Rebera: Real-time Bandwidth Estimation and Rate Adaptation for Video Calls over Cellular Networks
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- Challenge: accurate available bandwidth measurement and rate adaptation for video calls over volatile cellular links
- Model the cellular links as isolated queues => use video frames as packet trains to measure the average available bandwidth
- Forecast the future bandwidth from past values and determine the safest max sending rate
- If encoded video exceeds the rate determined, drop selected frames to minimize quality impact
- Use temporal scalable video coder to enhance error resilience and reduce frame rate variation
- We implemented the entire end-to-end video call system (Rebera) over Linux
- In our emulations/experiments, Rebera has 8-16% more available bandwidth utilization and 100-150 msec less frame delay than Apple’s FaceTime
- Adopted in recent release of WeChat, #1 social media APP in China, improving video call quality of WeChat’s 570M daily active users