[Volume 8 / Number 3]

akamai's [state of the internet]

Q3 2015 report

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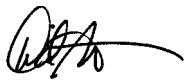
When we first started publishing the State of the Internet Report in 2008, it only included data broken out at a global and U.S. state level. However, several years ago, in response to both Akamai's growing international presence as well as the increasing popularity of the report, we began to include "regional" sections as well, featuring data from a selected set of countries in North and South America; the Europe, Middle East, and Africa (EMEA) region; and the Asia Pacific (APAC) region. However, we've never provided insight into why some countries are included in these regional sections while others aren't, and we receive questions from time to time about this. The countries/regions included within the *State of the Internet Report* reflect a majority of the locations where Akamai is "open for business" and the company is actively selling in-market. (The list is reviewed with local Sales & Marketing leaders on a yearly basis and updated based on their input.) As such, the report may not fully represent the progress being made on broadband initiatives being undertaken within a given region. Many other countries, such as Luxembourg, are actively working to improve broadband within their respective territories, but the results are not included within this report. In order to provide greater insight into such efforts, we will explore ways to make relevant data about these other countries available, such as through one or more data sets that can be downloaded from the State of the Internet data visualizations page at *https://www.stateoftheinternet.com/trends-visualizations-connectivity-global-heat-map-internet-speeds-broadband-adoption.html*

In addition, it is worth reinforcing that the connection speed and broadband adoption data within the report are currently based only on IPv4 connections to Akamai. Some network service providers are starting to roll out, or have already rolled out, higher-speed broadband tiers for subscribers using native IPv6 connectivity. As such, the *State of the Internet Report* does not currently reflect the higher-speed connections from these network providers/subscribers, which means that the average speeds published for some countries may be lower than expected. However, we expect that we'll be able to start publishing speed data for IPv6 connections starting in 2016, ideally in the first-quarter issue. If data is available before then, we'll highlight it on the *State of the Internet* blog at *https://www.stateoftheinternet.com/trends-blogs.html*.

As we noted in last quarter's "Letter from the Editor", ongoing work is being done to improve the accuracy of mobile network identification. Due to these changes, mobile connection speed data and mobile browser usage data have once again been removed from this quarter's *State of the Internet Report*, but both will return in a future edition. We are committed to continuing to increase the granularity of the data published within the *State of the Internet Report* while at the same time maintaining accuracy in the face of a rapidly changing Internet, including increased adoption of IPv6 and mobile connectivity.

As always, if you have comments, questions, or suggestions regarding the *State of the Internet Report*, the website, or the mobile applications, please reach out to us via email at *stateoftheinternet@akamai.com* or on Twitter at *@akamai_soti*. You can also interact with us in the *State of the Internet* subspace on the Akamai Community at *https://community.akamai.com/*.



—David Belson

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Akamai's globally distributed Intelligent Platform™ allows us to gather massive amounts of data on many metrics, including Internet connection speeds, network connectivity/availability issues, and IPv6 adoption progress, as well as traffic patterns across leading web properties and digital media providers. Each quarter, Akamai publishes the *State of the Internet Report* based on this data.

This quarter's report includes data gathered from across the Akamai Intelligent Platform during the third quarter of 2015, covering Internet connection speeds and broadband adoption metrics as well as trends seen in this data over time. In addition, the report includes insight into the state of IPv4 exhaustion and IPv6 adoption, Internet disruptions that occurred during the quarter, and observations from Akamai partner Ericsson regarding data and voice traffic growth on mobile networks.

Beginning with the *First Quarter, 2015 State of the Internet Report,* security-related content that was previously included in the *State of the Internet Report*, including data on attack traffic seen across the Akamai platform and insights into high-profile security vulnerabilities and attacks, is now published in a separate *State of the Internet/Security Report*. The quarterly security report provides timely information about the origins, tactics, types, and targets of cyberattacks, including quarter-over-quarter and year-over-year attack traffic trends as well as case studies highlighting emerging cybersecurity issues. The *State of the Internet/Security Report* can be found at *http://www.stateoftheinternet.com/security-report*.

Internet and Broadband Adoption / In the third quarter of 2015, Akamai observed a 0.6% quarterly increase in the number of unique IPv4 addresses connecting to the Akamai Intelligent Platform, growing to over 808 million — about 4.8 million more than were seen in the second quarter of 2015. Despite an 8.4% decrease from the previous quarter, Belgium remained the clear global leader in IPv6 adoption, with 35% of its connections to Akamai occurring over IPv6. The global average connection speed increased 0.2% quarter over quarter to 5.1 Mbps, while the global average peak connection speed decreased 0.9% to 32.2 Mbps. At a country/region level, South Korea continued to have the highest average connection speed in the world, in spite of an 11% decrease from the second quarter to 20.5 Mbps, while Singapore maintained its position as the country with the highest average peak connection speed after a 25% quarterly jump to 135.4 Mbps.

Globally, 4 Mbps broadband adoption was up 2.7% from the second quarter to 65%, with Bulgaria and South Korea having the highest levels of adoption at 96%. Despite noticeable decreases in broadband adoption levels in the third quarter, South Korea unsurprisingly led the world again across the 10 Mbps, 15 Mbps, and 25 Mbps tiers, with adoption rates of 68%, 45%, and 24%, respectively. Global 10 Mbps, 15 Mbps, and 25 Mbps broadband adoption grew modestly in the third quarter, posting gains of 2.4%, 5.3%, and 6.3% at each threshold and reaching adoption levels of 27%, 15%, and 5.2%, respectively.

Mobile Connectivity / Based on traffic data collected by Ericsson, the worldwide volume of mobile data traffic grew by 14% between the second and third quarters of 2015. Mobile connection speed and browser usage data are again absent from this quarter's report due to ongoing changes being made to further refine Akamai's mobile network identification algorithms.

[SECTION][1] INTERNET PENETRATION

Through its globally deployed Intelligent Platform and by virtue of the more than 2 trillion requests for web content that it serves on a daily basis, Akamai has unique visibility into levels of Internet penetration around the world. In the third quarter of 2015, well over 808 million unique IPv4 addresses from 242 unique countries/regions connected to the Akamai Intelligent Platform. This is a 2.3% increase in the number of unique IPv4 addresses seen by Akamai as compared with the third quarter of 2014 and a 0.6% increase from the number seen in the second quarter of 2015.

Although we saw over 800 million unique IPv4 addresses, Akamai believes that this count represents well over 1 billion web users. In some cases, multiple individuals may be represented by a single IPv4 address (or a small number of IPv4 addresses) because they access the web through a firewall or proxy server; in other cases, individual users may have multiple IPv4 addresses associated with them due to their use of multiple connected devices. Unless otherwise specified, the use of "IP address" within Section 1.1 refers to IPv4 addresses.

1.1 Unique IPv4 Addresses / Partially reversing the reduction seen in the second quarter, the number of unique IPv4 addresses worldwide connecting to Akamai increased by about 4.8 million in the third quarter. As noted in last quarter's report, however, we expect that the number of unique global IPv4 addresses seen by Akamai may level off or decline in the future as carriers increase the availability of native IPv6 connectivity for subscribers and implement carrier-grade network address translation (CGN) solutions more broadly in an effort to conserve limited IPv4 address space.

As seen in Figure 1, in the third quarter of 2015, 8 of the top 10 countries/regions saw a quarterly increase in unique IPv4 counts, compared with 4 countries/regions in the previous quarter. Gains were modest, ranging from 0.7% in China to 2.7% in Brazil. The United Kingdom saw IPv4 counts hold steady, while the United States saw a small 0.5% decline from the second quarter.

Globally, close to 60% of the countries/regions saw a quarter-over-quarter increase in unique IPv4 address counts in the third quarter, compared with roughly half in the second quarter. Forty-three countries/regions saw IPv4 address counts grow 10% or more, while twenty-seven saw counts decline 10% or more as compared with the previous quarter.

Looking at year-over-year changes among the top 10, the United Kingdom again saw the largest increase, with a gain of 16%. South Korea and Japan were not far behind, with increases of 15% and 13%, respectively. Russia had the smallest increase among the top 10 with a 2.1% yearly gain, while three countries — India, Germany, and the United States — saw yearly declines of 0.4%, 1.4%, and 5.7% respectively. Again, the losses seen in these countries are not indicative of long-term declines in Internet usage but are more likely related to changes in IPv4 address management/conservation practices and/or increased IPv6 adoption.

Globally, close to three-quarters of the countries/regions had higher unique IPv4 address counts in the third quarter compared with one year ago. Yearly growth rates of 100% or more were seen in 16 countries/regions, although 7 of them had fewer than 2,000 unique IPv4 addresses, so small changes can result in deceptively large percentage shifts in these countries. In all, 30 countries saw yearly growth rates of at least 50%, while 5 countries saw IPv4 address counts decline at least 50%.

1.2 IPv4 Exhaustion / As expected, the third quarter saw continued depletion of available IPv4 address space as Regional Internet Registries (RIRs) assigned/allocated blocks of IPv4 address space to organizations within their respective territories. A reference table translating the /nn notations used below to identify unique IP address counts can be found at *https://www.arin.net/knowledge/cidr.pdf.*

Leveraging data[1] collected by Geoff Huston, Chief Scientist at APNIC,[2] the *State of the Internet Report* provides a perspective on the size of the available IPv4 address pool at each RIR and how the sizes of the available pools have been shrinking over time. In addition, the report uses data provided by the individual RIRs to highlight IPv4 address space delegation activity within each region over the course of the quarter.

Figure 2 illustrates how the size of available IPv4 address pools at each RIR changed during the third quarter of 2015 based on data made available by Mr. Huston. Notably, after starting the quarter with roughly 400,000 available addresses, ARIN had to waitlist a qualified request for the first time on July 1 (due to lack of availability),[3] and it allocated its final IPv4 address block on September 24, completely depleting its pool of available addresses.[4] During the third quarter, LACNIC handed out nearly 480,000 addresses, or roughly 17% of its available pool, and AFRINIC distributed nearly 5 million addresses, or 11% of its available pool — far more than the 700,000 it distributed in the second quarter. RIPE and APNIC handed out roughly 800,000 and 550,000 addresses respectively, representing about 5% of each of their available pools. With just under 39 million addresses available at the end of the third quarter, AFRINIC is the only RIR with a substantial pool of IPv4 addresses remaining.

	Country/Region	Q3 2015 Unique IPv4 Addresses	QoQ Change	YoY Change
–	Global	808,573,073	0.6%	2.3%
1	United States	147,911,430	-0.5%	-5.7%
2	China	126,077,926	0.7%	3.2%
3	Brazil	47,182,078	2.7%	3.8%
4	Japan	46,074,201	1.0%	13%
5	Germany	36,285,678	1.2%	-1.4%
6	United Kingdom	30,979,247	0%	16%
7	France	29,402,991	0.9%	4.0%
8	South Korea	23,871,054	2.2%	15%
9	Russia	19,006,645	2.0%	2.1%
10	India	17,901,010	0.9%	-0.4%

Figure 1: Unique IPv4 Addresses Seen by Akamai

As previously noted, ARIN had depleted its pool by the end of the quarter, and LACNIC, with the next smallest remaining pool, had just over 2 million available addresses remaining.

The complete exhaustion of the ARIN pool triggered changes in ARIN's policies, including the removal of restrictions on address transfer requests. ARIN also announced it would continue to process and approve requests for IPv4 addresses via its Waiting List for Unmet Requests, satisfying those requests where possible if it receives additional address space from IANA or recovers addresses from other organizations.[5] On September 1, for example, IANA distributed a /15 and two /16 blocks to ARIN as part of its Global Policy for Post Exhaustion IPv4 Allocation, which were then redistributed by ARIN — in under 24 hours — to satisfy 13 wait list requests.[6, 7] ARIN expects to receive its next allocation from IANA in March 2016, but most IPv4 address needs within ARIN's market will now depend on the secondary transfer market for fulfillment. Within just 7 weeks after ARIN began wait-listing requests, the list had grown to 56 organizations with almost a /12 worth of address space requested.[8] Based on this and the fact that the "low hanging fruit" — e.g., large excess address blocks owned by companies such as Merck, Lilly, DuPont, and Nortel — have already been purchased, IPv4 address prices may be expected to rise in the near future.[9]

On the other hand, the exhaustion of IPv4 in the ARIN region also provides impetus for companies to expand adoption of IPv6, with its virtually unlimited address space.

Figure 3 illustrates the IPv4 allocation/assignment activity across each of the RIRs during the third quarter of 2015. Overall, there was a significant increase in activity, with more than double the number of addresses allocated in the third quarter (18.5 million) compared with the second (8.8 million), though, as we explain later, the majority of these transactions — particularly the large assignments at ARIN — are more likely to be third-party transfers instead of direct RIR allocations due to the way this data is captured. APNIC, RIPE, and LACNIC all saw slow, consistent delegation activity once again, with no specific days during the quarter where it appeared that significant allocations were made. At AFRINIC, the largest single delegation during the third quarter was made on July 28, when a /11 was allocated to Egyptian Internet service provider company TE Data.[10] Other sizeable allocations during the quarter include a /13 allocated to Egyptian provider Link.net[11] on July 16, and a /12 allocated to Tunisian[12] provider Orange Tunisia on September 21.

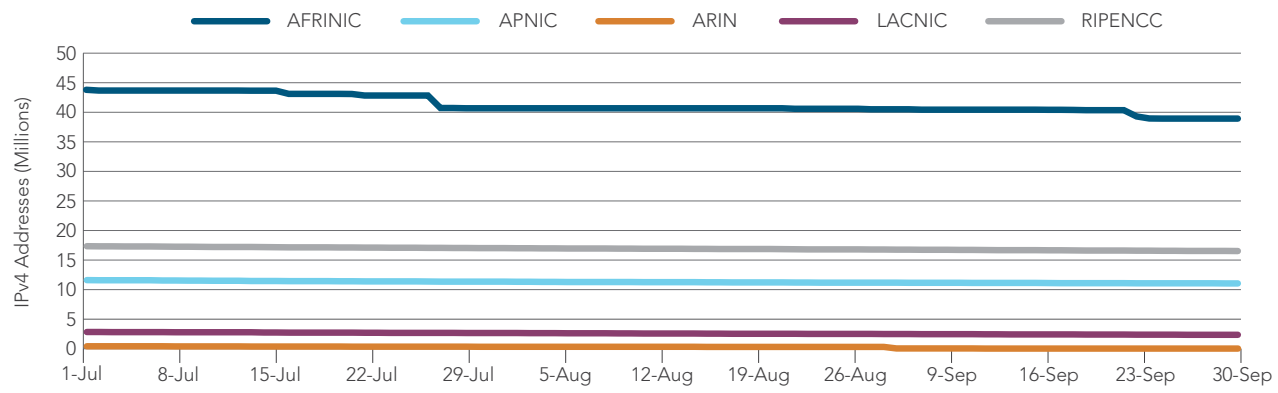

Figure 2: Available IPv4 Address Pool Size by RIR, Q3 2015

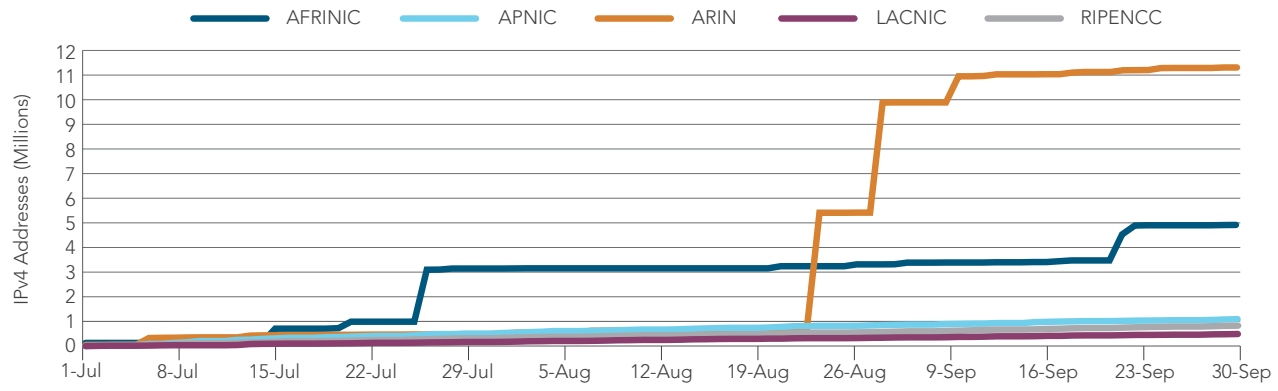

Figure 3: Total Number of IPv4 Addresses Assigned/Allocated by RIR, Q3 2015

At ARIN, a number of significant assignments occurred during the third quarter. On August 28, U.S. telecommunications provider Frontier Communications Corporation[13] received several blocks of addresses, including three /12s, a /13, and several smaller IP blocks. On September 2, Amazon Technologies[14] received two /11s. Finally, on September 8, U.S. cable provider Suddenlink Communications[15] received a /12. According to this data, ARIN appears to have allocated more than 11 million addresses in the third quarter despite having less than 500,000 addresses available at the beginning of the quarter — a phenomenon seen in the previous quarter's data as well. As noted in last quarter's report, this is due to the way IP block transfers between two third-party companies typically work: the source organization's resources are first returned to ARIN and then, within hours, re-issued to the recipient organization. The newly assigned IP addresses get captured in the data used to generate Figure 3, but do not show up in ARIN's available pool (i.e., the data used to generate Figure 2). So, in fact, the large allocations seen at ARIN in the third quarter are not new IP blocks being handed out by ARIN, but are instead third party transfers. As available IPv4 address space becomes scarce and transfers become more frequent, we expect to see this phenomenon — where ARIN appears to be assigning more addresses than it has available — more and more often, and possibly at other RIRs as well. Note also that despite the fact that ARIN has no more available addresses as of the end of the third quarter, it does still hold some addresses in reserve status for uses specifically defined by policy, such as facilitating IPv6 deployments or enabling small allocations for critical Internet infrastructure.

