

A Zeugma Systems White Paper by Tom Meehan

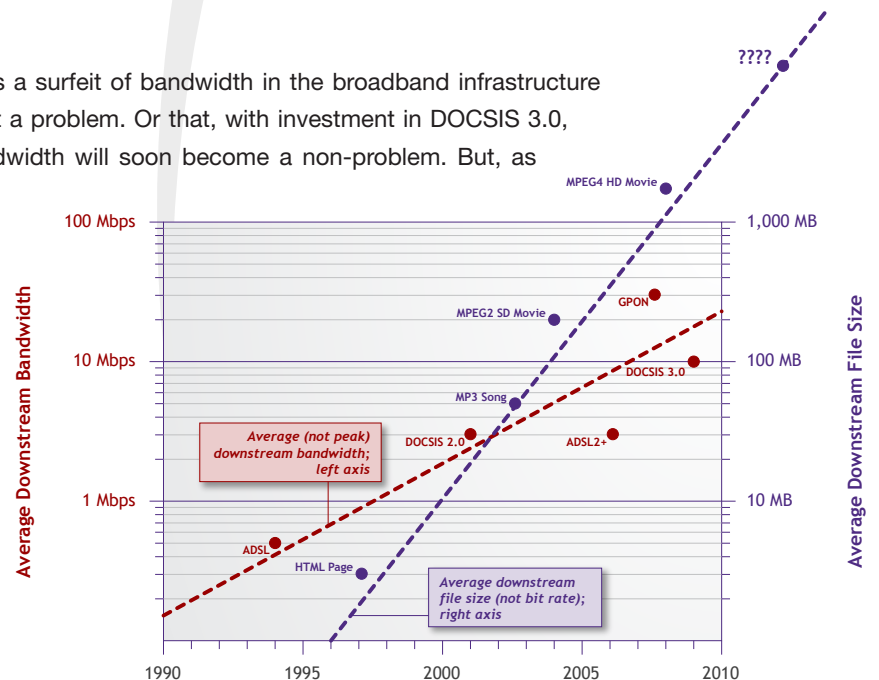
Handling Long-Form, High-Definition Over The Top (OTT) Video

Many years ago—during what historians will one day refer to as the “End-of-the-Second-Millennium Tech Bubble”—there was a clever advertisement on television. A tired, bedraggled salesman pulls into a dilapidated motel in the middle of the desert and, upon checking in and asking the inattentive twenty-something clerk if movies are available, is told that they have every movie ever made in any language at any time. I forget the name of the company that ran the ad (like many such companies, it probably no longer exists), and it was obviously ahead of its time by a decade or two (much to the chagrin of its investors), but the point was prescient. Today, new video products, services, and storefronts are turning up every day, and many speculate as to where this all leads. Undoubtedly, the richest television experience would be one in which an infinite content library was instantly available with the high-definition resolution required by increasingly ubiquitous 40- or 50-inch flat-panel HDTVs.

Internet-delivered, or over the top (OTT), video is the only medium capable of delivering this richness. But while IPTV delivery systems can tightly control bandwidth and quality of service (QOS), OTT video traffic is lumped together with all other traffic and forced to share constrained network resources. As a result, the OTT experience, while great in promise, has thus far been primarily a YouTube-ish sort of thing—PC-based, low-resolution, short-form video. To truly harness the ubiquity and flexibility of the web as a delivery medium for high-quality video, the broadband infrastructure requires additional capabilities.

Some believe that there is a surfeit of bandwidth in the broadband infrastructure and that this is simply not a problem. Or that, with investment in DOCSIS 3.0, GPON, and LTE/4G, bandwidth will soon become a non-problem. But, as figure 1 depicts, while available bandwidth has increased nicely since the dawn of broadband, the demand placed on that broadband infrastructure has increased at an even faster pace. This graph illustrates two critical points. First, it shows average downstream bandwidth, not peak.

