SURVEY REPORT:

Stream it Clean: Quality is the Key to Video Service Success
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SUMMARY

• Our survey focused on companies with so-called Direct to Consumer (DTC) video services (also called over-the-top video services) in market, or with plans to launch such services. Half of survey participants have already launched service. A third more will launch within the next year. Forty-four percent (44%) provide live content, and 38% provide a mix of short- and long-form content. Linear channels delivery is the least popular format, with just 18% of survey participants using it.

• We asked survey participants to think about the most important issues affecting their video service. Quality, with an average ranking of 8.2, is the most important issue. Efficient video workflow also ranks highly (7.4), as does video latency (6.9). Both of these issues are particularly important for services delivering live content.

• Given the importance attached to great quality, we asked the over-the-top video service providers (OVSPs) in the study what constituted “bad” quality. Video buffering is in the top three issues cited by 84% of our participants. Sixty-nine percent (69%) say audio synchronization problems are critical. Blurry or pixelated video is cited by 60%.

• Many OVSPs believe video buffering is the most important quality parameter to track. Over 70% say each of the two measures we offered (i.e., rebuffers per play and rebuffer rate) for tracking are the most important. Sixty-five percent (65%) say bitrate, which is often equated with delivered video quality, is very important. Sixty-three percent (63%) rate video startup time and 58% rate video latency (i.e., the delay behind the original video source in live delivery) as very important.

• This ranking of quality parameters changes somewhat once a service is launched. We asked the OVSPs with services in market to select the one parameter they would improve if they could. Again, the two rebuffing parameters are the top qualities selected by survey participants, with 25% each. Startup time and latency tied for the second slot, and bitrate was least selected by just 13%. This low ranking for bitrate does not necessarily mean it is unimportant. It’s more likely to show that many OVSPs are comfortable with their ability to deliver video at the target bitrates they have selected.

• With such an emphasis on quality, 44% of OVSPs have established key performance indicators (KPIs) by which to judge and manage their service performance. The rest either need to create these KPIs, or better communicate them to the people in their organizations with responsibility for the service. As to monitoring performance against the KPIs, OVSPs take various approaches. Twenty-three percent (23%) are comfortable allowing their content delivery network (CDN) partner to tell them how they are doing. Thirty-one percent (31%) either charge their ops team or a third-party provider with that responsibility. Twenty-eight percent (28%) recognize it as the responsibility of both the ops team and CDN working together.

• The CDN is clearly critical to achieving a quality video service experience. For this reason, quality trumps all other criteria (including cost) when an OVSP is selecting a CDN to work with. Sixty-nine percent (69%) rated it as very influential. The second most influential characteristic is service and support, with 56%. Given the collaborative relationship that is required to deliver a video service, OVSPs are wise to weigh service and support so highly. Price per gigabyte is the third ranked criteria (48%). The ability to handle sudden peaks in traffic is a notoriously difficult thing to do for video streamers, and it is ranked as very important by 46% of survey participants. Interestingly, having big-name clients did not seem to hold much sway with OVSPs. Less than a quarter think this is a very important criterion by which to judge a CDN.

• We asked those OVSPs with service in market if they are happy with their CDN. Fifty-eight percent (58%) said they were. However, nearly a
third were not sure. This is one situation where ignorance is not bliss. Those who are uncertain or unhappy with their current CDN are much more likely to consider moving elsewhere. Twenty-three percent (23%) of survey participants say they are considering switching their CDN.

• There is continuing concern about OTT video service security. Over two-thirds of survey participants expressed some level of concern about security, with piracy and cyber-attacks neck and neck as their primary worries.

ABOUT THE DATA
To better understand how corporations with media assets are planning to deliver them to end consumers, nScreenMedia partnered with Broadcasting & Cable and Multichannel News, two NewBay Media brands, to field a survey to 351 company managers with responsibility for the technological implementation of the video streaming service. The respondents were drawn from the following groups:
• Broadcast television stations, station groups, or networks (e.g., NBCU, KPBS, Sinclair)
• Pay television operation/MSO/MVPD (e.g., Dish Network, Charter, Surewest)
• Programmers, such as syndicators, studios, or other license holders (e.g., SyFy Network, Endermol, MGM)
• TV services, such as producers, distributors, talent groups, television rep firms, or other providers (e.g., Adreline Films, BBC Worldwide, Katz Television Group)
• New media, such as digital, Internet, or interactive companies (e.g., Netflix, Sling TV, AwesomenessTV)
• Other companies with video assets to be delivered to consumers (e.g., American Express, Proctor & Gamble)

Survey respondents were based in the United States and drawn from the following disciplines:
• Corporate Management
• Engineering/IT Management
• Programming Management

For ease of reading, this report will refer to all survey respondents as OTT video service providers (OVSPs). It will also refer to broadcast TV stations and groups, pay TV providers, and programming and services companies as traditional TV companies.

