



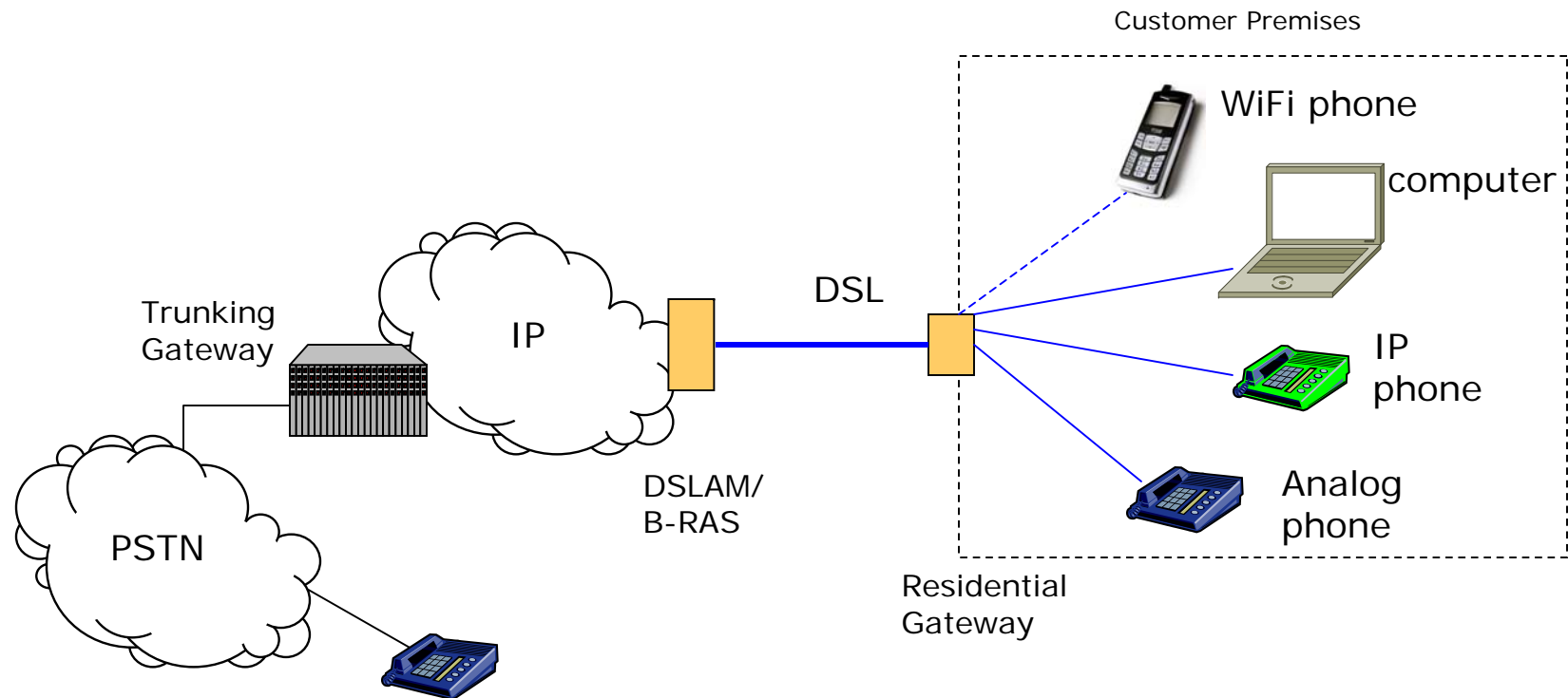
Managing Residential VoIP and IPTV Services

