sandvine®

Intelligent Broadband Networks

Global Internet Phenomena

Africa, Middle East & North America

DECEMBER 2015

North America

Fixed Access

For this report, unsurprisingly, Real-Time Entertainment maintains its status as the dominant traffic category in the region and the key driver for continued network growth. Real-Time Entertainment (audio and video traffic) is now responsible for more than 70% of downstream bytes during peak period.

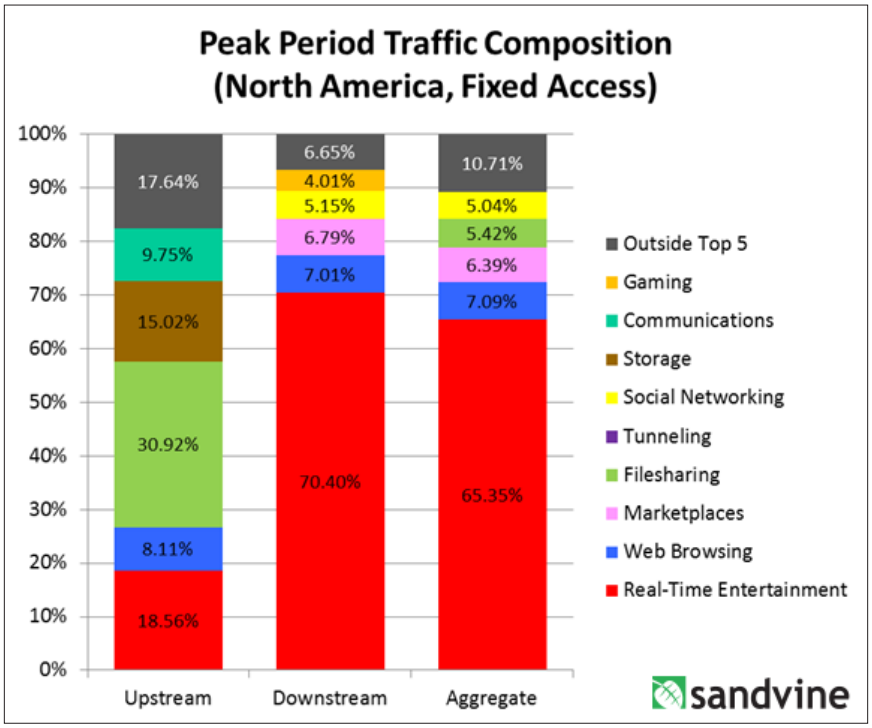

Figure 1 - Peak Period Traffic Composition - North America, Fixed Access

Netflix continues to be the leader in peak period traffic, accounting for 37.1% of downstream traffic during the study period. This is a slight increase over the 36.5% figure published in the report issued earlier in the year. Netflix, however isn't the only service driving the growth of Real-Time Entertainment,YouTube, Amazon Video and Hulu have all shown an increase in their traffic share when compared to the last Global Interent Phenomena Report. While Amazon Video stills holds only a fraction of the bandwidth share when compared to Netflix, they have established themselves as the fourth largest source of downstream traffic in our report.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	BitTorrent	28.56%	Netflix	37.05%	Netflix	34.70%
2	Netflix	6.78%	YouTube	17.85%	YouTube	16.88%
3	HTTP	5.93%	HTTP	6.06%	HTTP	6.05%
4	Google Cloud	5.30%	Amazon Video	3.11%	BitTorrent	4.35%
5	YouTube	5.21%	iTunes	2.79%	Amazon Video	2.94%
6	SSL - OTHER	5.10%	BitTorrent	2.67%	iTunes	2.62%
7	iCloud	3.08%	Hulu	2.58%	Facebook	2.51%
8	FaceTime	2.55%	Facebook	2.53%	Hulu	2.48%
9	Facebook	2.25%	MPEG - OTHER	2.30%	MPEG	2.16%
10	Dropbox	1.18%	SSL - OTHER	1.73%	SSL - OTHER	1.99%
		65.95%		78.69%		76.68%

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Table 1 - Top 10 Peak Period Applications - North America, Fixed Access

As observed in previous reports, BitTorrent continues to decline in traffic share and now accounts for less than 4.4% of total traffic during peak period, and only 5% of total traffic during the entire day. This demonstrates a sharp decline in share from the 31% of total traffic we had revealed in our 2008 report

