Workshop on Immersive Services

24 January 2018, Gwangju, Korea
Gwangju Kimdaejung Convention Center

Chaired by
José Roberto Alvarez, Huawei
Co-chair MPEG Roadmap Activity

Welcome!

Time	Speaker	Affiliation	Subject / Title
14:00	**Jose Alvarez**	*MPEG (Director, Huawei)*	Welcome
14:05	**Rob Koenen**	*MPEG (Principal, TNO)*	MPEG Roadmap update
14:10	**Jeong Ho Choi**	*Director, Ministry of Science and ICT (PyeongChang ICT Olympic Preparation Team)*	**Keynote** Introduction to PyeongChang ICT Olympic
14:35	**KyungGeun**	*Lab Leader, Samsung Media Standard Lab.*	Perspective view of VR/MR technology development
15:00	*OMAF Developer Day Pitches (1 minute each)*		
15:10	*Break*		
15:30	**Taeil Chung**	*Research Fellow, LG SIC R&D Center*	Introduction to Global broadcasting service and Media immersive products
15:55	**Dillon Seo**	*Founder and CEO, Voler Creative*	Why should you care about VR?
16:20	**Jongmin Lee**	*Lab Leader, SKT Media Laboratory*	Next generation media platform and technologies
16:45	**Kei Kawamura**	*Senior Manager, KDDI Cooperation (Home Product Development Department)*	Introduction to KDDI's 5G network service

OMAF Developers' Day Pitch Session

Fraunhofer HHI

Fraunhofer IIS

Shanghai Jiao Tong University

Samsung

SK Telecom

TNO

Tiledmedia

Fraunhofer HHI @ OMAF Developers' Day

- HEVC-based viewport-dependent OMAF video profile:
  - Beyond 4K resolution in viewport based on HEVC Motion Constrained Tile Sets
  - Supports native viewport resolution of latest HMDs

- Reference software contributions:
  - ISOBMFF: Extractor implementation and player app in libisomedia
  - HEVC: Motion-Constrained Tile Set encoding in HM
  - Testvectors available in MPEG

- Mobile player app demonstration at Gwangju

- Live 360° chain in preparation for NAB 2018

MPEG-H Audio

OMAF 3D Audio Baseline Profile

- Omnidirectional media presentation of VR content using different audio formats:
  - Channel-based audio (e.g., 7.1+4H)
  - Object-based audio
  - Higher Order Ambisonics (HOA)
- Content authored and encoded according to VRIF Guidelines
- OMAF Viewport-Dependent Baseline Presentation Profile

OMAF over MMT

- 360° VR media streaming service based on MPEG OMAF and MPEG MMT standards providing an enriched immersive media experience

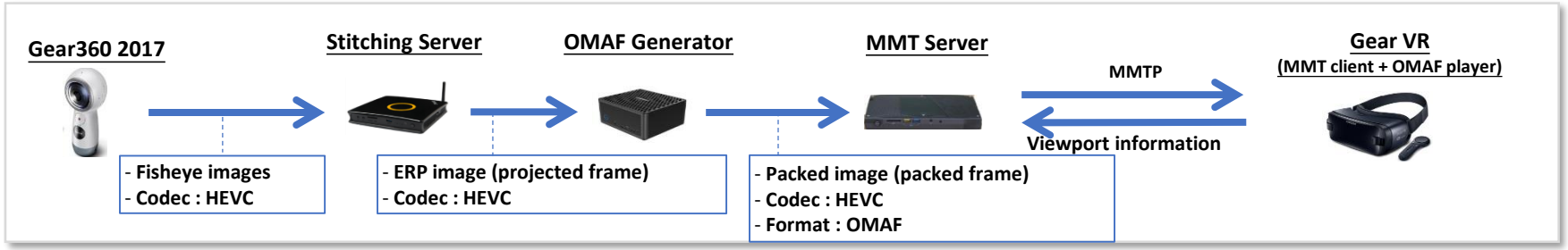
Achievements

- Developed standard-based 360° media delivery based on OMAF and MMT
- Ultra high quality and low delay 360° VR live streaming

