The Perils of Multiscreen Pay TV: and the $10B cost of making it all work

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EXECUTIVE SUMMARY

The definition of pay television service is migrating from a network dedicated to its delivery to one among many software services that run upon that network. This change brings along with it critical benefits, including flexibility and speed in implementing new and improved features. However, it also makes service operations much more challenging and expensive.

- The perils of OTT service delivery: an online pay TV operator failed to cope with a predictable peak load costing it U.S. $1 million in lost revenue and support costs.
- The perils of TV Everywhere: consumer confusion over how WiFi operates is costing an operator with 10 million subscribers €4M a month.
- The perils of customer owned devices: an authentication problem caused an hour outage that cost one operator U.S. $800K in call costs and lost revenue opportunity.
- The perils of operator CPE maintenance: one operator allowed a single bug in a cable modem upgrade that wound up affecting 10,000 subscribers and costing $3M to fix.

These operational challenges are costing pay TV providers in the U.S. and Europe nearly $10B in support calls and truck rolls, with $2.8B derived directly from operator failures. While some level of maintenance and operations costs is unavoidable, these figures seem likely to grow much higher as consumers switch viewing time from the managed pay TV network to the unmanaged home network.

The definition of pay television service is migrating from a network dedicated to its delivery to one among many software services that run upon that network

Operators are working to contain these costs in two ways:

- Improving processes to reduce the incidence of errors in their own products and services
- Improving instrumentation of the home network in order to make it more manageable and deterministic.

There are some strategies operators can employ to combat the growing complexity and cost of multiscreen service management.

As operators launch standalone OTT TV and TV Everywhere services, early detection of performance and experience issues is critical. To aid in that early detection, one operator is improving the network diagnostic capabilities of the software running on its customer premise equipment.

This approach can also be brought to customer owned equipment. Adding diagnostic and monitoring features to a TV Everywhere app running on a tablet or smartphone can be very useful in diagnosing and localizing problems.

Testing TV Everywhere apps with as wide a range of devices, and in as many network environments as possible before release is essential. And as operator set-top boxes become more web-centric and are updated more frequently, strategies employed to guarantee the quality of experience through them must change.

Certainly, the platform for delivering video services is becoming ever more complex and unruly. Luckily there are many things operators can do to contain the costs of ensuring a magical video experience from whatever screen a customer may use.

INTRODUCTION

One of the most important and least discussed functions of the pay television operator is network and service maintenance. In the past, providing 24x7 reliability in the managed operator network was hard enough. However, the move to TV Everywhere and multiscreen delivery is forcing operators to deal with issues in the unmanaged world of today's connected home.

The inglorious yet essential role of network and service maintenance is also one of the largest expenses faced by operators. Consider the following:[1]

- One large cable operator said that it allocated $1 per year per home passed just to cover the costs of employees to handle outages. Assuming this holds true for every operator in the U.S., that's $130 million a year just for staff to handle outages.
- Multiple European and North American operators told nScreenMedia that they budget call center staffing and facilities to handle 1 to 2 calls per household passed per year. That means U.S. operators are spending over $4.5B a year to handle all the customer support calls.
- Sending a service representative to a customer's home is also an expensive proposition. One tier 1 operator estimates that 7% of subscriber homes get a truck roll each, and each truck roll costs around $100. That adds another $700M a year of expenses in the U.S.

To handle calls, manage outages and provide in-home maintenance services to customers, U.S. operators are spending a staggering $5.3B a year to support the 100 million homes with pay TV, and European operators are spending €3.7B supporting 170M subscribers. In other words, U.S. pay TV operators spend over $50 and European operators €22 per year per subscriber to handle these issues.

Unfortunately, the signs are that this cost could be going up. Home WiFi, TV Everywhere and customer devices are all making the platform for delivering video services ever more complex and unruly. 60% of support calls can be traced back to two issues: in-home connectivity (WiFi problems and home wiring) and customer premise equipment (mostly customer owned devices). And with so many new ways for failures in service delivery to occur, the management burden on operators is starting to increase.

70% or more of customer calls are actually due to no direct fault of the operator.[2] That means U.S. operators are spending $1.6B to resolve the 30% of calls which are caused by some failure of the services they deliver. Likewise, European operators are spending €1.1B due to service failures. These problems include line cuts, router misconfigurations, software bugs, hardware failures and a host of other problems.

