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Intelligent Broadband Networks

Global Internet Phenomena Spotlight

Netflix Rising



Executive Summary

As iTunes is to music, Netflix is to video - is this a new syllogism? In the "Fall 2010 Global Internet Phenomena Report", Sandvine revealed that Netflix traffic accounted for 20.61% of downstream traffic during peak period in North America. In the months that followed the report's October release, the Netflix statistic was repeated thousands of times in media articles, analyst reports, conference presentations, and consumer blogs. Even today, almost 7 months later, "Netflix is 20% of downstream traffic" continues to appear in articles discussing Internet traffic.

NETFLIX

The report also shed light onto the first few weeks of Netflix' expansion into Canada, hinting at dramatic service uptake and potentially massive implications for Canada's service providers. Netflix' venture into Canada is no doubt being carefully monitored by service providers around the world, for it gives them an idea of what might be in store in their own backyard if Netflix pursues further international expansion.

7 months is an eternity in the Internet age, and much has changed since the Fall 2010 report was released. Since that time:

- Netflix has added 6.7 million subscribers.¹
- Netflix introduced a "Streaming Only" service tier in the United States, mirroring the only service available in Canada. In announcing the new service, Netflix CEO Reed Hastings said, "We are now primarily a streaming video company delivering a wide selection of TV shows and films over the Internet."²
- Netflix Canada has continued to expand the library of available content and has grown to become a top application on Canadian broadband networks.
- Netflix posted a blog entry showing the performance of US and Canadian networks as measured by bandwidth delivered.³
- Netflix announced a deal to air exclusive content, the television series "House of Cards", reportedly outbidding major networks including HBO and AMC.⁴
- Information has repeatedly surfaced⁵ hinting at Netflix' continued international expansion plans, with reports suggesting Europe, Latin America and Asia are the prime targets.⁶
- Streaming on Nintendo Wii and Sony Playstation 3 no longer requires a physical disc.⁷
- Apple began shipping a version of the AppleTV with integrated Netflix streaming.⁸

What does all of this activity mean for the Internet providers of the world? Several prominent findings are enclosed in this report.

Netflix has achieved subscriber penetration of 28% in the United States and 11% in Canada, and the average Netflix subscriber consumes more than a gigabyte of data per day. Both of these metrics (market penetration and daily data consumption) continue to grow at aggressive rates.

1. For more information, visit Netflix' Investor Relations page: <http://ir.netflix.com/index.cfm>

2. Slattery, Brennon. "Netflix Streaming - Only Plan Arrives with Price Hike"> PCWorld. 22 November 2010. Web. <http://www.pcworld.com/article/211321/netflix_streamingonly_plan_arrives_with_price_hike.html>

3. For more information, read the blog post at: <<http://techblog.netflix.com/2011/01/netflix-performance-on-top-isp-networks.html>>

4. For more information, visit: <<http://www.deadline.com/2011/03/netflix-to-enter-original-programming-with-mega-deal-for-david-fincher-kevin-spacey-drama-series-house-of-cards/>>

5. For more information, read the article "Sources: Netflix Thinking World Domination" by Steve McClellan at: <<http://www.adweek.com/news/technology/sources-netflix-thinking-world-domination-104108>>

6. For more information, read the article "What Netflix CEO hopes U.S. won't notice" by Etan Vlessing at: <<http://www.hollywoodreporter.com/news/what-netflix-ceo-hopes-us-28218>>

7. For more information, visit Netflix' blog at: <<http://blog.netflix.com/2010/10/wii-and-ps3-to-be-disc-free.html>>

8. For more information, visit: <<http://www.apple.com/pr/library/2010/09/01appletv.html>>

Netflix users who access the service through a gaming console exhibit larger daily data consumption of around 2.5 GB per day, although changes to default codecs mean that Canadian subscribers who don't override these settings now use about 1/3 the daily data as they did before the changes to the defaults were made.

Finally, in the 7 months that have passed since Sandvine released the Fall 2010 Global Internet Phenomena Report, Netflix' remarkable growth has continued - it now accounts for 29.70% of all downstream traffic during peak period.

It is difficult to understate how truly staggering the growth has been. Lest the reader think that this phenomenon is limited to peak period, even when measured over 24 hours, and when measuring all traffic (upstream and downstream), Netflix is #1.

Netflix is now the undisputed bandwidth king of the Internet in North America.

Even doubters (if there are any left) must now agree that the age of Internet video is upon us. Subscribers have clearly embraced the Netflix streaming service, fundamentally altering the Internet landscape. Furthermore, the success of Netflix' expansion into Canada suggests that it is not a phenomenon localized to the United States.

With the company poised for continued international expansion, fixed and mobile Internet providers worldwide must plan for a future in which on-demand video (whether provided by Netflix or another service) is a large proportion, if not the majority of, last-mile traffic.

