sandvine®

Intelligent Broadband Networks

GLOBAL INTERNET PHENOMENA REPORT 2H 2014

Executive Summary

The Global Internet Phenomena Report: 2H 2014 shines a light on fixed and mobile data networks around the world, identifying facts, fads, and the future trends that will shape the Internet's future. In this report, we present a mix of high-level observations, regional-focused analysis, deep-dives into specific subjects, and educational tidbits. Communications service providers (CSPs) in particular are in the position to act on this information, but we believe that the findings will be of interest to a wide range of readers.

As with all reports in recent years, Real-Time Entertainment (comprised of streaming video and audio) continues to be the largest traffic category on virtually every network we examined, and we expect its continued growth to lead to the emergence of longer form video on mobile networks globally into 2015.

In North America, the dominance of Real-Time Entertainment is due in large part to the continued market leadership of Netflix which saw its share (34.9%) remain relatively consistent with the previous report. Amazon Video Instant Video at 2.6% of peak downstream traffic hhas established itself as the second leading paid OTT video service in North America, without yet having a presence in Canada. In 2015, it will be interesting to observe how the OTT video market changes as HBOGO opens up their Internet offering to those who aren't subscribers to their cable or satellite products.

The popularity of Netflix is not limited to the locations it is currently offered as it was observed on a fixed network in Australasia that Netflix was a top-10 application on the network. Amazingly, approximately 2.5% of subscribers are accessing the service and it comprises as much as 4% of peak downstream traffic and the service isn't yet available in the region.

Thanks to significant customer wins in the region, Sandvine is able to once again shine a light on mobile usage in Africa. Usage on the continent is drastically different than what is observed in other regions, with Real-Time Entertainment accounting for less than 6% of total traffic and Viber overtaking Skype as the VoIP app of choice on some mobile networks.

In addition to detailed analysis of global networks, this report includes focused spotlights that examine a particular emerging trend or observation. Interspersed among regional summaries, readers will find sections that tackle numerous topics including:

- An examination of the impact Facebook autoplay has had on fixed and mobile networks
- An exploration of the impact the launch of iOS 8 had on networks around the globe
- An overview of what impact the World Cup had on networks in Latin America

Contents

Figures

Tables

North America

Fixed Access

For 2H 2014, mean usage was 57.4 GB, which represents a 13GB increase from the 44.5 GB observed in our 2H 2013 report. Over the same period, median monthly usage also saw a similar increase moving from 17.6 GB to 22.5 GB. This growth continues to fall broadly in line with the 30-40% growth rate that many of our ISP customers forecasted for 2014 and are expecting to continue into 2015. It is important however to understand there is more to network use than monthly usage. As some operators continue to explore usage based billing, particularly in the United States, it is important to note that that there are both a large percentage of users who greatly exceed our published mean usage figures, and also many subscribers who use far less than our published figures each month.

Monthly Consumption - North America, Fixed Access		
	Median	**Mean**
Upstream	1.8 GB	8.5 GB
Downstream	20.4 GB	48.9 GB
Aggregate	22.5 GB	57.4 GB

Table 1 - Monthly Consumption Figures - North America, Fixed Access

As with previous reports, Real-Time Entertainment maintains its status as the dominant traffic category in the region and likely the key driver of network growth. Real-Time Entertainment is responsible for over 67% of downstream bytes during peak period, a small increase over the 64% we reported in our 1H 2014 report.

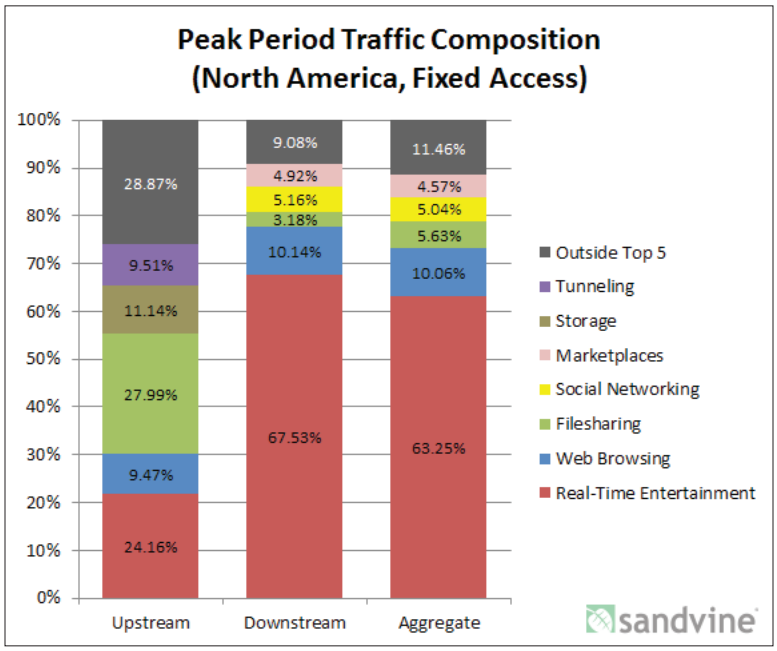


Figure 1 - Peak Period Aggregate Traffic Composition - North America, Fixed Access

Netflix continues to be the leader in peak period traffic, accounting for 34.9% of downstream traffic during that time. This is a modest increase over the figures published in 1H 2014 report. It is however a significant increase from the 31.6% measured in 2H 2013, an increase we previously observed to be driven by the availability of high bitrate Super HD content for all subscribers.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	BitTorrent	25.49%	Netflix	34.89%	Netflix	32.39%
2	Netflix	9.48%	YouTube	14.04%	YouTube	13.25%
3	HTTP	7.18%	HTTP	8.62%	HTTP	8.47%
4	SSL	7.05%	Facebook	2.98%	BitTorrent	5.03%
5	YouTube	6.14%	BitTorrent	2.80%	Facebook	2.94%
6	iCloud	4.41%	iTunes	2.77%	SSL	2.63%
7	Skype	2.77%	MPEG - OTHER	2.66%	iTunes	2.55%
8	Facebook	2.60%	Amazon Video	2.58%	MPEG - OTHER	2.44%
9	FaceTime	2.38%	SSL	2.14%	Amazon Video	2.37%
10	Dropbox	1.48%	Hulu	1.41%	Hulu	1.20%
		68.98%		74.89%		73.28%

sandvine

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

As observed in previous reports, BitTorrent continues to lose share and now accounts for just 5% of traffic during peak period. In our last report, we revealed that Filesharing as a whole accounted for less than 9% of total daily traffic, and that trend continues with Filesharing now responsible for just 7% of daily network traffic. This demonstrates a sharp decline in share from the 31% of total traffic we had revealed in our 2008 report.

While Amazon Instant Video still holds only a fraction of the bandwidth share when compared to Netflix, in the past year it has seen significant gains. At 2.6% of peak downstream traffic, Amazon Video Instant Video has established itself as the number two paid OTT video service in North America, without the service being made available in Canada.

With HBO's recent announcement[1] to offer HBOGO as a standalone service, the OTT video market could change significantly in the next year. Currently HBOGO accounts for 1% of traffic during peak period, so we expect this figure to serve as an interesting benchmark to measure adoption of the service without the need for a cable or satellite subscription.