1.3 IPv6 Adoption / Starting with the *Third Quarter, 2013 State of the Internet Report*, Akamai began including insight into IPv6 adoption across a number of vectors based on data gathered across the Akamai Intelligent Platform. The traffic percentages cited in Figure 4 and Figure 5 are calculated by dividing the number of content requests made to Akamai over IPv6 by the total number of requests made to Akamai (over both IPv4 and IPv6) for a subset of customer web properties that have enabled Akamai edge delivery via IPv6 – in other words, for dual-stacked hostnames. This reporting methodology provides something of a lower bound for IPv6 adoption, as some dual-stacked clients – such as Safari on Mac OS X Lion and Mountain Lion — will only use IPv6 for a portion of possible requests. While not all of Akamai's customers have chosen to implement IPv6 delivery yet, the data set used for this section includes traffic from numerous leading web properties and software providers, so we believe that it is sufficiently representative. Note that in compiling the data for the figures in this section, a minimum of 90 million total requests to Akamai during the third quarter was required to qualify for inclusion.

A regularly updated view into the metrics discussed below can be found in the "IPv6 Adoption Trends by Country and Network" visualization on the *State of the Internet* website at *https://www.stateoftheinternet.com/ipv6*.

Figure 4 highlights the 10 countries/regions with the largest percentage of content requests made to Akamai over IPv6 in the third quarter. All of the top 10 countries/regions from the second quarter remained in the top 10 in the third quarter, with European countries taking 8 of the top 10 spots. Despite an 8.4% quarterly drop, Belgium again maintained a clear lead, with 35% of content requests being made over IPv6. In contrast with the previous quarter, where all of the top 10 countries enjoyed quarterly gains in IPv6 traffic, in the third quarter, half of the top 10 saw quarterly declines, ranging from 0.6% in Germany to 12% in Switzerland. Luxembourg remained unchanged, with 14% of its requests made to Akamai over IPv6. Of the remaining four countries/regions, Peru posted a minimal quarterly gain of 0.9%, while Portugal, Estonia, and Greece all saw robust increases, ranging from 21% to 37% quarter over quarter.

	Country/Region	Q3 2015 IPv6 Traffic %	QoQ Change
1	Belgium	35%	-8.4%
2	Switzerland	20%	-12%
3	United States	18%	-2.9%
4	Peru	17%	0.9%
5	Germany	17%	-0.6%
6	Portugal	16%	21%
7	Luxembourg	14%	0%
8	Greece	14%	37%
9	Estonia	10%	22%
10	Czech Republic	8.6%	-1.3%

Figure 4: IPv6 Traffic Percentage, Top Countries/Regions

Figure 5 lists the top 20 network providers by the number of IPv6 requests made to Akamai during the third quarter. Once again, cable and wireless/mobile providers continued to drive the largest volumes of IPv6 requests, as many are leading the way for IPv6 adoption in their respective countries. As observed in the APNIC blog, the skyrocketing growth of the mobile market as well as the frequent upgrades in device and network hardware and software make it both easier and more advantageous for the mobile ecosystem to adopt IPv6. Apple's announcement that it would require IPv6 support for all apps starting with iOS 9 is further indicative of the significance of IPv6 to the massive mobile market.[16]

In the third quarter, Verizon Wireless and Belgium's Telenet continued to lead the pack as the two companies with more than half of their requests to Akamai made over IPv6. Verizon's percentage increased from 71% in the second quarter to 72% in the third, while Telenet's stayed steady at 53%. Nine providers in the top twenty, down from eleven in the second quarter, had at least one in four content requests to Akamai happen over IPv6. However, all of the top 20 — up from 17 in the previous quarter — had at least 10% of their requests to Akamai occur over IPv6.

In addition to the increases in IPv6 traffic seen in the major carriers highlighted in this table, the third quarter saw additional activity in IPv6 deployment among other providers worldwide. For example,

BT — the largest telecommunications provider in the United Kingdom — announced that it is beginning IPv6 rollout, with plans to enable 50% of its network by April 2016 and 100% of its network by December 2016.[17] Other deployments are noted in the World IPv6 Launch blog (*http://www.worldipv6launch.org/blog/*).

Country/Region	Network Provider	Q3 2015 IPv6 Traffic %
United States	Comcast Cable	40%
United States	AT&T	39%
United States	Verizon Wireless	72%
United States	Time Warner Cable	20%
Brazil	NET Serviços de Comunicação S.A.	11%
Peru	Telefonica Del Peru	22%
Brazil	Global Village Telecom	12%
Germany	Deutsche Telekom	24%
United States	T-Mobile	45%
Malaysia	Telekom Malaysia	14%
Japan	KDDI Corporation	25%
France	Proxad/Free	23%
Belgium	TELENET	53%
Germany	Kabel Deutschland	49%
United Kingdom	Sky	10%
Pan-European	Liberty Global B.V. (UPC)	10%
Ecuador	CNT Ecuador	15%
Switzerland	Swisscom	38%
Belgium	Belgacom Skynet	26%
Portugal	Sapo	43%

Figure 5: IPv6 Traffic Percentage, Top Network Providers by IPv6 Request Volume

[SECTION]2 GEOGRAPHY GLOBAL

The data presented within this section was collected during the third quarter of 2015 through Akamai's globally deployed Intelligent Platform and includes all countries/regions that had more than 25,000 unique IPv4 addresses request content from Akamai during the quarter. Prior to 2015, the *State of the Internet Report* looked at connection speeds of these requests within three different threshold classifications — namely, 4 Mbps ("broadband"), 10 Mbps ("high broadband"), and 15 Mbps ("4K ready"). However, in its 2015 Broadband Progress Report, the U.S. Federal Communications Commission (FCC) increased its benchmark definition of broadband Internet service to download speeds of 25 Mbps, sharply raising the bar from the 4 Mbps definition it had set in 2010.[18] Given this new standard, beginning with the the *First Quarter, 2015 State of the Internet Report*, Akamai began tracking data for the 25 Mbps threshold (in addition to the three pre-existing thresholds) in both the global and United States data sets. Each threshold tier is now simply referred to by speed rather than using the stand-alone "broadband" and "high broadband" labels, as we expect that standards and definitions for such terms will continue

to evolve as technology drives ever-increasing speeds over time. Note that broadband tiers throughout this report refer to speeds greater than or equal to the specified threshold.

In addition to providing insight into adoption levels at different broadband threshold speeds, this report also includes data on average and average peak connection speeds — the latter provides insight into the peak speeds that users can likely expect from their Internet connections. (See the blog post at *http://akamai.me/sotimetrics* for more information on how these metrics are calculated.)

As always, traffic from known mobile networks has been removed from the data set used to calculate the metrics in the present section as well as subsequent regional "Geography" sections.

Beginning with the *Second Quarter, 2015 State of the Internet Report*, we have also removed traffic identified as coming from major cloud hosting providers, as cloud services data centers typically have extremely fast Internet connections that can skew connection speed metrics. We believe that removing this data from our calculations provides a more accurate picture of the end-user experience. To calculate consistent year-over-year results in the current report, we have reprocessed connection speed data from the third quarter of 2014 with traffic from cloud hosting providers removed as well, thus giving a true apples-to-apples comparison of the changes in connection speeds over time. As such, yearly percentage changes may not line up with the numbers published in previous *State of the Internet* reports, which did not have the cloud hosting provider traffic removed.

2.1 Global Average Connection Speeds / In the third quarter, the global average connection speed was 5.1 Mbps, a slight 0.2% increase from the second quarter. As Figure 6 shows, quarterly changes were mixed across the top 10 countries/regions, with three countries/regions showing declines. Despite having a quarterly decline of 11% – the largest decline in the top 10, South Korea held on to the top spot across the globe with an average connection speed of 20.5 Mbps. Hong Kong and Japan also had quarterly declines of 6.9% and 8.1% respectively. Among the gaining countries/regions, quarter-over-quarter increases were fairly modest, with Norway having the only double-digit gain at 15%. The remaining six countries/regions saw connection speeds grow anywhere from 2.3% in Latvia to 8.6% in Sweden.

	Country/Region	Q3 2015 Avg. Mbps	QoQ Change	YoY Change
–	Global	5.1	0.2%	14%
1	South Korea	20.5	-11%	-19%
2	Sweden	17.4	8.6%	23%
3	Norway	16.4	15%	44%
4	Switzerland	16.2	3.7%	12%
5	Hong Kong	15.8	-6.9%	-2.7%
6	Netherlands	15.6	3.0%	12%
7	Japan	15.0	-8.1%	0.2%
8	Finland	14.8	5.6%	26%
9	Latvia	14.5	2.3%	8.9%
10	Czech Republic	14.5	4.5%	18%

Figure 6: Average Connection Speed by Country/Region

Average connection speeds among the top 10 countries/regions all remained well above 10 Mbps, and 7 of the 10 had average speeds of at least 15 Mbps, up from 6 in the second quarter. Globally, a total of 78 out of 145 qualifying countries/regions saw quarterly increases in average connection speeds, compared with 110 countries/regions in the second quarter. Growth rates ranged from a modest 0.3% in the Ukraine (to 10.2 Mbps) to a substantial 64% in Congo (to 2.0 Mbps). Quarter-over-quarter losses were seen in 67 qualifying countries/regions, compared with only 34 countries/regions in the second quarter. Declines in connection speeds ranged from 0.4% in Azerbaijan (to 3.2 Mbps) to 29% in Syria (to 1.2 Mbps).

When looking at year-over-year changes, South Korea again saw a double-digit decline, with average connection speeds dropping 19% compared with the third quarter of 2014. Hong Kong declined as well, losing 2.7%. The rest of the top 10 saw yearly growth in the third quarter, ranging from a mere 0.2% in Japan to a sizeable 44% in Norway. Six of the ten countries/regions enjoyed double-digit increases compared with the third quarter of 2014.

On a global basis, the average connection speed increased 14% year over year. Increases were seen in 126 qualifying countries, with growth rates ranging from 0.2% in Japan to 147% in Congo – the only country to see average connection speeds more than double from the previous year. Yearly declines were seen in 19 countries/regions, with declines ranging from 0.6% in Namibia (to 1.8 Mbps) to 64% in Sudan (to 1.3 Mbps).

Yemen and Libya were the only countries/regions with an average connection speed below 1.0 Mbps in the third quarter of 2015. This may change for Libya as its government has announced that broadband connectivity will play an integral role in the rebuilding of its economy. In addition to initiatives aimed at building expertise and improving service provisioning, Libya is building out a massive fiber-to-the-home network with the goal of connecting every home and office in the country — as well as potentially selling excess capacity to other African nations.[19]

2.2 Global Average Peak Connection Speeds / After seeing 12% quarterly growth in the second quarter, the global average peak connection speed declined a slight 0.9% to 32.2 Mbps in the third quarter, as shown in Figure 7. Among the countries/regions in the top 10, average peak speeds increased across the board as compared with the second quarter, with the exception of Israel, where the average peak connection speed decreased 2.0%. Singapore again saw a double-digit quarterly gain with a 25% increase, as did Macao, where the peak speed grew by 18%. The remaining countries saw more moderate increases, ranging from 1.1% in Romania to 9.8% in Sweden. All of the top 10 from the second quarter remained in the third quarter top 10, with Singapore retaining its position as the

country/region with the highest average peak connection speed at 135.4 Mbps. Nine of the top ten again saw average peak speeds of at least 70 Mbps, with the bottom country, Sweden, very close behind at 69.0 Mbps.

On a global basis, 93 of the 145 qualifying countries/regions saw quarterly increases in average peak connection speeds, compared with 107 in the previous quarter. Growth rates ranged from 0.1% in Macedonia (to 35.5 Mbps) to 66% in Kenya (to 13.6 Mbps). Kenya was the only country/region to see a quarterly increase of more than 50%, but 36 countries/regions enjoyed double-digit growth. Fifty-one qualifying countries/regions saw lower average peak connection speeds in the third quarter, with losses ranging from 0.3% in Italy (to 44 Mbps) to 73% in Haiti (to 30.1 Mbps).

Looking at year-over-year numbers, average peak connection speeds increased 30% year over year on a global basis. All of the top 10 countries/regions saw increases in average peak connection speeds, as Qatar and Singapore again led the pack with increases of 80% and 63% respectively, while South Korea and Israel had the smallest gains of 17% and 13% respectively.

Across all of the qualifying countries/regions, a total of 135 saw yearly increases in average peak connection speeds, as compared with 127 in the previous quarter. Growth ranged from a mere 1.3% in Lebanon (to 19.4 Mbps) to an impressive 152% in Uzbekistan (to 37.0 Mbps). Uzbekistan, Mauritius, and Congo all saw average peak connection speeds more than double compared with the previous year, while an additional 24 countries saw speeds increase by over 50%. Nine countries/regions saw a yearly decline in average peak speeds, with Haiti and Ghana experiencing the largest drops at 75% (to 13.3 Mbps) and 51% (to 8.8 Mbps) respectively.

In the third quarter, Tanzania was the country/region with the lowest average peak connection speed after a 23% quarterly drop to 7.2 Mbps. Zambia, the country/region in the bottom spot last quarter, saw a 22% gain in the third quarter to 9.0 Mbps. A total of six countries, all in Africa, saw average peak connection speeds below 10 Mbps in the third quarter, up from four countries in the previous quarter.

2.3 Global 4 Mbps Broadband Adoption / In the third quarter, the global percentage of unique IP addresses connecting to Akamai that met the 4 Mbps broadband speed threshold increased by 2.7% to 65%. As shown in Figure 8, among the top 10 countries/regions, quarterly changes were mixed but muted, ranging from a 1.9% loss in Thailand to a 2.0% gain in Malta. Malta was the only new country/region to join the top 10 in the third quarter, as Hong Kong dropped off the list with a 1.0% decline to a 92% adoption rate.

Bulgaria and South Korea again led the world in 4 Mbps adoption, with both countries seeing 96% of their unique IP addresses connecting to Akamai at average speeds exceeding the threshold. The other countries/regions in the top 10 remain close behind, with all 10 meeting the 4 Mbps average connection speed threshold for at least 93% of their unique IP addresses connecting to Akamai, the same as in the second quarter.

Globally, a total of 108 countries/regions qualified for inclusion for this metric, up from 107 in the previous quarter. Fifty-six of them saw quarterly growth in 4 Mbps broadband adoption rates, down from eighty-five in the previous quarter. Increases ranged from 0.1% in Poland, New Zealand, and the Netherlands (to adoption rates of 88%, 87%, and 95%, respectively) to 380% in Kenya (to an adoption rate of 18.4%). In addition to Kenya, Pakistan also saw 4 Mbps broadband adoption rates more than double in the third quarter with a 159% gain (to 2.2% adoption). Indonesia had the third largest gain in adoption at 93% (to 17% adoption). Quarter-over-quarter declines were seen in 50 qualifying countries/regions, compared with 22 in the second quarter. Decreases ranged from 0.1% in the Singapore, Puerto Rico, and Serbia (to 87%, 75%, and 87% adoption respectively) to 52% in Palestine and Egypt (to 9.1% and 1.3% adoption respectively). Germany and Austria saw adoption levels remain unchanged in the third quarter, staying at 87% and 90% respectively.

	Country/Region	Q3 2015 Peak Mbps	QoQ Change	YoY Change
–	Global	32.2	-0.9%	30%
1	Singapore	135.4	25%	63%
2	Hong Kong	101.1	6.7%	20%
3	South Korea	86.6	4.0%	17%
4	Japan	78.4	4.4%	20%
5	Taiwan	77.9	4.6%	41%
6	Qatar	75.2	4.8%	80%
7	Macao	73.7	18%	53%
8	Romania	72.9	1.1%	24%
9	Israel	70.0	-2.0%	13%
10	Sweden	69.0	9.8%	28%

Figure 7: Average Peak Connection Speed by Country/Region

	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
–	Global	65%	2.7%	9.8%
1	Bulgaria	96%	-0.4%	0.6%
2	South Korea	96%	-0.9%	-0.1%
3	Netherlands	95%	0.1%	5.1%
4	Isle Of Man	94%	0.4%	4.7%
5	Malta	94%	2.0%	8.2%
6	Denmark	94%	0.5%	5.1%
7	Israel	94%	-0.9%	2.5%
8	Romania	94%	-0.2%	5.7%
9	Switzerland	93%	-0.2%	0.6%
10	Thailand	93%	-1.9%	9.9%

Figure 8: 4 Mbps Broadband Adoption by Country/Region

Year over year, the percentage of unique IP addresses connecting to Akamai at average speeds of at least 4 Mbps increased by 9.8%, continuing the positive trend that began in the first quarter of 2015. Yearly adoption rates of 4 Mbps broadband were up across all of the top 10 countries/regions except for South Korea, which saw a slight 0.1% decline. Like the second quarter, yearly increases were fairly muted, ranging from 0.6% in Bulgaria and Switzerland to 9.9% in Thailand.