Market Penetration

In their most recent quarterly filing, Netflix announced that they have 23.6 million subscribers, of which 800,000 are in Canada. Sandvine is in the somewhat unique position of being able to measure similar statistics independently. Using our Network Analytics product, we can measure the absolute numbers and percentage of total broadband subscribers who use Netflix; Figure 1 (a large network in the United States) shows the percentage of total subscribers who have visited Netflix.com in the past 30 days. Similar reports for Canadian networks suggest 9-11% penetration at the end of March.

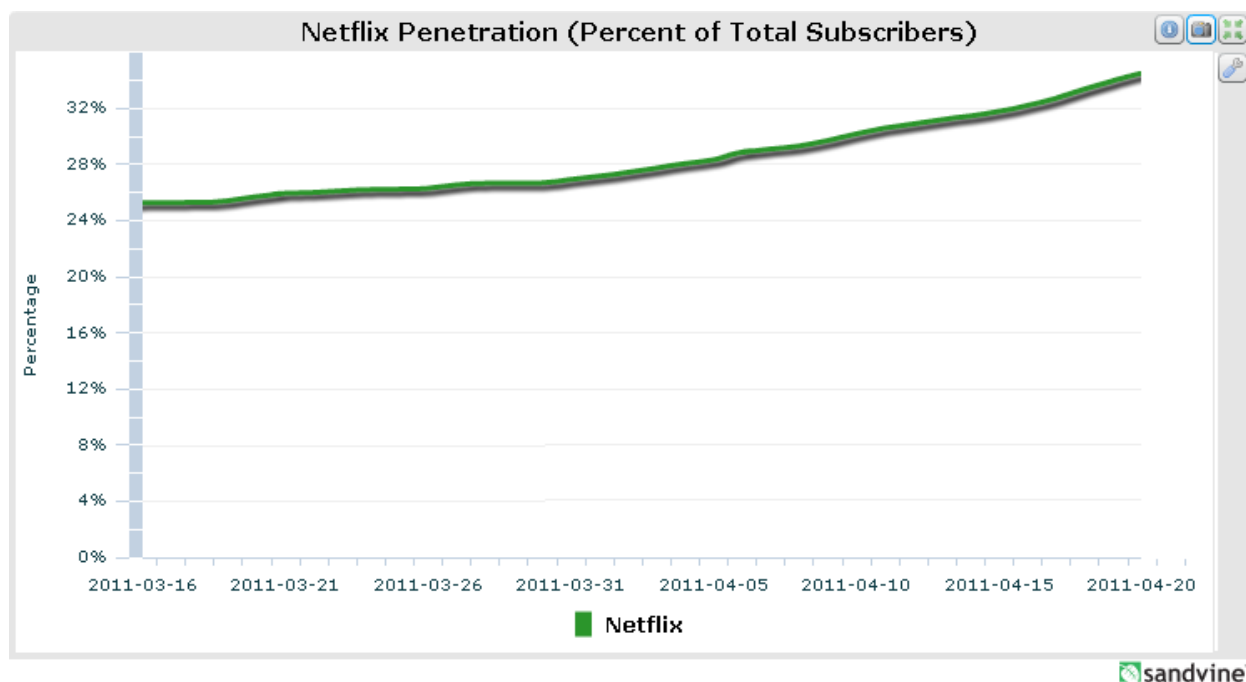


Figure 1 - Netflix Market Penetration (United States)

Assuming that these networks are representative of the United States and Canada in general, then do these numbers align with what Netflix themselves are reporting?

Assuming there are 81 million broadband-connected households in the United States and 8 million in Canada, then Netflix' reported numbers for March 2011 suggest roughly 28% market penetration in the U.S. and 11% in Canada. Both of these calculated market shares closely match what Sandvine observes on networks in each country.

Another interesting metric is the percentage of active subscribers who use Netflix on any given day; this metric is plotted in Figure 2. The peaks correspond to Saturdays and Sundays, showing that Netflix traffic is heaviest on weekends. Perhaps most important for service providers, the trend is continuing steadily upward.

