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BACK IN 2008 (EIGHT YEARS AGO — AN AGE IN INTERNET TIME), WE PUBLISHED THE FIRST issue of the *State of the Internet Report*. Initially intended as a vehicle for sharing some of Akamai's unique Internet insights with the broader community, the report has become a de facto reference on Internet connection speeds at a state, national, and international level. Over this last year, data from the report has been featured in a *Time Magazine* sidebar and a *USA Today* Snapshot as well as referenced in numerous blog posts and news articles. It has also been cited by broadband advocates and legislators around the world.

In my Letter From The Editor a year ago, I talked about our goals for the report in 2015, including the launch of a media-focused report, adding IPv6 connection speed metrics, and enhancing the RUM data included in the report. Unfortunately, we fell short on accomplishing these goals, but they remain on our to-do list going forward. In fact, we expect to be able to start looking at connection speeds for IPv6 starting in the *First Quarter, 2016 State of the Internet Report*.

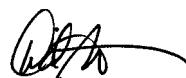
Also starting in next quarter's report, we expect to start shifting away from average connection speed as a primary metric, with the goal of providing a more representative view of end-user experience. More details, and previews of the data, will be provided in upcoming blog posts. We're looking forward to exploring this data in more detail as well as exploring the speed differences between IPv6 and IPv4 connections and what the impact of these differences may be.

Readers of the *State of the Internet Report* have likely noted the absence of mobile connection speed and mobile browser usage data in the report over the last couple of quarters. We're happy to announce that these data sets have returned in this issue, leveraging improved mobile network identification algorithms. In fact, this quarter's mobile connectivity data includes ten more countries than the last time it appeared (in the *First Quarter, 2015 State of the Internet Report*). However, it's worth noting that even with an improved ability to identify connections coming from mobile network providers, the active use of proxies within many of these providers influences the measured speeds. This is discussed in more detail in Section 7.

Finally, as I frequently note when talking to the press about the results covered within the report each quarter, it is the longer-term (year-over-year and multi-year) trends that are the most important data to focus on. These trends are more indicative of actual progress around improved performance than any observed quarter-to-quarter differences.

For readers that want to consume the *State of the Internet Report* on a tablet or e-reader device, we are now making the report available for download from online bookstores including [amazon.com](http://amazon.com), [Barnes & Noble](http://Barnes&Noble), [Google Play](http://Google Play), [Apple iBooks](http://Apple iBooks), and [Kobo](http://Kobo). Specific download links can be found at <https://www.stateoftheinternet.com/>, and we encourage you to leave positive reviews of the report at your online bookstore of choice.

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](mailto:stateoftheinternet@akamai.com) or on Twitter at [@akamai\\_soti](https://twitter.com/@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 fourth 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, mobile browser usage trends, 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 fourth quarter of 2015, Akamai observed a 0.2% quarterly increase in the number of unique IPv4 addresses connecting to the Akamai Intelligent Platform, growing to over 810 million—about 1.7 million more than were seen in the third quarter of 2015. Belgium remained the clear global leader in IPv6 adoption with 37% of its connections to Akamai occurring over IPv6, up 6.2% from the previous quarter. The global average connection speed increased 8.6% quarter over quarter to 5.6 Mbps, while the global average peak connection speed increased 1.0% to 32.5 Mbps. At a country/region level, South Korea continued to have the highest average connection speed in the world at 26.7 Mbps, a 30% gain over the third quarter, while Singapore maintained its position as the country with the highest average peak connection speed at 135.7 Mbps, a 0.2% quarterly increase.

Globally, 4 Mbps broadband adoption came in at 69%, up 5.8% from the third quarter, with South Korea as the country with the highest level of adoption at 97%. Unsurprisingly, South Korea once again led the world across the 10 Mbps, 15 Mbps, and 25 Mbps broadband tiers as well, with adoption rates of 81%, 63%, and 37% respectively, after seeing substantial quarterly gains across all three metrics. Global 10 Mbps, 15 Mbps, and 25 Mbps adoption also grew robustly in the fourth quarter, posting gains of 15%, 28%, and 37% at each threshold and reaching adoption levels of 32%, 19%, and 7.1% respectively.

**MOBILE CONNECTIVITY** / Average mobile connection speeds (aggregated at a country/region level) ranged from a high of 26.8 Mbps in the United Kingdom to a low of 1.3 Mbps in Iran in the fourth quarter, while average peak mobile connection speeds ranged from 153.3 Mbps in Australia to 7.4 Mbps in Iran. Finland and Australia led the world in terms of 4 Mbps broadband adoption levels for mobile connectivity, as both countries saw 99% of unique IP addresses from mobile providers connect to Akamai at average speeds above this threshold. On the other end of the spectrum, three countries—Iran, Kazakhstan, and Venezuela—each had less than 1% of IP addresses connecting at those speeds. Based on traffic data collected by Ericsson, the volume of mobile data traffic grew by 12% between the third and fourth quarters of 2015.

Analysis of Akamai IoT data collected during the fourth quarter from a sample of requests to the Akamai Intelligent Platform™ indicates that for traffic from mobile devices on cellular networks, Apple Mobile Safari accounted for roughly 38% of requests, while Android Webkit and Chrome Mobile (the two primary Android browser bases) accounted for 21% and 32% of requests respectively—giving a total of 53% for the Android platform. For traffic from mobile devices across all networks, Apple Mobile Safari was responsible for close to 47% of requests, while Android Webkit and Chrome Mobile made up approximately 21% and 27% of requests respectively, for a total of 48%.





# [SECTION]<sup>1</sup> 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 fourth quarter of 2015, over 810 million unique IPv4 addresses from 243 unique countries/regions connected to the Akamai Intelligent Platform. This is a 0.9% increase in the number of unique IPv4 addresses seen by Akamai as compared with the fourth quarter of 2014 and a 0.2% increase from the number seen in the third 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** / The number of unique IPv4 addresses worldwide connecting to Akamai increased by about 1.7 million in the fourth quarter of 2015. This modest increase is in line with our expectation that the number of unique global IPv4 addresses seen by Akamai may level off or even 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.

In the fourth quarter, like the third, 8 of the top 10 countries/regions posted a quarterly increase in unique IPv4 counts, as seen in Figure 1. Gains were again modest, ranging from 0.6% in Japan to 2.3% in Russia. The United States and India both saw slight declines from the third quarter, with unique IPv4 counts dropping 3.2% and 1.9% respectively.

Globally, close to 70% of the countries/regions saw a quarter-over-quarter increase in unique IPv4 address counts in the fourth quarter compared with approximately 60% in the third quarter. Forty-three countries/regions saw IPv4 address counts grow 10% or more, while thirteen saw counts decline 10% or more as compared with the previous quarter.

Looking at year-over-year changes among the top 10, South Korea saw the largest increase with a gain of 10%. Japan and the United Kingdom were not far behind, both with annual increases of 9.4%, while the other four gaining countries saw more modest increases. Russia had the smallest increase among the top 10 with a 0.9% yearly gain, while three countries — India, Germany, and the United States — again saw yearly declines, with unique IPv4 counts dropping 3.7%, 4.0%, and 5.4% respectively. As noted previously, the losses seen in these countries are not indicative of long-term declines in Internet usage but are more likely related to changes in IP address management/conservation practices and/or increased IPv6 adoption.

Globally, approximately 70% of the countries/regions had higher unique IPv4 address counts in the fourth quarter compared with one year ago. Yearly growth rates of 100% or more were seen in 13 countries/regions, although 6 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, 28 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 fourth 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<sup>1</sup> collected by Geoff Huston, Chief Scientist at APNIC,<sup>2</sup> 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 fourth quarter of 2015 based on data made available by Mr. Huston. As noted in the *Third Quarter, 2015 State of the Internet Report*, ARIN fully depleted its pool of available addresses after allocating its final IPv4 address block on September 24, 2015. Its available pool remained at zero throughout the fourth quarter. The other four registries all saw an uptick in activity compared with the third quarter. LACNIC handed out more than 650,000 addresses, or roughly 33% of its available pool, and AFRINIC distributed nearly 8 million addresses, or 24% of its available pool. RIPE and APNIC handed out roughly 900,000 and 670,000 addresses respectively, representing about 6% of each of their available pools. With just under 33 million addresses available at the end of the fourth quarter, AFRINIC was the RIR with the most substantial pool.

	Country/Region	Q4 2015 Unique IPv4 Addresses	QoQ Change	YoY Change
-	Global	810,235,006	0.2%	0.9%
1	United States	143,153,801	-3.2%	-5.4%
2	China	127,187,349	0.9%	1.4%
3	Brazil	47,913,625	1.6%	1.4%
4	Japan	46,336,973	0.6%	9.4%
5	Germany	36,674,664	1.1%	-4.0%
6	United Kingdom	31,632,529	2.1%	9.4%
7	France	29,641,699	0.8%	2.9%
8	South Korea	24,298,862	1.8%	10%
9	Russia	19,443,307	2.3%	0.9%
10	India	17,568,808	-1.9%	-3.7%

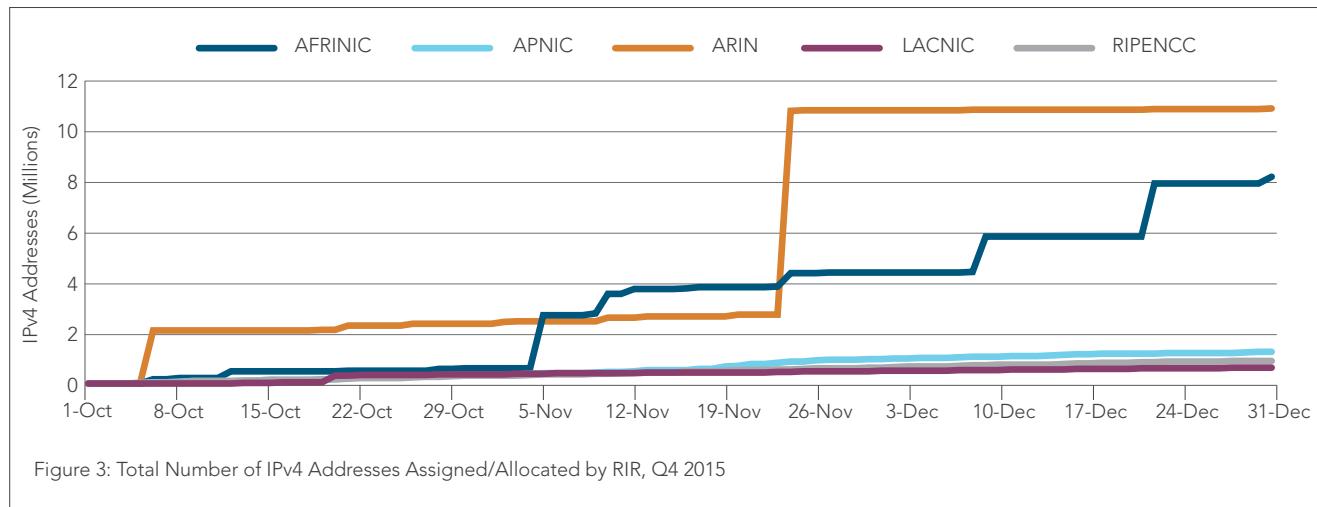
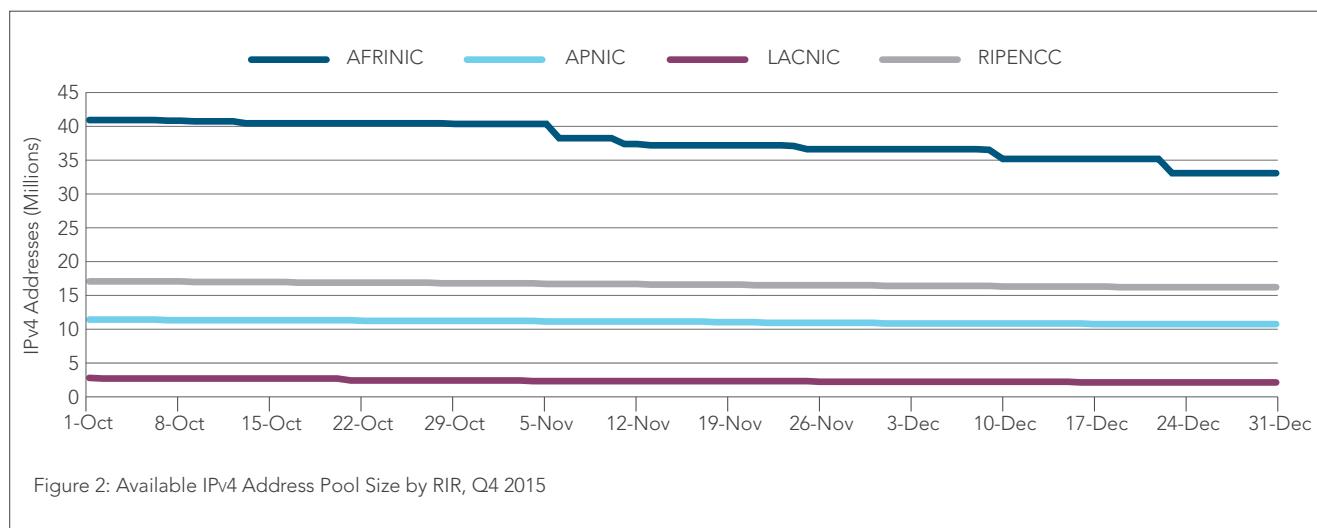
Figure 1: Unique IPv4 Addresses Seen by Akamai

of IPv4 addresses remaining. Its remaining addresses represent less than 30% of its original available pool.<sup>3</sup> At the end of the fourth quarter, RIPE and APNIC had roughly 16 million and 11 million available IPs respectively, and LACNIC, with the smallest remaining pool, had just under 2 million available addresses remaining.

Figure 3 illustrates the IPv4 allocation/assignment activity across each of the RIRs during the fourth quarter of 2015. Overall, there was an increase in activity, as 21.9 million addresses were assigned/allocated in the fourth quarter compared with 18.5 million in the third quarter. It is important to note, however, that like the third quarter, the majority of these transactions—including ARIN’s assignment/allocation of 10.9 million addresses—are likely to have been third-party transfers instead of direct RIR allocations.

In particular, ARIN appeared to see significant activity in the fourth quarter despite having no addresses left in its available pool. The largest transaction occurred on November 24, when a sizeable group of IP addresses—consisting of two /11s, a /12, two /13s, four /14s, and several smaller IP address blocks—was assigned to Microsoft Corporation.<sup>4</sup> The second-largest transaction occurred

on October 6, when a /11 was allocated to Ford Motor Company.<sup>5</sup> This transaction is interesting as Ford is an automaker, not an Internet or telecommunications company—it is perhaps an indication of the increasing connectivity that is coming to cars in the near future.<sup>6</sup> While ARIN is officially out of available addresses, 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. However, the large transactions we see here, that on the surface appear to be ARIN allocations, are most likely IP block transfers between third-party companies. As noted in previous *State of the Internet Reports*, when a third-party address block transfer takes place, the source organization’s resources are first returned to ARIN and then, within hours, reissued 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). 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.



APNIC, RIPE, and LACNIC all saw slow, consistent delegation activity once again in the fourth quarter, with no specific days seeing unusually sizeable allocations. Among these three RIRs, the two largest allocations in the fourth quarter were /15 blocks, both allocated by LACNIC on October 20 to Brazilian telecommunications company Embratel.<sup>7</sup> At AFRINIC, the two largest delegations during the fourth quarter were /11s, allocated to Vodafone Egypt<sup>8</sup> and Cloud Innovation<sup>9</sup>—a Seychelles corporation associated with the Netherlands-based ISP Outside Heaven—on November 5 and December 22 respectively. Other sizeable allocations during the quarter include two /13s and a /14 allocated to South African ISP MWEB<sup>10</sup> on December 9, a /13 allocated to Egyptian mobile provider Mobinil<sup>11</sup> on November 24, and three /14s allocated one each to telecommunications companies Airtel Ghana<sup>12</sup>, Ooredoo Tunisia<sup>13</sup>, and MTN Côte d'Ivoire<sup>14</sup> on November 10.

**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 from 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 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 a number of 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 fourth 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 fourth quarter. Ecuador, France, and Malaysia joined the top 10 with quarter-over-quarter increases of 56%, 113%, and 13% respectively. Belgium again maintained a clear global lead with 37% of content requests being made over IPv6, a 6.2% gain over the third quarter. Other increases ranged from 1.8% in Peru to 45% in Greece. Among the top 10, only the United States saw a quarterly decline with 9.4% fewer requests made to Akamai over IPv6 in comparison with the third quarter. In contrast, during the previous quarter, half the top 10 countries/regions saw quarterly declines.

Figure 5 lists the top 20 network providers by the number of IPv6 requests made to Akamai during the fourth quarter. Once again, cable and wireless/mobile providers continued to drive the

	Country/Region	Q4 2015 IPv6 Traffic %	QoQ Change
1	Belgium	37%	6.2%
2	Switzerland	21%	3.6%
3	Greece	20%	45%
4	Portugal	20%	28%
5	Germany	19%	14%
6	Peru	18%	1.8%
7	United States	17%	-9.4%
8	Ecuador	11%	56
9	France	11%	113%
10	Malaysia	8.8%	13%

Figure 4: IPv6 Traffic Percentage, Top Countries/Regions

largest volumes of IPv6 requests, as many are leading the way for IPv6 adoption in their respective countries. In the fourth quarter, Verizon Wireless and Belgium's Telenet once again led the pack as the only two network providers with more than half of their requests to Akamai made over IPv6. Verizon's percentage decreased from 72% in the third quarter to 67% in the fourth, while Telenet's stayed steady at 53%. Just as in the third quarter, 9 providers in the top 20 had at least one in four content requests to Akamai take place over IPv6. Eighteen of the top twenty—down from all twenty in the previous quarter—had at least 10% of their requests to Akamai occur over IPv6.

IPv6 deployments continued to grow among providers worldwide. For example, Canadian provider Telus began its IPv6 rollout in the latter part of 2015 and by the fourth quarter, already saw 39% of requests to Akamai coming in over IPv6. Similarly, Sky started to aggressively deploy IPv6 towards the end of the third quarter and was a key contributor to the IPv6 adoption levels seen in the United Kingdom in the fourth quarter. Other deployments and developments are noted in the World IPv6 Launch blog (<http://www.worldipv6launch.org/blog/>).

Country/Region	Network Provider	Q4 2015 IPv6 Traffic %
United States	Comcast Cable	38%
United States	AT&T	38%
Brazil	NET Serviços de Comunicação S.A.	13%
United States	Time Warner Cable	18%
Brazil	Global Village Telecom	12%
Peru	Telefonica Del Peru	22%
United States	Verizon Wireless	67%
Malaysia	Telekom Malaysia	15%
France	Proxad/Free	24%
Germany	Deutsche Telekom	26%
United States	T-Mobile	44%
Pan-European	Liberty Global B.V. (UPC)	15%
Ecuador	CNT Ecuador	24%
Canada	Telus Corporation	39%
Japan	KDDI Corporation	28%
South Korea	SK Telecom	19%
Germany	Kabel Deutschland	49%
United Kingdom	Sky	9.3%
Belgium	TELENET	53%
Brazil	Telefonica Data S.A.	1.8%

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





# [SECTION]<sup>2</sup> GEOGRAPHY GLOBAL

The data presented within this section was collected during the fourth 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, *State of the Internet* reports 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.<sup>15</sup> Given this new standard, beginning with 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 fourth 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 reports, which did not have the cloud hosting provider traffic removed.

