



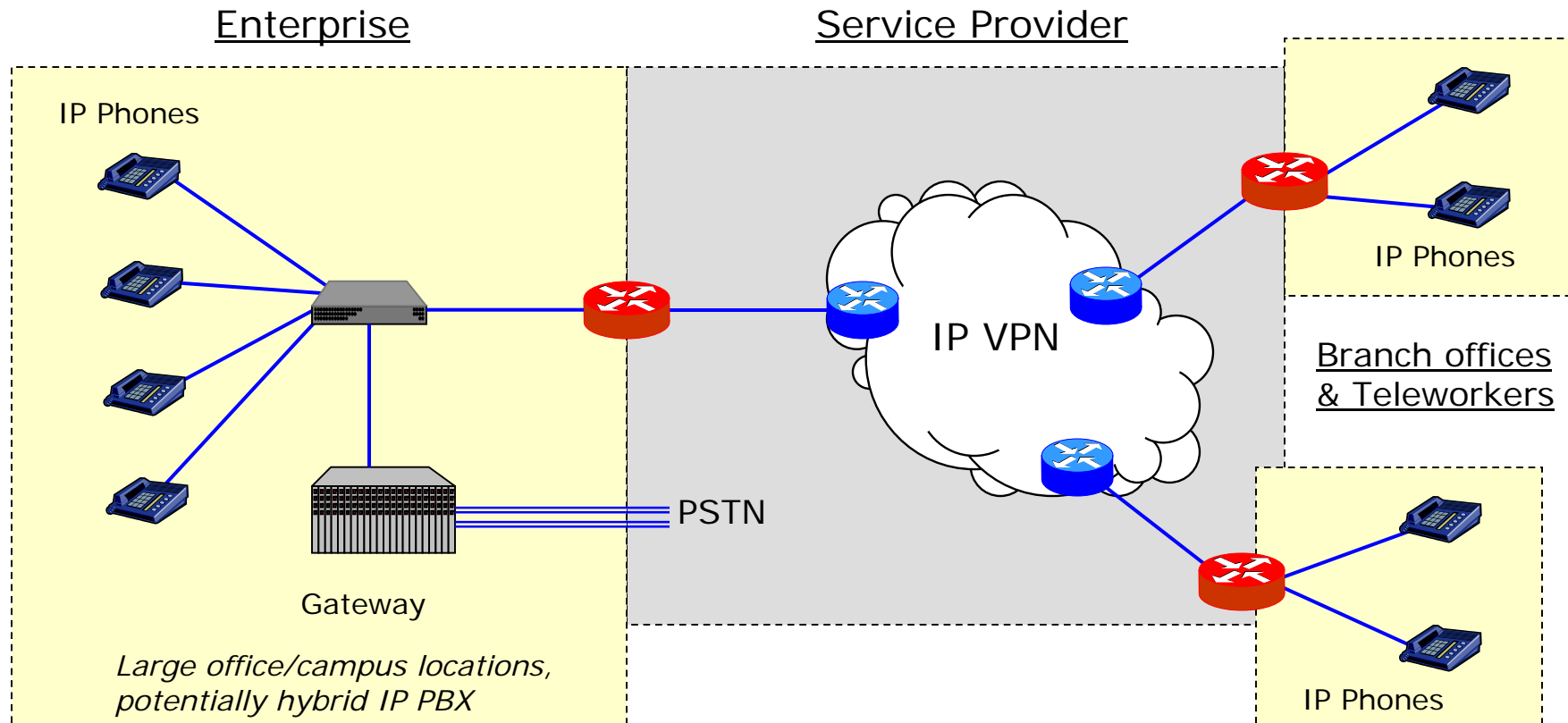
Voice over IP Performance Management

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VoIP Performance Management