Paul McMenamin

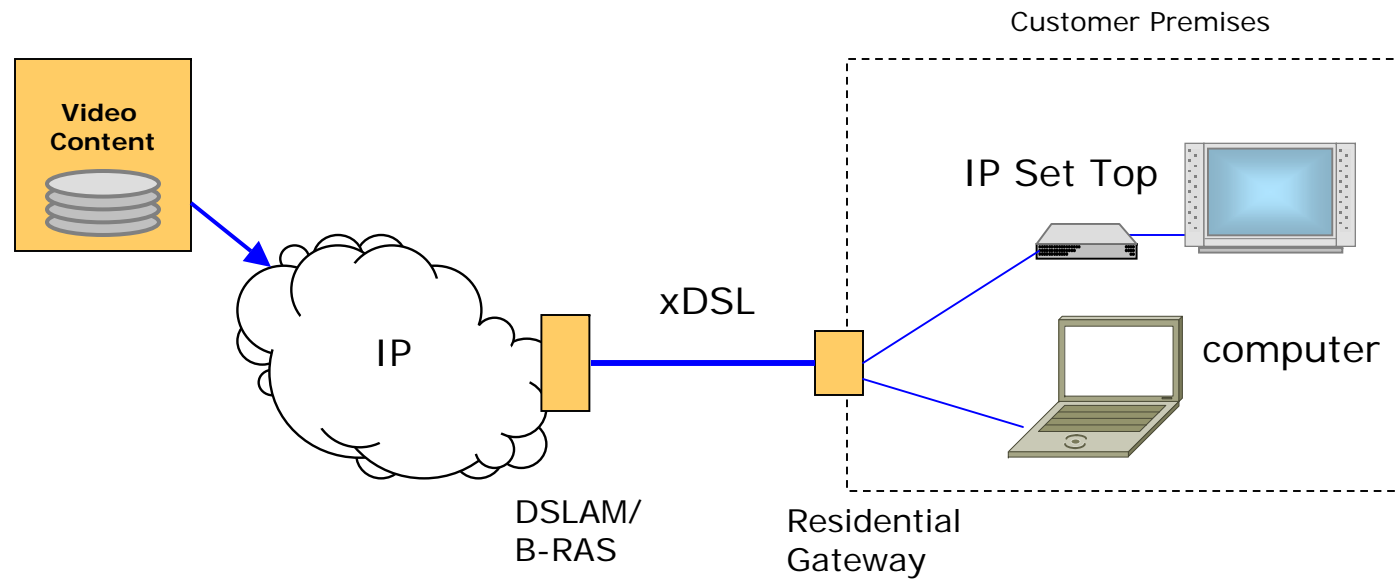
VP Product Development, Telchemy

Broadband World Forum, Fall 2006

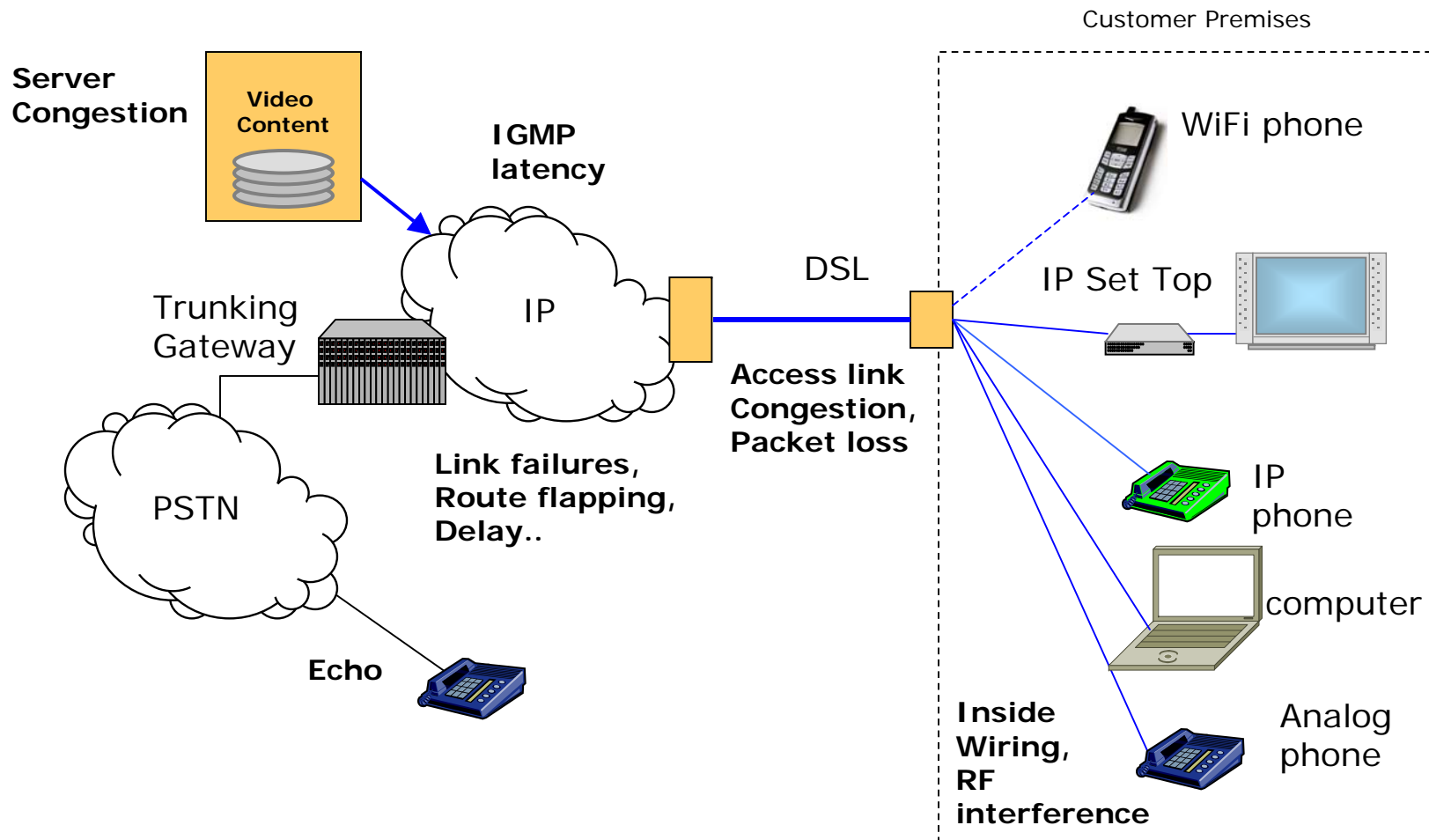
Triple Play Architecture - VoIP



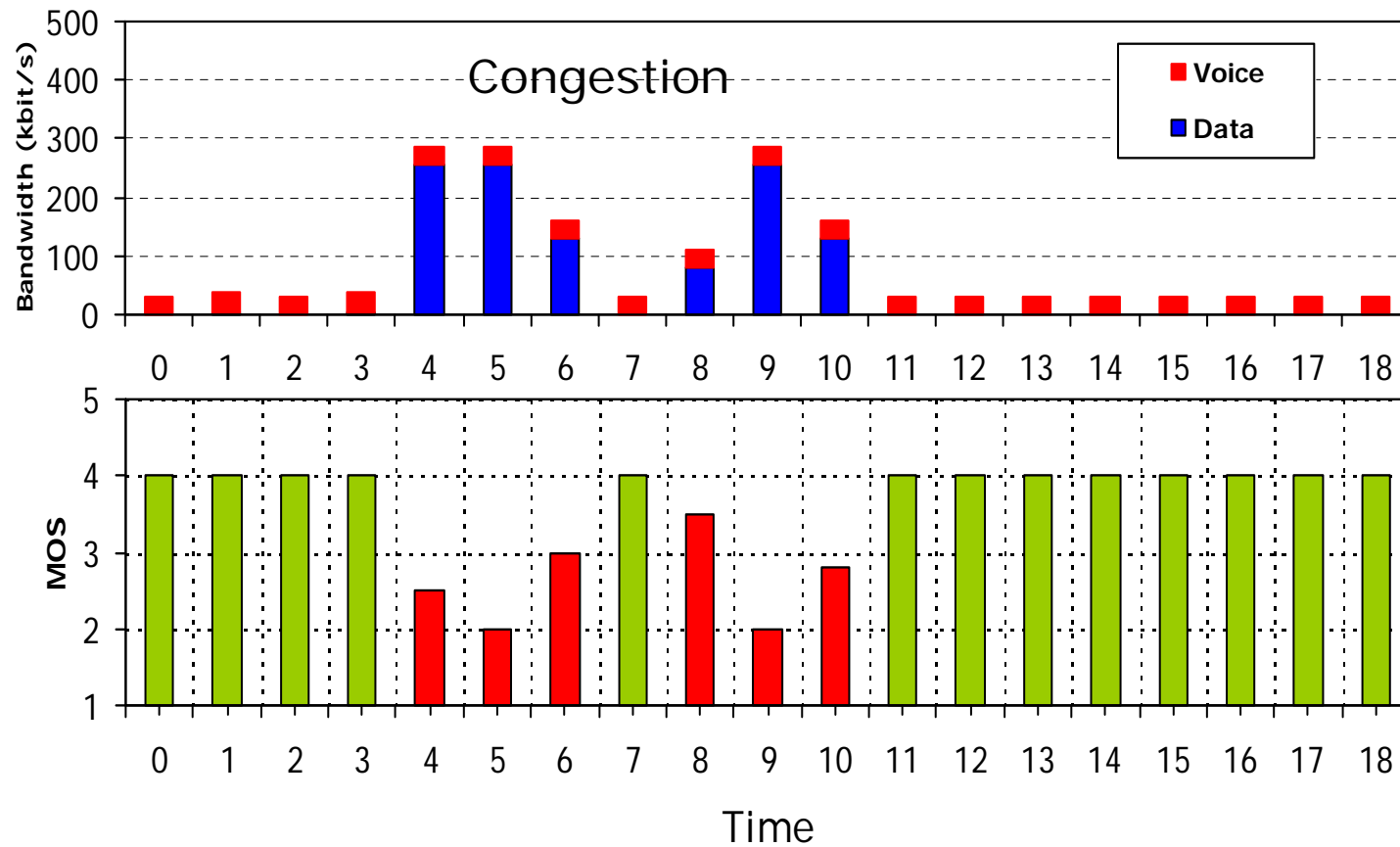
