

## **QoE measurement in the NGN - a market perspective**

Dr Mike Hollier  
CTO Psytechnics



- o Industry Landscape
- o Quality as a critical economic success factor
- o What is “quality” anyway?
- o Why existing metrics are not enough
- o A new generation of methods and standards
- o Industry examples
- o Next steps ... key standards needed!
- o Summary



# Industry Landscape

ITU-T

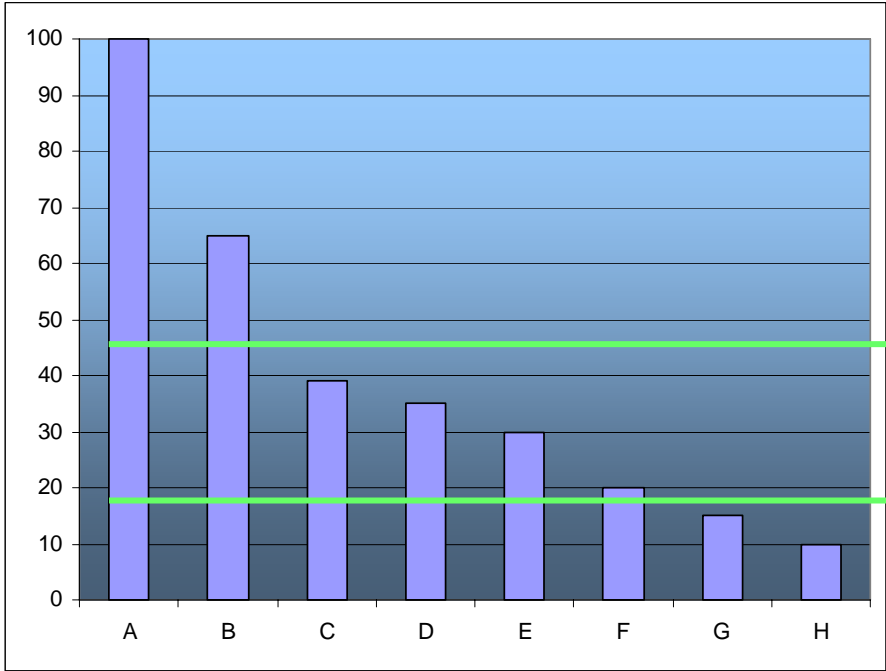
- Traditional telcos - falling voice revenue and rising OPEX
- New wave SPs - delivering new economic models
- Technology discontinuity
  - Analogue to Digital
  - Circuit-switched to packet-switched
- Changing market place
  - De-regulation
  - Intense competition
- Industry's new imperatives
  - Reduce OPEX, increase ARPU
- Leading to:
  - NGN - reduce opex, drive up ARPU
  - Convergence, IMS
  - NWM to CEM
  - Wideband and multi-media services



ITU-T

# Service design and deployment - IMS

% user applicability



Economic viability thresholds

PS threshold

IMS threshold

Services



Viable in PS

Viable in IMSS

Not viable in IMS



- o Quality driven economics
  - SLA - thresholds and reports
  - Directed maintenance
  - Targeted investment
  - Efficient operation, e.g. interconnect selection
  - Quality differentiated services
  - Billing - billable quality
- o Competitive quality essential
  - Service re-use
  - Customer retention



## What is “quality” anyway?

ITU-T

- o Baseline for quality is customer opinion/satisfaction
- o Customer satisfaction is a blend of; availability, quality, price and utility
- o I think I am safe in not explaining objective and subjective testing to this group ;-)
- o New subjective and objective methods are required to inform QoE based network operation.



