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

draft-ietf-mops-ar-use-case-03
Renan Krishna, Akbar Rahman

Virtual MOPS WG IETF-112 Meeting, November 2021
Draft’s Table of Contents

Table of Contents

1. Introduction ................................................................. 2
2. Conventions used in this document ...................................... 3
3. Use Case ................................................................. 3
   New 3.1. Processing of Scenes .......................................... 3
   Update 3.2. Generation of Images ...................................... 4
4. Requirements ............................................................. 4
   New 5. AR Network Traffic and Interaction with TCP ................ 6
   Update 6. Informative References ...................................... 7
Authors' Addresses ......................................................... 10
Updates

• In sub-section 3.1, we have added the notion of AR data processing pipeline and the sub-section has been reorganized accordingly.

• We have added section 5 where we summarize the network characteristics of AR application traffic as well as TCP’s interaction with 4G LTE network carrying AR traffic.
The AR Data Processing Pipeline: a brief sketch

• We restructure section 3 around the pipeline of three consecutive subtasks namely tracking, followed by an acquisition of a model of the real world, and finally registration.
  • Tracking: This includes tracking of the three-dimensional coordinates and six-dimensional pose (coordinates and orientation) of objects in the real world [AUGMENTED].
  • The tracked natural features are used to develop an annotated point-cloud based model.
  • Finally, the coordinate systems, brightness, and color of virtual and real objects need to be aligned in a process called registration [REG].
AR Network Traffic and Interaction with TCP

• The uploading of data from an AR device to a remote server for processing dominates the end-to-end latency.

• A lack of visual features in the grid environment can cause increased latencies as the AR device uploads additional visual data for processing to the remote server.

• AR applications tend to have large bursts that are separated by significant time gaps. As a result, the TCP congestion window enters slow start before the large bursts of data arrive increasing the perceived user latency. The study [AR_TRAFFIC] shows that segmentation latency at 4G LTE (Long Term Evolution)'s RAN (Radio Access Network)'s RLC (Radio Link Control) layer impacts TCP's performance during slow-start.
• Many Thanks to Spencer Dawkins and Rohit Abhishek for providing feedback on the mailing list.

• Reviewers and contributors are invited to improve the draft. The Github repo is here (Many Thanks to Kyle Rose): https://github.com/ietf-wg-mops/draft-ietf-mops-ar-use-case
Informative references

