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

Level (3)
COMMUNICATIONS

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What matters in quality video online

Dan Cryan,

Head of Broadband

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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)

Legend: ■ USA ■ EU Big5
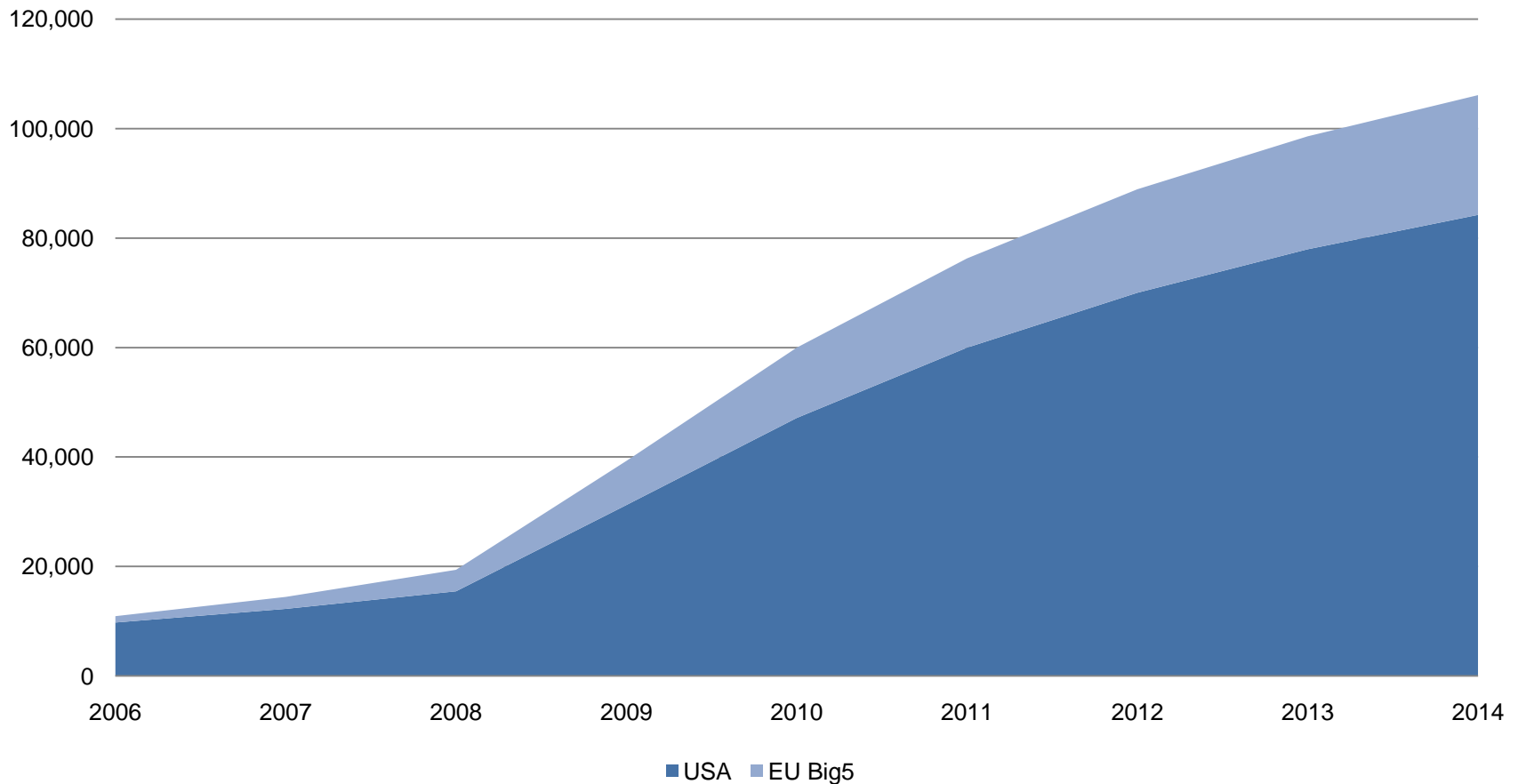
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In the UK online TV consumption is set to reach 1bn hours by 2014

UK: viewing time (bn hours)