**2.1 GLOBAL AVERAGE CONNECTION SPEEDS** / In the fourth quarter of 2015, the global average connection speed was 5.6 Mbps, an 8.6% increase from the third quarter. In contrast to the mixed changes seen in the previous quarter, in the fourth quarter the top 10 countries/regions all saw gains, as shown in Figure 6. With the largest quarterly gain among the top 10, South Korea remained firmly in the lead globally with an average connection speed of 26.7 Mbps, a 30% increase over the third quarter. The remaining countries/regions saw quarter-over-quarter gains of between 2.8%

	Country/Region	Q4 2015 Avg. Mbps	QoQ Change	YoY Change
-	Global	5.6	8.6%	23%
1	South Korea	26.7	30%	20%
2	Sweden	19.1	9.3%	30%
3	Norway	18.8	14%	65%
4	Japan	17.4	16%	15%
5	Netherlands	17.0	8.7%	20%
6	Hong Kong	16.8	5.9%	-0.4%
7	Latvia	16.7	15%	28%
8	Switzerland	16.7	2.8%	15%
9	Finland	16.6	12%	37%
10	Denmark	16.1	15%	36%

Figure 6: Average Connection Speed by Country/Region

(in Switzerland) and 16% (in Japan) with 6 of the top 10 posting double-digit increases, and a 15% quarterly increase allowed Denmark to edge out the Czech Republic for the number 10 spot. For the first time, average connection speeds among the top 10 countries/regions were all above 15 Mbps. In the third quarter, only 7 of the top 10 had achieved this threshold.

Globally, 131 out of 148 qualifying countries/regions saw quarterly increases in average connection speeds compared with 78 countries/regions in the third quarter. Growth rates ranged from a modest 0.8% in Turkey (to 6.3 Mbps) to a substantial 99% in Kenya (to 5.0 Mbps). Seventy-three countries/regions enjoyed double-digit gains. Quarter-over-quarter losses were seen in 17 qualifying countries/regions compared with 67 countries/regions in the third quarter, and only 4 were double-digit drops. Declines in connection speeds ranged from 0.1% in Iraq (to 3.7 Mbps) to 33% in Uzbekistan (to 2.5 Mbps).

When looking at year-over-year changes, 9 of the top 10 countries/regions saw increases in the fourth quarter—all of which were double-digit—while Hong Kong saw a modest 0.4% decline. Yearly gains were stronger than in the previous quarter, ranging from 15% in Japan and Switzerland to 65% in Norway. On a global basis, the average connection speed increased 23% year over year in the fourth quarter as compared with 14% in the third quarter. Increases were seen in 138 qualifying countries with growth rates ranging from 0.3% in New Caledonia (to 4.8 Mbps) to 254% in Kenya. The only other country to see average connection speeds more than double from the previous year was Indonesia, with a 109% yearly increase to 3.9 Mbps. Yearly declines were seen in 10 countries/regions, with declines ranging from 0.4% in Hong Kong to 36% in Syria (to 1.2 Mbps).

Yemen saw its average connection speed rise 10% to 1.0 Mbps in the fourth quarter, leaving Libya as the only qualifying country/region with an average connection speed below 1.0 Mbps. As noted in last quarter’s *State of the Internet Report*, this may change in the not-too-distant future as the Libyan government has announced major initiatives with the goal of connecting every home and office in the country to high-speed Internet.<sup>16</sup>

Not directly represented in this data is the fact that there are still many regions of the world with little or no broadband connectivity to the Internet. As mentioned in the previous *State of the Internet Report*, some organizations, including Google and Facebook, have ambitious plans to try to bring connectivity to those parts of the globe through creative means including high-altitude balloons, solar-powered drones, and high-endurance aircraft. In the fourth quarter, Google and Facebook both highlighted current work they are doing to bring Internet access to parts of Africa through more traditional means. Google revealed that its Project Link initiative—which builds out fiber backbone networks in underserved areas—was in the process of laying fiber to serve the cities of Accra and Kumasi in Ghana,<sup>17</sup> while Facebook’s Internet.org announced a partnership with Eutelsat, a French satellite provider, to bring free Internet access to sub-Saharan Africa starting in the second half of 2016.<sup>18</sup>

**2.2 GLOBAL AVERAGE PEAK CONNECTION SPEEDS** / After seeing a 0.9% decline in the third quarter, the global average peak connection speed increased a modest 1.0% to 32.5 Mbps in the fourth quarter, as shown in Figure 7. Among the countries/regions in the top 10, average peak speeds increased across the board, though the gains were relatively modest with the exception of Indonesia, which saw average peak connection speeds rise a tremendous 157% over the previous quarter. This massive improvement is likely due to additional Akamai server deployments at a leading network provider within the country. The remaining countries/regions in the top 10 saw more moderate increases, ranging from 0.2% in Singapore to 13% in Macao. Singapore retained its position as the country/region with the highest average peak connection speed at 135.7 Mbps in the fourth quarter, while Israel and Sweden dropped out of the top 10, with Indonesia and Mongolia taking their places. (Mongolia did not qualify for inclusion in the third quarter because it did not meet the threshold of 25,000 unique IPs connecting to Akamai.) For the first time, all of the top 10—and a total of 13—qualifying countries/regions worldwide saw average peak speeds of at least 70 Mbps compared with just 9 countries/regions in the third quarter.

On a global basis, 115 of the 148 qualifying countries/regions saw quarterly increases in average peak connection speeds compared with 93 in the previous quarter. Growth rates ranged from 0.2% in Singapore and Nepal (to 21.6 Mbps) as well as Paraguay (to 13.4 Mbps), to 157% in Indonesia. Kenya and Botswana also more than doubled their average peak connection speeds, seeing increases of 136% (to 32.2 Mbps) and 105% (to 18.2 Mbps) respectively. El Salvador saw a 99% increase to 32.8 Mbps, and 29 additional countries/regions also posted double-digit growth. Thirty-three qualifying countries/regions saw lower average peak connection speeds in the fourth quarter with losses ranging from 0.4% in Macedonia (to 35.3 Mbps) to 38% in Uzbekistan (to 22.9 Mbps).

Looking at year-over-year numbers, average peak connection speeds increased 21% year over year on a global basis. All of the top 10 countries/regions saw increases in average peak connection speeds, with Indonesia leading the pack with a 495% increase.

	Country/Region	Q4 2015 Peak Mbps	QoQ Change	YoY Change
–	Global	32.5	1.0%	21%
1	Singapore	135.7	0.2%	61%
2	Hong Kong	105.2	4.0%	20%
3	South Korea	95.3	10%	26%
4	Macao	83.1	13%	60%
5	Japan	82.9	5.7%	20%
6	Indonesia	79.8	157%	495%
7	Mongolia	78.9	7.5%	97%
8	Taiwan	78.8	1.2%	23%
9	Qatar	77.8	3.5%	24%
10	Romania	73.6	1.0%	9.7%

Figure 7: Average Peak Connection Speed by Country/Region

Remaining gains among the top 10 ranged from 9.7% in Romania to 97% in Mongolia. Across all of the qualifying countries/regions, a total of 134 saw yearly increases in average peak connection speeds as compared with 135 in the previous quarter. Growth ranged from a mere 1.3% in Lithuania (to 49.6 Mbps) to an impressive 450% in Kenya and 495% in Indonesia. A total of 7 qualifying countries/regions saw average peak connection speeds more than double compared with the previous year, while an additional 19 saw speeds increase by at least 50%. Fourteen countries/regions saw a yearly decline in average peak speeds, with Haiti and Ghana again experiencing the largest drops at 77% (to 12.4 Mbps) and 50% (to 9.0 Mbps) respectively.

In the fourth quarter, Libya was the country/region with the lowest average peak connection speed, despite a 7.8% quarterly increase to 7.8 Mbps. Tanzania, the country/region in the bottom spot last quarter, saw a 54% gain in the fourth quarter to 11.1 Mbps. A total of four countries, all in Africa, saw average peak connection speeds below 10 Mbps in the fourth quarter, down from six countries in the previous quarter.

**2.3 GLOBAL 4 MBPS BROADBAND ADOPTION** / In the fourth quarter, the global percentage of unique IP addresses connecting to Akamai that met the 4 Mbps broadband speed threshold increased by 5.8% to 69%. As shown in Figure 8, among the top 10 countries/regions, quarterly changes were muted but mostly positive, with only Bulgaria posing a 1.4% loss. Gains ranged from 0.1% in Israel to 2.7% in Thailand. Seeing a 2.6% quarterly decline to 91% adoption, Romania dropped out of the top 10, making room for Hong Kong to join. South Korea led the world in 4 Mbps adoption, with 97% of its unique IP addresses connecting to Akamai at average speeds exceeding the threshold. The other countries/regions in the top 10 remained 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 third quarter.

Globally, a total of 110 countries/regions qualified for inclusion for this metric, up from 108 in the previous quarter. Ninety-nine of them saw quarterly growth in 4 Mbps broadband adoption rates, up from fifty-six in the previous quarter. Increases ranged from 0.1% in Israel and New Zealand (to adoption rates of 94% and 85% respectively) to 232% in Kenya (to an adoption rate of 61%). Three more countries—El Salvador, Indonesia, and Morocco—also saw 4 Mbps broadband adoption rates more than double in the fourth quarter with gains of 127% (to 24% adoption), 107% (to 36% adoption), and 102% (to 24% adoption) respectively. Quarter-over-quarter declines were seen in just 11 qualifying countries/regions compared with 50 in the third quarter. Decreases ranged from 0.1% in Luxembourg (to 88% adoption) to 65% in Jordan (to 13% adoption).

Year over year, the percentage of unique IP addresses connecting to Akamai at average speeds of at least 4 Mbps increased by 17%, 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 Bulgaria, which saw a 1.2%

decline. Like the second and third quarters, yearly increases were fairly muted, ranging from 0.8% in Switzerland to 10% in Malta and Thailand.

Across the globe, 102 of the qualifying countries/regions saw 4 Mbps broadband adoption levels increase year over year compared with 96 in the previous quarter. Growth rates ranged from 0.8% in Switzerland to an incredible 2454% in Kenya. Indonesia saw the second-largest annual increase at 688%, while 13 additional countries/regions posted 4 Mbps adoption rate gains of 100% or more. Eight countries/regions saw adoption rates fall with declines ranging from 1.1% in Montenegro (to 55% adoption) to 39% in Nigeria (to 14% adoption).

In the fourth quarter, Egypt again remained the country with the lowest level of 4 Mbps broadband adoption despite a 27% quarterly gain to 1.7% adoption. Algeria, Pakistan, and Venezuela rounded out the bottom four, as all three countries posted adoption rates of less than 3%.

The United Kingdom is not currently in the top 10 for 4 Mbps broadband adoption, ranking twenty-sixth worldwide with an 89% adoption rate. In November, Prime Minister David Cameron called Internet access a fundamental universal right—promising all U.K. residents the legal right to affordable access at speeds of at least 10 Mbps by 2020.<sup>19</sup> If he is able to follow through on this promise, we may see the U.K. move up in ranking over the coming years. On the other hand, a recent Pew Research Center survey suggests home broadband adoption in the United States may be plateauing. Published in December, the survey found that fewer U.S. homes—particularly among rural and lower-income areas—had broadband in 2015 compared with 2013, with more Americans opting for smartphone-only Internet access.<sup>20</sup> It remains to be seen whether this trend will continue in light of recent governmental pushes towards providing more universal broadband accessibility.

At the lower end of the spectrum, Indonesia saw vast improvements in broadband adoption levels and speeds during the fourth quarter as well as over the past year, but two-thirds of its citizens are still not connected to the Internet. However, in October, Google, as part of its Project Loon initiative, announced a partnership with three large Indonesian telecom companies—Telkomsel, XL Axiata, and Indosat—to test balloon-delivered Internet beginning in 2016, with the goal of bringing Internet access with download speeds of up to 10 Mbps to even the remotest parts of the 17,000-island country.<sup>21</sup>

**2.4 GLOBAL 10 MBPS BROADBAND ADOPTION /** As seen in Figure 9, in the fourth quarter, 32% of unique IP addresses globally connected to Akamai at average speeds above 10 Mbps, a 15% increase over the previous quarter. In contrast to the mixed changes seen in the past two quarters, all of the top 10 countries/regions saw increases in adoption rates in the fourth quarter. South Korea had the largest quarterly gain at 19%, further solidifying its first-place standing with an adoption rate of 81%—a full 17 percentage points higher than the second-place Netherlands. Switzerland had the smallest quarterly gain at 2.6%, falling from second to fourth place in the fourth quarter. With a 6.8% quarterly decline, Romania dropped from the top 10, while Denmark's 18% quarterly gain allowed it to join.

Seventy-six countries/regions qualified for this metric in the fourth quarter, up from seventy-one in the third. Among these, 75 saw quarter-over-quarter increases compared with just 41 in the third quarter. Gains ranged from 0.9% in Ireland (to 41% adoption) to 511% in Kenya (to 3.8% adoption), with four countries/regions seeing adoption rates more than double compared with the third quarter. Romania was the only country to see a quarterly decline as its 10 Mbps adoption rate fell to 53%.

Looking at year-over-year changes, there was a 34% increase globally in the percentage of unique IP addresses connecting to Akamai at average speeds above 10 Mbps. All of the top 10 countries/regions enjoyed yearly growth in adoption rates, ranging from 1.7% in Hong Kong to 75% in Norway. Across the globe, 70 qualifying countries/

	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
-	Global	69%	5.8%	17%
1	South Korea	97%	1.2%	1.3%
2	Netherlands	96%	0.8%	4.9%
3	Malta	96%	1.7%	10%
4	Thailand	95%	2.7%	10%
5	Isle Of Man	95%	0.9%	6.9%
6	Bulgaria	94%	-1.4%	-1.2%
7	Denmark	94%	0.4%	1.9%
8	Israel	94%	0.1%	1.6%
9	Switzerland	94%	0.5%	0.8%
10	Hong Kong	93%	1.0%	2.3%

Figure 8: 4 Mbps Broadband Adoption by Country/Region

	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
-	Global	32%	15%	34%
1	South Korea	81%	19%	2.2%
2	Netherlands	64%	8.1%	16%
3	Japan	63%	16%	12%
4	Switzerland	62%	2.6%	10%
5	Norway	62%	15%	75%
6	Hong Kong	61%	2.8%	1.7%
7	Belgium	61%	16%	41%
8	Denmark	60%	18%	36%
9	Sweden	60%	7.6%	28%
10	Singapore	59%	16%	47%

Figure 9: 10 Mbps Broadband Adoption by Country/Region

regions saw year-over-year increases in 10 Mbps broadband adoption in the fourth quarter, up from 63 in the third quarter. Hong Kong and South Korea were the only countries/regions to see single-digit growth with gains of 1.7% and 2.2% respectively. On the other hand, 21 countries/regions saw adoption rates more than double year over year, and Kenya led the pack, posting a massive 1749% increase. Six countries/regions saw yearly declines, ranging from Romania's 2.7% decline to Argentina's 40% drop (to 4.4 Mbps).

Vietnam and Indonesia, the two countries with the lowest 10 Mbps broadband adoption rates in the previous quarter, both saw tremendous gains—50% and 82% respectively—in the fourth quarter. However, Vietnam's 1.0% adoption rate still put it in last place among the qualifying countries/regions, while Indonesia edged up to third-from-last place. China held the second-lowest spot globally with a 1.6% adoption rate in the fourth quarter, a modest 1.9% increase from the third quarter.

**2.5 GLOBAL 15 MBPS BROADBAND ADOPTION** / As Figure 10 shows, 19% of unique IP addresses globally connected to Akamai at average connection speeds of 15 Mbps or above in the fourth quarter, up 28% from the third quarter. After four quarters of declines, South Korea posted a large 40% gain in the fourth quarter to solidify its position as the clear leader in 15 Mbps broadband adoption with a 63% adoption rate, while second-place Norway posted an adoption rate of 45%, a 21% increase from the previous quarter. All of the top 10 countries/regions from the third quarter remained in the top 10 for the fourth quarter, and all saw quarterly gains, ranging from Switzerland's 4.0% to South Korea's 40%.

In the fourth quarter, 61 countries/regions qualified for inclusion in this metric, up from 56 in the third quarter. China again had the lowest 15 Mbps broadband adoption rate at 0.3% after an 8.4% quarterly decrease. Colombia, Argentina, and Brazil all had adoption rates below 1.0% as well. Overall, quarterly gains were seen in 60 qualifying countries/regions compared with 43 in the previous quarter. Turkey had the smallest rate of growth at 1.9% (to 3.0% adoption), while Bosnia enjoyed the biggest quarter-over-

quarter increase at 253% (to 6.1% adoption). Réunion and Serbia also more than doubled their 15 Mbps adoption rates compared with the third quarter, achieving 9.5% and 9.3% adoption respectively.

Year over year, the global 15 Mbps adoption rate grew a sizeable 54%, with 9 of the top 10 countries/regions seeing gains. Hong Kong, the only country/region to see adoption decrease, posted a 7.1% year-over-year drop. Norway had the largest yearly increase at 102% while South Korea had the smallest at 3.3%. The seven remaining countries/regions in the top 10 posted double-digit gains.

When looking across all of the qualifying countries, only four countries saw a yearly decrease compared with nine in the third quarter. Losses ranged from 6.5% in Colombia (to 0.5% adoption) to 45% in Argentina (to 0.7% adoption). The remaining countries/regions saw stronger increases overall than those in the third quarter with gains ranging from 3.3% in South Korea to 1074% in Georgia (to 11% adoption). Nineteen countries/regions saw adoption levels more than double year over year in the fourth quarter compared with ten in the third quarter, and an additional eighteen countries/regions saw gains of at least 50%.

**2.6 GLOBAL 25 MBPS BROADBAND ADOPTION** / Globally, 7.1% of unique IP addresses connected to Akamai at average connection speeds of at least 25 Mbps—a sizeable 37% increase over the previous quarter, as shown in Figure 11. All of the top 10 countries/regions enjoyed healthy quarterly gains in adoption rates, ranging from 9.8% in Hong Kong to 55% in South Korea—which cemented its top spot again with a 37% adoption rate, 14 percentage points above second-place Sweden. The relatively modest 6.7% and 16% gains of Switzerland and the Czech Republic were not enough to keep them in the top 10 in the fourth quarter, as Denmark and Lithuania took their spots with quarterly increases of 47% and 41%, respectively. Nine of the top ten countries/regions had 25 Mbps adoption rates of at least 15%, up from just three in the third quarter.

In the fourth quarter, 47 countries/regions qualified for inclusion in this metric, up from 44 in the third. All but three of them saw quarterly gains in adoption, ranging from 5.5% in Australia (to 2.6% adoption) to 294% in Réunion (to 3.6% adoption). Taiwan and Serbia also more than doubled their adoption rates with quarterly gains of 106% and 121% to adoption levels of 9.4% and 1.9% respectively. China, which enjoyed the largest third-quarter growth, saw the largest drop in the fourth quarter, with adoption falling 27% to less than 0.1%. Turkey and South Africa were the other two countries to see a decline, posting modest losses of 6.0% (to 0.9% adoption) and 1.8% (also to 0.9% adoption).