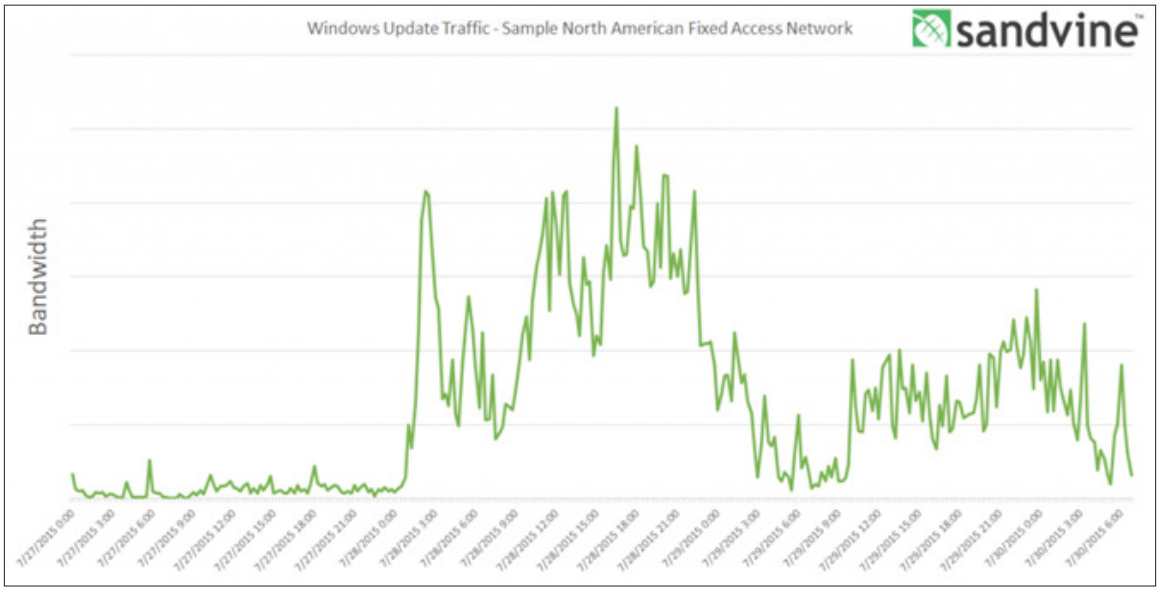
Windows 10 Did not Break the Internet

Windows 10 was the biggest software launch in history, with some pundits even making the prediction that it could break the Internet. When such bold predictions are made, we think it warrants an investigation, so in July Sandvine reached out to multiple customers in order to make public preliminary data on the launch.

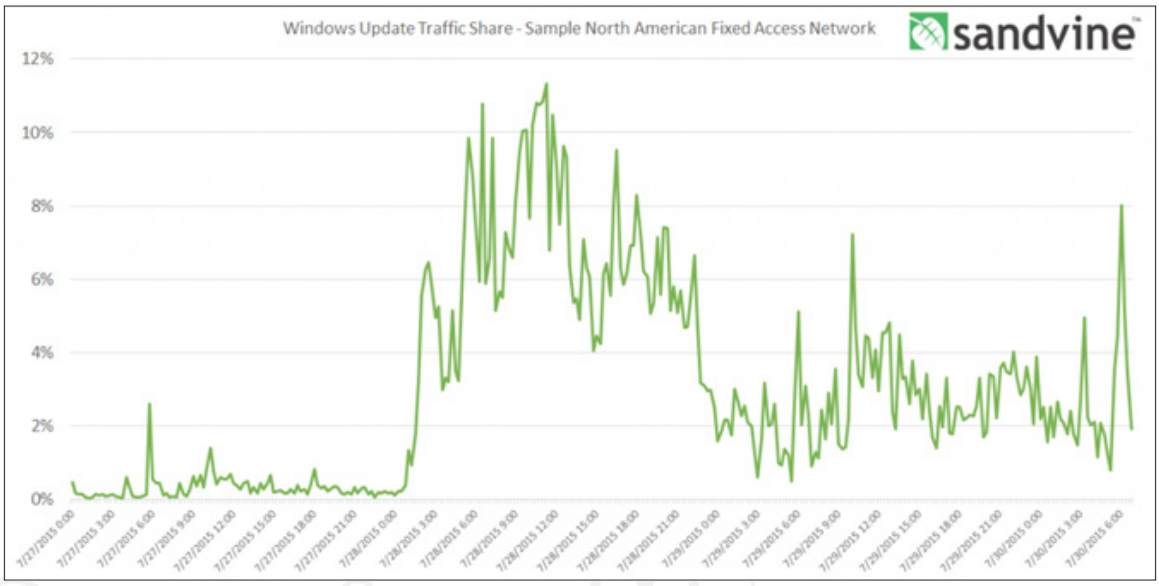
Below you will see two charts from a North American fixed network, although the data observed is almost identical worldwide. The first shows the total amount of traffic generated by Windows Update.

Windows Insiders, those who were beta testing the software, were given access to the software a day early on July 28. You can see that at midnight a number of them hit refresh and downloaded the commerical release version of the software. The traffic level then decreased in the early hours of the day and then rose and fell throughout Tuesday.

