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## Begin with the End in Mind: A Unified End-to-End Quality-of-Experience Monitoring, Optimization, and Management Framework

By Zhou Wang and Abdul Rehman

There has been an increasing consensus in the video distribution industry that the design and operation of the complete video delivery chain need to be driven by the quality of experience (QoE) appropriate to the end users.

Here, we propose a new framework that uses a unified end-to-end solution to produce consistent QoE scores at all points along the delivery chain under the same evaluation criterion. This is a framework that produces a clear picture instantaneously to operation engineers, managing executives, and content creators about how video QoE degrades along the chain; a framework that allows immediate issue identification, localization, and resolution; a framework that enables quality and resource usage optimization; and a framework that provides reliable predictive metrics for long-term strategic resource and infrastructure allocations. The main challenge in the implementation of such a framework is to create a unified QoE metric that not only accurately predicts human QoE but is also lightweight and versatile, readily plugged into multiple points in the video delivery chain. We show that the SSIMPLUS metric offers the best promise, and we demonstrate the benefits of the proposed framework and QoE metric using bandwidth optimization as an example.



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