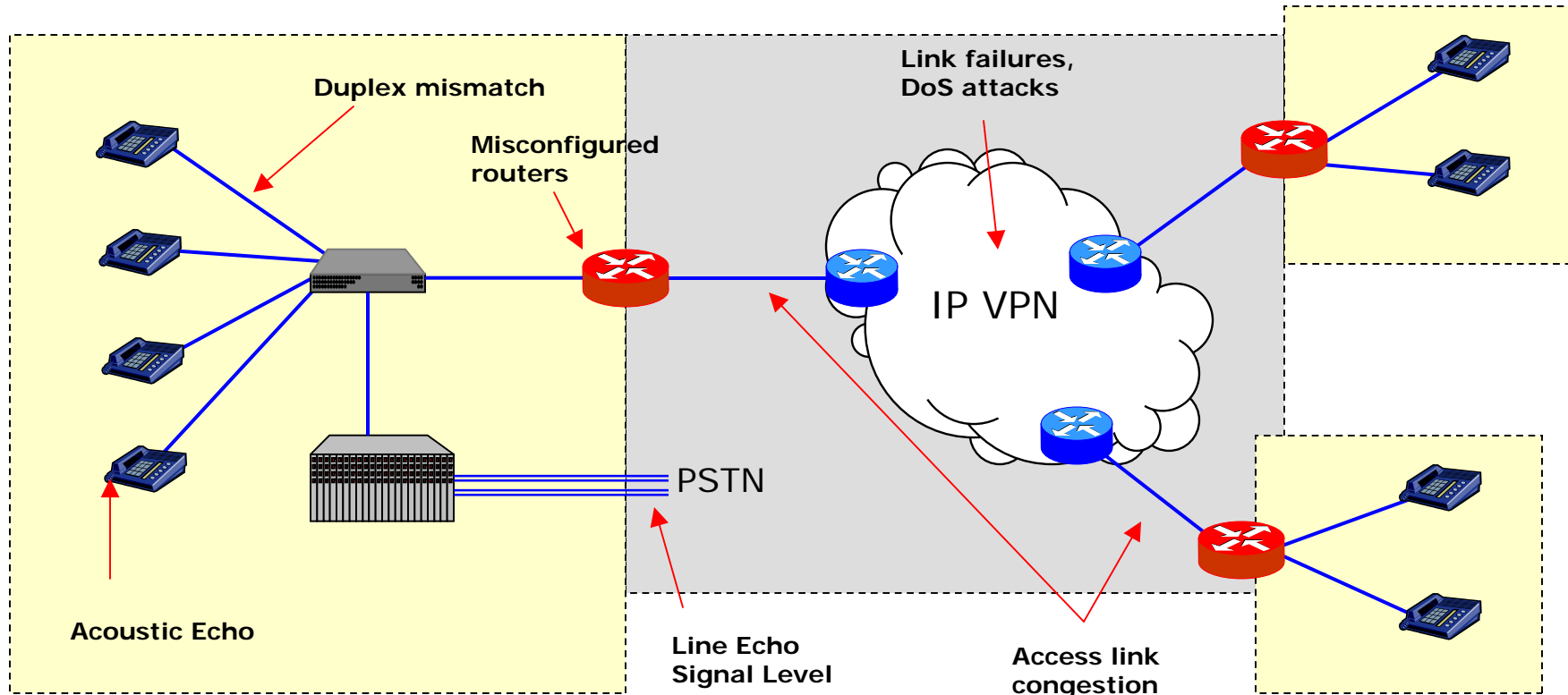
- What issues and problems will you face?
- VoIP Performance Management Architecture
- Passive vs Active Testing
- Recommendations