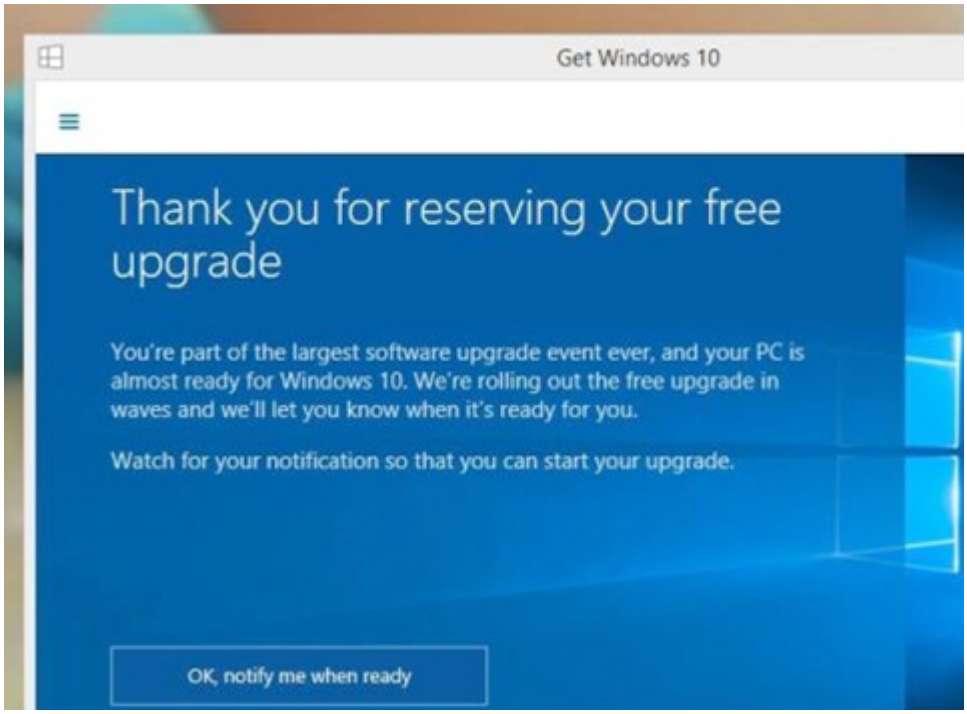
On Wednesday, July 29, launch day for the general public, you can see there is no midnight spike and in fact Windows Update traffic is half that of what was observed on the previous day.



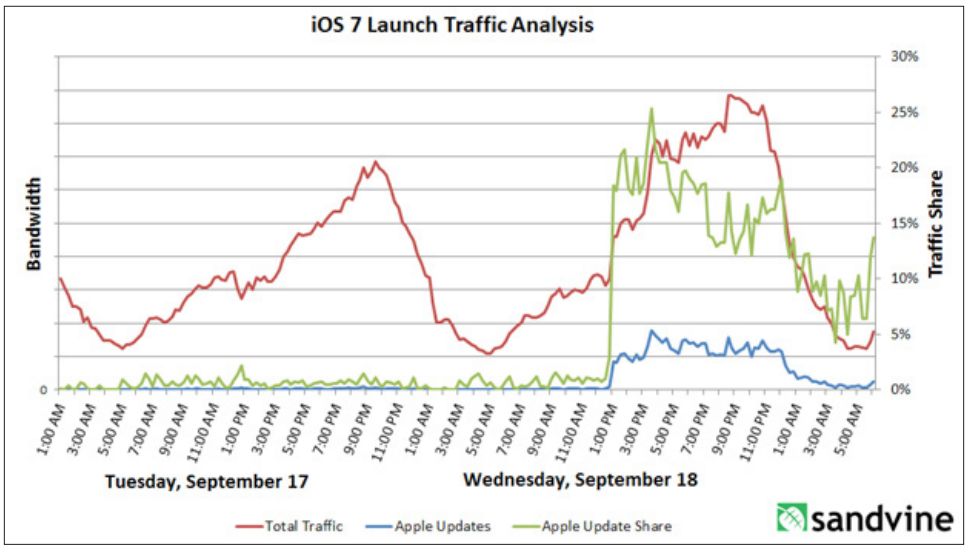
As for share of traffic, the chart below shows Windows Insiders drove it to account for between 6-8% of traffic during peak evening hours. However on Wednesday when it was available to the general public it account for only 3-4% of traffic.



So why didn't it break the internet? Was it lack of enthusiasm? No. Instead it was the result of Microsoft rolling out the release in waves. Subscribers had to reserve a copy and it was rolled out to them in batches at the discretion of Microsoft.



While Microosft was a good Internet citizen when releasing Windows 10, Apple is less so. Two years ago the Apple's iOS 7 update accounted for over 15% of peak period traffic on the day it was released. That type of release can and does put tremendous amount of pressure on networks which can make the experience frustrating for subscribers and stressful for network operators.



Microsoft should really be applauded for their phased Windows 10 roll out. While it may leave some people waiting for an update on launch day, the largest digital software release in history had no significant impact on network experience which is kind of incredible if you think about it.

Mobile Access

During peak period, Real-Time Entertainment traffic is by far the most dominant traffic category, accounting for over 40% of the downstream bytes on the mobile network. As observed in past reports, Social Networking applications continue to be very well represented on the mobile network, which speaks to their popularity with subscribers as these social applications typically generate far less traffic than those that stream audio and video, although in recent years services like Facebook and Twitter have added auoplaying video to their services in order to drive advertising engagement.

