

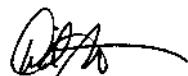
As we enter the tenth year of publication of the *State of the Internet Report*, I thought that it would be interesting to reflect on relevant events that have taken place since we released the first issue in the Spring of 2008.

- July 2008: Apple launches the iPhone App Store, which ultimately set the stage for mobile phones to supplant personal computers as primary Internet access devices.
- December 2009: TeliaSonera makes the first LTE service available in Oslo, Norway and Stockholm, Sweden.
- July 2010: The number of Internet users crossed two billion for the first time, per estimates from Internet Live Stats.
- January 2011: In response to civil unrest, the Egyptian government moves to shut down almost all of the country's access to the global Internet.
- June 2012: Network service providers, content providers, and Internet infrastructure companies participate in the World IPv6 Launch event, with a goal of making IPv6 “the new normal.”
- April 2013: Google announces that its Google Fiber initiative would be expanding beyond Kansas City, Kansas to Austin, Texas and Provo, Utah.
- September 2014: A vulnerability in the widely-used Unix Bash shell, known as “Shellshock,” allows attackers to gain unauthorized access to computer systems, resulting in the creation of botnets that launch distributed denial-of-service attacks and perform vulnerability scanning.
- June 2015: The United States Federal Communication Commission’s Open Internet rules take effect, intended to “protect and maintain open, uninhibited access to legal online content without broadband Internet access providers being allowed to block, impair, or establish fast/slow lanes to lawful content.”
- September/October 2016: The Mirai botnet, comprised largely of compromised Internet of Things devices, such as IP-connected cameras and home routers, launches record-breaking distributed denial of service attacks against the Krebs on Security website and DNS infrastructure provider Dyn.

This list represents just a small sample of significant events that have occurred over the last nine years, but each entry has arguably had a meaningful impact on the Internet, whether in relation to general Internet usage, wired broadband, mobile connectivity, security, or addressing. These topics have formed the foundation of the *State of the Internet Report* over the last nine years, and we expect that they will become even more important over the coming decade. Of course, we will work to continue to provide relevant and actionable data related to these topics within the reports, as well as through expanded and new data visualizations on akamai.com

For readers who like to consume the *State of the Internet Report* on a tablet or e-reader, it is available for download in ePub format from online bookstores including [amazon.com](#), [Barnes & Noble](#), [Google Play](#), [Apple iBooks](#), and [Kobo](#). Specific download links are available upon registration at <https://www.akamai.com/stateoftheinternet>, 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 or on Twitter at [@akamai_soti](#). You can also interact with us in the *State of the Internet* subspace on the Akamai Community at <https://community.akamai.com/>.



—David Belson

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Akamai's globally distributed Intelligent Platform™ allows us to gather enormous 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 first quarter of 2017, covering Internet connection speeds and broadband adoption metrics across both fixed and mobile networks, 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 events and disruptions that occurred during the quarter, and observations from Ericsson regarding data and voice-traffic growth on mobile networks.

Data on attack traffic seen across the Akamai platform and insights into high-profile security vulnerabilities and attacks are 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 <https://www.akamai.com/stateoftheinternet-security>.

INTERNET CONNECTIVITY / In the first quarter of 2017, Akamai observed a 0.9% quarterly increase in the number of unique IPv4 addresses connecting to the Akamai Intelligent Platform, rising to just over 814 million—about 7.6 million more than in the fourth quarter of 2016. In all, approximately 5 million IPv4 addresses were depleted from available pools at the Regional Internet Registries in the first quarter, leaving approximately 39 million addresses remaining. Belgium remained the clear global leader in IPv6 adoption with 38% of its connections to Akamai for dual-stacked content happening over IPv6, down 19% from the previous quarter.

CONNECTION SPEEDS & BROADBAND ADOPTION / The global average connection speed increased 2.3% quarter-over-quarter to 7.2 Mbps, a 15% increase compared with one year prior. At a country/region level, South Korea continued to have the highest average connection speed in the world at 28.6 Mbps—a 9.3% increase compared to the fourth quarter of 2016, and Singapore maintained its position as the country with the highest average peak connection speed at 184.5 Mbps.

Globally, 4 Mbps broadband adoption was 82% in the first quarter, up 3.3% from the previous quarter, with Guernsey and South Korea seeing the highest levels of adoption worldwide at 98% each. The worldwide 10 Mbps, 15 Mbps, and 25 Mbps broadband adoption rates all saw robust quarter-over-quarter growth, increasing 9.0%, 11%, and 16% to adoption levels of 45%, 28%, and 12%, respectively.

As it has for many quarters, South Korea continued to lead the world in all three broadband tiers, with adoption rates of 85%, 69%, and 40% respectively, after quarterly increases of 3.1%, 7.8%, and 16%.

MOBILE / In the first quarter of 2017, average mobile connection speeds (aggregated at a country/region level) ranged from a high of 26.0 Mbps in the United Kingdom to a low of 2.8 Mbps in Venezuela. Based on traffic data collected by Ericsson, the volume of mobile data traffic grew by nearly 12% over the previous quarter.





[SECTION]¹ INTERNET PENETRATION

Through its globally deployed Intelligent Platform, and by virtue of the over 2 trillion requests for web content that it serves daily, Akamai has unique visibility into levels of Internet penetration around the world. In the first quarter of 2017, more than 814 million unique IPv4 addresses from 239 unique countries/regions connected to the Akamai Intelligent Platform. This is a 0.7% increase in the number of unique IPv4 addresses seen by Akamai compared to one year prior and a 0.9% increase from the number seen in the fourth quarter of 2016.

We believe the 814 million IPv4 addresses seen by Akamai represent 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.

1.1 UNIQUE IPv4 ADDRESSES / The number of unique IPv4 addresses worldwide connecting to Akamai increased by nearly 7.6 million in the first quarter of 2017. However, as noted previously, we expect that the unique global IPv4 addresses seen by Akamai will level off or decline somewhat in the future as carriers increase the availability of native IPv6 connectivity for subscribers and implement Carrier-Grade Network Address Translation (CGNAT) solutions more broadly to conserve limited IPv4 address space.

In the first quarter of 2017, seven of the top 10 countries/regions saw modest quarterly gains in unique IPv4 address counts, while three saw modest decreases. As seen in Figure 1, gains ranged from 0.2% in Japan to 4.4% in France, while declines ranged from 0.2% in Russia to 2.7% in China. Across the globe, more than 70% of the countries/regions surveyed saw a quarter-over-quarter increase in unique IPv4 address counts in the first quarter of 2017, up from approximately 50% in the previous quarter. Thirty-seven countries/regions saw IPv4 address counts grow 10% or more, while twelve saw counts decline 10% or more as compared with the previous quarter.

Year-over-year changes among the top 10 countries/regions were mixed as well, with seven seeing IPv4 address counts rise and three seeing them drop. Germany and South Korea posted the largest increases at 7.0% each, while Japan had the smallest at 0.9%. Among the countries/regions to see a yearly decrease in unique IPv4 address counts, China again had the largest decline with a drop of 7.8%, while Russia had the smallest at 0.2%. As noted previously, the declines 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, roughly 60% of the countries/regions surveyed had higher unique IPv4 address counts in the first quarter of 2017 compared with one year prior. Yearly growth rates of 100% or more were seen in seven countries/regions, although most of them had a relatively small number of unique IPv4 addresses, so associated percentage shifts can appear deceptively large. Three countries/regions saw IPv4 address counts decline at least 50%, but all three had fewer than 200 IPv4 addresses connect to Akamai in the first quarter.

1.2 IPv4 EXHAUSTION / As expected, in the first quarter of 2017, available IPv4 address space continued to decrease as Regional Internet Registries (RIRs) assigned and 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 data¹ collected by Geoff Huston, Chief Scientist at APNIC,² we can provide 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, we use 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 first quarter of 2017 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 reported available pool has remained at zero since then.

LACNIC handed out approximately 470,000 addresses—slightly more than the number it distributed in the fourth quarter of 2016 and representing more than 10% of the addresses it had available in its pool at the beginning of the quarter. AFRINIC distributed more than 3.2 million addresses—more than double the number it handed out in the previous quarter and representing about 17% of its available pool. APNIC distributed over 440,000 addresses—slightly more than the number given out in the fourth quarter and roughly 6% of its available pool, and RIPE NCC handed out about 870,000 addresses—slightly lower than the number it distributed in the previous quarter and also roughly 6% of its pool.

With close to 15.7 million addresses available at the end of the first quarter, AFRINIC was again the RIR with the most substantial pool of IPv4 addresses remaining. At the end of the first quarter, RIPE NCC and APNIC had roughly 12.6 million and 6.7 million available IPv4 addresses, respectively; and LACNIC, with the smallest remaining pool, had just under 4 million available addresses remaining.

| | Country/Region | Q1 2017 Unique IPv4 Addresses | QoQ Change | YoY Change |
|----|----------------|-------------------------------|------------|------------|
| - | Global | 814,430,862 | 0.9% | 0.7% |
| 1 | United States | 142,764,621 | 0.9% | 1.9% |
| 2 | China | 116,682,392 | -2.7% | -7.8% |
| 3 | Brazil | 47,684,097 | 0.9% | -1.4% |
| 4 | Japan | 46,179,708 | 0.2% | 0.9% |
| 5 | Germany | 38,894,612 | 1.2% | 7.0% |
| 6 | United Kingdom | 31,812,059 | 2.8% | 2.3% |
| 7 | France | 31,052,551 | 4.4% | 2.2% |
| 8 | South Korea | 26,226,184 | 3.2% | 7.0% |
| 9 | Russia | 19,432,455 | -0.2% | -0.2% |
| 10 | Italy | 17,108,083 | -1.8% | 2.5% |

Figure 1: Unique IPv4 Addresses Seen by Akamai

Figure 3 illustrates the IPv4 allocation/assignment activity across each of the RIRs during the first quarter of 2017. Compared with the fourth quarter, there was significantly more activity, as 9.2 million addresses were allocated/assigned in the first quarter of 2017 versus 6.4 million in the fourth quarter of 2016. As noted in previous *State of the Internet Reports*, as available address pools dwindle, sizeable portions of these transactions—most notably ARIN’s assignment/allocation of 4 million addresses—are likely to be third-party transfers instead of direct RIR allocations.