Enterprise Scenario

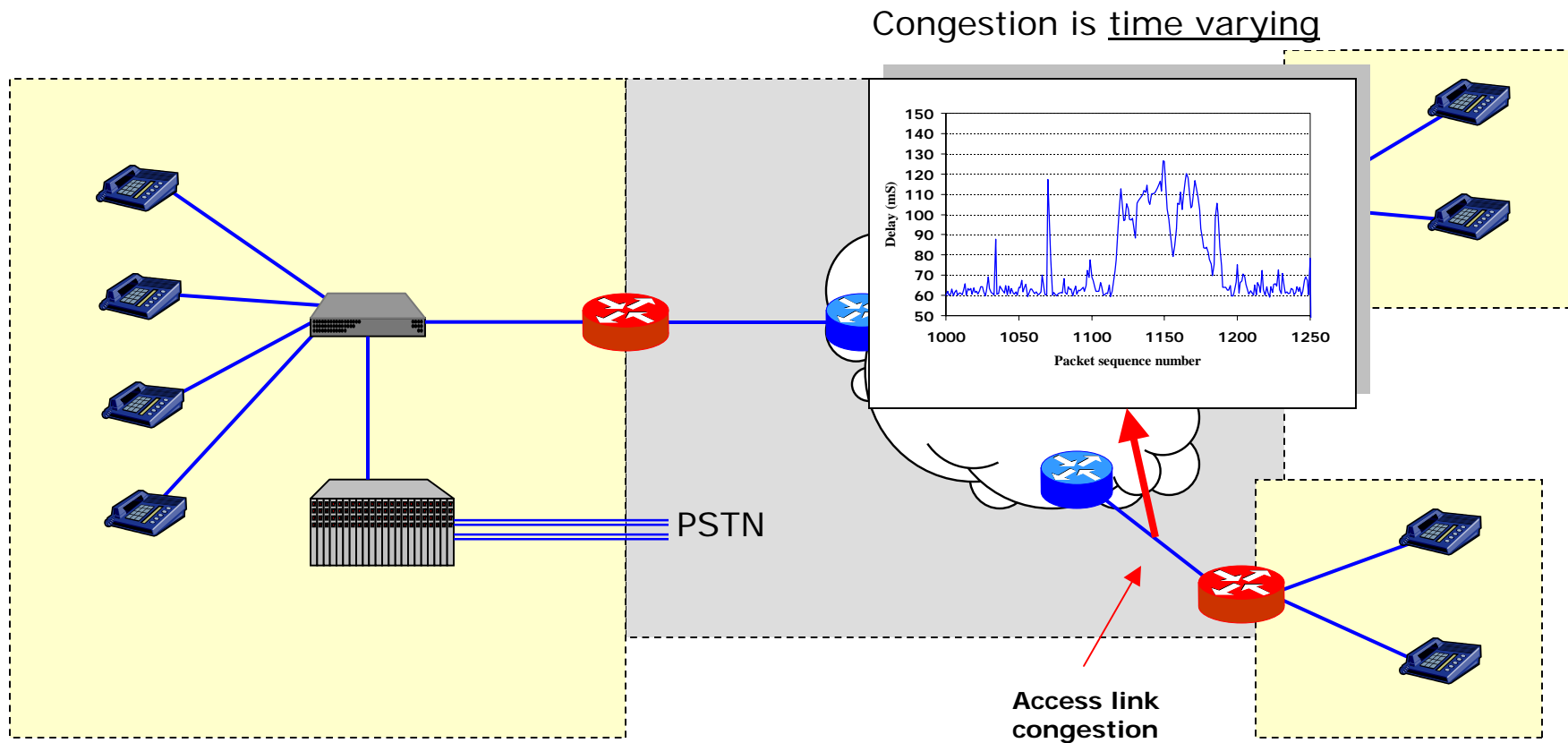


Typical problems and issues

Wide variety of problems - occurring anywhere

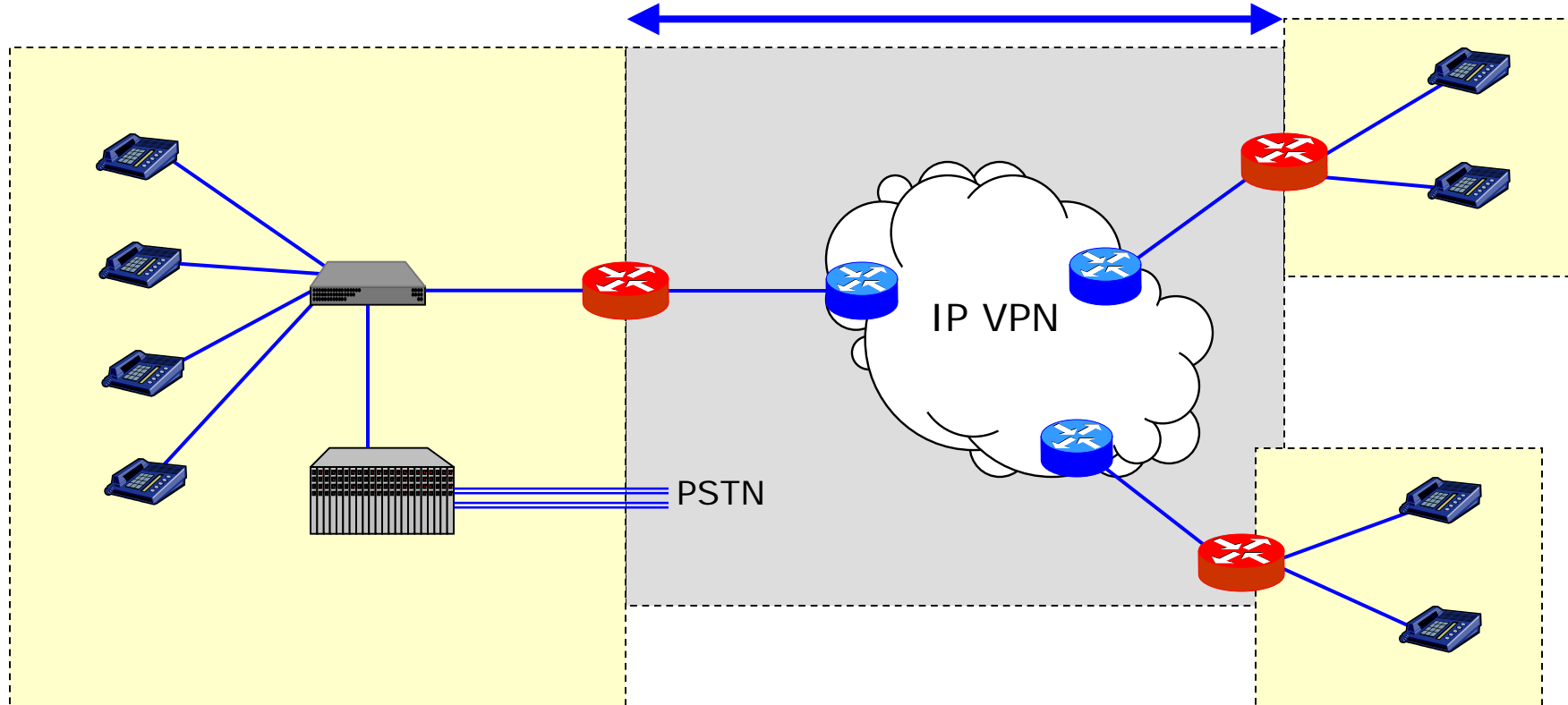


Typical problems and issues



Typical problems and issues

Service Provider SLA's often *meaningless*



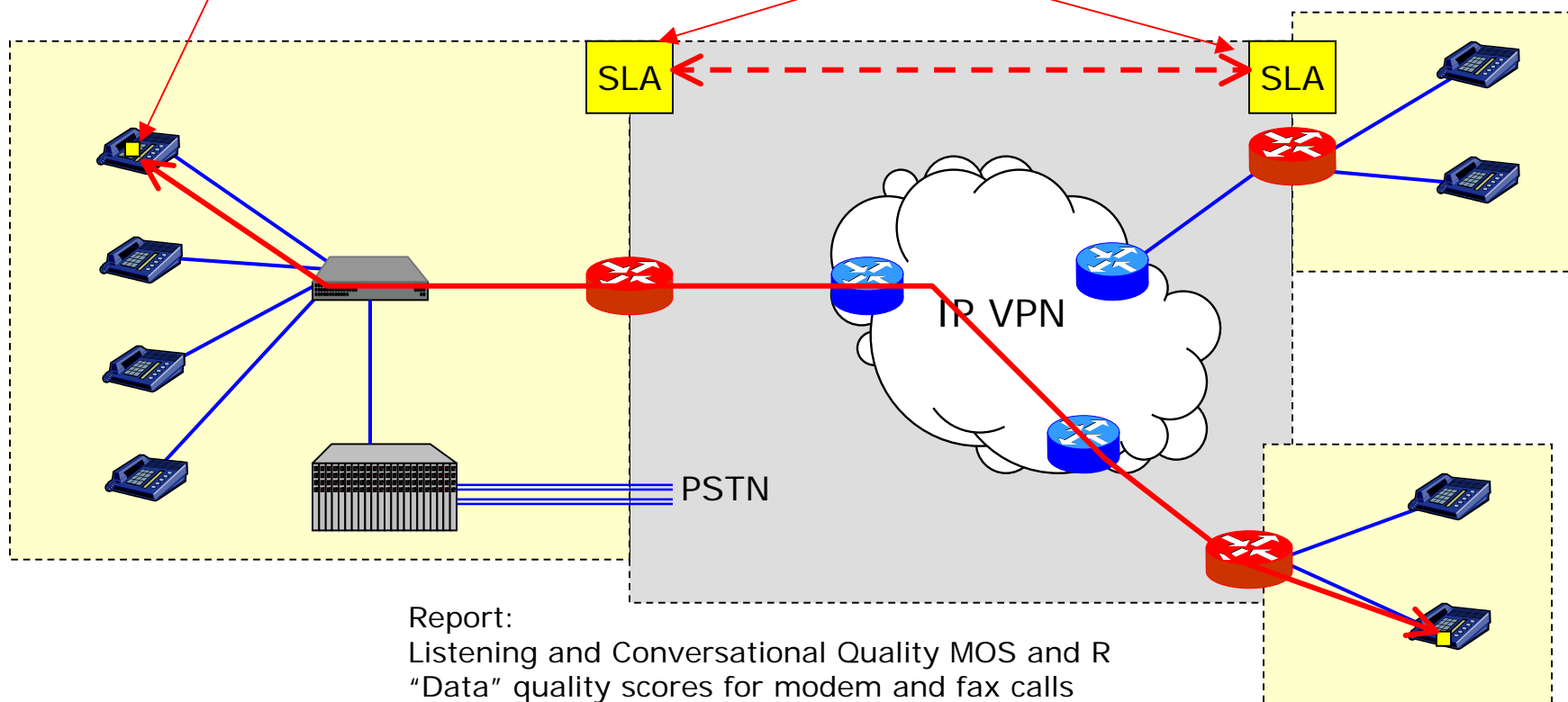
What's needed to manage VoIP?

- Problems are transient, may vary from call to call and can occur anywhere up to the IP phone
 - Need to catch problems when they occur
 - Need to monitor quality at the user interface (desktop)
- Problems can be IP related (loss, jitter...) or voice signal related (noise, echo, loudness)
 - Loss and jitter are strongly time varying
 - Noise, echo, loudness are expensive to measure (require access to the decoded voice signal)
- Need clear, meaningful Service Level Agreements with equipment providers and service providers
- Need to understand combined impact of various impairments on user - i.e. in terms of MOS or R

Performance Management Architecture

Passive Software Agent integrated into IP phone monitors live call (e.g. VQmon)

Active Test Agent in probe or integrated into edge router makes test calls (e.g. VQattest)