In this white paper, we will look at some of the ways networks and services fail, and the likely cost of those failures. Drawing on specific examples from operators in the North American and European markets, the paper focuses on four "perils" faced by operators as they step up to the challenges of delivering a 21st century television service.

About this white paper

The examples and data points attributed to operators used in this paper are derived from a series of interviews with European and North American operators conducted in February and March of 2015. Given the sensitive nature of failures in the network and with services, the operators asked that they not be identified in the paper.

THE PERILS OF OTT VIDEO DELIVERY

Some operators are launching standalone OTT services to provide a different formulation of pay TV service for customers who have resisted the traditional approach. And every operator is launching TV Everywhere solutions to give their subscribers access to the content they pay for on their connected devices. This is new territory for operators used to dealing with managed network delivery of television. It also brings with it a whole host of new potential problems.

One of the most visible and problematic issues when delivering live video online, particularly sports, is poor quality. Failing to deliver HD quality is bad enough, but pixilation and video stream stalls are even worse. For an illustration of how big a problem this can be for operators, consider what happened to Sling TV, the new personal streaming service from Dish Network, during the NCAA basketball semi-finals. [3]

> "Doing live TV is challenging. A lot more challenging than on-demand. Don't underestimate the difficulty of doing live TV."
>
> Roger Lynch, CEO Sling TV

Sling TV is the only independent OTT service that provides access to the live ESPN sports channels online. Consumers can get ESPN by subscribing to Sling's base package of 20 channels for $20. For watching the NCAA quarter finals, Sling TV is literally the only way to catch the game in town.

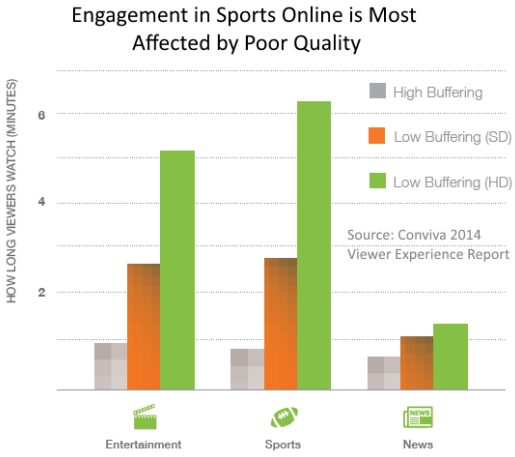
Unfortunately, according to Sling TV around 1,000 subscribers experienced pixelated and choppy video during the NCAA basketball games, and others were unable to sign up for service. Of course, Sling had to deal with 1,000 angry customers calling in to complain about the poor quality. However, there was an even more costly problem caused by the outage.

Sling TV has set out to target millennials, particularly those who do not have pay TV service. This group uses social media much more than the rest of the population. 55% share bad experiences with their social network. [4] Assuming the majority of Sling customers experiencing video quality and signup problems were millennials, they would have reached nearly 700,000 people with their negative experiences through Facebook alone.[5]

Many of those people seeing these negative posts were likely millennials themselves. Since 27% of the population are millennials and 37% of those do not currently have pay TV services, nearly 200,000 of Sling TV's target market received a strong negative impression of Sling TV. If just 5% of those were dissuaded from subscribing to Sling TV, the company will miss out on $1M in revenue over the next year.

In Sling TV's case, the company acted swiftly to rectify the problem by deploying new software for its cloud streaming solution. 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, CEO Sling TV, 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."