Based on the data below, the most significant transactions at ARIN in the first quarter occurred on February 22, when a /12, /13, and /14 were allocated to Microsoft,³ and on March 21, when a /12 was allocated to Google.⁴ As noted in previous *State of the Internet Reports*, these transactions were most likely IPv4 address block transfers between third-party companies, but they appear as ARIN assignments in this data set because of the administrative logistics of the transfer process.

In the meantime, the remaining RIRs still have IPv4 addresses available to assign. AFRINIC’s largest two largest allocations occurred on March 1, when Egyptian broadband provider

TE Data received a /12,⁵ and on March 30, when Ghanaian telecommunications provider Scancom received a /12.⁶ In addition, on January 4, AFRINIC allocated a /13 to Airtel Kenya,⁷ and on February 7, it allocated a /14 to Egypt’s Nile Online (now owned by multinational Etisalat).⁸ Other than these transactions, AFRINIC, APNIC, RIPENCC, and LACNIC all saw slow, consistent delegation activity in the first quarter, much like the previous quarters, with no specific days seeing assignments or allocations larger than a /15.

1.3 IPv6 ADOPTION / This section includes insight into IPv6 adoption 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 new versions of Mac OS X have addressed this issue, we are now finding that lack of IPv6 support in some consumer electronics (such as smart TVs and stand-alone digital media player

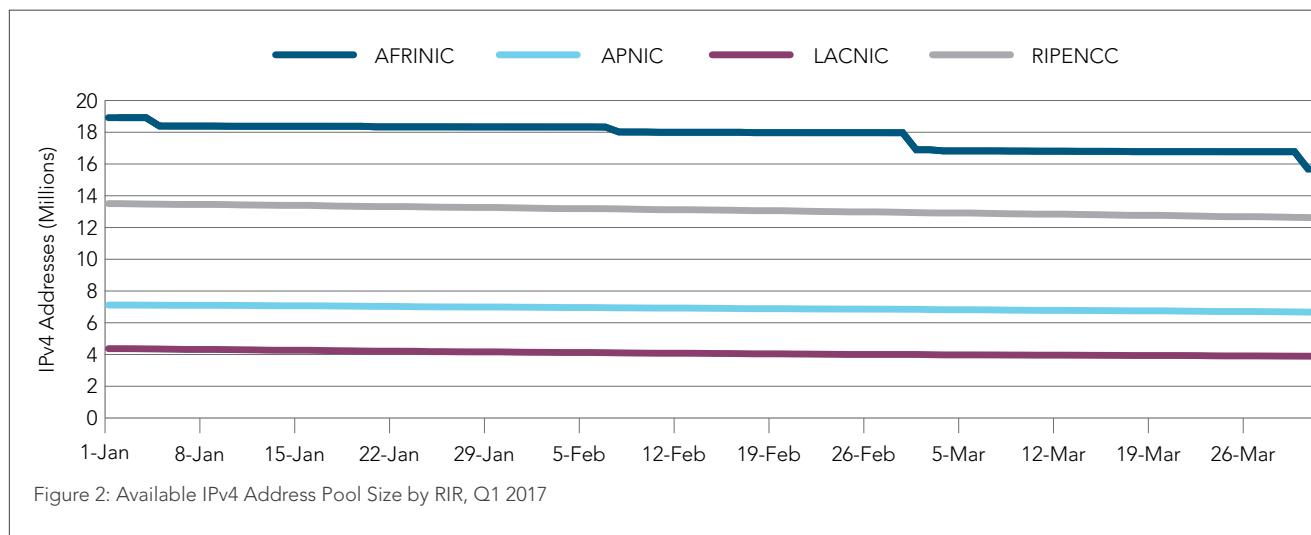


Figure 2: Available IPv4 Address Pool Size by RIR, Q1 2017

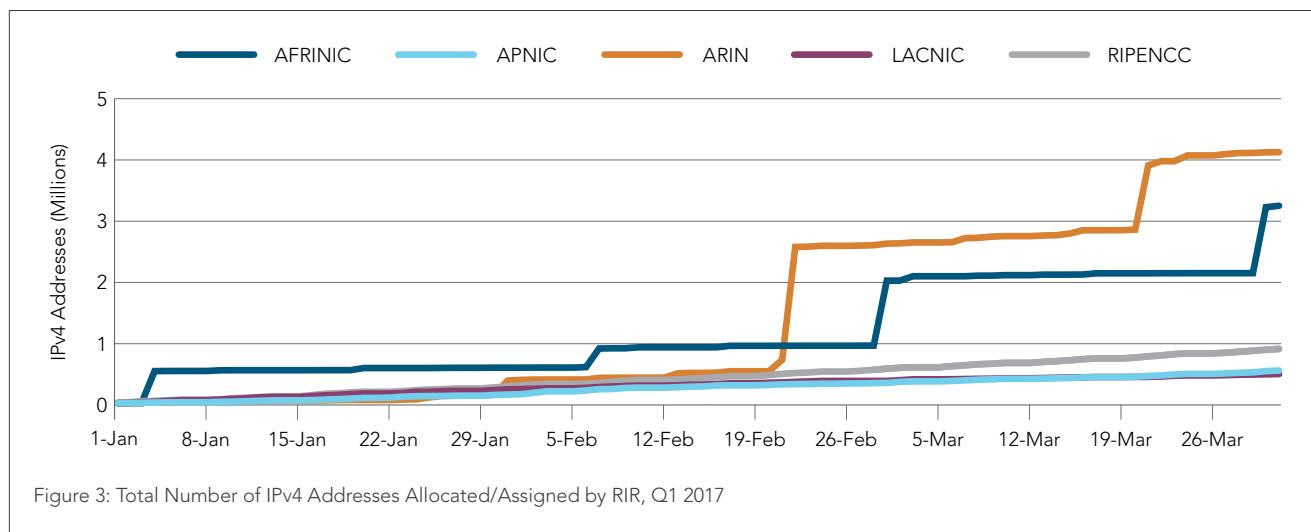


Figure 3: Total Number of IPv4 Addresses Allocated/Assigned by RIR, Q1 2017

devices) is presenting a barrier to growth in adoption, especially as the amount of content consumed on these devices grows over time. 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 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 first 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* section of Akamai’s website at <https://www.akamai.com/stateoftheinternet/ipv6>.

Figure 4 highlights the 10 countries/regions with the largest percentage of content requests made to Akamai over IPv6 in the first quarter. Many of the countries recorded quarter-over-quarter drops in adoption; however, a longer-term view of the data indicates this may be due in part to a seasonal effect, as fourth-quarter IPv6 numbers generally appear to spike somewhat in comparison to other quarters; the numbers seen for the first quarter of 2017 are like those seen in the third quarter of 2016, with a significant spike in the fourth quarter of 2016. The end-of-year holiday period may be a factor in this, as during this time, more people are accessing the Internet more frequently from residential (versus business) connections, and residential connections tend to have higher levels of IPv6 penetration, sometimes substantially so.

In the first quarter, despite a 19% quarterly drop in IPv6 adoption, Belgium maintained its substantial global lead, as 38% of its dual-stack content requests to Akamai were made over IPv6. Belgium’s IPv6 percentage was 13 points higher than Greece, in which held second place. Unlike the fourth quarter of 2016, when 9 of the top 10 countries/regions recorded a rise in IPv6 adoption, in the first quarter of 2017, 8 of the 10 posted declines, though these changes may be explained in part by the cyclical seasonal effects noted above. Drops ranged from 4.8% in the United Kingdom and Trinidad and Tobago to 22% in Switzerland. India and Brazil were the two countries in the top 10 to see quarterly gains, as their adoption levels rose 21% and 29% respectively.

| | Country/Region | Q1 2017 IPv6 % | QoQ Change |
|----|---------------------|----------------|------------|
| 1 | Belgium | 38% | -19% |
| 2 | Greece | 25% | -16% |
| 3 | United States | 22% | -15% |
| 4 | Switzerland | 21% | -22% |
| 5 | Trinidad and Tobago | 21% | -4.8% |
| 6 | Germany | 20% | -20% |
| 7 | India | 17% | 21% |
| 8 | Estonia | 16% | -10% |
| 9 | Brazil | 13% | 29% |
| 10 | United Kingdom | 13% | -4.8% |

Figure 4: IPv6 Traffic Percentage, Top Countries/Regions

Figure 5 lists the top 20 network providers ordered by the number of IPv6 requests made to Akamai during the first quarter. Once again, cable and wireless/mobile providers continued to drive the largest volumes of IPv6 requests, as many are leading the way for IPv6 adoption in their respective countries. In the first quarter of 2017, T-Mobile caught up to Verizon Wireless to share the lead in adoption rates, as both providers had 82% of their requests to Akamai being made over IPv6, up from 77% and 81% respectively in the fourth quarter. Sixteen of the top twenty providers had at least one in four requests for dual-stacked content to Akamai take place over IPv6—down from 17 providers in the fourth quarter. All but one of the top 20 had at least 15% of dual-stack content requests to Akamai occur over IPv6.

First-quarter news announcements reflected the leadership role mobile carriers are continuing to play in IPv6 adoption. In Japan, three major mobile carriers—NTT Docomo, KDDI, and Softbank—revealed they would start full IPv6 services in 2017.⁹ In the U.S., Verizon Wireless informed customers that beginning on June 30, 2017, it would cease to issue new IPv4 addresses. From that point forward, Verizon customers requesting new static public IP addresses will be issued IPv6 addresses only.¹⁰

| Country/Region | Network Provider | Q1 2017 IPv6 % |
|----------------|----------------------------------|----------------|
| United States | Comcast Cable | 43% |
| United States | AT&T | 44% |
| India | Reliance Jio INFOCOMM Ltd | 79% |
| United States | Verizon Wireless | 82% |
| United States | Time Warner Cable | 27% |
| United States | T-Mobile | 82% |
| Germany | Deutsche Telekom | 32% |
| United Kingdom | Sky Broadband | 62% |
| United States | Cox Communications | 25% |
| Brazil | NET Serviços de Comunicação S.A. | 22% |
| Canada | Rogers Cable | 41% |
| Belgium | TELENET | 55% |
| United States | Sprint Communications | 43% |
| Canada | Telus Communications | 44% |
| Japan | KDDI Corporation | 34% |
| France | Orange | 12% |
| Germany | Kabel Deutschland | 49% |
| France | Proxad/Free | 26% |
| Australia | Telstra Direct | 18% |
| Pan-European | Liberty Global B.V. (UPC) | 16% |

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







[SECTION]² GEOGRAPHY GLOBAL

The data presented within this section was collected during the first quarter of 2017 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. The report features 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. In addition, the report provides insight into adoption levels at different broadband threshold speeds; references to broadband tiers throughout this report refer to speeds greater than or equal to the specified threshold. To qualify for inclusion in a speed tier, a country or region must have more than 25,000 unique IPv4 addresses with average connection speeds that meet the given speed threshold. Note that connection speeds published within the *State of the Internet Report* are guidance based on the reach of Akamai's platform. See the blog post at <http://akamai.me/sotimetrics2016>, as well as previous posts referenced within, for more information on how these metrics are calculated.