Across the globe, 96 of the qualifying countries/regions saw 4 Mbps broadband adoption levels increase year over year, compared with 100 in the previous quarter. Growth rates ranged from 0.6% in Bulgaria and Switzerland to 417% in Cambodia (to 40% adoption). In total, 15 of the 108 qualifying countries/regions saw yearly 4 Mbps adoption rates grow 100% or more, compared with 18 countries in the second quarter. Twelve countries saw adoption rates fall, with declines ranging from a mere 0.1% in South Korea to a sizable 60% in Saudi Arabia (to 17% adoption).

In the third quarter, Egypt again remained the country with the lowest level of 4 Mbps broadband adoption at 1.3% after a 52% quarterly drop that reversed its large second-quarter gain. Venezuela again held the second-to-last position, with an adoption rate of 2.1%, down 34% quarter over quarter but up 61% year over year.

In 2010, the United Nations developed a set of five-year goals to make broadband universal and affordable across the globe. The UN Broadband Commission's 2015 annual report, published in September, made clear that there is still a significant way to go before achieving the goals, particularly among developing nations. [20] However, while there are still many regions of the world that have little-to-no broadband connectivity, there are ambitious projects underway to try to reach them. In July, Sri Lanka announced it was in talks with Google to have Project Loon — which aims to bring Internet access to remote and underserved areas using high-altitude balloons — provide connectivity across the entire country.[21] Meanwhile, in September, Facebook CEO Mark Zuckerberg, in a campaign supported by luminaries Bill Gates, Jimmy Wales, Bono, and others, launched a call-to-action to bring Internet access to everyone across the globe by 2020.[22, 23] Facebook says it is working on technologies to make this goal possible, including a high-altitude endurance aircraft that can stay in the air for months at a time, providing Internet access to remote regions, as well as free space optical (FSO) technology that enables wireless communications through lasers that are ten times more efficient than the current state-of-the-art technology.[24]

2.4 Global 10 Mbps Broadband Adoption / As seen in Figure 9, in the third quarter, 27% of unique IP addresses globally connected to Akamai at average speeds above 10 Mbps, a 2.4% increase over the previous quarter. Changes among the top ten countries/regions were again mixed, with four countries/regions seeing quarter-over-quarter increases, ranging from Switzerland's 0.4% to Norway's 14% — a jump that pushed Norway into the top 10 in the third quarter and edged out Bulgaria, which saw a 7.1% decline to 50% adoption. Declines in the top 10 ranged from 0.1% in Romania to 9.6% in South Korea. In spite of its quarterly decline, however, South Korea's 68% adoption rate remained well ahead of second-place Switzerland's 61% adoption rate.

	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
–	Global	27%	2.4%	19%
1	South Korea	68%	-9.6%	-17%
2	Switzerland	61%	0.4%	11%
3	Netherlands	60%	-0.8%	12%
4	Hong Kong	59%	-4.2%	7.3%
5	Romania	57%	-0.1%	16%
6	Sweden	55%	4.5%	27%
7	Japan	54%	-9.4%	-0.4%
8	Norway	54%	14%	54%
9	Belgium	52%	-0.6%	17%
10	Singapore	51%	1.5%	19%

Figure 9: 10 Mbps Broadband Adoption by Country/Region

In the third quarter, 71 countries/regions qualified for this metric, the same as in the second quarter. Among these, 41 saw quarter-over-quarter increases, ranging from 0.2% in Slovenia (to 23% adoption) to 85% in Belarus (to an adoption rate of 14%). Quarterly losses — seen in 30 qualifying countries/regions — ranged from 0.1% in Romania to 59% in Argentina (to 3.1% adoption).

Looking at year-over-year changes, there was a 19% increase globally in the percentage of unique IP addresses connecting to Akamai at average speeds above 10 Mbps. The global leader, South Korea, posted a sizeable decline of 17%, while Japan saw a small drop of 0.4%. The remaining eight countries/regions enjoyed yearly growth in adoption rates, ranging from 7.3% in Hong Kong to 54% in Norway.

Sixty-three of the seventy-one qualifying countries/regions saw year-over-year increases in 10 Mbps broadband adoption in the third quarter. Malaysia and Moldova had the smallest gains at 1.6% each, to adoption levels of 4.0% and 32% respectively, while Belarus and Peru had the largest at 321% and 274%, to adoption rates of 14% and 2.9% respectively. In total, 12 of the qualifying countries/regions saw adoption rates more than double year over year. Eight countries/regions posted yearly declines, ranging from 0.4% in Japan to 71% in Indonesia (to 0.9% adoption).

Vietnam and Indonesia again had the lowest 10 Mbps broadband adoption rates in the third quarter, though both saw quarterly increases to 0.6% and 0.9% adoption, respectively. China again held the third-lowest spot globally with a 1.6% adoption rate in the third quarter, a 32% increase from the second quarter.

2.5 Global 15 Mbps Broadband Adoption / As Figure 10 shows, 15% of unique IP addresses globally connected to Akamai at average connection speeds of 15 Mbps or above in the third quarter, up 5.3% from the second quarter. Despite declining for the fourth quarter in a row, South Korea remained the clear leader in 15 Mbps broadband adoption with a 45% adoption rate, while second-place Sweden saw an adoption rate of 38%, a 12% increase from the previous quarter. Six other countries/regions enjoyed increases during the quarter, ranging from 0.7% in Latvia to 27% in Norway, while two other countries/regions — Hong Kong and Japan — saw quarterly losses of 11% and 16% respectively. Denmark and Finland joined the top 10 in the third quarter with quarterly gains of 17% and 7.2% respectively, pushing Romania and Lithuania out of the group.

Just as in the second quarter, 56 countries/regions qualified for inclusion in this metric in the third quarter. China again had the lowest 15 Mbps broadband adoption rate at 0.3%, a 36% increase from the second quarter. Argentina, Brazil, and India all had adoption rates below 1.0% as well. Overall, quarterly gains were seen in 43 qualifying countries/regions, compared with 35 in the previous quarter. Belarus enjoyed the biggest quarter-over-quarter increase at 129% (to 4.7% adoption), while Greece had the smallest rate of growth at 0.3% (to 2.3% adoption). Thirteen countries/regions saw 15 Mbps broadband adoption rates drop, with losses ranging from 1.5% in the Ukraine (to 17% adoption) to 67% in Argentina (to 0.5% adoption).

Year over year, the global 15 Mbps adoption rate grew 21%, with 7 of the top 10 countries/regions seeing gains ranging from 8.9% in Latvia to 73% in Norway. Three countries saw declines, with South Korea experiencing the most significant loss at 32%. Hong Kong and Japan each saw small decreases, of 2.4% and 3.1% respectively.

When looking across all of the qualifying countries, nine countries saw a yearly decrease, compared with seven in the second quarter. Losses ranged from 2.4% in Hong Kong to 79% in Reunion (to 4.0% adoption). Forty-seven countries saw yearly gains, with stronger increases overall than those seen in the second quarter. Gains ranged from 5.7% in Taiwan (to 13% adoption) to 405% in Georgia (to 6.0% adoption). Ten countries/regions saw adoption levels more than double year over year in the third quarter, compared with only three in the second quarter, and an additional eleven countries/regions saw gains of over 50%.

2.6 Global 25 Mbps Broadband Adoption / Starting with the *First Quarter, 2015 State of the Internet Report*, Akamai began reporting on the percentage of unique IP addresses connecting to Akamai at average speeds of above 25 Mbps — the new benchmark broadband speed adopted by the United States Federal Communications Commission in January 2015. This data will be provided in the global overview as well as in Section 3 on the United States.

Globally, 5.2% of unique IP addresses connected to Akamai at average connection speeds of at least 25 Mbps, a 6.3% increase over the previous quarter, as shown in Figure 11. The Czech Republic joined the top 10 in the third quarter with a 17% quarterly increase, while Lithuania dropped from the group with an 8.3% quarterly decline. South Korea also faced a 19% decline in the third quarter but held onto its position as the global leader in 25 Mbps adoption with almost one in four IP addresses connecting to Akamai at average speeds exceeding the threshold. However, Sweden closed the gap considerably, posting a quarterly increase of 26% to reach 19% adoption. In all, 7 of the top 10 countries/regions saw quarterly increases, ranging from 14% in Switzerland to 48% in Norway. In addition to South Korea, two other countries/regions — Japan and Hong Kong — suffered declines, of 18% and 15% respectively. Just as in the second quarter, all of the top 10 countries/regions had 25 Mbps adoption rates of at least 10%.

Forty-four countries/regions qualified for inclusion in this metric, with thirty-two of them seeing quarterly gains in adoption. China enjoyed the largest growth with a 69% increase over the second quarter (to 0.05% adoption), while Mexico had the smallest at

	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
–	Global	15%	5.3%	21%
1	South Korea	45%	-15%	-32%
2	Sweden	38%	12%	33%
3	Norway	37%	27%	73%
4	Switzerland	36%	5.8%	22%
5	Hong Kong	36%	-11%	-2.4%
6	Netherlands	34%	4.2%	16%
7	Japan	32%	-16%	-3.1%
8	Latvia	31%	0.7%	8.9%
9	Denmark	29%	17%	54%
10	Finland	28%	7.2%	38%

Figure 10: 15 Mbps Broadband Adoption by Country/Region

	Country/Region	% Above 25 Mbps	QoQ Change	YoY Change
–	Global	5.2%	6.3%	15%
1	South Korea	24%	-19%	-37%
2	Sweden	19%	26%	48%
3	Norway	16%	48%	109%
4	Latvia	14%	5.1%	16%
5	Hong Kong	14%	-15%	-15%
6	Switzerland	13%	14%	38%
7	Japan	13%	-18%	-2.5%
8	Finland	12%	16%	41%
9	Netherlands	12%	16%	33%
10	Czech Republic	11%	17%	54%

Figure 11: 25 Mbps Broadband Adoption by Country/Region

1.0% (to 0.5% adoption). Twenty-seven countries saw double-digit growth. On the declining side, losses ranged from 0.6% in Slovenia (to 5.1% adoption) to 19% in South Korea.

Year over year, the global 25 Mbps adoption rate increased by 15%, in contrast to the 0.5% yearly decrease seen in the second quarter. Three of the top ten countries/regions — South Korea, Hong Kong, and Japan — saw yearly declines, losing 37%, 15%, and 2.5%, respectively. Gains among the remaining seven countries were healthy, ranging from 16% in Latvia to 109% in Norway.

Globally, 37 of the 44 qualifying countries/regions saw yearly gains, led by Portugal with a 203% increase (to 5.2% adoption). Portugal has seen a surge in fiber-to-the-home connections in recent quarters, which likely contributed to its healthy gains in this high-speed metric.[25] Seven countries/regions in all saw 25 Mbps adoption more than double compared with the third quarter of 2014. On the declining side, seven countries/regions saw yearly losses, ranging from 2.5% in Japan to 37% in South Korea.

[SECTION]3 GEOGRAPHY USA

The metrics presented here for the United States are based on a subset of data used for Section 2 and are subject to the same thresholds and filters discussed within that section. The subset used for this section includes connections identified as coming from the United States, based on classification by Akamai's EdgeScape geolocation tool. For the purposes of this section, the District of Columbia is treated as a state.

3.1 United States Average Connection Speeds / In the third quarter, average connection speeds among the top 10 states showed improvements across the board, unlike the mixed bag of changes seen in the second quarter. As shown in Figure 12, Delaware posted the largest quarterly gain at 9.7%, closing the gap with the top-ranking District of Columbia, which had the smallest quarterly gain at 2.7%. Eight states had average connection speeds meeting the 15 Mbps threshold — up from five in the previous quarter — but none had average connection speeds reaching the FCC's new 25 Mbps broadband threshold.

	State	Q3 2015 Avg. Mbps	QoQ Change	YoY Change
1	District Of Columbia	19.5	2.7%	34%
2	Delaware	18.5	9.7%	6.3%
3	Utah	16.2	6.4%	9.7%
4	Massachusetts	16.2	5.5%	13%
5	Rhode Island	15.7	3.4%	17%
6	Washington	15.2	2.9%	-7.1%
7	Maryland	15.0	3.2%	22%
8	New Jersey	15.0	5.7%	20%
9	Virginia	14.9	5.3%	2.8%
10	New York	14.8	5.9%	20%

Figure 12: Average Connection Speed by State

	State	Q3 2015 Peak Mbps	QoQ Change	YoY Change
1	Delaware	86.6	31%	14%
2	District Of Columbia	80.2	10%	27%
3	Massachusetts	75.8	18%	19%
4	Utah	75.8	24%	27%
5	Rhode Island	75.0	14%	27%
6	Maryland	72.9	9.7%	28%
7	Virginia	72.1	9.1%	17%
8	New Jersey	71.5	9.9%	21%
9	Washington	69.2	4.5%	10%
10	New York	68.6	8.4%	23%

Figure 13: Average Peak Connection Speed by State

Looking across all 51 states, 44 saw average connection speeds above the 10 Mbps threshold, compared with 42 in the second quarter. Additionally, 49 states saw quarterly increases in average connection speeds, compared with just 22 in the previous quarter. Gains ranged from 0.1% in Montana (to 10.3 Mbps) to 11% in Vermont (to 12.5 Mbps). Only North Dakota and South Dakota saw declines, with speeds dropping 4.6% and 2.9% to 13.0 Mbps and 11.9 Mbps, respectively.

On a year-over-year basis, 49 states saw higher average connection speeds compared with the third quarter of 2014. Thirty-nine states saw double-digit yearly gains, with Missouri and the District of Columbia having the largest at 34% each, to average speeds of 12.4 Mbps and 19.5 Mbps respectively. Virginia had the smallest yearly increase in the nation, as its average connection speed rose 2.8% (to 14.9 Mbps). Washington and Connecticut saw declines of 7.1% and 8.9%, to speeds of 15.1 Mbps and 13.9 Mbps respectively.

Despite a 7.2% quarterly increase to 8.5 Mbps, Alaska again remained the state with the lowest average connection speed in the third quarter. However, improvements may be forthcoming for the remote state, as Alcatel-Lucent announced a partnership with Quintillion Subsea Holdings in July to build an undersea cable route bringing high-speed Internet to northern Alaska by 2016.[26]

3.2 United States Average Peak Connection Speeds / In the third quarter, the top 10 states showed fairly strong quarterly growth across the board, in contrast to the second quarter, when only 3 of the top 10 states had increases. As seen in Figure 13, Delaware had the strongest increase at 31%, more than recapturing losses seen in the second quarter and gaining the top spot across the nation for average peak connection speed. Utah and Massachusetts had strong quarterly gains as well, at 24% and 18% respectively, while Washington had the smallest quarterly increase among the top 10, at 4.5%.

When looking at average peak connection speeds across all 51 states, there was across-the-board growth in the third quarter, with gains ranging from a modest 4.3% in Nebraska (to 53.4 Mbps) to Delaware's robust 31% increase. Twenty-five states in all enjoyed double-digit growth.

Year-over-year changes were positive across all 51 states as well with the exception of Connecticut, where average peak speeds dropped 8.0% (to 65.3 Mbps) compared with the previous year. Alabama saw the smallest increase in the country at 7.3% (to 47.7 Mbps), while Hawaii saw the largest at 33% (to 56.1 Mbps). Among the top 10, Maryland had the largest yearly increase at 28%, while Washington saw the smallest at 10%. Forty-seven states across the nation had double-digit yearly increases in the third quarter, compared with thirty-seven in the second quarter.

Despite a 7.0% quarterly gain, Kentucky once again held the spot for lowest average peak connection speed in the country, at 38.2 Mbps. Arkansas remained in the second-to-last spot with an 11% quarterly gain to 41.0 Mbps.

Over the upcoming quarters, we expect to see positive growth in average peak connection speeds across the United States as well as an increased level of broadband adoption across all threshold speeds, as gigabit-plus services continue to extend their footprint across the country. Next TV compiled a list showing 176 cities where 15 major telecommunications companies have either currently available or planned gigabit-plus broadband service offerings as of July 2015.[27] While the list looks at the largest telecommunications companies, it does not claim to be comprehensive, as there are now more than 80 service providers offering gigabit connectivity in the U.S. — indicating the nascent market is growing quickly.[28]

Building on the trend over the last few quarters, the third quarter continued to see numerous announcements of new gigabit-plus service rollouts across the country. Currently running in three cities and in the midst of rolling out in six more, Google Fiber announced six additional cities under consideration: Portland (Oregon),

San Jose, Irvine, San Diego, Phoenix, and Louisville.[29] Comcast launched 250 Mbps speed tiers in Oregon and Washington states[30] and reaffirmed its plans to bring gigabit service to customers across its entire nationwide network within two years.[31] Meanwhile, Verizon is pushing the speed envelope even further, as it announced testing of ultra-high-speed services using a new fiber optic technology, NG-PON2 (next generation passive optical network), that can enable its FiOS network to provide speeds up to 80 Gbps.[32] In light of these announcements, many states across the U.S. could see boosts in average peak connection speeds over the next year as well as increases in the broadband adoption metrics Akamai currently tracks.