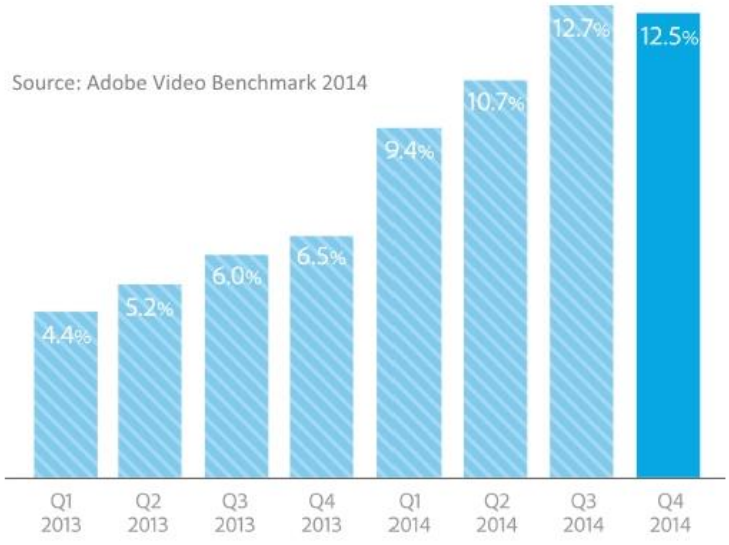
The problem of poor quality video online is far more common than you might think. And sport is particularly vulnerable to it. According to Conviva, typical engagement time for HD quality sports is over 6 minutes. That drops dramatically, to under 3 minutes, if the quality is standard definition.[6] A sobering statistic for anyone delivering live sports online.



THE PERILS OF TV EVERYWHERE

TV Everywhere (TVE) is on the precipice of entering the mainstream amongst pay TV subscribers. Adobe's Primetime handles most of the TVE authentications in the U.S. and the company says usage has seen huge growth over the last year. The first quarter of 2014 saw the number of pay TV subscribers actively viewing TVE content reach 9.4%, an increase of 45% over the previous quarter.[7] By the end of 2014, 12.5% of subscribers were logging on through TVE.

The vast majority of TVE usage takes place on connected devices in the home, leveraging home WiFi in the process. This makes the home router a critical component of pay TV service delivery.



PAY-TV SHARE OF ACTIVE QUARTERLY TV-EVERYWHERE VIEWERS

SHARE OF ACTIVE VIEWERS

Yet the majority of consumers simply don't understand the limitations of WiFi in the home. For example, a major European operator told nScreenMedia that it frequently receives calls from angry customers claiming they are not receiving the broadband speed they are paying for. Upon further investigation, the call center employee often discovers that the customers are running a broadband speed test from a WiFi connected device in a room distant from their router. In this situation, it would be surprising if the customers were getting anywhere near their full rated broadband speed!

Simply put, WiFi is a mess in the home. Interference on the 2.4GHz band, distance from the router, thickness of walls and quality of the router antenna are just some of the variables influencing performance. Little wonder that home WiFi is the single biggest issue generating calls to the operator's customer support.

Though customer support can often resolve the customers WiFi issues over the phone, some problems require that a technician be dispatched to the customer's house. One operator told nScreenMedia that the home router is usually replaced by the technician on these calls. Further, when the old router is analyzed by a technician at the operator's facility, more often than not no fault is found with the device.

The calls, the truck roll and the (often needless) router replacement are costing operators a lot of money. Assuming 30% of support calls are WiFi related, 1 in a hundred results in a truck roll, and just 30% of those result in replacement of the router; an operator with 10M subscribers is spending €4M a month on home WiFi issues.

It could be that this problem is about to get much worse for operators. Adobe forecasts that 18%, nearly one fifth, of pay TV subscribers will be TVE users by the end of 2015.

THE PERILS OF CUSTOMER-OWNED DEVICES

In times past, the first thing most people did when the alarm went off in the morning was to listen to the radio, or flip on the TV for a news fix. Connected devices are changing all that. In North America, 44% of cellphone owners admit to taking their smartphone to bed with them.[8] And, of course, it is only natural to wake up and reach for that device to watch the morning news through a TV Everywhere app on the phone.

One large European operator found out about this change in behavior the hard way, when a CDN issue cascaded into a torrent of angry customer calls. The operator's CDN had a problem at 8 a.m. one morning that prevented people from being able to log in through the TVE mobile phone app. The problem persisted for over an hour, during which time the customer service department was inundated with calls about the issue. Needless to say, many of the callers were less than pleased not to be getting their morning news fix.

> "Every software release is full of bugs, and customer devices are not very resilient."
>
> Senior Operational Manager, Tier 1 European Operator

Customer owned devices also come with a hidden vulnerability for operators. With set-top boxes, operators are completely in control of when and how a software update is rolled out to a box. With connected devices, this process is in the hands of the user. Many of them have elected to automatically receive software updates on their mobile phone and tablet for the apps they use every day. A problem with a TVE app that slips through the testing process would automatically be picked up by many users. And many would be unaware they were running a new version. Consequently, if a bug slips through, a large number of people will be very likely to encounter it.