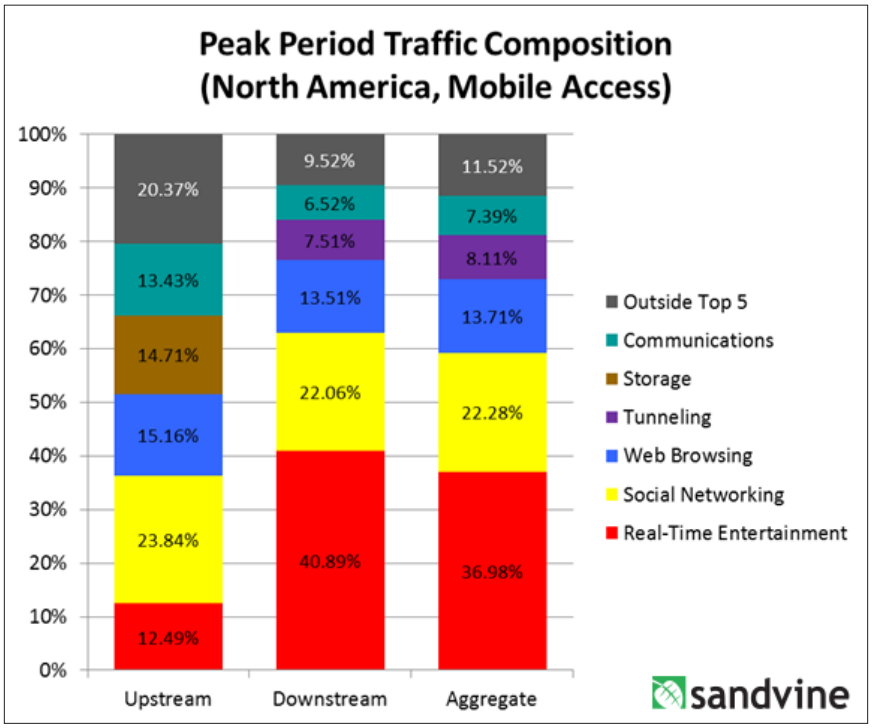


Figure 2 - Peak Period Traffic Composition - North America, Mobile Access

In Sandvine's study issued a year ago, YouTube accounted for 19.8% of peak downstream traffic and over the past year that value increased to 20.8%. Facebook and HTTP Web Browsing round out the top three applications, with Facebook actually observing a slight year-over-year decline in share. It now accounts for 16% of downstream traffic, down from 19.1% last year

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	Facebook	19.09%	YouTube	20.78%	YouTube	19.59%
2	SSL - OTHER	11.40%	Facebook	15.96%	Facebook	16.35%
3	Google Cloud	10.46%	HTTP	10.75%	HTTP	10.69%
4	HTTP	10.33%	SSL - OTHER	7.29%	SSL - OTHER	7.81%
5	YouTube	5.50%	MPEG - OTHER	4.54%	Google	4.33%
6	BitTorrent	3.25%	Snapchat	4.33%	Snapchat	4.11%
7	Snapchat	2.75%	Pandora Radio	4.30%	MPEG - OTHER	4.09%
8	Instagram	2.25%	Instagram	4.02%	Pandora Radio	3.95%
9	Pandora Radio	1.54%	Netflix	3.44%	Instagram	3.79%
10	Skype	1.03%	Google	3.33%	Netflix	3.22%
		67.60%		78.72%		77.94%

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Table 2 - Top 10 Peak Period Applications - North America, Mobile Access

As first reported in our 1H 2014 report, Snapchat continues to be the leading third-party messaging service by volume, generating more traffic each day than competing services such as WhatsApp. In this report the service actually leap frogs Real-Time Entertainment applciations Netflix and Pandora to establish itself as the sixth ranked applciation in the region.

Making an appearance once again is Google Cloud which is a combination of the various services used by Google's Android operating system to keep devices constantly in sync, as well as some Google services such as Google Photos. Because cloud syncing requires both upstream and downstream communication, it is a significant contributor of bandwidth in both the upstream and downstream direction.

