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Managed Online Services: Responding to Emerging Content and Apps

By Andrew McDonald and Jim Guillet

The allure of new revenues from a managed digital television service offering hit its stride in 2004 when the world's leading service providers began making decisions about the requisite service delivery architecture for IPTV. The technical challenges of IPTV were significant: the service requires a cost-effective architecture that delivers high subscriber scale, high bandwidth throughput per-subscriber and high concurrency. Furthermore, IPTV is a "managed" service due to the strict quality of service requirements needed to deliver a high quality and "always on" experience to the mass market of TV-savvy consumers. The new requirements of IPTV service delivery were extensive and drove a new network architecture.

The evolved network architecture now needed to provide distributed, fine-grain policy enforcement with centralized policy control to deliver multiple services to subscribers, including managed services such as IPTV and voice as well as unmanaged services such as High Speed Internet (HSI) access. In addition, the architecture ideally would utilize all parts of the network to deliver and enforce policy end-to-end.

Now, with IPTV architecture decided, the priorities of service providers is shifting to maximizing the return on investment of their new, strategic residential triple play foundation. Specifically, attention is shifting to new, innovative solutions that exploit the new network's ability to create new services and business models that go beyond the initial, mass market requirements of triple play.

One such challenge is emerging broadband applications and content delivered "over the top" (OTT) of consumers' Internet access service. Service Providers are seeking a positive, value-centric approach to embrace OTT as an opportunity. Specifically, they are looking for an architecture that will enable deep packet inspection (DPI) as well as even more fine-grain application assurance (AA) within the triple play network that will allow operators to broaden their triple play portfolio with a suite of complementary and managed on-line services. This allows service providers to position themselves in the value chain as facilitators of highly-personalized, managed and unmanaged services that enable consumers, content owners, application owners, advertisers - and other key actors in the value chain - to choose the quality of experience they want for the content they care about and at a price

they are prepared to pay.

Triple Play Service Definitions and Delivery Architectures

A good place to begin a discussion on services and supporting delivery architectures is with the current residential triple play portfolio as defined at the IP service edge. Existing triple play service definitions can be positioned according to their average bandwidth per subscriber and whether the service is managed or not. IPTV, for example, is a managed service with quality of service, high sustained bandwidth per subscriber and high concurrency. High Speed Internet (HSI) access service, by comparison, is unmanaged in the sense that the service definition offers "best effort" access to a pool of bandwidth shared amongst the Internet community. Being highly over-subscribed, the average bandwidth per subscriber for HSI is typically in the 10 to 100 kb/s range. Finally, VoIP service refers to the service provider's own broadband digital voice offering and is a managed service with low average bandwidth per subscriber.



Viewed from the IP service edge, all three service definitions are different, with IPTV being the most difficult to deliver. Simply put, these differences and IPTV's new requirements drove service providers to choose a new service delivery architecture for their triple play networks. Now, a few years after deciding upon a new architecture, video is again creating another challenge: this time for video delivered over-the-top of a consumer's HSI access service. The challenge with the growing OTT phenomena is its impact on the HSI service definition, the engineering rules embedded in the underlying network and the corresponding affect both have on the consumer experience.

HSI service delivery was the driving force behind first-generation broadband networks deployments that begin in the late 1990s. The legacy HSI service delivery network is comprised of access, aggregation and service edge elements. From a consumer perspective, applications with bursty traffic patterns such as email and general web browsing deliver an experience largely defined by the broadband access technology. Indeed, operators have traditionally marketed their HSI access

services according to their peak download speed e.g., users could choose between a 2Mb/s, 4 Mb/s or higher speed “download” service.

With the advent of video-rich applications generally and long-form video content specifically, the traffic pattern becomes less bursty and more steady state. When enough subscribers consume video concurrently, as is the case today with OTT video, their combined behavior begins to impact the always present, but seldom felt, engineering rules at the IP service edge: as the demand for higher average bandwidth grows, the over-subscription factor defined at the IP service edge for the HSI service definition is stressed. When this happens, the HSI access service’s best effort congestion management system kicks in, resulting in an unpredictable traffic flow. This is how the Internet service is designed to work: a community of users share access to a pool of bandwidth and during periods of congestion all members receive equal treatment. While this “best effort” experience is suitable for many applications, video is not one of them.

Enhanced triple play architectures have introduced significant upgrades from first-generation broadband network solutions - that tunnel “best effort” Internet traffic across the network - by providing distributed, fine-grain enforcement with centralized policy control to deliver multiple services to subscribers. These architectures use every part of the network to deliver and enforce policy, ensuring every service is delivered to subscribers with its required quality of service. Equally important, the policies defined at these multiple and distributed, end-to-end service touch points are managed centrally through a sophisticated subscriber management system.

The phrase “video changes everything” was often heard in 2004 when operators were deciding their IPTV architectures. It is applicable again for today’s challenges of OTT video delivery and HSI service delivery over legacy, Broadband Remote Access Server (BRAS) -centric networks. Video requires a cost-effective architecture with high subscriber scale, high bandwidth throughput per subscriber and high concurrency.



Now, with new application assurance enhancements to triple play architectures, service providers can exploit the new capabilities to offer a positive, value-centric solution for OTT video.

Over-The-Top Video: Threat or Opportunity?

Is OTT video a threat or an opportunity for service providers? Like many challenges in telecom, the answer is a bit of both. From an IP service edge point of view, the adoption of OTT video by consumers is attempting to change the HSI access service definition. OTT video wants to pull the HSI service bandwidth-usage range upward, increasing the average bandwidth per subscriber. The issue for service providers is that video rich content drives up the average bandwidth per subscriber, thereby stressing the engineering rules defined for HSI at the IP service edge.