Legend: ■ Long form online FTV TV ■ Short form online FTV TV ■ User-gen
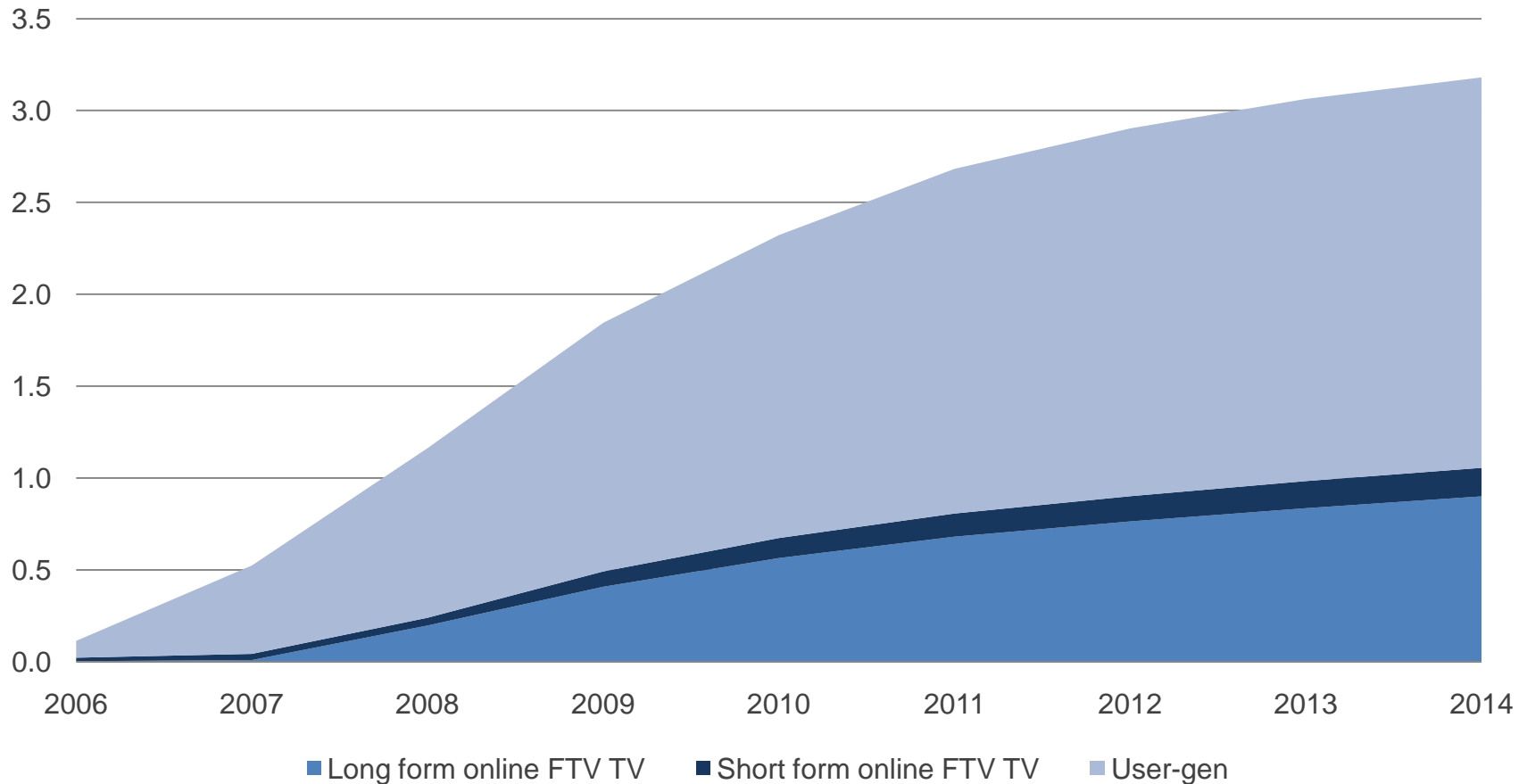
Top line findings

- 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

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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

| Rank	
1	Well Synchronised Sound
2	Lack of Longer Interruptions
3	Video Resolution
4	Frame Rate
5	Lack of Skipped Frames/Jitter
6	Freedom from Digital Artifacts/Noise
7	Freedom from Audible Quantisation
8	Start Time
9	Colour Gamut