3.3 United States 4 Mbps Broadband Adoption / In the third quarter, Rhode Island and Delaware again led the country with 4 Mbps broadband adoption rates of 96%, virtually unchanged from the second quarter. As seen in Figure 14, third-quarter changes among the top 10 states were minimal across the board, ranging from a 0.2% loss in Delaware to a 1.6% gain in Hawaii. Five states had 4 Mbps adoption levels of 90% or more, compared with four in the second quarter, and the other top 10 states were not far behind.

Nationwide, 45 states saw quarterly growth in adoption rates, compared with 36 in the previous quarter, although none of the states had double-digit gains. Arkansas led the pack with 7.4% growth (to 71% adoption), while Maryland saw the smallest gain at 0.1%. Six states saw losses — though all very small — the largest being New Hampshire's 0.8% decline (to 86% adoption).

Yearly changes were positive in 49 states in the third quarter, with Connecticut and Delaware — both among the top 10 states for 4 Mbps adoption levels — seeing declines of 7.9% and 0.5% respectively. Within the top 10, Maryland saw the largest yearly increase in adoption at 21%, while Hawaii had the smallest at 3.9%. Across the country, Missouri enjoyed the largest growth rate at 39% (to 82% adoption), while New Hampshire saw the smallest, with a 2.3% increase over the previous year. In total, 23 states saw double-digit yearly increases in 4 Mbps broadband adoption in the third quarter, down from 27 in the second quarter.

	State	% Above 4 Mbps	QoQ Change	YoY Change
1	Rhode Island	96%	0.3%	4.5%
2	Delaware	96%	-0.2%	-0.5%
3	New Jersey	92%	0.8%	8.1%
4	Hawaii	91%	1.6%	3.9%
5	Massachusetts	90%	1.1%	6.7%
6	Maryland	89%	0.1%	21%
7	New York	89%	0.8%	9.0%
8	North Dakota	88%	1.2%	7.0%
9	Connecticut	88%	0.6%	-7.9%
10	Florida	88%	1.0%	8.2%

Figure 14: 4 Mbps Broadband Adoption by State

For the eighth consecutive quarter, West Virginia remained the state with the lowest 4 Mbps broadband adoption rate at 64% — down 0.7% from the previous quarter and up 12% from the third quarter of 2014.

We expect to see continued growth in broadband adoption percentages across the United States as a result of continued efforts by local, state, and federal government programs to push for universal broadband availability, particularly for underserved communities such as those in rural and low-income areas. In July, President Obama announced ConnectHome, an initiative to bring broadband to low-income and rural areas across the country. Initially launching in 27 locations, the program will start by providing access to 275,000 low-income households.[33] In addition, the Federal Communications Commission's Connect America fund intends to provide $9 billion in financial incentives over the next six years to broadband carriers promising to bring high speed Internet access to underserved areas across the country. Ten service providers — including AT&T, CenturyLink, Frontier Communications, and Windstream Communications — are participating in the initiative to expand broadband to over 7 million homes in rural areas across 45 states.[34] In the third quarter, Windstream Communications announced it was delivering upgraded speeds of up to 100 Mbps to 250 markets across the country, with another 600 markets planned by year end.[35]

There were a number of positive announcements in the third quarter at the state and municipal level as well. Through its Kentucky Wired initiative, for example, Kentucky is laying 3,400 miles of state-owned fiber-optic cable to provide broadband service to the entire state, even in less accessible rural areas.[36, 37] In Massachusetts, 22 towns have joined the Wired West, a coalition to bring municipal gigabit fiber-optic broadband to town residents.[38] In Maine — a state with one of the slowest Internet speeds in the country and where 80% of the population does not have high-speed Internet access — the city of Sanford announced plans to lay 32 miles of fiber-optic cable through a public-private partnership, with the aim of delivering speeds of 10 Gbps to its businesses and residents within the next two years.[39] Finally, in Salisbury, North Carolina, municipal broadband provider Fibrant recently launched 10 Gbps services to homes and businesses, making Salisbury one of the first cities in the country to offer these ultra-high speeds to its residents.[40]

3.4 United States 10 Mbps Broadband Adoption / Delaware once again held the top spot in 10 Mbps adoption with a 71% adoption rate, followed by Rhode Island with a 68% adoption rate, as seen in Figure 15. Nine of the top ten states enjoyed modest quarter-over-quarter growth in adoption, with only Maryland seeing a decline of 0.6% in the third quarter. New York posted the largest quarterly gain at 5.8%, while New Hampshire saw the smallest at 0.6%. Once again, all of the top 10 had more than half of their unique IP addresses connecting to Akamai at average speeds above 10 Mbps.

Most states saw quarterly gains in 10 Mbps adoption rates across the nation as well, with only four states seeing losses in the third quarter. Declines were fairly small, ranging from 0.2% in West Virginia

	State	% Above 10 Mbps	QoQ Change	YoY Change
1	Delaware	71%	3.6%	2.9%
2	Rhode Island	68%	0.9%	18%
3	New Jersey	66%	2.3%	20%
4	Massachusetts	64%	1.3%	14%
5	Maryland	61%	-0.6%	38%
6	District Of Columbia	61%	4.3%	49%
7	Virginia	58%	3.0%	18%
8	New York	58%	5.8%	23%
9	Connecticut	56%	4.0%	-12%
10	New Hampshire	56%	0.6%	11%

Figure 15: 10 Mbps Broadband Adoption by State

	State	% Above 15 Mbps	QoQ Change	YoY Change
1	Delaware	44%	17%	13%
2	District Of Columbia	42%	7.9%	60%
3	Massachusetts	36%	10%	24%
4	New Jersey	36%	13%	40%
5	Rhode Island	36%	8.0%	39%
6	Maryland	35%	6.3%	57%
7	Virginia	33%	13%	39%
8	Washington	32%	7.2%	18%
9	New York	31%	15%	50%
10	Utah	31%	20%	26%

Figure 16: 15 Mbps Broadband Adoption by State

(to 34% adoption) to 4.1% in South Dakota (to 45% adoption). Arizona and Georgia saw adoption rates remain steady at 45% in each state, while the remaining 45 states enjoyed gains in the third quarter. California had the smallest increase at 0.2% (to 50% adoption), while Hawaii enjoyed the largest at 27% (to 39% adoption). Seven states in all enjoyed double-digit quarterly growth rates, and a total of 19 states had 10 Mbps adoption rates of at least 50%, up from 16 states in the second quarter.

Year-over-year changes in 10 Mbps adoption were positive across all states in the third quarter with the exception of Connecticut, which saw a 12% decline. The District of Columbia led the top 10 states in yearly growth with a 49% increase, while Hawaii led the nation with a 77% jump. Delaware again posted the smallest growth rate in the country with a modest 2.9% increase over the third quarter of 2014. In all, 46 states enjoyed double-digit growth compared with the previous year.

Despite seeing 14% quarterly growth in its 10 Mbps broadband adoption rate, Idaho remained in last place across the country with a 28% adoption rate. Alaska, Arkansas, Iowa, and Kentucky shared the next-lowest 10 Mbps adoption rate in the country at 30%.

3.5 United States 15 Mbps Broadband Adoption / After a mixed bag of changes in the second quarter, the top 10 states showed growth across the board in 15 Mbps adoption rates in the third quarter, as seen in Figure 16. Utah and Delaware led the gainers, with increases of 20% and 17% respectively. Utah's jump allowed it to join the top 10 in the third quarter, pushing out Pennsylvania, while Delaware's boost enabled it to retake the top spot in the nation for 15 Mbps broadband adoption. Maryland had the smallest gain among the top 10, with a 6.3% increase over the second quarter.

Across the country, 50 states saw quarterly increases in the third quarter, compared with only 16 states in the second quarter. Only South Dakota saw a decline, at 6.2% (to 21% adoption). North Dakota had the smallest gain, with a 1.3% increase (to 24% adoption), while Hawaii again had the largest growth with an impressive 46% gain (to 16% adoption). In all, 40 states enjoyed double-digit increases in adoption rates in the third quarter, compared with only six in the second quarter. Twenty-two states had at least one-quarter of their unique IP addresses connecting to Akamai at average speeds of 15 Mbps or faster, up from 17 in the previous quarter.

Just as with the 10 Mbps broadband tier, Connecticut was the only state in the country that saw a yearly decline in adoption; its adoption rate dropped 5.8% compared with the third quarter of 2014. Among the top 10 states, the District of Columbia led again with a 60% increase, while Hawaii led the nation with a 135% jump, followed by Alaska, which doubled its adoption rate (to 12%). Fifteen additional states saw yearly increases of at least 50%, compared with four in the second quarter. South Dakota, with a gain of 6.1%, was the only state that did not see double-digit yearly growth in the third quarter. Delaware saw the next smallest gain in the country (and the smallest among the top 10), with a 13% increase over the third quarter of 2014.

Despite sizeable quarterly gains of 25% and 32%, Kentucky and Alaska ranked last in the country for 15 Mbps broadband adoption again in the third quarter, with adoption levels of 11% and 12% respectively.

3.6 United States 25 Mbps Broadband Adoption / The District of Columbia held the top spot again in 25 Mbps broadband adoption, with more than one in five of its unique IP addresses connecting to Akamai in the third quarter at average speeds of at least 25 Mbps. As seen in Figure 17, second-ranked Delaware closed the gap considerably, after a 40% quarterly increase led to 17% adoption. After a mixed second quarter, all of the top 10 states enjoyed strong quarterly growth in the third quarter, with the District of Columbia's increase being the most modest and Delaware's the largest. The remaining eight states all posted double-digit increases, ranging from 14% in Washington to 29% in New Jersey. All of the top 10 states — up from just five in the previous quarter — had at least one in ten of their unique IP addresses connecting to Akamai at average speeds of 25 Mbps or more.

Across the nation, only two states saw quarterly declines in the third quarter, in contrast to very mixed changes in the second quarter. North Dakota and South Dakota saw adoption levels fall 6.4% and 3.1% (to 7.6% and 6.1% adoption respectively). Maine led the gainers with a 53% quarterly increase (to 4.5% adoption), followed by Vermont with a 46% gain (to 8.4% adoption). Forty-five states in all enjoyed double-digit growth, compared with just twelve in the second quarter. Wyoming and Kentucky had the smallest quarterly gains, at 5.8% and 6.0% (to 5.4% and 2.0% adoption respectively).

Year over year, all of the top 10 states posted gains in 25 Mbps broadband adoption rates, ranging from 9.9% in Washington to 70% in New Jersey. Eight of the top ten had gains of at least 30%. All of the states across the country saw yearly increases as well, ranging from 0.6% in Connecticut (to 8.8% adoption) to 87% in Hawaii (to 4.1% adoption). In the third quarter, 47 states saw double-digit year-over-year increases and 16 states had gains of at least 50% in the third quarter — compared with just 4 states in the second quarter.

Adoption rates for 25 Mbps broadband remained fairly low nationwide but are slowly improving. Forty-one states saw adoption levels below 10% — down from forty-six in the second quarter. Alaska and Kentucky had the lowest adoption rates in the country, at 2.4% and 2.0% respectively, and 10 states had adoption levels below 5% — down from 16 in the second quarter.

	State	% Above 25 Mbps	QoQ Change	YoY Change
1	District Of Columbia	22%	7.5%	62%
2	Delaware	17%	40%	30%
3	Utah	14%	19%	16%
4	Massachusetts	13%	24%	36%
5	Washington	12%	14%	9.9%
6	Virginia	11%	24%	39%
7	Maryland	11%	19%	50%
8	New York	10%	19%	64%
9	Rhode Island	10%	20%	59%
10	New Jersey	10%	29%	70%

Figure 17: 25 Mbps Broadband Adoption by State

[SECTION]4 GEOGRAPHY AMERICAS

The metrics presented here for the Americas region (North and South America) are based on a subset of data used for Section 2 and are subject to the same thresholds and filters discussed within that section. The subset used for this section includes connections identified as coming from networks within North and South America, based on classification by Akamai's EdgeScape geolocation tool.

4.1 Americas Average Connection Speeds / In the third quarter, the United States again had the fastest average connection speed among surveyed Americas countries, with Canada just 0.7 Mbps behind. As shown in Figure 18, the United States and Canada remained well ahead of the other countries in the region, with Canada staying 6 Mbps faster than third-place Uruguay. As in the second quarter, third quarter changes were mixed, with 8 of the 15 surveyed countries seeing increases and 7 seeing declines. The United States had the largest

Global Rank	Country/Region	Q3 2015 Avg. Mbps	QoQ Change	YoY Change
16	United States	12.6	7.3%	9.4%
21	Canada	11.9	6.3%	16%
59	Uruguay	5.9	-0.4%	8.6%
65	Chile	5.7	1.6%	40%
68	Mexico	5.5	1.6%	34%
80	Peru	4.4	-6.4%	23%
81	Colombia	4.2	-6.1%	25%
83	Argentina	4.2	-12%	-1.0%
84	Ecuador	4.1	2.0%	13%
93	Brazil	3.6	1.0%	24%
96	Panama	3.5	6.5%	21%
99	Costa Rica	3.2	0.9%	17%
132	Bolivia	1.8	-8.4%	58%
137	Paraguay	1.5	-1.9%	12%
138	Venezuela	1.5	-9.1%	9.8%

Figure 18: Average Connection Speed by Americas Country

Global Rank	Country/Region	Q3 2015 Peak Mbps	QoQ Change	YoY Change
15	Uruguay	60.2	26%	2.7%
21	United States	57.3	14%	18%
26	Canada	52.4	9.0%	20%
44	Chile	42.0	14%	61%
73	Peru	30.4	6.9%	48%
79	Brazil	29.0	7.3%	41%
82	Colombia	28.1	1.1%	24%
88	Mexico	27.3	0.2%	20%
89	Argentina	26.9	4.8%	22%
93	Ecuador	25.5	2.5%	23%
118	Panama	16.9	-4.5%	19%
121	Costa Rica	16.4	-5.3%	32%
129	Bolivia	13.9	-18%	49%
131	Paraguay	13.4	-10%	45%
135	Venezuela	11.8	-15%	16%

Figure 19: Average Peak Connection Speed by Americas Country

quarterly gain at 7.3%, followed by Panama with a 6.5% gain. Brazil saw the smallest increase at 1.0%. Losses in declining countries were also fairly modest, ranging from 0.4% in Uruguay to 12% in Argentina.

On a yearly basis, 14 of the 15 surveyed countries saw positive growth, though more modest than in the previous quarter. Increases ranged from 8.6% in Uruguay to 58% in Bolivia, with 10 other countries seeing double-digit yearly growth. Argentina was the sole declining country, with its average speed decreasing 1.0% compared with the third quarter of 2014. Nine of the surveyed Americas countries had an average connection speed at or above the 4 Mbps threshold — the same as in the second quarter — although only the United States and Canada once again had speeds above the 10 Mbps broadband threshold.

4.2 Americas Average Peak Connection Speeds / As shown in Figure 19, Uruguay overtook the United States and Canada to lead the Americas region in average peak connection speeds in the third quarter. With a 26% increase over second-quarter speeds, Uruguay enjoyed an average peak connection speed of 60.2 Mbps. The United States and Canada both saw quarterly increases as well — of 14% and 9.0% — to 57.3 Mbps and 42.4 Mbps respectively, and all three countries' average peak connection speeds stayed more than 10 Mbps faster than the remaining surveyed countries in the region.

Eight other countries in the group also saw quarterly gains in average peak connection speeds, ranging from 0.2% in Mexico to 14% in Chile. The remaining five countries — the bottom five among the surveyed Americas countries in terms of average peak speeds — all saw losses, ranging from 4.5% in Panama to 18% in Bolivia.

Looking at year-over-year changes, all of the surveyed countries saw improvements in average peak connection speeds. Uruguay, which saw a slight yearly loss in the second quarter, had the smallest yearly gain in the third at 2.7%. The remaining 14 countries all saw double-digit gains, ranging from 16% in Venezuela to 61% in Chile.