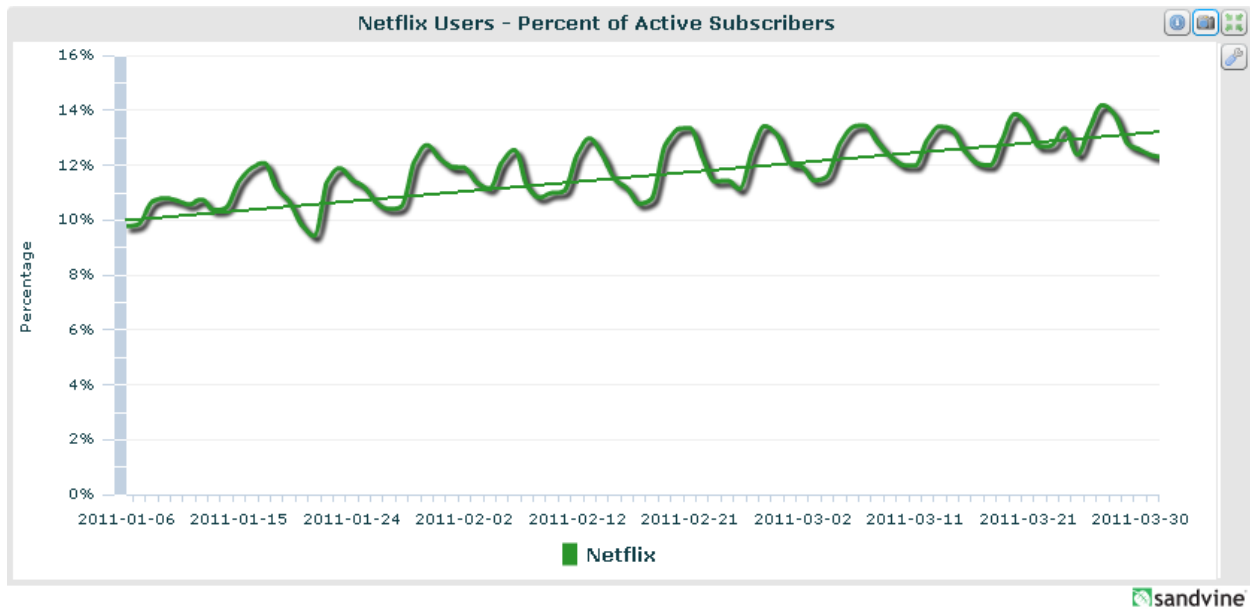


Figure 2 - Netflix Users - Percent of Active Subscribers

Canadian Launch

Netflix expanded into Canada with the introduction of a streaming-only service on September 22nd, 2010. In the months that followed, the service experienced widespread adoption, and as of March 2011 boasted 800 000 subscribers. Sandvine's Fall 2010 Global Internet Phenomena Report included Network Analytics charts of the first few days following the Canadian launch.

With Netflix announcing planned international expansion⁹, operators around the world are looking to the Canadian experience as an indicator of what awaits. Figure 3 shows the traffic growth from Netflix' Canadian launch from September 2010 through February 28th, 2011. The figure also shows the introduction of Netflix support for Canada's Xbox 360 community (results are similar on the other leading gaming consoles), and the huge spike that followed Christmas.

In Canada, in the four months that followed the launch, Netflix grew to account for 13.5% of downstream traffic during the peak evening period.

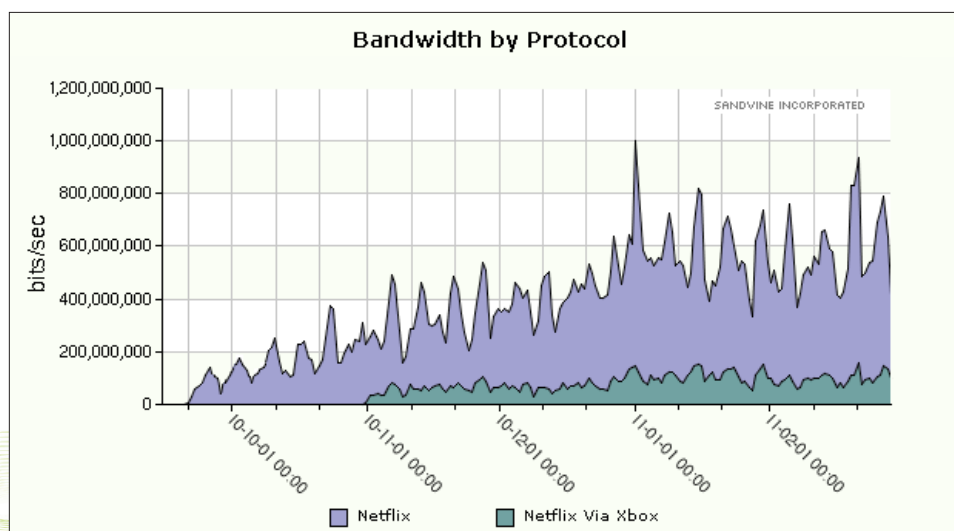


Figure 3 - Netflix Traffic on a Canadian network (September 15th, 2010 to February 28th, 2011)

9. Mexico, Brazil, and Great Britain have been suggested as the front-runners: <http://latimesblogs.latimes.com/entertainmentnewsbuzz/2011/04/netflix-eyeing-latin-america-great-britain-for-next-international-launches.html>

Netflix Traffic

Netflix offers three tiers of encoding, ranging from requiring 1.5 Mbps up to 6 Mbps. Different Netflix-capable devices offer different capabilities. The devices that subscribers use to consume Netflix streams therefore significantly impact their data usage.

