Transmitting volumetric video via Media over QUIC to subscribers with contradicting spatial and temporal preferences

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Motivation & Concept-

- Demands of real-time volumetric video challenge traditional transmission methods
- · Use Media over QUIC (MoQ) in an immersive teleconferencing system^[1] to enable a simpler architecture leveraging QUIC compared to WebRTC

Alice's Stereo Camera

Client A

Point A

Cloud A

Point A

Point A

Point A

Cloud A

Point A

Point A

Point A

Point A

Point A

Point A

Cloud A

Point A

Point

MoQ

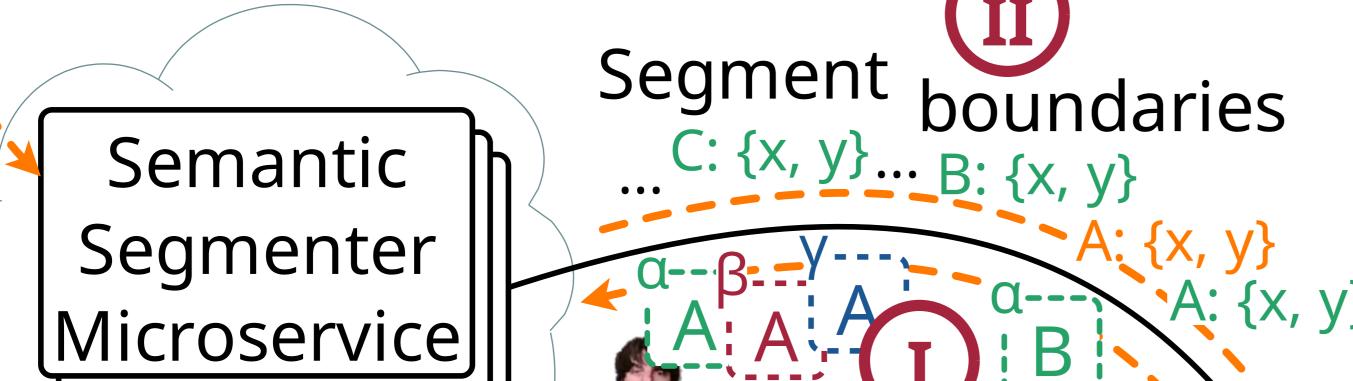
Client

- · Organize point cloud video into layers, bandwidth-limited users receive only a subset of data without the need for explicit bandwidth measurement
- · Capture point cloud (PC) frames with stereo camera
- · Split into α , β , γ layers of varying detail and information level based on sematic information gained at steps () (III)
- · Subscribe to every layer of every client
- Prefer higher spatial quality for improved body part detection
- · Use novel LINKED_TRACK extension to join groups of different tracks
- · Assemble incoming layers, convert to 2D
- Detect face and hands using MediaPipe
 Publish bounding box coordinates

scribers via the Relay Network
Non-trivial content mapping scheme:

