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Evolution of the Set-Top Box

By Jesse Cryderman

One of the most annoying factors with TV services is the set-top box (STB). This big, clunky extra piece of equipment that subscribers need to find space for and pay to rent--all so the service provider can deliver and charge for their services. To make matters worse, each time a customer moves or upgrades services, they require a new STB and must return, deliver, and arrange to receive a new one. Even though some cable operators such as Comcast have come a long way with their "take it with you" program, it still begs the question: does anyone really need a STB anymore?

While I doubt that anyone loves their set-top box, they do perform valuable services and they are an integral part of the modern TV-video experience. More appropriately, STB are seen as home media gateways: they authenticate subscribers, provision and decode video streams, and deliver time-shifting and recording capabilities as well as on-demand features.

With that said, the set-top box, in its current incarnation, has become a relic of our video past. Like similar entertainment relics, it's become antiquated, cumbersome, and it doesn't match the aesthetic of modern entertainment systems.

However, declaring the set-top box dead is both premature and misses the point. The set-top box is on its way out, but the essential functions it performs aren't going anywhere. So what will replace it?

The Video Game is Changing

Before we unpack the future of the STB, some discussion of the underlying video delivery technology is warranted, as there are two standards at play--standards that prevent me from swapping my Verizon FiOS STB for a Comcast STB. Although time-shifting and video-on-demand (VOD) has made cable TV look and feel a little like internet TV, it is indeed different.

From inception, cable was a one-way broadcast system. The technology then evolved to create return paths on the lower frequencies to send commands "back to base" from the set-top box. Today, the Data Over Cable Service Interface Specification (DOCSIS) predominates. The fastest iteration is DOCSIS 3.0

(deployed by MSOs like Comcast) can deliver around 150Mbit/s download speeds and about 100 Mbit/s upload. DOCSIS 3.0 also enables MSOs to deliver video over IP.

Internet Protocol TV (IPTV) is video programming delivered via packets over a two-way session, just like all other internet traffic. Verizon FiOS, AT&T U-Verse, and all forms of internet over-the-top (OTT) video such as Hulu and Netflix are IPTV. By nature, IPTV is interactive, non-proprietary, and the de facto communication standard for all things internet.

Cable and IPTV lack interoperability today, but this reality may only last another five to 10 years. The communications networks of the world are slowly moving to all-IP, packet-based technologies. Since the model of the future is all about coopetition (aggregating and layering numerous service ecosystems to create new service experiences), IP is the standardized language of the future. It's only a matter of time until everything is IP-based, including video from the cable guy. Numerous MSOs discussed IPTV strategies at The Cable Show last year, and in preparation for the eventual transition, Comcast plans to test an IPTV network at MIT this fall. Meanwhile, major OTT plays by Apple, Google, and Roku are underway to snatch as much of the market share as they can.

Set-Top Box Market Outlook

The turn away from the STB market has been clearly signaled via recent actions by heavyweights Cisco and Google. First, Cisco made headlines by spending $5 billion to acquire video software enabler NDS, reigniting rumors that Cisco plans to sell its set-top box unit Scientific Atlanta. Soon thereafter, Google was reportedly shopping Motorola's set-top box division.

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Cisco CEO and Chairman John Chambers said the decision to purchase NDS is about, "enabling content and service providers to deliver new video solutions that leverage the cloud and drive new monetization opportunities and service differentiation." He was more blunt when questioned by the Atlanta Journal-Constitution. "This isn't [about] set-top boxes. It's how you bring video into the home, into wherever," Chambers was quoted as saying. "This is right now our sweet spot for where we want to go."

During a webcast on Mar. 15, Chambers went on to explain his vision for the future of video. "Video will be the new voice. It will be pervasive, on any device, anytime."

Dr. Abe Peled, executive chairman, NDS, also commented on the evolving nature of video and the impact of the acquisition, saying the companies "are uniquely positioned to enable service providers to deliver fresh and exciting multi-screen video services to their customers."

"The total value of the three markets at stake--the pay-TV STB industry, the pay-TV software and security industry and the pay-TV network infrastructure industry--are sizable. Respectively, they equate to about $13 billion, $4 billion and $10 billion," wrote said Tom Morrod, senior principal analyst of TV technology for IHS in a recent report.

"While STBs will continue to represent a large market for U.S. cable companies, over the long term, multi-screen device access increasingly will become the core metric that determines the scale of operators' coverage," he continued.

If the future is multi-screen, where does that leave the set-top box?

The Multi-Screen Advantage

"To cash in on this trend, operators need digital rights management technology and a compelling user interface that can be ported across multiple devices," said Tom Morrod. "The U.S. cable equipment market has been rife with news and rumors of corporate acquisitions and sales--all of which point to a shift in emphasis away from STB hardware and toward multi-screen software and services."