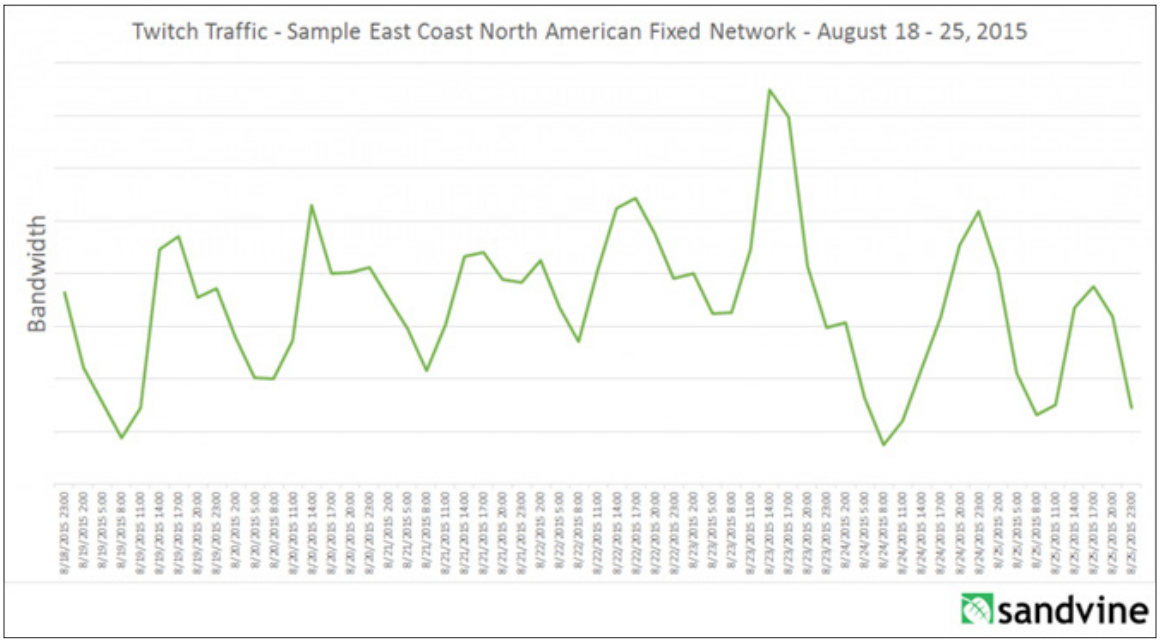
Twitch's Record Setting Weekend

Twitch, a service that allows subscribers to watch eSports online is a topic we have covered previously. Last year we revealed that the service was generating more traffic than HBOGO in the United States and shortly after that news was released, Amazon purchased the service for a rumored $1B.

Eighteen months later, Twitch continues to make waves on North America fixed access networks.

On August 23rd, Twitch announced that they had set a new viewership milestone, boasting more than two million concurrent viewers. These viewership numbers were driven by two major eSports events, ESL One: Cologne the world's biggest Counter Strike: GO tournament, and the League of Legends Summer Playoffs.

So what impact did these events have? As seen in the chart below, on one east coast North American network T***witch saw a 50% increase in traffic*** over its average daily peak levels.



Twitch, like most streaming applications typically has traffic peaks in the evening hours. In this case however, due to some of the events taking place in Europe and the time shifting required to watch on the east coast, Twitch reached its peak during the late morning/early afternoon and ***accounted for over 4% of total network traffic at the time***.

eSports viewing continues to gain momentum, with Google recently launching a service that competes with Twitch called YouTube Gaming. Sandvine will continue to actively track the eSports streaming space and will aim to provide updates in the future on how Google's new entrant fairs against Twitch, the current leader in eSports streaming.

Africa

Mobile Access

Africa is a region with tremendous potential for growth, but few understand what the traffic composition in the region is. At Sandvine, we believe that to understand Africa, you must be in Africa, and thanks to being deployed in over 20 networks in the region, Sandvine is able to publish mobile usage statistics for a third straight year.

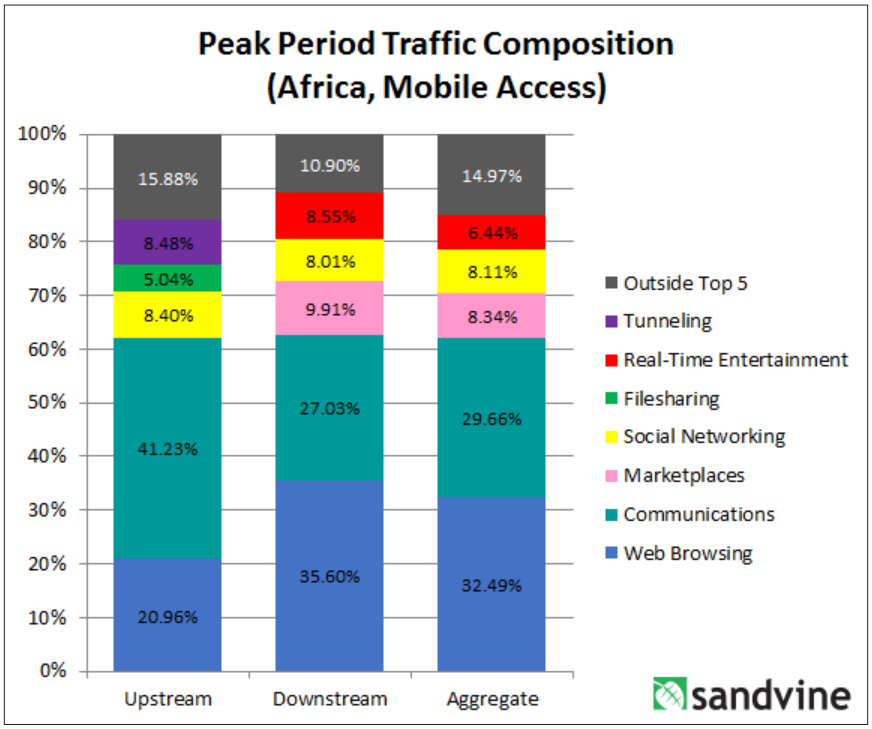


Figure 3 - Peak Period Traffic Composition - Africa, Mobile Access

In most regions, Real-Time Entertainment is the traffic category that is the most dominant, however this is not the case in Africa. During peak period, Real-Time Entertainment accounts for only 8.6% of peak downstream traffic, an increase from 6.6% last year which may indicate the beginning of significant growth for this category as both networks and devices in the region improve. Web Browsing continues as the dominant downstream traffic category, accounting for 35.6% of downstream traffic.

Over the past two years, Communications applications continue grow in bandwidth share as subscribers move from traditional voice calls and SMS messaging to a mix of VoIP and over-the-top (OTT) messaging applications. The migration is underscored by the fact that WhatsApp now generates over 10% of network traffic, an almost 50% increase in traffic share from the same period a year ago.