1. http://recode.net/2014/10/15/hbo-says-its-going-to-start-selling-on-the-web-next-year/

Mobile Access

Much like our examination of fixed access networks in North America, mobile networks have also seen only minor shifts in traffic composition in the past six months. Since our last report, mean monthly usage has made an 18% jump, increasing from 465 MB to 522 MB. This increase is partially due to organic growth on the network, as well as the continued rollout of LTE by some participants in the study. Median usage, a figure we feel is more indicative of a "typical user", grew at a similar pace from 102 MB to 118 MB. This significant increase in mean and median usage is a phenomenon we have been tracking over the past several years and believe the rate at which it is increasing is no longer tied to first-time adoption of smartphones by subscribers. Instead, we suspect it is driven by increasing individual usage, in particular driven by growing use of streaming audio and video applications.

Monthly Consumption - North America, Mobile Access		
	Median	**Mean**
Upstream	19.7 MB	75.4 MB
Downstream	99.1 MB	506.5 MB
Aggregate	118.4 MB	521.9 MB

sandvine

Table 3 - Monthly Consumption Figures - North America, Mobile Access

During peak period, Real-Time Entertainment traffic is by far the most dominant traffic category, accounting for 40% of the downstream bytes on the network. As observed in past reports, Social Networking applications continue to be very well represented on the mobile network. This speaks to their popularity with subscribers as these social applications typically generate far less traffic than those that stream audio and video.

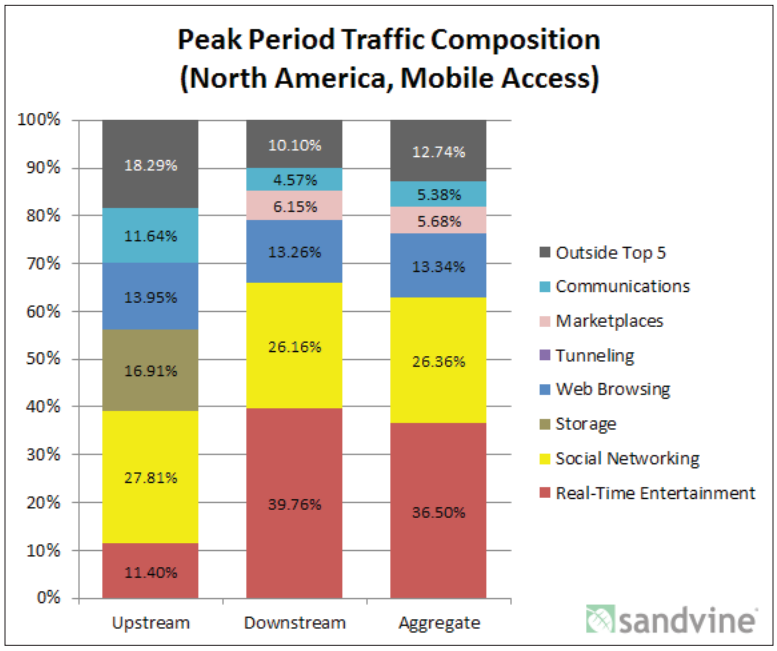


Figure 2 - Peak Period Aggregate Traffic Composition - North America, Mobile Access

In our 2H 2013 study, YouTube accounted for 17.7% of peak downstream traffic and for 2H 2014 that figure saw a light increase to 19.8%. While not typically associated with video, Facebook saw a notable increase in its traffic share. This growth we believe is directly attributable to the addition of the video autoplay feature, which automatically plays videos in your Facebook feed. On one network, autoplay caused an average of 60% more Facebook consumption per user.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	Facebook	22.36%	YouTube	19.75%	Facebook	19.43%
2	Google Cloud	11.97%	Facebook	19.05%	YouTube	18.02%
3	HTTP	9.85%	HTTP	11.44%	HTTP	11.26%
4	SSL	9.22%	MPEG - OTHER	6.32%	MPEG - OTHER	5.72%
5	YouTube	4.56%	Netflix	4.51%	SSL	4.63%
6	Instagram	2.55%	Instagram	4.49%	Instagram	4.27%
7	Snapchat	1.94%	SSL	4.03%	Netflix	4.10%
8	BitTorrent	1.88%	iTunes	3.20%	Google Cloud	4.09%
9	FaceTime	1.59%	Google Cloud	3.07%	iTunes	2.96%
10	Skype	1.53%	Pandora Radio	2.72%	Pandora Radio	2.53%
		67.44%		78.57%		77.02%

sandvine

Table 4 - Top 10 Peak Period Applications - North America, Mobile Access

As for streaming audio, in our 2H 2013 report Pandora Radio was the leading music application during peak hours. In our 2H 2014 report, that figure drops somewhat for a number of reasons including, greataer competition and the inclusion of data from countries where the service is not currently available.

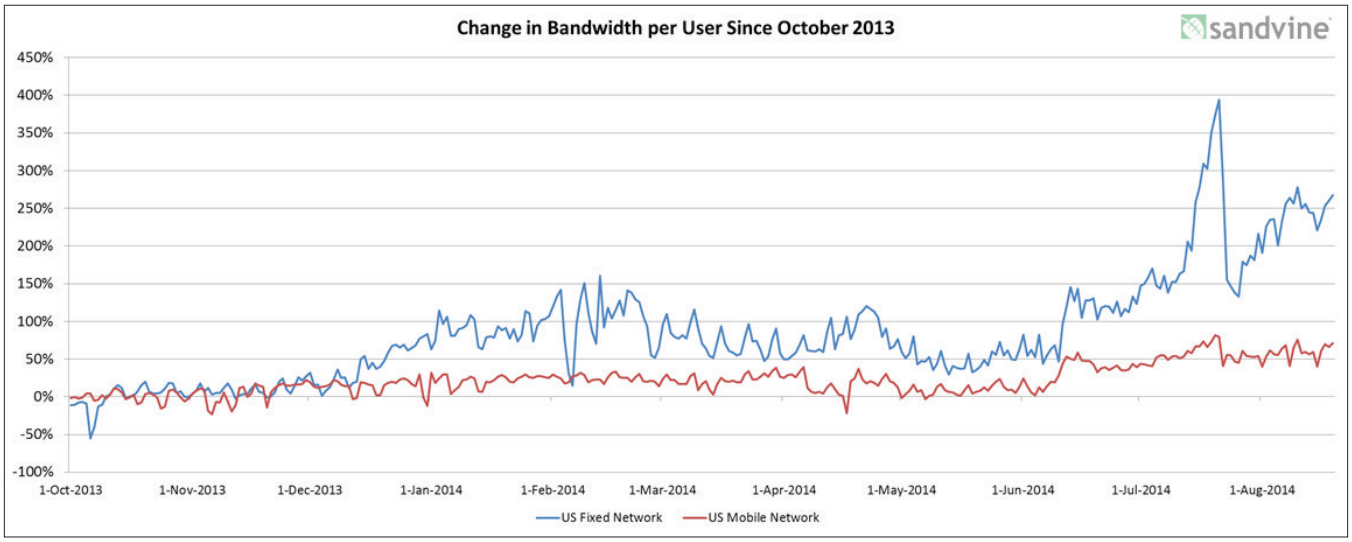
As first reported in our 1H 2014 report, Snapchat continues to be the leading third-party messaging service by volume, generating more traffic each day than competing services such as WhatsApp.