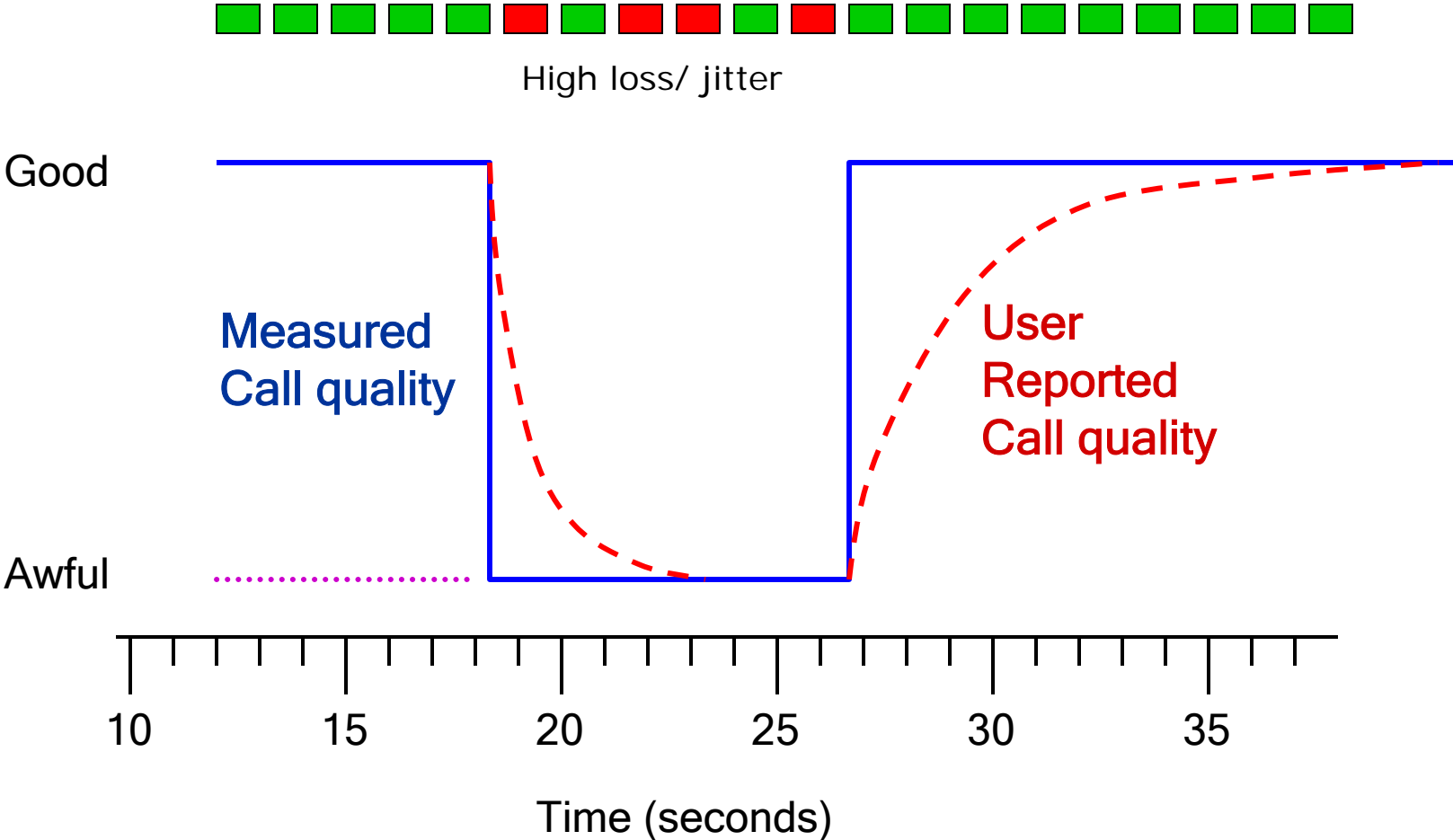


Report:
Listening and Conversational Quality MOS and R
"Data" quality scores for modem and fax calls
Diagnostic Data