Year over year, the global 25 Mbps broadband adoption rate increased by a sizeable 74%. Hong Kong was the only top 10 country/region across all 47 qualifying countries/regions to see a yearly decline, losing 13%. Gains among the remaining 9 countries in the top 10 were healthy, ranging from 23% in South Korea to 188% in Denmark. Across the remaining qualifying countries/regions, Réunion and Turkey posted slight gains of 2.2% and 4.3% respectively, while the rest all saw gains of more than 20%. Twenty

	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
-	Global	19%	28%	54%
1	South Korea	63%	40%	3.3%
2	Norway	45%	21%	102%
3	Sweden	42%	11%	36%
4	Japan	40%	27%	20%
5	Netherlands	39%	16%	31%
6	Hong Kong	38%	5.8%	-7.1%
7	Denmark	38%	31%	80%
8	Switzerland	38%	4.0%	24%
9	Latvia	37%	17%	26%
10	Finland	34%	22%	61%

Figure 10: 15 Mbps Broadband Adoption by Country/Region

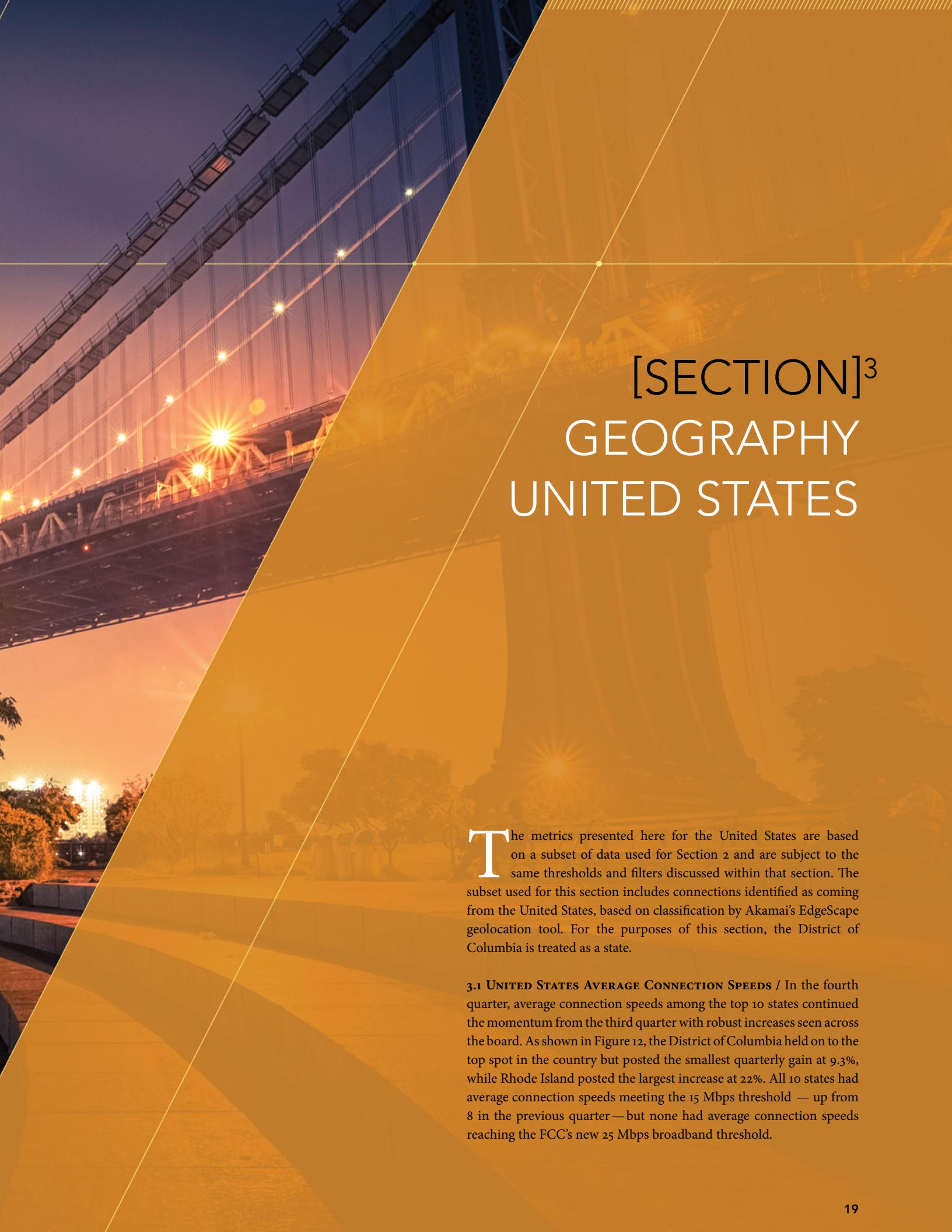
countries more than doubled their 25 Mbps adoption rates in comparison with the fourth quarter of 2014, led by Portugal with a 441% increase (to 9.0% adoption). As noted in the third quarter report, Portugal has seen a surge in fiber-to-the-home connections in recent quarters, which likely contributed to its healthy gains in this high-speed metric.<sup>22</sup>

	Country/Region	% Above 25 Mbps	QoQ Change	YoY Change
-	Global	7.1%	37%	74%
1	South Korea	37%	55%	23%
2	Sweden	23%	20%	62%
3	Norway	21%	28%	165%
4	Latvia	18%	33%	69%
5	Japan	17%	33%	28%
6	Finland	16%	29%	84%
7	Hong Kong	15%	9.8%	-13%
8	Denmark	15%	47%	188%
9	Netherlands	15%	23%	77%
10	Lithuania	14%	41%	60%

Figure 11: 25 Mbps Broadband Adoption by Country/Region







# [SECTION]<sup>3</sup>

## GEOGRAPHY

### UNITED STATES

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 fourth quarter, average connection speeds among the top 10 states continued the momentum from the third quarter with robust increases seen across the board. As shown in Figure 12, the District of Columbia held on to the top spot in the country but posted the smallest quarterly gain at 9.3%, while Rhode Island posted the largest increase at 22%. All 10 states had average connection speeds meeting the 15 Mbps threshold — up from 8 in the previous quarter—but none had average connection speeds reaching the FCC's new 25 Mbps broadband threshold.

	State	Q4 2015 Avg. Mbps	QoQ Change	YoY Change
1	District Of Columbia	21.3	9.3%	48%
2	Delaware	20.4	11%	24%
3	Rhode Island	19.1	22%	35%
4	Massachusetts	18.6	14%	31%
5	Utah	17.9	10%	28%
6	Maryland	17.6	17%	47%
7	New Jersey	17.3	15%	42%
8	Virginia	17.2	15%	-3.1%
9	New York	16.8	13%	33%
10	Washington	16.7	10%	25%

Figure 12: Average Connection Speed by State

Looking across all 51 states, 49 saw average connection speeds above the 10 Mbps threshold compared with 44 in the third quarter. Kentucky and Alaska—the two states with the slowest speeds—were not far behind the rest, both seeing average connection speeds of 9.8 Mbps after quarterly increases of 13% and 15% respectively. All 51 states saw quarterly increases in average connection speeds compared with 49 in the previous quarter, and gains were significantly stronger than in the third quarter, ranging from 8.3% in Iowa (to 11.5 Mbps) to 22% in Rhode Island, with 45 states seeing double-digit gains.

On a year-over-year basis, Virginia saw a small decline of 3.1% while the remaining 50 states enjoyed robust, double-digit gains in average connection speeds compared with the fourth quarter of 2014. Oregon had the smallest increase in the nation at 16% (to 14.9 Mbps) while the District of Columbia had the largest at 48%. Twenty-five states saw gains of at least 30% compared with the previous year.

**3.2 UNITED STATES AVERAGE PEAK CONNECTION SPEEDS** / In the fourth quarter, 9 of the top 10 states saw increases in average peak connection speeds, although gains were smaller than in the third quarter. As seen in Figure 13, Delaware held on to the top spot in the country but posted the smallest gain in the top 10 at 2.0%, while Maryland posted the largest gain at 9.5%. Among the top 10, as well as the rest of the country, Utah was the only state to see a decline, with its average peak connection speed dropping 1.5% relative to the third quarter. The remaining 50 states saw more modest growth than in the third quarter with gains ranging from a mere 0.7% in Nevada (to 62.4 Mbps) to a modest 13% in Vermont (to 62.6 Mbps). Only 4 states posted double-digit growth rates, compared with 25 in the previous quarter.

Year-over-year changes were positive across all 51 states, with Virginia seeing the smallest increase in the country (and among the top 10) at 5.4%. The remaining 50 states all enjoyed double-digit

	State	Q4 2015 Peak Mbps	QoQ Change	YoY Change
1	Delaware	88.3	2.0%	17%
2	District Of Columbia	82.5	2.9%	25%
3	Massachusetts	81.2	7.2%	24%
4	Maryland	79.8	9.5%	38%
5	Rhode Island	79.1	5.5%	22%
6	Virginia	77.5	7.5%	5.4%
7	New Jersey	77.3	8.2%	30%
8	Utah	74.6	-1.5%	24%
9	Washington	73.8	6.8%	28%
10	New York	72.7	5.9%	22%

Figure 13: Average Peak Connection Speed by State

growth, led by Hawaii and Maryland with 38% increases compared with the fourth quarter of 2014, achieving average peak connection speeds of 59.1 Mbps and 79.8 Mbps respectively.

Despite a 5.3% quarterly gain, Kentucky once again held the spot for lowest average peak connection speed in the country at 40.2 Mbps. Arkansas remained in the second-to-last spot with a 3.8% quarterly gain to 42.5 Mbps.

Continuing the trend we have seen over the past year, the fourth quarter saw numerous announcements of new gigabit-plus broadband service rollouts across the country. Google Fiber revealed five additional cities under consideration, including Chicago and Los Angeles—the two largest metropolitan areas it has announced to date.<sup>23</sup> Currently, Google Fiber operates in three U.S. cities with six upcoming and eleven under consideration. In December, AT&T, Comcast, and Cox Communications all publicized ambitious plans for their own gigabit services. AT&T announced that it would double the footprint of its GigaPower service by the end of 2016, bringing gigabit service to an additional 38 metropolitan areas.<sup>24</sup> Comcast announced the installation of its first live commercial DOCSIS 3.1 customer equipment in Philadelphia and reaffirmed expectations that its DOCSIS 3.1 technology would enable it to offer gigabit-speed Internet to customers across the U.S. by the end of 2016.<sup>25</sup> Cox Communications launched its G1GABLAST service in Northern Virginia with plans to offer gigabit speeds across all of its markets by the end of 2016.<sup>26</sup> Pushing the speed envelope even further, Rocket Fiber launched its ultrafast broadband service in downtown Detroit, offering speeds of 100 Gbps for businesses and 10 Gbps for residents.<sup>27</sup>

In addition to the commercial announcements, the fourth quarter again saw a number of updates by local governments bringing municipal gigabit services to their communities. Lincoln, Neb. announced a partnership with Allo Communications to bring gigabit Internet to all premises across the city by 2019.<sup>28</sup> Santa Cruz, Calif. showcased plans to build a fiber network at an expected cost of \$45 to \$50 million that would bring gigabit access to every home

and business in town by 2018.<sup>29</sup> New York City saw the installation of its first LinkNYC gigabit Wi-Fi access point in December as part of an initiative to convert 7,500 old pay phone booths across the city into free public gigabit wireless access points. Finally, as the first city to offer municipal gigabit-speed Internet—five years before Google Fiber launched its first city project—Chattanooga, Tenn. announced the rollout of municipal 10 Gbps service available to every residence and business across the city.<sup>30</sup> We expect that the numerous commercial and municipal initiatives announced over the past year will continue to boost average peak connection speeds and broadband adoption metrics across the United States over the upcoming year.

**3.3 UNITED STATES 4 Mbps BROADBAND ADOPTION** / In the fourth quarter, Rhode Island and Delaware again led the country with 4 Mbps broadband adoption rates of 96%, virtually unchanged from the second and third quarters. As seen in Figure 14, fourth-quarter changes among the top 10 states were positive but muted across the board with gains ranging from Rhode Island's 0.5% to Utah's 2.2%. Eight states had 4 Mbps adoption levels of 90% or more compared with five in the third quarter, and Florida and Utah were close behind with adoption rates of 89%. Nationwide, all 51 states saw quarterly growth in adoption rates compared with 45 in the previous quarter, although as in the third quarter, none of the states had double-digit gains. Kansas saw the smallest quarter-over-quarter gain at 0.4% (to 83% adoption), while Vermont enjoyed the largest at 6.8% (to 77% adoption).

Yearly changes were positive in 50 of the 51 states in the fourth quarter, while Delaware's adoption rate remained the same compared with one year prior. Within the top 10, Maryland again saw the largest increase in adoption with a gain of 18% year over year, while Hawaii again had the smallest at 3.9%. Across the country, Missouri again enjoyed the largest growth rate at 32% (to 83% adoption), while New Hampshire again saw the smallest at 1.3% (to 86% adoption). In total, 25 states saw double-digit year-over-year increases in 4 Mbps broadband adoption in the fourth quarter, up from 23 states in the third.

	State	% Above 4 Mbps	QoQ Change	YoY Change
1	Rhode Island	96%	0.5%	4.2%
2	Delaware	96%	0.6%	0%
3	New Jersey	93%	0.7%	13%
4	Hawaii	92%	1.2%	3.9%
5	Massachusetts	91%	1.3%	6.0%
6	Maryland	91%	2.0%	18%
7	North Dakota	90%	2.1%	4.6%
8	New York	90%	1.4%	5.3%
9	Florida	89%	1.8%	6.3%
10	Utah	89%	2.2%	8.6%

Figure 14: 4 Mbps Broadband Adoption by State

For the ninth consecutive quarter, West Virginia remained the state with the lowest 4 Mbps broadband adoption rate at 66%—up 3.7% from the previous quarter and up 14% from the fourth quarter of 2014. Arkansas and Iowa shared the next lowest adoption rates in the country at 73%.

In addition to the numerous announcements of ultra-high-speed gigabit-plus services being rolled out in various cities across the United States, the fourth quarter also saw news of the continued push to bring broadband to more remote regions of the country. In October, AT&T announced it was testing its fixed wireless local loop (WLL) technology with residents of Alabama, Georgia, Kansas, and Virginia as part of its work with the Federal Communications Commission's (FCC) Connect America fund—an initiative to bring broadband to underserved areas. The WLL technology is expected to enable Internet access in rural areas at speeds of 15 to 25 Mbps.<sup>31</sup> In addition, based on papers it has filed with the FCC, some are speculating that Google Loon may be looking to test its balloon-powered Internet service in the United States.<sup>32</sup> Meanwhile, in some rural areas, residents are taking it upon themselves to secure Internet access. After getting fed up with slow and unreliable service from their commercial provider—including a 10-day outage when an underwater fiber was cut—a group of neighbors on Orcas Island, Wash., took it upon themselves to design and build their own wireless network that currently serves 50 homes at speeds of 20 to 40 Mbps.<sup>33</sup>

**3.4 UNITED STATES 10 Mbps BROADBAND ADOPTION** / Delaware and Rhode Island again held the top two spots for 10 Mbps broadband adoption with adoption rates of 78% and 77% respectively, as seen in Figure 15. All of the top 10 states enjoyed quarter-over-quarter growth, with stronger gains than those seen in the third quarter. The District of Columbia posted the smallest increase at 6.4%, while New York and Rhode Island enjoyed the largest at 14% each. For the first time, all of the top 10 states had more than 60% of their unique IP addresses connecting to Akamai at average speeds above 10 Mbps compared with just 6 of 10 in the previous quarter.

	State	% Above 10 Mbps	QoQ Change	YoY Change
1	Delaware	78%	9.3%	14%
2	Rhode Island	77%	14%	27%
3	New Jersey	72%	9.2%	37%
4	Massachusetts	71%	11%	21%
5	Maryland	69%	13%	46%
6	New York	66%	14%	32%
7	Virginia	65%	12%	24%
8	District Of Columbia	65%	6.4%	49%
9	Connecticut	62%	10%	19%
10	New Hampshire	62%	10%	13%

Figure 15: 10 Mbps Broadband Adoption by State

Across the nation, all 51 states saw gains in 10 Mbps broadband adoption rates in the fourth quarter compared with 45 in the third quarter. Increases ranged from 5.2% in Nevada (to 56% adoption) to 33% in Hawaii (to 52% adoption), and 43 states in all enjoyed double-digit quarterly growth rates compared with just 7 in the previous quarter. Thirty-three states had 10 Mbps broadband adoption rates of at least 50%, a significant increase from nineteen states in the third quarter.

Year-over-year changes in 10 Mbps broadband adoption were robustly positive across all 51 states in the fourth quarter, led again by Hawaii with a sizeable 115% boost. The next largest increase was seen in Missouri with a 69% gain (to 50% adoption), while the District of Columbia posted the biggest increase among the top 10 with a 49% yearly gain. New Hampshire had the lowest increase in the country (and among the top 10) with adoption rates rising 13% compared with the fourth quarter of 2014.

Despite seeing 22% quarterly growth in its 10 Mbps broadband adoption rate, Idaho remained in last place across the country with a 34% adoption rate. Iowa, New Mexico, and Arkansas shared the next-lowest 10 Mbps broadband adoption rate in the country at 36%.

**3.5 UNITED STATES 15 MBPS BROADBAND ADOPTION** / With adoption levels surpassing 50% for the first time, Delaware and Rhode Island continued to lead the country in 15 Mbps broadband adoption, just as they have in the 4 Mbps and 10 Mbps tiers. As seen in Figure 16, all of the top 10 states showed strong growth in the fourth quarter, led by Rhode Island's 46% gain. Pennsylvania's 30% quarterly increase allowed it to regain its spot among the top 10, pushing out Utah, which had temporarily beaten out Pennsylvania for a top-10 spot in the third quarter. The District of Columbia had the smallest gain among the top 10 with 15 Mbps broadband adoption levels rising 12% quarter over quarter.

Across the country, all 51 states enjoyed strong gains in 15 Mbps broadband adoption rates in the fourth quarter, the District of Columbia's 12% increase being the smallest. Maine posted the largest gain in the nation with an impressive increase of 56% (to 23%

	State	% Above 15 Mbps	QoQ Change	YoY Change
1	Delaware	54%	22%	43%
2	Rhode Island	52%	46%	73%
3	Massachusetts	47%	29%	57%
4	District Of Columbia	47%	12%	72%
5	New Jersey	47%	30%	98%
6	Maryland	45%	31%	103%
7	Virginia	43%	29%	55%
8	New York	41%	31%	87%
9	Pennsylvania	39%	30%	67%
10	Washington	39%	20%	45%

Figure 16: 15 Mbps Broadband Adoption by State

adoption). In all, 40 states had at least one-quarter of their unique IP addresses connecting to Akamai at average speeds of 15 Mbps or faster, nearly double the number found in the third quarter.

Year-over-year gains in 15 Mbps broadband adoption were strong across the board as well—and substantially larger than those in the third quarter. Oregon posted the smallest gain—a still robust 41% (to 36% adoption), while Hawaii again led the nation with an impressive 223% increase (to 23% adoption). A total of 10 additional states saw adoption rates at least double, and 35 more saw adoption increase by at least 50% compared with a year prior. Among the top 10 states, Maryland led with a 103% jump while Delaware saw the smallest year-over-year increase at 43%.

Despite a large 52% increase in adoption rates, Kentucky remained in last place across the country with a 15 Mbps broadband adoption level of 16%. Idaho, Alaska, and Arkansas shared the second-to-last spot with an adoption rate of 18%, despite fourth-quarter gains of 29%, 47%, and 45%, respectively.

**3.6 UNITED STATES 25 MBPS BROADBAND ADOPTION** / In the fourth quarter, all of the top 10 states enjoyed strong quarterly growth in 25 Mbps broadband adoption, as seen in Figure 17, with larger gains overall than those seen in the third quarter. Among the top 10, the District of Columbia had the smallest gain at 15% but still maintained the top spot in the country, with one in four of its unique IP addresses connecting to Akamai in the fourth quarter at average speeds of at least 25 Mbps. Despite its 39% quarterly increase (to 14.1% adoption), New York was just edged out of the top 10 by Pennsylvania with a 44% gain (to 14.2% adoption). In the third quarter, only the top three states had adoption rates of 14% or higher.