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
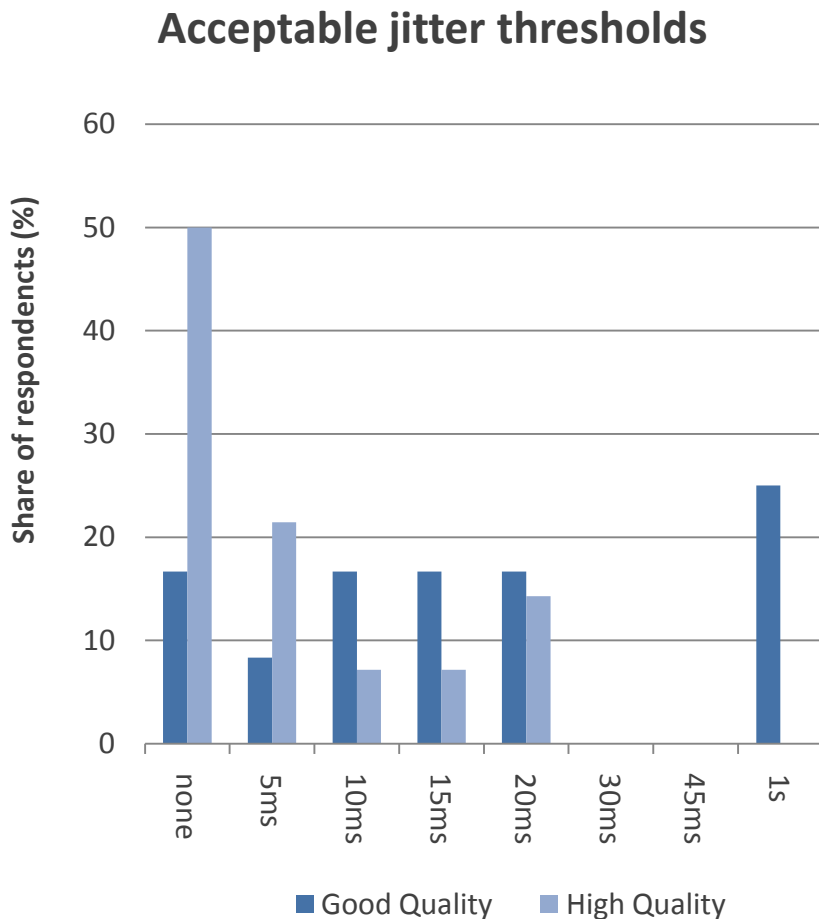 - Makes it exciting/involving

Acceptable level of AV-sync delay/lead?

Good Quality   High Quality
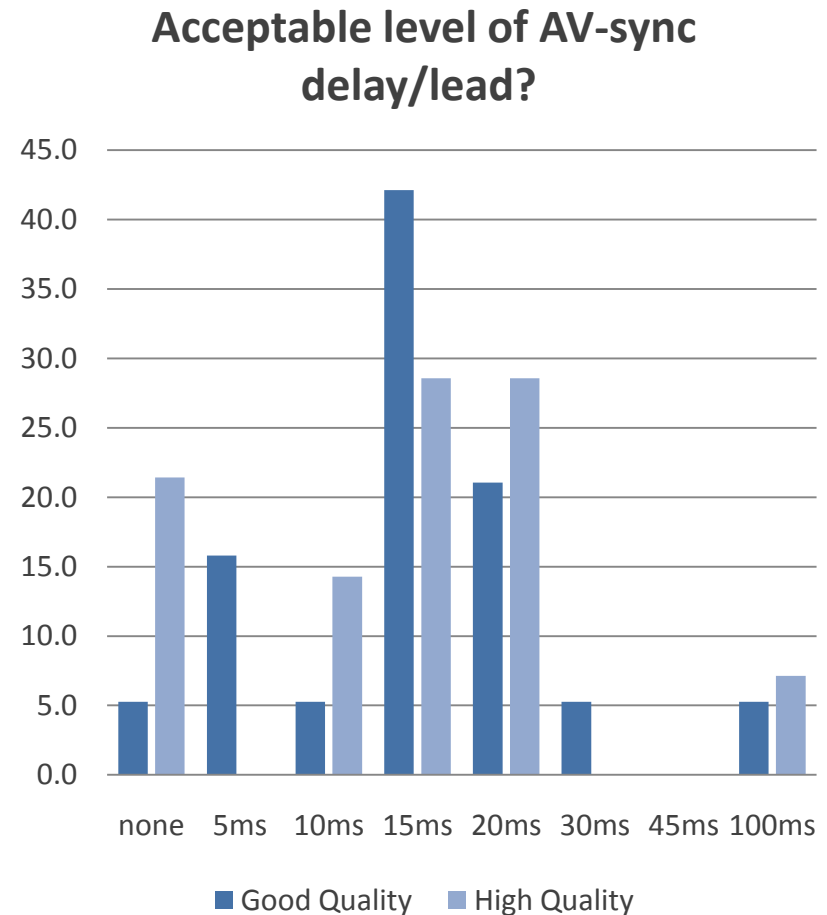
Across all genre continuous video was the most important element in a quality service