Triple Play Architecture - IPTV



Triple Play - Issues and Problems



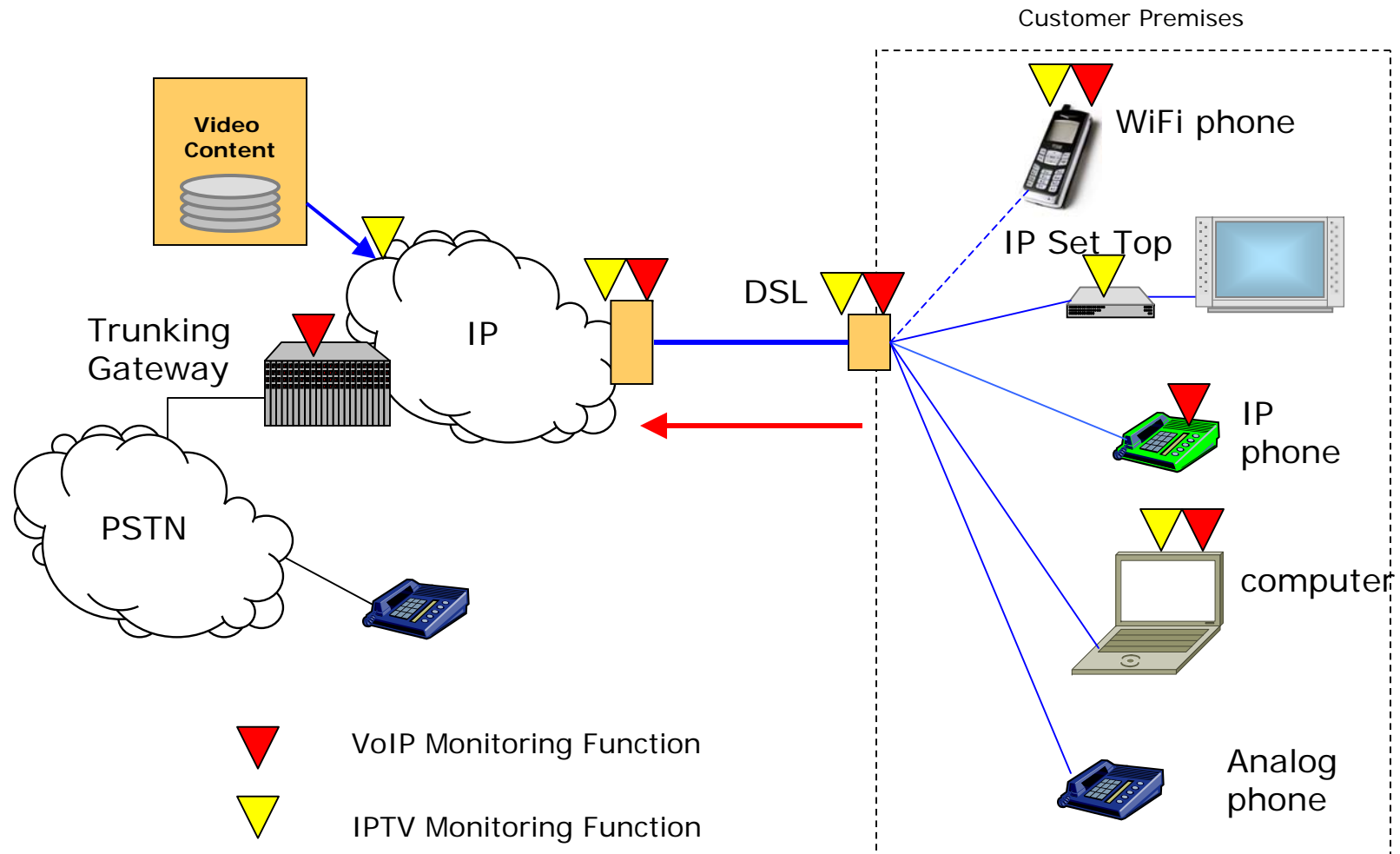
IP problems are transient



Key factors in monitoring VoIP/IPTV QoE

- Many problems are transient
 - Only way to detect is continuous monitoring
