

Activities for Immersive services in MPEG

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MPEG-i

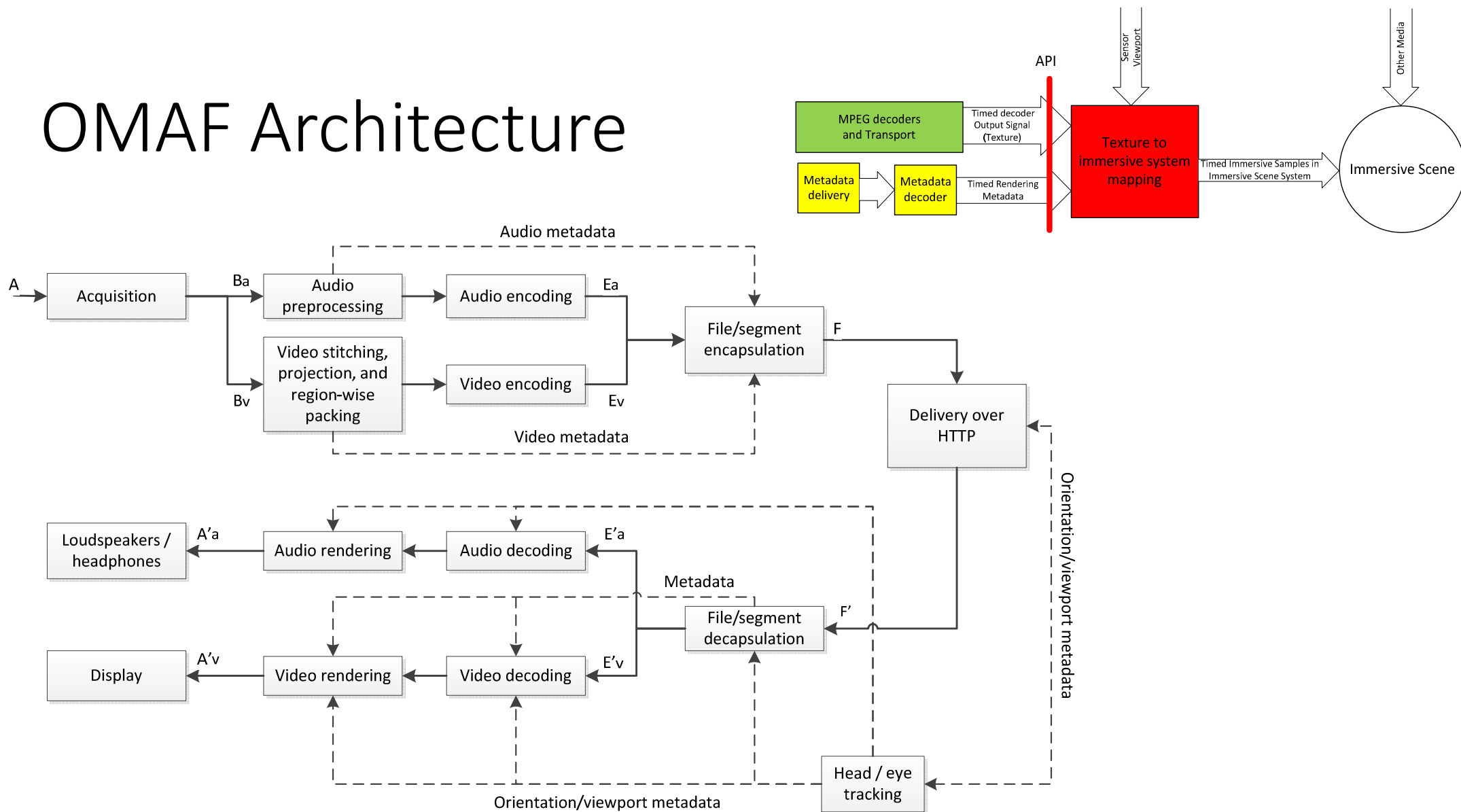
Pt.	Title	Considerations
1	Immersive Media Architectures	There may one or more architecture used by MPEG-i applications. Media-centric and Renderer/Gaming Centrics are considered for now, but may add others
2	Omnidirectional Media Format	More details to follow
3	Immersive Video Coding	Expected to contains FVC as we know it today Other consideration to be seen
4	Immersive Audio Coding	Currently considering 6DoF
5	Point Cloud Compression	Under development in MPEG
6	<i>Scene data container</i>	<i>Based on Gaming centric 6DOF</i>
7	<i>Metadata</i>	<i>Collection common metadata for consistent definition</i>
8	<i>Reportable data/Metrics</i>	<i>Used for consistent quality logging</i>