Relative importance by genre

- Resolution
- Frame Rate
- Colour Gamut
- Longer interrruptions
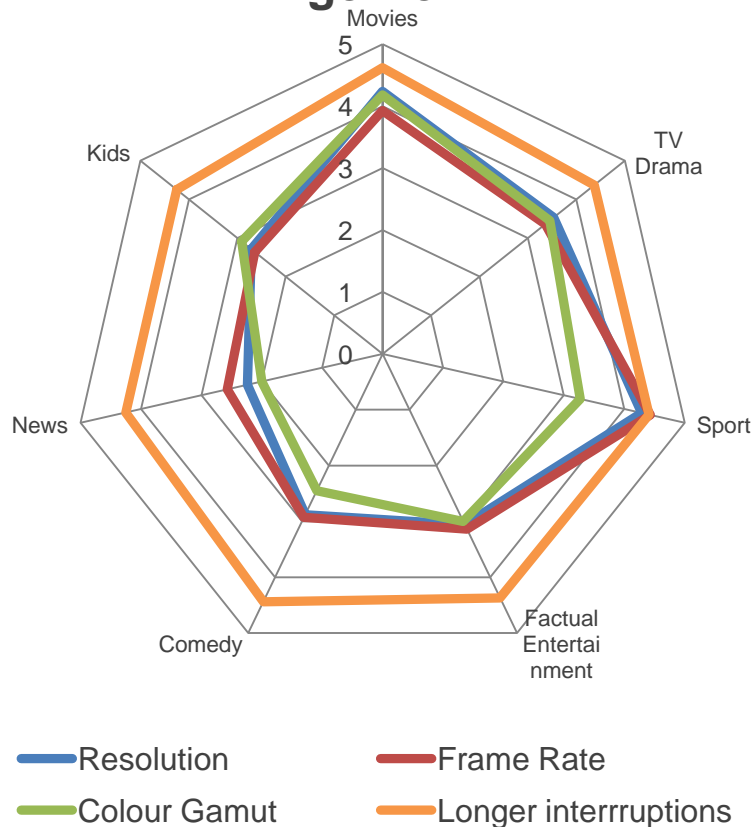
- Buffering gaps emerged as the most important issue:
  - consistently rated as utterly unacceptable

- 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 ear-marked 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

Share of respondencts (%) — chart with x-axis categories: none, 5ms, 10ms, 15ms, 20ms, 30ms, 45ms, 1s. Legend: Good Quality, High Quality.

- 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 of impact 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
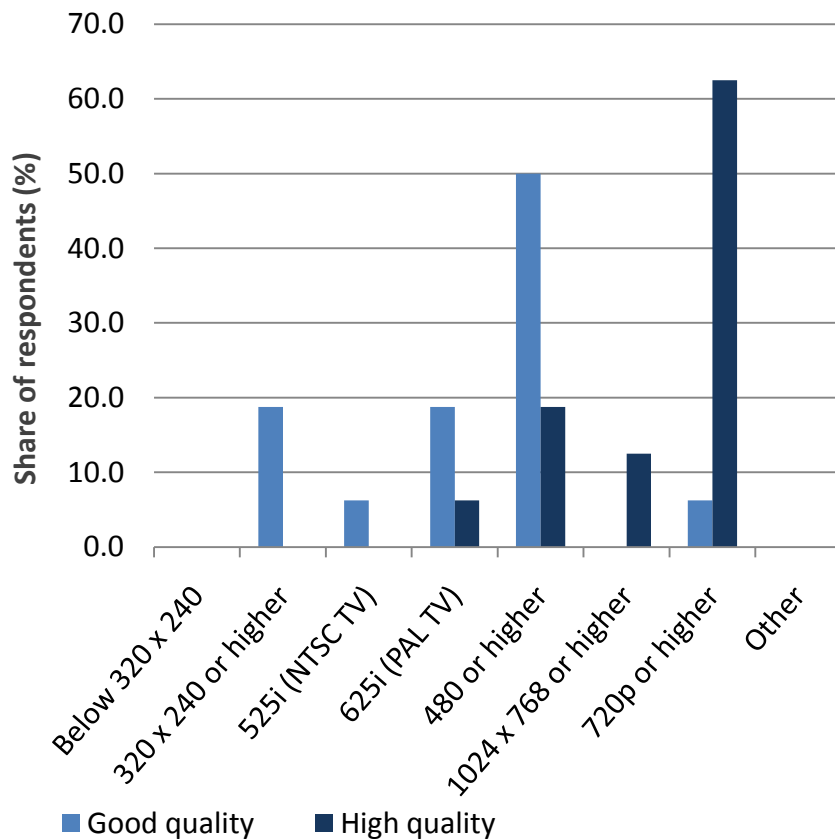
Acceptable skipped frames (%)