4.3 Americas 4 Mbps Broadband Adoption / The sizeable difference in 4 Mbps broadband adoption rates between the top and bottom qualifying Americas countries widened slightly in the third quarter as Canada gained 1.0% (to 87% adoption) and Venezuela

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
26	Canada	87%	1.0%	5.3%
41	United States	80%	4.2%	9.9%
57	Uruguay	68%	12%	15%
61	Mexico	64%	3.4%	82%
62	Chile	62%	-0.2%	58%
73	Colombia	48%	-5.2%	89%
75	Peru	46%	-17%	55%
80	Argentina	39%	-6.9%	8.0%
83	Ecuador	36%	12%	37%
85	Panama	33%	41%	103%
86	Brazil	32%	0.3%	30%
92	Costa Rica	20%	3.7%	53%
107	Venezuela	2.1%	-34%	61%
–	Bolivia	2.8%	-29%	100%
–	Paraguay	2.1%	36%	105%

Figure 20: 4 Mbps Broadband Adoption by Americas Country

dropped 34% (to 2.1% adoption), as seen in Figure 20. As noted before, it is likely that this gap will remain large for the foreseeable future. While Venezuela had the largest quarterly drop among qualifying surveyed Americas countries in the third quarter, four others also saw declines, ranging from 0.2% in Chile to 17% in Peru. The remaining eight qualifying countries saw gains, led by Panama with a sizeable 41% jump to 33% adoption. The other increases were more moderate, with Brazil seeing the smallest at 0.3% and Uruguay and Ecuador seeing the largest at 12%.

Year-over-year changes were again all positive in the third quarter, though widely varying in magnitude. Canada saw the smallest gain at 5.3%, followed by Argentina with an 8.0% increase over the third quarter of 2014. Panama saw the largest yearly increase among the qualifying countries with a 103% jump, and six other qualifying Americas countries all saw 4 Mbps adoption levels grow more than 50%.

4.4 Americas 10 Mbps Broadband Adoption / As shown in Figure 21, the United States and Canada remained the clear leaders in 10 Mbps broadband adoption among the surveyed Americas countries, and the gap between second-place Canada and third-place Uruguay widened from 29 percentage points to more than 35 in the third quarter, due in large part to Uruguay's 30% quarterly decline in adoption rates. Six of the nine qualifying surveyed Americas countries saw drops in 10 Mbps adoption in the third quarter, with Argentina suffering the largest loss at 59% and Chile seeing the smallest at 5.0%. The remaining three countries — Canada, the United States, and Mexico — saw modest gains, of 8.3%, 7.0%, and 3.0% respectively.

From a yearly perspective, only Argentina saw a decline in 10 Mbps broadband adoption, with a 44% drop to 3.1% adoption. The remaining qualifying countries posted gains, ranging from a modest 7.1% in Uruguay to an impressive 274% in Peru. Mexico and Chile also both saw adoption rates more than double from the third quarter of 2014, while Canada and the United States had more moderate gains of 31% and 18% respectively.

4.5 Americas 15 Mbps Broadband Adoption / As Figure 22 shows, only 6 of the 15 surveyed countries in the Americas region qualified for inclusion in the 15 Mbps broadband adoption metric in the third quarter — down from 8 in the second – with Colombia and Uruguay seeing too few unique IP addresses connecting to Akamai above the speed threshold to qualify this quarter. Just as with the other broadband adoption metrics we have examined thus far, the United States and Canada continued to have adoption levels well above those seen in the remaining countries, and the gap widened as these two nations enjoyed the largest quarterly increases among qualifying countries in the region, at 16% and 19% respectively. Among the remaining qualifying countries, Mexico, Chile, and Brazil saw single-digit gains, while Argentina suffered a 67% loss (to 0.5% adoption). Note that because Argentina's adoption rate is so low, even small changes to can be reflected as deceptively large percentage shifts.

Year-over-year numbers showed adoption levels increase across all of the qualifying surveyed Americas countries except Argentina, which suffered a 52% yearly decline. The United States and Brazil posted the smallest gains at 29% each, while Mexico and Chile enjoyed jumps of 104% and 101% respectively. Canada's yearly increase sat in the middle of the pack, at a healthy 52%.

A number of announcements in the third quarter point to a continuing upward trend in peak connection speeds and broadband adoption for the leaders in the Americas region — the United States and Canada. Bell Fibe recently announced the launch of its Gigabit Fibe service, enabling speeds of up to 940 Mbps currently and

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
16	United States	46%	7.0%	18%
19	Canada	43%	8.3%	31%
57	Uruguay	7.7%	-30%	7.1%
59	Chile	7.1%	-5.0%	111%
60	Mexico	6.4%	3.0%	132%
63	Argentina	3.1%	-59%	-44%
65	Peru	2.9%	-10%	274%
67	Brazil	2.2%	-6.0%	41%
68	Colombia	1.7%	-37%	49%
–	Ecuador	2.5%	0.5%	2.8%
–	Panama	1.5%	21%	85%
–	Costa Rica	1.1%	0.6%	48%
–	Venezuela	0.2%	-15%	0.9%
–	Bolivia	0.2%	-31%	77%
–	Paraguay	0.1%	126%	345%

Figure 21: 10 Mbps Broadband Adoption by Americas Country

Global Rank	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
17	United States	24%	16%	29%
21	Canada	21%	19%	52%
50	Mexico	1.7%	5.3%	104%
52	Chile	1.6%	4.4%	101%
54	Brazil	0.6%	3.8%	29%
55	Argentina	0.5%	-67%	-52%
–	Uruguay	1.6%	-42%	-25%
–	Peru	0.6%	11%	324%
–	Ecuador	0.6%	9.4%	-7.3%
–	Costa Rica	0.5%	7.6%	21%
–	Colombia	0.4%	-40%	18%
–	Panama	0.4%	20%	65%
–	Venezuela	0.1%	-1.7%	11%
–	Bolivia	0.1%	-14%	74%
–	Paraguay	0.1%	225%	983%

Figure 22: 15 Mbps Broadband Adoption by Americas Country

increasing to speeds of over 1 Gbps in 2016. Currently available to 800,000 homes across Canada, Gigabit Fibe will be available to 2.2 million homes by the end of 2015.[41] The Canadian government also announced broadband initiatives, including CAD $6 million in funding to bring high-speed access to 14,000 homes in rural Nova Scotia,[42] as well as new measures requiring broadband incumbents to offer wholesale access to their infrastructure in an effort to foster increased competition among broadband providers.[43] Similarly, as noted in Section 3 of this report, the third quarter saw numerous advancements of broadband initiatives across both public and private sectors in the United States. We expect these developments to be reflected in continuing improvements in broadband adoption across all speed tiers for these two countries in the upcoming quarters.

[SECTION]5 GEOGRAPHY ASIA PACIFIC *(APAC)*

The metrics presented here for the Asia Pacific region are based on a subset of data used for Section 2 and are subject to the same thresholds and filters discussed within that section. The subset used for this section includes connections identified as coming from networks in the Asia Pacific region, based on classification by Akamai's EdgeScape geolocation tool.

5.1 Asia Pacific Average Connection Speeds / As shown in Figure 23, in the third quarter, the top country/region in the world for average connection speed was again South Korea, despite an 11% quarterly drop to 20.5 Mbps. Hong Kong and Japan, which held the number two and three spots globally in the second quarter, dropped to fifth and seventh during the third quarter as each saw modest declines as well. In total, nine of the fifteen surveyed countries/regions in Asia Pacific saw third-quarter drops in average connection speed, with South Korea's the largest and Singapore's the smallest, at 1.8%. Of the

remaining six countries, Indonesia had the biggest quarterly gain at 24%, while the other five saw single-digit increases ranging from 0.6% in Australia to 7.3% in China.

Just as in the second quarter, in the third quarter, 10 of the 15 surveyed Asia Pacific countries/regions had average connection speeds above the 4 Mbps broadband threshold, and 5 of these exceeded the 10 Mbps threshold. India had the lowest average connection speed among surveyed countries in the region, at 2.5 Mbps, followed by the Philippines at 2.8 Mbps.

Eleven of the fifteen surveyed countries/regions in the Asia Pacific region showed year-over-year growth in observed average connection speeds in the third quarter. Japan had the smallest increase at 0.2%, while Sri Lanka again had the largest at 50%. Eight countries in total enjoyed double-digit yearly growth. Hong Kong and China each saw small yearly losses, of 2.7% and 2.8%, respectively, while South Korea and Indonesia had larger drops of 19% and 20%, respectively, compared with the third quarter of 2014.

One of the countries with the slowest Internet speeds in the region, the Philippines, announced in September that it would provide free Wi-Fi coverage in schools, hospitals, airports, and parks in all of the towns and cities across the nation by the end of 2016, with an emphasis on making access available in areas that currently do not have any.[44] Although the free connectivity only runs at 256 kbps, the hope is that the availability of free access will push the incumbent service providers to both lower their rates and upgrade their networks to boost speeds in order to keep their paying customers. Thus, this government initiative could potentially reduce average connection speeds in the Philippines in the short term if large numbers of users take advantage of the free coverage, but will hopefully set the stage for long-term improvements in speed and connectivity throughout the country.

Global Rank	Country/Region	Q3 2015 Avg. Mbps	QoQ Change	YoY Change
1	South Korea	20.5	-11%	-19%
5	Hong Kong	15.8	-6.9%	-2.7%
7	Japan	15.0	-8.1%	0.2%
17	Singapore	12.5	-1.8%	2.4%
33	Taiwan	10.1	-4.9%	5.5%
42	New Zealand	8.7	2.4%	23%
43	Thailand	8.2	-4.1%	25%
46	Australia	7.8	0.6%	13%
71	Sri Lanka	5.1	-3.6%	50%
73	Malaysia	4.9	-3.2%	20%
91	China	3.7	7.3%	-2.8%
97	Vietnam	3.4	3.1%	33%
104	Indonesia	3.0	24%	-20%
108	Philippines	2.8	-10%	14%
116	India	2.5	5.3%	26%

Figure 23: Average Connection Speed by APAC Country/Region

5.2 Asia Pacific Average Peak Connection Speeds / Just as in the second quarter, the top five global leaders in average peak connection speeds in the third quarter were all from the Asia Pacific region, as shown in Figure 24. Hong Kong joined top-ranked Singapore in seeing average peak connection speeds above the 100 Mbps threshold, while an additional four surveyed countries in Asia Pacific saw average peak speeds above 50 Mbps. With the exception of India and the Philippines, which both saw insignificant quarterly declines of less than 1%, the surveyed countries in Asia Pacific all posted gains in average peak speeds during the third quarter. Indonesia enjoyed the largest jump at 48% followed by China at 26%, while Australia and South Korea had the smallest increases at 4.0% each.

Year-over-year changes in the Asia Pacific region were consistently positive, with all 15 surveyed countries seeing double-digit gains. Singapore enjoyed the largest gain, with a 63% increase over the third quarter of 2014, while Australia had the smallest at 16%. Nine countries posted yearly growth rates greater than 25%.

Global Rank	Country/Region	Q3 2015 Peak Mbps	QoQ Change	YoY Change
1	Singapore	135.4	25%	63%
2	Hong Kong	101.1	6.7%	20%
3	South Korea	86.6	4.0%	17%
4	Japan	78.4	4.4%	20%
5	Taiwan	77.9	4.6%	41%
18	Thailand	58.3	13%	39%
45	New Zealand	42.0	10%	30%
46	Australia	41.9	4.0%	16%
54	Malaysia	38.3	5.1%	29%
66	Sri Lanka	33.5	6.6%	59%
72	Indonesia	31.0	48%	20%
92	Vietnam	25.5	12%	54%
94	Philippines	25.3	-0.9%	19%
101	China	23.1	26%	28%
116	India	18.7	-0.4%	34%

Figure 24: Average Peak Connection Speed by APAC Country/Region

5.3 Asia Pacific 4 Mbps Broadband Adoption / In the third quarter, South Korea once again led the Asia Pacific region in 4 Mbps broadband adoption – but fell to the number-two spot globally — with 96% of its IP addresses connecting to Akamai at average connection speeds above this threshold. As shown in Figure 25, 11 of the 15 surveyed countries saw quarterly declines in adoption, with the Philippines posting the largest drop at 35%. The other declines were fairly small, ranging from 0.1% in Singapore to 6.1% in Malaysia. Indonesia led the gaining countries with a 93% jump over the second quarter, while India and China followed with increases of 23% and 19% respectively. New Zealand had the smallest gain at just 0.1%. Again, seven of the surveyed Asia Pacific

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
2	South Korea	96%	-0.9%	-0.1%
10	Thailand	93%	-1.9%	9.9%
11	Hong Kong	92%	-1.0%	3.8%
18	Japan	90%	-0.2%	3.0%
21	Taiwan	88%	-2.2%	13%
25	New Zealand	87%	0.1%	14%
31	Singapore	87%	-0.1%	4.6%
47	Sri Lanka	76%	-0.8%	268%
52	Australia	72%	-2.6%	9.5%
71	Malaysia	52%	-6.1%	31%
84	China	33%	19%	-3.8%
87	Vietnam	31%	-3.4%	119%
94	Indonesia	17%	93%	-51%
98	India	14%	23%	99%
101	Philippines	10%	-35%	13%

Figure 25: 4 Mbps Broadband Adoption by APAC Country/Region

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
1	South Korea	68%	-9.6%	-17%
4	Hong Kong	59%	-4.2%	7.3%
7	Japan	54%	-9.4%	-0.4%
10	Singapore	51%	1.5%	19%
33	Taiwan	29%	-14%	18%
40	New Zealand	22%	5.8%	59%
43	Thailand	18%	-9.6%	93%
45	Australia	18%	1.3%	24%
62	Malaysia	4.0%	-11%	1.6%
66	India	2.3%	40%	107%
69	China	1.6%	32%	12%
70	Indonesia	0.9%	53%	-71%
71	Vietnam	0.6%	44%	99%
–	Sri Lanka	2.2%	-31%	369%
–	Philippines	0.9%	38%	20%

Figure 26: 10 Mbps Broadband Adoption by APAC Country/Region

countries/regions enjoyed 4 Mbps broadband adoption rates of 80% or higher, while the Philippines — the lowest ranking surveyed Asia Pacific country — had an adoption rate of just 10%.

Looking at year-over-year changes, Indonesia saw the largest decline at 51%, while China and South Korea had small yearly losses of 3.8% and 0.1% respectively. The remaining twelve surveyed countries in the region posted gains ranging from just 3.0% in Japan to an impressive 268% in Sri Lanka. Vietnam posted the next-largest increase, gaining 119% over adoption levels from the third quarter of 2014.

5.4 Asia Pacific 10 Mbps Broadband Adoption / Despite a 9.6% quarterly decrease in its adoption level in the third quarter, South Korea led both the region and the world in 10 Mbps broadband adoption once again, with 68% of its IP addresses connecting to Akamai at average connection speeds above this threshold. However, the gap with second-place Hong Kong narrowed to 9 percentage points, down from 13 in the second quarter and 17 in the first. At the other end of the spectrum, Indonesia and Vietnam again had adoption levels below 1.0%, as seen in Figure 26.

Like the second quarter, changes in adoption levels were mixed in the third quarter, with seven qualifying countries/regions seeing increases and six seeing declines. Taiwan and Malaysia had the only double-digit declines at 14% and 11% respectively, while Hong Kong posted the smallest loss at 4.2%. Third-quarter gains were varied, ranging from 1.3% in Australia to 53% in Indonesia.

Year over year, ten qualifying Asia Pacific countries/regions saw adoption rates increase, led by India, where adoption more than doubled compared with the third quarter of 2014. Seven other countries saw double-digit growth, while Malaysia saw the most modest increase in the region at 1.6%. Three qualifying countries saw adoption levels decline year over year, with Indonesia seeing the biggest drop at 71% and Japan seeing the smallest at 0.4%.

5.5 Asia Pacific 15 Mbps Broadband Adoption / Given its lead in the 4 Mbps and 10 Mbps broadband adoption metrics, it is not surprising that South Korea was once again the global leader in 15 Mbps broadband adoption as well, despite a 15% quarterly decline. As seen in Figure 27, in the third quarter, 45% of the unique IP addresses from South Korea made requests to Akamai at average speeds of 15 Mbps or higher. With adoption levels declining 11% compared with the second quarter, second-place Hong Kong nevertheless closed the gap with South Korea to 9 percentage points, down from 13 in the second quarter and 19 in the first. Quarterly gainers and losers were evenly split among the ten qualifying countries/regions in Asia Pacific, with China and India enjoying the largest gains at 36% and 33% respectively, but remaining at the bottom of the group with adoption levels below 1%. Singapore posted the smallest increase, seeing a 1.8% gain compared with the third quarter of 2014. Among the declining countries/regions, quarterly losses ranged from 11% in Hong Kong to 16% in Japan.

Year-over-year changes in the 15 Mbps broadband adoption metric were mixed as well, with the Asia Pacific region's top-three surveyed countries seeing declines in adoption. Hong Kong and Japan had small declines of 2.4% and 3.1% respectively, while South Korea's adoption rate dropped 32% compared with the previous year. Among those that increased, Thailand was again the only qualifying country to see adoption levels more than double over the previous year, as it enjoyed a 109% increase. Yearly gains among the other qualifying countries ranged from 5.7% in Taiwan to 92% in New Zealand.

