



IPTV Deployment: Performance Planning and Management Architecture

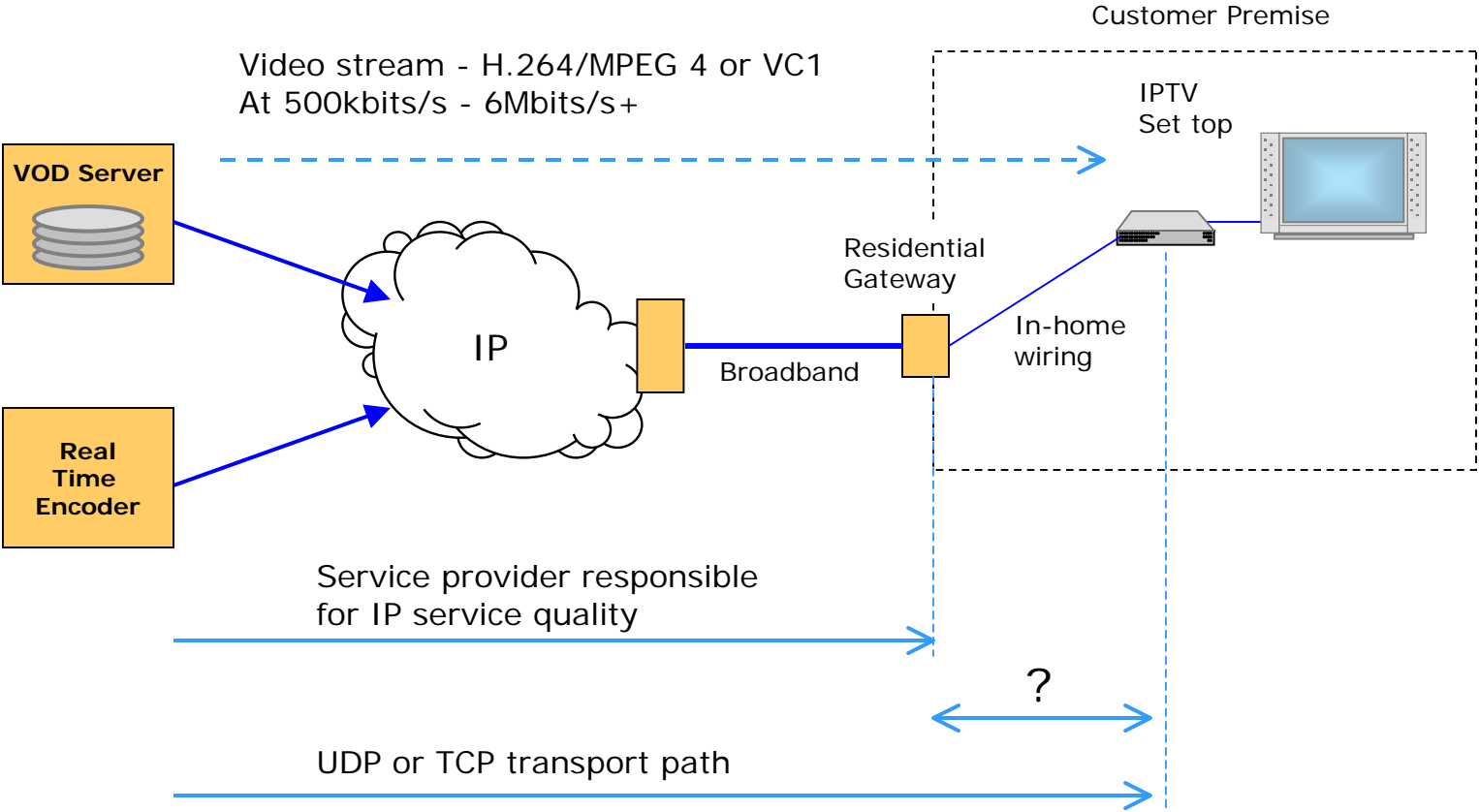
Alan Clark

CEO, Telchemy

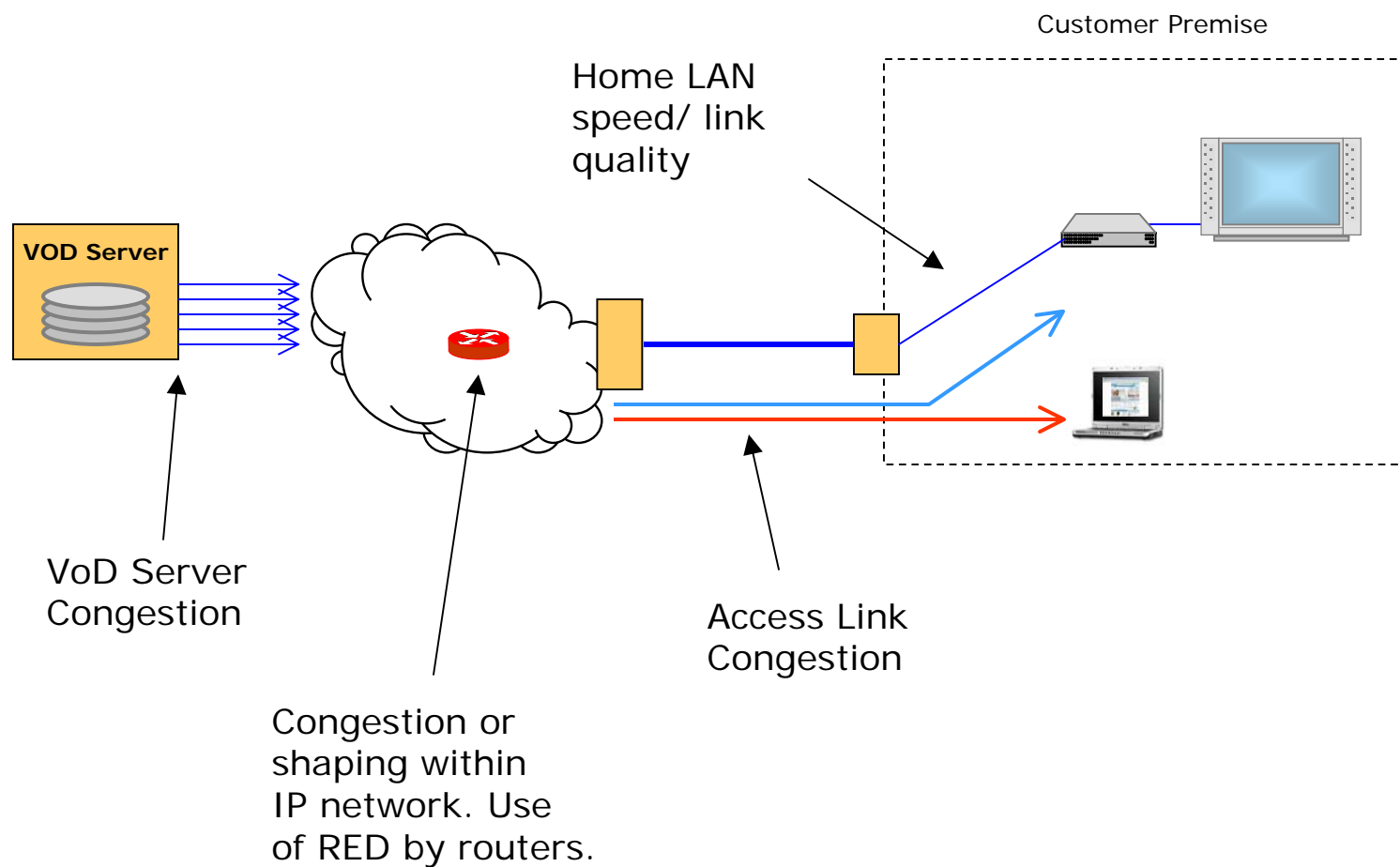
Outline

- IPTV Delivery Architecture
- Problems affecting performance
- IPTV performance management architecture

IPTV System Overview



Potential problem areas



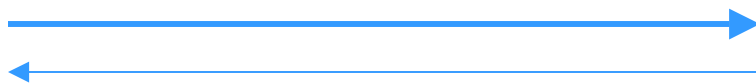
Delivery Models

MPEG Transport over UDP



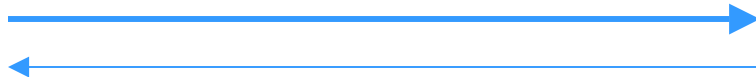
Packet loss leads to video quality degradation