For consumers, the statistical nature of HSI service means early adopters of long-form video delivered OTT received more average bandwidth than others, and along with it, a reasonable quality of experience ... but only for a while. Once the majority join in the fun, the Internet's best-effort congestion management system makes its presence known. (That's how it's designed to work.)

Amongst the many expressed opinions about the Internet, there are signs that the fundamental business issues have begun to receive public attention. A good example is the following quote from a traditional television broadcaster on the importance of their on-line consumers receiving their OTT programs with a high quality of experience:

"Nothing can be more debilitating than having a
bad experience and no one gets the ad"

Albert Cheng, EVP Digital Media, ABC

At the risk of stating the obvious, this quote sums up the challenge of ad-funded content distributed over the Internet: if the on-line experience is bad, consumers don't see the ad and the content owner doesn't get paid.

Given all this, the question remains: what is an appropriate response by Service Providers to OTT?

Initial attempts to manage the growing OTT phenomena have had mixed results at best. Some operators chose to preserve the status quo by augmenting the Internet's best-effort congestion management system with course-level traffic throttling of Peer-to-Peer (P2P) traffic, a key distribution protocol for OTT video. This "cost control" strategy was greeted with negative publicity due to the discriminatory nature of traffic shaping generally and the control service providers' exercise in determining which traffic is "good" vs "bad." Furthermore, it's a negative proposition for service providers who are essentially spending money to stop consumers from using the network services they're fundamentally in business to sell.

Adding more bandwidth is another approach taken and is often the default starting point for many operators. Alas, this approach too has its limitations due primarily to the way P2P protocols work and the way power users run them. While most

networking protocols and users respect the Internet community's spirit of sharing a common resource equally, a single P2P application presents itself on the network as being up to 100 separate applications and, in aggregate, takes a disproportionate allocation of bandwidth. Furthermore, file sharing enthusiasts often run P2P applications unattended thereby generating non-stop traffic volumes on the Internet. Consequently, the benefit of adding more bandwidth may not be realized by the majority of users. And without a corresponding increase in revenue, there comes a point where adding more is no longer financially sustainable.

Neither of these approaches embrace OTT video as an opportunity. They're either a negative proposition (i.e., cost control) and/or have issues of business sustainability and benefit realization. Service providers need another option and applying managed service concepts to broadband content provides such. Adding a portfolio of managed on-line services to the triple play service offering gives consumers – and other key actors in the value chain – freedom and choice to choose the experience they want. There are no regulatory barriers preventing operators from offering managed services for either business or residential customers. Furthermore, TPSDA provides the required infrastructure constructs to deliver a managed on-line service that is fully compliant with the principles of net neutrality.

Managed On-line Services: A Positive, Value-Centric Approach

Managed On-line Services leverage new triple play architecture innovations and application assurance technology to deliver high quality on-line services that allow consumers – and other key actors in the value chain – to choose the experience they want. Complementing HSI service, the expanded portfolio of managed and unmanaged service offerings provides a positive, value-centric response to consumer and content provider demands. The combined portfolio for on-line services enables service providers to embrace the OTT phenomena. Managed On-line Services use new bandwidth that is "managed" according to the quality of service parameters required to assure a high quality of experience for a specific broadband content or application. They may include strict Service Level Agreements (SLAs) and could include offers for managed on-line video, managed on-line gaming, managed on-line Virtual Private Network (VPN) access – even a managed service for 3rd party VoIP... the possibilities are unlimited.

Managed On-line Services expand the opportunities and business models for service providers as facilitators of value that is exchanged amongst consumers and partners. Service providers use the new triple play architecture to offer a complete portfolio of complementary and concurrent services including IPTV, voice, managed on-line services and - arguably the easiest service to deliver – HSI. Subscribers choose the services they want for the quality of experience they desire. In addition service providers can now expand their relationships with content providers, application providers, advertisers, and other key actors in the value chain by facilitating a value exchange based on "managed" bandwidth. The expanded portfolio creates opportunities for new revenue, which service providers can use to upgrade their broadband infrastructure and improve the end user experience of all services delivered by it.

New leading triple play architectures provide the required policy-based architectural foundation to enable Managed On-line Services. Drawing upon distributed policy enforcement and Application Assurance, the best solution provides fine-grain application granularity to mark specific on-line content for which the appropriate quality of service is subsequently applied. The best solution will also possess centralized policy management to allow policy profiles on a per-subscriber, per-service and per-application basis for significant application-level intelligence and control with lots of queues. This total solution defines the next phase of subscriber management and enables service providers to offer a full complement of managed and unmanaged services allowing unlimited personalization on a per-subscriber, per-service and per-application/content basis.

Conclusions

This article describes a positive, value-centric response to emerging OTT content. It provides the 3rd option – the missing piece – service providers need to develop and evolve new revenue from business models and services delivered over next generation residential broadband networks. For those who view the role of a service provider as being to deliver services, then the new triple play architecture discussed in this article is the solution.

“The rise of a broad array of rich online services and applications delivered over triple play networks is changing how service providers must architect the network. By taking a high-touch approach to managing subscriber preferences and application requirements, such as with Alcatel-Lucent’s TPSDA, triple play providers can deliver a superior online experience and provide additional value to subscribers, content owners, application providers, advertisers and other key actors in the value chain.”

David Vorhaus, Associate Analyst, Yankee Group

By enhancing the triple play portfolio for consumer services with new, managed on-line services, service providers can position themselves in the value chain as facilitators of managed and unmanaged services that enable subscribers and business partners to choose the experience they want, for the content they care about, and at a price they’re prepared to pay.

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