



Content streaming by deploying adaptive streaming

IP Streaming: consumer preference and emerging business

Consumer industry has always been extremely quality and cost sensitive. Consumer demands high quality products, services at competitive price point. In addition to this, consumer expects newer products introduction at much faster interval than any other market. These market dynamics puts sever pressure on profitability of device manufacturer. These challenges are becoming more critical as emerging technologies coming into home entertainment. IP streaming is one such capability gaining popularity in recent times.

Home entertainment had traditionally been centered on viewing TV program over linear medium. This was limiting for the user to exploit more benefits from device. Broadcasters were constrained in tapping revenue beyond fixed service subscription cost of service. Need was felt to have additional capability on the device to offer more services & interactivity to establish additional revenue stream. Having non liner medium like IP has been obvious option.

This opened up several options for the network operators to offer value added services, varied content and apps so as to enrich consumer experience and motivate consumer to spend more. With internet boom, PC user has been enjoying wide variety of content available on web.

Consumer and service provider felt the need for having IP capability on consumer devices as well clearly to leverage web services, content.

Problems associated with IP streaming

Delivery on IP channel gets limited by the last mile delivery pipe which is typically much more limited in overall bandwidth. Fiber-to-the-home is an option but yet to get widely deployed in cost efficient manner. Typically, only the current linear channel or specifically requested video-on-demand (VOD) content stream is delivered over the network connection at any given moment.

Coming from a completely different direction, Internet video delivery has always suffered from unmanaged shared unstable varying bandwidth network. Video content require higher data rates and very low rates of packet loss or delay. This quality criterion is extremely challenging to satisfy due to unstable bandwidth which manifests itself in erosion of consumer satisfaction because user experiences long startup times, stuttering playback, degraded video quality and unpleasant audio effects.

As a result device manufacturer, content distribution companies find difficult to keep consumer interested in their services of content streaming. They face the problem of reliably projecting subscriber base, revenue and so on so forth.

IP delivery mechanism on consumer devices is in evolution and stabilization phase. Like any other technology adoption curve, exploitation of IP adoption will slow down if consumer satisfaction index does not improve and interest level of service operator, content owners and technology providers does not increase. Wide spread adoption means more innovation more growth.

So what is the option?

Does it mean enjoyable video experience can only be provided in a controlled network environment? Realistically, IP delivery pipes cannot be terminated at devices and are insulated from the dynamics and unpredictable nature of a general purpose broadband service. This approach is not practical, cost effective and scalable. Delivery approach based on variable bit rate adaptive streaming is expected to be long term solution where QoS is client managed instead of network managed.

Adaptive streaming

Adaptive steaming technology evolved on PC good aspect is its delivery format is well suited for content delivery on embedded platform as well. This delivery technology uses HTTP protocol for its strength that is efficiency and scalability.

Encoded streams are offered at different bit rates and formats as parallel streams divided into several logical chunks having clear start and end time. Each client device dynamically detects the network condition to fetch the segments synchronized with start and end time.

Network evaluation and appropriate chunk request happen in real time during the playback. These chunks are lined up according to start and end time for playback. Entire cycle remains transparent to the user and he is unaware of stream switch, video stutter or re-buffering.

By this technique every user can enjoy the streaming according to its network condition. If user has high bandwidth available to him then he can experience HD quality streaming whereas other user with lower quality bandwidth can enjoy appropriate reception as per their network condition.

In summary every user can experience uninterrupted streaming with highest quality appropriate to its network conditions. Therefore adaptive streaming offers optimum quality to the user by making use of existing content distribution network and highly scalable HTTP technologies

Deployment of adaptive streaming

From deployment standpoint, having HTTP based delivery mechanism work even better because infrastructure is hugely popular and deployed broadly this also means any other proprietary streaming protocol such as RTSP, RTMP would not get as much as deployment due to heavy requirement of CAPEX from content distribution network companies instead these companies can focus on improving their HTTP infrastructure.

There are several adaptive bit rate technologies are being introduced with different format by different players but one thread is common to all of those that is HTTP. Dominant players and standards are from Apple's HTTP live streaming; Microsoft Silverlight architecture based smooth steaming and recently published Dynamic adaptive Streaming over HTTP (DASH) specification.

Conclusion

Advancement in steaming technologies by use of variable bit rate of adaptive streaming is most likely the future scenario. Though dominant players like Apple and Microsoft are propagating their specified formats yet common HTTP thread will ensure that adaptive streaming remains the winner and in coming time consumer will experience uninterrupted streaming of true HD content on his device. Having HTTP being massively deployed, it becomes nature choice for the operators and content distributors to continue supporting adaptive streaming with higher scalability and efficiency.