Conversely, customers who have automatic updates turned off on their devices may encounter problems in software that were fixed many releases ago. Nonetheless, this often results in a call to technical support.

In both these scenarios an operator might count itself as lucky to receive a call to customer support. At least then the problem can be corrected and the customer can go back to happily using the app again. Unfortunately, many users simply remove the app from their device, though they may not go quietly! Far more people leave negative comments about their experience than positive. For example, 55% of millennials share their bad experiences online through their social media sites. Conversely, only 43% of millennials have "liked" more than 20 brands on Facebook.

What are the potential costs of an 8 a.m. TVE authentication bug? For a 10M subscriber operator, 200,000 subscribers are likely to see the bug*. If just 5% call the operator, that generates $300,000 in costs.

However, if 55% of those who see the problem post about it, nearly 40M will hear about the issue.[9] Since quarterly pay TV churn is 8.9%[10], at least one person in the 135,000 households that will churn in the next quarter will hear about the bug. If just 5% are dissuaded from switching to the operator, it misses out on $500,000 in subscriber revenue in that quarter.

Unfortunately, these scenarios are far from fanciful. As one operator put it: "Every software release is full of bugs, and customer devices are not very resilient." This statement highlights one of the biggest challenges for operators. In the past, the delivery of television services was based upon a tightly controlled physical network comprised of wires and set-top boxes. The delivery of TVE services, however, is fundamentally a software infrastructure. If, as the operator says, software releases are full of bugs, this represents one of the biggest vulnerabilities a modern pay TV operator must face.

* According to Digitalsmiths Q4 2014 Video Trends report, 25.2% of subscribers have the operator TVE app installed on their device and 18.4% use it more than once per week.

THE PERILS OF CPE MAINTENANCE

While users might forgive a failed stream start in a TV Everywhere app every now and again, they expect their pay TV service to work every time they turn on the television. Unfortunately, problems occur in the network all the time. Operator after operator told nScreenMedia that hundreds of issues occur every day in the network, though most of these are completely invisible to customers. This is thanks to the heavy investment operators have made in the resilience of their network, ensuring every major component and link has a backup.

Unfortunately, one area for which there are no backups is customer premise equipment (CPE). These are, quite literally, single points of failure. And even here software plays a greater and greater roll. Hybrid set-top boxes receive guide and software updates on a daily basis, cable modems get firmware updates to activate new functionality or protect against a new vulnerability to hacker attack.

> "Every change bears a risk. The bigger the change, the bigger the risk"
>
> Head of Operations, Tier 1 North American Cable Operator

As one operator told nScreenMedia: "Every change bears a risk. The bigger the change, the bigger the risk." That is why operators have adopted one of the most rigorous testing and quality regimes of any industry. Part of that quality regime requires operations staff to only implement changes between midnight and 6 o'clock in the morning. That way, if anything goes wrong, there is time to rectify it before most customers have a chance to notice. According to a North American operator, 95% of all the changes go well. Unfortunately, that means 5% don't, and some of these failures can cause major problems.

One senior operational manager in a North American operator recounted how he had put in place a careful procedure for making firmware updates to the cable modems. That involved rigorous testing before roll-out and then, once satisfied with the update, rolling it out gradually one network node at a time. A bug got through during this rollout that affected a specific revision of hardware. Unfortunately, this impacted all 10,000 modems on one network segment, rendering them completely useless (turning them into a 'brick', as the operator put it). The operator was forced to buy new modems, and send a truck to every home to replace each one over the course of a few days. Just to handle new CPE, customer calls and truck rolls, the cost to the operator to resolve this issue was $3M.

As software complexity increases in the STB, so too does the list of bugs, especially in hybrid boxes. They are designed to allow frequent updates, but that also means the possibility that bugs get through similarly increases. Though bugs that cause an immediate STB crash are rare, other types of bugs are not. For example, software memory leaks are very common and can be tough to find.* These type of bugs may persist for weeks, months and years and their deleterious effect builds up over time until the STB freezes.

A manager at a North American operator said they take a defensive approach to memory leaks by rebooting the STB every night. The set-top box monitors its activity, waiting for a period when the box is not being used, and then executes a reset. Another operator agreed this seemingly extreme solution to the memory leak problem is a good defensive strategy. Though he was quick to add that it was not necessary with his STBs.