TCP Streaming



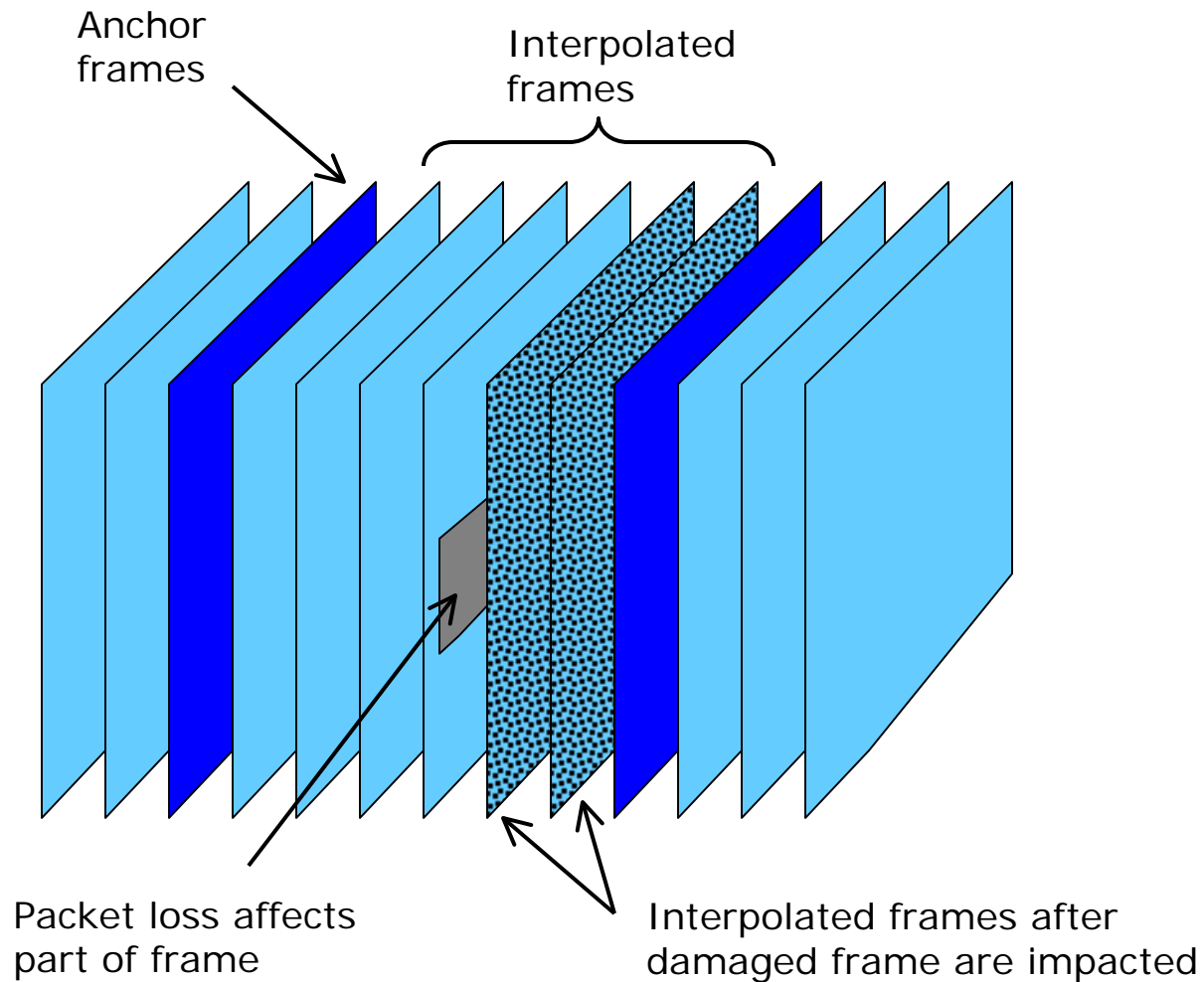
Packet loss leads to gaps in video playout.
Set top box needs more buffer memory.