Across the nation, all 51 states enjoyed strong, double-digit gains in the fourth quarter. Rhode Island led the nation (and the top 10) with an 86% quarterly gain, followed by Alabama with a 61% gain (to 8.2% adoption). The District of Columbia had the smallest increase across the country (and the top 10) at 15%, followed by Iowa at 18% (to 6.8% adoption).

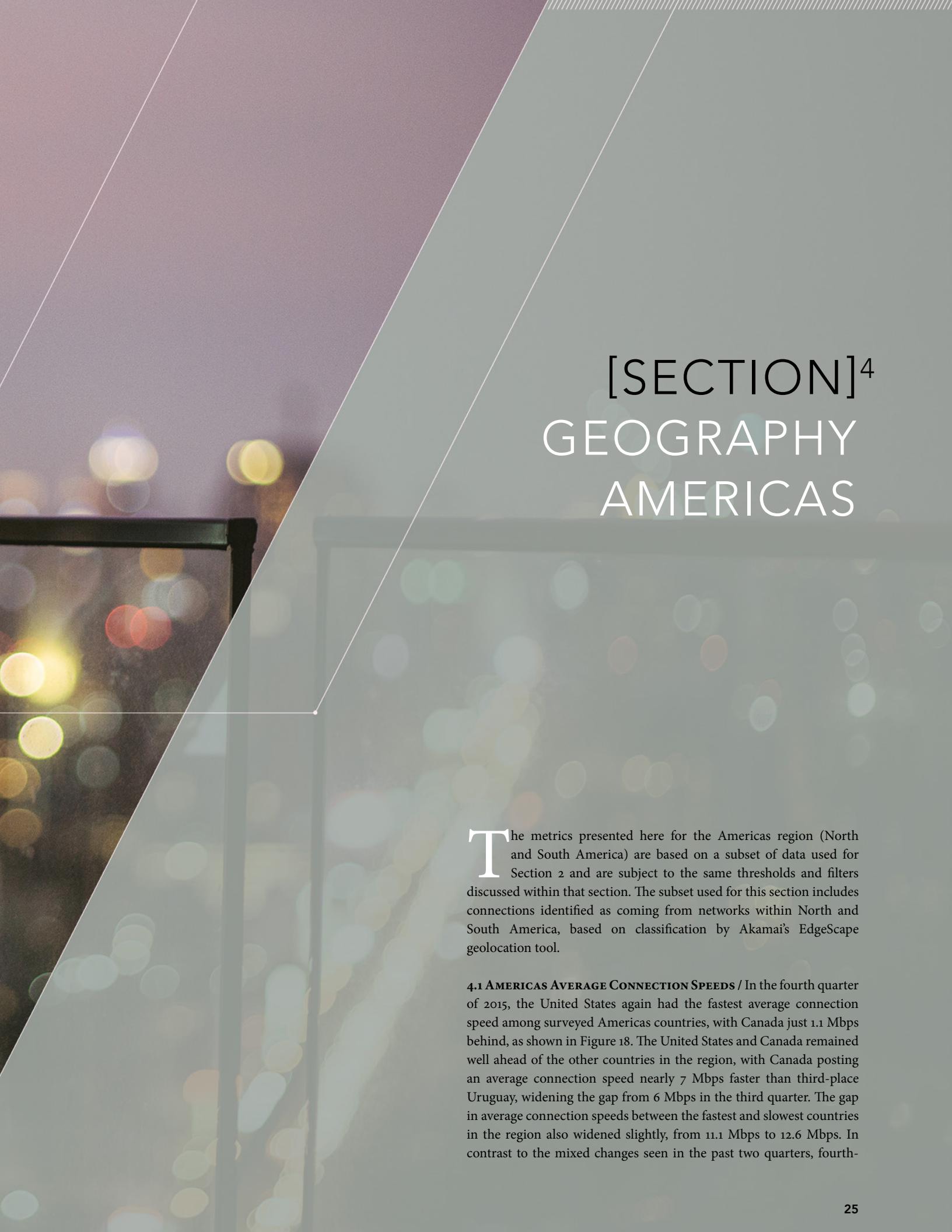
	State	% Above 25 Mbps	QoQ Change	YoY Change
1	District Of Columbia	25%	15%	91%
2	Delaware	22%	28%	89%
3	Rhode Island	19%	86%	143%
4	Massachusetts	18%	43%	107%
5	Maryland	17%	53%	165%
6	Utah	16%	20%	61%
7	Virginia	16%	48%	48%
8	New Jersey	16%	57%	185%
9	Washington	15%	29%	91%
10	Pennsylvania	14%	44%	122%

Figure 17: 25 Mbps Broadband Adoption by State

Building on the positive momentum from the third quarter, the fourth quarter saw all of the top 10 states post even stronger year-over-year improvements in 25 Mbps broadband adoption rates, with increases ranging from 48% in Virginia to 185% in New Jersey. Five of the top ten saw adoption rates more than double compared with the fourth quarter of 2014. All of the states across the country saw double-digit yearly increases as well, ranging from 29% in Wyoming (to 7.4% adoption) to 297% in Alaska (to 3.7% adoption). Twenty-six states saw adoption rates more than double year-over-year in the fourth quarter compared with none in the third, and forty-eight states in all had gains of at least 50% compared with only 16 in the previous quarter.

Twenty-five Mbps broadband adoption rates remained fairly low nationwide but are clearly improving. In all, 25 states saw adoption levels below 10% — down from 41 in the third quarter. Alaska and Kentucky again had the lowest adoption rates in the country at 3.7% and 3.1% respectively, but both saw quarterly increases of more than 50%. In the fourth quarter, they were the only two states with adoption levels below 5% — down from ten states in the third quarter.





# [SECTION]<sup>4</sup>

## 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 fourth quarter of 2015, the United States again had the fastest average connection speed among surveyed Americas countries, with Canada just 1.1 Mbps behind, as shown in Figure 18. The United States and Canada remained well ahead of the other countries in the region, with Canada posting an average connection speed nearly 7 Mbps faster than third-place Uruguay, widening the gap from 6 Mbps in the third quarter. The gap in average connection speeds between the fastest and slowest countries in the region also widened slightly, from 11.1 Mbps to 12.6 Mbps. In contrast to the mixed changes seen in the past two quarters, fourth-

Global Rank	Country/Region	Q4 2015 Avg. Mbps	QoQ Change	YoY Change
14	United States	14.2	13%	29%
20	Canada	13.1	10%	23%
64	Uruguay	6.2	4.7%	5.4%
66	Chile	6.1	8.4%	23%
70	Mexico	5.9	6.2%	31%
80	Argentina	4.7	12%	3.9%
82	Peru	4.5	1.4%	12%
83	Colombia	4.5	5.0%	21%
86	Ecuador	4.4	6.6%	17%
88	Brazil	4.1	13%	38%
94	Panama	3.8	10%	30%
102	Costa Rica	3.4	5.6%	20%
132	Bolivia	2.0	12%	60%
141	Venezuela	1.6	13%	14%
142	Paraguay	1.6	5.2%	16%

Figure 18: Average Connection Speed by Americas Country

quarter changes were positive across the board. Brazil, the United States, and Venezuela had the largest quarterly gains at 13% each, while Peru posted the smallest increase at 1.4%. Seven countries in all posted double-digit gains compared with the previous quarter.

All 15 surveyed countries saw positive growth on a yearly basis as well, ranging from 3.9% in Argentina to 60% in Bolivia. Thirteen of the fifteen enjoyed double-digit increases in average connection speeds compared with the fourth quarter of 2014. Ten of the surveyed Americas countries had an average connection speed at or above the 4 Mbps threshold — up from nine in the third quarter — and once again only the United States and Canada had speeds above the 10 Mbps broadband threshold.

**4.2 AMERICAS AVERAGE PEAK CONNECTION SPEEDS /** In the fourth quarter, the United States regained the top spot among the surveyed Americas countries in average peak connection speeds after ceding that spot to Uruguay in the third quarter. As shown in Figure 19, Uruguay posted a 5.0% quarterly decline in average peak connection speeds in the fourth quarter after seeing a sizeable 26% increase in the third quarter. Changes among the remaining countries were mixed, similar to the third quarter, with nine countries seeing increases and six seeing declines. Gains ranged from 0.2% in Paraguay to 9.4% in Mexico, while losses ranged from 3.7% in Ecuador to 16% in Colombia. The spread of average peak connection speeds between the fastest and slowest countries increased slightly from 48.4 Mbps in the third quarter to 50.2 Mbps in the fourth.

While all of the surveyed countries saw year-over-year improvements in average peak connection speeds in the third quarter, in the fourth quarter, Uruguay, Colombia, and Venezuela saw declines of 9.7%,

Global Rank	Country/Region	Q4 2015 Peak Mbps	QoQ Change	YoY Change
20	United States	61.5	7.2%	25%
26	Uruguay	57.2	-5.0%	-9.7%
30	Canada	54.9	4.6%	18%
48	Chile	44.7	6.3%	37%
80	Peru	31.5	3.6%	37%
85	Brazil	30.3	4.6%	38%
86	Mexico	29.9	9.4%	23%
90	Argentina	28.5	6.3%	22%
99	Ecuador	24.6	-3.7%	13%
105	Colombia	23.6	-16%	-4.4%
123	Panama	17.3	2.5%	16%
126	Costa Rica	15.7	-4.3%	19%
131	Paraguay	13.4	0.2%	34%
132	Bolivia	13.2	-4.7%	30%
140	Venezuela	11.3	-4.0%	-3.0%

Figure 19: Average Peak Connection Speed by Americas Country

4.4%, and 3.0% respectively. The remaining countries all posted double-digit gains, though all were slightly more modest than in the third quarter, ranging from 13% in Ecuador to 38% in Brazil.

**4.3 AMERICAS 4 MBPS BROADBAND ADOPTION /** With an 88% adoption rate, Canada remained the leader in the Americas region for 4 Mbps broadband adoption in the fourth quarter followed by the United States with an 83% adoption rate, as seen in Figure 20. The difference in adoption rates between the top and bottom qualifying Americas countries held steady at a sizeable 85 percentage points, and as noted before, is likely to remain large for the foreseeable

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
29	Canada	88%	1.1%	3.9%
43	United States	83%	2.9%	13%
57	Uruguay	72%	6.1%	14%
61	Mexico	68%	5.6%	57%
63	Chile	67%	7.9%	27%
75	Colombia	51%	6.3%	62%
77	Peru	47%	2.6%	20%
78	Argentina	46%	19%	21%
81	Ecuador	42%	15%	41%
85	Brazil	39%	20%	49%
86	Panama	37%	15%	121%
98	Costa Rica	23%	16%	62%
107	Venezuela	2.7%	29%	56%
—	Bolivia	3.3%	21%	131%
—	Paraguay	2.3%	10%	92%

Figure 20: 4 Mbps Broadband Adoption by Americas Country

future. In contrast to the third quarter's mixed changes, all of the surveyed Americas countries saw quarter-over-quarter growth in 4 Mbps broadband adoption in the fourth quarter. Venezuela, the bottom-ranking country in this metric, posted the largest quarterly gain at 29%, while Canada, the top-ranking country, posted the smallest at 1.1%.

Just as in the third quarter, year-over-year changes were positive across the board in the fourth quarter, though widely varying in magnitude. Canada again saw the smallest gain at 3.9%, followed by the United States with a 13% increase over the fourth quarter of 2014. Panama again saw the largest yearly increase among the qualifying countries with a 121% jump, and four other qualifying Americas countries saw 4 Mbps broadband adoption levels grow by more than 50%.

**4.4 AMERICAS 10 MBPS BROADBAND ADOPTION** / As shown in Figure 21, the United States and Canada once again remained the clear leaders in 10 Mbps broadband adoption among the qualifying surveyed Americas countries. The gap between Canada and the next-highest country widened from 35 percentage points to more than 39 in the fourth quarter, while the gap between the top and bottom qualifying countries increased from 44 percentage points to 51. In contrast to the third quarter, where quarterly losses outnumbered gains two to one, the fourth quarter enjoyed across-the-board gains. Peru had the smallest increase at 1.4% while the remaining countries all enjoyed double-digit gains. Argentina and Chile saw the largest jumps, at 41% and 43% respectively.

From a yearly perspective, 2 of the 10 qualifying surveyed countries saw declines in 10 Mbps broadband adoption. Argentina saw adoption rates fall 40% compared with the previous year, and Uruguay saw adoption fall 11%. The remaining countries posted

gains ranging from a modest 13% in Colombia to an impressive 135% in Mexico. Peru also saw adoption rates more than double from the fourth quarter of 2014, with a year-over-year gain of 129%.

**4.5 AMERICAS 15 MBPS BROADBAND ADOPTION** / As Figure 22 shows, only 7 of the 15 surveyed countries in the Americas region qualified for inclusion in the 15 Mbps broadband adoption metric in the fourth quarter — up from 6 in the third quarter — with Colombia seeing enough unique IP addresses connecting to Akamai above the speed threshold to qualify this quarter. 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 between Canada and the next-highest country widened from 19 percentage points to 24 in the fourth quarter. Likewise, the gap between the United States and the bottom-ranking country increased from 23 percentage points in the third quarter to 31 in the fourth. However, all of the qualifying surveyed countries enjoyed robust gains in adoption in the fourth quarter, ranging from Brazil's 24% increase to Chile's 74% jump.

Year-over-year numbers showed mixed changes in adoption levels across the qualifying surveyed Americas countries, with five posting yearly gains while Colombia and Argentina saw declines of 6.4% and 45% respectively. Note, however, that both of these countries have adoption rates below 1%, so even small changes can be reflected as deceptively large percentage shifts. Among the remaining countries, Canada had the smallest gain at 67% and Mexico had the largest at 131%.

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
16	United States	53%	14%	35%
20	Canada	49%	12%	29%
57	Chile	10%	43%	74%
59	Uruguay	8.8%	15%	-11%
62	Mexico	8.2%	29%	135%
64	Argentina	4.4%	41%	-40%
67	Ecuador	3.3%	33%	36%
69	Peru	2.9%	1.4%	129%
70	Brazil	2.9%	30%	54%
72	Colombia	2.2%	31%	13%
—	Panama	1.9%	31%	115%
—	Costa Rica	1.2%	11%	60%
—	Bolivia	0.3%	29%	129%
—	Venezuela	0.2%	0%	13%
—	Paraguay	0.2%	32%	240%

Figure 21: 10 Mbps Broadband Adoption by Americas Country

Global Rank	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
15	United States	32%	30%	73%
20	Canada	27%	31%	67%
53	Chile	2.7%	74%	100%
55	Mexico	2.2%	26%	131%
58	Brazil	0.8%	24%	69%
59	Argentina	0.7%	45%	-45%
60	Colombia	0.5%	37%	-6.4%
—	Uruguay	2.1%	25%	-36%
—	Peru	0.9%	32%	299%
—	Ecuador	0.8%	32%	48%
—	Panama	0.5%	32%	104%
—	Costa Rica	0.5%	1.5%	30%
—	Venezuela	0.1%	-6.1%	22%
—	Bolivia	0.1%	14%	182%
—	Paraguay	0.1%	26%	382%

Figure 22: 15 Mbps Broadband Adoption by Americas Country





# [SECTION]<sup>5</sup> 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 fourth quarter, South Korea was again the top country in the world for average connection speed, and the gap between it and lowest-ranking India widened from 18 Mbps to 24 Mbps in the fourth quarter, as South Korea's average connection speed increased by 30% over the third quarter. While declines outnumbered gains in the third quarter, the fourth quarter saw gains across all of the surveyed Asia Pacific countries/regions with the exception of Sri Lanka, which posted a 6.4% quarterly decrease. Australia saw the smallest increase at 4.2% while Indonesia had the largest at 32%. Ten countries enjoyed double-digit gains.

Global Rank	Country/Region	Q4 2015 Avg. Mbps	QoQ Change	YoY Change
1	South Korea	26.7	30%	20%
4	Japan	17.4	16%	15%
6	Hong Kong	16.8	5.9%	-0.4%
16	Singapore	13.9	11%	19%
21	Taiwan	12.9	28%	22%
41	New Zealand	9.3	7.5%	27%
42	Thailand	9.3	13%	32%
48	Australia	8.2	4.2%	11%
73	Malaysia	5.2	7.5%	28%
78	Sri Lanka	4.8	-6.4%	12%
89	China	4.1	12%	20%
92	Indonesia	3.9	32%	109%
95	Vietnam	3.8	13%	43%
107	Philippines	3.2	12%	18%
114	India	2.8	11%	36%

Figure 23: Average Connection Speed by APAC Country/Region

In the fourth quarter, 11 of the 15 surveyed Asia Pacific countries/regions had average connection speeds above the 4 Mbps broadband threshold — up from 10 in the third quarter — and five of these exceeded the 10 Mbps threshold. India once again had the lowest average connection speed among surveyed countries in the region at 2.8 Mbps, followed by the Philippines at 3.2 Mbps.

Fourteen of the fifteen surveyed countries/regions in the Asia Pacific region showed year-over-year growth in observed average connection speeds in the fourth quarter with Hong Kong having the only decline — a modest 0.4%. Indonesia, with a 109% gain, was the only country to see its average connection speed more than double compared to the year prior. Increases in the remaining countries/regions ranged from 11% in Australia to 43% in Vietnam.

**5.2 ASIA PACIFIC AVERAGE PEAK CONNECTION SPEEDS /** As seen in Figure 24, the Asia Pacific region continues to lead the world in average peak connection speeds with the top nine global leaders all found in the region. (The countries ranked 4, 7, and 9 — Macao, Mongolia, and Qatar — are all in the region but are not among our surveyed countries.) Singapore and Hong Kong once again led the pack as the only two countries/regions with average peak connection speeds above the 100 Mbps threshold, while an additional five surveyed countries/regions in Asia Pacific saw average peak speeds above 50 Mbps — up from four in the third quarter. With the exception of Australia, which saw a quarterly decline of 6.3%, the surveyed Asia Pacific countries/regions all posted gains in average peak speeds during the fourth quarter. Indonesia enjoyed the largest gain with a tremendous 157% jump followed by Vietnam with a 23% increase. Singapore had the smallest quarterly gain at 0.2%. The gap between average peak connection

Global Rank	Country/Region	Q4 2015 Peak Mbps	QoQ Change	YoY Change
1	Singapore	135.7	0.2%	61%
2	Hong Kong	105.2	4.0%	20%
3	South Korea	95.3	10%	26%
5	Japan	82.9	5.7%	20%
6	Indonesia	79.8	157%	495%
8	Taiwan	78.8	1.2%	23%
18	Thailand	63.7	9.4%	38%
53	New Zealand	42.8	1.8%	25%
55	Malaysia	42.0	9.5%	42%
60	Australia	39.3	-6.3%	6.4%
72	Sri Lanka	34.8	3.9%	40%
81	Vietnam	31.4	23%	81%
91	Philippines	27.0	6.7%	23%
92	China	26.7	16%	50%
115	India	21.2	13%	46%

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

speeds in the top- and bottom-ranked countries/regions in Asia Pacific narrowed slightly, from 116.7 Mbps in the third quarter to 114.5 Mbps in the fourth.

Like the third quarter, year-over-year changes in the Asia Pacific region were consistently positive in the fourth quarter. Australia again had the smallest gain at 6.4% while Indonesia had the largest at 495%. The remaining countries/regions all posted double-digit gains, ranging from 20% in Hong Kong and Japan to 81% in Vietnam.