OMAF Overview

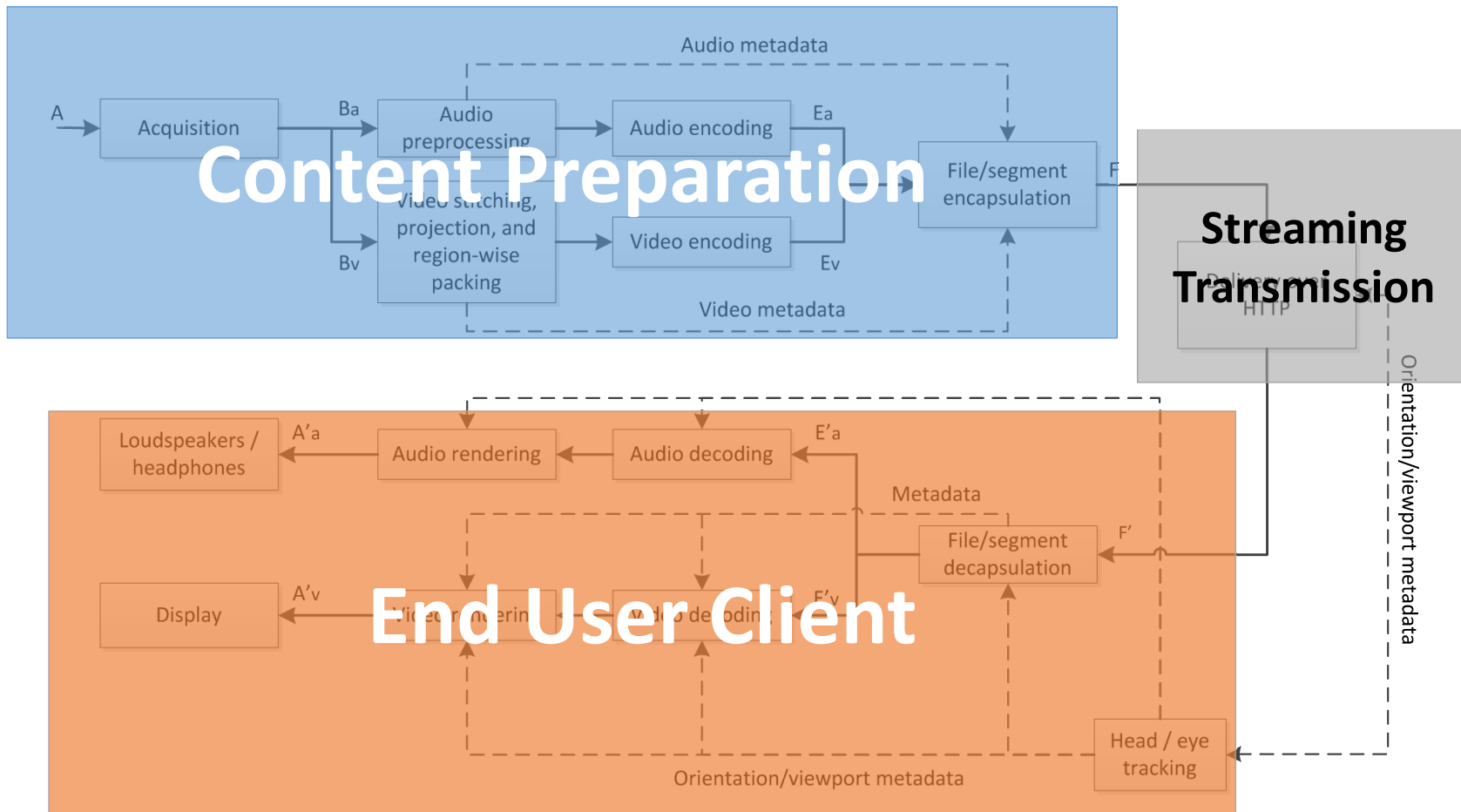
Emerging MPEG Omnidirectional Media Format (OMAF) standard (ISO/IEC 230090 Part 2):