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

Facebook Autoplay

Video autoplay is a feature Facebook began rolling out in the US last September for videos, and in December for video ads. A more international expansion of autoplaying video ads took place in May of this year with Australia, Brazil, Canada, France, Germany, Japan and the United Kingdom all receiving this feature.

So what impact does autoplay have on networks? Below, we show a chart normalized for bandwidth consumption at the end of September 2013, for both a US mobile operator and a US fixed operator, showing the change in average bandwidth per user over the previous 10 months.



In the past year, Facebook traffic (depending on the day) increased by 60% on the mobile network, and by over 200% on the fixed network, driven (we believe) mainly by the addition of autoplay videos to the Facebook feed.

That may sound shocking, but if you think back to the time pre-autoplay, your Facebook page would have been mainly text and images. Add in video, which is essentially 24-30 photos being displayed in your feed each second, and you can see how the data quickly adds up.

Sharp rises in usage caused by video isn't actually a new Phenomenon. When Instagram added video to their service in June of last year we observed a significant increase in bandwidth on networks across the globe.

The above data is taken from just two networks, and Facebook is famous for running multiple trials and in one famous anecdote, they claim to have up to 1,000 different versions of the site for testing purposes at any one time. At this point it is unclear how fast or how slow the rollout of autoplay is taking place around the world. Are they rolling it out to a small percentage of users at a time? Are they rolling it out at different rates to desktop users and mobile users? These are questions that are difficult to answer at this time.

Europe

Fixed Access

Europe presents a mix of mature and emerging markets, with cultural, economic, technological, and linguistic diversities that combine to create traffic patterns that can prove to be interesting to roll-up. Regional analysis is intricate, as different applications can vary in penetration and availability depending on the country.

Europe's mean monthly usage of 28.2 GB and median monthly usage of 10.1 GB is significantly lower than that observed in North America. Sandvine first reported monthly usage figures in 2013, so the comparison of Europe's growth rate to other regions around the world, will be interesting to analyze in future reports.

Monthly Consumption - Europe, Fixed Access		
	Median	Mean
Upstream	1.5 GB	5.1 GB
Downstream	8.7 GB	23.1 GB
Aggregate	10.1 GB	28.2 GB

Table 5 - Monthly Consumption Figures - Europe, Fixed Access

In Europe, Real-Time Entertainment is once again the top traffic category, responsible for 42.3% of peak downstream traffic, a figure that is essentially unchanged from our study six months ago. Depending on the specific country however, this percentage ranges anywhere from 20% to 67% of downstream traffic. This fluctuation in share is due in large part to the availability of OTT video services in varying countries as well as the speed of service made available to subscribers. Based on our observations in this and previous reports, countries with access to paid services like Netflix or BBC iPlayer typically had a higher share of Real-Time Entertainment traffic on their network.

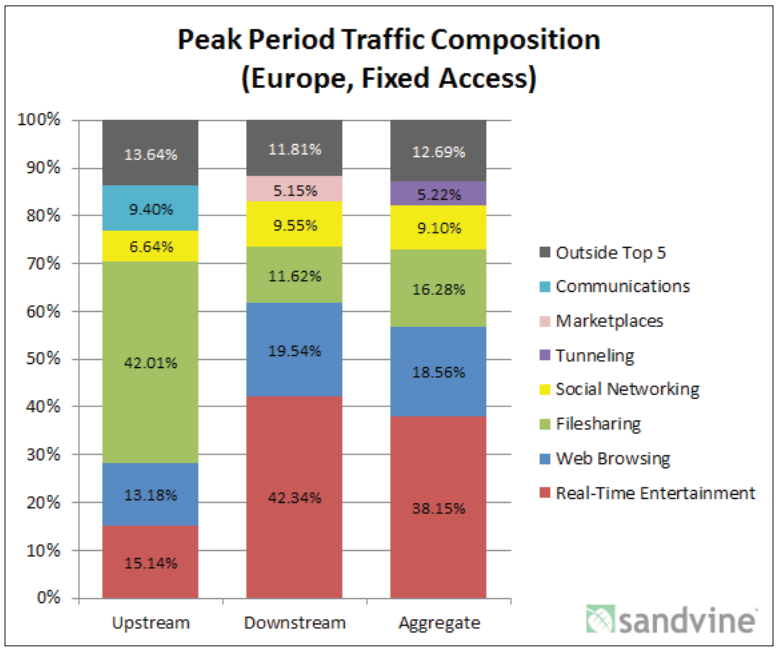


Figure 3 - Peak Period Aggregate Traffic Composition - Europe, Fixed Access

European networks have a consistent set of dominant applications and services that are available in each region, which account for 80-85% of all traffic. A set of localized websites and region-restricted applications make up the remainder of traffic. This can be seen in the list of top 10 applications for the region, all of which have global availability. One application that is noteworthy however is Netflix whose appearance accounts for 3.44% of peak downstream traffic. In recent months Netflix has expanded to several new countries, such as Germany and Luxembourg. Unfortunately our collection period for this report was just outside the launch date in these countries, so it is our hope to provide figures for those countries in a future report.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	BitTorrent	36.56%	YouTube	22.38%	YouTube	19.85%
2	HTTP	10.60%	HTTP	17.27%	HTTP	16.25%
3	Skype	6.38%	BitTorrent	10.39%	BitTorrent	14.40%
4	YouTube	5.92%	Facebook	7.84%	Facebook	7.48%
5	Facebook	5.48%	SSL	4.56%	SSL	4.67%
6	SSL	5.27%	MPEG - OTHER	3.57%	MPEG - OTHER	3.23%
7	eDonkey	2.46%	Netflix	3.44%	Netflix	2.97%
8	Dropbox	1.42%	RTMP	2.31%	Skype	2.27%
9	MPEG - OTHER	1.27%	Flash Video	1.90%	RTMP	2.08%
10	Flash Video	1.08%	PC: Valve's Steam Service	1.73%	Flash Video	1.74%
		76.44%		75.38%		74.95%

sandvine

Table 6 - Top 10 Peak Period Applications - Europe, Fixed Access

Mobile Access

As discussed earlier, examining mobile networks in Europe provides the same set of challenges for regional analysis as fixed networks due to the diversity in each country's culture, economy, languages, and deployed network technologies.

One metric that may not be impacted too significantly by some of these factors is monthly subscriber consumption. It's not unreasonable to expect that subscribers will use their devices in a similar way; the only difference is that they will simply substitute the services that are most popular or only available in their country. In our analysis, mean monthly usage for Europe was observed to be 449.5 MB, an increase of over 13% from 394.4 MB observed six months ago.

Monthly Consumption - Europe, Mobile Access		
	Median	Mean
Upstream	15.1 MB	69.5 MB
Downstream	108.8 MB	380.3 MB
Aggregate	122.1 MB	449.5 MB

sandvine

Table 7 - Monthly Consumption Figures - Europe, Mobile Access

Much like other mobile networks during peak period, Real-Time Entertainment traffic is the clear traffic category leader account for 38% of downstream traffic during peak period. Web Browsing and Social Networking, as seen commonly in other regions, round out the second- and third-most popular traffic categories.