The fourth quarter saw news of more efforts to boost broadband deployments in the Asia Pacific region. The Malaysian government announced plans to boost the country's Internet penetration rate to 95% by 2020, with 55% penetration for high-speed Internet.<sup>34</sup> Just a few days prior, Telekom Malaysia announced it had signed two public-private deals with the government to bring high-speed Internet to rural towns across the country. The projects, costing approximately \$785 million USD in total, include upgrading the existing broadband network with fiber-optic connections as well as building out a new high-speed network.<sup>35</sup> Meanwhile, two major ISPs in the Philippines — Philippine Long Distance Telephone Corp. and Globe Telecom — both launched new high-speed services in the fourth quarter. Available in more than 1,600 villages across the country, the plans will offer speeds of up to 1 Gbps and may boost peak connection speeds for what has historically been one of the slowest countries in the region.<sup>36</sup>

**5.3 ASIA PACIFIC 4 MBPS BROADBAND ADOPTION /** South Korea once again led the Asia Pacific region and regained the top spot in the world for 4 Mbps broadband adoption with 97% of its IP addresses connecting to Akamai at average connection speeds above this threshold in the fourth quarter. As shown in Figure 25, among the 15 surveyed Asia Pacific countries/regions, only

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
1	South Korea	97%	1.2%	1.3%
4	Thailand	95%	2.7%	10%
10	Hong Kong	93%	1.0%	2.3%
18	Japan	91%	1.3%	3.1%
20	Singapore	91%	4.9%	12%
22	Taiwan	90%	2.1%	4.9%
32	New Zealand	87%	0.1%	8.6%
56	Australia	73%	1.4%	6.2%
69	Malaysia	56%	7.9%	39%
74	Sri Lanka	52%	-31%	15%
83	China	41%	25%	52%
84	Vietnam	40%	29%	113%
88	Indonesia	36%	107%	688%
101	India	17%	24%	117%
102	Philippines	14%	36%	39%

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

Sri Lanka saw a quarterly decline with adoption rates dropping 31% from the previous quarter. Among the gaining countries/regions, Indonesia was the outlier with a 107% quarterly increase, while the remaining countries/regions saw more moderate growth, ranging from 0.1% in New Zealand to 36% in the Philippines. Once again, seven of the surveyed Asia Pacific countries/regions enjoyed 4 Mbps broadband adoption rates of 80% or higher, and the difference in adoption levels between the top- and bottom-ranked countries/regions in Asia Pacific narrowed from 86 to 83 percentage points in the fourth quarter.

Looking at year-over-year changes, all 15 surveyed countries/regions saw positive improvements in the fourth quarter, though magnitudes varied widely. Top-ranking South Korea posted the smallest gain at 1.3%, and five other countries also had modest single-digit increases. On the other end of the spectrum, Vietnam and India both more than doubled adoption rates compared with the fourth quarter of 2014, while Indonesia led the region in growth with a tremendous 688% year-over-year increase.

**5.4 ASIA PACIFIC 10 MBPS BROADBAND ADOPTION /** As seen in Figure 26, South Korea led both the region and the world in 10 Mbps broadband adoption once again, with 81% of its IP addresses connecting to Akamai at average connection speeds above this threshold, a 19% increase over the third quarter. The gap between South Korea and the next-closest country/region in Asia Pacific stood at 18 percentage points in the fourth quarter, up from 9 in the third, and the gap between it and Vietnam — the qualifying country/region with the lowest adoption levels in the region — widened from to 67 percentage points to 80. After two quarters of mixed changes, adoption levels saw across-the-board quarter-over-quarter growth in the fourth quarter, led by the Philippines with a 118% quarter-

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
1	South Korea	81%	19%	2.2%
3	Japan	63%	16%	12%
6	Hong Kong	61%	2.8%	1.7%
10	Singapore	59%	16%	47%
24	Taiwan	45%	55%	20%
40	Thailand	26%	41%	103%
42	New Zealand	26%	18%	71%
47	Australia	20%	8.8%	25%
63	Malaysia	5.4%	37%	48%
71	India	2.8%	21%	152%
73	Philippines	1.9%	118%	232%
74	Indonesia	1.7%	82%	583%
75	China	1.6%	1.9%	45%
76	Vietnam	1.0%	50%	141%
-	Sri Lanka	3.6%	64%	86%

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

over-quarter gain. China saw the most modest increase at 1.9% while 10 of the 14 qualifying surveyed countries/regions enjoyed robust double-digit gains.

Year-over-year changes were positive across the board as well in the fourth quarter. Hong Kong and South Korea posted small gains of 1.7% and 2.2% respectively, while seven qualifying Asia Pacific countries/regions saw double-digit increases in adoption rates and five saw triple-digit jumps. Indonesia posted the largest gain with a 583% increase over the fourth quarter of 2014.

**5.5 ASIA PACIFIC 15 MBPS BROADBAND ADOPTION /** Unsurprisingly, South Korea also led the region (and the world) in 15 Mbps broadband adoption with 63% of its IP addresses connecting to Akamai at average connection speeds above 15 Mbps, up 40% from the third quarter. As seen in Figure 27, China's adoption rate remained below half a percentage point, so the spread between the first and last place countries/regions in Asia Pacific widened from 45 percentage points in the third quarter to 63 in the fourth. After a mixed third quarter, changes were mostly positive in the fourth quarter with only China seeing a decline in adoption rates – a drop of 8.4%. The remaining countries/regions posted gains ranging from Hong Kong's 5.8% to Taiwan's 89%, with eight countries/regions seeing double-digit gains.

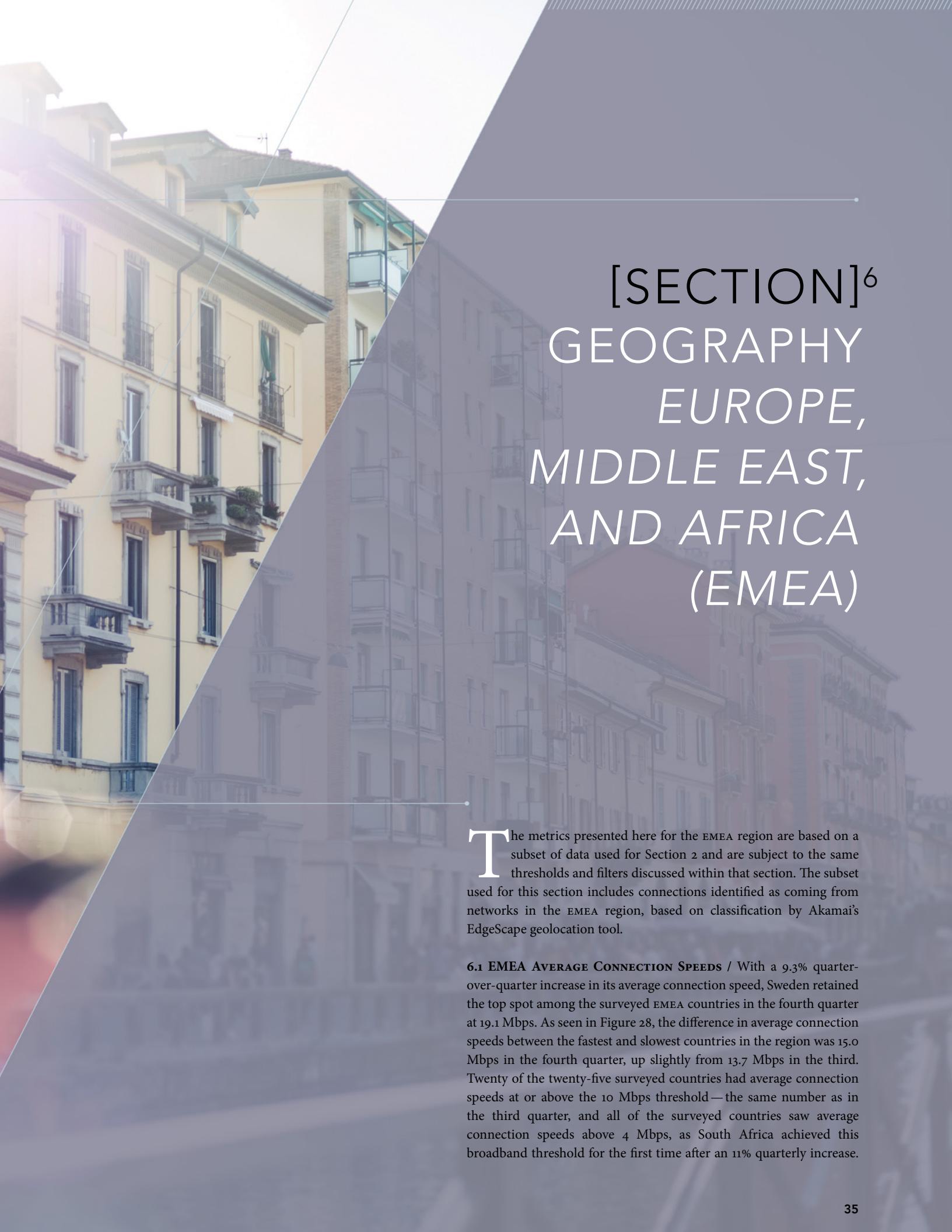
Hong Kong saw the only year-over-year drop in adoption levels with a 7.1% decline. Among the remaining countries/regions, South Korea had the smallest increase at 3.3%, followed by Japan with a 20% gain. Three countries — Thailand, New Zealand, and India — more than doubled their adoption levels compared with the previous year, enjoying gains of 118%, 130%, and 152% respectively.

Global Rank	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
1	South Korea	63%	40%	3.3%
4	Japan	40%	27%	20%
6	Hong Kong	38%	5.8%	-7.1%
13	Singapore	32%	21%	56%
24	Taiwan	24%	89%	46%
39	New Zealand	11%	31%	130%
44	Australia	8.2%	11%	27%
45	Thailand	8.2%	41%	118%
57	India	1.0%	21%	152%
61	China	0.3%	-8.4%	44%
–	Sri Lanka	1.3%	107%	155%
–	Malaysia	1.2%	31%	30%
–	Philippines	0.8%	140%	299%
–	Indonesia	0.5%	34%	382%
–	Vietnam	0.2%	38%	149%

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







# [SECTION]<sup>6</sup> 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** / With a 9.3% quarter-over-quarter increase in its average connection speed, Sweden retained the top spot among the surveyed EMEA countries in the fourth quarter at 19.1 Mbps. As seen in Figure 28, the difference in average connection speeds between the fastest and slowest countries in the region was 15.0 Mbps in the fourth quarter, up slightly from 13.7 Mbps in the third. Twenty of the twenty-five surveyed countries had average connection speeds at or above the 10 Mbps threshold—the same number as in the third quarter, and all of the surveyed countries saw average connection speeds above 4 Mbps, as South Africa achieved this broadband threshold for the first time after an 11% quarterly increase.

Global Rank	Country/Region	Q4 2015 Avg. Mbps	QoQ Change	YoY Change
2	Sweden	19.1	9.3%	30%
3	Norway	18.8	14%	65%
5	Netherlands	17.0	8.7%	20%
8	Switzerland	16.7	2.8%	15%
9	Finland	16.6	12%	37%
10	Denmark	16.1	15%	36%
11	Czech Republic	15.9	9.2%	29%
15	Belgium	14.2	11%	31%
17	United Kingdom	13.9	6.8%	27%
19	Romania	13.2	0.9%	14%
22	Germany	12.9	12%	46%
23	Ireland	12.8	2.7%	0.7%
24	Hungary	12.6	19%	45%
25	Slovakia	12.5	12%	53%
27	Austria	12.3	8.4%	26%
29	Portugal	12.1	14%	51%
30	Spain	12.1	17%	48%
32	Israel	11.6	3.8%	9.2%
33	Russia	11.6	14%	30%
36	Poland	11.0	3.9%	25%
44	France	8.9	9.4%	26%
51	Italy	7.4	14%	33%
53	United Arab Emirates	6.9	2.2%	21%
63	Turkey	6.3	0.8%	8.9%
90	South Africa	4.1	11%	26%

Figure 28: Average Connection Speed by EMEA Country

Fourth-quarter changes were positive across the board for the surveyed countries with slightly stronger gains than in the third quarter. Increases ranged from 0.8% in Turkey to 19% in Hungary. Twelve countries posted double-digit gains, up from four in the third quarter.

Year-over-year changes in average connection speeds were positive across the board as well. Ireland saw the smallest change with a slight 0.7% increase, followed by Turkey and Israel with more robust gains of 8.9% and 9.2% respectively. The remaining 22 countries all enjoyed double-digit yearly gains with Norway having the biggest increase at 65%. Eighteen countries saw yearly gains of at least 25%, up from seven in the previous quarter.

**6.2 EMEA AVERAGE PEAK CONNECTION SPEEDS** / Romania again led the EMEA region in average peak connection speeds with a 1.0% quarterly increase to 73.6 Mbps, as shown in Figure 29. However, with bottom-ranked South Africa seeing a strong 14% increase in the fourth quarter, the gap between their average peak connection speeds closed slightly, from 54.0 Mbps to 52.1 Mbps. Similar to the third quarter, the EMEA region saw mostly positive changes

Global Rank	Country/Region	Q4 2015 Peak Mbps	QoQ Change	YoY Change
10	Romania	73.6	1.0%	9.7%
12	Sweden	71.8	4.2%	25%
14	Switzerland	66.3	6.0%	16%
16	Netherlands	65.3	2.9%	16%
17	Belgium	64.1	8.1%	24%
19	Israel	61.7	-12%	2.0%
22	Russia	60.1	3.7%	21%
23	Spain	60.0	12%	51%
24	Norway	59.8	6.9%	41%
25	Hungary	58.5	8.6%	29%
27	United Kingdom	56.8	4.7%	16%
28	Finland	55.4	-3.6%	17%
29	Ireland	54.9	5.7%	5.4%
31	Czech Republic	54.6	7.4%	19%
32	Denmark	54.2	8.3%	23%
35	United Arab Emirates	52.4	14%	2.3%
36	Germany	51.3	4.2%	25%
37	Slovakia	50.9	3.9%	27%
41	Portugal	48.9	1.9%	10%
42	Poland	48.7	6.9%	20%
45	Austria	47.6	8.2%	16%
52	France	43.2	11%	37%
61	Turkey	38.2	-0.8%	13%
78	Italy	32.0	6.3%	19%
114	South Africa	21.5	14%	42%

Figure 29: Average Peak Connection Speed by EMEA Country

in this metric during the fourth quarter with gains in 22 of the 25 surveyed countries. The United Arab Emirates and South Africa posted the biggest increases at 14% each, while Romania saw the smallest increase at 1.0%. Israel, Finland, and Turkey were the three countries to see quarterly declines with average peak connection speeds decreasing 12%, 3.6%, and 0.8% respectively. Eighteen of the surveyed EMEA countries had average peak connection speeds of at least 50 Mbps as compared with fifteen in the third quarter—with several more countries not far behind.

Like the third quarter, year-over-year changes were consistently positive for the surveyed EMEA countries in the fourth quarter. Spain again had the largest gain, with an increase of 51% over the previous year. The remaining countries posted gains between 2.0% (in Israel) and 42% (in South Africa), with 21 of the 25 surveyed countries seeing double-digit gains.

In the fourth quarter, the United Kingdom saw a great deal of activity relating to the growth of high-speed broadband in the country with a number of providers launching ultra-fast fiber-to-the-premise (FTTP) services. Hyperoptic, which has a gigabit service that already

reaches 100,000 premises, launched in Birmingham in October with plans to reach a total of 500,000 premises by 2018.<sup>37</sup> Gigaclear began construction on its public-private FTTP gigabit service to rural Gloucestershire and the Cotswolds as part of the Broadband Delivery U.K. initiative<sup>38</sup> and also announced a new 5 Gbps service it plans to offer across the United Kingdom, beginning with 25 mostly rural locations.<sup>39</sup> British Telecom, in partnership with the state-supported Superfast Cymru project, announced 330 Mbps FTTP capabilities had gone live in Nasareth, Wales,<sup>40</sup> while the Aylesbury Vale Broadband project revealed that the first customers of its 100 Mbps FTTP offering in rural Buckinghamshire, England, would go live in November 2015.<sup>41</sup> Meanwhile, on the wireless side, Virgin Media announced that it was testing its new “Smart Pavement” service—a free, public Wi-Fi offering—also in Buckinghamshire, offering speeds of up to 166 Mbps through wireless access points deployed underneath the roads and sidewalks.<sup>42</sup> Finally, in its annual report on the state of broadband in the United Kingdom, the U.K. telecommunications regulatory body—Office of Communications, or Ofcom—raised the threshold definition of “ultrafast” broadband from 100 Mbps to 300 Mbps, an indication of the country’s aspirations for high-speed Internet access.

**6.3 EMEA 4 MBPS BROADBAND ADOPTION** / The Netherlands led the surveyed EMEA countries in 4 Mbps broadband adoption again in the fourth quarter with a 0.8% quarterly increase to an adoption level of 96%, as seen in Figure 30. Last-place South Africa posted a strong 23% increase in the fourth quarter, closing the gap in adoption levels between the two countries from 73 percentage points in the third quarter to 69 in the fourth. The next highest quarterly increase was seen in Italy with a gain of 10%. Twenty additional countries in the region saw gains, but they were very modest, ranging from 0.1% in Israel to 4.5% in Spain. Three countries—Romania, Poland, and Turkey—saw losses in the fourth quarter, though all the declines were less than 3%.

A total of 12 countries—up from 9 in the previous quarter—enjoyed 4 Mbps broadband adoption rates above 90% with several more in close range. Despite its strong quarterly gain, South Africa again had the lowest 4 Mbps broadband adoption rate in the group by far with just over one in four IP addresses connecting to Akamai at or above the threshold speed. The next lowest country, Turkey, had 77% of its IP addresses connecting to Akamai at average speeds of 4 Mbps or greater.

On a year-over-year basis, the surveyed EMEA countries saw gains in 4 Mbps broadband adoption across the board in the fourth quarter. South Africa and the United Arab Emirates led the pack with increases of 40% and 39% respectively, while Switzerland saw the smallest yearly growth at 0.8%. A total of 13 countries saw year-over-year growth of more than 10% in the fourth quarter, up from 12 in the third.

**6.4 EMEA 10 MBPS BROADBAND ADOPTION** / In the fourth quarter, the Netherlands beat out Switzerland for the top spot in 10 Mbps broadband adoption among surveyed EMEA countries with an adoption rate of 64%, up 8.1% from the third quarter. As seen

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
2	Netherlands	96%	0.8%	4.9%
7	Denmark	94%	0.4%	1.9%
8	Israel	94%	0.1%	1.6%
9	Switzerland	94%	0.5%	0.8%
11	Belgium	93%	2.1%	6.8%
12	Sweden	93%	1.2%	6.5%
15	Hungary	92%	2.9%	13%
16	Austria	92%	1.2%	5.4%
17	Romania	91%	-2.6%	2.3%
19	Finland	91%	0.3%	9.1%
23	Russia	90%	3.4%	10%
24	Norway	90%	2.2%	12%
25	Germany	89%	2.3%	11%
26	United Kingdom	89%	2.1%	7.8%
27	Czech Republic	88%	2.8%	4.8%
28	Spain	88%	4.5%	13%
35	United Arab Emirates	86%	1.4%	39%
36	Poland	86%	-2.1%	3.5%
38	Portugal	86%	0.5%	14%
40	Slovakia	85%	0.4%	24%
47	Ireland	79%	3.0%	15%
48	Italy	78%	10%	29%
49	France	78%	4.4%	11%
52	Turkey	77%	-0.6%	21%
90	South Africa	27%	23%	40%

Figure 30: 4 Mbps Broadband Adoption by EMEA Country

in Figure 31, ten EMEA countries had at least half of their unique IP addresses connecting to Akamai at average speeds of at least 10 Mbps as compared with eight in the third quarter. On the other end of the spectrum, only two countries—South Africa and Turkey—had 10 Mbps broadband adoption rates below 10%, down from four countries in the third quarter. However, the gap in adoption levels between the top and bottom countries in the region widened slightly, from 58 percentage points in the third quarter to 61 in the fourth. Quarterly changes in adoption rates were positive across EMEA in the fourth quarter with the exception of Romania, which posted a 6.8% loss. Italy had the largest quarterly increase at 50%, while the remaining countries saw gains ranging from Ireland’s 0.9% to Hungary’s 32%.