Although it currently ranks in the bottom third of qualifying countries worldwide, Australia may soon see a boost in 15 Mbps adoption rates as well as overall speeds, as its government-owned backbone initiative — the National Broadband Network (NBN) — launched services in September that enable high-speed Internet access over existing copper phone lines using fiber-to-the-node technology. When the network is completed in 2020, roughly 38% of Australian homes are expected to have access at speeds of 25 Mbps to 500 Mbps, depending on their distance to the nodes.[45]

Global Rank	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
1	South Korea	45%	-15%	-32%
5	Hong Kong	36%	-11%	-2.4%
7	Japan	32%	-16%	-3.1%
14	Singapore	27%	1.8%	25%
34	Taiwan	13%	-13%	5.7%
37	New Zealand	8.2%	14%	92%
39	Australia	7.4%	3.3%	27%
41	Thailand	5.8%	-13%	109%
53	India	0.8%	33%	85%
56	China	0.3%	36%	37%
–	Malaysia	0.9%	-6.0%	-15%
–	Sri Lanka	0.6%	-11%	360%
–	Indonesia	0.4%	45%	-60%
–	Philippines	0.3%	45%	38%
–	Vietnam	0.1%	67%	78%

Figure 27: 15 Mbps Broadband Adoption by APAC Country/Region

[SECTION]6 GEOGRAPHY *EUROPE, MIDDLE EAST, AND AFRICA (EMEA)*

The metrics presented here for the EMEA region are based on a subset of data used for Section 2 and are subject to the same thresholds and filters discussed within that section. The subset used for this section includes connections identified as coming from networks in the EMEA region, based on classification by Akamai's EdgeScape geolocation tool.

6.1 EMEA Average Connection Speeds / Enjoying a 23% quarter-over-quarter increase in average connection speed, Sweden retained the top spot among the surveyed EMEA countries in the third quarter, although Norway and Switzerland were not far behind. Of the 25 surveyed countries, 20 in total had average connection speeds at or above the 10 Mbps threshold, up from 18 in the second quarter, and all of the surveyed countries except South Africa again saw average connection speeds above the 4 Mbps broadband threshold. While three countries — Turkey, the United Arab Emirates, and Israel — saw quarterly decreases in connection speeds, the declines were modest, ranging from 0.5% to 7.1%. The remaining countries all posted gains

Global Rank	Country/Region	Q3 2015 Avg. Mbps	QoQ Change	YoY Change
2	Sweden	17.4	8.6%	23%
3	Norway	16.4	15%	44%
4	Switzerland	16.2	3.7%	12%
6	Netherlands	15.6	3.0%	12%
8	Finland	14.8	5.6%	26%
10	Czech Republic	14.5	4.5%	18%
11	Denmark	14.0	8.1%	25%
12	Romania	13.1	2.0%	16%
14	United Kingdom	13.0	10%	21%
15	Belgium	12.8	3.1%	12%
18	Ireland	12.4	13%	-11%
22	Germany	11.5	7.3%	32%
23	Austria	11.4	4.3%	9.2%
25	Israel	11.2	-7.1%	-1.5%
26	Slovakia	11.2	8.2%	29%
27	Hungary	10.7	6.3%	21%
28	Portugal	10.6	1.4%	32%
29	Poland	10.6	5.6%	23%
30	Spain	10.4	6.6%	34%
31	Russia	10.2	6.7%	12%
44	France	8.2	3.1%	18%
51	United Arab Emirates	6.8	-3.5%	45%
52	Italy	6.5	2.4%	18%
55	Turkey	6.2	-0.5%	12%
92	South Africa	3.7	11%	2.3%

Figure 28: Average Connection Speed by EMEA Country

Global Rank	Country/Region	Q3 2015 Peak Mbps	QoQ Change	YoY Change
8	Romania	72.9	1.1%	24%
9	Israel	70.0	-2.0%	13%
10	Sweden	69.0	9.8%	28%
13	Netherlands	63.5	4.3%	19%
14	Switzerland	62.6	5.4%	15%
16	Belgium	59.3	3.5%	13%
19	Russia	57.9	7.0%	23%
20	Finland	57.4	7.9%	32%
22	Norway	55.9	12%	35%
23	United Kingdom	54.2	6.4%	16%
24	Hungary	53.9	4.2%	23%
25	Spain	53.5	13%	48%
27	Ireland	52.0	12%	3.0%
29	Czech Republic	50.9	4.4%	17%
30	Denmark	50.1	4.1%	29%
32	Germany	49.2	5.2%	26%
33	Slovakia	49.0	11%	28%
34	Portugal	47.9	-0.6%	9.7%
38	United Arab Emirates	45.8	-4.1%	38%
39	Poland	45.6	4.7%	21%
41	Austria	44.0	1.2%	9.0%
52	France	38.9	4.6%	34%
53	Turkey	38.5	2.8%	20%
74	Italy	30.1	-0.3%	19%
114	South Africa	18.9	13%	10%

Figure 29: Average Peak Connection Speed by EMEA Country

in the third quarter, though increases were also modest. Gains ranged from 1.4% in Portugal to 15% in Norway, with four surveyed countries posting double-digit gains.

Year-over-year changes in average connection speeds were mostly positive for EMEA, with only Israel and Ireland seeing drops of 1.5% and 11%, respectively. South Africa and Austria had the smallest yearly gains, at 2.3% and 9.2% respectively, while the United Arab Emirates and Norway had the largest, at 45% and 44% respectively. Seven surveyed countries saw yearly gains of at least 25%, up from six in the previous quarter.

6.2 EMEA Average Peak Connection Speeds / Romania again led the EMEA region in average peak connection speeds, with a 1.1% quarterly increase to 72.9 Mbps, as shown in Figure 29. Overall, the EMEA region saw mostly positive changes in this metric during the third quarter, with 21 of the 25 surveyed countries seeing gains. Spain and South Africa posted the biggest increases at 13% each, while Romania saw the smallest increase at 1.1%. Losses seen by the four declining countries were small, ranging from 0.3% in Italy to 4.1% in the United Arab Emirates.

Fifteen of the surveyed EMEA countries had average peak connection speeds of at least 50 Mbps as compared with eleven in the second quarter, with several other countries not far behind. South Africa continued to trail the group with an average peak speed of 18.9 Mbps, but in the third quarter it closed the gap with Italy, the next-lowest country, to just over 11 Mbps.

Year-over-year changes were consistently positive for the surveyed EMEA countries, led by Spain and the United Arab Emirates with gains of 48% and 38% respectively over the previous year. The remaining countries posted gains between 3.0% (in Ireland) and 35% (in Norway), with 22 of the 25 surveyed countries seeing double-digit gains.

6.3 EMEA 4 Mbps Broadband Adoption / The third quarter saw mixed changes in 4 Mbps broadband adoption across the surveyed EMEA countries, as shown in Figure 30. Nine countries saw quarterly losses in adoption, albeit small, ranging from 0.2% in Romania, Switzerland, and the Czech Republic to 3.6% in Turkey. Two more countries — Germany and Austria — remained unchanged, while fourteen posted gains. South Africa enjoyed

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
3	Netherlands	95%	0.1%	5.1%
6	Denmark	94%	0.5%	5.1%
7	Israel	94%	-0.9%	2.5%
8	Romania	94%	-0.2%	5.7%
9	Switzerland	93%	-0.2%	0.6%
12	Sweden	92%	0.2%	8.9%
14	Belgium	91%	-0.4%	3.9%
15	Finland	91%	1.0%	14%
16	Austria	90%	0%	5.0%
19	Hungary	90%	1.6%	15%
22	Poland	88%	0.1%	11%
24	Norway	88%	1.6%	16%
27	United Kingdom	87%	2.1%	7.1%
28	Germany	87%	0%	11%
29	Russia	87%	3.3%	9.3%
32	Czech Republic	86%	-0.2%	3.1%
34	Portugal	85%	-2.1%	16%
35	United Arab Emirates	85%	-1.1%	68%
36	Slovakia	85%	3.9%	20%
37	Spain	85%	0.2%	13%
45	Turkey	77%	-3.6%	17%
46	Ireland	76%	6.4%	11%
50	France	74%	-0.5%	9.8%
53	Italy	71%	1.8%	18%
90	South Africa	22%	18%	-5.2%

Figure 30: 4 Mbps Broadband Adoption by EMEA Country

the biggest increase among the EMEA countries at 18%, but the remaining gains were more modest, ranging from 0.1% in Poland and the Netherlands to 6.4% in Ireland.

With its 95% adoption rate, the Netherlands again led the region in 4 Mbps adoption, while Denmark, Israel, and Romania — each with a 94% adoption rate — followed close behind. A total of nine countries — the same as in the previous quarter — enjoyed 4 Mbps adoption rates above 90%, with several more in close range. South Africa again had the lowest 4 Mbps adoption rate in the group by far, with just over one in five IP addresses connecting to Akamai at or above the threshold speed. The remaining countries had much higher levels of adoption, with at least 7 out of every 10 unique IP addresses connecting to Akamai at average speeds of 4 Mbps or greater.

South Africa was the only one of the surveyed EMEA countries to see a decline in 4 Mbps broadband adoption decline on a year-over-year basis, as its adoption rate dropped 5.2%. Among the gainers, the United Arab Emirates once again led the pack in yearly growth in the third quarter, posting a 68% gain over the previous year. The other countries saw more modest growth, ranging from 0.6% in Switzerland to 20% in Slovakia, with a total of 12 countries seeing growth of more than 10%.

6.4 EMEA 10 Mbps Broadband Adoption / In the third quarter, Switzerland and the Netherlands again led the EMEA region in 10 Mbps broadband adoption with adoption rates of 61% and 60%, respectively, as seen in Figure 31. Eight surveyed EMEA countries in all had more than half of their unique IP addresses connecting to Akamai at average speeds of at least 10 Mbps as compared with five in the second quarter. On the other end of the spectrum, four countries — South Africa, Turkey, Italy, and the United Arab Emirates — had 10 Mbps broadband adoption rates below 10%.

Quarterly changes in adoption rates were again mixed across EMEA, with 18 countries seeing gains. Russia and Norway had the largest gains at 14% each, while Switzerland saw the smallest at 0.4%. On the flip side, seven countries had losses, with Romania's 0.1% being the smallest. Only Israel and the United Arab Emirates suffered double-digit declines, at 22% and 15% respectively.

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
2	Switzerland	61%	0.4%	11%
3	Netherlands	60%	-0.8%	12%
5	Romania	57%	-0.1%	16%
6	Sweden	55%	4.5%	27%
8	Norway	54%	14%	54%
9	Belgium	52%	-0.6%	17%
11	Denmark	51%	5.1%	33%
12	Finland	51%	6.0%	40%
17	Czech Republic	46%	-2.6%	16%
18	United Kingdom	46%	11%	28%
20	Ireland	41%	13%	16%
22	Russia	38%	14%	24%
23	Portugal	37%	-0.4%	49%
25	Germany	37%	8.7%	65%
26	Israel	36%	-22%	-18%
27	Hungary	36%	4.2%	30%
28	Spain	34%	10%	77%
29	Poland	34%	3.9%	36%
31	Austria	33%	5.9%	17%
34	Slovakia	28%	5.9%	33%
41	France	21%	5.9%	49%
51	United Arab Emirates	9.7%	-15%	178%
53	Italy	9.2%	6.3%	76%
58	Turkey	7.6%	9.8%	26%
64	South Africa	2.9%	9.5%	-15%

Figure 31: 10 Mbps Broadband Adoption by EMEA Country

Yearly gains were achieved across all of the surveyed EMEA countries in the third quarter with the exception of Israel and South Africa, which saw 10 Mbps adoption rates drop 18% and 15% respectively as compared with the third quarter of 2014. Among gainers, the United Arab Emirates again led the region with a 178% increase in adoption rates as compared with the same period a year prior. The remaining countries saw gains ranging from 11% in Switzerland to 77% in Spain.

6.5 EMEA 15 Mbps Broadband Adoption / In the third quarter, 11 of the surveyed EMEA countries had at least one in five IP addresses connecting to Akamai at average speeds above 15 Mbps, up from 10 in the second quarter. As seen in Figure 32, Sweden and Norway led the region, with adoption rates of 38% and 37% respectively, after posting large quarterly gains in adoption to overtake second-quarter leader Switzerland. On the other end of the spectrum, five surveyed countries had adoption rates below 10% in the third quarter — the same as in the second. South Africa remained the country with the lowest adoption level in the region, with a mere 1.7% of unique IP addresses connecting to Akamai at average speeds of 15 Mbps or more.

Quarterly growth was mostly positive across the region, with only two EMEA surveyed countries seeing declines. Israel and the United Arab Emirates posted drops of 23% and 17% respectively, while the remaining countries saw gains ranging from 1.3% in Romania to 29% in Ireland. Sixteen countries in all saw gains of more than 10%.

Year-over-year changes were mostly positive as well, with only Israel and South Africa seeing losses, of 22% and 2.5% respectively. Three countries — the United Arab Emirates, Spain, and Germany — saw 15 Mbps adoption rates more than double, with gains of 142%, 111%, and 104% respectively, while an additional seven countries saw yearly growth rates of more than 50%. Austria again posted the smallest yearly gain, but still saw adoption levels increase 11% from the third quarter of 2014.

As with previous quarters, the third quarter brought a number of announcements underscoring the continued growth of fast broadband connectivity in Europe. In August, Italy launched a public-private partnership to build a €12 billion (or roughly $13 billion USD) high-speed fiber-optic network to replace the copper wires currently running to homes.[46] Italy also announced it would unveil a national broadband strategy before the end of the year.[47] Meanwhile, the German government announced plans to make 50 Mbps service available to all its citizens by 2018.[48] Finally, in the United Kingdom, the government's Broadband Delivery U.K. initiative is working with telecommunications provider BT to provide broadband speeds of at least 24 Mbps to 95% of U.K. citizens, while plans to reach the last 5% are expected to be publicized before year end.[49] BT has also announced it will offer broadband speeds of 300 Mbps to 500 Mbps to more than 10 million premises by 2020,[50] while competitor Virgin Media revealed its customers would receive a free speed upgrade from the current 50 Mbps, 100 Mbps, and 152 Mbps tiers to 70 Mbps, 150 Mbps, and 200 Mbps tiers, respectively.[51] The speed boost is expected to be available to 90% of its customers by the end of the year.

Global Rank	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
2	Sweden	38%	12%	33%
3	Norway	37%	27%	73%
4	Switzerland	36%	5.8%	22%
6	Netherlands	34%	4.2%	16%
9	Denmark	29%	17%	54%
10	Finland	28%	7.2%	38%
11	United Kingdom	28%	20%	43%
12	Romania	27%	1.3%	34%
13	Czech Republic	27%	4.1%	34%
15	Belgium	26%	6.5%	24%
18	Ireland	23%	29%	27%
22	Portugal	19%	7.1%	99%
23	Germany	19%	21%	104%
24	Hungary	18%	19%	54%
25	Spain	17%	20%	111%
27	Poland	17%	14%	51%
28	Austria	17%	12%	11%
29	Slovakia	17%	12%	46%
31	Russia	15%	18%	21%
32	Israel	14%	-23%	-22%
36	France	8.7%	15%	72%
45	Italy	3.4%	12%	62%
46	Turkey	2.9%	27%	48%
48	United Arab Emirates	2.3%	-17%	142%
51	South Africa	1.7%	13%	-2.5%

Figure 32: 15 Mbps Broadband Adoption by EMEA Country

[SECTION]7 MOBILE CONNECTIVITY

The source data in this section encompasses usage from smartphones, tablets, computers, and other devices that connect to the Internet through mobile network providers. Once again, this quarter's report does not include mobile connection speed data or mobile browser usage data due to ongoing changes in Akamai's mobile network identification algorithms. However, it still includes insight into mobile voice and data traffic trends contributed by Ericsson, a leading provider of telecommunications equipment and related services to mobile and fixed operators globally.

7.1 Mobile Traffic Growth Observed by Ericsson / In mobile networks, the access medium (spectrum) is shared by different users in the same cell. It is important to understand traffic volumes and usage patterns in order to enable a good customer experience. Ericsson's presence in more than 180 countries and its customer base representing more than 1,000 networks enable it to measure mobile voice and data

volumes. The result is a representative base for calculating world total mobile traffic in 2G, 3G, and 4G networks (not including DVB-H, Wi-Fi, and Mobile WiMAX).

These measurements have been performed for several years. It is important to note that the measurements of data and voice traffic in these networks (2G, 3G, 4G/LTE) around the world show large differences in traffic levels between markets and regions and also between operators due to their different customer profiles.

Mobile data traffic has continued to grow, and Figure 33 shows total global monthly data and voice traffic from the first quarter of 2010 to the third quarter of 2015. It depicts a continued strong increase in data traffic and voice traffic growth in the mid-single digits per year. The growth in data traffic is being driven both by increased smartphone subscriptions and a continued increase in average data volume per subscription, fueled primarily by increased viewing of video content. In the third quarter, data traffic grew around 14% quarter over quarter and 65% year over year.