WHAT WE LOOKED AT AND WHY
The objective of the survey was to better understand how important video quality is to people planning to launch or already providing a consumer video service. The survey covered the following topics:
• The type of video service to be delivered
• How important video quality is to the success of the business
• How OVSPs plan to judge the quality performance of the service
• The impact of quality goals on the selection of a CDN
• What parameters OVSPs track
• What constitutes acceptable performance for these parameters

This report is made possible by the generous contribution of Akamai. Although the subject matter of the report is a collaboration between Akamai, NewBay Media, and nScreenMedia, Akamai and NewBay Media did not influence the data, analysis, and conclusions presented here.

THE DATA
Who We Talked To
Our primary interest was in speaking with companies that had video assets they intended to deliver direct-to-consumer (DTC) over the Internet. We found 224 such companies among the many we spoke with for our survey.

Almost half of the survey respondents had already launched service. Another 21% planned to launch service within the next six months, and almost a third within the next year. Twenty-two percent (22%) had no fixed date set, or they were uncertain when the service would launch.
This data suggests the brisk pace we have seen for the launch of DTC video services is liable to continue late into 2017 and beyond.

Survey respondents covered a wide variety of industries including broadcasters, pay TV operators, digital media natives, and many companies not directly associated with entertainment media. These video non-traditionalists come from a broad swath of organizations including schools, trade associations, PR agencies, magazine publishers, and even federal government agencies.

Remarkably, 43% of the video non-traditionalists we talked with have already launched a DTC video service, and a quarter more plan to launch service within the next year. This illustrates how the Internet is democratizing video entertainment and delivery. Any company with a message can deliver it directly to interested parties.

As we saw in our previous report *The State of Direct-to-Consumer Internet Video Services*, live streaming continues to capture the interest of OVSPs. Forty-four percent (44%) of survey respondents say they plan to deliver live content (with and without on-demand assets) in the DTC video service. Thirty-eight percent (38%) plan to deliver a mix of short-form (i.e., 20 minutes or less) and long-form (i.e., over 20 minutes) content. A third plan on focusing only on short-form material, while just 19% are planning episodic and movie-length video services. Least popular of all the formats is the venerable linear channel, with just 18% of respondents making that format the primary focus of the service.

![Figure 1: When will your DTC service launch?](chart)

![Figure 2: What content will your service deliver?](chart)
The Importance of Quality

There are many issues that can affect a video service business. We asked our survey participants to rank a group of six major issues on a scale of 1 - 10, with 10 having the most severe impact.

**Video Quality: Average ranking 8.2**

Delivering better quality video is by far the most important of the issues of the six we offered for consideration. Our survey participants seemed acutely aware of the impact of rebuffering and slow video starts. They recognize that quality issues pose the biggest threat to attracting and retaining subscribers and viewers of their service. The average ranking for this service is 8.2, which is much higher than the second place issue.

**Video Workflow: Average ranking 7.4**

One of the quickest ways to derail any video service is to have a poorly designed video workflow. Whether a service is providing on-demand content, linear channels, or live events, efficient end-to-end transit for the video is essential. To maximize the value of time sensitive media, such as news and sports, OVSPs must be able to simultaneously live stream, segment, annotate, and syndicate the content. For a purely on-demand service to retain interest, it must maintain a continual flow of new content. That means rotating video in and out of the service on a regular basis. No matter what the content type, an efficient video workflow is essential to a successful service.

**Visual Latency: Average ranking 6.9**

Given the importance of live delivery to so many of the survey participants, it is no surprise that latency is considered a challenge for many video businesses.

Latency can degrade service value in two fundamental ways. If a live stream is lagging behind a broadcast or an actual event, people can find out about a result or incident before they actually see it. This can be annoying for sports fans, but can also lead to legal and financial problems if a video service is supporting a sports betting franchise.