Twenty-two of the twenty-five surveyed EMEA countries saw yearly gains in the fourth quarter. Italy led the group with a 142% increase over the fourth quarter of 2014, while the remaining countries saw double-digit gains ranging from 10% in Switzerland to 87% in Spain. Turkey, Israel, and Romania were the three declining countries, posting year-over-year adoption rate decreases of 7.1%, 4.9%, and 2.7% respectively.

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
2	Netherlands	64%	8.1%	16%
4	Switzerland	62%	2.6%	10%
5	Norway	62%	15%	75%
7	Belgium	61%	16%	41%
8	Denmark	60%	18%	36%
9	Sweden	60%	7.6%	28%
11	Finland	57%	12%	45%
15	Romania	53%	-6.8%	-2.7%
17	Czech Republic	51%	11%	24%
18	United Kingdom	50%	8.6%	32%
21	Hungary	48%	32%	73%
23	Russia	46%	22%	58%
25	Portugal	43%	16%	75%
26	Germany	43%	15%	79%
28	Spain	42%	23%	87%
29	Ireland	41%	0.9%	25%
31	Israel	39%	5.8%	-4.9%
32	Austria	38%	15%	43%
34	Poland	36%	5.6%	37%
36	Slovakia	33%	17%	64%
43	France	24%	16%	58%
53	Italy	14%	50%	142%
55	United Arab Emirates	11%	18%	24%
61	Turkey	8.4%	9.4%	-7.1%
66	South Africa	3.8%	29%	44%

Figure 31: 10 Mbps Broadband Adoption by EMEA Country

Global Rank	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
2	Norway	45%	21%	102%
3	Sweden	42%	11%	36%
5	Netherlands	39%	16%	31%
7	Denmark	38%	31%	80%
8	Switzerland	38%	4.0%	24%
10	Finland	34%	22%	61%
11	Belgium	32%	27%	75%
12	United Kingdom	32%	15%	50%
17	Czech Republic	30%	13%	47%
19	Romania	28%	3.7%	24%
21	Portugal	26%	38%	173%
22	Hungary	25%	43%	138%
23	Ireland	25%	6.1%	52%
25	Spain	24%	37%	146%
26	Germany	23%	22%	141%
28	Russia	21%	38%	89%
31	Slovakia	20%	18%	88%
33	Austria	19%	11%	44%
35	Poland	19%	8.9%	68%
37	Israel	16%	12%	5.8%
40	France	11%	24%	94%
48	Italy	5.2%	56%	141%
51	Turkey	3.0%	1.9%	-15%
54	United Arab Emirates	2.7%	16%	26%
56	South Africa	1.9%	13%	39%

Figure 32: 15 Mbps Broadband Adoption by EMEA Country

**6.5 EMEA 15 MBPS BROADBAND ADOPTION** / Norway overtook Sweden for the top position in 15 Mbps broadband adoption among EMEA surveyed countries in the fourth quarter with an adoption rate of 45%, up 21% from the third quarter. As seen in Figure 32, 17 of the surveyed EMEA countries had at least one in five IP addresses connecting to Akamai at average speeds above 15 Mbps, up from 11 in the third quarter. On the other end of the spectrum, four surveyed countries had adoption rates below 10% in the fourth quarter—down from five in the third. South Africa remained the country with the lowest adoption level in the region, and despite a 13% quarterly increase, the gap between South Africa and the top-ranking EMEA country widened from 36 percentage points to 43 in the fourth quarter. All of the surveyed EMEA countries saw growth in 15 Mbps broadband adoption rates in the fourth quarter, led by Italy with a 56% gain. Twenty of the twenty-five countries showed gains of more than 10% compared with sixteen in the third quarter, and Turkey saw the smallest increase at 1.9%.

Year-over-year changes were positive across the board with the exception of Turkey, which saw a 15% decline compared with the fourth quarter of 2014. Israel posted a modest gain of 5.8% while the remaining countries enjoyed more robust increases, ranging from 24% in Romania and Switzerland to 173% in Portugal. Six countries in all saw 15 Mbps broadband adoption rates more than double.







# [SECTION]<sup>7</sup> 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. In addition, this section 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. Mobile connectivity metrics are aggregated at a country/region level. To qualify for inclusion in any given quarter, a country/region must have a minimum of 25,000 unique IP addresses seen by Akamai and identified as coming from a mobile network that quarter.

The mobile speed measurements shown here—particularly average peak connection speeds—can be influenced by a number of factors, including the use and location of proxies within mobile networks. If a country's major mobile carriers make heavy use of such proxies, peak connection speeds recorded for that country are likely to be influenced by the speeds achieved between Akamai and the proxies (residing in data centers) rather than speeds achieved between Akamai and

the mobile devices themselves. We note that some of the average peak connection speeds recorded below are higher than one might expect given the current state of LTE and LTE-A deployment,<sup>43</sup> so it is likely that these speeds are affected—to differing degrees—by proxies within those countries' mobile provider networks and may not be fully representative of speeds being seen by end users.

**7.1 CONNECTION SPEEDS ON MOBILE NETWORKS** / In the fourth quarter of 2015, 72 countries/regions around the world qualified for inclusion in the mobile section. Figure 33 shows that across these countries/regions, the United Kingdom had the fastest average mobile connection speed at 26.8 Mbps with Spain in second place at 14.0 Mbps, just over half the speed of the United Kingdom. Iran had the lowest average connection speed at 1.3 Mbps, followed by Vietnam with an average connection speed of 1.8 Mbps.

Along with the United Kingdom and Spain, 11 countries in total had an average mobile connection speed exceeding the 10 Mbps broadband threshold, while 46 countries achieved average speeds at or above the 4 Mbps broadband level. Within the individual continental regions, the following countries had the highest average mobile connection speeds:

- **Africa:** Kenya, 5.0 Mbps
- **Asia Pacific:** South Korea, 11.8 Mbps
- **Europe:** United Kingdom, 26.8 Mbps
- **North America:** Canada, 7.6 Mbps
- **South America:** Paraguay, 5.7 Mbps

Average peak mobile connection speeds spanned an extremely broad range in the fourth quarter, from 153.3 Mbps in Australia to 7.4 Mbps in Iran. As mentioned above, the speeds on the upper end of this spectrum are higher than one might expect given the current state of LTE and LTE-A deployment and are likely to be influenced by mobile carriers' use of proxies within their networks. Proxy usage differs across carriers and can affect the measurements to varying degrees in different countries.

A total of five countries—Australia, Japan, Israel, Thailand, and the United Arab Emirates—recorded average peak speeds above 100 Mbps. Twenty-three countries posted average peak speeds above 50 Mbps, with several more not far behind. Iran was the only country with an average peak mobile connection speed below 10 Mbps; Nepal had the next-lowest speed at 12.1 Mbps. Within the individual continental regions, the following countries had the highest average peak mobile connection speeds:

- **Africa:** Angola, 58.6 Mbps
- **Asia Pacific:** Australia, 153.3 Mbps
- **Europe:** Germany, 81.1 Mbps
- **North America:** Canada, 62.0 Mbps
- **South America:** Peru, 72.1 Mbps

Similar to the global and regional connectivity sections of this report, we are also including insight into 4 Mbps broadband adoption levels for mobile connectivity—that is, the percentage of

unique IP addresses connecting to Akamai from mobile network providers within the qualifying countries/regions at average speeds over 4 Mbps. In the fourth quarter, Finland and Australia led the world with 99% adoption rates, followed closely by Sweden with 98% adoption. Eight countries in all had adoption levels of 90% or higher. At the other end of the spectrum, Iran, Kazakhstan, and Venezuela all had adoption rates below 1%. Within the individual continental regions, the following countries/regions had the highest mobile 4 Mbps broadband adoption rates:

- **Africa:** Kenya, 60%
- **Asia Pacific:** Australia, 99%
- **Europe:** Finland, 99%
- **North America:** Canada, 87%
- **South America:** Paraguay, 65%

**7.2 MOBILE BROWSER USAGE DATA** / In June 2012, Akamai launched the “Akamai io” destination site (<http://www.akamai.com/io>), with an initial data set that highlighted browser usage across PCs and other connected devices connecting to Akamai via fixed and mobile networks. The data and graphs below are derived from Akamai io.

This quarter, data for December 1 through December 8 was removed from Figure 34 and Figure 35, as well as from our analysis here, due to anomalous measurements that resulted from an incorrect configuration file being deployed.

Figure 34 illustrates mobile browser usage by users identified to be on cellular networks in the fourth quarter of 2015. As of Android version 4.4 (KitKat), Chrome has replaced Webkit as the default Android browser engine, so when comparing Android versus iOS platforms we combine metrics from Android Webkit and Chrome for mobile to calculate an Android platform number. We expect that over time, as older Android versions are retired, Webkit traffic will decline and Chrome traffic will increase.

As Figure 34 shows, at the start of the quarter, Mobile Safari comprised approximately 39% of requests over cellular, leading Chrome Mobile by about 9 percentage points. Chrome, in turn, held a 10 percentage point lead over Android Webkit. Over the quarter, it appears that Safari lost a little ground while Chrome gained some, and Webkit stayed fairly steady. At the end of the quarter, Chrome had overtaken Safari by just under 2 percentage points, while Webkit trailed Safari by 14 points.

In comparing iOS versus Android platforms, Android had a clear and widening lead over iOS in the fourth quarter, starting with an 11 percentage point lead and ending the quarter 22 percentage points ahead. Overall, iOS comprised about 38% of requests in the fourth quarter, while Android was responsible for 53%.

Expanding the set of data to all networks (not just those defined as cellular), we see a much wider gap between Mobile Safari and Chrome Mobile, as shown in Figure 35. At the start of the quarter, Mobile Safari usage was roughly 21 percentage points higher than Chrome Mobile, though the gap gradually narrowed

Country/Region	Q4 2015 Avg. Mbps	Q4 2015 Peak Mbps	% Above 4 Mbps
<b>AFRICA</b>			
Angola	2.9	58.6	7.3%
Egypt	3.8	22.7	32%
Kenya	5.0	31.5	60%
Morocco	3.1	24.6	15%
Namibia	2.2	20.8	4.9%
South Africa	3.9	30.2	33%
Tunisia	3.3	34.5	16%
<b>ASIA PACIFIC</b>			
Australia	8.0	153.3	99%
China	4.7	21.9	63%
Hong Kong	6.3	37.0	63%
India	2.7	17.8	16%
Indonesia	4.4	34.5	68%
Iran	1.3	7.4	0.3%
Israel	5.7	107.3	95%
Japan	9.9	112.2	81%
Kazakhstan	2.4	21.6	0.4%
Kuwait	6.9	56.2	89%
Malaysia	2.5	24.5	10%
Nepal	3.2	12.1	27%
New Zealand	7.4	75.4	88%
Oman	3.6	38.0	17%
Pakistan	2.7	18.2	16%
Qatar	4.1	74.7	42%
Saudi Arabia	3.2	16.2	23%
Singapore	6.1	64.8	74%
South Korea	11.8	71.2	75%
Sri Lanka	4.2	42.5	34%
Syria	2.1	16.9	1.6%
Taiwan	6.5	46.8	81%
Thailand	3.9	104.3	30%
United Arab Emirates	6.8	104.0	93%
Vietnam	1.8	27.1	1.4%
<b>EUROPE</b>			
Austria	9.9	39.0	87%
Belgium	10.9	43.8	88%
Croatia	4.4	21.5	55%
Czech Republic	6.9	26.2	76%

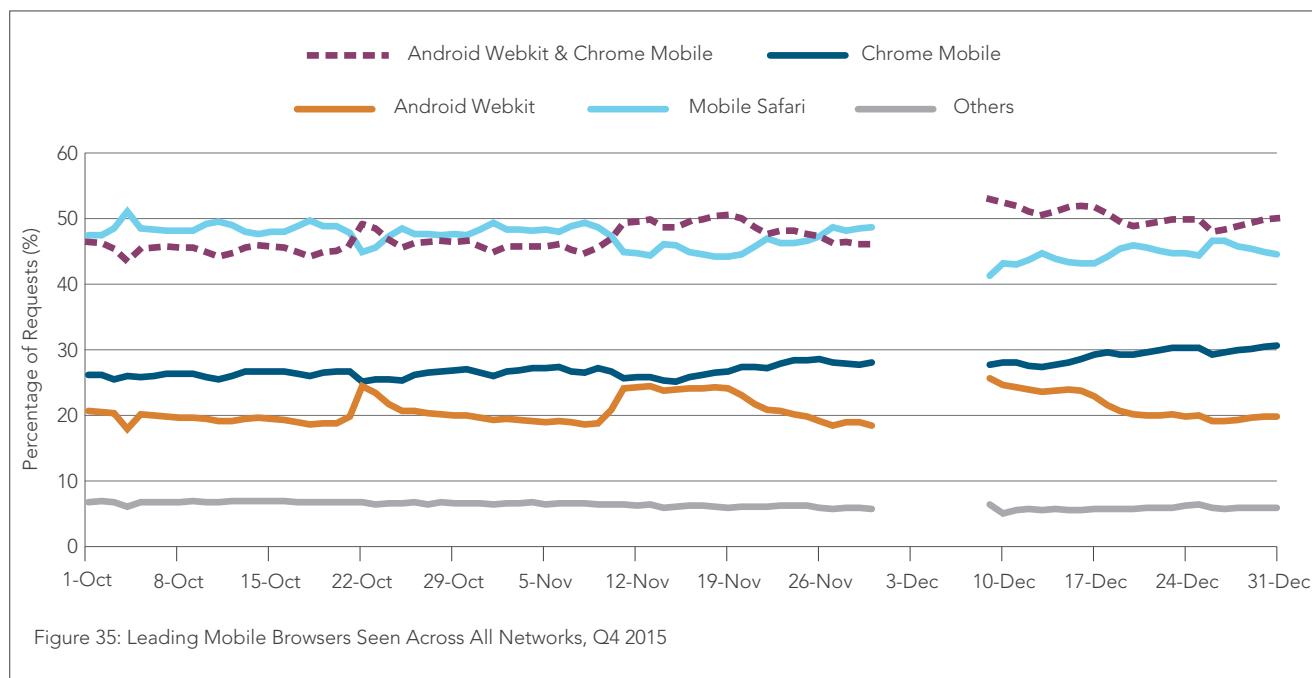
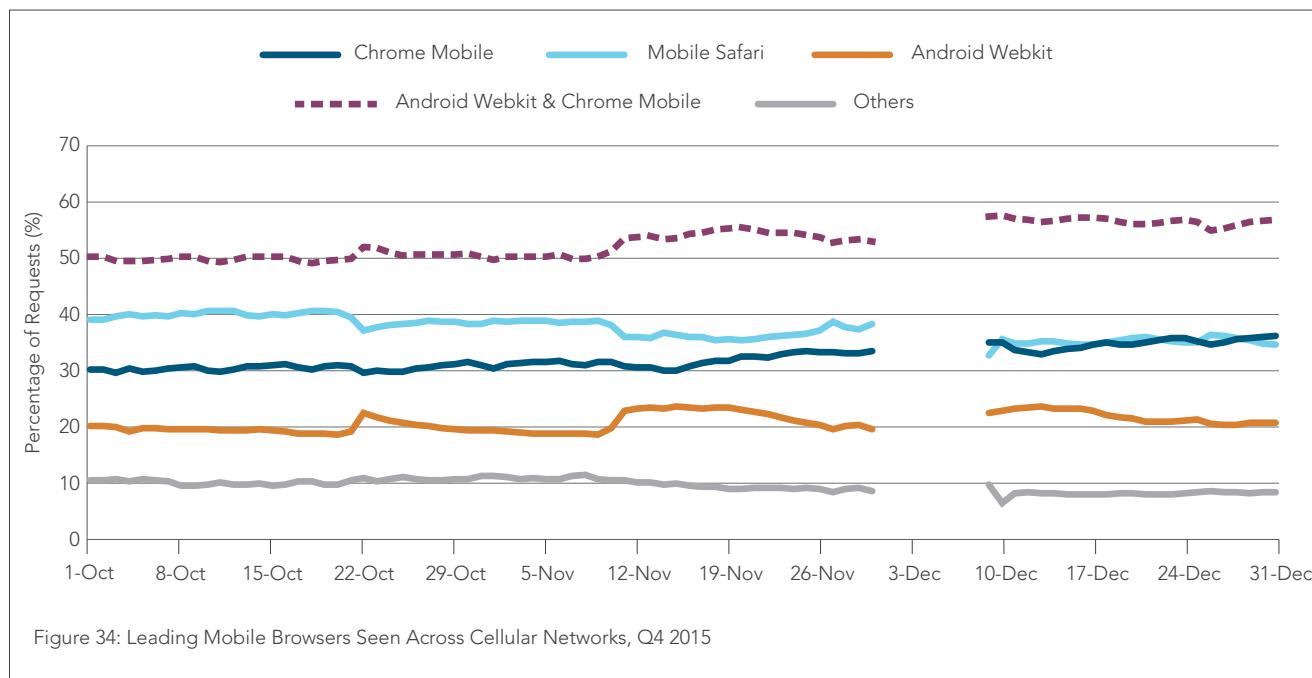
Figure 33: Average and Average Peak Connection Speeds, 4 Mbps Broadband Adoption for Mobile Connections by Country/Region

Country/Region	Q4 2015 Avg. Mbps	Q4 2015 Peak Mbps	% Above 4 Mbps
Denmark	11.1	42.0	93%
Estonia	5.3	24.2	51%
Finland	12.8	79.9	99%
France	10.3	51.3	82%
Germany	9.0	81.1	69%
Greece	8.1	46.8	90%
Hungary	8.4	40.9	81%
Iceland	6.7	29.3	84%
Ireland	11.3	54.4	84%
Italy	9.3	67.7	88%
Lithuania	6.1	28.1	71%
Moldova	5.9	35.2	48%
Netherlands	8.8	33.0	78%
Norway	9.8	48.2	83%
Poland	6.4	37.7	77%
Russia	9.1	60.5	74%
Slovakia	12.0	52.9	87%
Slovenia	7.7	24.8	82%
Spain	14.0	78.1	94%
Sweden	11.0	48.3	98%
Turkey	11.0	72.5	80%
Ukraine	7.9	34.0	73%
United Kingdom	26.8	73.0	89%
<b>NORTH AMERICA</b>			
Canada	7.6	62.0	87%
El Salvador	3.4	19.6	27%
Puerto Rico	6.8	37.0	75%
United States	4.8	18.3	35%
<b>SOUTH AMERICA</b>			
Argentina	2.3	20.8	7.9%
Bolivia	2.2	14.9	6.1%
Brazil	3.2	22.7	17%
Chile	2.5	19.2	10%
Colombia	3.2	20.1	20%
Paraguay	5.7	35.9	65%
Peru	3.2	72.1	23%
Uruguay	2.8	21.8	11%
Venezuela	2.3	28.6	0.8%

\*\*NOTE: Exceedingly high average peak connection speeds are likely related to the use of proxies within mobile network provider infrastructure, and are not necessarily representative of the peak connection speeds experienced by mobile subscribers

throughout the quarter, ending at 14 percentage points. Chrome Mobile and Android Webkit began the quarter with a difference of approximately 6 percentage points and ended the quarter at 11. Chrome Mobile usage appeared to drift steadily upward, while Safari and Webkit usage both fluctuated throughout the quarter without a clear directional trend.