Features

- 360° media delivery with ultra high quality based on MPEG OMAF
  - OMAF improves the quality of 360° media per same unit bandwidth through a packing process which results in bandwidth consumption reduction
  - Real-time stitching of 4K captured video for live streaming
- OMAF delivery over MPEG MMT for live streaming
  - MMT minimizes delivery delay of OMAF based 360° media
  - Smooth and seamless switching of streams

Demo System



SAMSUNG

VR Streaming with OMAF Timed Text and WebVR

- **WebVR-based Viewport-dependent VR streaming with MPEG OMAF Timed Text and MPEG MMT**

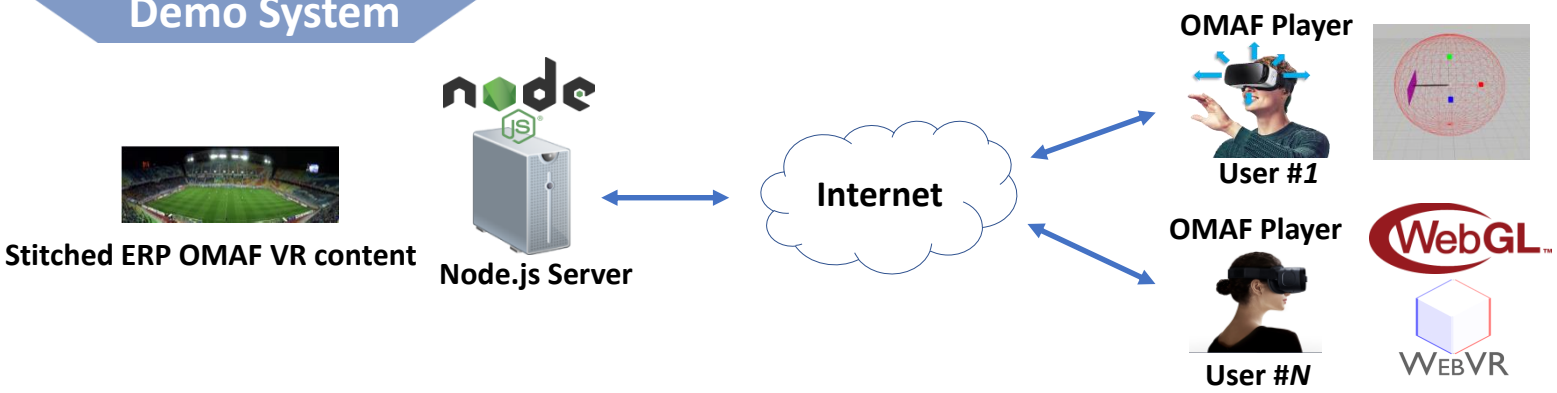
Achievements

- Web-based 360° media delivery and playback compatible with OMAF
- Demonstration of OMAF-based VR with timed text, using WebVTT
- Integration of OMAF and MMT standard-based VR streaming service into WebVR

Features

- 360° media delivery featuring timed text with MPEG OMAF
  - Developed OMAF timed text through WebVTT on transparent 3D plane
  - Rendering equirectangular projected (ERP) video texture to sphere
- 360° media delivery through Web for large scale OMAF media service
  - Node.js for streaming server to provide large scale OMAF content delivery
  - Browser-based client solution provides easy consumption of OMAF content for users