Bulk download

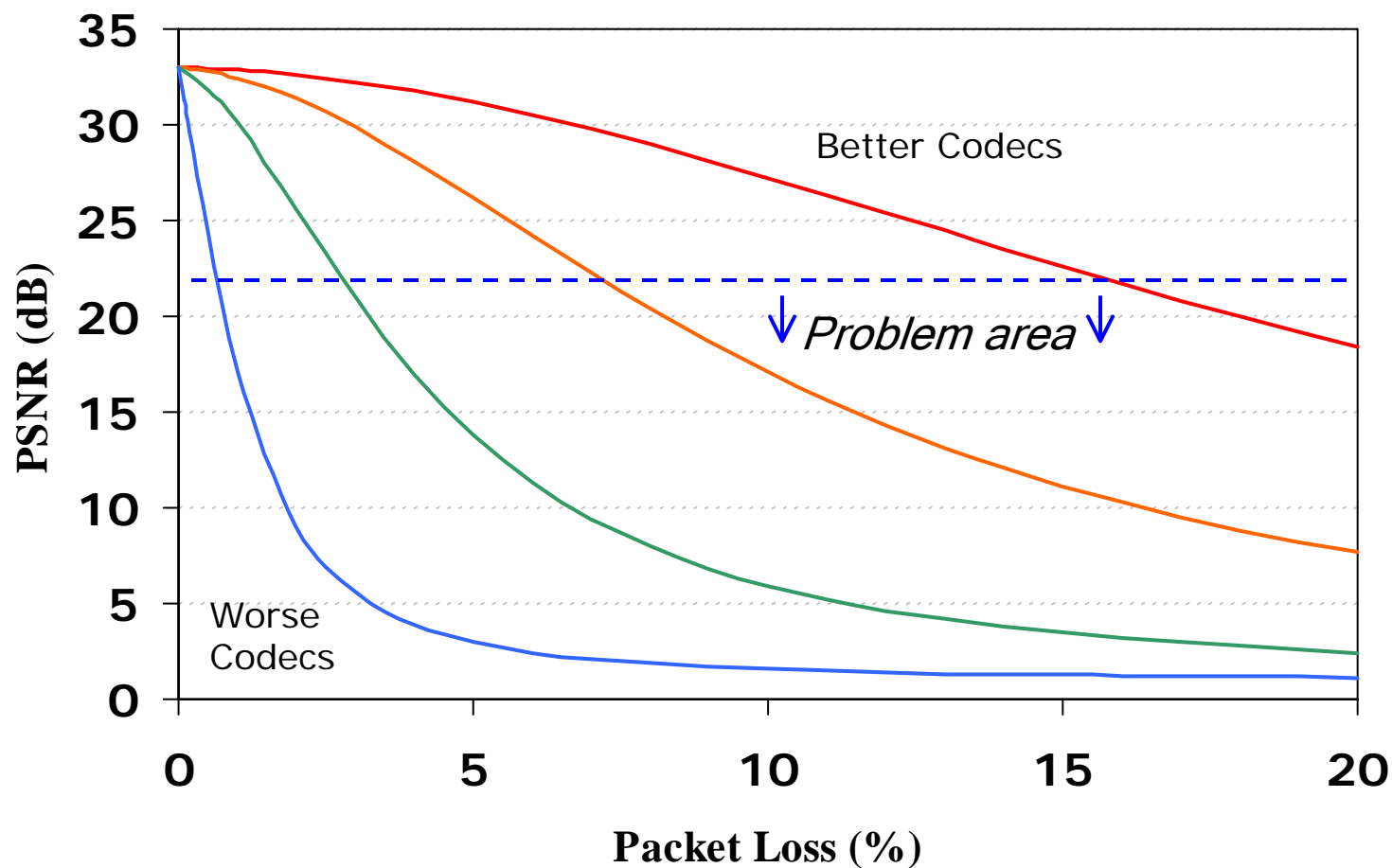


Delay in starting playback.
Set top box needs mass storage.