Legend: ■ 0% ■ 0.5% ■ 2% ■ 5% ■ 10% ■ 20%

Frame rate

Frame rate required for good quality
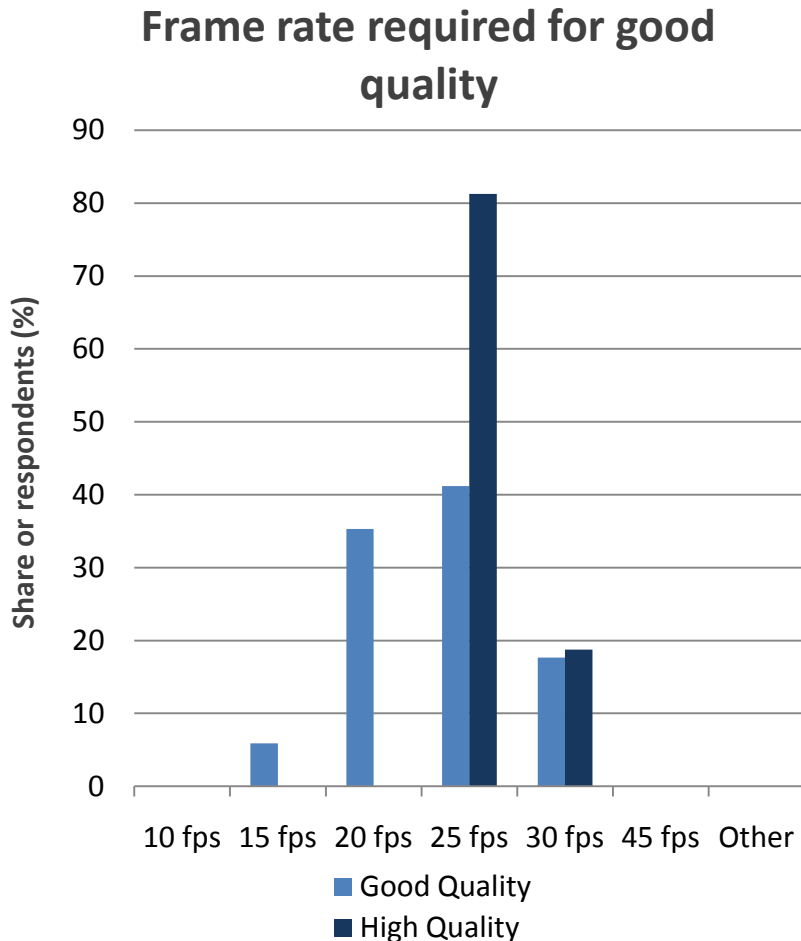
- Video is standardly delivered at 25fps online

- 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
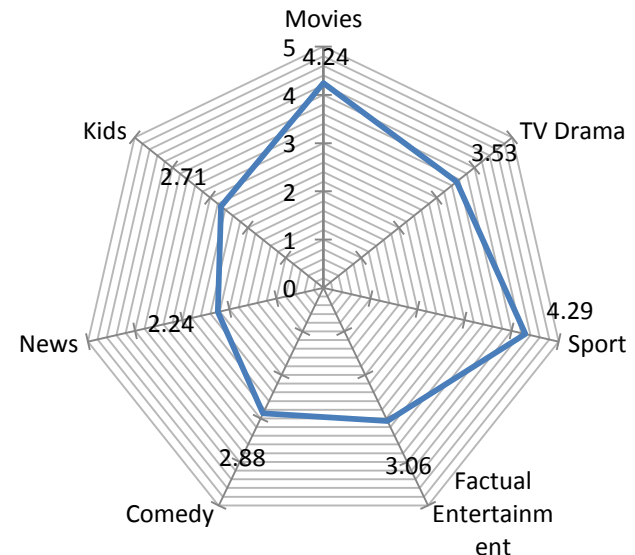
'High Quality' has become synonymous with HD

Resolution Required for Good Quality

Bar chart — Share of respondents (%) (y-axis, 0.0 to 70.0) by resolution category (x-axis):
- Below 320 x 240
- 320 x 240 or higher
- 525i (NTSC TV)
- 625i (PAL TV)
- 480 or higher
- 1024 x 768 or higher
- 720p or higher
- Other

Legend: Good quality, High quality

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

## Importance of resolution by genre

Radar chart with values by genre:
- Movies: 4.24
- TV Drama: 3.53
- Sport: 4.29
- Factual Entertainment: 3.06
- Comedy: 2.88
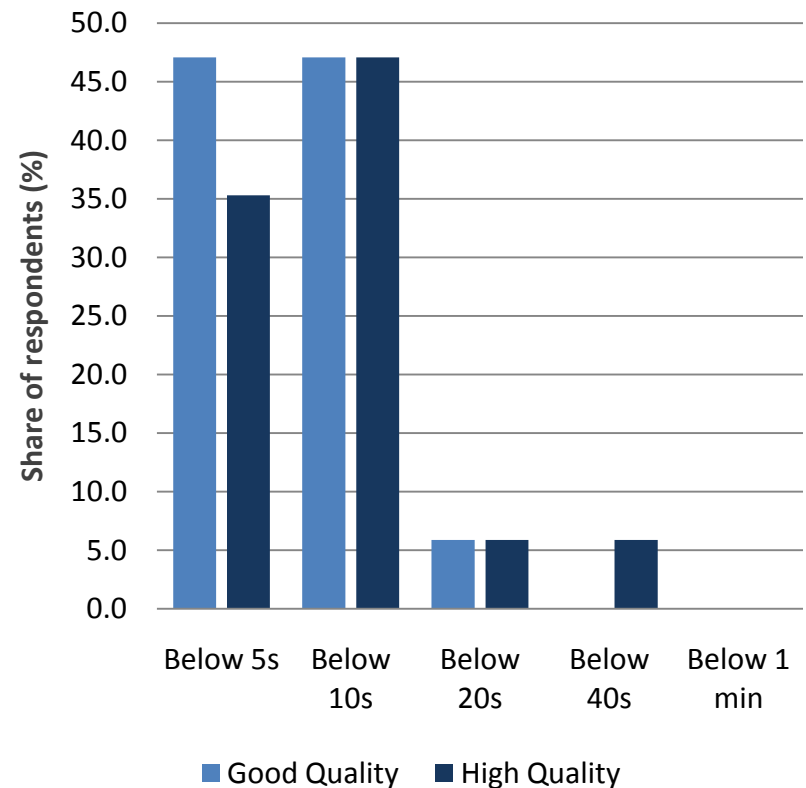- News: 2.24
- Kids: 2.71