In most regions, YouTube is the application responsible for generating the most bandwidth, but in Africa it accounts for just 4.6% of downstream traffic. WAP Browsing continues to see decline, a phenomenon likely caused by increased adoption of smartphones in the region. Africa is however the only region where Opera Mini, a web browser focused on data efficiency, is among the top 10 applications.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	Whats App	13.38%	HTTP	24.43%	HTTP	21.72%
2	HTTP	11.70%	Whats App	10.10%	Whats App	10.86%
3	BlackBerry	8.39%	BlackBerry	6.87%	BlackBerry	7.11%
4	Facebook	6.69%	Facebook	4.93%	Facebook	5.22%
5	SSL - OTHER	4.84%	BitTorrent	4.72%	BitTorrent	4.58%
6	BitTorrent	3.67%	YouTube	4.63%	YouTube	4.32%
7	Opera Mini	1.97%	Google Market	4.42%	Google Market	4.05%
8	WAP v2	1.64%	Opera Mini	4.16%	Opera Mini	3.88%
9	Viber	1.63%	SSL - OTHER	3.85%	SSL - OTHER	3.45%
10	Skype	1.45%	WAP v2	3.21%	WAP v2	2.89%
		55.37%		71.32%		68.09%

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Table 3 - Top 10 Peak Period Applications – Africa, Mobile Access

Fixed Access

As a market where mobile networks are the primary way of accessing the Internet for many subscribers, an examination of fixed access networks in Africa reveals some interesting findings.

Unsurprisingly, Real-Time Entertainment is the leading source of traffic; accounting for almost 30% peak downstream traffic which is a far cry from regions where streaming audio and video account for over 60% of peak traffic.

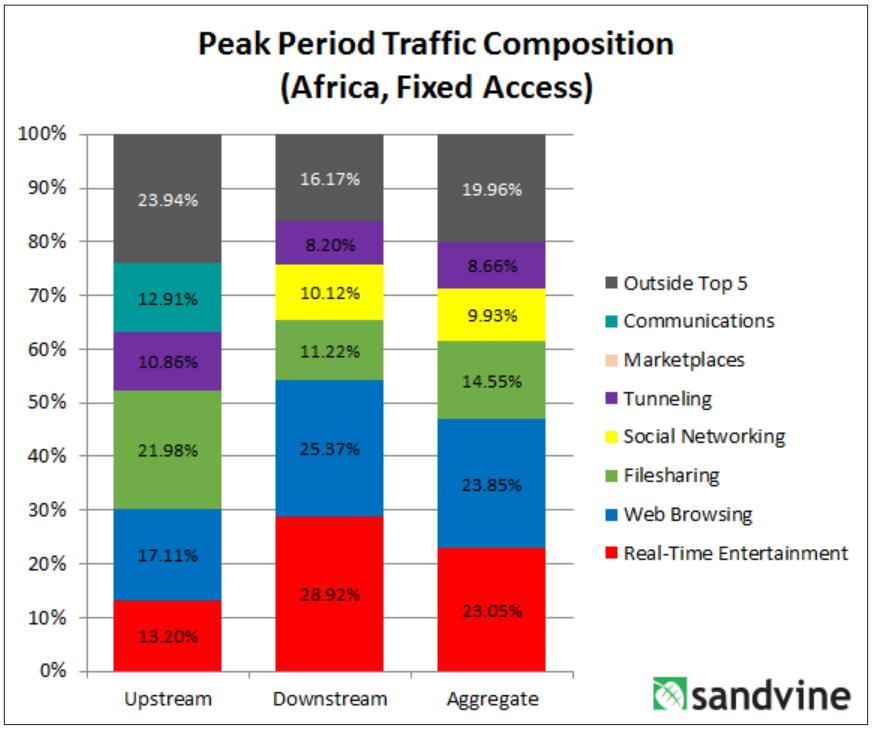

Figure 4 - Peak Period Traffic Composition - Africa, Fixed Access

Looking at the top applications, HTTP at 20.3% of peak downstream traffic is the leader in share, only slightly ahead of YouTube (16.3%) which made significant share gains in the region this past year and is typically the top source of traffic on other fixed networks around the globe. The reason for video accounting for a lower share could have to do with fixed networks in the region providing slower speeds than what is seen in parts of Europe or North America as well as fewer options to stream content legally. These content access issues could also play a role in explaining why BitTorrent consumes the third largest amount of bandwidth in the region.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	BitTorrent	19.98%	HTTP	20.26%	HTTP	18.76%
2	HTTP	12.15%	YouTube	16.34%	YouTube	14.05%
3	Facebook	7.12%	BitTorrent	10.58%	BitTorrent	12.62%
4	SSL - OTHER	5.91%	Facebook	8.16%	Facebook	8.00%
5	YouTube	5.09%	SSL - OTHER	6.71%	SSL - OTHER	6.60%
6	Google	4.26%	Windows Update	3.25%	Google	3.46%
7	Skype	2.69%	Google	3.20%	Windows Update	2.78%
8	Dropbox	2.63%	MPEG - OTHER	3.09%	MPEG - OTHER	2.62%
9	Gmail	1.95%	Gmail	1.83%	Gmail	1.89%
10	Apple iMessage	1.61%	Google Market	1.44%	Skype	1.29%
		63.39%		74.86%		72.07%