Figure 4 shows the average daily data consumption of a Netflix user. Based on a 30-day month, this daily usage suggests that by June the average Netflix user consumes more than 40 GB of data per billing period.

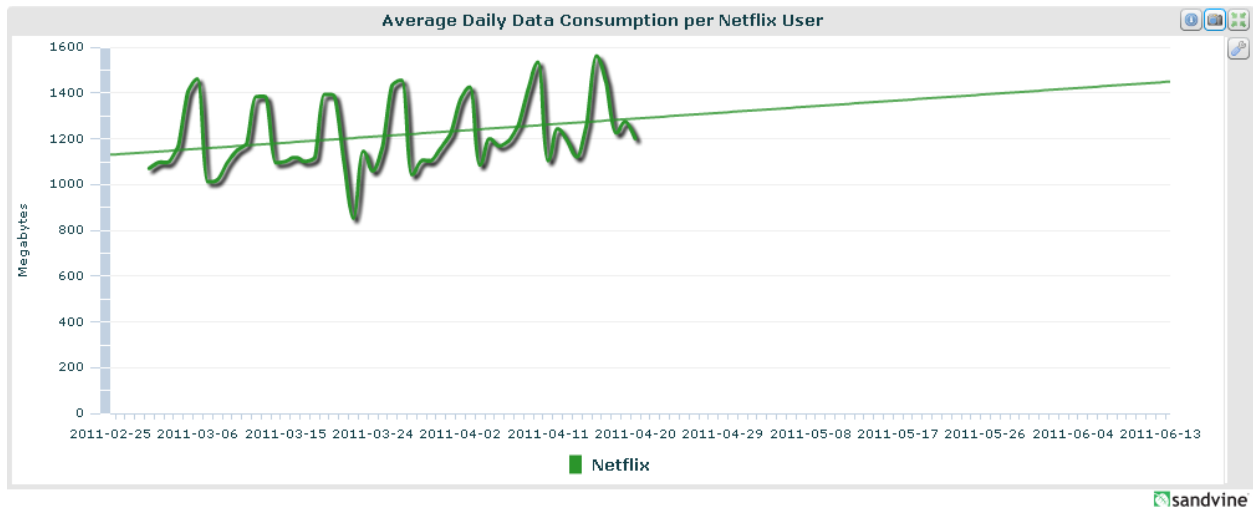


Figure 4 - Netflix Average Daily Usage (MB)

Contrast Figure 4 with Figure 5, which shows the average daily data consumption of a Netflix user who uses the service via an Xbox 360. 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). As Netflix is supported on more and increasingly powerful platforms, service providers should carefully monitor usage in order to anticipate the needs of broadband subscribers.

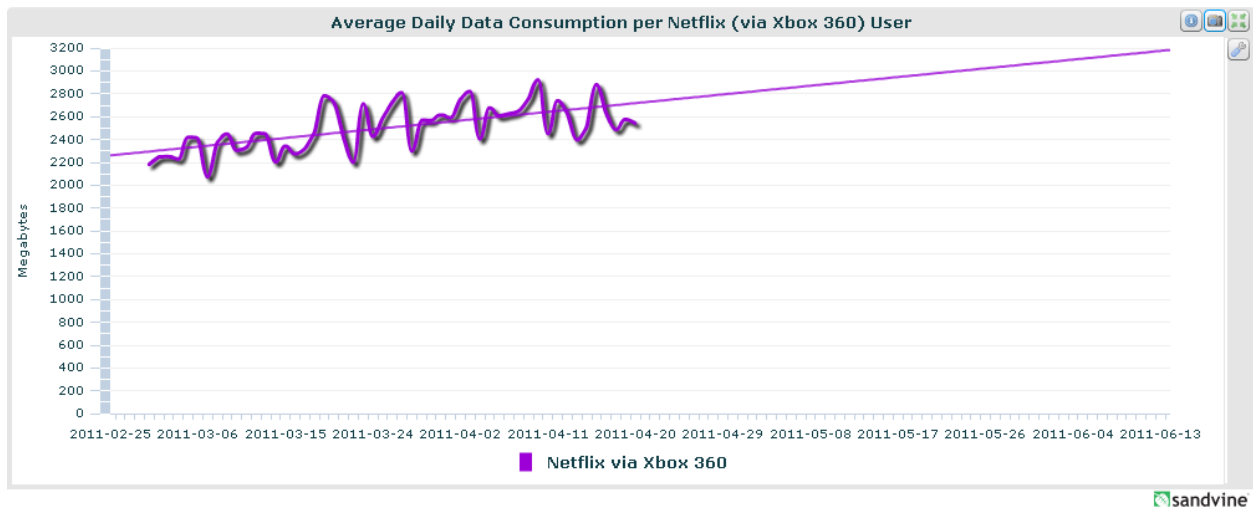


Figure 5 - Netflix via Xbox 360 Average Daily Usage (MB)

Netflix is well-aware of the potential billing implications for subscribers. On March 28th, Canadian subscribers received an e-mail announcing that “watching movies & TV shows in Canada will use 2/3 less data”. The e-mail explains that the change was made because “many of our Canadian members have monthly Internet data caps”.