 - Reporting average loss/ jitter/ quality can mislead
- Problems often occur in the last mile/ customer premise
 - Only way to detect is to embed monitoring functionality into CPE
 - Need efficient push model for data collection
 - Information from the embedded agent to receiver

Triple Play - Monitoring Architecture



RTCP XR based protocols

RTCP XR
VoIP Metrics

High level QoE metrics (MOS)

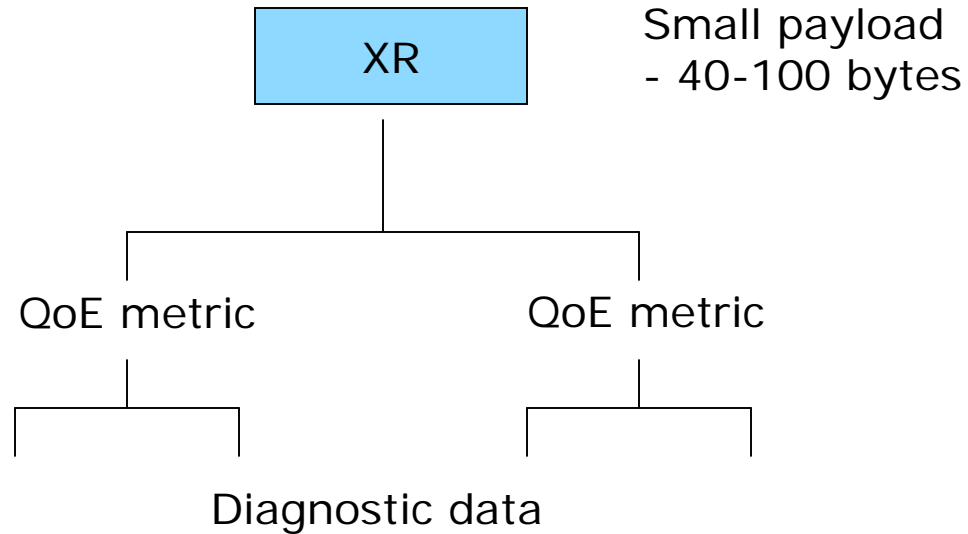
Detailed information on packet loss
distribution