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
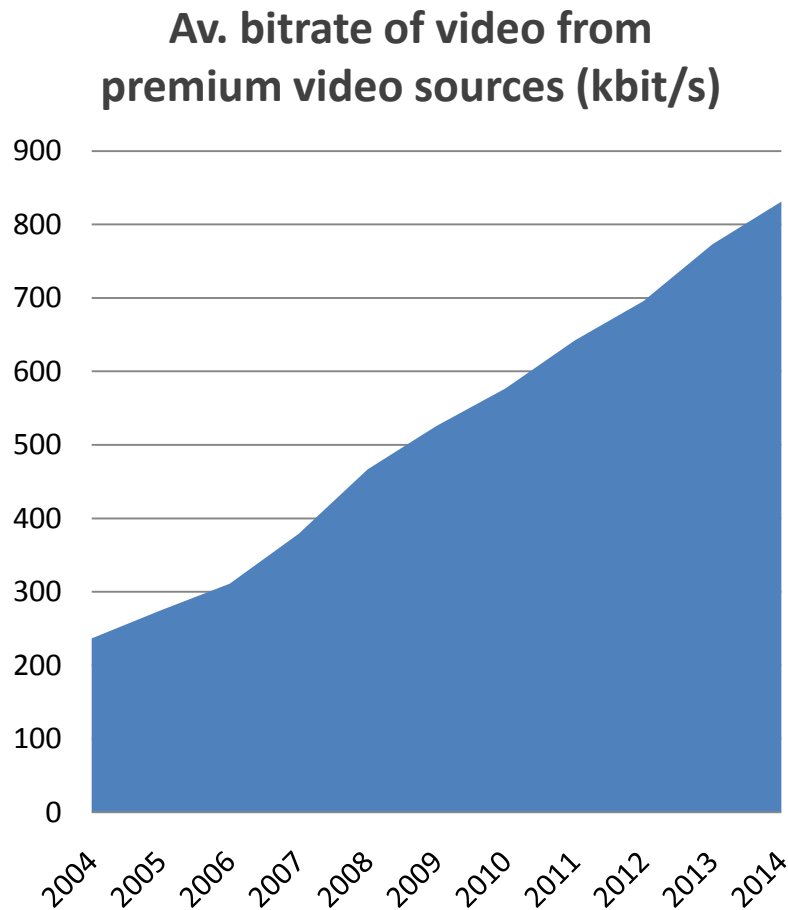 - Often they will pay more when the same content is available in both HD and SD