· Publish layers to MoQ sub-

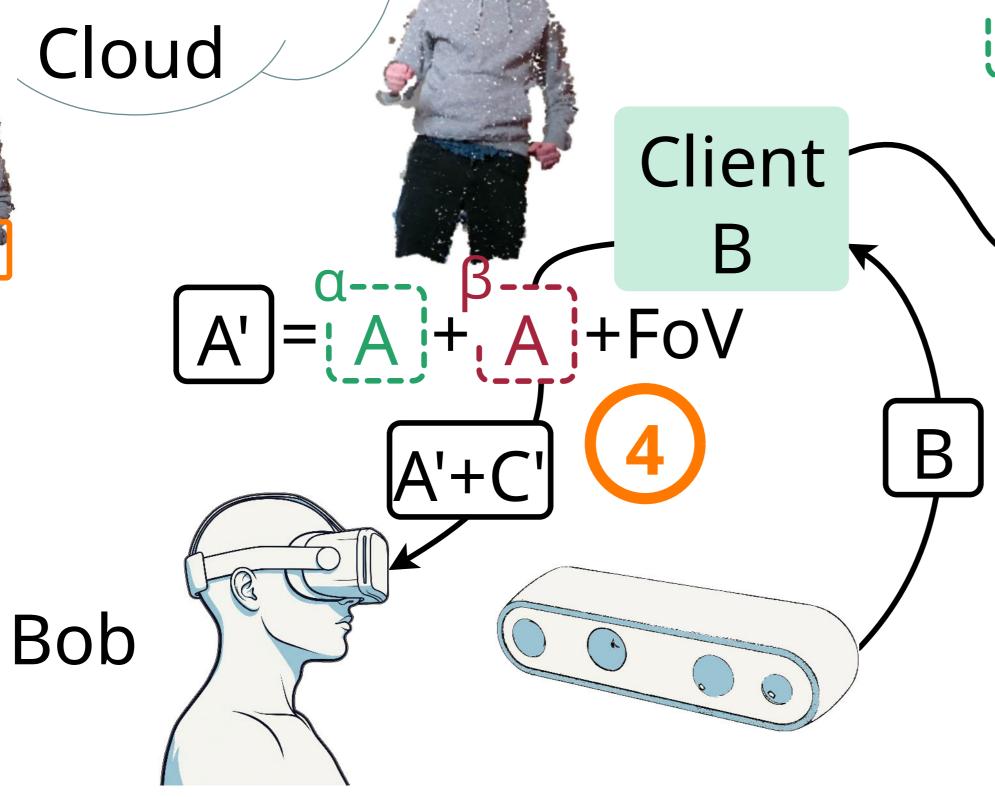
- · A Draco-encoded PC layer at a
- discrete timestamp is encapsulated as a single MoQ object
- Different detail levels via separate MoQ tracks: the relay tries to send the most recent objects from lower priority tracks only until a new higher priority object arrives
- No need for explicit bandwidth measurement and complex interlayer synchronization



· All participants prefer higher temporal quality

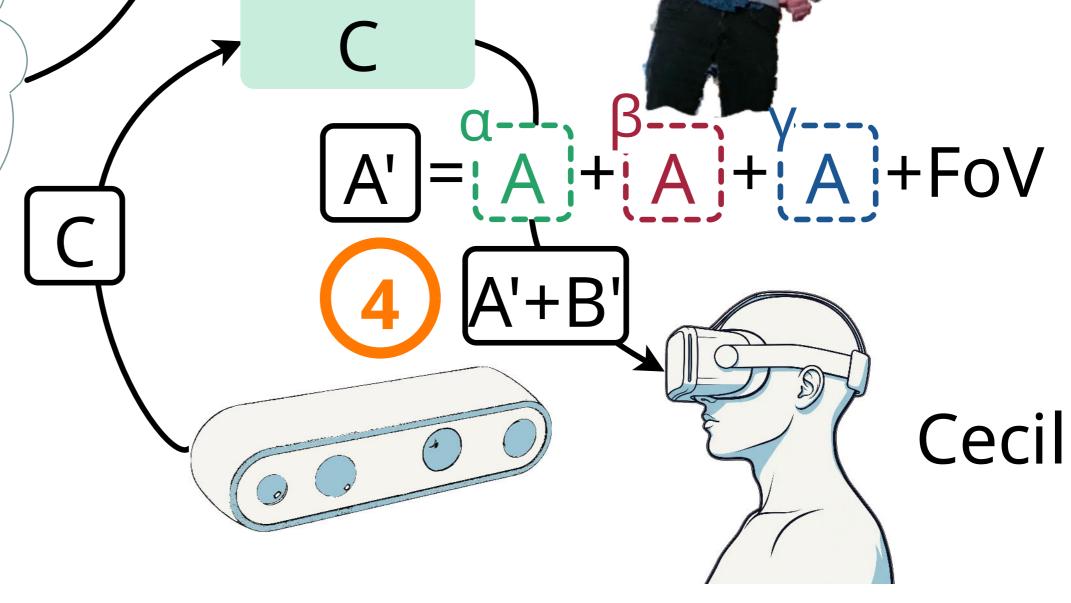
References [1] M. De Fré, J. van der Hooft, T. Wauters, F. De Turck, "Demonstrating Adaptive Many-to-Many Immersiv

"Demonstrating Adaptive Many-to-Many Immersive Teleconferencing for Volumetric Video." In ACM MMSys '24. 2024.



MoQ Relay Network

B



Client