* A memory leak is caused when software reserves some memory to use while it is running, but fails to release it again when it is done. These memory leaks build up over time gradually eating up all available memory until the STB crashes.

CONCLUSIONS

It has always been expensive to maintain a reliable and robust network for the delivery of pay TV services. Line cuts, equipment upgrades, set-top box failures and configuration changes all contribute to these costs. And some of these failures are avoidable. For example, some operators were unable to handle the flood of pay-per-view requests for the Mayweather-Pacquiao "fight of the century."[11] That said, it is impossible to eliminate all of the failures. However, the addition of the home network, connected set-top boxes and Internet to the delivery platform of television is likely to drive these costs much higher.

There are some strategies operators can employ to combat the growing complexity and cost of multiscreen service management.

As operators launch standalone OTT TV and TV Everywhere services, early detection of performance and experience issues is critical. Nipping a problem in the bud, before most customers even know there is an issue, will reduce support calls. It will also minimize the risk to an operator's reputation, and may actually enhance it. Were someone to see an issue and post to social media about it, it may be fixed by the time anyone else sees the post. Hopefully others will comment they don't see the problem.

> As the platform for video services becomes ever more unruly, there are things an operator can do now to contain the costs of ensuring a magical multiscreen experience.

To aid in that early detection, one operator is improving the capabilities of the software running on its customer premise equipment. It is adding the capability to run a network speed test from the cable modem directly to the headend. With this in place, when a customer calls complaining they are not getting their rated broadband speed, the support technician can immediately localize the problem.

This approach can also be brought to customer owned equipment. Adding diagnostic and monitoring features to a TV Everywhere app running on a tablet or smartphone can be very useful in diagnosing and localizing problems.

Testing apps with as wide a range of devices, and in as many network environments as possible before release is essential. Unfortunately, this is an onerous task as the permutations and combinations of OS version, device brand and WiFi environment are almost endless. Luckily, there are companies specializing in this type of testing and quality assurance which operators can turn to.

Even strategies employed to guarantee the quality of experience through the humble set-top box must change. With hybrid boxes receiving daily software updates, keeping ahead of the pernicious memory leak problems might also seem an impossible task. However, adopting a continuous testing approach that closely mimics real-world usage should ensure early detection of even the worst of problems.

Certainly, the platform for delivering video services is becoming ever more complex and unruly. Luckily there are many things operators can do to contain the costs of ensuring a magical video experience from whatever screen a customer may use.

References

[1] Data in this section was obtained directly from pay TV operators who declined to be identified in this paper.

[2] Operators in the U.S. and Europe provided estimates to nScreenMedia during interviews in early 2015 that between 25% and 30% of support calls were due to some operator failure.

[3] Peter Kafka, *Sling TV Says It Dropped the Ball During March Madness. When Will Web TV Be Ready for Primetime?*, re/code, April 5, 2014, recode.net/2015/04/05/sling-tv-says-it-dropped-the-ball-during-march-madness-when-will-web-tv-be-ready-for-primetime/ (accessed on 4/8/15)

[4] Adena DeMonte, *Infographic: The Rise of the Millennials*, Badgeville Blog, Dec 18, 2013, badgeville.com/2013/12/18/infographic-the-rise-of-the-millennials (accessed on 4/5/15)

[5] According to Facebook the average user has 338 friends.

[6] Conviva, *Video Experience Report 2014*, Conviva, Q2 2014, www.conviva.com/vxr-home/2014-viewer-experience-report/ (accessed on 3/9/15)

[7] Adobe, *Digital Video Benchmark 2014*, Adobe, Q2 2015

[8] Aaron Smith, *U.S. Smartphone Use in 2015*, Pew Research Center, April 1, 2015, www.pewinternet.org/fact-sheets/mobile-technology-fact-sheet/ (accessed on 4/5/15)

[9] Ibid. Adena DeMonte

[10] Digitalsmiths, *Q4 2014 Video Trends Report*, Digitalsmiths, Q2 2015

[11] R. Thomas Umstead, *Mayweather-Pacquiao Packed PPV Punch*, Multichannel News, May 4, 2015, www.multichannel.com/news/content/mayweather-pacquiao-packed-ppv-punch/390378 (accessed on 5/4/2015)

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