Demo System

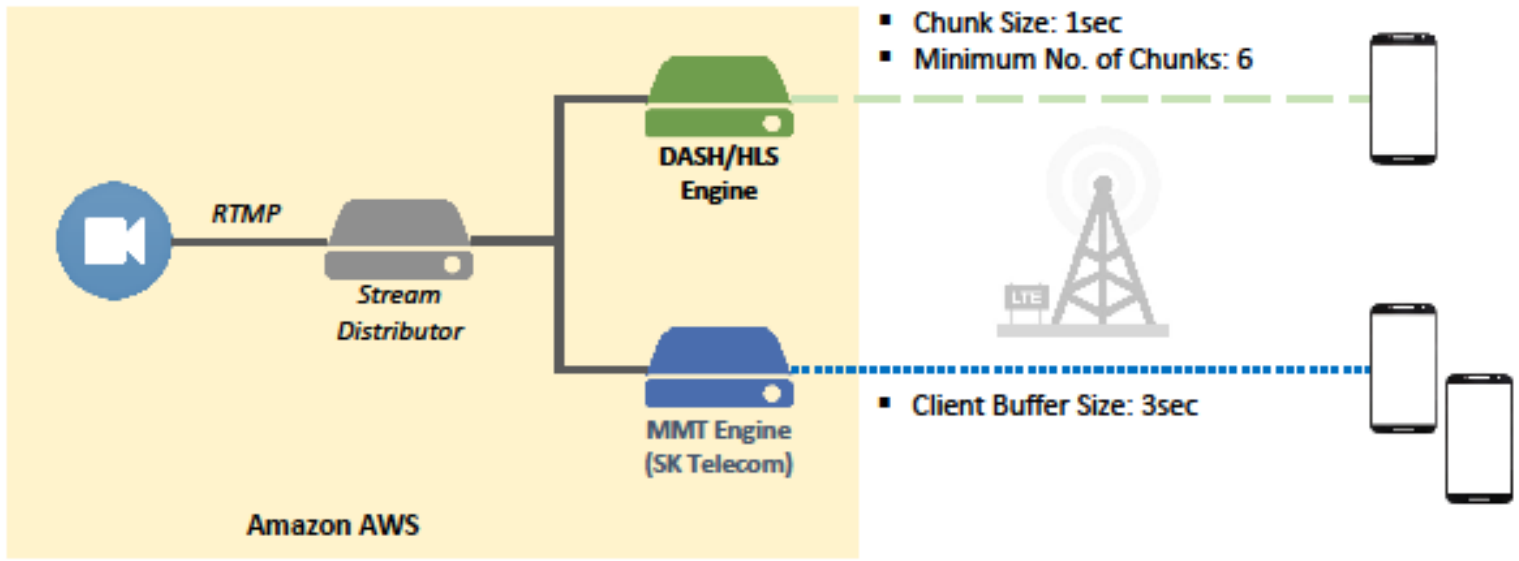


SAMSUNG

MPEG OMAF and MMT streaming for low-latency 360 video streaming

- *The world's first commercially deployed MMT-based mobile live video streaming*
- MMT-based Ultra-low latency and Perfect playback synchronization on Mobile Live Video Streaming