Traffic from known mobile networks is analyzed and reviewed in *Section 8* of the Report. Therefore, mobile network data has been removed from the data set used to calculate the metrics in the present section, as well as in subsequent regional “Geography” sections. However, a small number of networks offer both fixed and mobile broadband service, and in some cases it may not be possible to accurately separate the two types of traffic within that network. Therefore, some data included in this section may be based on connections from mobile devices and/or mobile gateways. In most cases, we do not expect this data to have a significant bearing on the results presented below, but we will note instances where we feel the speeds presented may be substantively affected.

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, which can skew connection speed metrics. We believe that removing this data from our calculations provides a more accurate picture of the end-user experience.

Note that the speed and broadband adoption data presented in Sections 2 through 7 of this report are meant to give an indication of speeds and broadband adoption rates as experienced by users connecting to Akamai in each country; it does not in any way reflect what portion of the population of each country is connected to the Internet or has subscribed to broadband Internet access services at specific speed tiers. In addition, the data is currently limited to connections made from IPv4 addresses only. Some countries, such as Luxembourg, have chosen to roll out new high-speed broadband services using native IPv6 connectivity. As such, these sections may under-report the connection speeds available to and achieved by broadband subscribers within these countries, as IPv6 speeds are not included.

Finally, due to data issues that affected peak speed calculations in the fourth quarter of 2016, data on Average Peak Connection Speeds from Sections 2 through 7 were not published in the *Fourth Quarter, 2016 State of the Internet Report*. We have reintroduced this data in the current report but have not calculated quarterly changes for it, since no data was published in the previous quarter.

2.1 GLOBAL AVERAGE CONNECTION SPEEDS (IPv4) / In the first quarter of 2017, the global average connection speed was 7.2 Mbps, a 2.3% increase from the fourth quarter of 2016, as seen in Figure 6. Among the top 10 countries/regions, quarter-over-quarter changes were mixed, with half the countries/regions seeing gains and the other half seeing losses. South Korea, which continued to lead the world in average connection speeds, saw the largest increase, with a 9.3% rise in average speeds compared with the previous quarter. The United States, with the second-largest gain at 8.8%, joined the top 10 this quarter, pushing the Netherlands out. Singapore had the smallest gain among the top 10 with a 0.8% increase. On the declining side, quarterly drops were modest, ranging from 0.2% in Hong Kong to 2.9% in Denmark.

| | Country/Region | Q1 2017 Avg. Mbps | QoQ Change | YoY Change |
|----|----------------|-------------------|------------|------------|
| - | Global | 7.2 | 2.3% | 15% |
| 1 | South Korea | 28.6 | 9.3% | -1.7% |
| 2 | Norway | 23.5 | -0.4% | 10% |
| 3 | Sweden | 22.5 | -1.3% | 9.2% |
| 4 | Hong Kong | 21.9 | -0.2% | 10% |
| 5 | Switzerland | 21.7 | 2.1% | 16% |
| 6 | Finland | 20.5 | -0.7% | 15% |
| 7 | Singapore | 20.3 | 0.8% | 23% |
| 8 | Japan | 20.2 | 3.1% | 11% |
| 9 | Denmark | 20.1 | -2.9% | 17% |
| 10 | United States | 18.7 | 8.8% | 22% |

Figure 6: Average Connection Speed (IPv4) by Country/Region

With an average connection speed of 28.6 Mbps in the first quarter, South Korea was once again the only country/region to exceed the 25 Mbps threshold, although second-place Norway was close with an average speed of 23.5 Mbps. In total, 25 countries/regions worldwide posted average speeds of at least 15 Mbps, up from 23 countries/regions in the fourth quarter of 2016.

Quarterly changes in average connection speeds were positive for 96 of the 149 qualifying countries/regions across the globe, compared with 130 in the fourth quarter of 2016. Increases were more modest than in the previous quarter, as they ranged from 0.1% in Moldova, Turkey, and Slovakia (to 11.1 Mbps, 7.6 Mbps, and 13.0 Mbps, respectively) to 35% in Fiji (to 9.5 Mbps). Twenty-one countries/regions enjoyed double-digit gains, compared with 71 in the previous quarter. Quarter-over-quarter declines were seen in 52 qualifying countries/regions, compared with 18 countries/regions in the previous quarter. Decreases ranged from 0.2% in Hong Kong, Bulgaria, and Trinidad and Tobago (to 21.9 Mbps, 15.5 Mbps, and 9.6 Mbps, respectively) to 56% in Liberia (to 1.8 Mbps). The Bahamas saw speeds remain unchanged compared with the previous quarter, holding steady at 7.9 Mbps.

The global average connection speed increased 15% compared with the first quarter of 2016. Just as in the previous quarter, all the top 10 countries/regions saw yearly increases except for South Korea, which posted a modest 1.7% decline. Gains ranged between 9.2% in Sweden and 23% in Singapore. Worldwide, year-over-year improvements in average connection speeds were seen in 114 countries/regions, compared with 138 in the preceding quarter, and increases ranged from 0.3% in Greece (to 7.9 Mbps) to 189% in Libya (to 2.1 Mbps). Yearly declines were seen in 35 countries/regions, with decreases ranging from 0.1% in Gabon and Congo (to 1.8 Mbps and 3.5 Mbps, respectively) to 56% in Liberia (to 1.8 Mbps).

With a 24% quarterly decrease to 1.0 Mbps, Yemen remained the qualifying country with the lowest average connection speed in the first quarter. Paraguay had the next lowest speeds at 1.4 Mbps, followed by Gabon, Liberia, Syria, and Venezuela—all with average connection speeds of 1.8 Mbps in the first quarter.

2.2 GLOBAL AVERAGE PEAK CONNECTION SPEEDS / The global average peak connection speed continued its march upwards in the first quarter of 2017, reaching 44.6 Mbps, up more than 7 Mbps from the third quarter of 2016 (two quarters prior, as no data was published in the *State of the Internet Report* for the previous quarter). As shown in Figure 7, Singapore again remained the clear world leader in this metric, posting an average peak connection speed of 184.5 Mbps, nearly twice as fast as 10th place Sweden.

Year over year, average peak connection speeds increased 28% on a global basis in the first quarter of 2017, compared with 16% in the prior quarter. All the top 10 countries/regions enjoyed yearly increases in average peak connection speed, led by Mongolia with a 63% rise, while South Korea and Hong Kong had the smallest yearly increases at 17% each.

Across the globe, 141 countries/regions saw year-over-year increases in average peak connection speeds as compared to 126 in the preceding quarter. Mozambique posted the smallest increase at 1.3% (to 20.7 Mbps), while Ghana had the largest at 120% (to 26.0 Mbps). Réunion was the only other country to see average peak connection speeds more than double compared with the previous year, while an additional 34 countries/regions saw speeds increase by at least 50%. In all, 131 countries/regions enjoyed double-digit yearly growth. Only eight countries/regions saw a yearly decline in average peak speeds, with Liberia experiencing the largest drop at 57% (to 9.2 Mbps) and Zambia seeing the smallest at 0.6% (to 7.9 Mbps).

In the first quarter of 2017, Zambia was once again the country/region with the lowest average peak connection speed. Gabon and Liberia, along with Zambia, were the only qualifying countries/regions in the world to see average peak connection speeds below 10 Mbps.

| | Country/Region | Q1 2017 Peak Mbps | QoQ Change | YoY Change |
|----|----------------|-------------------|------------|------------|
| – | Global | 44.6 | n/a | 28% |
| 1 | Singapore | 184.5 | n/a | 26% |
| 2 | Macao | 132.0 | n/a | 54% |
| 3 | Mongolia | 131.1 | n/a | 63% |
| 4 | Hong Kong | 129.5 | n/a | 17% |
| 5 | South Korea | 121.0 | n/a | 17% |
| 6 | Jersey | 108.4 | n/a | 40% |
| 7 | Qatar | 107.9 | n/a | 21% |
| 8 | Thailand | 106.6 | n/a | 53% |
| 9 | Israel | 99.1 | n/a | 51% |
| 10 | Sweden | 95.3 | n/a | 20% |

Figure 7: Average Peak Connection Speed (IPv4) by Country/Region

2.3 GLOBAL 4 MBPS BROADBAND ADOPTION (IPv4) / In the first quarter of 2017, the global percentage of unique IPv4 addresses connecting to Akamai at average speeds above 4 Mbps increased by 3.3% to 82%, as seen in Figure 8. Guernsey and South Korea led the world with adoption levels of 98%, with the rest of the top 10 following closely. All 10, as well as Switzerland, Belgium, Taiwan, and Aruba, had at least 95% of their unique IPv4 addresses connecting to Akamai at average speeds of 4 Mbps or faster in the first quarter. In the previous quarter, only 11 countries/regions had adoption rates of 95% or higher. Andorra, which did not qualify for inclusion in the fourth quarter of 2016, joined the top 10 this quarter, pushing out Singapore.

As expected given the high adoption rates, quarterly changes in 4 Mbps adoption were small across the top 10, with Macao having the largest increase in the group at 2.0%. The remaining quarterly changes ranged between a 0.3% drop in Bulgaria and a 1.1% gain in Isle of Man. In all, three countries/regions posted losses, six posted gains, and one—Malta—saw adoption levels remain unchanged compared with the previous quarter.

