Media Operations Use Case for an Augmented Reality Application on Edge Computing Infrastructure

draft-ietf-mops-ar-use-case-08

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Sections 3.1 and 5.1 have been updated

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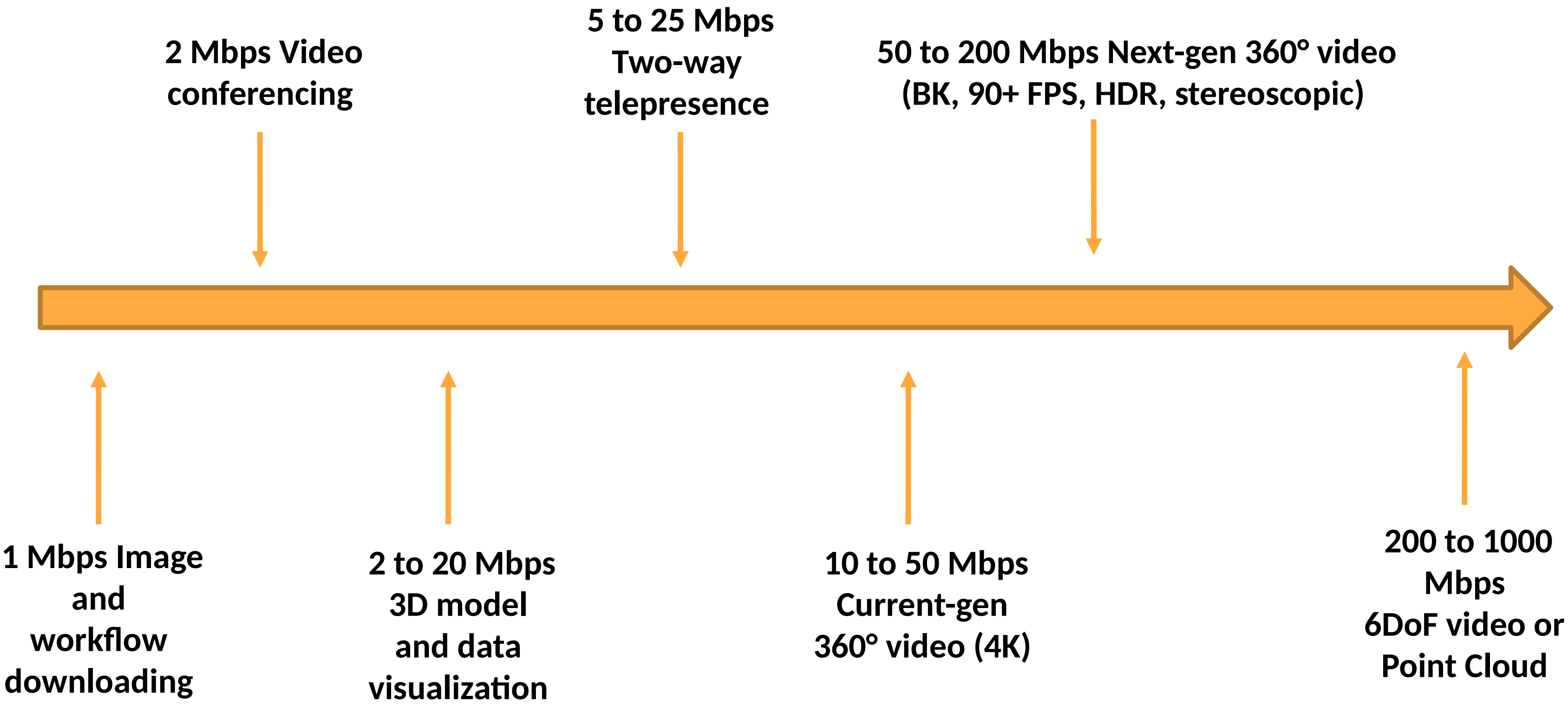
Section 3.1 Update

- We have elaborated the techniques to acquire a model of the real world (Thanks to Cullen Jennings):
  - An annotated point cloud-based model.
  - A model based on polygon mesh and texture mapping technique.
  - A model based on light field which is a table called environment map that describes the intensity or color of the light rays arriving at a single point from arbitrary directions.

Section 5.1 Update

- We have elaborated the AR traffic workload characteristic that operators will have to support in use cases such as ours:
  - Both uplink and downlink traffic to a UE device has parameters such as volume of XR data, burst time, and idle time that are heavy tailed. If multiple XR device users are accessing the wireless link to the closest edge server as in our use case, the **heavy tailed sources get aggregated into long range dependent traffic**. Such traffic can have long bursts and various traffic parameters from widely separated time can show correlation. **As a result, the edge servers to which multiple XR devices are connected wirelessly could face long bursts of traffic**. Thus, the provisioning of edge servers in terms of the number of servers, the topology, where to place them, the assignment of link capacity, CPUs and GPUs should keep the above factors in mind.

Now for some numbers! [1]



More Numbers! [2]

Application	Expected E2E Latency	Expected Data Capacity	Possible Implementations/ Examples
AR based remote surgery with uncompressed 4K (3840x2160 pixels) 120 fps HDR 10-bit real-time video stream [3]	<750 µs	> 30 Gbps	World's first remote surgery over 5G [4]
Mobile AR based remote assistance with uncompressed 4K (1920x1080 pixels) 120 fps HDR 10-bit real-time video stream[3], [5]	< 10ms	> 7.5 Gbps	Assisting maintenance technicians, Industry 4.0 remote maintenance, remote assistance in robotics industry[6]-[9]
Indoor and localized outdoor navigation [1],[5]	< 20ms	50-200 Mbps	Theme Parks, Shopping Malls, Archaeological Sites, Museum guidance [10]-[13], [14]
Cloud-based Mobile AR applications	< 50ms	50-100 Mbps	Google Live View [15], AR-enhanced Google Translate [16]

Next Steps?

The Github repo is here (Many Thanks to Kyle Rose) :

https://github.com/ietf-wg-mops/draft-ietf-mops-ar-use-case

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