- Currently in Study of DIS Ballot expected to be finalized by the end of 2017
- Scope: Storage and transmission of omnidirectional video and audio
- Based on MPEG standards: File Format and DASH
- VR-IF published first guidelines draft for OMAF profiles at IBC

OMAF Architecture

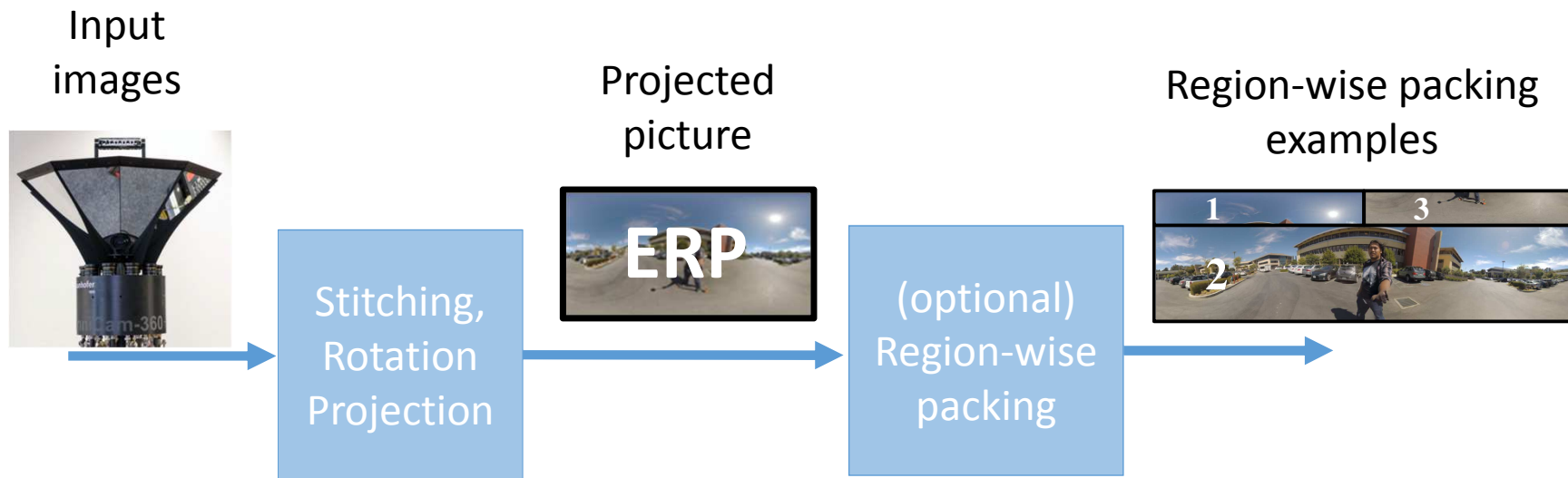


(Simplified) OMAF Architecture