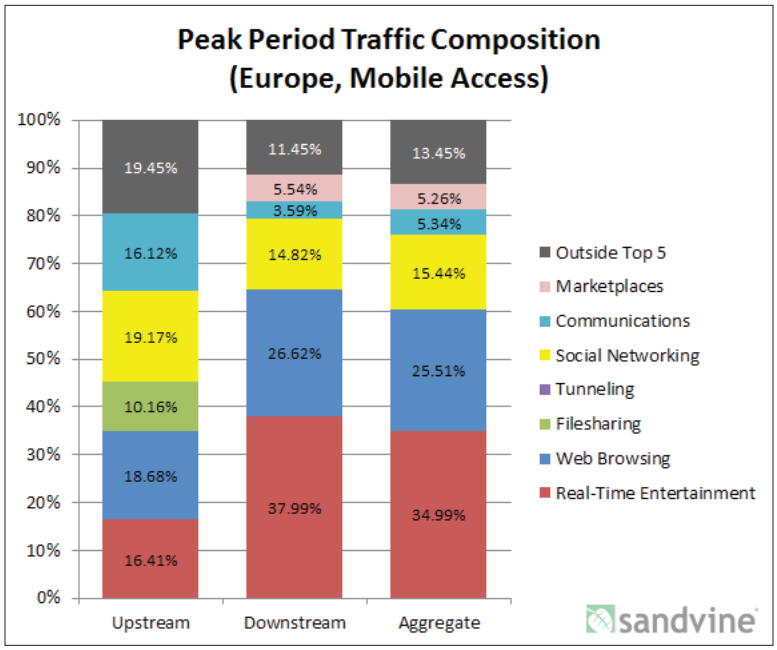


Figure 4 - Peak Period Aggregate Traffic Composition – Europe, Mobile Access

Skype is the application that continues to drive the majority of communications traffic, now accounting for almost half of that category's traffic in the region. The remaining top applications vary from country to country, but we have observed continued growth of OTT messaging applications in many European countries with WhatsApp and now Snapchat being the dominant third-party players.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	HTTP	15.38%	HTTP	24.60%	HTTP	23.31%
2	Facebook	14.76%	YouTube	20.89%	YouTube	19.04%
3	BitTorrent	8.99%	Facebook	12.16%	Facebook	12.54%
4	Skype	8.33%	MPEG - OTHER	3.77%	BitTorrent	3.82%
5	YouTube	7.41%	SSL	3.06%	MPEG - OTHER	3.44%
6	SSL	5.70%	Flash Video	3.03%	SSL	3.42%
7	Google Cloud	3.39%	BitTorrent	3.01%	Flash Video	2.66%
8	iTunes	1.88%	Google Cloud	1.90%	Skype	2.43%
9	Instagram	1.76%	Google Market	1.67%	Google Cloud	2.10%
10	Apple iMessage	1.47%	iTunes	1.61%	iTunes	1.64%
		69.05%		75.70%		74.43%

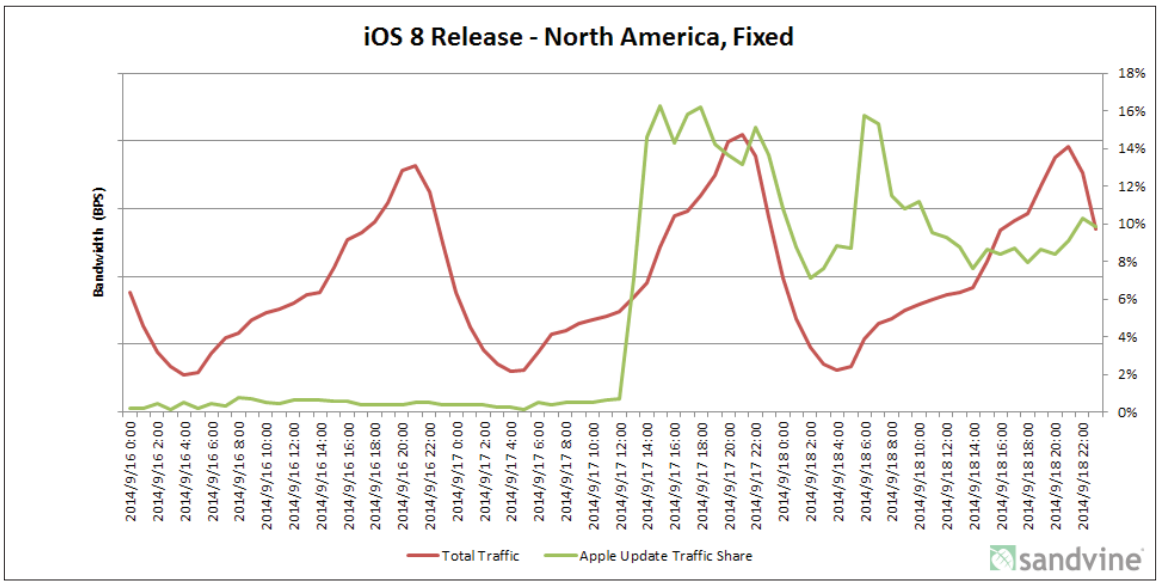
sandvine

Table 8 - Top 10 Peak Period Applications – Europe, Mobile Access

HTTP is the application that generates the most bandwidth both in peak period and the entire day, slightly edging out YouTube which is often the top ranked application on the mobile networks we study. In the past six months however YouTube has made gains and has seen its share increase from 16.5% to 20.9% of downstream traffic in the peak evening hours. The appearance of BitTorrent on the list indicates that the use of aircards or dongles remains popular practice in Europe, although in the past year it has declined from 5.7% to 3.8% of total traffic during peak period.

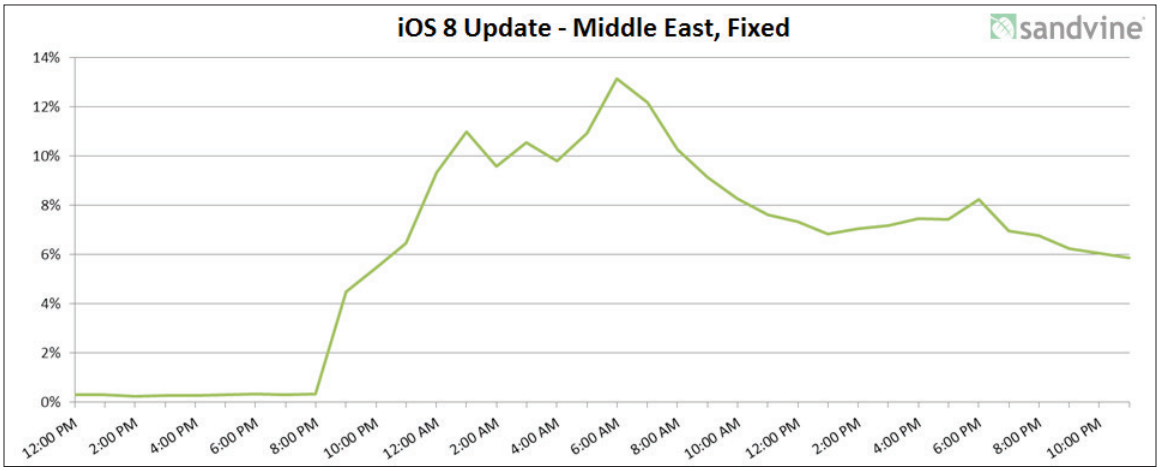
iOS 8 Launch

Below is a report from a North American fixed access operator, showing both the bandwidth and traffic share that Apple Updates accounted for in the days leading up to the public availability of iOS 8. Upon release at 1PM ET, Apple Updates immediately became almost 16% of total network traffic, and continued to stay above 13% of total traffic into the evening peak hours.