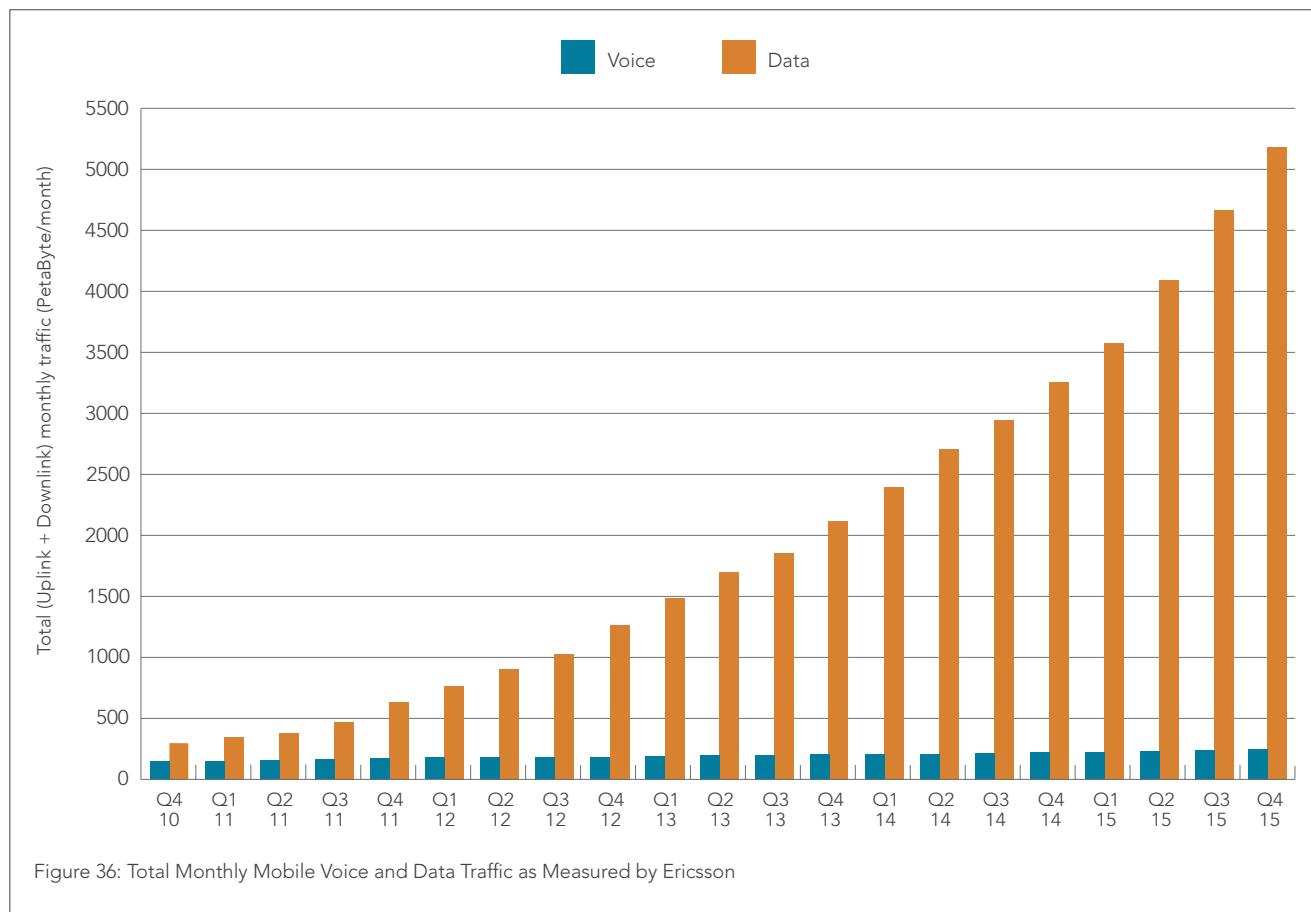
In comparing platforms, iOS and Android were close throughout the quarter, alternating leads multiple times. While iOS began the quarter with a slight one percentage-point lead over Android, it ended the quarter with an almost 6-point deficit. Averaged across the entire fourth quarter, iOS accounted for about 47% of requests, while Android accounted for roughly 48% of requests.



**7.3 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 36 shows total global monthly data and voice traffic from the fourth quarter of 2010 to the fourth 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 fourth quarter, data traffic grew 11.5% quarter over quarter and 64% year over year. Looking at the full five-year period shown in Figure 36, cumulative voice-traffic growth was only 52%, while cumulative data-traffic growth was just under 1700%.







# [SECTION]<sup>8</sup> 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 together 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<sup>44</sup> (or "navtiming"), 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,<sup>45</sup> 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.<sup>46</sup> Apple's Safari browser only began supporting it in version 8 on OS X and support for it in iOS returned in version 9.0. (Support had initially been added in iOS 8, but was removed in iOS 8.1 due to poor performance.) 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 37 shows average page load times for users on both broadband and mobile connections based on RUM data collected by Akamai during the fourth 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 fourth-quarter data collection period. In the fourth quarter, 104 countries/regions qualified for inclusion in this section, growing by more than 50% compared with the third quarter. Since the number of requests from mobile networks is the key qualifier for inclusion, we believe that the improvements to our mobile network identification algorithms may be, at least in part, responsible for this increase. Note also 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 37, we find the lowest values (i.e., fastest page load times) in Iran with a 1.2-second average load time, followed by South Korea with a 1.5-second load time. The country with the slowest broadband page load time was Cameroon, where pages took 7.2 seconds to load on average—approximately six times as long as Iran—a slightly larger multiplier than that seen between the fastest and slowest broadband page load times in the third quarter. Afghanistan and Zambia rounded out the bottom three in terms of broadband measurements with average load times of 5.6 and 5.5 seconds respectively. Note that these measurements do not just reflect broadband network speeds but are also influenced by factors such as average page weight, page composition, and the Akamai customer content consumed by users within these countries.

Looking at mobile networks, Laos had the fastest average page load time at just under half a second, followed by Iran, last quarter's leader, with an average load time of 0.6 seconds. Seven countries/regions in total had average page load times of under a second. At the other end of the spectrum, Nigeria and Zambia had the highest average load times for mobile connections, at 8.1 seconds and 7.5 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.

Country/Region	Avg. Page Load Time Broadband (ms)	Avg. Page Load Time Mobile (ms)	Mobile Penalty
<b>AFRICA</b>			
Algeria	2533	3515	1.4x
Angola	3722	3600	1.0x
Cameroon	7235	6033	0.8x
Cote D'Ivoire	5367	4325	0.8x
Egypt	1947	1890	1.0x
Ethiopia	4258	6106	1.4x
Ghana	5072	6237	1.2x
Kenya	5225	6617	1.3x
Morocco	2805	2693	1.0x
Mozambique	3735	3633	1.0x
Nigeria	4681	8071	1.7x
Senegal	5319	4144	0.8x
South Africa	3669	4792	1.3x
Tanzania	4651	4867	1.0x
Uganda	4663	6734	1.4x
Zambia	5513	7536	1.4x
<b>ASIA PACIFIC</b>			
Afghanistan	5572	3844	0.7x
Australia	3632	4073	1.1x
Azerbaijan	1888	1322	0.7x
Bahrain	5024	5521	1.1x
Bangladesh	3946	3619	0.9x
Brunei	3729	4411	1.2x
Cambodia	1589	1246	0.8x
China	2661	2426	0.9x
Hong Kong	2213	3772	1.7x
India	3992	6923	1.7x
Indonesia	3369	2807	0.8x
Iran	1239	614	0.5x
Israel	1951	1136	0.6x
Japan	2021	3573	1.8x
Jordan	2058	871	0.4x
Kazakhstan	2064	743	0.4x
Kuwait	4067	2905	0.7x
Laos	2813	463	0.2x
Lebanon	2924	3003	1.0x

Figure 37: Average Page Load Times Based On Real User Monitoring

In the fourth quarter, the mobile penalty across surveyed countries ranged from 0.2x in Laos to 1.9x in Taiwan, a smaller variance than was seen in the third quarter. Of the 104 countries/regions surveyed, 33 had a mobile penalty lower than 1.0x, meaning that average page load times were faster on mobile connections than on broadband connections. Note that many of these are countries that may have underdeveloped fixed-broadband infrastructure and depend heavily

Country/Region	Avg. Page Load Time Broadband (ms)	Avg. Page Load Time Mobile (ms)	Mobile Penalty
Malaysia	3475	3478	1.0x
Myanmar	3614	1947	0.5x
New Zealand	2100	2859	1.4x
Oman	4489	2381	0.5x
Pakistan	2668	2216	0.8x
Philippines	4595	6821	1.5x
Qatar	3937	4634	1.2x
Saudi Arabia	2967	2941	1.0x
Singapore	2162	3054	1.4x
South Korea	1461	2696	1.8x
Sri Lanka	3789	3867	1.0x
Taiwan	2220	4184	1.9x
Thailand	2724	2363	0.9x
United Arab Emirates	4110	5059	1.2x
Vietnam	2465	2581	1.0x
<b>EUROPE</b>			
Austria	1925	2560	1.3x
Belarus	2381	3274	1.4x
Belgium	1966	2051	1.0x
Bulgaria	2108	2179	1.0x
Croatia	2576	3080	1.2x
Czech Republic	1904	2288	1.2x
Denmark	1567	2218	1.4x
Estonia	2136	2780	1.3x
Finland	1923	2703	1.4x
France	2978	3083	1.0x
Germany	1904	807	0.4x
Greece	3381	4601	1.4x
Hungary	1926	2162	1.1x
Ireland	2792	3491	1.3x
Italy	2901	3715	1.3x
Lithuania	2073	2700	1.3x
Netherlands	1885	2377	1.3x
Norway	1940	2985	1.5x
Poland	2503	2884	1.2x
Portugal	2450	2915	1.2x
Romania	2048	2385	1.2x

on mobile; as such, the content they are consuming may also be heavily optimized for the mobile experience, with aggressively slimmed-down content being delivered to mobile devices. On the other end of the spectrum, Taiwan, South Korea, and Japan were the three countries/regions with the highest mobile penalties, with pages loading nearly least twice as fast, on average, over broadband connections compared with mobile connections. The average mobile penalty across all 104 qualifying countries was 1.1x, down from 1.3x in the third quarter.

Country/Region	Avg. Page Load Time Broadband (ms)	Avg. Page Load Time Mobile (ms)	Mobile Penalty
Russia	1985	2640	1.3x
Serbia	2054	2591	1.3x
Slovakia	2196	2278	1.0x
Slovenia	2127	2239	1.1x
Spain	2724	3522	1.3x
Sweden	1853	2707	1.5x
Switzerland	1937	2212	1.1x
Turkey	2516	3239	1.3x
Ukraine	1609	1562	1.0x
United Kingdom	2918	4133	1.4x
<b>NORTH AMERICA</b>			
Canada	2753	3738	1.4x
Costa Rica	3378	3359	1.0x
Dominican Republic	2685	2573	1.0x
El Salvador	2899	1503	0.5x
Guatemala	2272	778	0.3x
Haiti	4140	2418	0.6x
Honduras	2167	870	0.4x
Jamaica	3249	4821	1.5x
Mexico	2002	1771	0.9x
Nicaragua	2905	1676	0.6x
Panama	2631	3000	1.1x
Puerto Rico	2916	2643	0.9x
United States	2564	3559	1.4x
<b>SOUTH AMERICA</b>			
Argentina	3793	2357	0.6x
Bolivia	3459	1017	0.3x
Brazil	4097	4323	1.1x
Chile	3928	4357	1.1x
Colombia	2848	3300	1.2x
Ecuador	3200	2255	0.7x
Paraguay	4126	3013	0.7x
Peru	3448	4210	1.2x
Uruguay	3183	2979	0.9x
Venezuela	5168	4276	0.8x

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





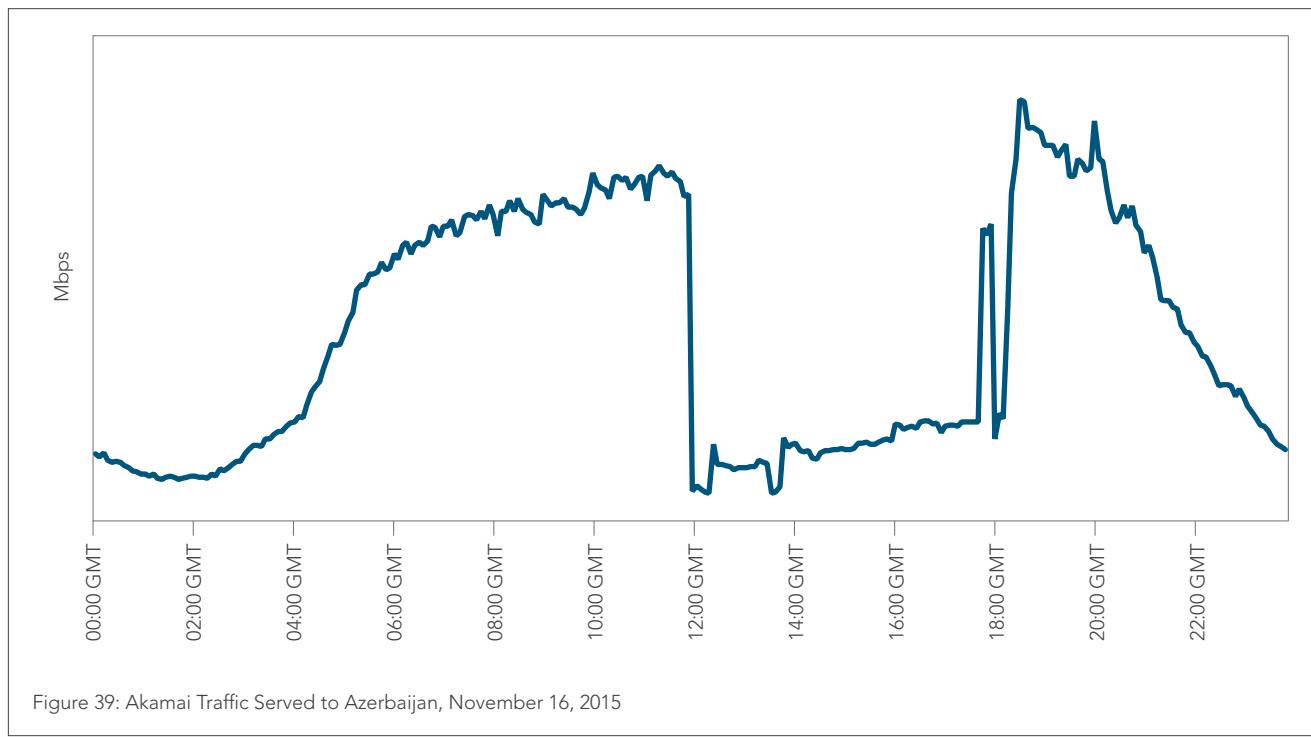
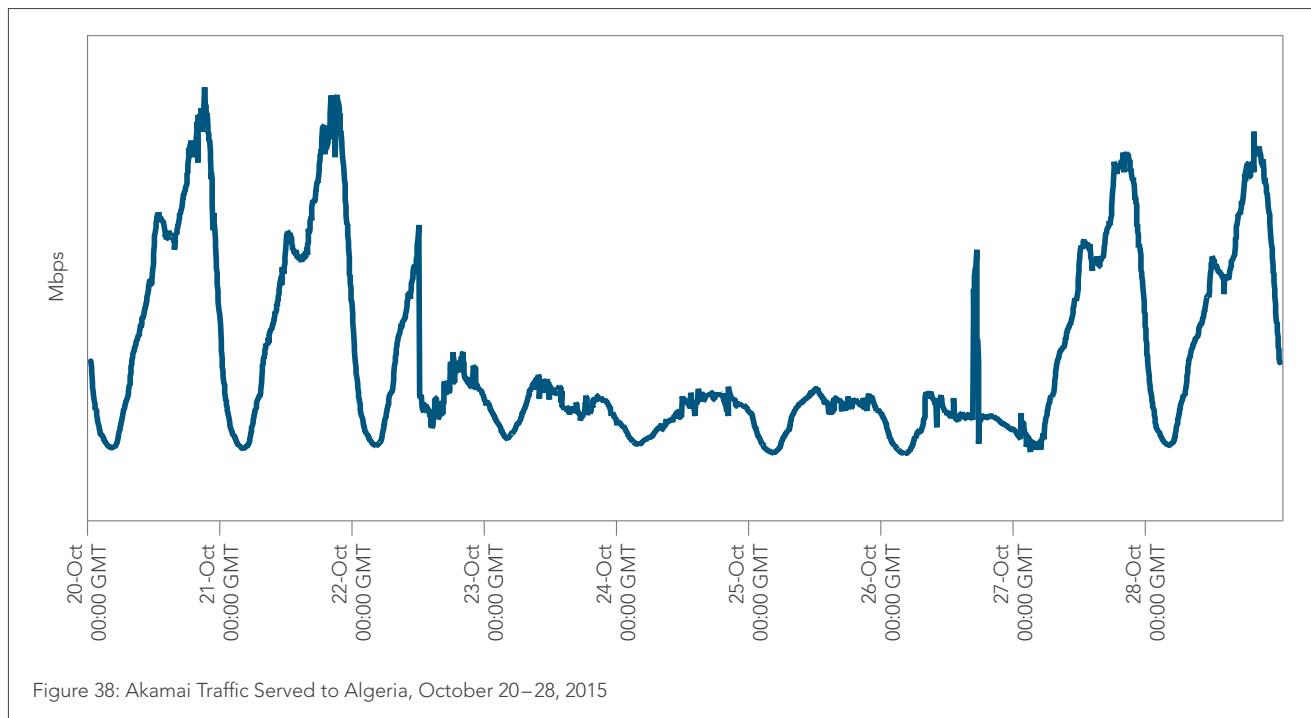
# [SECTION]<sup>9</sup> INTERNET DISRUPTIONS + EVENTS

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 insight into how Akamai traffic was impacted by major Internet disruptions and events during the fourth quarter of 2015.