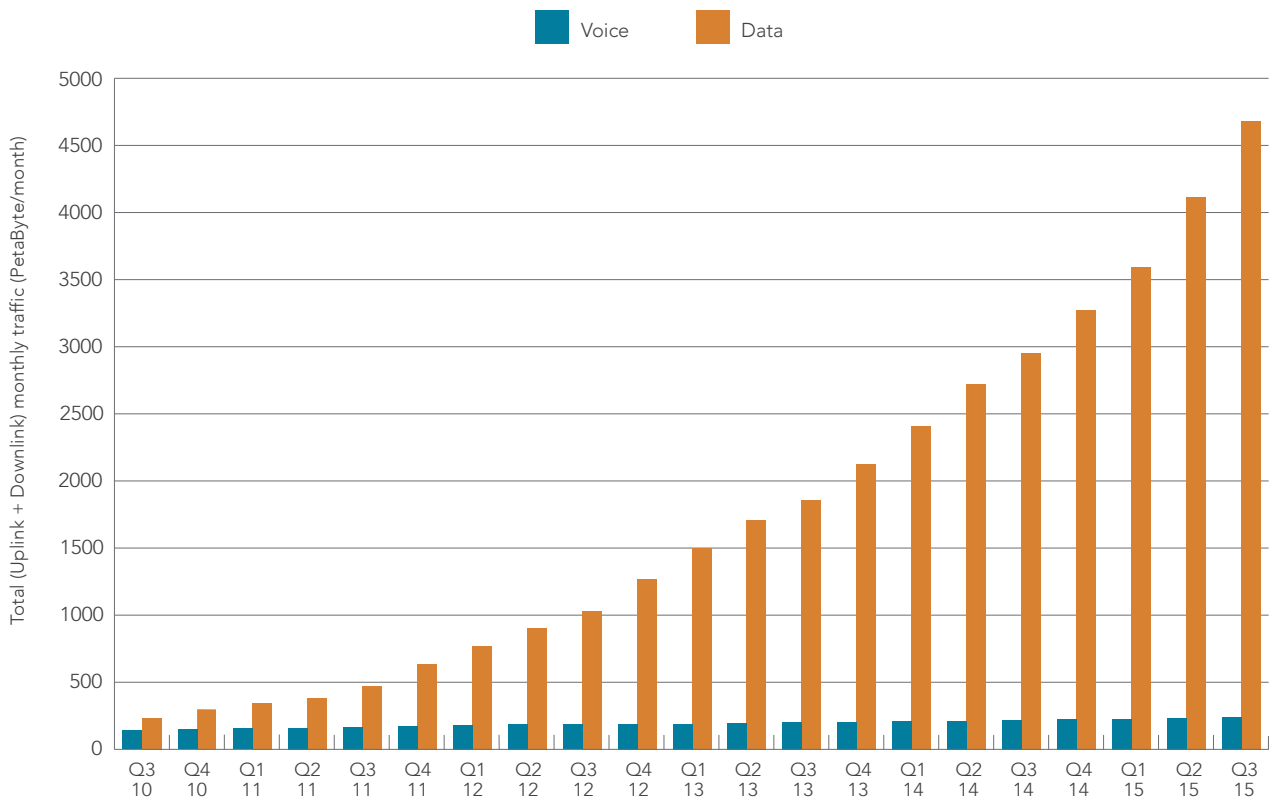

Figure 33: Total Monthly Mobile Voice and Data Traffic as Measured by Ericsson

[SECTION]8 SITUATIONAL PERFORMANCE

The metrics presented here are based on data collected through Akamai's Real User Monitoring (RUM) capabilities, which take passive performance measurements from actual users of a web experience in order to provide insight into performance across devices and networks. RUM is a complementary capability to synthetic testing, and the two can and should be used in conjunction to gain a comprehensive picture of user experience.

There are a few different RUM measurement methodologies. The first uses what is known as navigation timing (or "navtiming"),[52] which allows JavaScript to collect page load time component information directly from the user agent (browser) through an API. The second relies on a framework for timing web pages, like Web Episodes,[53] that leverages JavaScript events such as "onload." While navtiming is the preferred methodology for collecting RUM measurements, not every user agent supports it at this time.[54] Apple's Safari browser only began supporting it in version 8 on OS X and does not yet support it for iOS.

Android first added navtiming support in version 4.0 ("Ice Cream Sandwich") of the operating system, and Microsoft's Internet Explorer began support in version 9 of the browser.

Figure 34 shows average page load times for users on both broadband and mobile connections based on RUM data collected by Akamai during the third quarter of 2015. The underlying data was collected with navtiming; therefore, as noted above, it does not include measurements from users of Safari on iOS devices or older versions of Android, Internet Explorer, or Safari on OS X. The countries included within the table were selected based on several criteria, including the availability of measurements from users on networks identified as mobile and those identified as broadband as well as having more than 90,000 measurements from mobile networks during the third-quarter data collection period. In the third quarter, we included 66 countries in our analyses, down slightly from 69 countries in the second quarter. Note that the inclusion criteria are subject to change in the future as we expand the scope of RUM measurements included within the *State of the Internet Report*.

In reviewing the average page load time measurements for broadband connections shown in Figure 34, we find the lowest values (i.e., fastest page load times) in New Zealand with a 1.1-second average load time, followed by the second-quarter leader, Iran, with a 1.4 second load time. The country with the slowest broadband page load time was Paraguay, where pages took 5.8 seconds to load on average — more than five times as long as New Zealand, though this gap was smaller than the gap seen between the fastest and slowest broadband page load times in the second quarter. Venezuela and Kenya rounded out the bottom three in terms of broadband measurements, with average load times of 5.6 and 5.3 seconds respectively. Note that these measurements do not just reflect broadband network speeds, but are also influenced by factors such as average page weight and page composition.

Looking at mobile networks, Iran had the fastest page load time at 1.6 seconds. Belgium and Myanmar followed with the next fastest times, at 2.0 seconds and 2.1 seconds respectively. At the other end of the spectrum, India and Kenya had the highest average load times for mobile connections, at 7.4 seconds and 7.0 seconds respectively. Note again that all of these page load time measurements are affected by average page weight and page composition as well as mobile network speeds and may include content that is mobile-optimized.

In comparing the average broadband page load times to those observed on mobile connections, we again find significant variance in what we have dubbed the "mobile penalty" — that is, the ratio of average page load times on mobile connections versus average load times on broadband connections. As stated previously, this ratio should not be taken as a pure comparison of mobile versus broadband network speeds, as these speeds are just one factor in the overall user experience. Average page weight — which is dependent both on the type of content requested as well as potential mobile-specific content optimizations — is another significant factor.

In the third quarter, the mobile penalty across surveyed countries ranged from 0.6x in Myanmar to 2.6x in Cambodia, a smaller variance than was seen in the second quarter. Of the 66 countries/regions surveyed, 6 had a mobile penalty lower than 1.0x, meaning that average page load times were faster on mobile connections than on broadband connections. This is far fewer than the number of low mobile penalty countries/regions seen in the second quarter. On the other end of the spectrum, Cambodia, New Zealand, and Taiwan, the three countries/regions with the highest mobile penalties, all had pages load at least twice as fast, on average, over broadband connections compared with mobile connections. The average mobile penalty across all 66 qualifying countries was 1.3x.

As more customers integrate Akamai's RUM capabilities and as more platforms support the navigation timing API, we expect that we will be able to expand the scope of the Situational Performance measurements presented within future issues of the *State of the Internet Report*.

Region	Country/ Region	Avg. Page Load Time Broadband (ms)	Avg. Page Load Time Mobile (ms)	Mobile Penalty
APAC	Australia	3598	3947	1.1x
APAC	Bahrain	4591	6598	1.4x
APAC	Bangladesh	4305	5886	1.4x
APAC	Cambodia	1534	3998	2.6x
APAC	China	2885	2867	1.0x
APAC	Hong Kong	2454	4607	1.9x
APAC	India	3892	7351	1.9x
APAC	Indonesia	3453	3545	1.0x
APAC	Iran	1355	1606	1.2x
APAC	Israel	2472	3017	1.2x
APAC	Japan	2445	4373	1.8x
APAC	Jordan	2569	2211	0.9x
APAC	Kuwait	4213	3970	0.9x
APAC	Malaysia	3541	4083	1.2x
APAC	Myanmar	3199	2078	0.6x
APAC	New Zealand	1121	2597	2.3x
APAC	Oman	4414	4786	1.1x
APAC	Pakistan	3772	4140	1.1x
APAC	Singapore	2422	3006	1.2x
APAC	South Korea	2478	3634	1.5x
APAC	Sri Lanka	3449	3963	1.1x
APAC	Taiwan	2508	5186	2.1x
APAC	Thailand	2952	3382	1.1x
APAC	United Arab Emirates	3938	5432	1.4x
APAC	Vietnam	3285	4674	1.4x
EMEA	Austria	1893	2744	1.4x
EMEA	Belgium	1904	1966	1.0x
EMEA	Czech Republic	1951	2320	1.2x
EMEA	Denmark	1613	2346	1.5x
EMEA	Egypt	3530	3642	1.0x
EMEA	France	2757	3248	1.2x
EMEA	Germany	2178	2945	1.4x
EMEA	Greece	3257	4691	1.4x
EMEA	Hungary	1645	2248	1.4x

Region	Country/ Region	Avg. Page Load Time Broadband (ms)	Avg. Page Load Time Mobile (ms)	Mobile Penalty
EMEA	Ireland	2843	3696	1.3x
EMEA	Italy	2949	3698	1.3x
EMEA	Kenya	5257	7006	1.3x
EMEA	Morocco	3772	4097	1.1x
EMEA	Netherlands	1880	2524	1.3x
EMEA	Norway	1963	2810	1.4x
EMEA	Poland	2205	2608	1.2x
EMEA	Portugal	2536	2869	1.1x
EMEA	Romania	2075	2101	1.0x
EMEA	Russia	2227	2690	1.2x
EMEA	Slovakia	2063	2140	1.0x
EMEA	South Africa	3697	5666	1.5x
EMEA	Spain	2551	3819	1.5x
EMEA	Sweden	1715	2664	1.6x
EMEA	Switzerland	2014	2742	1.4x
EMEA	Turkey	2608	3495	1.3x
EMEA	Ukraine	2172	2281	1.1x
EMEA	United Kingdom	2872	4425	1.5x
N. America	Canada	2663	4230	1.6x
N. America	Dominican Republic	3785	5155	1.4x
N. America	El Salvador	4261	3714	0.9x
N. America	Mexico	2994	3557	1.2x
N. America	Puerto Rico	3168	3763	1.2x
N. America	United States	2531	4526	1.8x
S. America	Argentina	3751	4172	1.1x
S. America	Brazil	4575	6082	1.3x
S. America	Chile	2850	3366	1.2x
S. America	Colombia	3225	3438	1.1x
S. America	Paraguay	5845	4320	0.7x
S. America	Peru	3391	3040	0.9x
S. America	Uruguay	3063	3882	1.3x
S. America	Venezuela	5582	6168	1.1x

Figure 34: Average Page Load Times Based on Real User Monitoring

[SECTION]9 INTERNET DISRUPTIONS +EVENTS

Internet disruptions are unfortunately still all too common — occurring in some countries/regions on a frequent basis. These disruptions may be accidental (backhoes or ship anchors severing buried fiber), natural (hurricanes or earthquakes), or political (governments shutting off Internet access in response to unrest). Because Akamai customer content is consumed by users around the world, the effect of these disruptions — whether brief or spanning multiple days — is evident in the levels of Akamai traffic delivered to the affected country/region.

The content presented in this section provides insights into how Akamai traffic was impacted by major Internet disruptions and events during the third quarter of 2015.

9.1 Syria / From roughly 3:30 a.m. to 3:50 a.m. UTC on July 17, Akamai observed its traffic levels to Syria effectively drop to zero, as seen in Figure 35. Dyn Research, the Internet monitoring arm of Internet

performance company Dyn, corroborated the event, noting there was an outage across all of the 94 networks in Syria during this time, although the cause of the outage is unknown.[55]

9.2 Northern Mariana Islands / The Northern Mariana Islands have only a single fiber-optic cable providing connectivity between them and the rest of the world. On July 7, that undersea cable broke, severely disrupting all voice and data transmissions to the islands, including Internet communications, phone calls, texts, and banking transactions.[56] As shown in Figure 36, Akamai saw traffic to the Northern Marianna Islands drop precipitously at approximately 4:00 P.M. UTC on July 7. For the next six days, traffic stayed severely depressed, at roughly 5% to 10% of usual levels, before improving somewhat — but not fully recovering — for several days after that. Cable repair was expected to take two weeks, during which time telecommunications provider IT&E was able to restore partial connectivity using an old microwave link.[57]

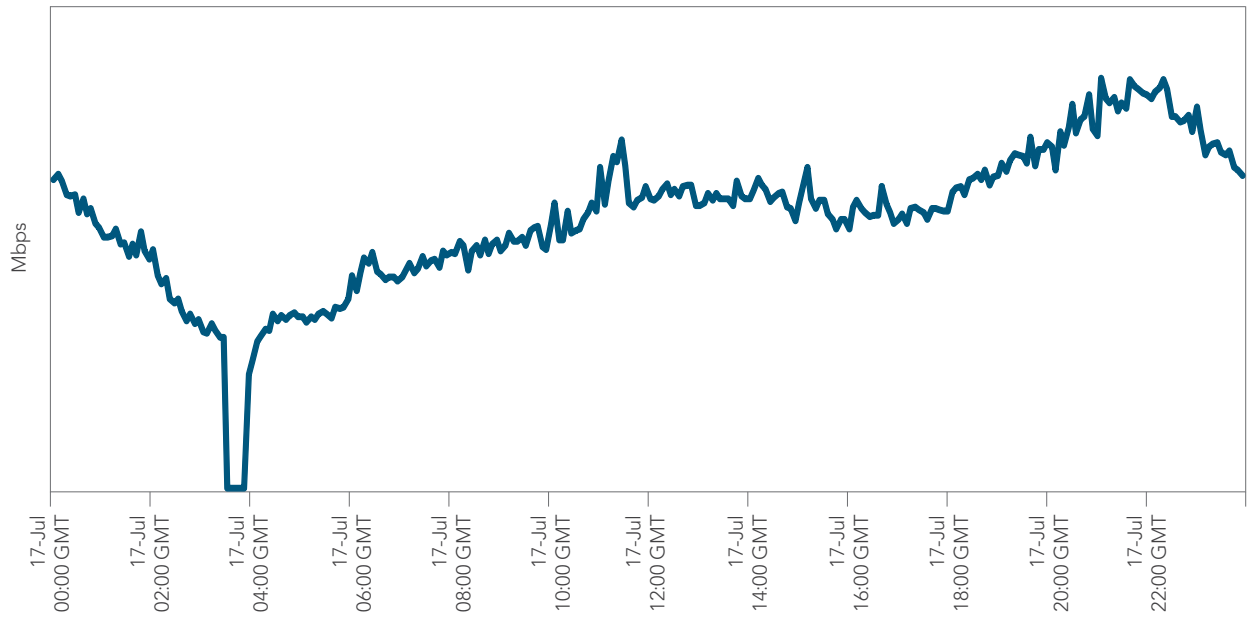

Figure 35: Akamai Traffic Served to Syria, July 17, 2015

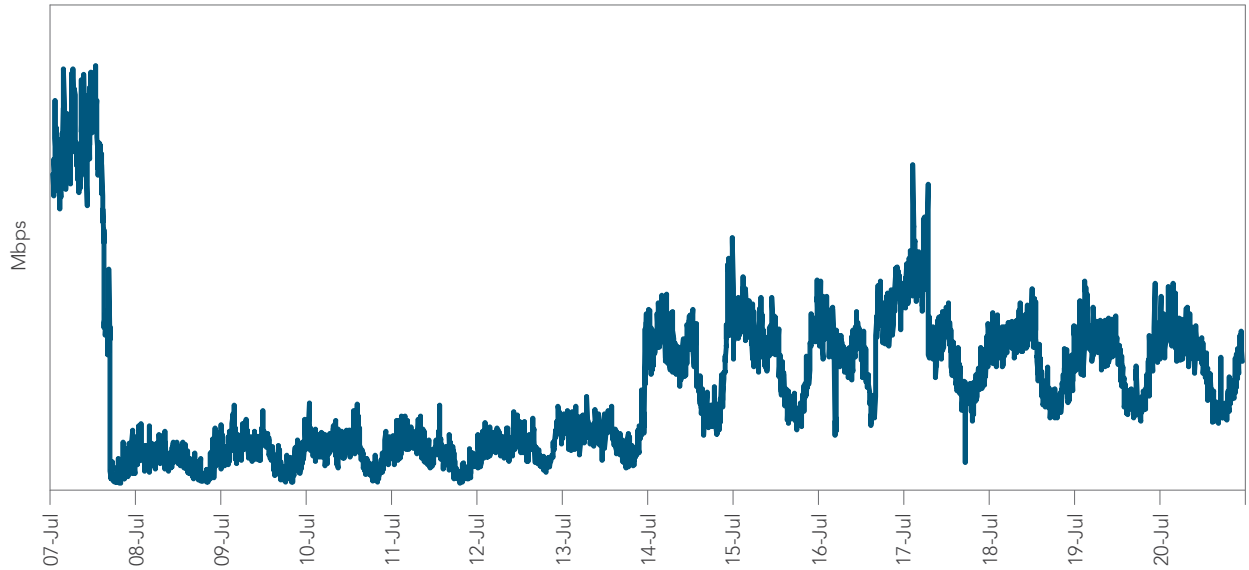

Figure 36: Akamai Traffic Served to the Northern Mariana Islands, July 7–18, 2015