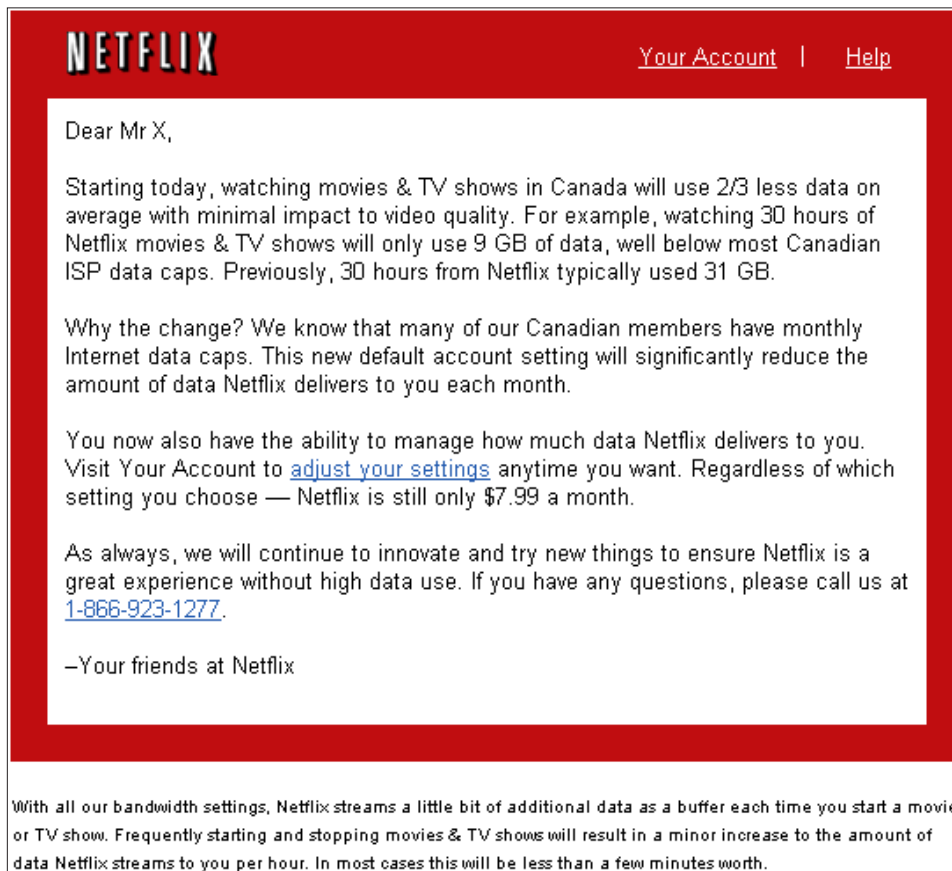


Figure 6 - Netflix e-mail to Canadian subscribers

The impact of this change can be seen in Figure 7. Prior to the change, Netflix traffic accounted for 13.5% of downstream traffic in Canada during the evening. After the change, Netflix traffic dropped substantially and now represents 5.7% of evening downstream traffic.

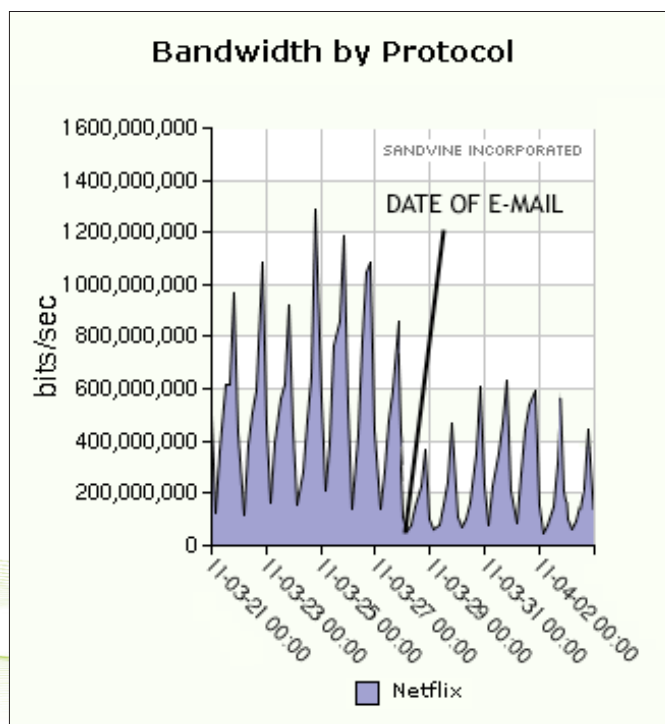


Figure 7 - Network Demographics plot of Netflix Traffic (Before and After E-mail to Canadian Subscribers)

What devices are driving the most Netflix usage? As Figure 8 indicates, the top 4 devices (Playstation 3, Xbox 360, PC and Wii) account for more than 85% of total Netflix traffic.