**9.1 ALGERIA** / At approximately 11:40 a.m. UTC on October 22, Akamai observed its traffic levels to Algeria suddenly drop by over 70%, as seen in Figure 38. Traffic stayed at suppressed levels, with daily peaks reaching only 20% to 25% of typical levels, for several days before recovering on October 27. Dyn Research, the Internet monitoring arm of Internet performance company Dyn, noted the outage took out more than half the routes in Algeria during this time.<sup>47</sup> Algeria Telecom reported the outage was due to a cut in the undersea fiber-optic cable between Algeria and France.<sup>48</sup>

**9.2 AZERBAIJAN** / Akamai saw traffic to Azerbaijan suddenly drop to under 10% of previous levels at approximately 12:00 p.m. UTC on November 16, as illustrated in Figure 39. The outage lasted almost six and a half hours, with service being restored around 6:20 p.m. It was caused by a data center fire damaging the equipment of Delta Telecom, the country's main Internet provider, highlighting the vulnerability of countries like Azerbaijan that have a very small number of external connections to the Internet.<sup>49</sup> Dyn Research noted that more than 600 networks—approximately 78% of the networks in the country—were

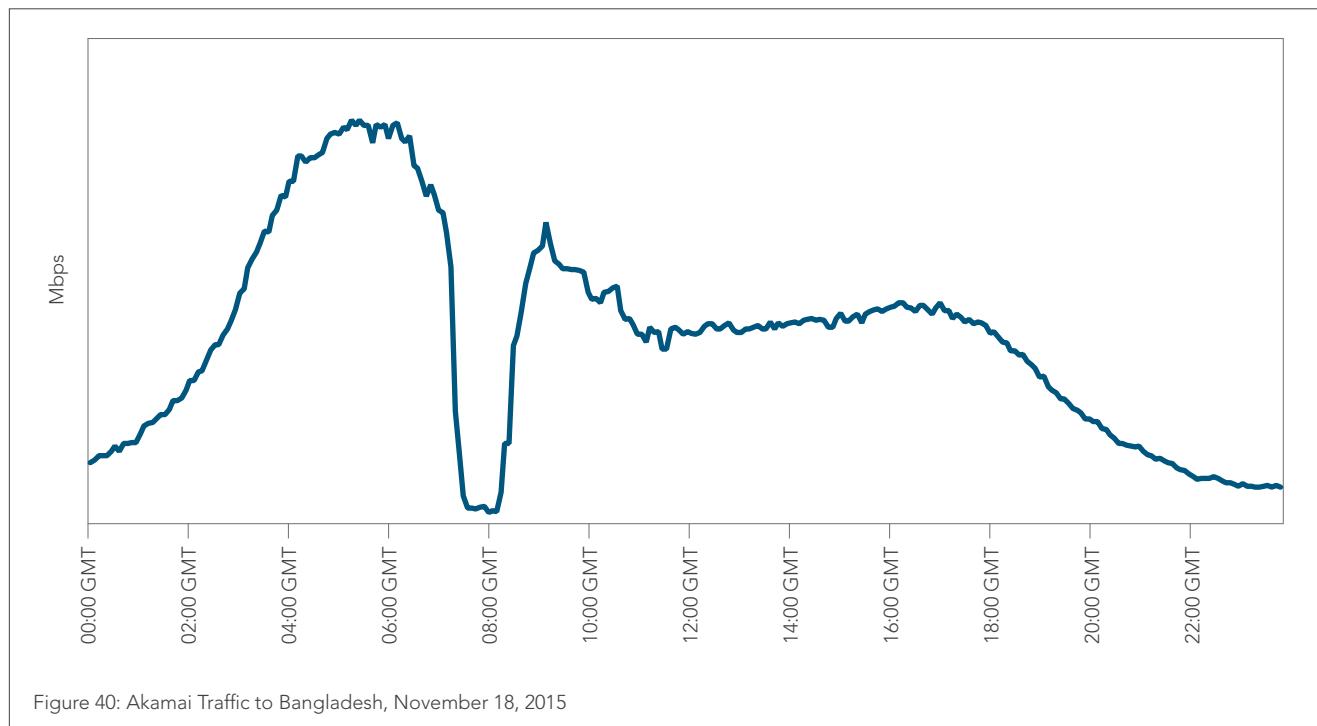


affected<sup>50</sup> and that all of the affected networks reach the Internet through a single connection between Delta Telecom and Telecom Italia Sparkle.<sup>51</sup>

**9.3 BANGLADESH** / On November 18, Akamai traffic to Bangladesh dropped to about 5% of normal levels, beginning around 7:20 a.m. UTC. As seen in Figure 40, the severe drop in traffic lasted for only about an hour, although traffic did not fully return to normal levels for weeks following the event. The initial outage was apparently the result of an Internet shut down ordered by the Bangladeshi government for “security reasons”, following the announcement of a Supreme Court ruling that the death penalty would be upheld in a war crimes trial against former government leaders.<sup>52</sup> The Bangladeshi government reportedly announced that the Internet outage had been a mistake, and that it had only intended to shut down certain social media sites and applications and that those applications would continue to be blocked until the security threat had passed.<sup>53</sup> Akamai’s data indicates that traffic levels to Bangladesh remained lower than normal until December 11.

**9.4 CAMEROON** / As seen in Figure 41, at approximately 6:50 p.m. UTC on December 11, Akamai saw its traffic levels to Cameroon drop suddenly to about one-third of previous levels. Traffic remained at reduced levels for several hours. Although the exact cause of the disruption is unknown, it may be related to the frequent power outages faced by the country.<sup>54</sup> Dyn Research corroborated the event, noting that 148 networks in Cameroon — representing 79% of the networks in the country — were unreachable during this time.<sup>55</sup>

**9.5 MYANMAR** / From approximately 10:05 a.m. UTC to 10:50 a.m. UTC and again from about 11:55 a.m. UTC to 12:10 p.m. UTC on November 9, Akamai traffic to Myanmar fell abruptly to just over half of previous levels, as seen in Figure 42. Dyn Research noted the outage as well, reporting that MPT Myanmar — the state-owned telecommunications operator — was dealing with power supply issues.<sup>56</sup>



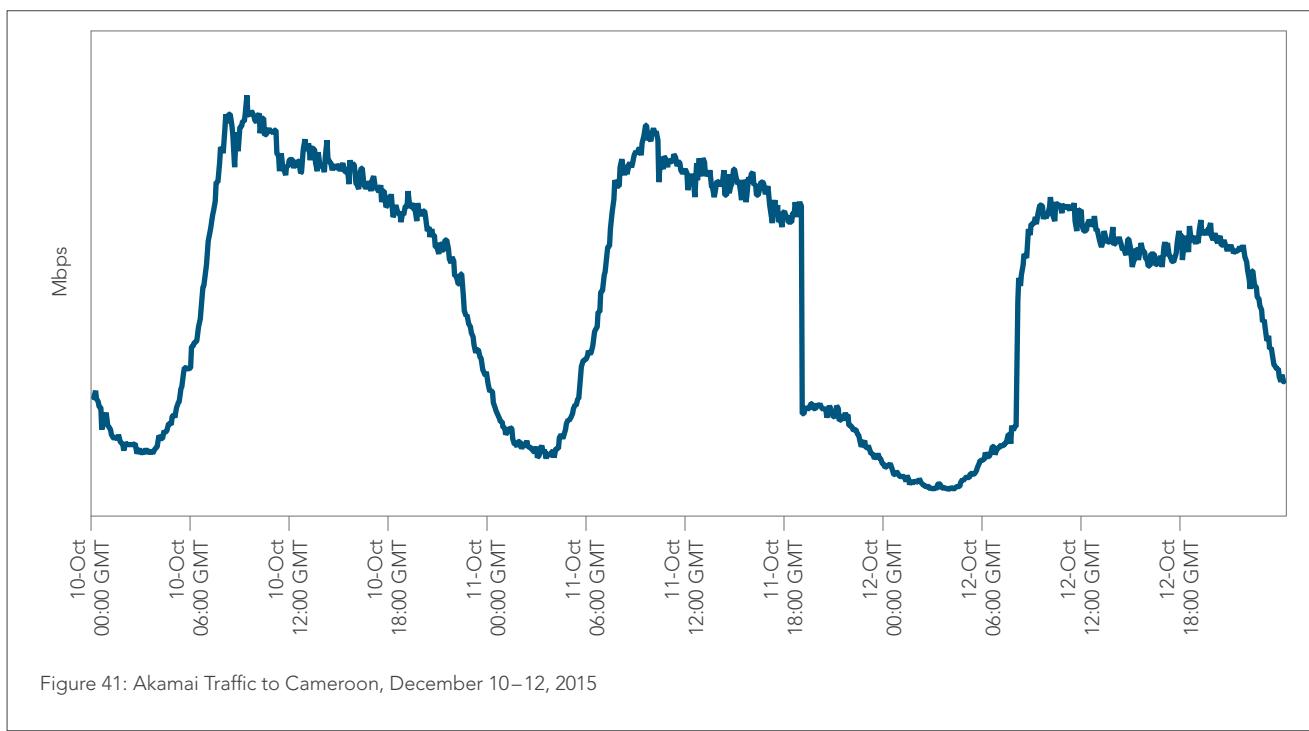


Figure 41: Akamai Traffic to Cameroon, December 10–12, 2015

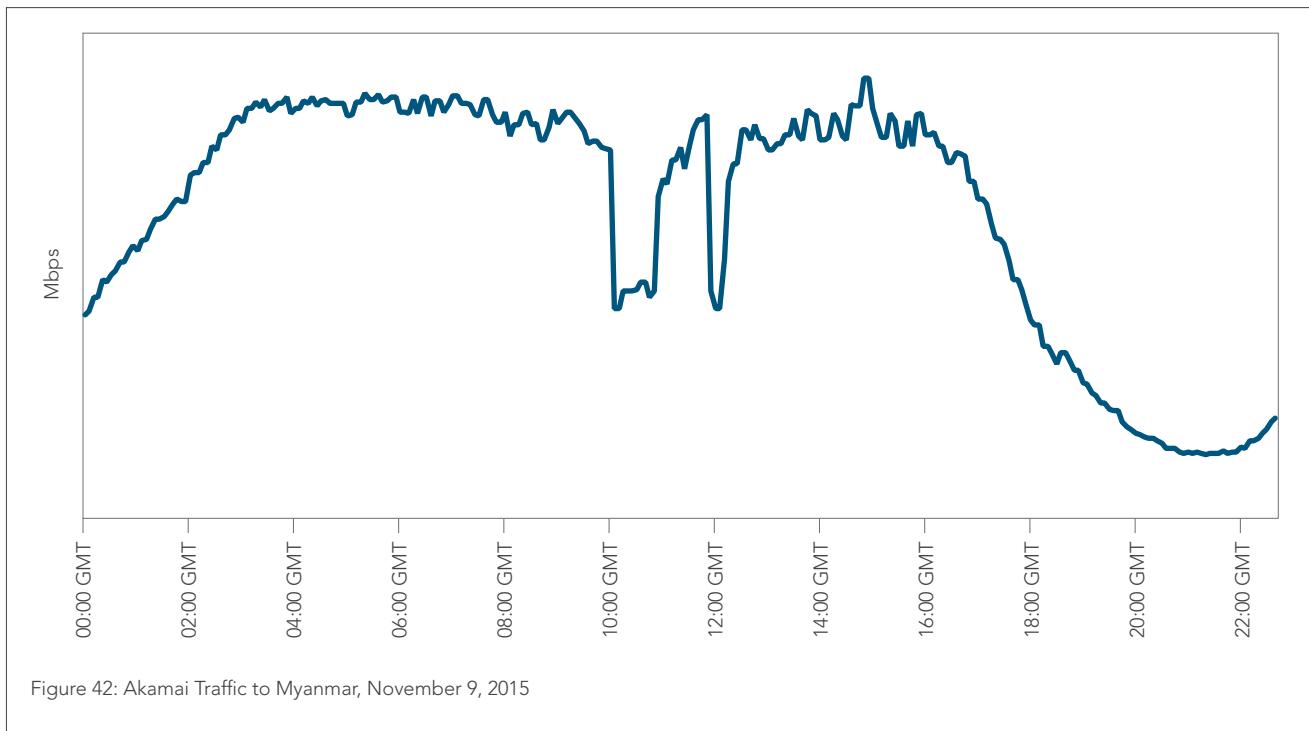


Figure 42: Akamai Traffic to Myanmar, November 9, 2015

Region	Unique IPv4 Addresses	Average Connection Speed (Mbps)	Average Peak Connection Speed (Mbps)	% Above 4 Mbps	% Above 10 Mbps	% Above 15 Mbps
<b>AMERICAS</b>						
Argentina	8,199,701	4.7	28.5	46%	4.4%	0.7%
Bolivia	279,921	2.0	13.2	3.3%	0.3%	0.1%
Brazil	47,913,625	4.1	30.3	39%	2.9%	0.8%
Canada	14,924,241	13.1	54.9	88%	49%	27%
Chile	4,750,333	6.1	44.7	67%	10%	2.7%
Colombia	10,881,807	4.5	23.6	51%	2.2%	0.5%
Costa Rica	504,725	3.4	15.7	23%	1.2%	0.5%
Ecuador	912,935	4.4	24.6	42%	3.3%	0.8%
Mexico	14,091,960	5.9	29.9	68%	8.2%	2.2%
Panama	515,609	3.8	17.3	37%	1.9%	0.5%
Paraguay	212,884	1.6	13.4	2.3%	0.2%	0.1%
Peru	1,043,910	4.5	31.5	47%	2.9%	0.9%
United States	143,153,801	14.2	61.5	83%	53%	32%
Uruguay	1,046,855	6.2	57.2	72%	8.8%	2.1%
Venezuela	2,890,917	1.6	11.3	2.7%	0.2%	0.1%
<b>ASIA PACIFIC</b>						
Australia	9,670,949	8.2	39.3	73%	20%	8.2%
China	127,187,349	4.1	26.7	41%	1.6%	0.3%
Hong Kong	3,182,013	16.8	105.2	93%	61%	38%
India	17,568,808	2.8	21.2	17%	2.8%	1.0%
Indonesia	3,806,115	3.9	79.8	36%	1.7%	0.5%
Japan	46,336,973	17.4	82.9	91%	63%	40%
Malaysia	2,075,107	5.2	42.0	56%	5.4%	1.2%
New Zealand	2,109,371	9.3	42.8	87%	26%	11%
Philippines	1,441,202	3.2	27.0	14%	1.9%	0.8%
Singapore	1,811,430	13.9	135.7	91%	59%	32%
South Korea	24,298,862	26.7	95.3	97%	81%	63%
Sri Lanka	166,266	4.8	34.8	52%	3.6%	1.3%
Taiwan	10,602,019	12.9	78.8	90%	45%	24%
Thailand	3,519,771	9.3	63.7	95%	26%	8.2%
Vietnam	6,553,822	3.8	31.4	40%	1.0%	0.2%
<b>EUROPE, MIDDLE EAST &amp; AFRICA</b>						
Austria	3,096,358	12.3	47.6	92%	38%	19%
Belgium	4,837,693	14.2	64.1	93%	61%	32%
Czech Republic	1,878,822	15.9	54.6	88%	51%	30%
Denmark	2,941,399	16.1	54.2	94%	60%	38%
Finland	2,669,474	16.6	55.4	91%	57%	34%
France	29,641,699	8.9	43.2	78%	24%	11%
Germany	36,674,664	12.9	51.3	89%	43%	23%
Hungary	2,832,221	12.6	58.5	92%	48%	25%
Ireland	2,100,071	12.8	54.9	79%	41%	25%
Israel	2,451,291	11.6	61.7	94%	39%	16%
Italy	16,720,285	7.4	32.0	78%	14%	5.2%
Netherlands	9,340,138	17.0	65.3	96%	64%	39%
Norway	3,461,397	18.8	59.8	90%	62%	45%
Poland	7,759,994	11.0	48.7	86%	36%	19%
Portugal	3,716,626	12.1	48.9	86%	43%	26%
Romania	3,429,228	13.2	73.6	91%	53%	28%
Russia	19,443,307	11.6	60.1	90%	46%	21%
Slovakia	993,680	12.5	50.9	85%	33%	20%
South Africa	5,682,767	4.1	21.5	27%	3.8%	1.9%
Spain	15,400,898	12.1	60.0	88%	42%	24%
Sweden	6,256,566	19.1	71.8	93%	60%	42%
Switzerland	3,734,509	16.7	66.3	94%	62%	38%
Turkey	9,123,323	6.3	38.2	77%	8.4%	3.0%
United Arab Emirates	1,411,778	6.9	52.4	86%	11%	2.7%
United Kingdom	31,632,529	13.9	56.8	89%	50%	32%

- <sup>1</sup> <http://www.potaroo.net/tools/ipv4/>
- <sup>2</sup> <https://www.apnic.net/publications/research-and-insights/geoff-huston>
- <sup>3</sup> <https://twitter.com/IPv4Countdown>
- <sup>4</sup> <http://whois.domaintools.com/52.160.0.0>, <http://whois.domaintools.com/52.224.0.0>, <http://whois.domaintools.com/52.96.0.0>
- <sup>5</sup> <http://whois.domaintools.com/136.32.0.0>
- <sup>6</sup> <http://finance.yahoo.com/news/ford-and-at-t-hook-up-for-free-connected-car-service-171519291.html>
- <sup>7</sup> <http://whois.domaintools.com/177.64.0.0>, <http://whois.domaintools.com/187.122.0.0>
- <sup>8</sup> <http://whois.domaintools.com/196.128.0.0>
- <sup>9</sup> <http://whois.domaintools.com/156.224.0.0>
- <sup>10</sup> <http://whois.domaintools.com/197.80.0.0>, <http://whois.domaintools.com/197.88.0.0>, <http://whois.domaintools.com/41.132.0.0>
- <sup>11</sup> <http://whois.domaintools.com/45.104.0.0>
- <sup>12</sup> <http://whois.domaintools.com/196.172.0.0>
- <sup>13</sup> <http://whois.domaintools.com/196.176.0.0>
- <sup>14</sup> <http://whois.domaintools.com/196.180.0.0>
- <sup>15</sup> <https://www.fcc.gov/document/fcc-finds-us-broadband-deployment-not-keeping-pace>
- <sup>16</sup> [http://www.samenaouncil.org/samena\\_daily\\_news.php?news=56059](http://www.samenaouncil.org/samena_daily_news.php?news=56059)
- <sup>17</sup> <http://www.wired.com/2015/10/google-project-link/>
- <sup>18</sup> <http://venturebeat.com/2015/10/05/facebook-will-use-satellites-to-bring-broadband-to-large-parts-of-africa/>
- <sup>19</sup> <http://arstechnica.co.uk/business/2015/11/uk-govt-promises-all-homes-will-have-legal-right-to-10mbps-broadband-by-2020/>
- <sup>20</sup> <http://www.pewinternet.org/2015/12/21/home-broadband-2015/>
- <sup>21</sup> <http://googleasiapacific.blogspot.com/2015/10/bringing-internet-within-reach.html>
- <sup>22</sup> <http://www.telecompaper.com/news/90-of-portuguese-internet-users-have-access-above-20-mbps--1098999>
- <sup>23</sup> <http://techcrunch.com/2015/10/28/oklahoma-city-jacksonville-and-tampa-invited-to-explore-google-fiber/>
- <sup>24</sup> <http://recode.net/2015/12/07/att-promises-to-bring-fiber-to-places-where-google-isnt/>
- <sup>25</sup> <http://corporate.comcast.com/comcast-voices/worlds-first-live-docsis-3-1-gigabit-class-modem-goes-online-in-philadelphia>
- <sup>26</sup> <http://bbpmag.com/wordpress2/2015/12/cox-launching-gigabit-internet-service-in-northern-virginia/>
- <sup>27</sup> <http://techcrunch.com/2015/11/12/rocket-fiber-launches-100gbs-internet-service-in-downtown-detroit/>
- <sup>28</sup> <http://bbpmag.com/wordpress2/2015/11/lincoln-neb-to-provide-gigabit-internet-service-by-2019/>
- <sup>29</sup> <http://www.bizjournals.com/sanjose/news/2015/12/04/santa-cruz-aims-to-have-gigabit-fiber-network.html>
- <sup>30</sup> <http://www.wired.com/2015/10/chattanooga-is-offering-internet-faster-than-google-fiber/>
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