The lack of synchronicity between live streams also inhibits the ability to deliver new and potentially profitable features. For example, multi-camera angle delivery is not worth very much if all the views are not synchronized.

**Multi-screen Support: Average ranking 6.4**

It is somewhat surprising that multi-screen support was not ranked higher in importance by our survey participants. The average rating for this service is 6.4, which is much lower than the second place issue.

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1. Devices maintain a small buffer of the video being watched to help provide smooth playback. If there is a problem with the Internet connection and the buffer empties video playback freezes. This is called a rebuffering event.
participants. However, the low ranking of multi-screen delivery is perhaps more a testament to the fact that most OVSPs assume it is no longer a major issue for the industry.

**Offloading Network Traffic: Average ranking 6.4**

Streaming bandwidth is one of the major costs borne by a video service. Minimizing these costs contributes directly to the profitability of the business. In this context, it might seem strange that network offload is ranked so low in the problems presented to survey participants. However, this could merely be a reflection of the fact that these costs are generally falling over time, and it may not be the largest costs faced by online video services. Content licensing and creation are liable to be the dominant costs, and far outstrip the cost of streaming.

**Advertising operations: Average ranking 6.0**

Advertising operations are a critical part of any advertising supported video service. However, with the rise of programmatic platforms, the efficiency and speed with which advertising can be bought and sold seems to have allayed the fears of our survey participants.

### What Constitutes Bad Video Quality

Our survey group is very clear about what constitutes bad video quality—the number one item on their list is persistent video buffering. Eighty-four percent (84%) list this issue in their top three problems defining “bad” video quality. Indeed, there is no faster way to lose your audience than with frequent and long video pauses.

Having the audio noticeably behind (or ahead) of the video is rated by 69% of survey participants in their top three issues. Studies have shown that audio problems can be more annoying to viewers than video problems. For example, studies have shown and our survey participants consistently prefer video with higher audio quality. Blurry and pixilation video problems are rated by 60% of survey participants in their top three challenges, well behind audio sync issues.

Video lag behind the original source (latency) is rated by just 26% of survey participants in their top three examples of bad video quality. This is, perhaps, not surprising. For VOD services, latency is irrelevant to the video experience. The fact that the video stream is well behind a local broadcast may have no effect at all on the enjoyment of the viewed material for a linear service. And while latency is a challenge for live content, provided the picture is delivered with fidelity and reliability, it can still be enjoyed by the viewer.

### Measuring Quality

Given that buffering problems are rated so high by survey participants as examples of “bad” quality,
it should come as no surprise that buffering is the most important parameter to measure. We offered two different aspects of buffering performance for OVSPs to rate in importance.

**Rebuffering Dominates The Quality Equation**

Overall rebuffering rate measures the percentage of video streams that were impacted by a rebuffering event. The number of rebuffering events per play tells an OVSP how many times, on average, a video play was interrupted by a rebuffering event. Both parameters are important to know if you are to understand the impact on quality. For example, an OVSP specializing in long-form video might have a very high rebuffering rate, but low rebuffering events per play. In other words, many streams are impacted by rebuffering, but it occurs just once or twice during a movie playback. A viewer might put up with this situation. Conversely, many rebufferings during playback are liable to drive viewers away quickly.

Over 70% of survey participants rate rebuffering rate and rebuffers per play 8 times higher in importance.

We asked those OVSPs that had launched service what is an acceptable value for these rebuffering parameters. The most frequent answer from survey participants was “unsure.” This shows that, although rebuffering is perceived as a huge problem, few are aware of how to evaluate their performance against acceptable values. Of those that did answer, the most frequently cited value for rebuffering rate is 1%. One in every 100 streams experiences a rebuffering event.

**Bitrate is perceived as important**

Bitrate is the second most important parameter to our survey participants, with two-thirds rating it at 8 or higher in importance. Why should bitrate be a concern for OVSPs? Today, most video is streamed using adaptive bitrate (ABR) protocols. When Internet conditions worsen, ABR streaming servers reduce the bitrate of video streaming to ensure the viewing session doesn’t stall. Under these circumstances, the lower the bitrate, the lower the picture quality.

**Startup time and latency**

Startup time, the length of time between a viewer selecting play and the video starting, is rated as the fourth most important parameter. Sixty-three percent (63%) of survey participants rate it at 8 or higher in our survey. Minimizing latency is rated as least important, with 58% rating it 8 or higher.