## Customer satisfaction

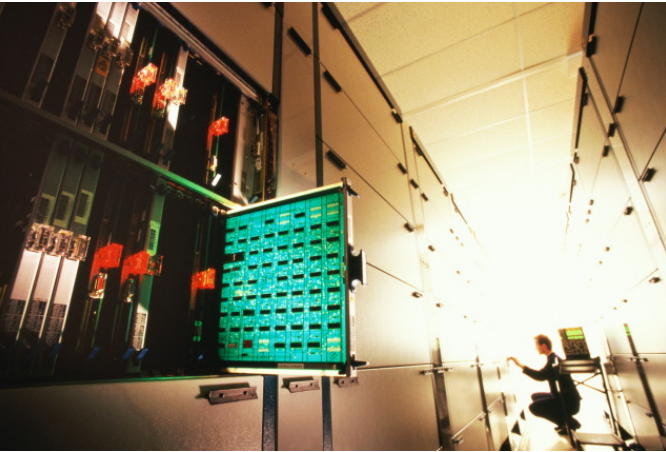
ITU-T

- Must detect onset of dissatisfaction without complaint\*
  - measurements must be real-time and per-session
  - must address QoE, e.g. conversational quality rather than one-way listening quality
  - Wideband and multi-media
- This data informs a commercial decision which dictates accuracy requirements
  - don't be fooled by "traffic lights" requirements

\*Customer complaint is an outdated means to detect customer dissatisfaction

- A single call to the help desk can cost 12 months margin
- Customer may not complain
  - loss of service re-use
  - Customer churn

## Existing metrics are not enough



**Delay**  
**Jitter**  
**Packet-loss**

Business decisions are typically based on technical measurements or by sampling...

e.g.

-Mobile: Radio Signal (RxQual, RxLev, BER), Customer Surveys and/or complaints, Network KPI's

-IP Telephony: packet loss, jitter & delay used to estimate VoIP network quality



- o Simple network statistics such as packet loss level will not mirror user's perception



1% packet loss  
(evenly distributed)



1% packet loss  
(bursty)



1% packet loss  
(jitter)

- o 3 examples with same content, bit rate, frame rate, codec and level packet loss but different MOS values



# QoE measurement solutions Solutions

ITU-T

	Active (Intrusive)	Passive (Non-Intrusive)	
	Agent	IP Monitor	Monitor
<b>Voice</b>	PSA Psytechnics Speech Agent  P.862 (PESQ)	PSI Psytechnics Speech IP Monitor  P.VTQ	PSM Psytechnics Speech Monitor P.563 (SEAM) P.562 (CCI) P.561 (INMD)  <div style="border: 1px solid black; padding: 2px; display: inline-block;">Conversational, P.CQO</div>
<b>Video</b>	PVA Psytechnics Video Agent  J.144	PVI Psytechnics Video IP Monitor	PVM Psytechnics Video Monitor



- Fixed voice -VoIP
  - Removing the barrier to adoption for enterprise
  - Directed maintenance
  - MOS based SLAs
- Mobile voice
  - Interconnect selection
  - Quality differentiated services
  - Assess actual usage patterns via handset agents
- Mobile video
  - Investigation of QoE coverage
  - Detection of billable quality - viral revenue leakage
- IPTV
  - T&M to validate competitive quality
  - Responding to RFI's with QoE monitoring proposals

- NGN, Convergence, IMS
  - Multiple network technologies and vendors
    - Inter-network measures at mid-points
    - End-to-end performance measured at the edge
  - Greater variety of services - IMS
    - Real-time per-session metrics
    - Multi-media QoE metrics - speech, music and video
- Quality differentiated service levels
  - Accurate multi-modal QoE metrics
  - QoE based SLAs
- New wave SPs (can't differentiate on price)
  - Multi-media
  - Wideband audio

- o Competitive quality is a commercial necessity due to competition
- o Performance measurement must correlate directly with end-user experience
- o Conventional network performance metrics inadequate
- o New methods to measure Quality of Experience
  - Portfolio of inter-working methods required
  - Accuracy needs to support commercial decisions
- o Convergence, IMS and IPTV driving requirement for mid-point and customer-edge instrumentation
- o Industry adoption examples - quality as a critical success factor
- o Next steps ... the workshop!



## About Psytechnics

ITU-T

- Psytechnics is a BT spin-out (2000)
- Strong credentials
  - 10+ years research in BT
  - 5 ITU-T world standards
    - P.862 PESQ
    - P.862.2 Wideband PESQ
    - P.562 Call Clarity Index
    - P.563 [passive voice waveform]
    - J.144 Broadcast video
  - 35+ patents
  - 300,000+ subjective test scores
- Software in use by 200 carriers
- Now supporting the industry's transition to
  - Customer experience management
  - MOS based SLA's, and alarms



NIF Ventures Co., Ltd.