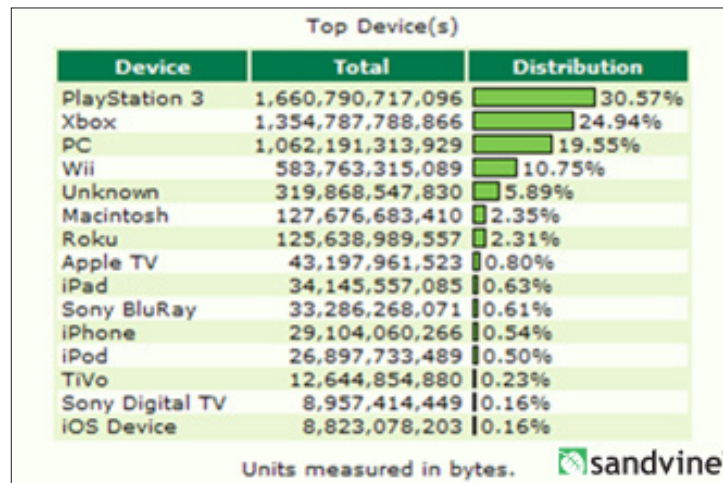


Figure 8 - Top Netflix Devices

Of course, business intelligence for video services extends beyond Netflix. Gaming consoles are constantly introducing support for new services; for instance, Vudu is now available on Sony's Playstation 3¹⁰. What percentage of broadband households have an Internet-connected gaming console? Figure 9 indicates that there us an Internet-connected Playstation 3 in more than 10% of North American broadband households - what happens to broadband networks if Vudu experiences the same success as Netflix?