Most interesting is the fact that the launch once again increased the total volume of traffic during peak hours. This presents a unique challenge for operators, since they must engineer their networks for peak demand, and Apple product launches and software updates are infrequent in nature.

For this report we were also able to obtain data from a middle eastern fixed access operator, which because of the time difference, felt the impact of impact of the software update in the middle of peak evening hours. As was observed in North America, the update immediately consumed a significant portion of network traffic.



Latin America

Fixed Access

Latin America is a market where mobile networks represent subscribers' primary way of accessing the Internet. As a result, an examination of fixed access networks in the region reveals interesting findings.

One of the first findings is that monthly fixed-access usage in Latin America is significantly lower than what has been observed in other regions around the globe. Mean monthly usage is 15.2 GB, and median monthly usage is 6.6 GB, figures that show approximate 40% increase over those we published in 2H 2013. Subscribers on Latin America's fixed access networks continue to use approximately a quarter of the data per month compared to those in North America, which has the leading consumption around the globe.

Monthly Consumption - Latin America, Fixed Access		
	Median	Mean
Upstream	889 MB	1.9 GB
Downstream	5.9 GB	12.3 GB
Aggregate	6.6 GB	15.2 GB

sandvine

Table 9 - Monthly Consumption Figures - Latin America, Fixed Access

While usage may be lower, the consumption habits of subscribers in the region are very similar to that observed in other regions around the globe. Unsurprisingly, Real-Time Entertainment is the leading source of traffic; continuing to account for essentially 45% of downstream bytes during peak period, while Web Browsing and Filesharing round out the top three traffic categories on the aggregate.

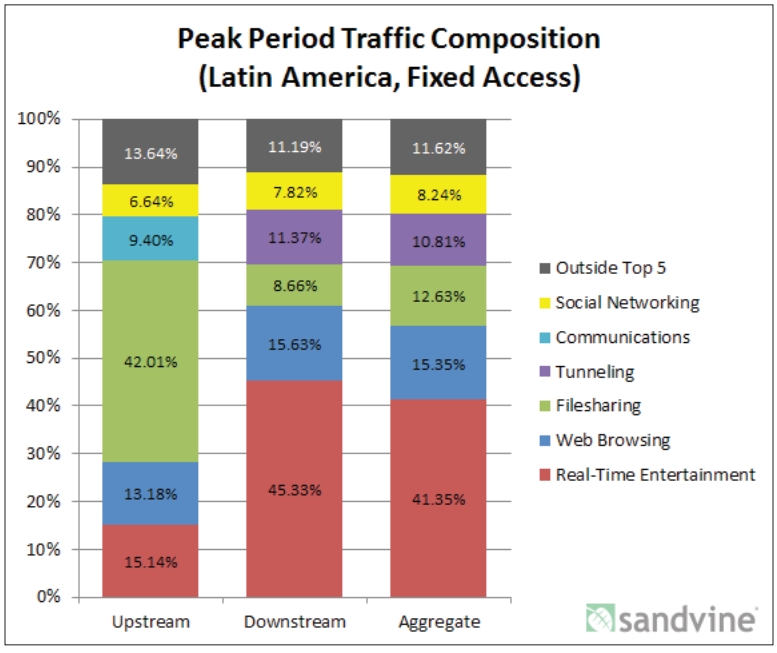


Figure 5 - Peak Period Aggregate Traffic Composition – Latin America, Fixed Access

Looking at the top applications, YouTube at 31.7% of peak downstream traffic is the clear leader in traffic share, more than doubling the second ranked application (HTTP). Making an appearance in our top 10 applications once again is Netflix, which accounts for 5.09% of peak downstream traffic. In 2H 2013, Netflix accounted for only 2.2% of peak downstream traffic which means in just 12 months the services share has more than doubled. While not yet at the levels observed on North American networks, Netflix continues to be the clear bandwidth share leader in paid-streaming video services in Latin America.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	BitTorrent	23.87%	YouTube	31.66%	YouTube	29.43%
2	YouTube	13.40%	HTTP	13.68%	HTTP	13.24%
3	HTTP	11.16%	SSL	8.65%	SSL	9.44%
4	Facebook	8.04%	BitTorrent	7.42%	BitTorrent	10.27%
5	SSL	7.18%	Facebook	5.50%	Facebook	5.94%
6	Ares	3.88%	Netflix	5.50%	Netflix	4.76%
7	Skype	2.46%	MPEG - OTHER	2.66%	MPEG - OTHER	2.53%
8	MPEG - OTHER	1.93%	Flash Video	2.04%	Flash Video	1.88%
9	Netflix	1.90%	RTMP	1.91%	RTMP	1.74%
10	Flash Video	1.28%	Google Market	1.79%	Google Market	1.59%
		75.08%		80.82%		80.82%

sandvine

Table 10 - Top 10 Peak Period Applications – Latin America, Fixed Access

Mobile Access

Latin America is a region that has great variation in the types of mobile networks, and because of this usage varies greatly from country to country. Some networks in the region are 2G/3G networks, however with the rollout of LTE in recent years, mobile networks have begun to offer an experience that is equivalent and in some cases even better than that of fixed access networks in the region.

For this report, we observed a mean monthly usage of 390.3 MB, a slight increase over the 355.4MB we observed six months ago.

Monthly Consumption - Latin America, Mobile Access		
	Median	Mean
Upstream	15.4 MB	47.2 MB
Downstream	82.1 MB	343.1 MB
Aggregate	94.1 MB	390.3 MB

sandvine

Table 11 - Monthly Consumption Figures – Latin America, Mobile Access

Because fixed access network penetration is not as widespread as Europe or North America, mobile networks in Latin America offer a mix of personal handsets and air cards that serve as a household's primary Internet connection. This mix results in interesting traffic profiles. Applications and traffic categories that are usually most prominent are those that are typically popular on both mobile devices and PCs.