Globally, a total of 126 countries/regions qualified for inclusion within this metric, up from 123 in the preceding quarter. In total, 95 countries/regions saw quarterly growth in 4 Mbps broadband adoption rates, up from 94 in the prior quarter. Increases ranged from a modest 0.1% in Luxembourg, Sweden, and Japan (to adoption levels of 88%, 94%, and 93%, respectively) to a robust 123% in the Sudan (to an adoption level of 13%). Twelve additional countries posted double-digit growth rates. Quarter-over-quarter declines were seen in 28 qualifying countries/regions, compared with 29 in the previous quarter. Decreases ranged from 0.1% in Ecuador, Macedonia, and the Netherlands (to adoption rates of 63%, 77%, and 95%, respectively) to 63% in Côte D'Ivoire (to an adoption rate of 5.7%). Three countries—Malta, Spain, and Latvia—saw adoption rates hold steady (at 97%, 90%, and 94%, respectively) compared with the previous quarter.

| | Country/Region | % Above 4 Mbps | QoQ Change | YoY Change |
|----|----------------|----------------|------------|------------|
| – | Global | 82% | 3.3% | 13% |
| 1 | Guernsey | 98% | 0.6% | 0.5% |
| 2 | South Korea | 98% | 0.3% | 0.6% |
| 3 | Andorra | 97% | 0.5% | 2.5% |
| 4 | Thailand | 97% | 1.0% | 1.2% |
| 5 | Malta | 97% | 0% | -0.1% |
| 6 | Macao | 97% | 2.0% | 15% |
| 7 | Bulgaria | 96% | -0.3% | -0.8% |
| 8 | Isle of Man | 96% | 1.1% | -1.1% |
| 9 | Netherlands | 95% | -0.1% | -0.1% |
| 10 | Israel | 95% | -0.2% | -0.4% |

Figure 8: 4 Mbps Broadband Adoption (IPv4) by Country/Region

Year-over-year, the percentage of unique IPv4 addresses connecting to Akamai at average speeds of at least 4 Mbps increased by 13% in the first quarter, continuing the positive trend of the past several quarters. Adoption levels for 4 Mbps broadband were up on a yearly basis in half of the top 10 countries/regions, with gains ranging from 0.5% in Guernsey to 15% in Macao. Among the countries/regions seeing declines, drops were very modest, ranging from 0.1% in Malta and the Netherlands to 1.1% in the Isle of Man.

Across the globe, 79 of the qualifying countries/regions saw 4 Mbps broadband adoption levels increase year-over-year, compared with 103 in the prior quarter. Growth rates ranged from a mere 0.1% in Norway (to 91% adoption) to a remarkable 1,298% in the Sudan. Six additional countries/regions posted 4 Mbps adoption rate gains of 100% or more. Among the 47 countries/regions that posted decreases in adoption levels, declines ranged between 0.1% in Iceland, the Netherlands, Hong Kong, and Mexico (to adoption levels of 97%, 94%, 95%, and 94%, respectively) and 40% in Nepal (to 23% adoption).

In the first quarter of 2017, Venezuela and Algeria were again the only two countries with 4 Mbps broadband adoption rates below 5%. Venezuela posted a 9.1% quarterly gain (to 3.6% adoption), while Algeria saw a 6.6% loss (to 3.7% adoption).

2.4 GLOBAL 10 MBPS BROADBAND ADOPTION (IPv4) / In the first quarter of 2017, 45% of unique IPv4 addresses around the world connected to Akamai at average speeds above 10 Mbps, a 9.0% increase over the fourth quarter of 2016, as shown in Figure 9. Following a robustly positive preceding quarter, gains in the first quarter of 2017 were mostly muted but positive among the top 10, with eight countries seeing gains. Thailand alone enjoyed a double-digit increase of 26%, propelling it into the top 10 in the first quarter. The remaining gaining countries saw growth ranging from 0.5% to 3.1%. Singapore and the Netherlands saw very modest losses as adoption levels fell 2.1% and 0.1% respectively.

South Korea remained the world leader in 10 Mbps broadband adoption with an adoption rate of 85%—10 percentage points higher than second-place Switzerland. All of the top 10 countries/regions enjoyed 10 Mbps adoption rates of at least 65%, and 32 countries/regions had at least half of their IPv4 addresses connecting to Akamai at average speeds of at least 10 Mbps.

In the first quarter of 2017, 86 countries/regions qualified for this metric, the same as in the preceding quarter. Unlike the uniform gains seen in the fourth quarter of 2016, quarterly changes were mixed in the first quarter, with 66 countries/regions seeing increases and 20 seeing decreases. Gains ranged between 0.4% in the Czech Republic, Slovenia, and Lithuania (to adoption levels of 54%, 43%, and 54%, respectively) and 120% in Egypt (to 0.6% adoption). An additional 28 countries/regions posted double-digit quarterly gains. Among the countries/regions seeing decreases, losses ranged from 0.1% in the Netherlands to 44% in the United Arab Emirates (to 23% adoption).

Globally, there was a 29% increase in the percentage of unique IPv4 addresses connecting to Akamai at average speeds above 10 Mbps compared with one year prior, and, once again, each of the top 10 countries/regions enjoyed year-over-year growth in adoption rates. South Korea had the smallest yearly gain at 1.7% while Thailand had the largest at 83%. Yearly changes were mostly positive across the globe as well, although 12 of the 86 qualifying countries/regions did see adoption levels fall. Moldova had the smallest drop at 0.2% (to 40% adoption), while Egypt had the largest at 65% (to 0.6% adoption). Note, however, that Egypt was just over the qualifying threshold in terms of IPv4 addresses, so it is more susceptible to large percentage swings. Among the 74 countries/regions seeing gains in the first quarter, increases ranged from a modest 0.5% in Slovenia to a significant 880% in China. In total, 23 qualifying countries saw their adoption rates more than double compared with one year prior, while an additional 30 posted double-digit gains.

With just 0.6% of its IPv4 addresses connecting to Akamai at average speeds of 10 Mbps or more, Egypt was the qualifying country with the lowest 10 Mbps broadband adoption rate in the first quarter, despite seeing a 120% quarterly increase. Egypt did not qualify for inclusion in this metric in the previous quarter. Iran, which held the bottom spot in the previous quarter, was in second-to-last place in the first quarter with a 1.3% adoption rate, down 6.0% quarter-over-quarter. Six countries/regions in all had fewer than 1 in 10 IPv4 addresses connecting to Akamai at speeds above 10 Mbps in the first quarter, compared with seven in the previous quarter.

2.5 GLOBAL 15 MBPS BROADBAND ADOPTION (IPv4) / As Figure 10 shows, 28% of unique IPv4 addresses globally connected to Akamai at average connection speeds of 15 Mbps or above in the first quarter of 2017, an 11% increase over the fourth quarter of 2016. Quarterly changes among the top 10 countries/regions were mostly positive but more muted than in the previous quarter. The United States joined the top 10 in the first quarter, and its 14% quarterly increase was the largest among the top 10. Seven other countries/regions saw gains as well, ranging from 0.1% in Norway to 7.8% in South Korea. Two countries, Denmark and Singapore, saw

| | Country/Region | % Above 10 Mbps | QoQ Change | YoY Change |
|----|----------------|-----------------|------------|------------|
| - | Global | 45% | 9.0% | 29% |
| 1 | South Korea | 85% | 3.1% | 1.7% |
| 2 | Switzerland | 75% | 2.5% | 10% |
| 3 | Japan | 73% | 1.0% | 11% |
| 4 | Singapore | 72% | -2.1% | 9.8% |
| 5 | Thailand | 72% | 26% | 83% |
| 6 | Hong Kong | 71% | 1.0% | 8.1% |
| 7 | Netherlands | 70% | -0.1% | 5.0% |
| 8 | Romania | 70% | 1.2% | 9.0% |
| 9 | Norway | 69% | 0.8% | 4.9% |
| 10 | Belgium | 68% | 0.5% | 2.8% |

Figure 9: 10 Mbps Broadband Adoption (IPv4) by Country/Region

| | Country/Region | % Above 15 Mbps | QoQ Change | YoY Change |
|----|----------------|-----------------|------------|------------|
| - | Global | 28% | 11% | 33% |
| 1 | South Korea | 69% | 7.8% | -0.4% |
| 2 | Switzerland | 56% | 3.9% | 26% |
| 3 | Norway | 54% | 0.1% | 8.1% |
| 4 | Hong Kong | 54% | 2.8% | 13% |
| 5 | Japan | 52% | 3.3% | 20% |
| 6 | Singapore | 51% | -1.4% | 20% |
| 7 | Sweden | 49% | 0.6% | 7.1% |
| 8 | United States | 48% | 14% | 36% |
| 9 | Romania | 47% | 5.6% | 14% |
| 10 | Denmark | 46% | -4.5% | 14% |

Figure 10: 15 Mbps Broadband Adoption (IPv4) by Country/Region

declines, as their adoption rates dropped 4.5% and 1.4% respectively. South Korea remained solidly in the lead worldwide with a 15 Mbps broadband adoption rate of 69%, 13 percentage points above second-place Switzerland.

Seventy-six countries/regions qualified for inclusion in this metric in the first quarter, up from seventy-five in the previous quarter. Quarterly gains were seen in 55 qualifying countries/regions, compared with 72 in the prior quarter. China saw the largest rate of growth at 122% (to 5.0% adoption), and Kazakhstan also saw its adoption level more than double, while an additional 48 countries posted double-digit growth compared with the preceding quarter. Norway, Poland, and Morocco shared the smallest quarterly increases at 0.1% each (to 54%, 25%, and 1.4% adoption, respectively). Among the countries/regions posting declines, losses ranged from 0.2% in the Czech Republic (to 36% adoption) to 61% in the United Arab Emirates (to 6.3% adoption).

Year-over-year, the global 15 Mbps adoption rate grew 33%, and all of the top 10 countries/regions enjoyed yearly growth except for global leader South Korea, which experienced a scant 0.4% decline. Among the top 10, Sweden had the smallest year-over-year increase in adoption at 7.1%, while the United States had the largest at 36%. Worldwide, 64 countries/regions enjoyed yearly growth in adoption, with gains ranging from a modest 0.6% in Slovenia (to 24% adoption) to a sizeable 1,222% in Vietnam (to 11% adoption). In all, 22 countries/regions saw adoption levels more than double year-over-year in the first quarter. On the other end of the spectrum, 12 countries/regions saw adoption rates decline, with drops ranging from 0.4% in South Korea to 25% in South Africa (to 5.8% adoption).