Effects of packet loss on decoded video

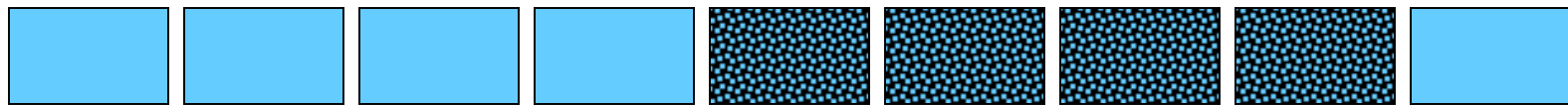


Codec Performance vs Packet Loss



Impact of loss/congestion on video stream

Video over UDP - impact of lost packets on video quality



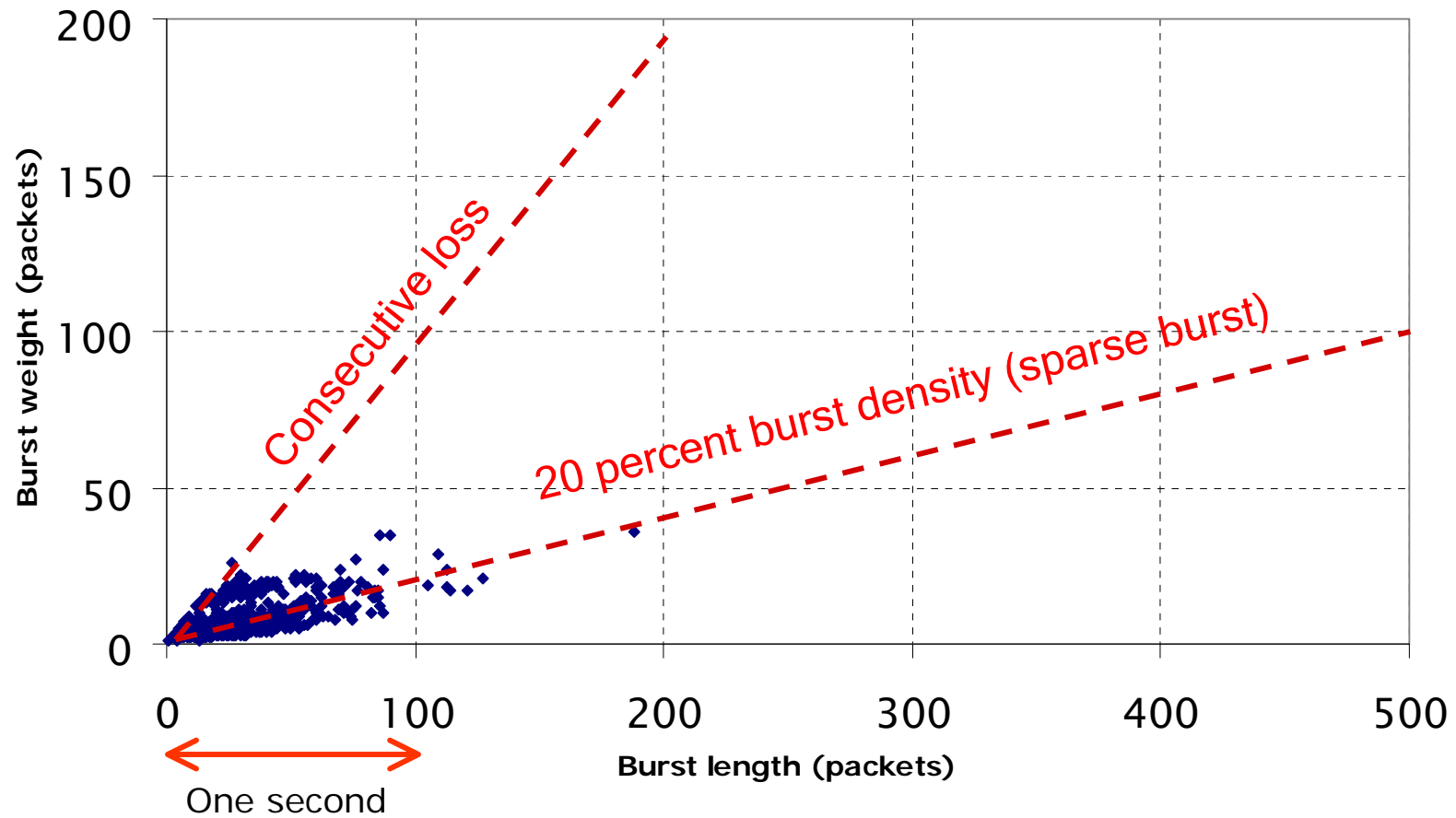
Video over UDP - server congestion leads to gaps in playout