RTCP XR
Video Metrics

Signal related metrics extracted from
decoder

RTCP XR used as the basis for many other QoE/QoS reporting protocols

RTCP XR objectives



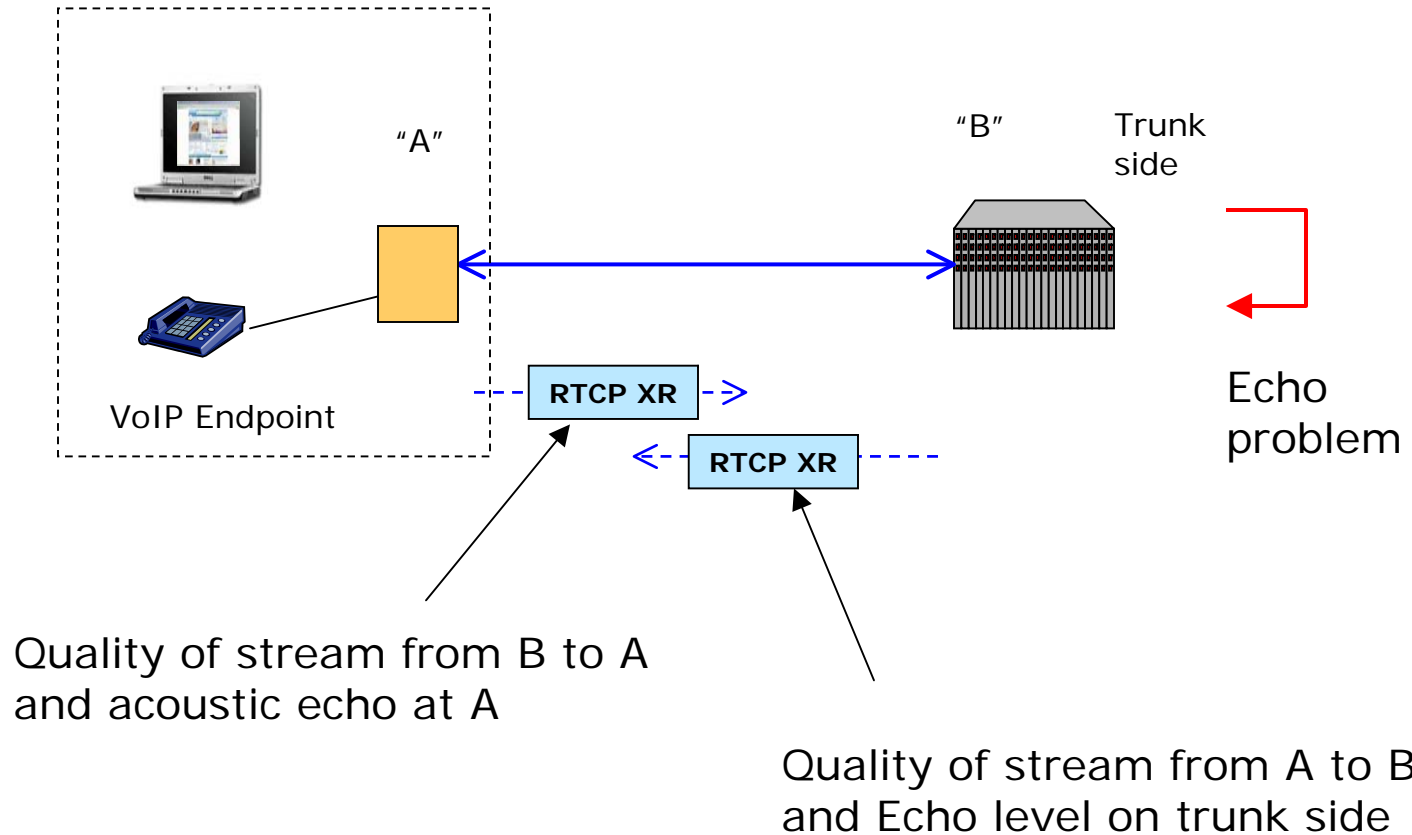
Informative enough to support post-analysis for problem identification

Small enough to capture for every call/ stream

RFC3611 - RTCP XR VoIP Metrics

- Packet statistics
 - Loss rate, discard rate
 - Burst length/ density, Gap length/ density
- Delay metrics
 - Network round trip delay
 - End system internal delay
- Signal related
 - Signal level, noise level, echo level
- QoE scores
 - R factors and MOS scores
- Configuration
 - Jitter buffer configuration