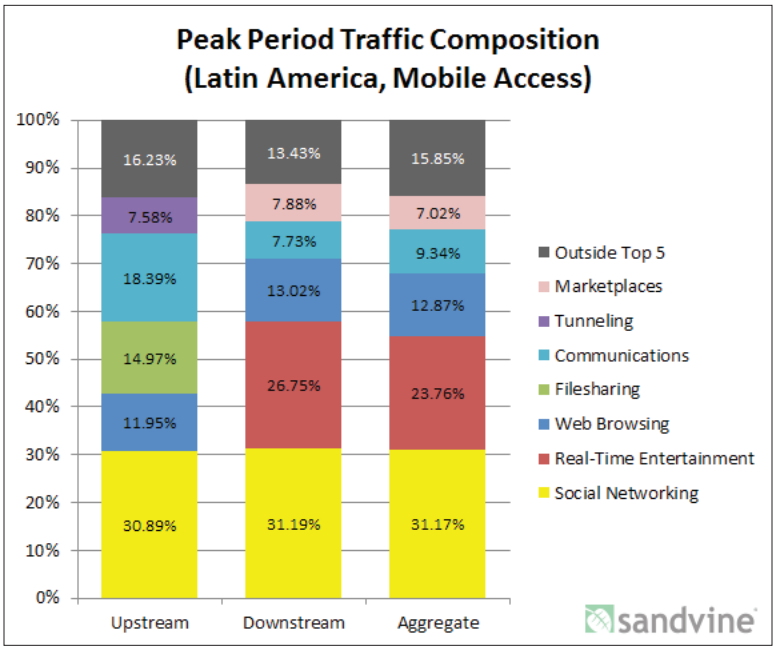


Figure 6 - Peak Period Aggregate Traffic Composition – Latin America, Mobile Access

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	Facebook	26.73%	Facebook	25.20%	Facebook	25.45%
2	Google Cloud	10.40%	YouTube	18.55%	YouTube	16.41%
3	WhatsApp	10.00%	HTTP	10.77%	HTTP	10.26%
4	HTTP	7.25%	SSL	6.55%	SSL	6.57%
5	SSL	6.73%	Google Market	4.53%	WhatsApp	5.10%
6	YouTube	4.20%	WhatsApp	4.23%	Google Cloud	4.80%
7	Skype	2.84%	Google Cloud	3.83%	Google Market	4.00%
8	Instagram	2.15%	Instagram	3.66%	Instagram	3.41%
9	iCloud	1.94%	MPEG - OTHER	3.56%	MPEG - OTHER	3.09%
10	Dropbox	1.79%	iTunes	1.68%	iTunes	1.52%
		74.03%		82.56%		80.60%

sandvine

Table 12 - Top 10 Peak Period Applications – Latin America, Mobile Access

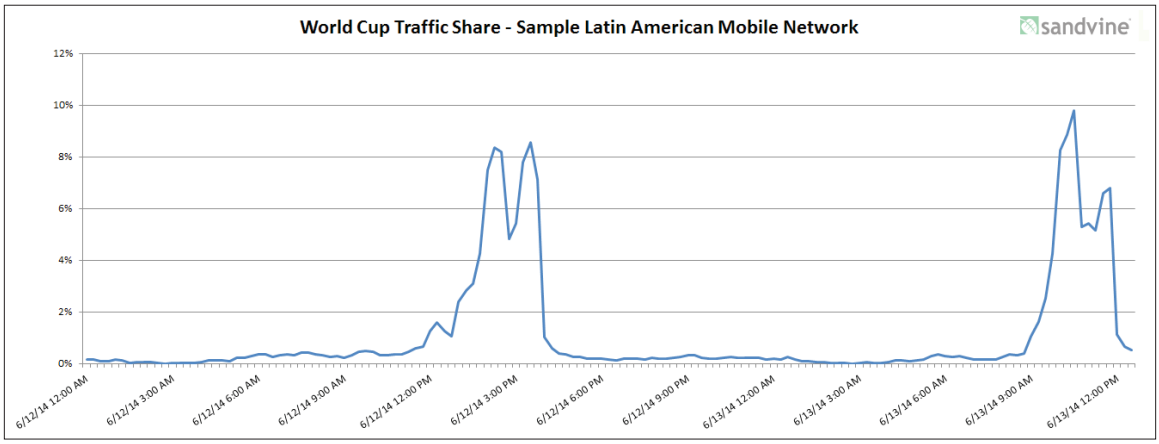
In Latin America, Social Networking is the largest driver of mobile usage, accounting for 31.2% of peak downstream traffic. One reason for its high share is the popularity of low-cost, all-you-can use social networking plans Sandvine has helped operators in the region to implement. In terms of streaming content, YouTube continues to be the largest source of video traffic, now accounting for almost 19% of downstream traffic in the peak evening hours.

World Cup Lessons

Sandvine counts some of the largest operators groups in Latin America as customers, and we are fortunate enough to have helped them gain tremendous insight about how the World Cup will impacted their network.

Below is a chart form one Latin American mobile network that shows that streaming of the first two matches of the World Cup caused a significant spike in HTTP live streaming traffic which is the internet protocol used to deliver the stream in this country.

One neat thing you may notice is that soccer matches have a distinct horseshoe traffic pattern, as subscribers take a break from streaming during half-time.



When actually crunching the numbers, World Cup streaming accounted for between 8-10% of total traffic when the first two matches were being played. These levels failed to reach our prediction that matches would consume as much as 40% of the network.

It appears as if the reality is that big sporting events are still best viewed on the largest screen available to a subscriber, and that screen is typically a television set. While there is still demand for live sports, especially appointment viewing events, the mobile device may simply serve as a backup for those stuck on the bus or at work.

Asia-Pacific

Fixed Access

For 2H 2014, mean usage in the region was 45.1 GB and median usage was 20.8 GB. Because of the amount of Filesharing and Peercasting traffic on networks in the region, subscribers in the region generate some of the largets amounts of upstream traffic in the world.

Monthly Consumption - Asia-Pacific, Fixed Access		
	Median	Mean
Upstream	2.9 GB	13.4 GB
Downstream	17.9 GB	31.7 GB
Aggregate	20.8 GB	45.1 GB

Table 13 - Monthly Consumption Figures - Asia-Pacific, Fixed Access

As observed in other regions across the globe, consumption in Asia-Pacific is driven by the use of Real-Time Entertainment, which accounts for 47.5% of total downstream traffic during peak period. On the upstream however, Filesharing still represents the majority of traffic, and is the only region in this report that can lay claim to that fact.

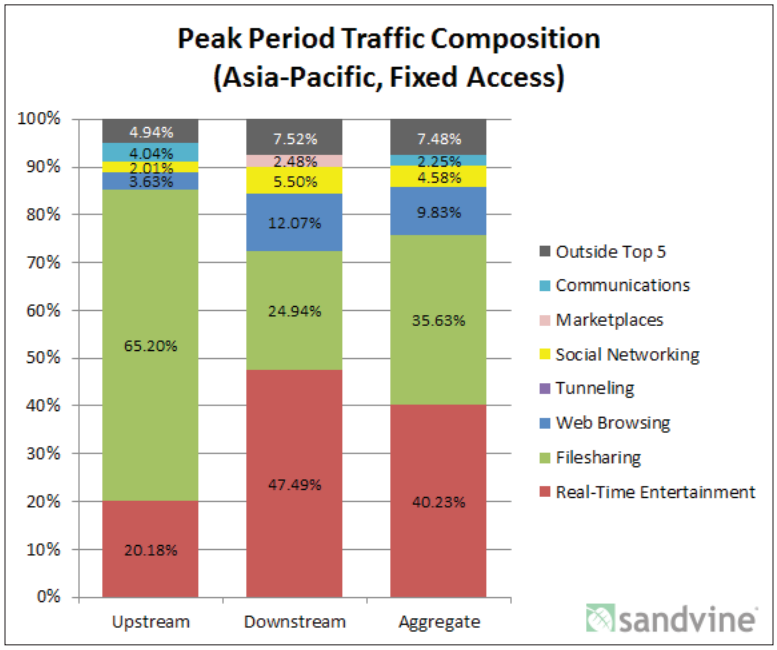


Figure 7 - Peak Period Aggregate Traffic Composition - Asia-Pacific, Fixed Access