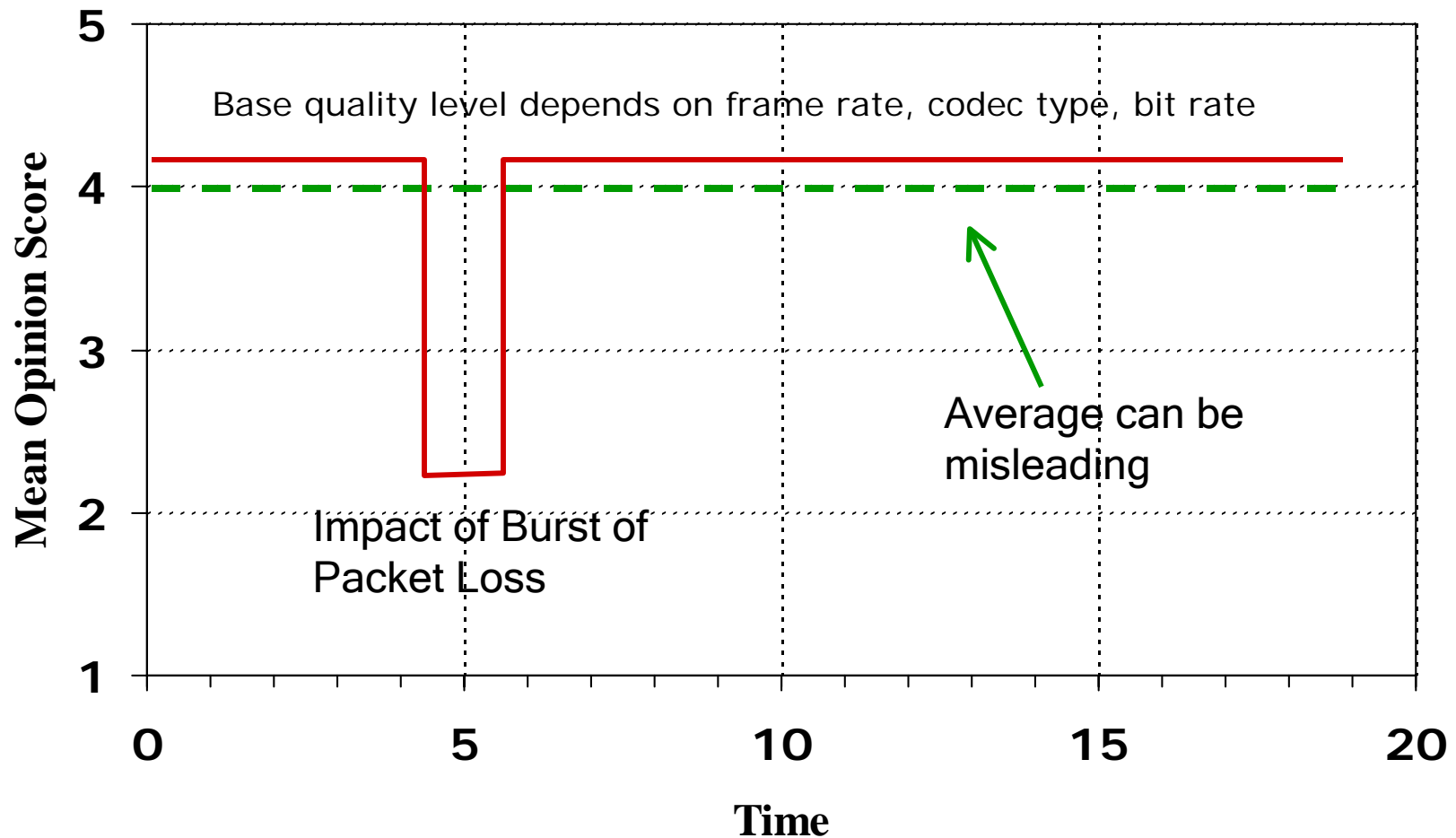
Video over TCP - impact of lost packets leads to gaps in playout



