

Cloud Rendering-based Volumetric Video Streaming System for Mixed Reality Services

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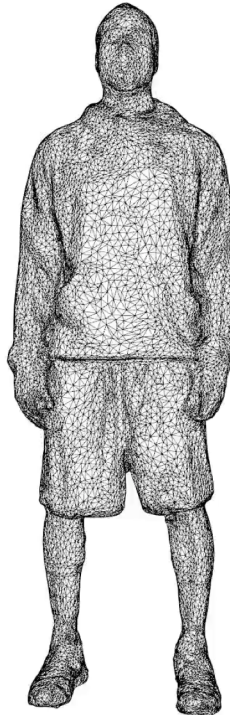
Presenter: Dimitri Podborski

Mesh-based volumetric video

Rendered result



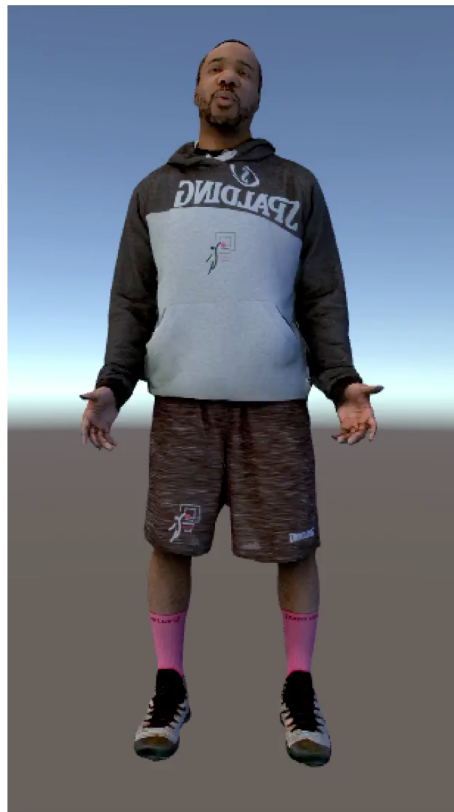
Meshes



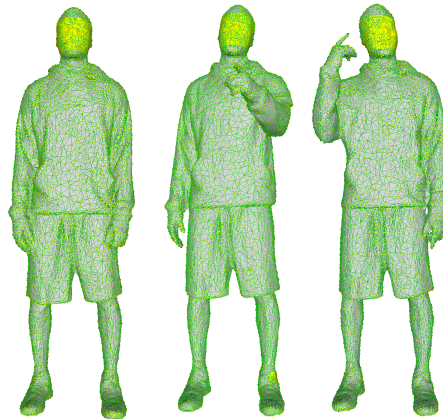
Textures



Volumetric video content preparation



Video
encoder



Mesh