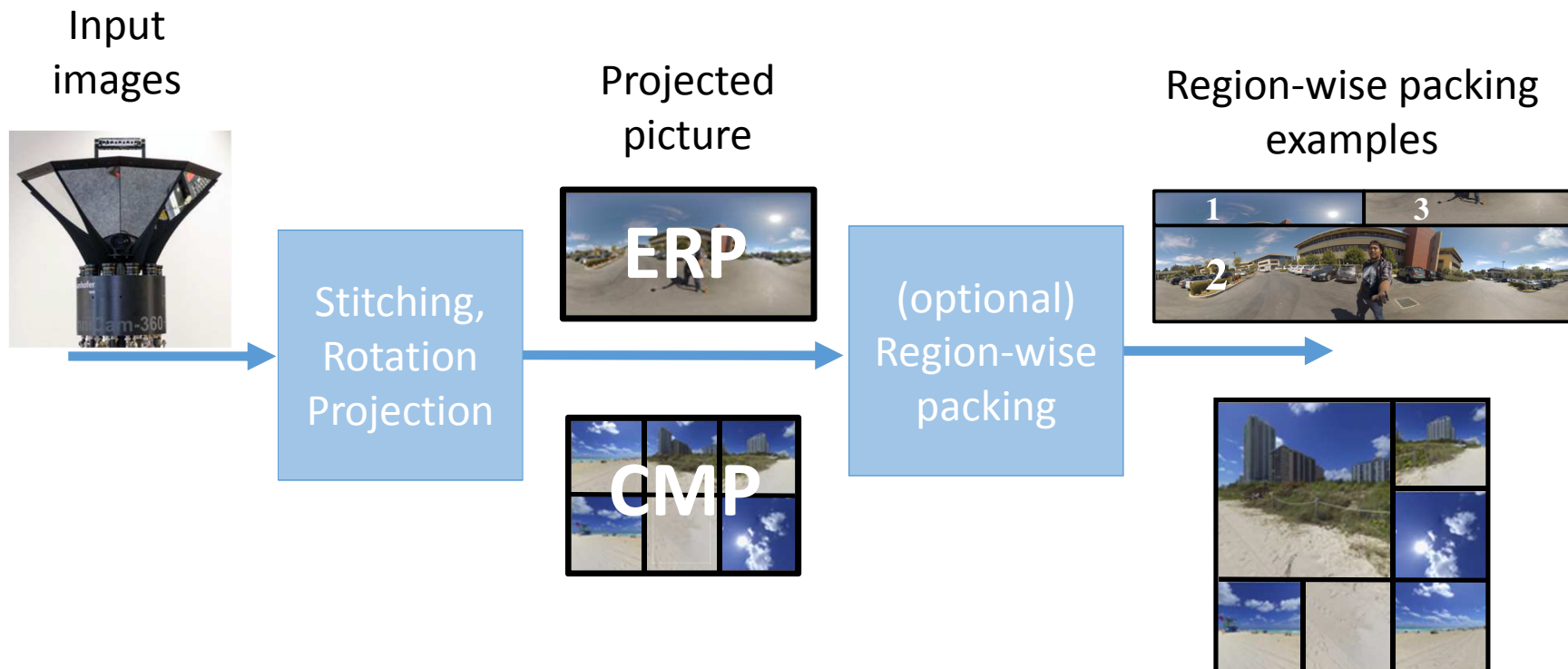
Content Preparation

Stitching, Projection & Packing



Content Preparation

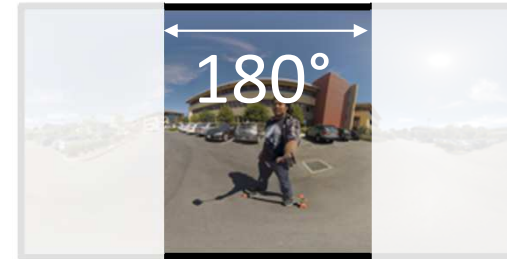
Stitching, Projection & Packing



Content Preparation

Additional Features of OMAF

- Coverage restrictions
- Fisheye video support for low cost consumer devices
- Initial and recommended viewpoint



