What matters in online video quality

• Welcome to the Screen Digest / Level 3 webinar on online video quality. Today’s agenda:
  • Presentation, Dan Cryan, Head of Broadband Screen Digest
  • Panel discussion
What matters in quality video online

Dan Cryan,
Head of Broadband
Scope

• Online video quality has always been a nebulous notion made up of a lot of differing, often subjective opinions

• Methodology: ask a range of leading service providers what their experiences were of consumer reactions to different aspects of video quality
  – Cherry picked leading services to get a representative & authoritative opinion of ‘best practice’
  – Questions focused on the thresholds required for a video to count as good quality
We spoke to 17 leading international online video service operators
Online TV set to beat 100bn streams in the US and ‘Big 5’ by 2014

FTV online TV streams and downloads (m)

Source: Screen Digest and comScore
In the UK online TV consumption is set to reach 1bn hours by 2014.
Top line findings

• Quality affects consumption:
  – 70% of respondents said that higher quality directly affects consumption
  – Of the remainder 60% said that it increased willingness to pay
  – Only 10% of respondents said that there was no impact from quality

• Sound emerged as the most important factor for a video to count as ‘good quality’

• Some genres (notably sport & movies) are more sensitive to quality than others

• Users are most interested in resolution, “the idea of HD” if they are being asked to pay
The most important factors in online video quality

- Well synched sound was a clear winner
- Lack of longer interruptions and resolution came close second
- None of the respondents thought colour gamut was important

<table>
<thead>
<tr>
<th>Rank</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Well Synchronised Sound</td>
</tr>
<tr>
<td>2</td>
<td>Lack of Longer Interruptions</td>
</tr>
<tr>
<td>3</td>
<td>Video Resolution</td>
</tr>
<tr>
<td>4</td>
<td>Frame Rate</td>
</tr>
<tr>
<td>5</td>
<td>Lack of Skipped Frames/Jitter</td>
</tr>
<tr>
<td>6</td>
<td>Freedom from Digital Artifacts/Noise</td>
</tr>
<tr>
<td>7</td>
<td>Freedom from Audible Quantisation</td>
</tr>
<tr>
<td>8</td>
<td>Start Time</td>
</tr>
<tr>
<td>9</td>
<td>Colour Gamut</td>
</tr>
</tbody>
</table>
Sound – getting the audio right (and when it matters less)

- Two things reoccurred:
  - Sound matters most when its intimately tied into the action (e.g. when you can see people’s lips move)
  - It matters less for news and some sports (e.g. football)

- Dynamic range is more important than true fidelity
  - Makes it exciting/involving
Across all genre continuous video was the most important element in a quality service

- Buffering gaps emerged as the most important issue:
  - consistently rated as utterly unacceptable

- Two buffering gaps per show emerged as the threshold beyond which people start turning off fast
  - Of those who expressed any sort of opinion 80% expressly earmarked 2 gaps

- From those showing live sport, there is some evidence that buffering events are a little more acceptable
Jitter (frame degradation)

Acceptable jitter thresholds

- Jitter saw a divide in opinion:
  - High quality: it was widely agreed that only very small quantities of jitter are acceptable
  - Good quality: opinion was divided, a trade off between length of jitter and the number of jitter events

- Over 75% of those who commented said the impact of jitter didn’t vary with genre
Skipped frames

• 50% of respondents said that <1% of frames can be skipped for a service to be ‘good quality’

• The issue was thought to be particularly acute for any form of high-motion content (sport, movies) and less important for news

• For both jitter and skipped 30% of people questioned did not feel qualified to give a technical opinion
Frame rate

- Video is standardly delivered at 25fps online
- 90% of respondents said that frame rate should be the same for free and paid content
- Small quantity of divergence generally revolving around animation/kids content where 20fps is acceptable
‘High Quality’ has become synonymous with HD

- HD has established itself as a driver for paid content
  - 25% of respondents thought HD is a prerequisite of asking people to pay

### Resolution Required for Good Quality

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Good quality</th>
<th>High quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 320 x 240 or higher</td>
<td>10.0</td>
<td>0.0</td>
</tr>
<tr>
<td>320 x 240 or higher</td>
<td>0.0</td>
<td>10.0</td>
</tr>
<tr>
<td>525i (NTSC TV)</td>
<td>20.0</td>
<td>0.0</td>
</tr>
<tr>
<td>625i (PAL TV)</td>
<td>20.0</td>
<td>0.0</td>
</tr>
<tr>
<td>480 or higher</td>
<td>20.0</td>
<td>0.0</td>
</tr>
<tr>
<td>1024 x 768 or higher</td>
<td>50.0</td>
<td>0.0</td>
</tr>
<tr>
<td>720p or higher</td>
<td>0.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Other</td>
<td>50.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

### Importance of Resolution by Genre

- Movies: 4.24
- TV Drama: 3.53
- Sport: 4.29
- Factual Entertainment: 3.06
- Comedy: 2.88
- News: 2.24
- Kids: 2.71
- Entertainment: 3.06
- TV: 4.29

[www.screendigest.com]
Consumers are willing to not only pay more but wait longer for HD video

- Consumers have demonstrated that they are willing to pay for HD
  - Often they will pay more when the same content is available in both HD and SD

**2010 HD share of US transactions (%)**
But HD is increasingly becoming expected and available on free content too

- High quality is associated with longer viewing times

- Consistently those interviewed said that quality improved consumption:
  - By making people engage with the brand more
  - Stopping people tune out: ‘quality matters when it isn’t there’
  - Improving watching time on ‘second tier’ content
Sport and movies consistently emerged as genres requiring higher quality thresholds.

Relative importance by genre

Av. bitrate for long form free to view video (kbit/s)

- TV show
- Sport
- Movies

Resolution
Frame Rate
Colour Gamut
Longer interruptions

2009
2010
Bridging the knowledge gap

- Certain technical details of what makes up good quality are beyond the scope of people running services
  - 30% of respondent's didn’t feel qualified to talk about buffering and skipped frames
  - Almost 65% couldn’t speak to the optimum chroma subsampling ratio
- Their position suggests that they don’t know because they don’t need to know (i.e. does not present a major problem)
Quality is only going to get more important

The Importance of PC screen size to the quality of online content

- Screen size was generally thought not to be that important
  - Weighted average rated between doesn’t matter much and quite important
  - Movies were a bit of an exception

- All the signs are that this will change when online content gets to the TV and expectations change
Thank you

dan.cryan@screendigest.com

Tel.: +44 (0)20 7427 2820
Panel discussion

- Dan Cryan, Head of Broadband, Screen Digest
- Dene Schonknecht, Global Media & Entertainment Lead, Microsoft
- Jaime Miles, Head of Content Architecture & Engineering, Level 3 Communications