Demo Configuration



Check Point

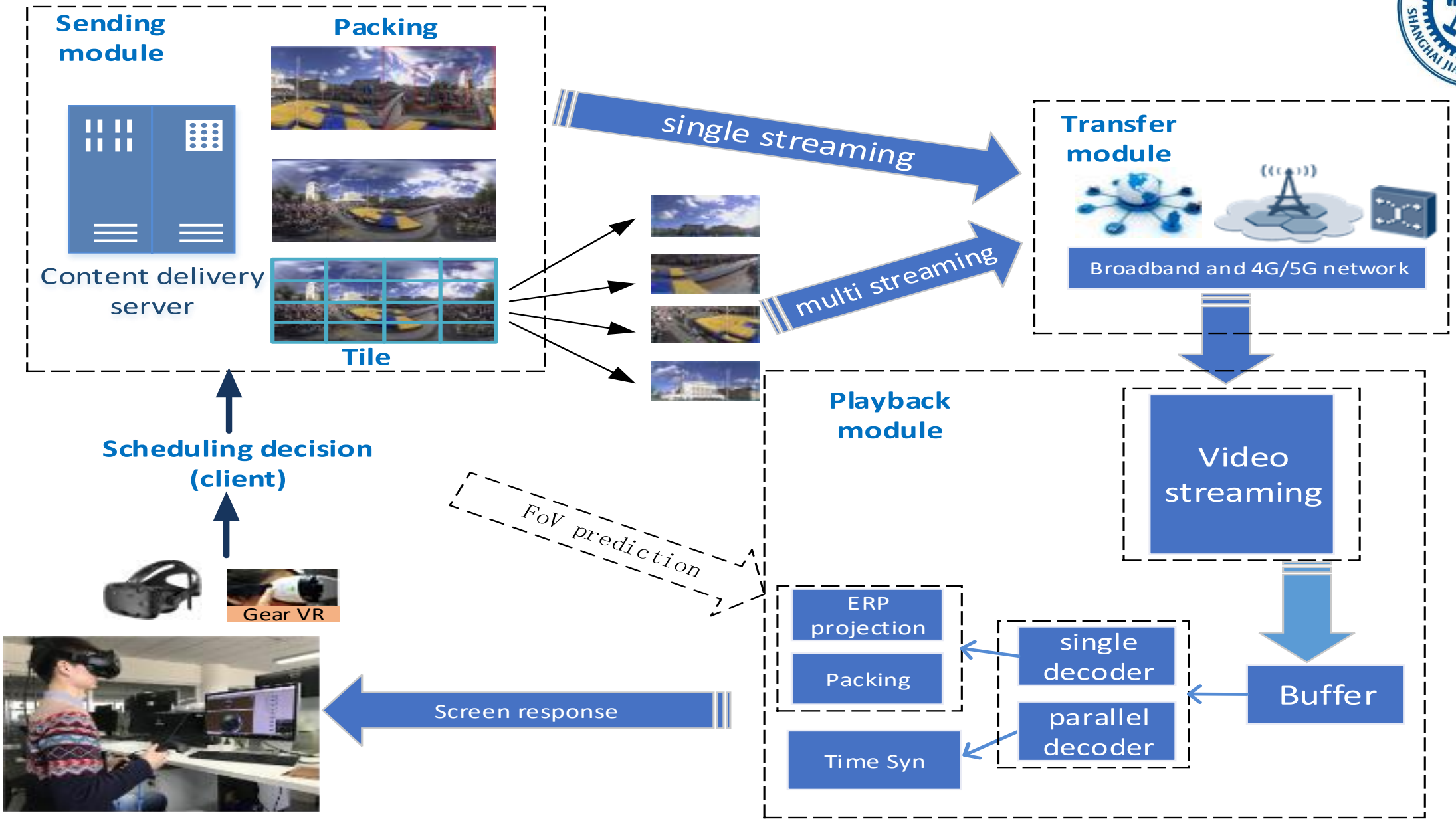
- ✓ Real-Live Video Experience
- ✓ End-to-End Delay Reduction
- ✓ Playback Synchronization

Deployed in oksusu

- Mobile TV of SKT
- 8.1M Subscribers
- 3.3M MAUs

SK telecom & HECAS

VR Streaming with OMAF SJTU



TILEDMEDIA

THE VR STREAMING COMPANY

2018 AIS Technology Award Winner

Next-generation viewport-dependent streaming

Bandwidth
4K: 5 Mbps
6K: 10-12 Mbps
8K: 14-15 Mbps

Motion-to-high-res latency
less than 2 frames (92%)

Demo streamed from Akamai

As showcased at CES, IBC, NAB by:
Akamai, Harmonic, Ericsson, Viaccess-Orca, DTS

SOCIAL VR

- Watch a movie together with Virtual Rob

VR MAGNIFIER

- Zoom in VR without nausea

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- All our Speakers!

- Gun Bang – Electronics and Telecommunications Research Institute
- Jihun Cha – Electronics and Telecommunications Research Institute

ETRI

- Yaeseul (Angela) Park – Telecommunications Technology Association

TTA 한국정보통신기술협회 Telecommunications Technology Association