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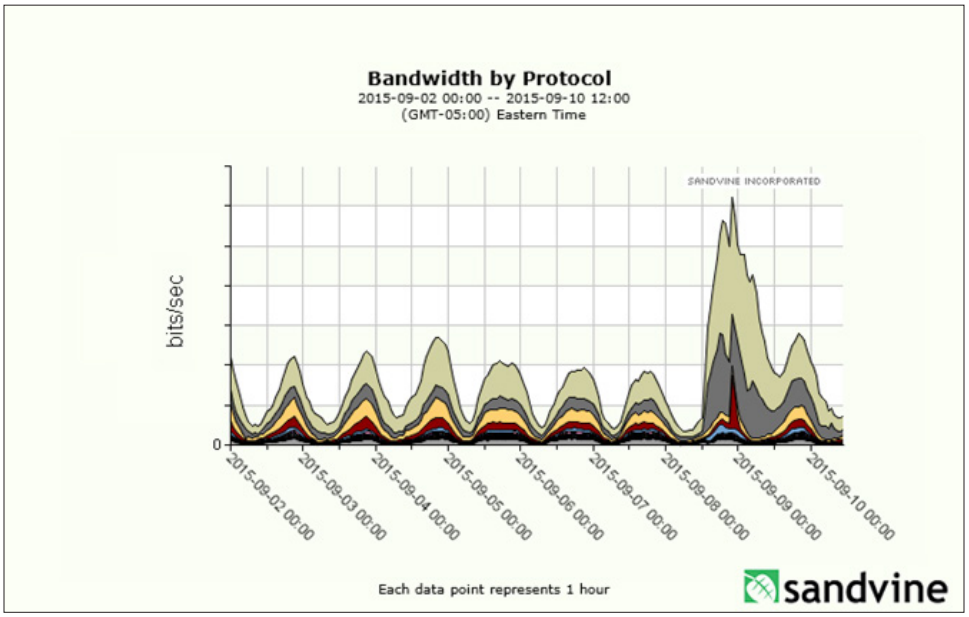
Table 4 - Top 10 Peak Period Applications – Africa, Fixed Access

FIFA 16 – The Beautiful Game?

When collecting data for this report, one major operator in the US told Sandvine that they had recently observed their biggest "gaming" event in history".

What was the cause? Not Call of Duty, not Grand Theft Auto, but FIFA 16's beta release.

The free public beta came out on September 9th on multiple gaming platforms with the average download size over 4GBs.



The chart above shows all gaming traffic the operator observed that week. You can see that ***FIFA 16's beta caused gaming traffic to be more than triple typical daily levels. The FIFA release also increased total traffic on this network to levels that were almost 8% higher than what is typically observed***.

As games increasingly rely on digital downloads it may benefit the industry to explore a better system for distribution, perhaps even using the Windows 10 launch discussed earlier in this report as an ideal model. If a system could be devised to allow subscribers to download content in advance (like some PC games do), not only would it save the network from being congested, but it would also result in a better experience for gamers who could begin playing the game immediately when it is released, rather than having to wait hours for the game to download.

Middle East

Mobile Access

Network Operators in the Middle East have made tremendous investments in recent years in improving the overall quality of their network. The reason for this focus is quickly revealed when we examine the composition of mobile networks in the region.

Real-Time Entertainment is the leading source of traffic in the region, accounting for almost 35% of peak downstream traffic. This is closely followed by Social Networking which also accounts almost a quarter of traffic in the region. Interestingly, the Middle East is among one of the only regions in the world, where the top traffic categories are identical in both the upstream and downstream direction.