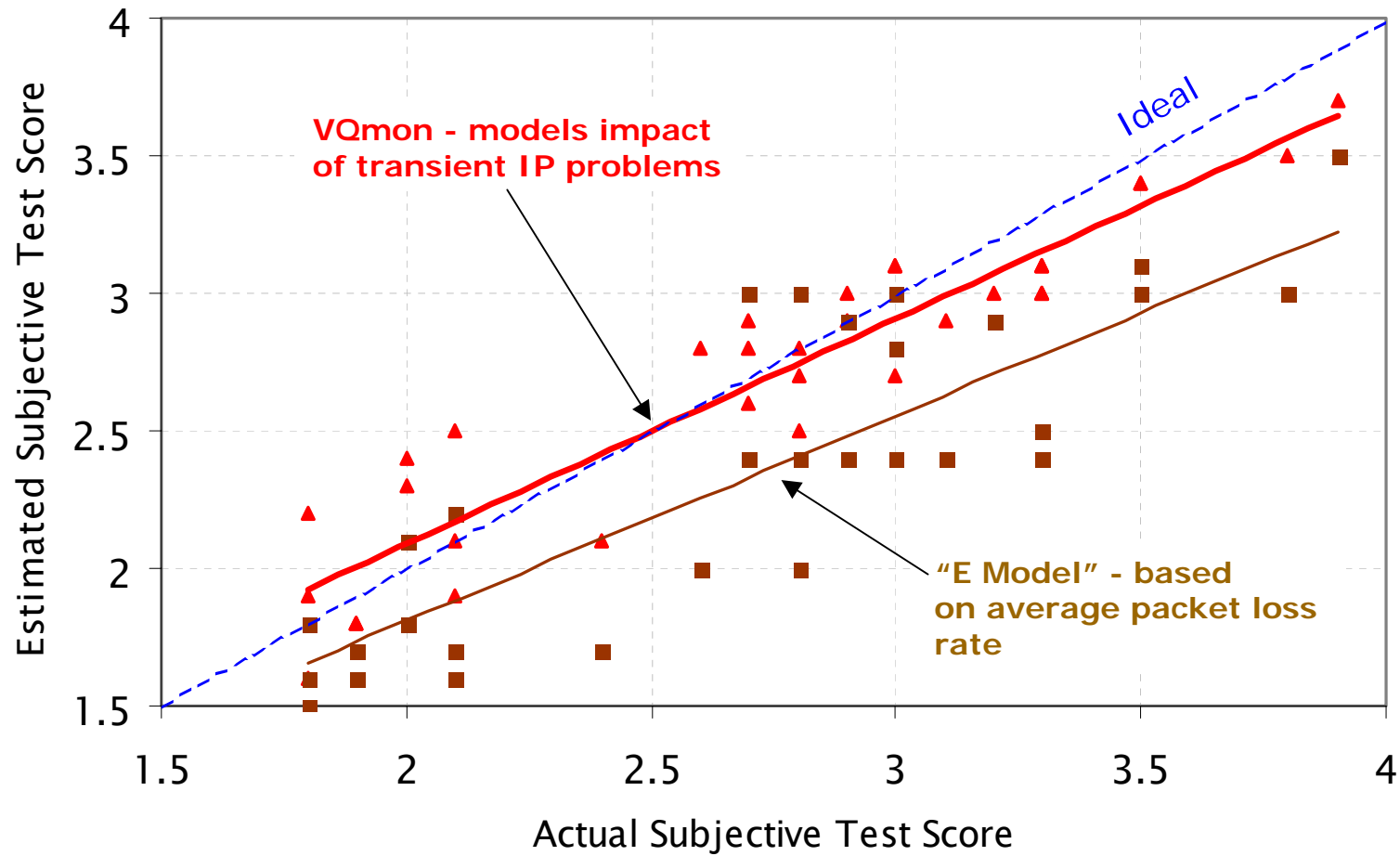
Live Call Monitoring using VQmon

- Small, efficient software agent integrated directly into IP phones, Gateways, Residential Gateways, Softphones.....
- Monitors each call continuously
- Has access to both IP metrics and noise / echo / loudness data - helps to detect and diagnose a wide range of both IP and non-IP problems
- Able to detect and report on transient problems, allowing post analysis of data from already completed calls
- Reports MOS scores, R factors, diagnostic data through RTCP XR (RFC3611) and end of call QoS report through signaling system (e.g. SIP)

Impact of transient IP problems



Why is this important?