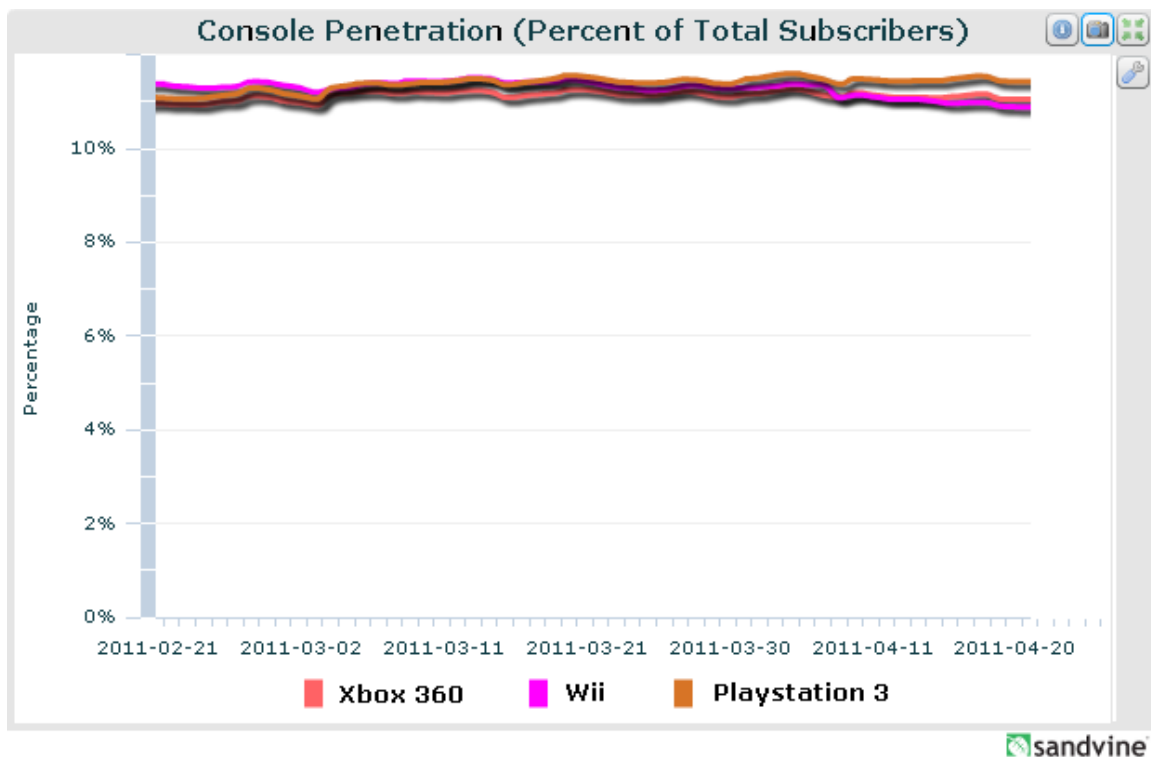
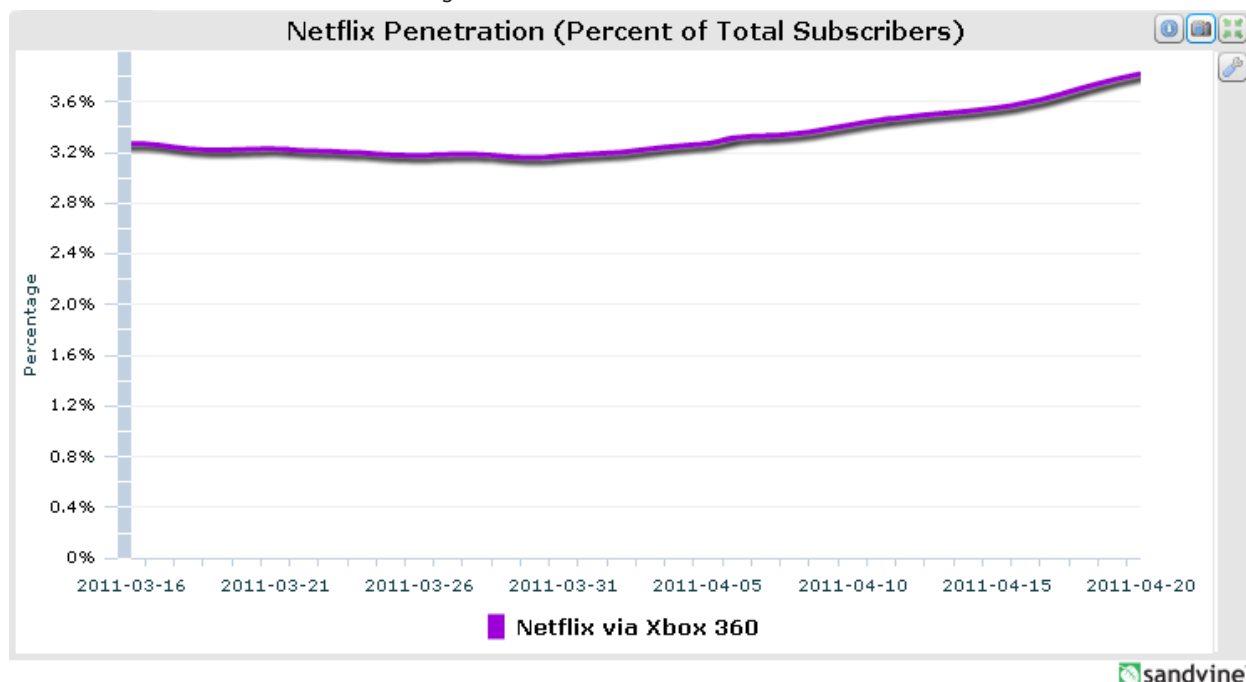


Figure 9 - Console Penetration

10. http://www.vudu.com/product_ps3.html

What percentage of Internet-connected Xbox 360s are used for Netflix? By dividing the numbers in Figure 10 by those in Figure 9, we can conclude that about 33% of connected Xbox 360s are used to stream Netflix content.

Figure 10 - Netflix via Xbox 360 Penetration



So far, we've examined Netflix usage in isolation. Once again, Sandvine is in the unique position of being able to put Netflix usage in proper context by comparing it to broadband traffic over-all. Recall that in October 2010 our "Fall 2010 Global Internet Phenomena Report" revealed that Netflix accounted for 20.61% of downstream Internet traffic in North America during the evening's peak period.

In the 7 months that have passed since that announcement, Netflix' remarkable growth has continued - it now accounts for 29.7% of all fixed access network downstream traffic during peak period. Table 1 shows the top 5 online applications in terms of share of upstream, downstream, and total (aggregate) traffic.

Rank	Upstream Traffic		Downstream Traffic		Total Traffic	
	Application	Share	Application	Share	Application	Share
1	BitTorrent	52.01%	Netflix	29.70%	Netflix	24.71%
2	HTTP	8.31%	HTTP	18.36%	BitTorrent	17.23%
3	Skype	3.81%	YouTube	11.04%	HTTP	17.18%
4	Netflix	3.59%	BitTorrent	10.37%	YouTube	9.85%
5	PPStream	2.92%	Flash Video	4.88%	Flash Video	3.62%

SOURCE: SANDVINE NETWORK DEMOGRAPHICS

Table 1 - North America - Top Applications by Bytes (Peak Period, Fixed Access)

Also bear in mind that these statistics are for North American fixed networks as a whole; service providers anecdotally speak of regions where Netflix accounts for as much as 55% of downstream traffic during the evening peak.