In the first quarter, Morocco again had the lowest 15 Mbps broadband adoption rate among qualifying countries worldwide at 1.4%, after a modest 0.1% increase. Colombia had the second-lowest adoption rate at 2.1%, a 6.0% decrease from the previous quarter.

2.6 GLOBAL 25 MBPS BROADBAND ADOPTION (IPv4) / Globally, 12% of unique IPv4 addresses connected to Akamai at average connection speeds of at least 25 Mbps in the first quarter of 2017 — a 16% increase compared with the previous quarter, as shown in Figure 11. Eight of the top 10 countries/regions enjoyed quarterly gains in adoption rates, led by the United States with a 24% increase that pushed it into the top 10 this quarter. South Korea, the global leader in 25 Mbps adoption, was the only other country/region in the top 10 to enjoy a double-digit increase, as its adoption levels grew 16% quarter-over-quarter. Norway posted the smallest quarterly gain at 0.1%, while Sweden and Denmark saw adoption levels fall, with declines of 1.3% and 4.7% respectively. In all, 16 countries/regions had 25 Mbps adoption rates of at least 15%, up from 15 in the previous quarter.

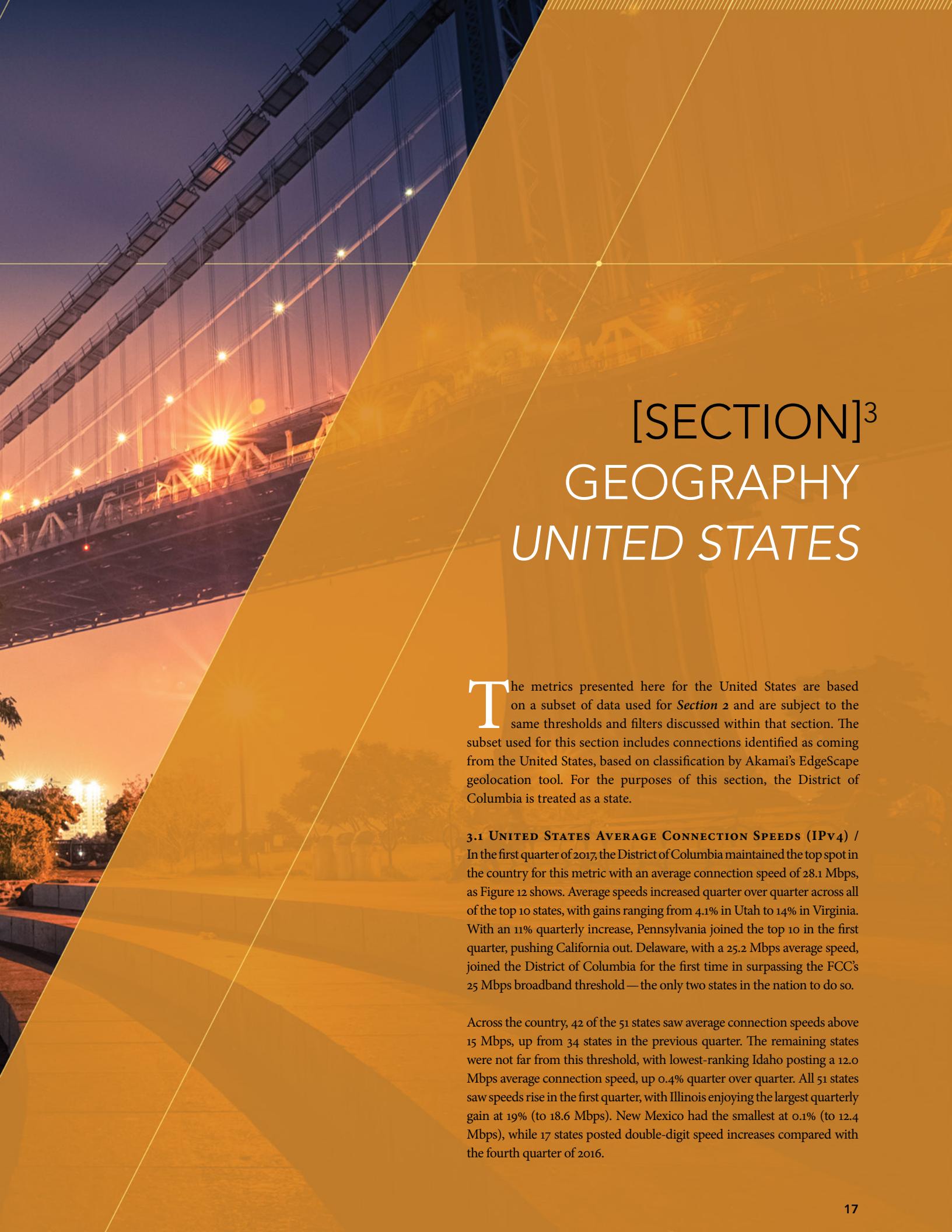
The number of countries/regions that qualified for inclusion in the 25 Mbps broadband adoption metric rose from 55 to 59 in the first quarter of 2017. Quarterly changes in adoption levels were mostly positive, with 47 countries/regions seeing gains, 10 seeing declines, and 2—the Czech Republic and Moldova—holding steady compared with the fourth quarter of 2016. Gains varied from Norway's modest 0.1% to China's sizeable 123% (to 0.6% adoption), while losses ranged between the Netherlands' 0.6% (to 14% adoption) and Kenya's 29% (to 11% adoption).

Year-over-year, the global 25 Mbps broadband adoption rate increased by a robust 42%. South Korea was the only country/region in the top 10 to post a decline, as its adoption levels dropped 5.5% compared with one year prior. The remaining nine countries/regions saw gains, ranging from 16% in Sweden to 65% in the United States. Across the globe, yearly increases were generally robust as well, with 47 countries/regions enjoying gains. Saudi Arabia and Vietnam enjoyed the largest gains at 1,577% and 1,539% (to adoption rates of 0.8% and 1.6%, respectively), while 15 additional qualifying countries saw adoption rates more than double. The Czech Republic and the Ukraine posted the smallest yearly gains at 2.8% each (to adoption levels of 16% and 8.4%, respectively). Among the 12 countries/regions seeing adoption levels fall year over year, declines were modest, ranging from 0.5% in Bulgaria (to 13% adoption) to 26% in South Africa (to 2.7% adoption).

| | Country/Region | % Above 25 Mbps | QoQ Change | YoY Change |
|----|----------------|-----------------|------------|------------|
| - | Global | 12% | 16% | 42% |
| 1 | South Korea | 40% | 16% | -5.5% |
| 2 | Norway | 34% | 0.1% | 26% |
| 3 | Sweden | 30% | -1.3% | 16% |
| 4 | Hong Kong | 28% | 4.3% | 20% |
| 5 | Switzerland | 26% | 5.6% | 45% |
| 6 | Denmark | 25% | -4.7% | 47% |
| 7 | Singapore | 25% | 2.8% | 57% |
| 8 | Japan | 25% | 6.8% | 30% |
| 9 | Finland | 24% | 2.1% | 31% |
| 10 | United States | 21% | 24% | 65% |

Figure 11: 25 Mbps Broadband Adoption (IPv4) by Country/Region



The background of the page features a large, semi-transparent image of a bridge at sunset. The sky is a gradient from blue to orange, and the bridge's lights reflect brightly on the water below. The overall mood is warm and architectural.

[SECTION]³

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 (IPv4) /

In the first quarter of 2017, the District of Columbia maintained the top spot in the country for this metric with an average connection speed of 28.1 Mbps, as Figure 12 shows. Average speeds increased quarter over quarter across all of the top 10 states, with gains ranging from 4.1% in Utah to 14% in Virginia. With an 11% quarterly increase, Pennsylvania joined the top 10 in the first quarter, pushing California out. Delaware, with a 25.2 Mbps average speed, joined the District of Columbia for the first time in surpassing the FCC's 25 Mbps broadband threshold — the only two states in the nation to do so.

Across the country, 42 of the 51 states saw average connection speeds above 15 Mbps, up from 34 states in the previous quarter. The remaining states were not far from this threshold, with lowest-ranking Idaho posting a 12.0 Mbps average connection speed, up 0.4% quarter over quarter. All 51 states saw speeds rise in the first quarter, with Illinois enjoying the largest quarterly gain at 19% (to 18.6 Mbps). New Mexico had the smallest at 0.1% (to 12.4 Mbps), while 17 states posted double-digit speed increases compared with the fourth quarter of 2016.

| | State | Q1 2017 Avg. Mbps | QoQ Change | YoY Change |
|----|----------------------|-------------------|------------|------------|
| 1 | District of Columbia | 28.1 | 5.2% | 17% |
| 2 | Delaware | 25.2 | 13% | 19% |
| 3 | Massachusetts | 23.8 | 9.6% | 20% |
| 4 | Rhode Island | 23.7 | 5.7% | 19% |
| 5 | Maryland | 22.3 | 10% | 21% |
| 6 | New Jersey | 22.2 | 8.9% | 20% |
| 7 | New York | 22.0 | 6.8% | 22% |
| 8 | Virginia | 21.1 | 14% | 17% |
| 9 | Pennsylvania | 20.8 | 11% | 22% |
| 10 | Utah | 20.7 | 4.1% | 4.9% |

Figure 12: Average Connection Speed (IPv4) by State

On a year-over-year basis, all 51 states enjoyed gains in the first quarter, just as in the previous one. Ohio had the biggest jump at 74% (to 15.7 Mbps), followed by Alaska with a 34% increase (to 14.3 Mbps). Twenty-three other states saw gains of at least 20% compared with the preceding year. Utah had the smallest yearly increase in the nation—and among the top 10—at 4.9%, while New York had the largest increase among the top 10 at 22%.