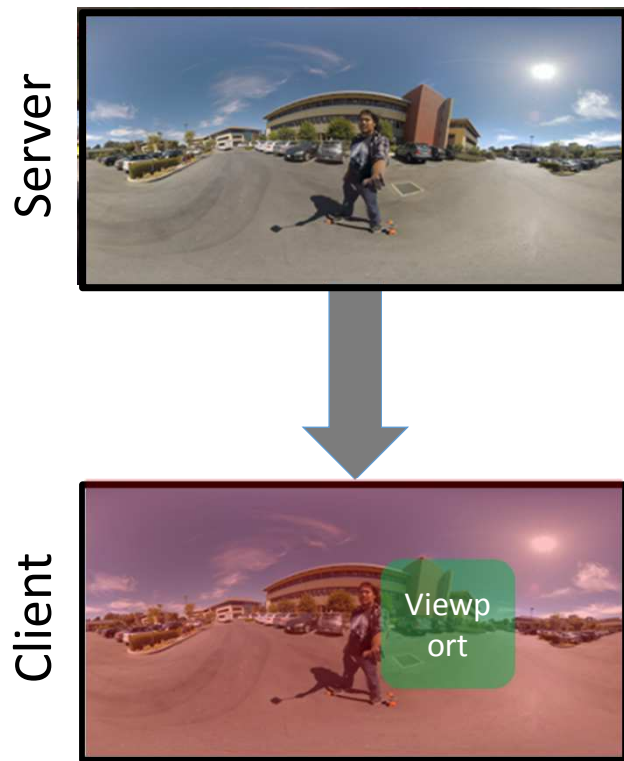
Streaming Transmission

Streaming Approaches and DASH

- OMAF builds on top of MPEG DASH
- OMAF v1 supports three basic schemes:
 - 1) viewport-independent streaming
 - viewport-dependent streaming:
 - 2) Viewport-specific streams
 - 3) Tile-Based streaming

Streaming Transmission

1) Viewport-agnostic streaming



- Transmit entire 360° video
- Simple integration in traditional streaming chain
- Implementation simplicity
- In OMAF: ERP only
- Viewport resolution limitation:
max. 4K ERP → HEVC Level 5.1
1Kx1K in typical Viewport

Streaming Transmission

2) Viewport-dependent streaming

Motivation

- Achieve higher resolution (beyond 1Kx1K) in the viewport with HEVC Level 5.1 constraints
- Bandwidth efficiency
- Better decoder utilization (higher QoE)
- OMAF Study of DIS supports 2 VPD approaches
 - Pre-encoded bitstreams
 - Tile-based

Streaming Transmission

2) Viewport-dependent streaming: **Viewport-specific**

- Preferred viewing direction through RWP
- Pre-encoded streams on server side
- Based on ERP or CMP
- Latency considerations
 - Requires frequent stream switching points
- Storage and generation overhead
 - Separate 4k video stream for each viewport



Streaming Transmission

3) Viewport-dependent streaming: **Tile-Based**

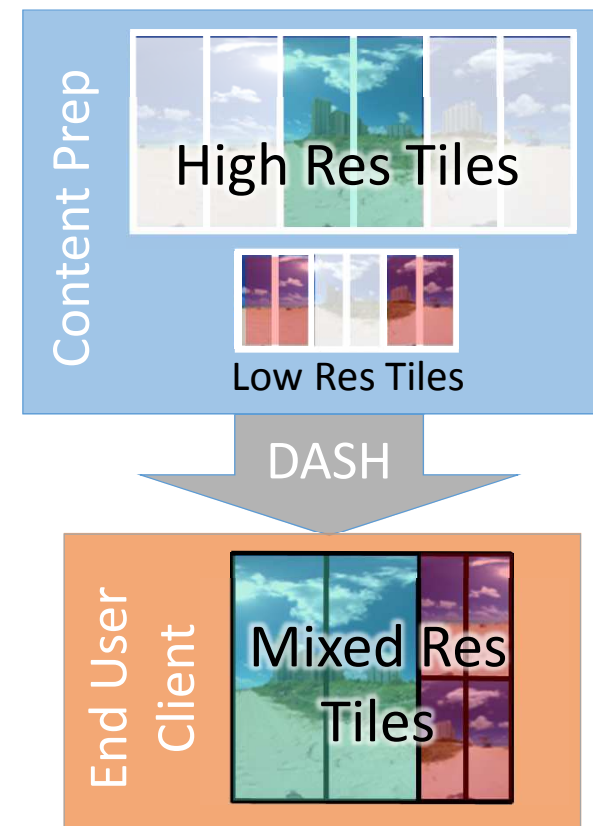
- HEVC Tiles
 - Available at different resolutions
- Lower storage and generation overhead
 - One separate stream per resolution
- Latency impact
- Implementation complexity
 - Client downloads multiple streams at different resolutions
- Single HEVC bitstream



Streaming Transmission

3) Viewport-dependent streaming: **Tile-Based**

- HEVC Tiles
 - Available at different resolutions
- Lower storage and generation overhead
 - One separate stream per resolution
- Latency impact
- Implementation complexity
 - Client downloads multiple streams at different resolutions
- Single HEVC bitstream



Thank you