9.3 French Polynesia / Akamai saw traffic to French Polynesia suddenly fall to zero at 10:40 p.m. UTC on July 14, as illustrated in Figure 37. This total outage lasted roughly two and half hours, with service being restored around 1:20 a.m. on July 15 and returning to normal soon after. Mana, the sole Internet service provider to the islands, apologized for outage, blaming it on technical equipment difficulties.[58]

9.4 Ecuador / At approximately 9:30 p.m. UTC on July 11, Akamai saw traffic delivered to Ecuador plunge by roughly half before recovering over the next few hours, as shown in Figure 38. During that timeframe, Dyn Research noted a sequence of connectivity outages and restorations of Ecuadorean networks involving nearly 400 networks,[59] including a 21-hour Internet outage experienced by Ecuadorean telecommunications provider CNT.[60]

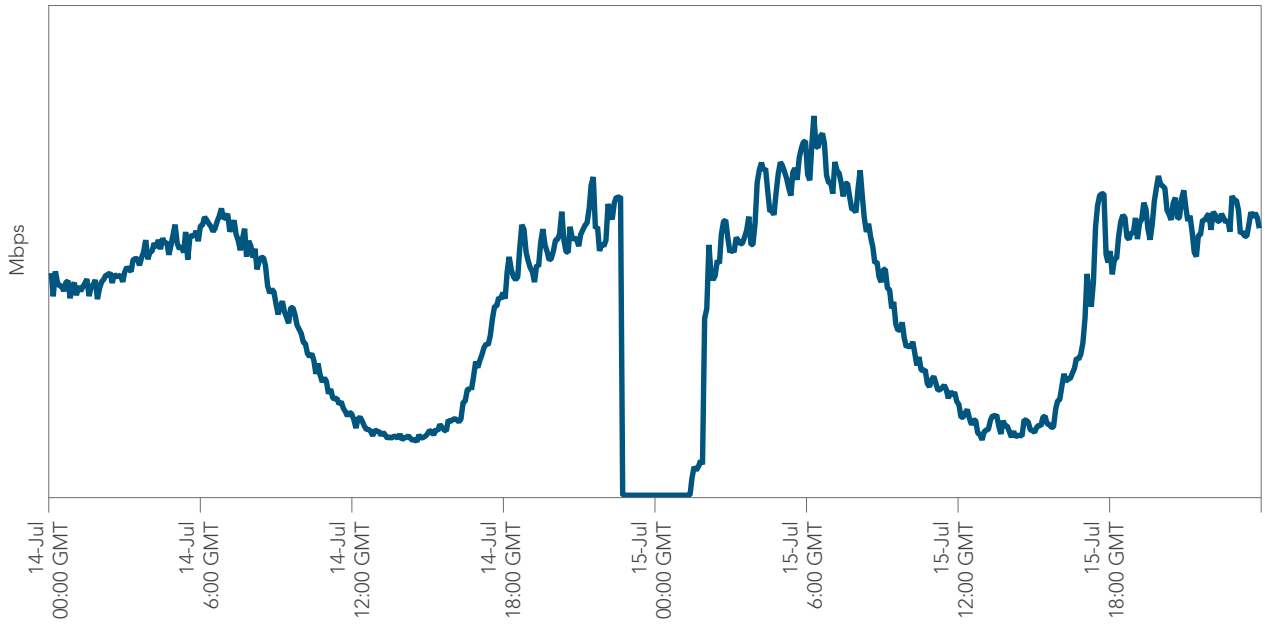

Figure 37: Akamai Traffic Served to French Polynesia, July 14–15, 2015

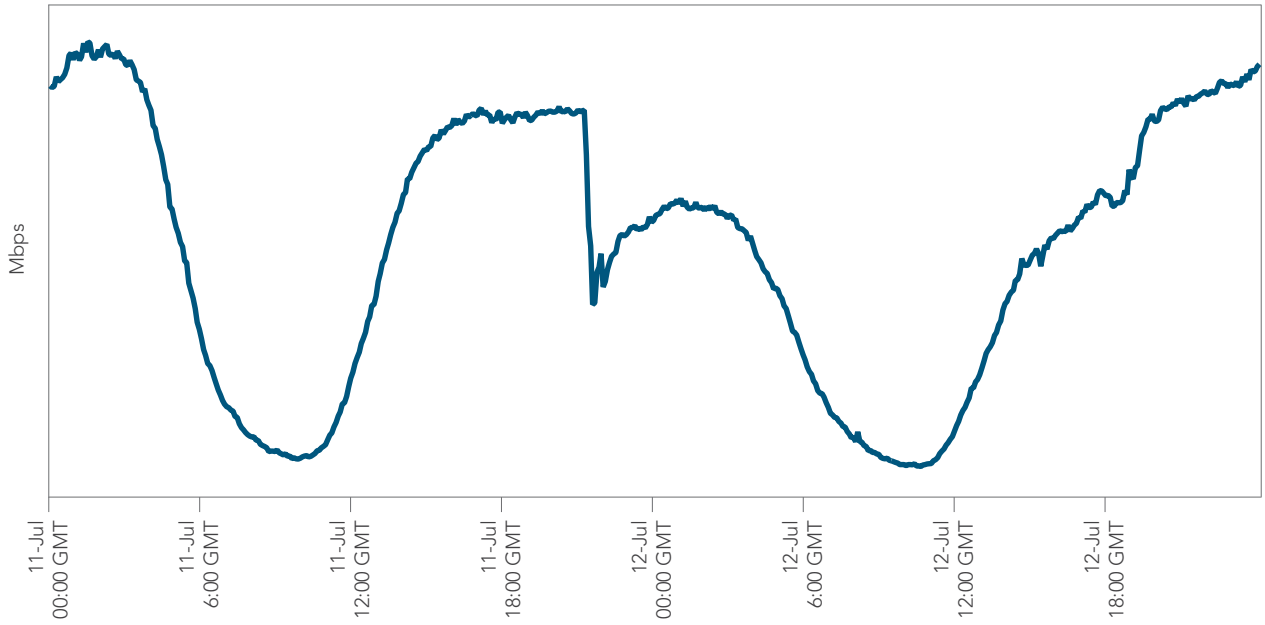

Figure 38: Akamai Traffic Served to Ecuador, July 11–12, 2015

9.5 Iraq / As described in the *Second Quarter, 2015 State of the Internet* report, Iraq experienced Internet outages on both June 27 and June 29, with Akamai seeing Iraqi traffic fall by more than 80% of previous levels between the hours of approximately 2:00 a.m. and 5:00 a.m. UTC. In the third quarter, Akamai saw this distinct pattern repeat again on nine different dates, as seen in Figure 39. Dyn Research corroborated the outages, noting that they were government-ordered Internet blockages, reportedly to prevent cheating during national school exams.[61, 62]

In a most likely unrelated occurrence, Akamai saw a significant decline in traffic to Iraq on September 7, as depicted in Figure 40. Around 10:35 a.m. UTC, traffic dropped to roughly 60% of previous levels and remained depressed until roughly 11:45 a.m. Dyn Research noted that 61 of Iraq's networks had outages at the time, although the cause is unknown.[63]

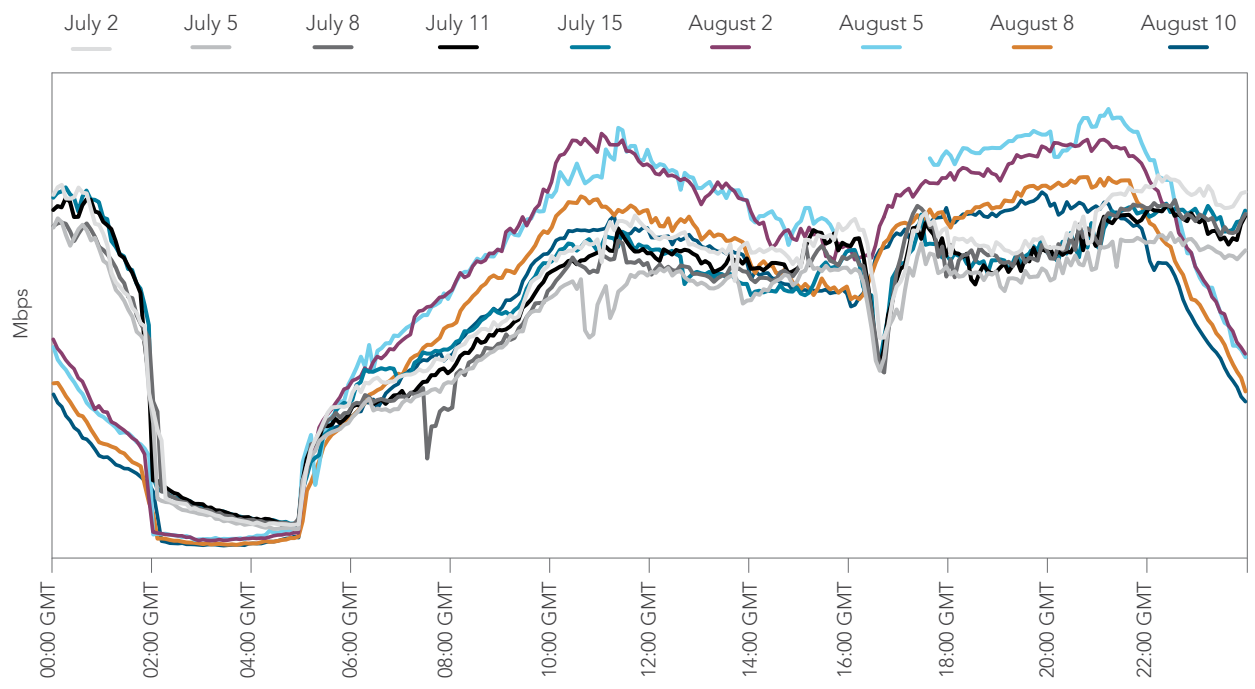

Figure 39: Akamai Traffic Served to Iraq, Multiple Days in July & August 2015

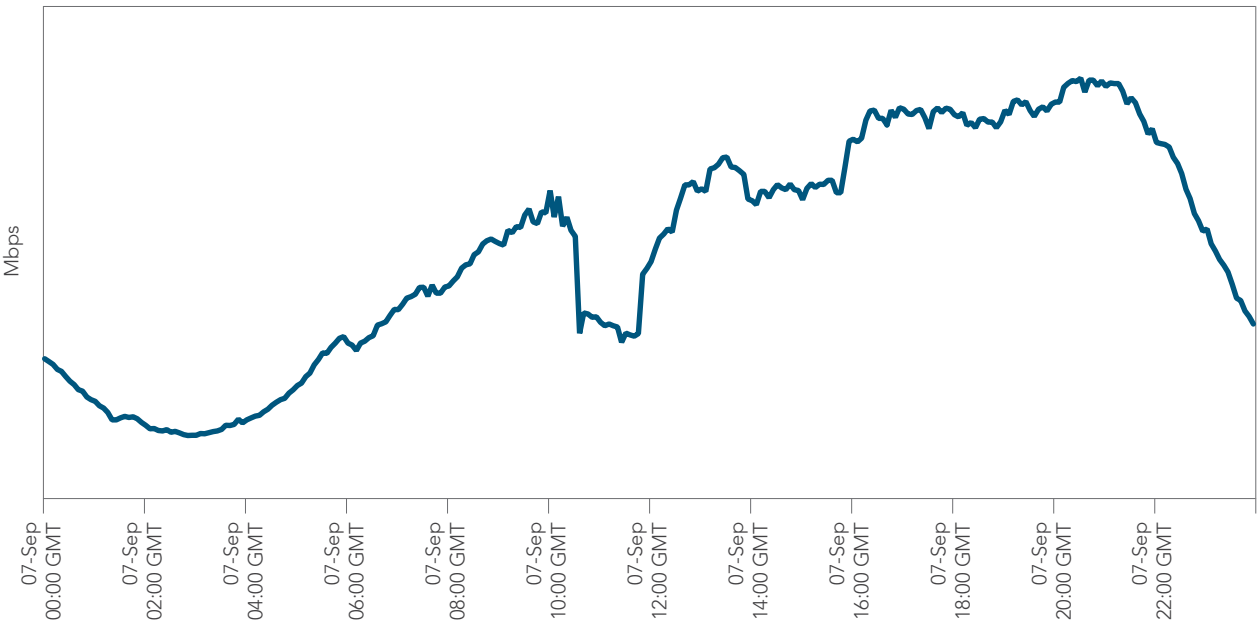

Figure 40: Akamai Traffic Served to Iraq, September 7, 2015

Region	Unique IPv4 Addresses	Average Connection Speed (Mbps)	Average Peak Connection Speed (Mbps)	% Above 4 Mbps	% Above 10 Mbps	% Above 15 Mbps
AMERICAS						
Argentina	8,246,899	4.2	26.9	39%	3.1%	0.5%
Bolivia	299,618	1.8	13.9	2.8%	0.2%	0.1%
Brazil	47,182,078	3.6	29.0	32%	2.2%	0.6%
Canada	14,772,943	11.9	52.4	87%	43%	21%
Chile	4,200,415	5.7	42.0	62%	7.1%	1.6%
Colombia	11,319,242	4.2	28.1	48%	1.7%	0.4%
Costa Rica	492,369	3.2	16.4	20%	1.1%	0.5%
Ecuador	958,360	4.1	25.5	36%	2.5%	0.6%
Mexico	13,948,820	5.5	27.3	64%	6.4%	1.7%
Panama	502,490	3.5	16.9	33%	1.5%	0.4%
Paraguay	206,162	1.5	13.4	2.1%	0.1%	0.1%
Peru	1,046,249	4.4	30.4	46%	2.9%	0.6%
United States	147,911,430	12.6	57.3	80%	46%	24%
Uruguay	988,922	5.9	60.2	68%	7.7%	1.6%
Venezuela	4,199,298	1.5	11.8	2.1%	0.2%	0.1%
ASIA PACIFIC						
Australia	9,746,046	7.8	41.9	72%	18%	7.4%
China	126,077,926	3.7	23.1	33%	1.6%	0.3%
Hong Kong	3,194,113	15.8	101.1	92%	59%	36%
India	17,901,010	2.5	18.7	14%	2.3%	0.8%
Indonesia	3,589,975	3.0	31.0	17%	0.9%	0.4%
Japan	46,074,201	15.0	78.4	90%	54%	32%
Malaysia	2,048,354	4.9	38.3	52%	4.0%	0.9%
New Zealand	2,075,373	8.7	42.0	87%	22%	8.2%
Philippines	1,354,527	2.8	25.3	10%	0.9%	0.3%
Singapore	1,783,055	12.5	135.4	87%	51%	27%
South Korea	23,871,054	20.5	86.6	96%	68%	45%
Sri Lanka	227,183	5.1	33.5	76%	2.2%	0.6%
Taiwan	10,532,581	10.1	77.9	88%	29%	13%
Thailand	3,431,736	8.2	58.3	93%	18%	5.8%
Vietnam	6,002,849	3.4	25.5	31%	0.6%	0.1%
EUROPE, MIDDLE EAST & AFRICA						
Austria	3,079,414	11.4	44.0	90%	33%	17%
Belgium	5,015,037	12.8	59.3	91%	52%	26%
Czech Republic	2,034,071	14.5	50.9	86%	46%	27%
Denmark	3,088,033	14.0	50.1	94%	51%	29%
Finland	2,736,858	14.8	57.4	91%	51%	28%
France	29,402,991	8.2	38.9	74%	21%	8.7%
Germany	36,285,678	11.5	49.2	87%	37%	19%
Hungary	2,908,776	10.7	53.9	90%	36%	18%
Ireland	2,050,340	12.4	52.0	76%	41%	23%
Israel	2,341,523	11.2	70.0	94%	36%	14%
Italy	17,000,053	6.5	30.1	71%	9.2%	3.4%
Netherlands	9,252,445	15.6	63.5	95%	60%	34%
Norway	3,739,469	16.4	55.9	88%	54%	37%
Poland	7,802,248	10.6	45.6	88%	34%	17%
Portugal	3,627,284	10.6	47.9	85%	37%	19%
Romania	3,311,053	13.1	72.9	94%	57%	27%
Russia	19,006,645	10.2	57.9	87%	38%	15%
Slovakia	1,001,142	11.2	49.0	85%	28%	17%
South Africa	5,965,058	3.7	18.9	22%	2.9%	1.7%
Spain	14,887,820	10.4	53.5	85%	34%	17%
Sweden	6,185,906	17.4	69.0	92%	55%	38%
Switzerland	3,775,098	16.2	62.6	93%	61%	36%
Turkey	8,948,547	6.2	38.5	77%	7.6%	2.9%
United Arab Emirates	1,402,074	6.8	45.8	85%	10%	2.3%
United Kingdom	30,979,247	13.0	54.2	87%	46%	28%

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Editor
David Belson

Design
Shawn Doughty, Creative Direction
Brendan O'Hara, Art Direction/Design

Contact
stateoftheinternet@akamai.com
Twitter: @akamai_soti / @akamai
www.stateoftheinternet.com

Contributors
Jon Thompson
Jennifer Sun
Richard Möller (Ericsson)
Mathias Sintorn (Ericsson)
Geoff Huston (APNIC)

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