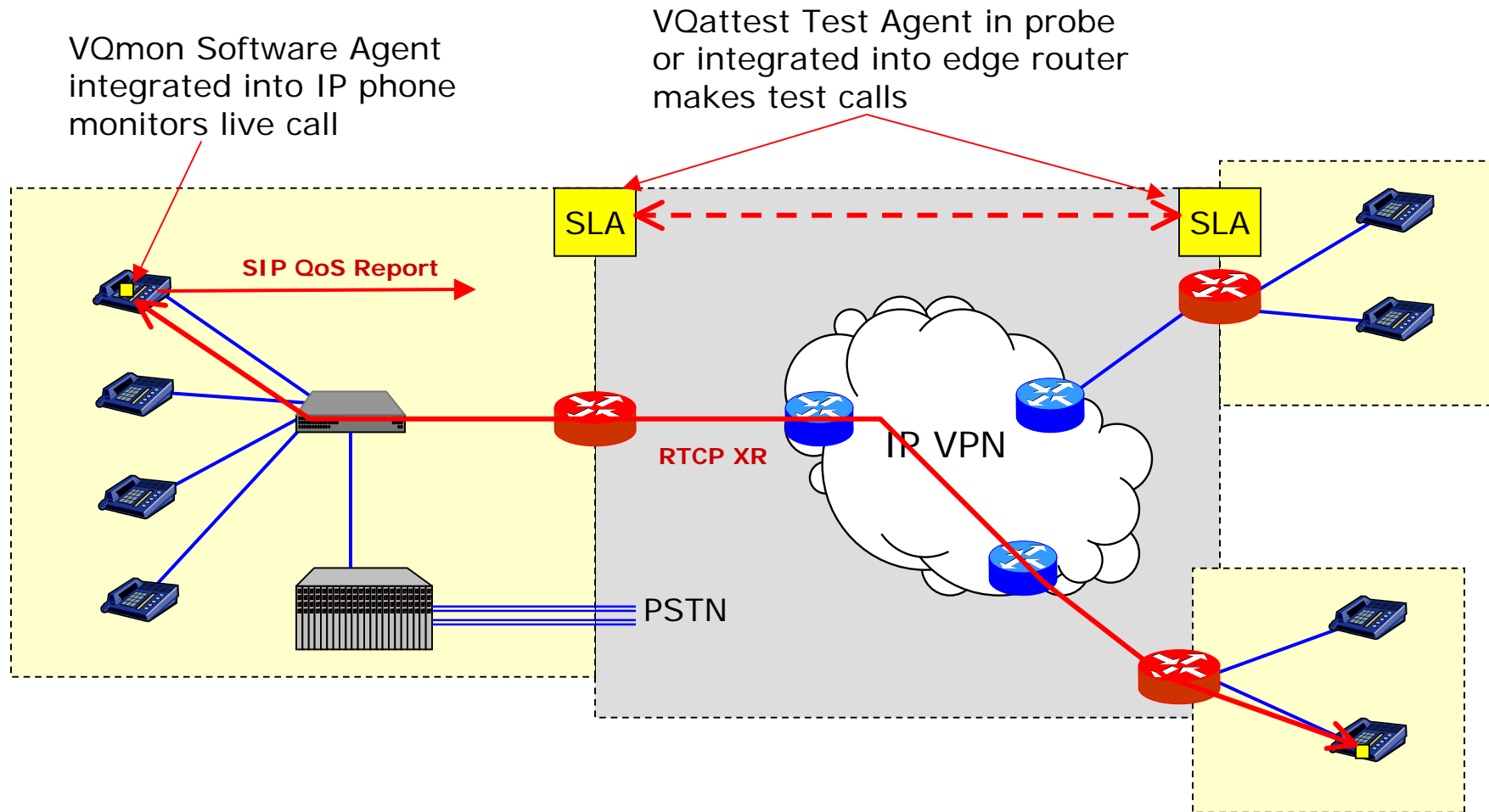


Independent test by France Telecom and University of Bochum

SLA Monitoring using VQattest

- Active software agent either in probe or integrated into edge router
- Makes active VoIP test call across IP VPN, ensures that test signal is treated identically to actual VoIP calls
- Detects and reports on transient problems (“DSQ events”), allowing SLA’s to be expressed in meaningful terms
- Uses SIP for call setup, can verify call manager/ SIP proxy performance as part of SLA
- Incorporates voice payloads to allow testing through media gateways or to IP phones

Performance Management Architecture



Recommendations

- There is a VoIP Performance Management Architecture - use it!!!
- IP Phones and Gateways
 - Insist on full support for RTCP XR VoIP Metrics
 - Insist on SIP QoS reporting (or equivalent)
- SLAs
 - Insist on SLA expressed in MOS or R factor terms
 - Insist on defined maximum levels of transient problems
- VoIP Metrics
 - Don't accept "E Model", insist on algorithm designed for monitoring, e.g. VQmon