As covered in previous reports, a unique characteristic of the Asia-Pacific region is the popularity of peercasting applications, particularly QVoD and PPStream. These applications allow users to stream live events while simultaneously helping to distribute the stream to other viewers, which drives large volumes of upstream traffic. BitTorrent is now the second ranked downstream application during peak and while its decline in share has been somewhat less drastic than in North America we believe the rate of decline may accelerate as more over-the-top Real-Time Entertainment sources are made available to subscribers in the region.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	BitTorrent	55.91%	YouTube	23.70%	BitTorrent	31.58%
2	QVoD	7.03%	BitTorrent	22.78%	YouTube	18.67%
3	YouTube	4.80%	HTTP	10.94%	HTTP	8.80%
4	RTSP	3.17%	RTSP	7.43%	RTSP	6.29%
5	Thunder	3.01%	Facebook	3.22%	QVoD	3.20%
6	HTTP	2.86%	MPEG - OTHER	2.93%	Facebook	2.74%
7	Skype	2.26%	QVoD	1.83%	MPEG - OTHER	2.25%
8	Facebook	1.43%	Flash Video	1.82%	SSL	1.59%
9	SSL	1.16%	SSL	1.75%	RTMP	1.40%
10	PPStream	0.64%	RTMP	1.74%	Flash Video	1.39%
		82.26%		78.14%		77.92%

sandvine

Table 14 - Top 10 Peak Period Applications - Asia-Pacific, Fixed Access

One interesting observation on a fixed network in Australasia was the appearance of Netflix as a top-10 application on their network. While the service is not available in the region, approximately 2.5% of subscribers are accessing the service and it comprises as much as 4% of peak downstream traffic. To gain access to these services a subscriber would have had to find a way to get credentials to the service and then use a location-spoofing service to bypass geolocation restrictions. If that Netflix usage is representative across all of Australia and New Zealand's broadband subscribers, there could easily be an excess of 100,000 households using Netflix in the region.

Mobile Access

Asia-Pacific mobile subscribers have traditionally shown the highest consumption numbers among users in the Global Internet Phenomena Report and that is unchanged in this edition. Asia-Pacific was the first region to exceed 1GB a month on average and while the figures for this report are nearly the same as previous, we expect Asia-Pacific's consumption leadership to continue in future reports for the foreseeable future. In future reports it is our goal to further break out regional usage data for large, diverse regions like Asia-Pacific, as usage in emerging markets differs greatly from emerged markets.

Monthly Consumption - Asia-Pacific, Mobile Access		
	Median	Mean
Upstream	261.7 MB	143.1 MB
Downstream	298.1 MB	1.0 GB
Aggregate	339.2 MB	1.1 GB

sandvine

Table 15 - Monthly Consumption Figures - Asia-pacific, Mobile Access

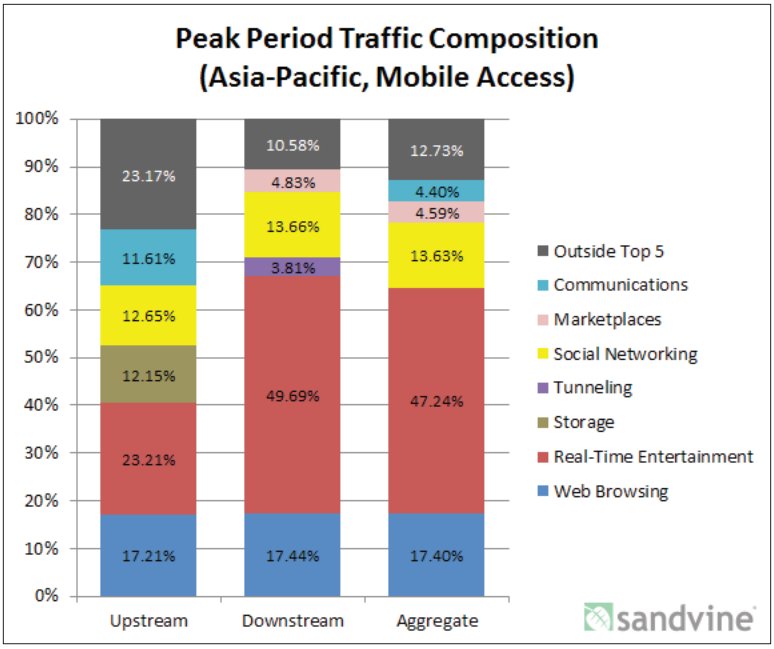


Figure 8 - Peak Period Aggregate Traffic Composition – Asia-Pacific, Mobile Access

/Other than the appearance of multiple applications accounting for the high Real-Time Entertainment share, Asia-Pacific's traffic is for the most part similar in composition to that of leading networks in Europe and North America. The one difference that may be present is the popularity of marketplaces in the region which accounts for 4.8% of downstream traffic. When combining the traffic share of iTunes and Google Play, subscribers in Asia-Pacific are the highest consumers of app and game downloads in the world.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	HTTP	14.40%	YouTube	17.46%	YouTube	16.24%
2	Facebook	9.68%	HTTP	15.59%	HTTP	15.46%
3	SSL	7.99%	Facebook	9.48%	Facebook	9.54%
4	Google Cloud	7.95%	MPEG - OTHER	7.12%	MPEG - OTHER	7.16%
5	YouTube	7.68%	SSL	5.37%	SSL	4.99%
6	KakaoTalk	4.17%	Google Market	3.56%	Google Market	3.93%
7	BitTorrent	3.43%	Dailymotion	2.59%	Dailymotion	2.42%
8	MPEG - OTHER	1.77%	Instagram	1.82%	Google Cloud	1.97%
9	Instagram	1.37%	iTunes	1.54%	Instagram	1.77%
10	Dropbox	1.13%	Google Cloud	1.47%	BitTorrent	1.55%
		59.57%		66.00%		65.02%

sandvine

Table 16 - Top 10 Peak Period Applications – Asia-Pacific, Mobile Access

Africa

Fixed Access

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

Unsurprisingly, Real-Time Entertainment is one of the leading sources of traffic; but it accounts for only just over a quarter of peak downstream traffic, which is a far cry from regions who see streaming audio and video account for the majority of peak traffic.