3.2 UNITED STATES AVERAGE PEAK CONNECTION SPEEDS (IPv4) / Average peak connection speeds showed robust gains from the third quarter of 2016, which was the last quarter in which this metric was published in the *State of the Internet Report*. As seen in Figure 13, 7 of the top 10 states in the nation had average peak speeds above 100 Mbps in the first quarter of 2017, whereas no states had crossed this threshold in the third quarter of 2016. Delaware led the country with an average peak connection speed of 111.0 Mbps, and the District of Columbia was close behind at 110.5 Mbps. At the other end of the spectrum, Mississippi had the lowest average peak connection speed in the country at 58.1 Mbps.

| | State | Q1 2017 Peak Mbps | QoQ Change | YoY Change |
|----|----------------------|-------------------|------------|------------|
| 1 | Delaware | 111.0 | n/a | 20% |
| 2 | District of Columbia | 110.5 | n/a | 19% |
| 3 | Massachusetts | 106.8 | n/a | 23% |
| 4 | Maryland | 106.1 | n/a | 26% |
| 5 | Rhode Island | 104.5 | n/a | 25% |
| 6 | New Jersey | 104.5 | n/a | 26% |
| 7 | Virginia | 101.8 | n/a | 20% |
| 8 | Wyoming | 98.2 | n/a | 46% |
| 9 | New York | 98.0 | n/a | 25% |
| 10 | Washington | 97.0 | n/a | 23% |

Figure 13: Average Peak Connection Speed (IPv4) by State

Year-over-year changes were robustly positive across all 51 states in the first quarter. Wyoming posted the biggest yearly gain among the top 10—and across the country—with an increase of 46%, while the District of Columbia had the smallest among the top 10 at 19%. Nationwide, Utah's yearly gain was the smallest at 13% (to an average peak connection speed of 95.2 Mbps). All 51 states enjoyed double-digit yearly growth in the first quarter, compared with 42 states in the previous quarter.

3.3 UNITED STATES 4 MBPS BROADBAND ADOPTION (IPv4) /

With a 98% adoption rate, Delaware remained the nationwide leader for 4 Mbps broadband adoption in the first quarter of 2017, while second-place Rhode Island remained close behind with 97% adoption, just as in the previous quarter. Among the top 10 states, New Jersey saw adoption rates remain unchanged compared with the previous quarter, while the remaining states saw very modest growth, as seen in Figure 14. Increases ranged from 0.2% in Maryland to 1.7% in North Dakota.

Quarterly changes were positive throughout the nation as well, apart from New Jersey (unchanged) and the District of Columbia (0.5% decline to 91% adoption). Increases in 4 Mbps adoption were modest, varying from 0.2% in Maryland to 4.3% in Iowa and West Virginia (to adoption levels of 77% and 83% respectively).

Yearly changes were positive across all 51 states, with Rhode Island posting the smallest gain at 0.5% and New Mexico posting the largest at 12% (to 86% adoption). Among the top 10, increases ranged from Rhode Island's 0.5% to Utah's 3.0%.

Twenty-three states nationwide had 4 Mbps adoption levels of 90% or more, up from 17 in the fourth quarter of 2016, while 50 states had 4 Mbps broadband adoption rates of at least 80%, up from 48. Despite leading the nation in its quarterly gain, West Virginia continued to lag the country in this metric, with a 4 Mbps broadband adoption rate of 77%, four percentage points below the next-lowest state, Arkansas.

| | State | % Above 4 Mbps | QoQ Change | YoY Change |
|----|---------------|----------------|------------|------------|
| 1 | Delaware | 98% | 0.3% | 0.8% |
| 2 | Rhode Island | 97% | 0.4% | 0.5% |
| 3 | New Jersey | 95% | 0% | 1.5% |
| 4 | Massachusetts | 94% | 0.3% | 2.2% |
| 5 | Hawaii | 94% | 0.4% | 0.8% |
| 6 | Utah | 93% | 1.2% | 3.0% |
| 7 | Maryland | 93% | 0.2% | 2.2% |
| 8 | New York | 93% | 0.4% | 1.6% |
| 9 | Florida | 93% | 0.6% | 2.3% |
| 10 | North Dakota | 92% | 1.7% | 0.8% |

Figure 14: 4 Mbps Broadband Adoption (IPv4) by State

Although the data above gives an indication of 4 Mbps broadband penetration across U.S. users connecting to Akamai, it is not a measure of Internet accessibility among the U.S. population or U.S. homes. Data from Pew Research published in the first quarter indicates that 73% of U.S. homes had broadband service in 2016 and 88% of Americans use the Internet.¹¹

At the state level, in the first quarter, New York granted \$212 million in awards to 26 broadband providers as part of phase two of the New NY Broadband program, which aims to expand broadband availability to unserved and underserved areas of the state.¹² The state's "Broadband for All" initiative looks to deliver universal broadband access across the state by 2018, making it the first state to do so if successful.¹³ Minnesota also announced \$34 million in grant funding for 42 broadband projects targeted at providing affordable high-speed Internet to households and businesses in non-urban settings.¹⁴ Finally, in New Mexico, the legislature passed several bills to support expanding access throughout the state, including a call for a statewide broadband network, increased funding for broadband deployment in underserved areas, and legislation that makes it easier for companies to leverage public infrastructure projects to deploy fiber cables.¹⁵

The first quarter also saw some noteworthy developments in local government broadband initiatives as well. In Eugene, Oregon, an unusual partnership between the city government, local township, local utility company, and community associations is successfully driving the deployment of EUGnet, a municipal wholesale network that will enable ISPs to offer gigabit service to Eugene customers at prices as low as \$79/month.¹⁶ Meanwhile, in a joint project with Fujitsu Network Communications, the town of Fairlawn, Ohio is building a fiber optic network that will support broadband speeds from 1 to 100 Gbps. Targeted for completion this fall, the network will support 4,100 users.¹⁷

3.4 UNITED STATES 10 MBPS BROADBAND ADOPTION (IPv4) / With an adoption rate of 86%, Delaware retained the top spot in the nation for 10 Mbps broadband adoption in the first quarter, just ahead of second-place Rhode Island, as seen in Figure 15.

| | State | % Above 10 Mbps | QoQ Change | YoY Change |
|----|----------------------|-----------------|------------|------------|
| 1 | Delaware | 86% | 3.7% | 7.4% |
| 2 | Rhode Island | 85% | 3.5% | 7.3% |
| 3 | New Jersey | 82% | 2.5% | 9.5% |
| 4 | Massachusetts | 81% | 3.4% | 11% |
| 5 | Maryland | 79% | 4.3% | 13% |
| 6 | New York | 77% | 3.3% | 12% |
| 7 | District of Columbia | 75% | 0.7% | 11% |
| 8 | Virginia | 74% | 3.5% | 10% |
| 9 | New Hampshire | 73% | 6.0% | 14% |
| 10 | Connecticut | 72% | 6.7% | 13% |

Figure 15: 10 Mbps Broadband Adoption (IPv4) by State

Like the previous quarter, each of the top 10 states enjoyed quarter-over-quarter growth in the first quarter, ranging from 0.7% in the District of Columbia to 6.7% in Connecticut—a robust gain that enabled Connecticut to join the top 10 in the first quarter, pushing out Pennsylvania.

Quarterly changes were consistently positive across the country in the first quarter, as Iowa led the country with a 16% increase compared with the previous quarter (to 51% adoption), and three other states posted double-digit quarterly gains. The District of Columbia's 0.7% increase was the smallest in the nation.

Thirteen states in total had at least 70% of their unique IPv4 addresses connecting to Akamai at average speeds above 10 Mbps, up from eight the previous quarter, and 48 states had at least half of their unique IPv4 addresses connecting to Akamai at average speeds of 10 Mbps or more, up from forty-five previously. Idaho, Arkansas, and New Mexico were the only states not to achieve the 50% adoption threshold in the first quarter, posting adoption rates of 45%, 47%, and 47%, respectively.

Year-over-year changes in 10 Mbps broadband adoption were positive across all 51 states, just as in the previous quarter. Rhode Island saw the smallest yearly gain in the country—and in the top 10—with an increase of 7.3%. New Hampshire enjoyed the largest year-over-year adoption growth among the top 10 at 14%, while Iowa posted the largest in the country at 30% (to 51% adoption).

3.5 UNITED STATES 15 MBPS BROADBAND ADOPTION (IPv4) / Rhode Island again held the top spot across the nation for 15 Mbps adoption in the first quarter, as 66% of its IPv4 addresses connected to Akamai at average speeds of at least 15 Mbps, as seen in Figure 16. All of the top 10 states enjoyed robust growth in this metric, with quarterly increases ranging from 5.6% in the District of Columbia to 17% in New Hampshire. All 10 states, as well as Connecticut and Michigan, maintained 15 Mbps adoption levels of at least 50%, compared with just 8 states in the preceding quarter.

| | State | % Above 15 Mbps | QoQ Change | YoY Change |
|----|----------------------|-----------------|------------|------------|
| 1 | Rhode Island | 66% | 7.6% | 20% |
| 2 | Delaware | 65% | 12% | 14% |
| 3 | New Jersey | 62% | 9.2% | 20% |
| 4 | Massachusetts | 61% | 11% | 21% |
| 5 | District of Columbia | 61% | 5.6% | 21% |
| 6 | Maryland | 60% | 13% | 25% |
| 7 | New York | 58% | 9.0% | 30% |
| 8 | Virginia | 56% | 8.3% | 21% |
| 9 | Pennsylvania | 54% | 15% | 27% |
| 10 | New Hampshire | 52% | 17% | 24% |

Figure 16: 15 Mbps Broadband Adoption (IPv4) by State

Across the country, all 51 states saw quarterly increases in the first quarter, up from 41 states in the previous quarter, and 39 states posted gains of at least 10% in the first quarter, compared with 12 in the previous one. Quarter-over-quarter gains ranged from 0.7% in Idaho (to 23% adoption) to 29% in Illinois (to 46% adoption). Once again, all but one of the 51 states had at least one-quarter of their unique IPv4 addresses connecting to Akamai at average speeds of 15 Mbps or faster, while last-place Idaho posted a 23% adoption rate.

Year-over-year changes in 15 Mbps access were positive throughout the country as well in the first quarter, just as in the previous one. Delaware saw the smallest gain among the top 10, tying with Utah for the smallest gain across the country at 14% (with Utah posting an adoption rate of 45%). At the other end of the spectrum, Kentucky led the nation with a robust 79% boost (to 35% adoption), and New York led the top 10 with a 30% rise. Alaska, Hawaii, and Ohio also saw adoption increase by at least 50% compared with a year prior, as they posted gains of 64%, 59%, and 55% (to adoption levels of 37%, 40%, and 40%, respectively).