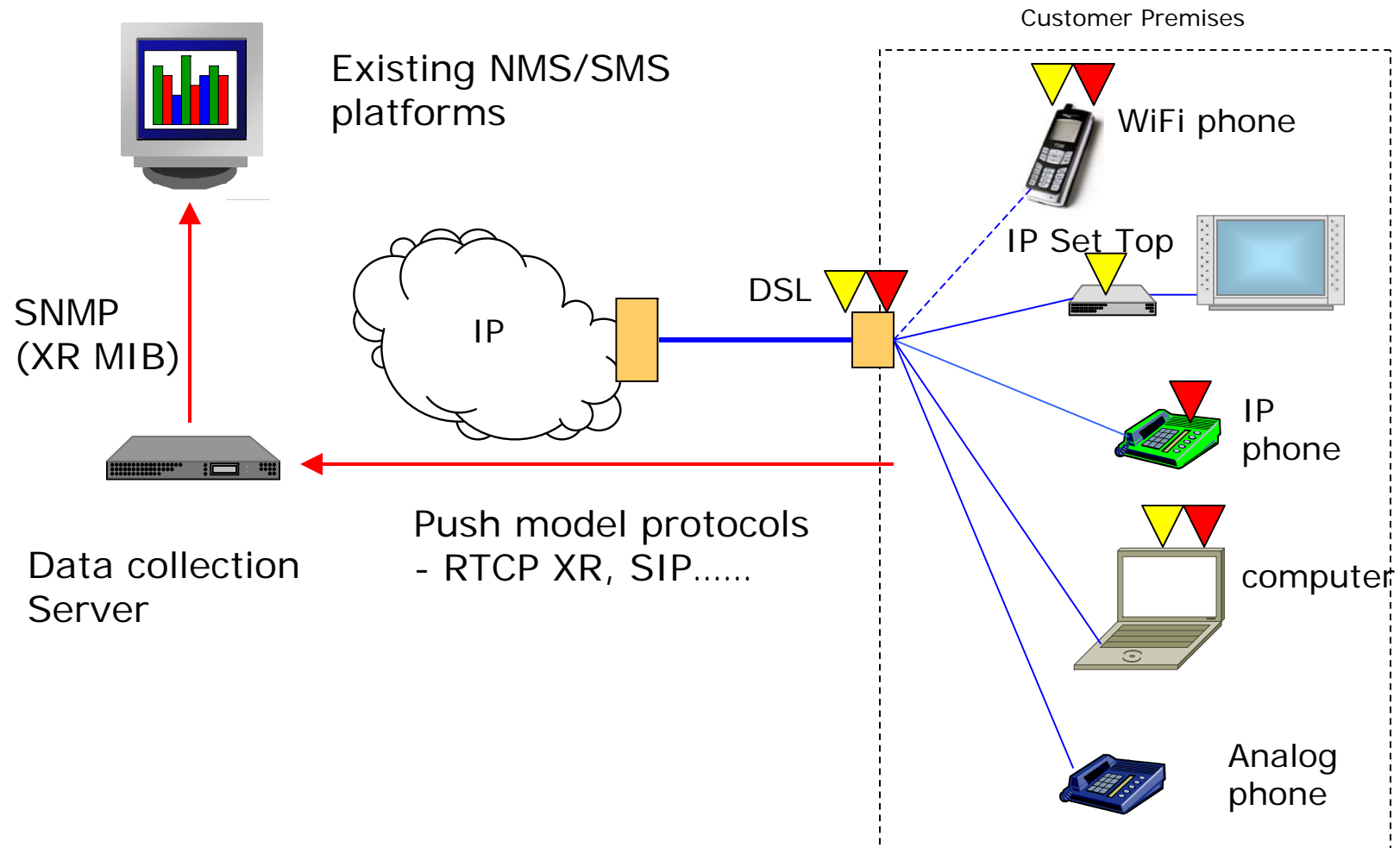
RTCP XR VoIP Metrics Application



RTCP XR Video Metrics

- IP statistics
 - Packet loss rates before and after FEC
- Video transport metrics
 - RTP and MPEG-Transport metrics
 - Burst/Gap metrics
 - Jitter levels
- QoE metrics
 - Transport quality metrics
 - MOS scores for Audio, Video, Audio-Video
 - Control plan quality metric
- Video stream metrics
 - I, B, P frame counts
 - Playout gaps
- Configuration

Triple Play - Monitoring Architecture



Summary

- Optimum approach to VoIP/IPTV service quality management:
 - Embedded service quality monitoring “agents” in residential gateways, IP Set Top Box, VoIP devices
 - Use advanced QoE monitoring functionality that can detect transient IP problems and report impact on perceptual quality
 - Use lightweight push model protocols to collect and aggregate data from endpoints
- Good news!!
 - Technology exists to do this
 - Protocols already defined in ITU, IETF,....
 - Already widely used for VoIP (4 million+ endpoints)
 - IPTV technology is in test equipment and moving into the network



Thank you

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