Table 1 suggests that Netflix traffic is highest during the evening period of peak network utilization, and Figure 11 confirms that this is the case. The figure shows the profile of Netflix traffic (relative to its own peak) for an average day. The peak occurs at 10pm (readers might be interested to know that the average day for Netflix via a gaming console peaks an hour later).

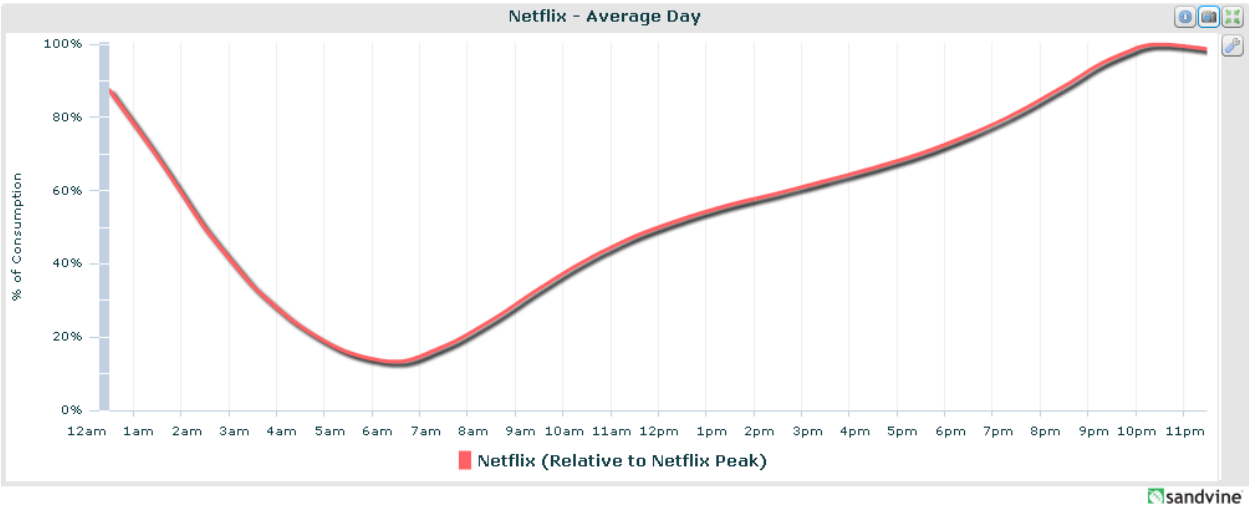


Figure 11 - Netflix Average Day



What does it all mean?

Even doubters (if there were any left) must now agree that the age of Internet video is upon us. Subscribers have clearly embraced the Netflix streaming service, fundamentally altering the Internet landscape. Furthermore, the success of Netflix' expansion into Canada suggests that it is not a phenomenon localized to the United States.

How much more can Netflix grow? A whole lot. Consider that game consoles have a huge market penetration, set-top boxes (Roku, Boxee, Apple TV¹¹ etc) are becoming mainstream, and you would be hard-pressed to go to an electronics store and purchase a TV that didn't include native Netflix support. It's not absurd to think that within a few years, >95% of North America's living rooms will be "Netflix-ready" (this includes late-adopters who refuse to watch Netflix on a laptop).

Netflix is also poised to grow a great deal in the mobile space. Since it's launch on the iOS platform, the Netflix application for the iOS-based iPad, iPhone, and iPod touch has consistently ranked among the 25 most popular free applications. On other platforms such as Windows Phone 7 and Android, official Netflix clients exist, but small market share from a new platform and DRM concerns respectively have held back widespread adoption so far. This won't be the case for long. As these issues are resolved and smartphone and tablet ownership rates continue to climb, watching a Netflix video on your mobile device will be as common as doing so on your TV or computer. For mobile operators this will mean a further surge in the amount of data used by customers on the mobile network; for fixed operators, it will mean increased traffic as many of these devices will rely on home WiFi (and therefore the fixed access network) to stream the content.

If Netflix continues their trends of subscriber addition, increasingly high definition streams, growing content libraries, greater device support and exclusive content, then the last mile might soon be delivering Netflix and "everything else".

Also, with Netflix "mulling family plans and multiple concurrent streams"¹², the demands of individual households might suddenly scale upwards significantly, without all of those other factors listed previously.

Internet providers worldwide, regardless of access technology and degree of mobility, must plan for a future in which on-demand video (whether provided by Netflix or another service) is a large proportion, if not the majority of, last-mile traffic.

11. For a full list of Netflix Instant Watch Devices, visit: <http://en.wikipedia.org/wiki/List_of_Netflix_Instant_Watch_Devices>

12. Albanesius, Chloe. "Netflix Mulling Family Plans, Multiple Streams". PCMAG.com. 19 April 2011. Web. <http://www.pcmag.com/print_article2/0,1217,a=263365,00.asp?hidPrint=true>