Among those people who have a service already in market, the cited range for acceptable startup time is two to four seconds. Ten to fifteen seconds was the acceptable range cited by most for video latency.

**Does view of quality change after service launch?**

We wondered if people’s opinion of these quality parameters changed once their service was launched. We asked those survey participants with a service already in-market the following theoretical question to gauge this: “If you could improve just one of the following quality performance parameters, which one would it be?”
Rebuffering isn’t just a theoretical problem for OVSPs. A quarter of online video providers would improve either rebuffers per play or overall rebuffering rate if they could. However, bitrate appears to be much less important to those with service in market than those planning to launch service. Why is this so?

Bitrate is not a reliable measure of the quality of the video delivered. For example, on a smartphone, a relatively low bitrate video stream (1.5Mbps) will look good to most viewers. Delivering any more than that will not improve the viewer’s experience. This, perhaps, explains why just 13% say they want to improve it. However, that’s not to say that bitrate is unimportant. If a video encoder’s efficiency can be improved the bitrate required to deliver a good experience to smartphone users could be lowered to, say, 1.1Mbps. That saves the OVSP money (as they pay less for bandwidth) and potentially reduces other problems, like rebuffering.

Keeping Track of Quality

Clearly quality is very important to all the OVSPs in our survey. However, many are struggling to translate this concern into a specific plan for managing it. Only 44% of survey participants have key performance indicators (KPIs) in place for quality. Thirty percent (30%) say they do not have KPIs, and a quarter aren’t sure if their company has them in place or not.

Monitoring how the service is doing against the critical quality metrics can be difficult. Eighteen percent (18%) of OVSPs are simply unsure of how to they should do this. Twenty-three percent (23%) are willing to rely completely on their CDN to tell them how they are doing. This is like letting the fox guard the henhouse.

Twenty-two percent (22%) said they would use their internal ops team to monitor performance, and 9% said they would use a third-party.

### Figure 6

<table>
<thead>
<tr>
<th>Top quality parameters to improve (for survey participants with service in market)</th>
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</thead>
<tbody>
<tr>
<td>Rebuffering rate</td>
</tr>
<tr>
<td>Rebuffers per play</td>
</tr>
<tr>
<td>Bitrate</td>
</tr>
<tr>
<td>Startup time</td>
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<tr>
<td>Minimize latency</td>
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</tbody>
</table>

### Figure 7

<table>
<thead>
<tr>
<th>How video performance is monitored</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDN</td>
</tr>
<tr>
<td>My ops team</td>
</tr>
<tr>
<td>Not sure</td>
</tr>
<tr>
<td>Contractor</td>
</tr>
<tr>
<td>Ops team and CDN</td>
</tr>
</tbody>
</table>
contractor. However, both these options are difficult, if not impossible, to implement since at least some assistance from the CDN is required to be able to measure all of the parameters and isolate problem areas in the delivery.

The most practical approach, which only 22% say they plan to follow, is for the OVSPs ops team to work with their CDN to monitor the performance.

**Picking a CDN**

No service provider is more important to an OVSP than the content distribution network (CDN) they choose. Not surprisingly, the ability to deliver a quality experience is the most influential parameter they take into account when deciding who to work with. Sixty-nine percent (69%) rate quality as very influential in their decision about which CDN to use to deliver their video service to customers.

Service and support is the next most important factor taken into account when selecting a CDN. This pairs well with quality, as the OVSPs wisely recognize they will need the help of the CDN to resolve any issues they may encounter.

It’s interesting to note that quality and service and support trump how much the CDN will actually charge to deliver the video. Forty-eight percent (48%) said the price per gigabyte was very important when deciding on a CDN, making it about as important as the ability service peak traffic loads.

The lower rating for peak traffic loads is a little surprising. Servicing peak loads is one of the hardest things to do, particularly for live events. It is sometimes impossible to predict when a peak will occur and how big that peak will be. For example, a breaking news story or big sporting event can take a local video stream from a few hundred viewers to millions in a matter of minutes. For example, consider what happened to Sling TV, the new personal streaming service from DISH Network, during the NCAA basketball semi-finals.

In 2015, Sling TV was the only independent OTT service that provided access to live ESPN sports channels online. Consumers could get ESPN by subscribing to Sling’s base package of 20 channels for $20. For watching the NCAA quarter finals, Sling TV was literally the only game in town.