2010 HD share of US transactions (%)
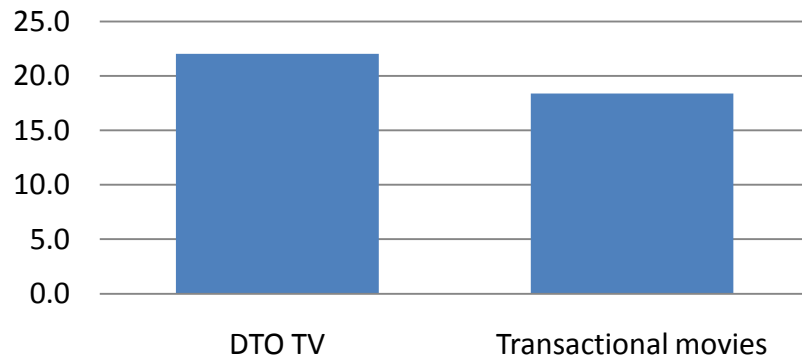
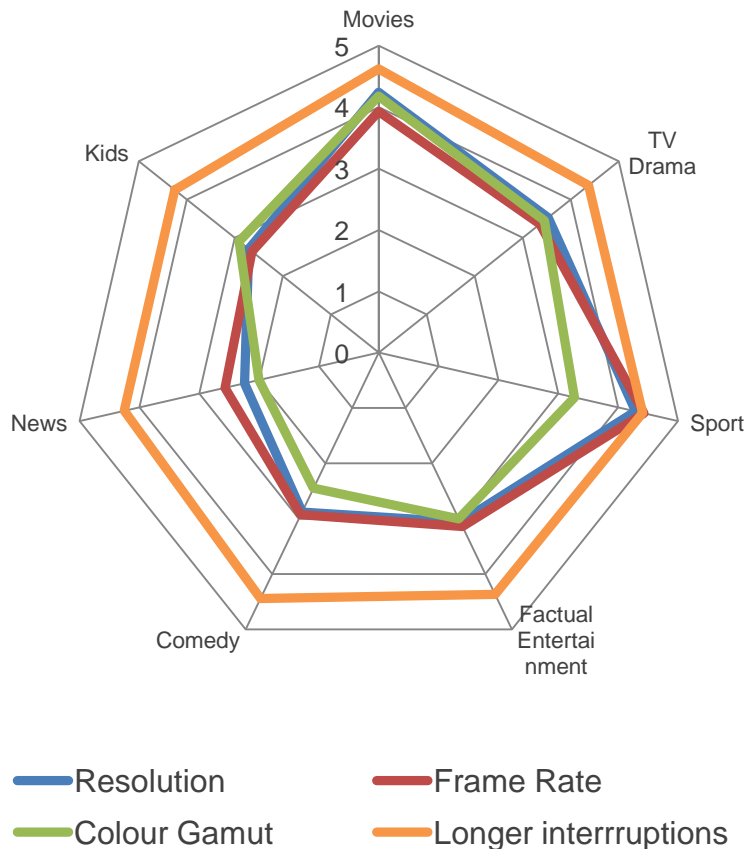**Amount of time tolerated before a video starts**

But HD is increasingly becoming expected and available on free content too

Av. bitrate of video from premium video sources (kbit/s)
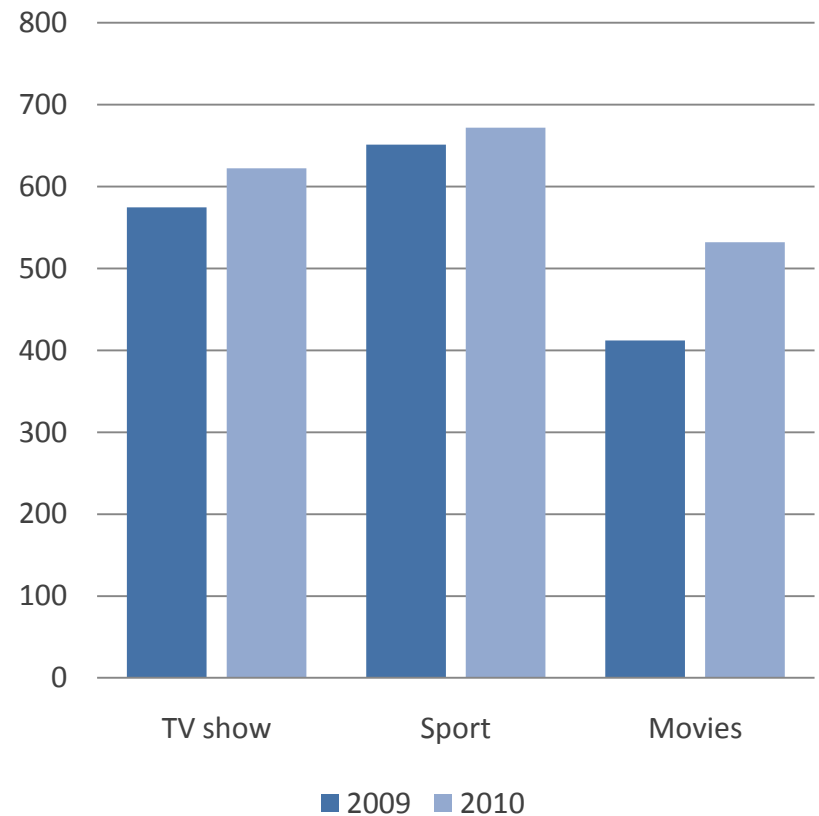