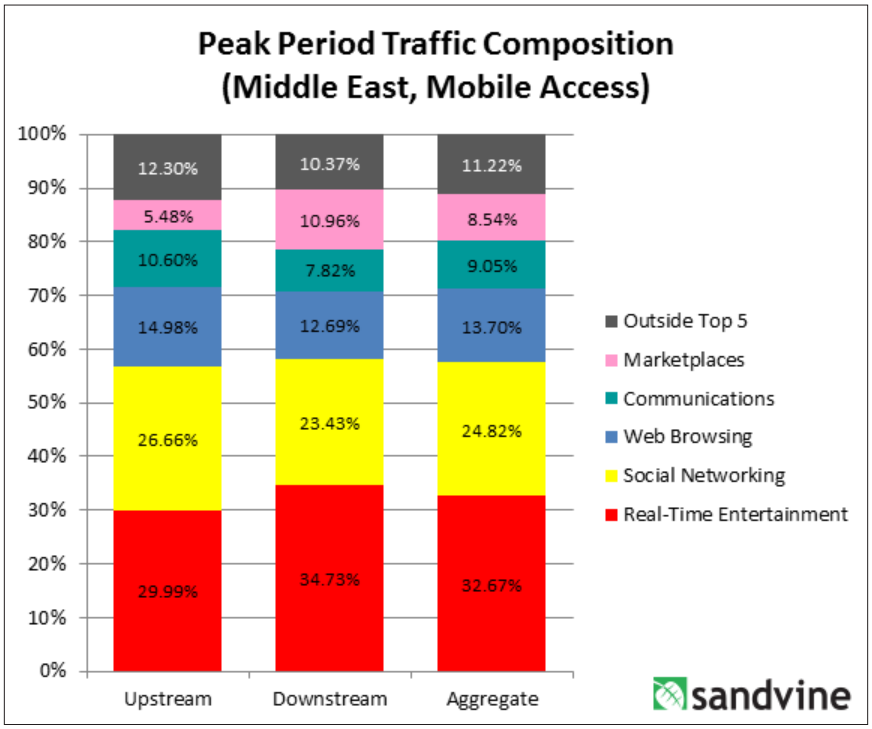


Figure 5 - Peak Period Traffic Composition - Middle East, Mobile Access

YouTube is the leading application in the region accounting for over 23% of downstream traffic during the peak evening hours. Facebook and HTTP Browsing then round out the top three applications, an identical order to that observed on North American networks.

What is unique with Middle Eastern networks is the popularity of Instagram, where it is the fourth ranked application, accounting for over 10% of total traffic during peak period. Combining Instagram with WhatsApp, the leading third party messaging application in the region, with the traffic from Facebook, the company which owns all three applications, reveals that Facebook controls almost a quarter of mobile traffic in the region.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	YouTube	15.45%	YouTube	23.23%	YouTube	19.82%
2	Instagram	14.80%	Facebook	13.79%	HTTP	11.85%
3	HTTP	13.26%	HTTP	10.75%	Facebook	11.16%
4	MPEG - OTHER	8.51%	Instagram	7.37%	Instagram	10.60%
5	Facebook	7.75%	MPEG - OTHER	5.76%	MPEG - OTHER	6.96%
6	Whats App	4.00%	iTunes	4.16%	SSL - OTHER	3.65%
7	SSL - OTHER	3.79%	SSL - OTHER	3.54%	Whats App	2.99%
8	BitTorrent	3.57%	Google Market	2.97%	BitTorrent	2.72%
9	Skype	1.65%	Whats App	2.21%	iTunes	2.68%
10	Dailymotion	1.19%	BitTorrent	2.06%	Google Market	1.81%
		73.97%		75.83%		74.26%

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Table 5 - Top 10 Peak Period Applications – Middle East, Mobile Access

Explanation of Traffic Categories

The table below describes each of the traffic categories used in the Global Internet Phenomena Report.

Traffic Category	Description	Examples
Storage	Large data transfers using the File Transfer Protocol or its derivatives. Services that provide file-hosting, network back-up, and one-click downloads	FTP, Rapidshare, Mozy, zShare, Carbonite, Dropbox
Gaming	Console and PC gaming, console download traffic, game updates	Nintendo Wii, Xbox Live, Playstation 2, Playstation 3, PC games
Marketplaces	Marketplaces where subscribers can purchase and download media including applications, music, movies, books, and software updates	Google Android Marketplace, Apple iTunes, Windows Update
Administration	Applications and services used to administer the network	DNS, ICMP, NTP, SNMP
Filesharing	Filesharing applications that use a peer-to-peer or Newsgroups as a distribution models	BitTorrent, eDonkey, Gnutella, Ares, Newsgroups
Communications	Applications, services and protocols that allow email, chat, voice, and video communications; information sharing (photos, status, etc) between users	Skype, WhatsApp, iMessage, FaceTime
Real-Time Entertainment	Applications and protocols that allow “on-demand” entertainment that is consumed (viewed or heard) as it arrives	Streamed or buffered audio and video (RTSP, RTP, RTMP, Flash, MPEG), peercasting (PPStream, Octoshape), specific streaming sites and services (Netflix, Hulu, YouTube, Spotify,)
Social Networking	Websites and services focused on enabling interaction (chat, communication) and information sharing (photos, status, etc) between users	Facebook, Twitter, Linkedin, Instagram
Tunneling	Protocols and services that allow remote access to network resources or mask application identity.	Remote Desktop, VNC, PC Anywhere, SSL, SSH,
Web Browsing	Web protocols and specific websites	HTTP, WAP browsing

Study Details

Sandvine's Global Internet Phenomena Reports examine a representative cross-section of the world's leading fixed and mobile communications service providers (CSPs) and are made possible by the voluntary participation of our customers. Collectively, Sandvine's customers provide Internet and data service to hundreds of millions of subscribers worldwide.

The data gathered for these reports was collected in September and Octobber of 2015 and is completely subscriber-anonymous. No information regarding specific content or personally-identifiable information (including, but not limited to, IP or MAC addresses and subscriber IDs) was collected during this study.

This study reflects the traffic profiles of real service providers, including the impact of any network management (for instance, congestion management and traffic optimization) policies that may be in place.

The data collected includes the bandwidth per second per protocol and the number of active hosts per protocol on the network at each hour.

The datasets were used to create a 24-hour profile of each network, normalized by the number of active subscribers at each hour in the day. These profiles were then aggregated hierarchically for each region with weightings based on subscriber counts and access technology market share.

In parts of the report we reference industry publications, analyst studies, media articles and other sources. As such, we are indebted to the collective work and wisdom of a large number of individuals and organizations and have endeavored to correctly cite all sources and to identify the original creator of referenced material.

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