Unfortunately, according to Sling TV around 1,000 subscribers experienced pixelated and choppy video during the NCAA basketball games, and others were unable to sign up for service. Of course, Sling had to deal with 1,000 angry customers.

**Figure 8 What influences CDN selection? (Rated as very influential)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality performance</td>
<td>69%</td>
</tr>
<tr>
<td>Service and support</td>
<td>56%</td>
</tr>
<tr>
<td>Price per gigabyte</td>
<td>48%</td>
</tr>
<tr>
<td>Handling peak traffic</td>
<td>47%</td>
</tr>
<tr>
<td>Distribution network</td>
<td>38%</td>
</tr>
<tr>
<td>Good client portfolio</td>
<td>23%</td>
</tr>
</tbody>
</table>
customers calling in to complain about poor quality. However, the damage to engagement was likely more serious. Live sports is the most vulnerable genre to buffering problems, with the time spent watching falling as much as 90% when buffering occurs.

In Sling TV’s case, the company acted swiftly to rectify the problem. When another surge in watching and signups occurred two weeks later for the premiere of season 3 of Game of Thrones on HBO, the service seemed to cope both with the streaming and signup loads. Speaking at INTX afterwards, Roger Lynch, Sling TV CEO, had these sage words for anyone considering streaming live video: “Doing live TV is more challenging than on-demand. Don’t underestimate the difficulty of doing live TV.”

With 44% of our survey participants delivering live content, we might have expected more survey participants to be very concerned about the ability of the CDN to scale quickly.

Having a global or regional distribution network does not figure as a primary concern when shopping for a CDN. Neither does the quality of the client portfolio. It appears that results speak much more loudly than the names of a few big name companies.

Finally, we asked those OVSPs that have launched their video service how satisfied they were that their CDN was meeting the quality targets they expected. The good news for CDNs is that 58% say they are happy with the performance of their provider. Just 13% say they are unhappy. However, 30% are unsure if their CDN was doing a good job or not. This is not good for either the CDN or its customers. Because if a customer isn’t sure their CDN is doing a good job, they are more likely to change providers. Twenty-three percent (23%) told us that is exactly what they are planning to do.

CONCLUSIONS

The focus of OVSPs on quality is entirely appropriate. A poor delivery experience can negate all the investment in content and marketing that a company must make to launch its service. It can also be very difficult to recover from.

Consider HBO Nordic. The service launched in October 2012 in Finland, Sweden, Norway, and Denmark. Netflix launched at exactly the same time in those countries. HBO content was well known as the company that licensed many of its best shows to local broadcasters. The HBO name was still extremely well known. Because HBO content reached Scandinavia a year or more after its U.S. release, there was very high demand for the DTC service from the very beginning. Unfortunately, things did not go well for the service. Two years later, HBO Nordic only had a 4% penetration in the region, while Netflix reached 29%.

What went wrong?

The video experience was nowhere near television standards. HD quality and 5.1 surround sound was initially only available to the latest
Samsung smart TVs. Users also struggled with rebuffering and slow video starts. The company slowly moved to address these issues, but the damage was already done.

HBO Nordic was able to somewhat recover. After fixing problems with streaming quality and other issues like pricing and app experience, the company was able to increase penetration to 14% in 2015. However, it remains well behind its rival, Netflix, in the region.

One thing that those contemplating the launch of a DTC service would do well to consider is establishing KPIs for quality before launch. This is perhaps best done in consultation with CDNs considered to deliver the service. Not only will this allow the OVSP to more easily compare CDNs, it will also allow them to experience what service and support will be like with each vendor. OVSPs should also have a plan for how they plan to measure and monitor their KPIs. Again, consultation with the CDN is probably a good place to start.

The survey data also suggests it is in the interest of CDNs to educate their customers on how to measure quality. It is also in their interest to ensure customers know how their service is performing against those parameters, assuming they are doing a good job. From the CDNs point of view, customer ignorance is not bliss. Customers that aren’t clear about the current provider’s benefits are much more likely to move their business elsewhere.

About the Author: nScreenMedia is a resource to the Digital Media Industry as it transitions to the new infrastructure for multi-screen delivery. Through a mix of informed opinion, news, information and research, nScreenMedia helps you make sense of multi-screen media.

www.nscreenmedia.com

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