- High quality is associated with longer viewing times

- 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
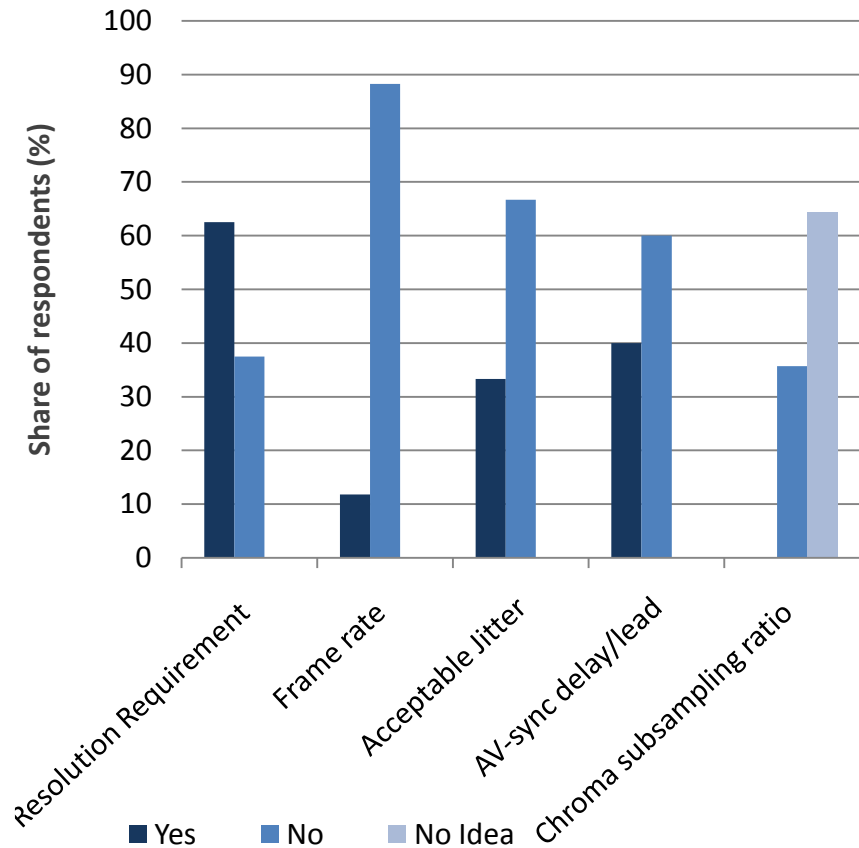

Relative importance by genre

Legend: Resolution, Frame Rate, Colour Gamut, Longer interrruptions

Axes: Movies, TV Drama, Sport, Factual Entertainment, Comedy, News, Kids

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

Categories: TV show, Sport, Movies
Legend: 2009, 2010

Bridging the knowledge gap

Do thresholds differ between free-to-view & pay to access content

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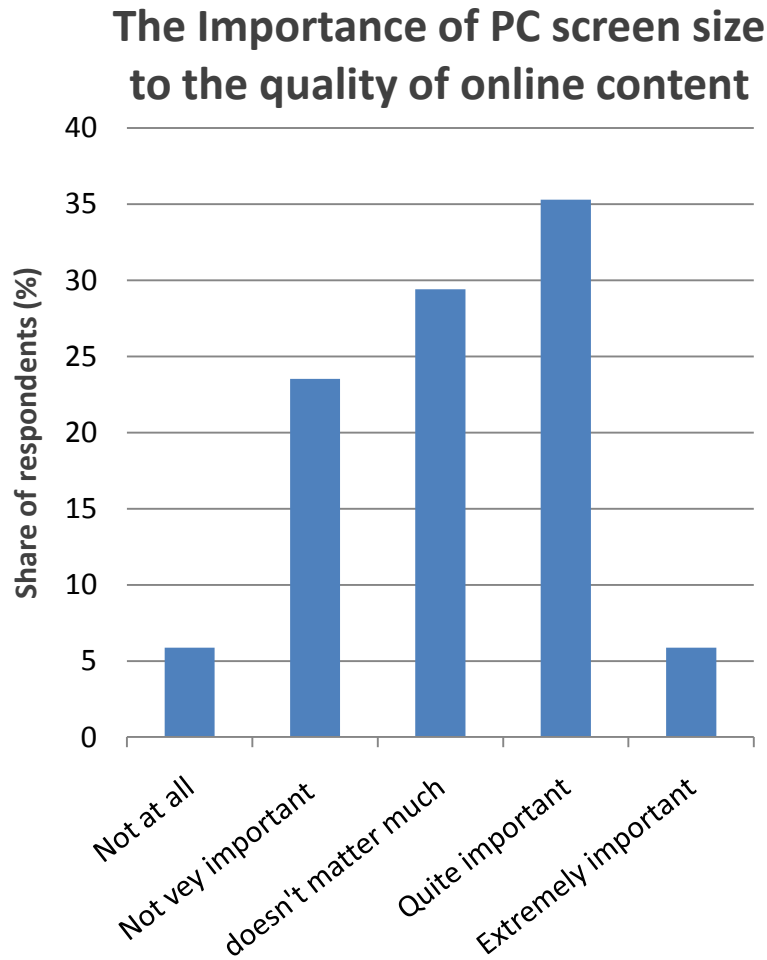
- Screen size was generally thought not to be that important
  - Weighted average rated between doesn't matter much and quite important
  - Movies were a bit of an exception

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

Thank you

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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