3.6 UNITED STATES 25 MBPS BROADBAND ADOPTION (IPv4) /

In the first quarter, the District of Columbia held on to the top spot in the nation for 25 Mbps broadband adoption, with an adoption rate of 38%, five points above second-place Delaware, as seen in Figure 17. Each of the top 10 states enjoyed robust quarter-over-quarter gains in adoption during the first quarter, with the District of Columbia posting the smallest at 10% and Pennsylvania posting the largest at 27%. Washington's 23% gain allowed it to join the top 10 in the first quarter, just edging out California. Nine states had at least one in four unique IPv4 addresses connecting to Akamai at average speeds of 25 Mbps or higher, up from just four states in the previous quarter.

Across the nation, New Mexico was the only state to see a decline in 25 Mbps adoption in the first quarter of 2017, as its adoption rate fell 3.1% (to 7.9% adoption). In contrast, 10 states posted quarterly declines in the fourth quarter of 2016. Among the 50 gaining states, increases ranged from 2.3% in Idaho (to 7.5% adoption) to 59% in Montana (to 14% adoption), with 49 states enjoying double-digit quarterly growth.

Year-over-year changes were positive across all 51 states, continuing the trend. Among the top 10, the District of Columbia had the smallest yearly growth at 32%, while New York enjoyed the largest at 67%. Gains across the rest of the nation were strong as well, with Kentucky and Alaska more than doubling their 25 Mbps adoption rates with yearly growth of 166% and 136% respectively (to adoption levels of 11% and 12%). New Mexico was the only state to see single-digit yearly growth, with an 8% gain, while the remaining states enjoyed increases ranging between 19% in Utah (to 22% adoption) and 99% in Kansas (to 17% adoption).

Adoption levels for 25 Mbps broadband remain low throughout the nation, although they continue to improve. In the first quarter of 2017, 4 states saw adoption levels below 10%, down from 13 states

| | State | % Above 25 Mbps | QoQ Change | YoY Change |
|----|----------------------|-----------------|------------|------------|
| 1 | District of Columbia | 38% | 10% | 32% |
| 2 | Delaware | 33% | 25% | 35% |
| 3 | Rhode Island | 33% | 14% | 53% |
| 4 | Massachusetts | 31% | 22% | 46% |
| 5 | New Jersey | 29% | 21% | 54% |
| 6 | Maryland | 29% | 25% | 53% |
| 7 | New York | 28% | 17% | 67% |
| 8 | Virginia | 27% | 15% | 48% |
| 9 | Pennsylvania | 26% | 27% | 56% |
| 10 | Washington | 24% | 23% | 42% |

Figure 17: 25 Mbps Broadband Adoption (IPv4) by State

in the fourth quarter of 2016. Idaho again had the lowest adoption rate in the country at 7.5%, up 2.3% from the previous quarter, while New Mexico had the next lowest adoption rate at 7.9%.

The first quarter saw a number of additional announcements of gigabit-speed or near gigabit-speed Internet service launches throughout the country. In January, Verizon launched its FiOS Instant Internet service to 7 million homes on the East Coast, offering 750 Mbps for both upload and download speeds.¹⁸ AT&T announced gigabit fiber services in five new cities—Columbia, South Carolina; Jackson, Mississippi; Knoxville, Tennessee; Milwaukee, Wisconsin; and Shreveport, Louisiana—with hopes to reach 12.5 million premises with fiber offerings by mid-2019.¹⁹ AT&T also revealed that 30% of its fiber-to-the-home (FTTH) customers have subscribed to gigabit-speed services.²⁰ Meanwhile, cable company RCN announced the launch of gigabit-speed service to 18 communities in Boston, priced at \$70/month, substantially lower than competitive services provided by Comcast and Verizon.²¹ Finally, broadband startup Angie Communications unveiled plans to bring gigabit service to more than 87 markets across the U.S., including several that Google Fiber had previously planned to serve before halting its rollout. Angie plans to leverage pre-existing backhaul infrastructure to support its wireless gigabit, in addition to partnering with infrastructure specialists to deploy additional backhaul connectivity.²²

Though Google Fiber announced a pause in its gigabit rollouts in the third quarter of 2016, in the first quarter of 2017 it again showed signs of life, with three “upcoming” cities noted on its website—Louisville, Kentucky; San Antonio, Texas; and Huntsville, Alabama. With its acquisition of wireless startup Webpass, Google Fiber may be looking to leverage a new hybrid architecture combining fiber backbone infrastructure with fixed wireless last-mile connectivity to greatly reduce the cost, and speed the deployment, of gigabit services.²³ Google Fiber also introduced service availability in Raleigh, North Carolina in the first quarter²⁴ and reported several

milestones in its Community Impact report, including providing 1,910 public-housing families — as well as more than 200 nonprofits and community organizations — with free gigabit Internet.²⁵

Finally, as reported in the *Third Quarter, 2016 State of the Internet Report*, AT&T introduced its AirGig technology for delivering gigabit Internet over existing powerlines in September 2016. This February, AT&T announced plans to trial the technology, which offers an alternative to slow and costly FTTH deployments, in two locations later in the year.²⁶





[SECTION]⁴

GEOGRAPHY

AMERICAS

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

4.1 AMERICAS AVERAGE CONNECTION SPEEDS (IPv4) / In the first quarter of 2017, the United States again had the fastest average connection speed among surveyed Americas countries at 18.7 Mbps, with Canada just 2.5 Mbps behind, as shown in Figure 18. As the only two countries in the region with average connection speeds above 10 Mbps, the United States and Canada remained well ahead of the other countries in the region, with Canada having an average connection speed nearly 7 Mbps faster than third-place Uruguay. The gap in average connection speeds between the fastest and slowest countries in the region also widened again in the first quarter, from 15.8 Mbps to 17.3 Mbps. Like the previous quarter, in the first quarter of 2017, 12 surveyed Americas countries saw

| Global Rank | Country/Region | Q1 2017 Avg. Mbps | QoQ Change | YoY Change |
|-------------|----------------|-------------------|------------|------------|
| 10 | United States | 18.7 | 8.8% | 22% |
| 20 | Canada | 16.2 | 9.1% | 13% |
| 57 | Uruguay | 9.5 | 14% | 34% |
| 60 | Chile | 9.3 | 8.1% | 27% |
| 76 | Mexico | 7.5 | 4.5% | 6.9% |
| 79 | Brazil | 6.8 | 6.7% | 51% |
| 90 | Argentina | 6.3 | 2.0% | 17% |
| 91 | Peru | 6.2 | 12% | 20% |
| 92 | Ecuador | 6.2 | -2.9% | 16% |
| 94 | Panama | 5.9 | 4.0% | 32% |
| 99 | Colombia | 5.5 | 2.3% | 19% |
| 112 | Costa Rica | 4.1 | 5.5% | 6.7% |
| 132 | Bolivia | 2.7 | 2.2% | 9.8% |
| 144 | Venezuela | 1.8 | -5.7% | -4.2% |
| 148 | Paraguay | 1.4 | -3.6% | -36% |

Figure 18: Average Connection Speed (IPv4) by Americas Country

quarterly increases in connection speeds and 3 saw declines. Uruguay had the biggest gain at 14%, while Argentina posted the smallest at 2.0%. The three Americas countries that saw speeds fall—Venezuela, Paraguay, and Ecuador—posted modest quarterly declines of 5.7%, 3.6%, and 2.9%, respectively.

Looking at yearly changes, most of the surveyed Americas countries saw growth in average connection speeds, apart from Paraguay and Venezuela, which recorded year-over-year declines of 36% and 4.2%, respectively. Yearly increases ranged between 6.7% in Costa Rica and 51% in Brazil. Twelve of the surveyed Americas countries had an average connection speed at or above the 4 Mbps threshold—up from eleven in the fourth quarter of 2016—as Costa Rica pushed above the threshold for the first time this quarter.

4.2 AMERICAS AVERAGE PEAK CONNECTION SPEEDS /

In the fourth quarter of 2016, the United States again held the top spot among the surveyed Americas countries for average peak connection speeds at 86.5 Mbps, as shown in Figure 19. This marks a robust 22% increase over its average peak connection speed from the third quarter of 2016 (when average peak connection speeds were last published in the *State of the Internet Report*). The difference between the average peak connection speeds of the fastest and slowest Americas countries also increased from 62.2 Mbps in the third quarter of 2016 to 76.4 Mbps in the first quarter of 2017.

Year-over-year changes were mostly positive, with only two Americas countries seeing declines. Paraguay's average peak connection speed dropped 19% compared with one year prior, while Uruguay's dropped a mere 1.1%. On the gaining side, increases were robust. Venezuela had the smallest yearly increase at 20%, while Panama again had the largest, with an 85% yearly gain.

| Global Rank | Country/Region | Q1 2017 Peak Mbps | QoQ Change | YoY Change |
|-------------|----------------|-------------------|------------|------------|
| 16 | United States | 86.5 | n/a | 28% |
| 24 | Canada | 78.7 | n/a | 32% |
| 36 | Uruguay | 70.0 | n/a | -1.1% |
| 47 | Chile | 65.5 | n/a | 35% |
| 82 | Peru | 47.5 | n/a | 52% |
| 84 | Brazil | 46.5 | n/a | 40% |
| 87 | Mexico | 45.2 | n/a | 41% |
| 96 | Ecuador | 41.7 | n/a | 32% |
| 99 | Argentina | 40.3 | n/a | 35% |
| 105 | Panama | 35.3 | n/a | 85% |
| 107 | Colombia | 32.4 | n/a | 36% |
| 116 | Costa Rica | 28.6 | n/a | 54% |
| 133 | Bolivia | 19.3 | n/a | 30% |
| 141 | Venezuela | 14.6 | n/a | 20% |
| 146 | Paraguay | 10.1 | n/a | -19% |