Consumers certainly prefer viewing video content wherever, whenever, and on whatever device they choose. It doesn't make sense to manage two separate standards in order to deliver this content. End-users also want to be able to access all their video subscriptions from a single location. To this end, all-IP set-top-boxes are a stop-gap eventuality, and they already exist from numerous third-parties like Roku, Google, Apple, and even Wal-Mart.

However, the core components of a home media gateway--user authentication, rights management, and interface--can all be software-based and ported to any number of devices. In this manner, it could even be argued that home media gateways in the form of app-enabled tablets, connected televisions, and Bluetooth players are an evolved form of the set-top box. Perhaps an unlikely device category that may be well poised to replace the set-top box altogether.

The Video Game Console is Evolving

Wildly popular massive multi-player online gaming has driven a hunger for bandwidth and interactivity that has produced some interesting offspring. To support online multi-player gaming, video game consoles have been sporting internet connectivity since it was originally delivered over a phone line

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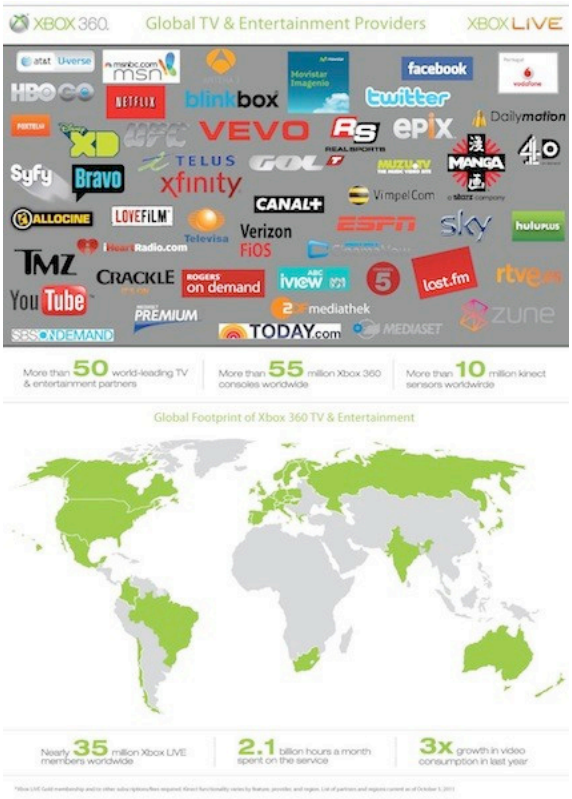
(Sega Dreamcast). Flash forward, and the blazing hardware and high-speed wired and wireless connectivity in today's video game consoles make them the perfect home media gateway. And they're cool. A Sony Playstation 3 was designed with sleek in mind. The same cannot be said for my Motorola set-top box.

Agile OTT video providers like Netflix were quick to jump on the market opportunity, and quickly rolled out apps for video game consoles. The plan worked. Soon, more people were watching IP-video through video game consoles than any other device; and the trend has continued. New research from Leichtman Research Group, Inc. indicates that "Video game systems are the key connected devices, as 28 percent of all households have a video game system connected to the internet."

What's more, Netflix subscribers who use the XBOX 360 as their gateway watch more video. According to Sandvine, "On average, a Netflix subscriber using an XBOX 360 has about twice the daily consumption as an average Netflix subscriber (suggesting 80 GB per month)."

One Box to Rule them All: The Rise of the XBOX

If there's one video game console positioned to replace the set-top box and become the multi-service media gateway of the future, its the Microsoft XBOX 360. What's interesting, though, is that its not so much the device as it is the massive content ecosystem Microsoft has cultivated with XBOX Live. This aggregation of video content from numerous top service providers is unmatched. As you can see in Fig. 1, the XBOX Live gateway provides access to more than 50 leading entertainment partners. This includes standard OTT players like Netflix and Hulu Plus, but also telco TV from Verizon (FiOS) and AT&T (U-Verse), individual networks like ESPN and Bravo, and cable offerings from Comcast (Xfinity) and others.



Word is spreading. Michael Humphrey of *Forbes* recently wrote, "As a premium gaming device, it is much more than that: it's a vision of the future. It's a box that could potentially deliver everything in entertainment you want — and just what you want — through one portal."

It gets better. With the Microsoft Kinect hardware, users can interact and control their video experience like never before, via gesture, facial recognition, and voice. There are already 10 million Kinect users worldwide. And let's not forget the global footprint and user base, the massively popular games, the coolness factor of the XBOX 360, and the possible deep integration of the newly acquired Skype. In the near-term, I see the XBOX 360 as a real game changer. In fact, if the Windows Phone can truly become a third force challenger in the mobile world (which is a huge if), and all Xbox Live content is available over the Windows Phone, we may be looking at the future already.