encoder

Multiplexer

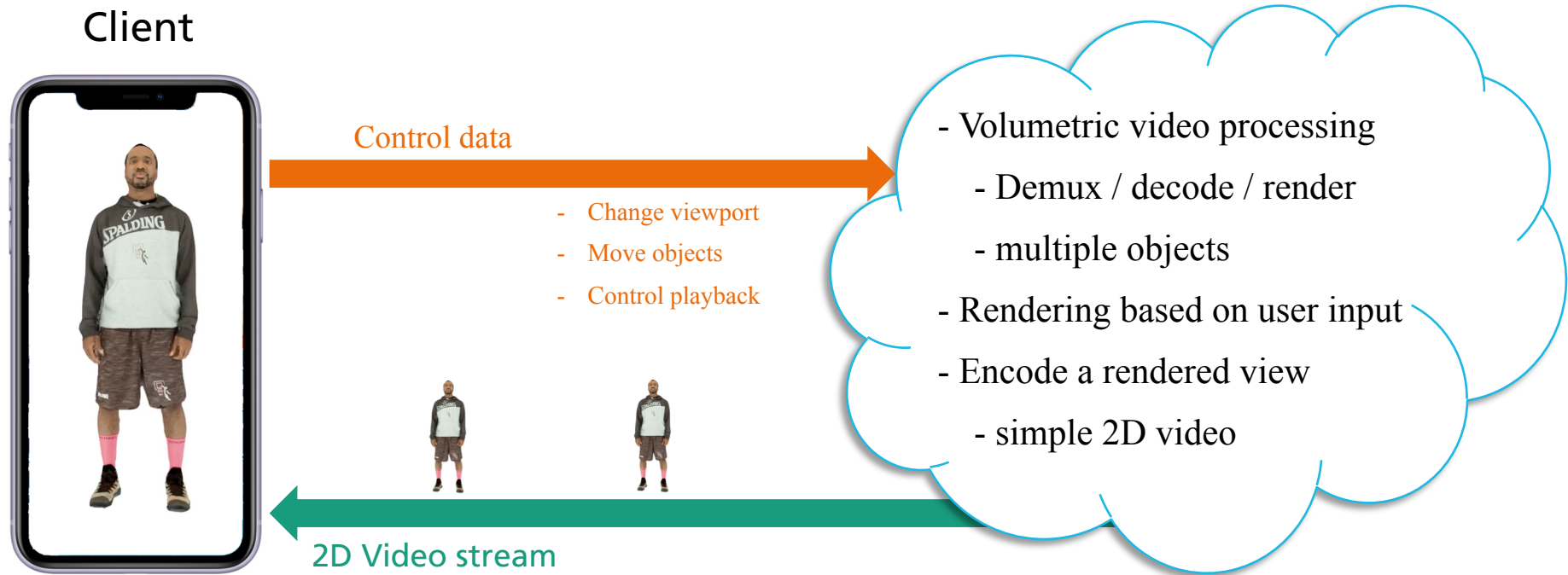
MP4 file

Processing challenges

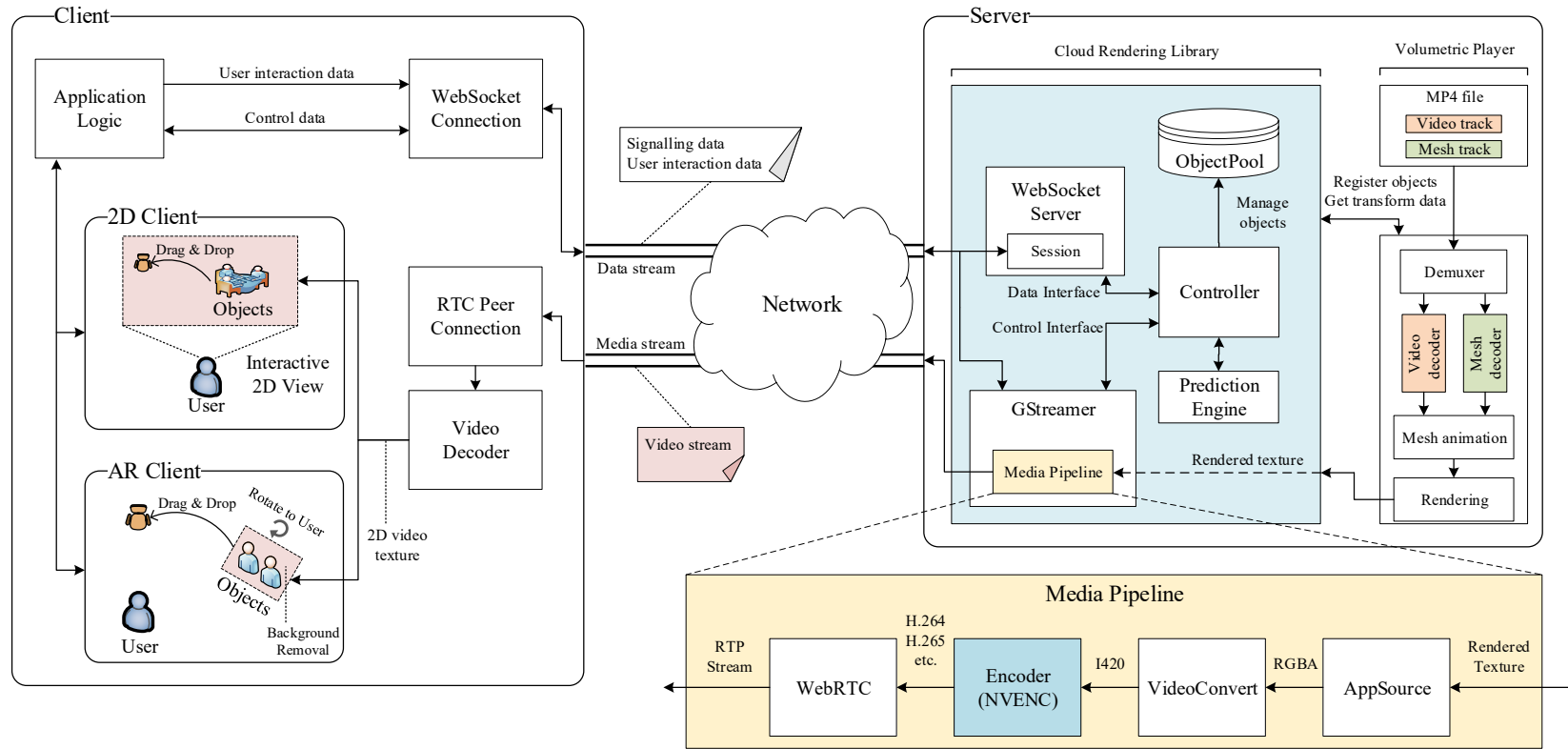
- No hardware decoders available
- Video-based point cloud compression
 - 3 decoder instances have to run in parallel
 - Sync issues
 - Frame drop issue
- Multiple volumetric objects
 - Not enough processing power on mobile devices
- Bitrates are still too high

Why do we need a cloud?