Example Packet Loss Distribution

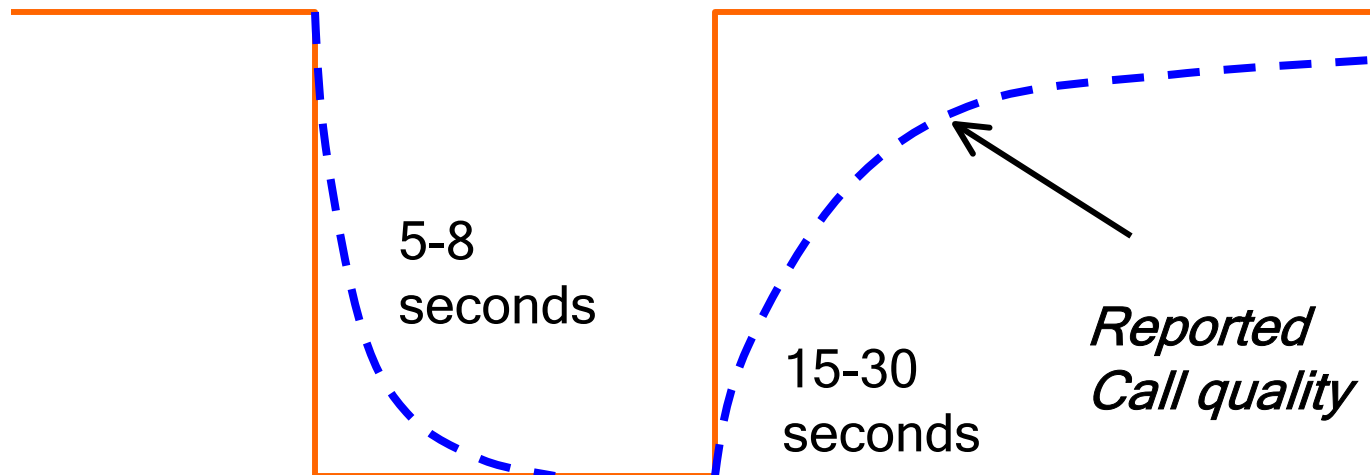


Leads to time varying quality (or gaps for TCP)



