition (SCADA) display
- Virtual desktop infrastructure (VDI)
- Cloud gaming for ultra-thin clients
- Efficient delivery
- Advanced advertising insertion
- Train / Bus entertainment systems

IMPACT OF MEC4FAIRFEST : Scientific contribution



- **Standard** compliance
- **Transparent**, no impact on service, CDN infrastructure nor media player
- Compatible with **encrypted** media delivery
- **Efficient**, no overheads
- Highly **scalable**

The Scientific contribution of MEC4FAIRFEST submitted to a Q1 Journal (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. IEEE Access received an impact factor of 3.244 in the 2016 JCR release.

FEEDBACK: Resources



Used Resources

- Nitos Testbed
- JFED reservation tool

Tools

- OMF experiment
- Image persistence

FEEDBACK: Added Value



Base testbed features used:

- Book resources
- Detailed inventory
- Persistence of images
- Experiment orchestration and replay
- Results records

Specific testbed feature used:

- APIs to SDR eNodeB enabling integration of MEC systems according to 5G ETSI architecture
- Availability of Linux-based UEs for fast prototyping of massive headless media players
- Real testbed where interferences, distances, modulation, constellation and muxing of LTE protocol comes into play

MEC4FAIRFEST is a ***scalable, transparent*** and ***zero delay*** active service to grant fair and efficient **media experiences** on **dense client cells**



Co-funded by the
European Union



Co-funded by the
Swiss Confederation

This project has received funding from the European Union's Horizon 2020 research and innovation programme, which is co-funded by the European Commission and the Swiss State Secretariat for Education, Research and Innovation, under grant agreement No 732638.

THANK YOU FOR YOUR ATTENTION!

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