Cloud gives us “unlimited” power (Volumetric video processing + Cloud rendering)



Architecture overview



Everything comes with a price

Motion to photon **latency!!!**

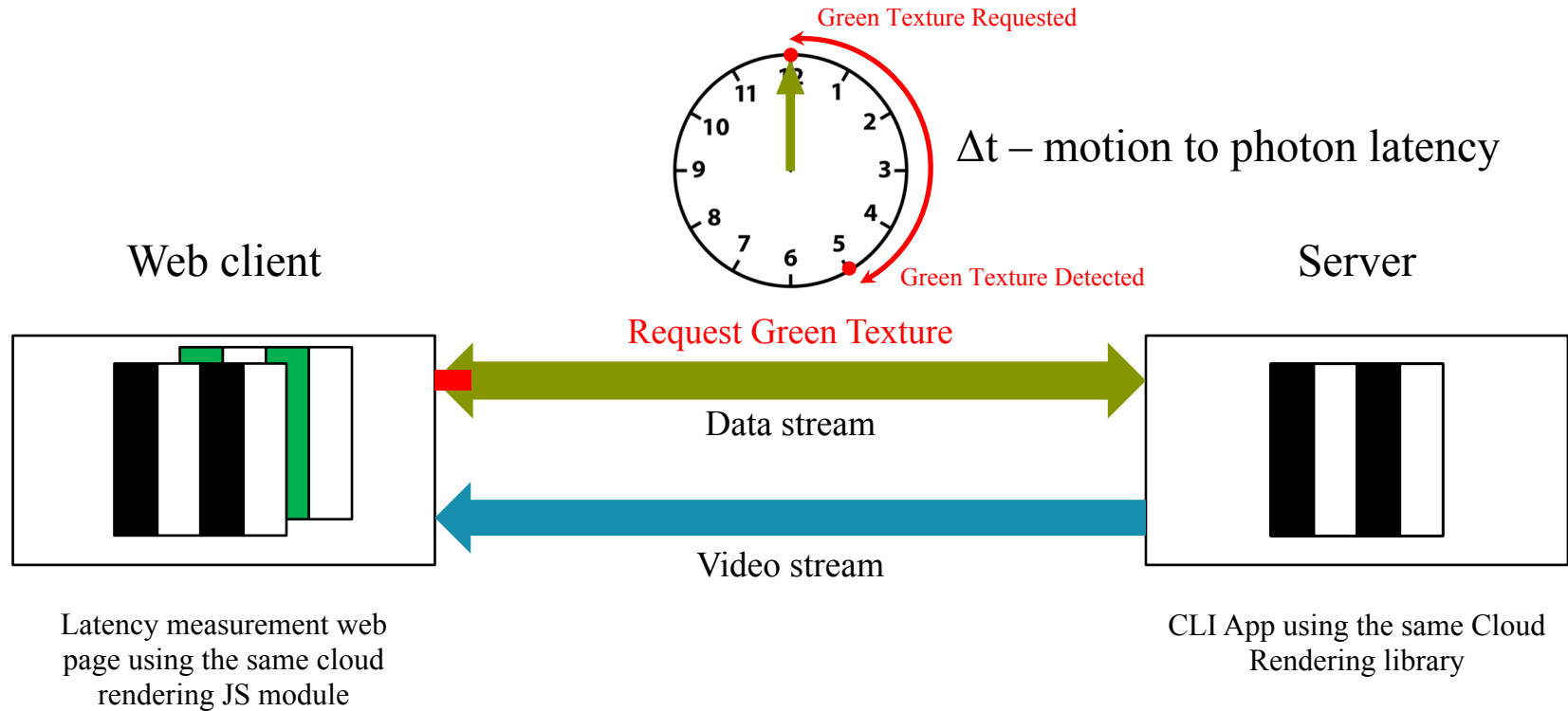
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- Send control data to the server
- The desired frame is rendered on client's device

Our good friends

- Hardware video encoding (NVIDIA Encoding API)
- WebRTC (ultra low latency streaming)
- 5G
- Viewport prediction
- Post-rendering correction

How to measure motion to photon latency



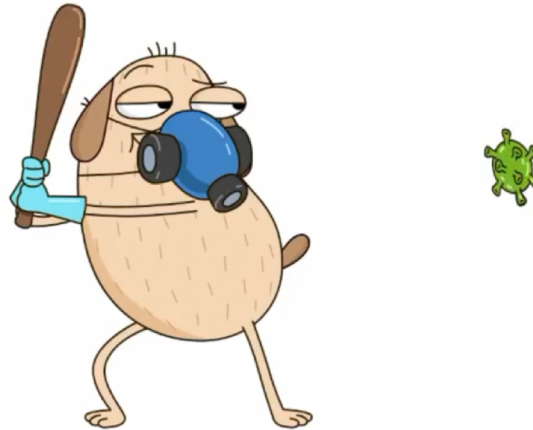
Demo time

Show the demo

Hololens client prototype



Stay healthy...



<https://www.instagram.com/p/B-jxFXBqOnj>