



DELIVERING LIFE IN THE MOMENT

Conversational Video Assured

Introduction

A father travelling on business in California calls his children in New York to tell them goodnight. He can see their delighted faces and hear their laughter as he reads them a cherished bedtime story. A classroom full of children in Texas watches as a paleontologist excavates a newly discovered Tyrannosaurus Rex, in a remote corner of Montana, while talking to them of a scientist's life in the field. They hear the swish of his brush, watch the patient tap of his pick as he uncovers an ancient bone, and can see the joy of discovery in his eyes as they ask him questions. This is the power of conversational video: people everywhere, in the moment, living their lives together visually in a way that audio alone cannot provide.

Over the last several years, the widespread, low-cost availability of high-speed internet access, coupled with the proliferation of inexpensive and small, yet powerful computing devices, has led to an explosion in subscribers' online video consumption.

An astounding 2.5 exabytes traversed mobile networks globally, each month in 2014—that's more than the contents of 107 million Blu-ray disks! Of all that data, 55% was dedicated to video content delivery alone, and it is soon expected to approach 70-80%. Presently, most online video usage stems from popular streaming video sites such as YouTube and Netflix, but increasingly conversational video, or interactive video calling, is coming into the picture. Skype (owned by Microsoft), Facebook and Google are some of the more familiar names bringing what was once exclusively used in corporate boardrooms, to the consumer in a big way.

In this paper, we discuss the dazzling revenue potential of conversational video along with the potential hazards it poses for Communications Service Provider (CSP) networks, if costs are not controlled. The key internet video delivery technologies are outlined, and we discuss how they may be utilized to ensure that consumers' growing desire for high-quality conversational video can be met without risking CSP investments in high-capacity mobile and fixed-line networks.

Conversational Video: A Complex Ecosystem for a Simple Need

Conversational video meets the simple human desire to see as well as hear the person to whom you are speaking. First imagined in the late 1800s and delivered via highly specialized networks in the mid-twentieth century, conversational video has been a great, but largely unfulfilled promise in the marketplace for many years. Fortunes have been spent developing the technology, but seldom made.

Although video telephony first saw limited financial success in the corporate teleconferencing market, it remained expensive and demanded high-speed, dedicated networks, even as it became available over standard Internet Protocol (IP)-based delivery technologies in the 1990s. The advent of free applications such as Skype and Apple's iChat in the early 2000s, began to push video calling into the realm of the average consumer with a decent internet connection. In today's world of high-speed fiber to the home (FTTH) and LTE mobile networks, there has been a gold rush-like influx of new video content delivery companies and devices, such as gaming consoles, wireless-enabled TVs and players, as well as tablet PCs.

Conversational video's major market players - Apple, Google, Microsoft and Facebook - have made use of innovative new video compression and IP technologies, even pushing them onto smartphones and small mobile devices. As a result, operators are now delivering conversational video from these over-the-top (OTT) providers to their subscribers, whether they want to or not. But the delivery is far from free for these operators, who provide the enabling network but are generally left out of the high-value revenue streams created by advertising and content creation.

Despite the advances in compression technology, conversational video is still extremely data-intensive, to the point that internet speeds slow to a near stop for many subscribers. This situation

Key Facts about Mobile Video

(Source: Cisco VNI Global Mobile Data Traffic Forecast Update, 2014-2019)

- By 2019, nearly 75% of global mobile data traffic will be video
 - Between 2014-2019, mobile video will grow at a CAGR of 66%
 - By 2019, 17.4 exabytes of video will cross mobile networks each month
 - Conversational video is being pushed onto the market by world-leading companies including Apple, Google, Microsoft and Facebook.
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NETSCOUT Integrated Suite

The Video and Media Assurance solution is part of an integrated package designed to ensure operational and commercial success with conversational video.

Iris Session Analyzer (ISA) uncovers and analyzes the specific calls and sessions that fail to deliver upon the required performance parameters.

Iris Alarming and Reporting offers fast-alarming dashboards that allow you to proactively monitor and segregate traffic quality by type.

Traffic Analysis provides advanced identification and resolution of network service and infrastructure performance issues—often before your customers are impacted.

Comprehensive Video and Media Assurance

NETSCOUT's solution is a comprehensive toolkit for ensuring the quality performance of your valuable video services.

- Support for conversational video (person-to-person calling, telepresence, H.264/ RTP/H.248)
 - Support for streaming video (RTSP/RTP/ HTTP, ABR)
 - Monitor SLA compliance for VIP users
 - Ensure quality and reduce customer churn and retention costs
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very quickly creates dissatisfaction among customers who feel that their provider is not living up to its promise of “high-speed” internet access. Customers often churn to other providers in search of better service.

To address this problem, CSPs worldwide are being forced to find solutions that will capitalize on current infrastructure investments while addressing the IP video traffic explosion. Expensive network expansions are no longer the answer, since subscriber revenue does not justify the investment. One outcome of this disturbing development has been an end to “all you can eat” data plans. But the question remains: how do you get your subscribers to pay for video delivery services when they are used to receiving them for free?

