Perceived QoS in MUSE lab trials and demos

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December 14, 2005
Introduction (1/2)

> Overall objective of MUSE
  • research and development of a future *low cost, full service access and edge network*, which enables the ubiquitous delivery of broadband services to every European citizen

> MUSE develops novel access platforms enabling end-to-end solutions

> MUSE lab trials and demonstration Taskforce (TF4)
  • defining a complete test suite for full-service end-to-end testing

> This talk
  • test methods with respect to perceived QoS
end-to-end perceived service quality

end-to-end network quality

supported network QoS mechanisms

terminal quality
> Scale for user perceived quality
  - A user’s experience of the quality of a service is expressed in Opinion Score value on a 5-point scale
  - Outcomes are averaged: Mean Opinion Score (MOS)

<table>
<thead>
<tr>
<th>Rating (MOS)</th>
<th>Quality</th>
<th>Degradation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Excellent</td>
<td>Imperceptible</td>
</tr>
<tr>
<td>4</td>
<td>Good</td>
<td>Perceptible, not annoying</td>
</tr>
<tr>
<td>3</td>
<td>Fair</td>
<td>Slightly annoying</td>
</tr>
<tr>
<td>2</td>
<td>Poor</td>
<td>Annoying</td>
</tr>
<tr>
<td>1</td>
<td>Bad</td>
<td>Very annoying</td>
</tr>
</tbody>
</table>
Applications to be tested in MUSE TF4
Voice-over-IP (1/2)

Conversational quality (MOS-CQ): three components

- Listening quality (MOS-LQ)
- Talking quality (MOS-TQ)
- Interaction (MOS-IQ)

\[ \text{MOS-CQ} = \min \{\text{MOS-LQ}, \text{MOS-TQ}, \text{MOS-IQ}\} \]
Voice-over-IP (2/2)

> Results for VoIP

  • test method has been applied in WPC.4
    – VoIP experiment between TNO and ACREO (14 feb 2005)

conversational quality: MOS-CQ = 4.02
Perceived QoS of Video

- End-to-end perceived audio-visual quality depends on
  - **Pure video quality** aspects
    - e.g. spatial temporal coding distortions
  - **Pure audio/speech** aspects
    - e.g. listening quality
  - **Audio/video interaction**
    - asynchrony (“lip sync”)
  - **Zapping time quality**

- All aspects will be
  - quantified by MOS values
  - combined to overall audio-visual MOS
Perceived QoS of Web Browsing

> Objective time parameters

\[ MOS = 4.38 - 1.30 \times \ln(0.47 \times T_1 + 0.60T_2 + 0.71 \times T_3 + 2.22T_4) \]
Conclusions and future work

> Conclusions

• Within MUSE TF4 a complete suite of test methods was developed for assessing the perceived QoS for
  – Voice-over-IP
  – Video
  – Web browsing/downloads

• Test suite for VoIP has been applied successfully

> Future work

• Application of test suites for streaming video and videophony
• Enhance test methods for web browsing/downloads
• Develop test methods for Interactive Gaming