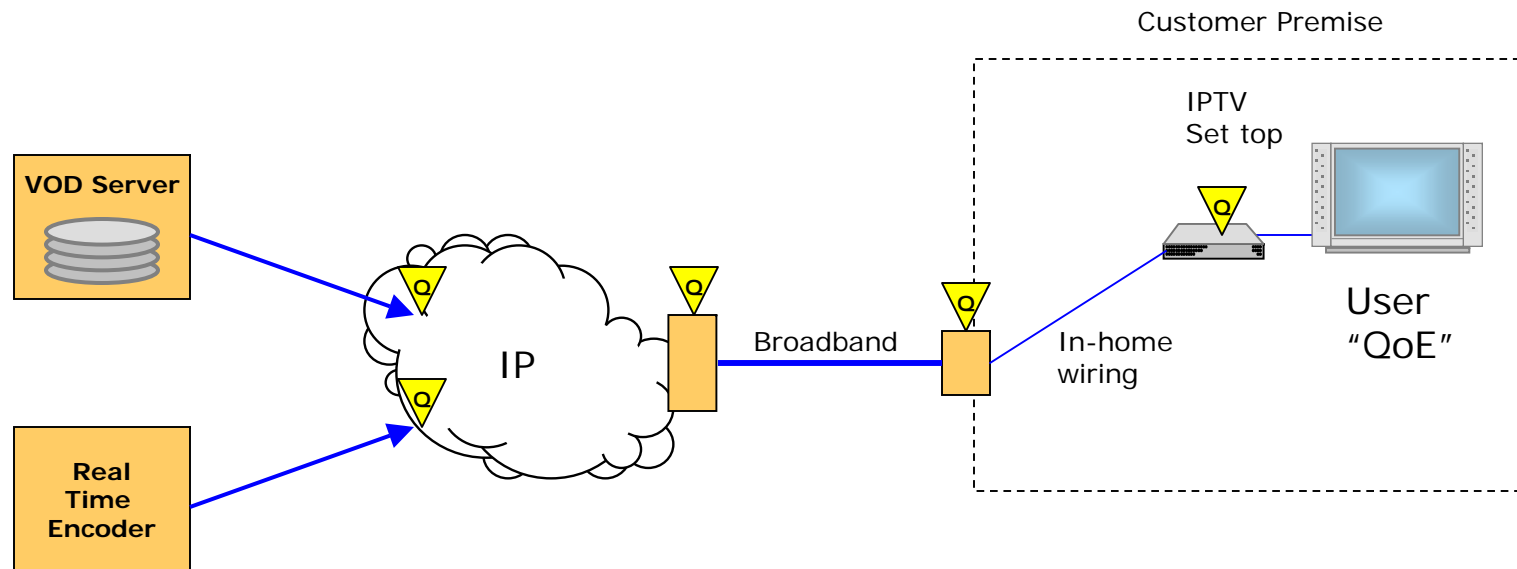
Perceptual effects of changing quality


Good quality most of the time



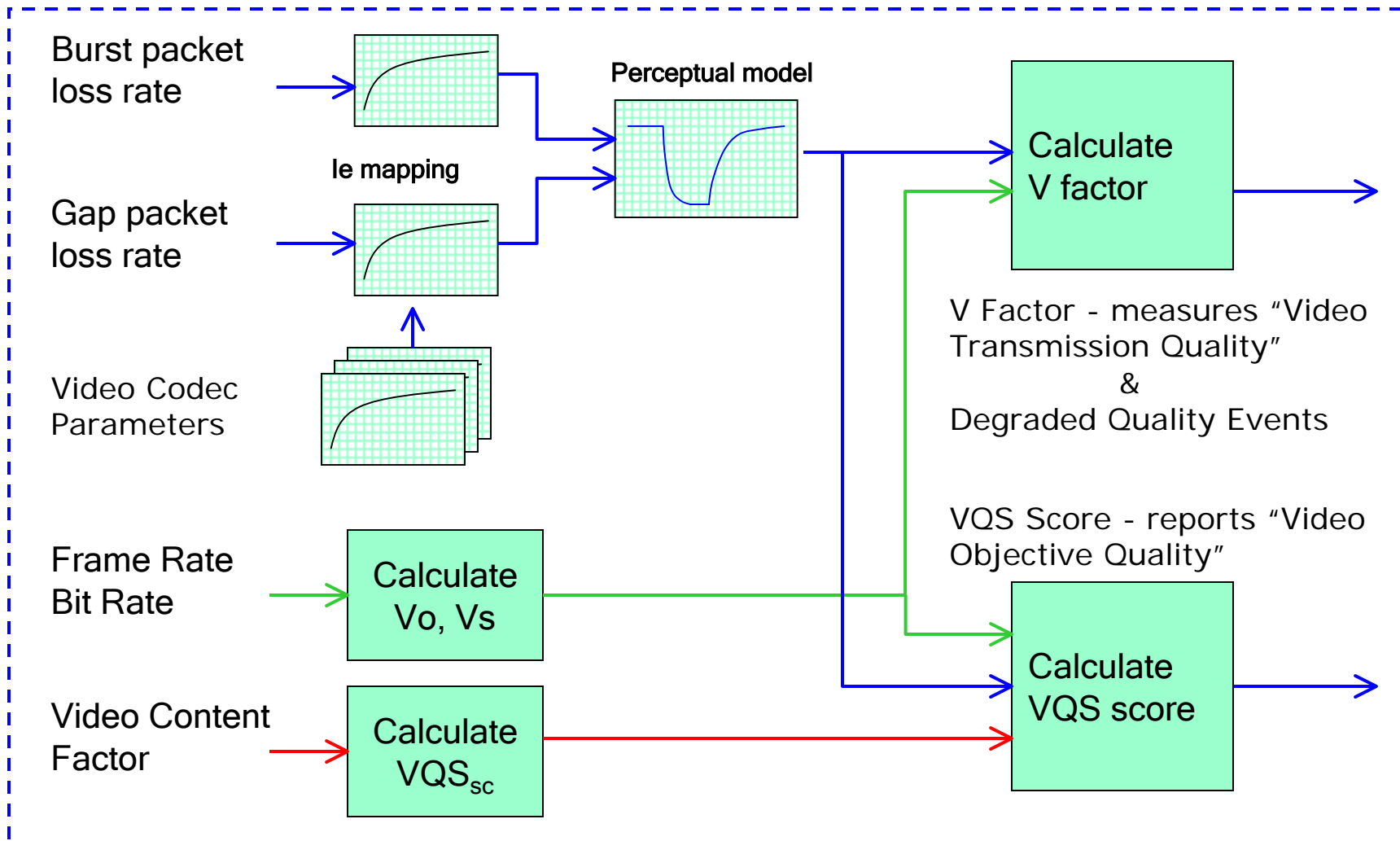
Poor quality during burst of loss/discards

IPTV Performance Management



-  Non-intrusive IPTV performance management function
- IPTV video transmission quality
 - IPTV control function performance

Video transmission quality monitoring with VQmon/SA-VM



Content dependency

- Motion vs bandwidth or distortion
 - High motion = higher bandwidth or more blur
- Visibility of impairments
 - Small impairments less visible in certain types of video stream
- Emotional aspects
 - Final ball in final game in MLB playoffs

Summary

- Successful IPTV deployment requires a focus on Quality of Experience (QoE)
- Need to
 - Measure video transmission performance at key points along the transmission path
 - Measure IPTV control protocol performance
- One key group working in this field - ATIS IPTV Interoperability Forum (IIF) QoS task force