Overview of OMAF
I. Background
VR Ecosystem and Interfaces

1. Multiple videos, Capture Metadata
2. Single Video, Projection Metadata, Interactivity Data
3. Storage & Delivery Format: OMAF
4. Single Video, Projection Metadata, Interactivity Data
Challenges in VR Industries (I)

Quality of video on HMDs

portion of video rendered on a HMD

encoded video
Challenges in VR Industry (II)

Interoperability of formats

- Projection formats
- Stereoscopic arrangement
- Coverage Range

<table>
<thead>
<tr>
<th>Video Type Combinations</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D video</td>
<td>&quot;_2dp&quot;</td>
</tr>
<tr>
<td>3D top bottom video</td>
<td>&quot;_3dpv&quot;</td>
</tr>
<tr>
<td>3D side by side video</td>
<td>&quot;_3dpb&quot;</td>
</tr>
<tr>
<td>Monoscopic 180</td>
<td>&quot;180x180&quot;</td>
</tr>
<tr>
<td>Monoscopic 180 16:9</td>
<td>&quot;180x101&quot;</td>
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<tr>
<td>Monoscopic 360</td>
<td>&quot;_mono360&quot;</td>
</tr>
<tr>
<td>Top bottom stereoscopic 360</td>
<td>&quot;3dv&quot; or &quot;_tb&quot;</td>
</tr>
<tr>
<td>Left right stereoscopic 360</td>
<td>&quot;3dh&quot; or &quot;_lr&quot;</td>
</tr>
<tr>
<td>Top bottom stereoscopic 3D 180</td>
<td>&quot;180x180_3dv&quot;</td>
</tr>
<tr>
<td>Left right stereoscopic 3D 180</td>
<td>&quot;180x180_3dh&quot;</td>
</tr>
<tr>
<td>LR stereo 3D 180 squished</td>
<td>&quot;180x180_squished_3dh&quot;</td>
</tr>
<tr>
<td>Top bottom stereoscopic 3D 180x160</td>
<td>&quot;180x160_3dv&quot;</td>
</tr>
<tr>
<td>Two monoscopic 180 hemispheres</td>
<td>&quot;180hemispheres&quot;</td>
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<tr>
<td>TB 3D cylinder 2.25:1</td>
<td>&quot;cylinder_slice_2x25_3dv&quot;</td>
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<tr>
<td>TB 3D cylinder 16:9</td>
<td>&quot;cylinder_slice_16x9_3dv&quot;</td>
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<td>TB 3D 360 no bottom</td>
<td>&quot;sib3d&quot;</td>
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<td>180 planetarium full dome</td>
<td>&quot;_planetarium&quot; or &quot;_fulldome&quot;</td>
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<td>V360 camera</td>
<td>&quot;_v360&quot;</td>
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<td>RTXP 360 cylindrical</td>
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<tr>
<td>Icosahedron</td>
<td>&quot;_icosahedron&quot;</td>
</tr>
<tr>
<td>Octahedron</td>
<td>&quot;_octahedron&quot;</td>
</tr>
</tbody>
</table>

Streaming Standards Support

- MMT
- DASH

https://samsungmilkvr.com/portal/content/faq#video-types
II. OMAF Solutions
• Ea/E'a, Ev/E'v, Ei/E'i: audio bitstream, video bitstream, coded image(s)
• F/F': media file, including projection and region-wise packing metadata
• delivery related interfaces for DASH delivery & MMT delivery.
projected frame, packed frame and region-wise packing

- projected frame: frame that has a representation format specified by a 360 video projection format
- packed frame: frame that results from region-wise packing of a projected frame

aligned(8) class RectRegionPacking(i) {
    unsigned int(32) proj_reg_width[i];
    unsigned int(32) proj_reg_height[i];
    unsigned int(32) proj_reg_top[i];
    unsigned int(32) proj_reg_left[i];
    unsigned int(8)  transform_type[i];
    unsigned int(32) packed_reg_width[i];
    unsigned int(32) packed_reg_height[i];
    unsigned int(32) packed_reg_top[i];
    unsigned int(32) packed_reg_left[i];
}
Static Metadata

- Projected omnidirectional video box
  - the projection format
  - the orientation of the projection structure relative to the global coordinate system
  - the spherical coverage of the projected omnidirectional video (i.e., the area on the spherical surface that is represented by the projected frame).

- Fisheye omnidirectional video box

Timed metadata

- Regions on Sphere
- Initial viewpoint
- Recommended viewport

**great circle, pitch circle and yaw circle**

- **great circle**: intersection of the sphere and a plane that passes through the center point of the sphere.
- **azimuth circle**: circle on the sphere connecting all points with the same azimuth value
- **elevation circle**: circle on the sphere connecting all points with the same elevation value
Fisheye video

No projection & region-wise packing process

Parameters

- Lens distortion correction (LDC) parameters with local variation of FOV
- Lens shading compensation (LSC) parameters with RGB gains
- Displayed field of view information
- Camera extrinsic parameters
II. Next Steps
Potential Items

3DoF+ Interactivities
OMAF Developers’ Day

When: 2018. 1. 24 (121st MPEG meeting)
Where: Gwangju, Korea
More Information will be available soon
https://mpeg.chiariglione.org/
Thank You