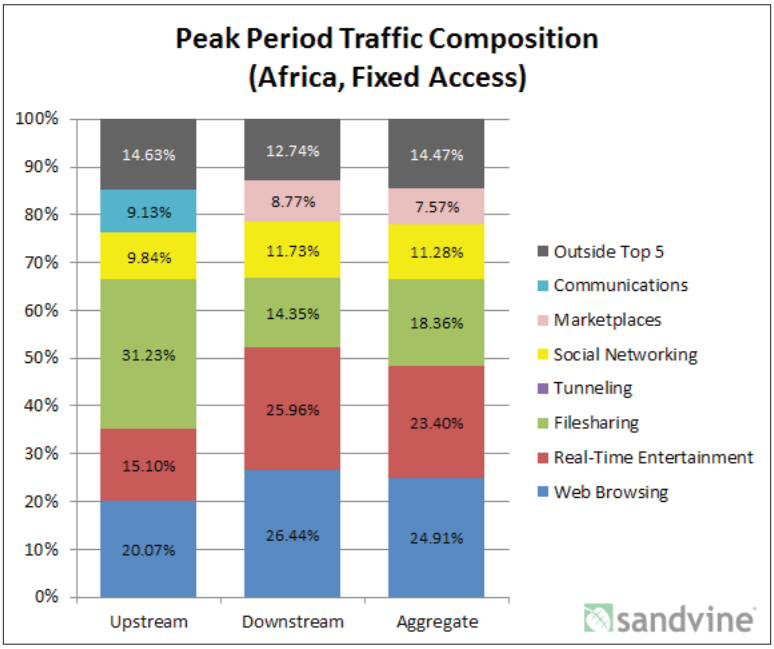


Figure 9 - Peak Period Aggregate Traffic Composition - Africa, Fixed Access

Looking at the top applications, HTTP at 22.9% of peak downstream traffic is the clear leader in share, well ahead of YouTube (12.3%) which is typically the top source of traffic on many networks. 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. The slower speed could also play a role in explaining why BitTorrent is the second ranked application on the aggregate, since downloading and watching content later may prove to offer a superior experience to the on-demand video options available in the region.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	BitTorrent	28.21%	HTTP	22.93%	HTTP	21.43%
2	HTTP	16.67%	BitTorrent	13.29%	BitTorrent	16.84%
3	Facebook	8.33%	YouTube	12.29%	YouTube	11.22%
4	YouTube	7.77%	Facebook	9.44%	Facebook	9.18%
5	Skype	4.71%	SSL	4.30%	SSL	4.39%
6	SSL	4.69%	MPEG - OTHER	4.25%	MPEG - OTHER	3.65%
7	MPEG - OTHER	1.69%	Windows Update	2.82%	Skype	2.92%
8	Dropbox	1.49%	Flash Video	2.73%	Windows Update	2.41%
9	Flash Video	1.17%	Skype	2.41%	Flash Video	2.36%
10	Windows Update	1.08%	iTunes	2.30%	iTunes	1.97%
		75.80%		76.77%		76.37%

sandvine

Table 17 - Top 10 Peak Period Applications - Africa, Mobile Access

Mobile Access

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

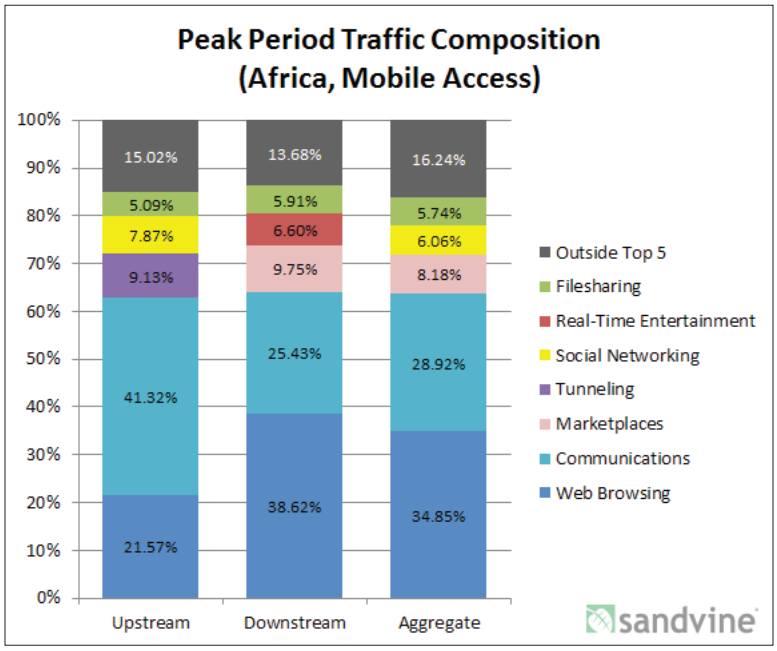


Figure 10 - Peak Period Aggregate Traffic Composition - Africa, Mobile Access

In most regions, Real-Time Entertainment is the traffic category that is the most dominant. This is not the case in Africa however. During peak period, Real-Time Entertainment accounts for only 6.6% of peak downstream traffic, which crowns Web Browsing as the dominant downstream traffic category, accounting for over 38.6% of traffic. Communications applications continue to also prove popular in Africa, the mix of VoIP and messaging applications now being the second largest traffic category in the region.

	Upstream		Downstream		Aggregate	
Rank	Application	Share	Application	Share	Application	Share
1	BlackBerry	15.26%	HTTP	27.22%	HTTP	23.80%
2	HTTP	11.81%	BlackBerry	12.62%	BlackBerry	13.17%
3	WhatsApp	8.98%	WhatsApp	6.37%	WhatsApp	6.98%
4	SSL	6.29%	BitTorrent	4.88%	BitTorrent	4.60%
5	Facebook	4.52%	Google Market	4.56%	SSL	4.21%
6	BitTorrent	3.59%	Opera Mini	3.84%	Google Market	3.71%
7	WAP v2	1.80%	SSL	3.63%	Opera Mini	3.38%
8	Opera Mini	1.78%	WAP v2	3.58%	Facebook	3.27%
9	Viber	1.32%	YouTube	3.47%	WAP v2	3.20%
10	Yahoo! Mail	1.23%	Facebook	2.92%	YouTube	2.87%
		56.58%		73.09%		69.19%

sandvine

Table 18 - Top 10 Peak Period Applications - Africa, Mobile Access

In most regions, YouTube is the application responsible for generating the most bandwidth, but in Africa it accounts for just 3.5% of traffic. HTTP traffic is the leading source of traffic at 27.2% and WAP browsing (typically web browsing on a feature phone) is also a contributor at 3.6%. WAP actually saw significant decline year over year, likely caused by increased adoption of smartphones in the region. Africa is also the only region where Opera Mini, a web browser focused on data efficiency, is among the top 10 applications.

Explanation of Traffic Categories

The table below describes each of the traffic categories used in the Global Internet Phenomena Report: 2H 2014

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.

In the Global Internet Phenomena Report: 2H 2014, we examined five regions:

- Africa
- Asia-Pacific
- Europe
- Latin America
- North America

The data gathered for these reports was collected in September 2014 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. Data also includes the total transmitted (upstream) and received (downstream) bytes, from the subscriber's perspective, attributable to each subscriber for a period of 30 days.

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.

The transmitted and received bytes per subscriber data sets were used to create ordinal rankings of all subscribers on a network based on a combination of data direction (upstream, downstream, aggregate) and data period (day, week, month), for a total of nine ranked lists ordered by total byte usage. These lists enabled consumption analysis based on percentile ranking and cast light on the widely varying data needs of individual subscribers.

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.

Headquarters
Sandvine Incorporated ULC
Waterloo, Ontario Canada
Phone: +1 519 880 2600
Email: sales@sandvine.com

European Offices
Sandvine Limited
Swindon, UK
Phone: +44 (0) 1256 698021
Email: sales@sandvine.co.uk

sandvine®
Intelligent Broadband Networks