Fortunately, there is hope and indeed, great promise in another shift occurring in consumer perceptions - the willingness to pay more for high-quality video delivery. According to Infonetics, “Many operators are moving toward charging a premium for better video experience...” (Global Telecom and Datacom Market Trends and Drivers, 2nd Edition, 2014). This trend is also supported by the growing number of fee-based video services offered through Amazon, Hulu, sling, iTunes and entities such as ESPN, NFL, CBS Sports, just to name a few. This then answers the question above: offer better quality video delivery service for an incremental fee.

But with the proliferation of so many devices, applications and services along with the difficulty in distinguishing online conversational video traffic from other data traffic, a dilemma is posed - how do network operators provide high-quality conversational video delivery and segment the service into a billable revenue stream? The solution lies in the ability to detect, monitor and report on the root delivery mechanism itself.

Conversational Video's Emerging Standards

Online video delivery applications are divided into two distinct service categories of “Streaming” and “Conversational”. They share common video encoding and decoding methodologies, which is true of nearly all major applications whether they deliver streaming services, such as those provided by Netflix and YouTube or conversational services, such as those found on the new iPhone 6S and many models of Android- and Windows-based smartphones. This common compression technology, developed by the International Telecommunication Union's Telecommunication Standardization Sector (ITU-T) is called H.264 and it has excellent compression characteristics and a scalable range of complexity and resolution profiles. H.264's wide range of uses stems from its ability to operate successfully within the processing power and screen size constraints of whatever device is producing and playing the video.

H.264 retains high-quality video by compressing the stream of full video frames into a series of “I”, “B” and “P” frames. I-frames are “independent”, full-picture frames which do not refer to any other frame in the video sequence. P-frames and B-frames are “predicting” frames which refer to another frame. Each carries just enough data to convey the changes necessary for the decoder to rebuild the next frame with associated changes in motion and color.

Although H.264 is the codec most commonly deployed by video delivery devices and applications worldwide, it continues to evolve. The ITU-T, the International Standards Organization (ISO/IEC) and the Moving Picture Experts Group (MPEG) are currently developing a new standard known as “High Efficiency Video Coding” (HEVC) or H.265, which boasts twice the data compression rates while still delivering the same quality. Already on its second version, H.265's adoption rate by developers and manufacturers has been slow.

In addition to using H.264 for data compression, most internet-based conversational video applications deploy Session Initiation Protocol (SIP) for establishing video calls and the Real-time Transport Protocol (RTP) for carrying the actual media stream.

Both standards were developed by the Internet Engineering Task Force (IETF) and are highly proven technologies that include built-in Quality of Service (QoS) features.

Technology standard developments such as these have helped to usher in a vibrant market for conversational video that could supplant traditional voice-only calling. As we have seen, consumers are increasingly willing to pay for these services, if video quality can be assured. Fortunately, some pioneering vendors, NETSCOUT among them, have utilized these widely adopted industry standards to develop specialized service assurance tools for segmentation, monitoring and quality control of conversational video.

Conversational Video Assurance

Although the underlying operations are extremely complex and nuanced, efficient conversational video calling can be achieved by being proactive in three basic areas of administration. First, sufficient network throughput and satisfactory admission controls must be ensured. Second, transcoding, number of hops-per-call and the total path length per call, must be minimized. Third, end-to-end delay, packet jitter and packet loss must be immediately detected and reported.

Meeting the demands of conversational video call administration, however, requires a specialized toolset. NETSCOUT's Video and Media Assurance solution is one such tool capable of operating in real-time and scaling to meet the needs of the world's largest operators. Integrated into the award-winning Iris suite of applications, this tool establishes a unique "Mean Opinion Score," (MOS) for conversational video that is used to provide a constant quality benchmark. Using the video call MOS, the fastest Mean Time to Detect (MTTD) and Mean Time to Repair (MTTR) are guaranteed by the system. This translates into minimal impact to service quality and delivery when problems do occur.

Because it is integrated into the already widely-deployed and well-understood Voice Assurance model, the Video and Media Assurance solution requires little specialized training for support personnel and may be quickly integrated into existing operations.

Conclusion

Conversational video represents both a huge new source of revenue for service providers and a potential vulnerability. Consumers, ever drawn to new, inexpensive and audiovisual forms of communication, are finding it available on many popular devices and increasingly easy to use. It is a risk in terms of the network capacity problems it generates and the difficulty in charging for a service that consumers consider free.

Where conversational video is concerned however, consumers are now showing an increased willingness to pay extra for the delivery of a high-quality product. Fortunately, industry standards and advanced toolsets, such as those offered by NETSCOUT, have emerged to provide operators with the ability to profitably deliver conversational video, while maintaining the high-quality of service demanded by subscribers. It's a win-win situation that leverages the true potential of high-speed networks - to let people live and share their lives in the moment.



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