Figure 1
Bandwidth Supply Versus Demand: A Growing Imbalance



Since it can take hours to download long-form HD videos, the speeds that a broadband technology can achieve in isolation and for a few milliseconds are meaningless. Second, since everything we do on the web is really the transfer of a file from one device to another, file size is the most important demand benchmark to look at. This is true even for streaming media; the only difference is that the destination device does not store the file.

So if bandwidth will not solve the problem, what will? Clearly, additional capabilities are required within the broadband network to ensure effective delivery and consumption of long-form, high-definition video.

Identification

The first necessary capability, which is possibly somewhat obvious but is missing from many broadband edge architectures, is to identify sessions carrying OTT video. This requires the examination of each and every flow traversing the network, along with the flow's associated signaling and control protocols, to determine when a high-definition OTT flow is starting. Some providers have used deep packet inspection (DPI) devices to help with this, but the requirement is much broader and more expansive. Some industry analysts have begun using the term deep session inspection (DSI) to describe this level of flow identification.

Policy

The broadband network must also have the ability to determine how to treat an individual session. This is obviously a policy question. Service providers will want to market services to consumers that provide guarantees associated with OTT video sessions; policy information is what will tell network elements which sessions to promote and which to leave alone.

Quality of Service

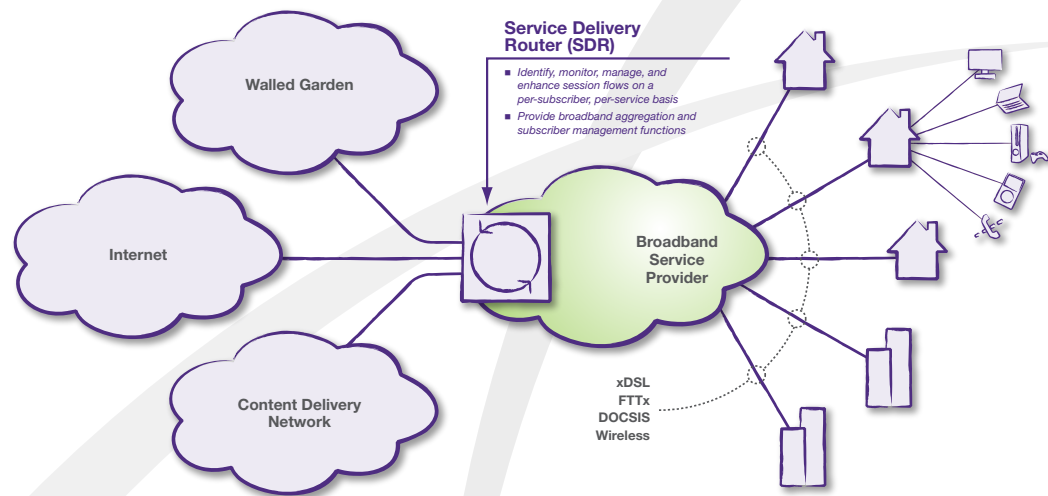
Finally, once we've identified a session carrying OTT video and determined that it should receive a specific quality of service, the network must be able to enforce that service guarantee. This requirement goes far beyond simply applying priority tags to the session so that downstream devices treat it with greater respect, it means carving out bandwidth, possibly incremental bandwidth, for that particular session, and then releasing the bandwidth at the end of the session.

A New Type of Network Element

Some analysts have proposed collapsing this combination of capabilities, together with general subscriber management, edge routing, and broadband aggregation functions, into a device known as a service delivery router (SDR). SDRs would typically be deployed at aggregation points where the broadband remote access server (BRAS) is deployed. SDRs could be used in conjunction with BRAS infrastructure or replace it.

Figure 2

The Service Delivery Router (SDR)



The primary function of the SDR is to enable the creation and delivery of new services on a per-subscriber, per-flow basis. One of these services, the promotion and bandwidth guarantees for video, may be a fundamental requirement if long-form HD-based OTT video is to become commonplace—and if the vision espoused in the TV advertisement described above is to become a reality.

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