Figure 19: Average Peak Connection Speed (IPv4) by Americas Country

4.3 AMERICAS 4 MBPS BROADBAND ADOPTION (IPv4) / With 90% adoption rates, the United States and Canada again led the Americas region for 4 Mbps broadband adoption in the first quarter of 2017, as seen in Figure 20. The difference in adoption rates between the top and bottom qualifying Americas countries was a sizeable 86 percentage points, one point higher than in the fourth quarter of 2016. As noted previously, this gap is likely to remain large for the foreseeable future. Changes in adoption rates were positive across the region except for Ecuador, which saw a small 0.1% decrease in adoption after having the largest gain among the qualifying surveyed countries in the previous quarter. Bolivia posted the largest increase

| Global Rank | Country/Region | % Above 4 Mbps | QoQ Change | YoY Change |
|-------------|----------------|----------------|------------|------------|
| 37 | United States | 90% | 1.6% | 4.9% |
| 39 | Canada | 90% | 1.6% | -0.6% |
| 48 | Uruguay | 86% | 4.0% | 11% |
| 67 | Mexico | 78% | 3.9% | -0.2% |
| 68 | Chile | 78% | 4.7% | -7.9% |
| 86 | Peru | 64% | 9.4% | -1.0% |
| 87 | Ecuador | 63% | -0.1% | 8.4% |
| 88 | Brazil | 63% | 6.8% | 43% |
| 92 | Colombia | 61% | 6.5% | 11% |
| 94 | Argentina | 60% | 7.2% | 13% |
| 97 | Panama | 58% | 4.2% | 20% |
| 110 | Costa Rica | 36% | 10% | 12% |
| 120 | Bolivia | 14% | 52% | 86% |
| 126 | Venezuela | 3.6% | 9.1% | -16% |
| - | Paraguay | 2.8% | 3.9% | -66% |

Figure 20: 4 Mbps Broadband Adoption (IPv4) by Americas Country

at 52%, qualifying for inclusion in this metric for the first time in the first quarter, while increases among the remaining countries ranged from 1.6% in Canada and the United States to 10% in Costa Rica.

Year-over-year changes were mixed, with 9 of the 14 of the qualifying Americas countries seeing gains. These ranged from 4.9% in the United States to 86% in Bolivia. Venezuela posted the largest yearly decline in adoption at 16%, while Mexico had the smallest at 0.2%. Seven qualifying Americas countries saw 4 Mbps broadband adoption levels grow by double digits compared to one year prior.

Although it is not one of the surveyed Americas countries in this report, Cuba had some promising news with respect to its Internet connectivity, which has increased greatly in the last two years through government-provided public Wi-Fi access spots—but still lags much of the world.²⁷ In a country where only 1 in 20 have home Internet access, the government has promised to get half the population connected by 2020.²⁸ ETECSA, the government-owned ISP, announced in March that it would offer Internet access at speeds of 128 kbps to 2 Mbps to around 38,000 households in an initial commercial rollout, following a successful two-month pilot to 2,000 homes.²⁹

4.4 AMERICAS 10 MBPS BROADBAND ADOPTION (IPv4) /
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 United States led with a 67% adoption rate, followed by Canada with 61% adoption. However, the gap between Canada and the next-highest country narrowed from 29 percentage points to 26 in the first quarter, while the gap between the top and bottom qualifying countries increased from 56 to 59 points. Fourth-quarter changes in adoption rates were mostly positive across the Americas, with 9 of the 11 qualifying surveyed countries seeing gains, ranging from 2.9% in Colombia to

40% in Peru. Ecuador and Argentina both saw adoption rates fall slightly in the first quarter, losing 6.2% and 1.9%, respectively, after having their rates more than double in the previous quarter.

From a yearly perspective, all qualifying surveyed countries saw 10 Mbps broadband adoption rates rise, just as in the previous quarter. Panama and Brazil led again, with jumps of 270% and 381%, respectively. Six qualifying countries saw adoption rates more than double year-over-year in the first quarter, while Canada and the United States—the region's leaders in 10 Mbps adoption—saw the smallest yearly gains at 13% and 19% respectively.

4.5 AMERICAS 15 MBPS BROADBAND ADOPTION (IPv4) /

As Figure 22 shows, the United States and Canada continued to have adoption levels that significantly exceeded those seen in the remaining Americas countries, just as with the other broadband adoption metrics examined thus far. The gap between the United States and Canada remained steady at 8 points in the first quarter, while the gap between Canada and the next-highest country increased from 21 to 25 points, and the gap between the top- and bottom-ranking qualifying countries widened from 40 to 46 points in the first quarter. Seven of the 10 qualifying surveyed countries posted quarterly gains in adoption, ranging from 14% in the United States to 60% in Peru, while three countries posted quarterly declines, ranging from 5.6% in Argentina to 9.4% in Ecuador.

Year-over-year numbers were robustly positive across the qualifying surveyed Americas countries in the first quarter, just as they were in the preceding quarter. Brazil posted the largest yearly increase in 15 Mbps adoption rates with a 451% gain, and 7 of the 10 countries saw adoption levels more than double compared with one year prior. Canada and the United States again had the smallest yearly increases—at 25% and 36% respectively.

| Global Rank | Country/Region | % Above 10 Mbps | QoQ Change | YoY Change |
|-------------|----------------|-----------------|------------|------------|
| 11 | United States | 67% | 6.2% | 19% |
| 20 | Canada | 61% | 8.4% | 13% |
| 51 | Uruguay | 35% | 37% | 104% |
| 55 | Chile | 30% | 14% | 95% |
| 65 | Mexico | 19% | 6.3% | 27% |
| 66 | Brazil | 18% | 15% | 381% |
| 70 | Argentina | 16% | -1.9% | 80% |
| 73 | Peru | 13% | 40% | 187% |
| 74 | Panama | 12% | 12% | 270% |
| 76 | Ecuador | 12% | -6.2% | 106% |
| 82 | Colombia | 7.6% | 2.9% | 226% |
| — | Costa Rica | 3.3% | 14% | 123% |
| — | Bolivia | 1.1% | 20% | 99% |
| — | Venezuela | 0.2% | 18% | -24% |
| — | Paraguay | 0.2% | 16% | -56% |

Figure 21: 10 Mbps Broadband Adoption (IPv4) by Americas Country

| Global Rank | Country/Region | % Above 15 Mbps | QoQ Change | YoY Change |
|-------------|----------------|-----------------|------------|------------|
| 8 | United States | 48% | 14% | 36% |
| 16 | Canada | 40% | 16% | 25% |
| 50 | Chile | 15% | 18% | 243% |
| 54 | Uruguay | 13% | 55% | 206% |
| 65 | Mexico | 6.1% | 15% | 52% |
| 66 | Brazil | 5.8% | 16% | 451% |
| 68 | Argentina | 5.1% | -5.6% | 206% |
| 72 | Peru | 4.4% | 60% | 211% |
| 73 | Ecuador | 4.3% | -9.4% | 263% |
| 75 | Colombia | 2.1% | -6.0% | 259% |
| — | Panama | 4.4% | 15% | 465% |
| — | Costa Rica | 1.0% | 13% | 66% |
| — | Bolivia | 0.4% | 11% | 117% |
| — | Venezuela | 0.1% | 4.8% | -42% |
| — | Paraguay | 0.1% | 20% | -55% |

Figure 22: 15 Mbps Broadband Adoption (IPv4) by Americas Country





[SECTION]⁵ GEOGRAPHY ASIA PACIFIC (APAC)

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

5.1 ASIA PACIFIC AVERAGE CONNECTION SPEEDS (IPv4) / As shown in Figure 23, in the first quarter of 2017, South Korea was again the top country/region in the world for the average connection speed metric, at 28.6 Mbps, up 9.3% from the previous quarter. The gap between it and the slowest Asia Pacific country/region increased slightly from 22 to 23 Mbps. The surveyed countries/regions all enjoyed quarterly gains in the first quarter, except for Hong Kong, which posted a modest 0.2% decline. Thailand, the Philippines, and China led in gains, as each enjoyed a 20% quarterly boost in speeds, while Singapore had the smallest increase at 0.8%. Seven countries enjoyed double-digit quarterly gains.

| Global Rank | Country/Region | Q1 2017 Avg. Mbps | QoQ Change | YoY Change |
|-------------|----------------|-------------------|------------|------------|
| 1 | South Korea | 28.6 | 9.3% | -1.7% |
| 4 | Hong Kong | 21.9 | -0.2% | 10% |
| 7 | Singapore | 20.3 | 0.8% | 23% |
| 8 | Japan | 20.2 | 3.1% | 11% |
| 16 | Taiwan | 16.9 | 7.9% | 14% |
| 21 | Thailand | 16.0 | 20% | 49% |
| 27 | New Zealand | 14.7 | 14% | 40% |
| 50 | Australia | 11.1 | 9.6% | 26% |
| 58 | Vietnam | 9.5 | 15% | 89% |
| 62 | Malaysia | 8.9 | 9.1% | 40% |
| 68 | Sri Lanka | 8.5 | 17% | 58% |
| 74 | China | 7.6 | 20% | 78% |
| 77 | Indonesia | 7.2 | 6.7% | 59% |
| 89 | India | 6.5 | 17% | 87% |
| 100 | Philippines | 5.5 | 20% | 57% |

Figure 23: Average Connection Speed (IPv4) by APAC Country/Region

All 15 of the surveyed Asia Pacific countries/regions had average connection speeds above 4 Mbps, and eight of them had speeds above 10 Mbps, the same as in the fourth quarter of 2016. India and the Philippines once again had the lowest average connection speeds among surveyed Asia Pacific countries/regions, at 6.5 Mbps and 5.5 Mbps respectively.

Apart from South Korea, which posted a 1.7% decline, each of the surveyed countries/regions in the Asia Pacific region showed year-over-year growth in observed average connection speeds in the first quarter of 2017, just as in the preceding quarter. Vietnam led the gainers again with an 89% increase, followed by India with an 87% boost. Hong Kong had the smallest gain among surveyed countries/regions with a 10% increase.

Although the Philippines has the lowest ranking among Asia Pacific countries/regions for this metric, as well as some of the broadband adoption metrics, first quarter announcements suggest it may see improvements to its infrastructure in coming years, as Philippine President Duterte approved a plan to deploy a national broadband network at an estimated cost of \$1.5 billion to \$4.0 billion (77 billion to 200 billion pesos). The network will be used to host a national portal and other online government services, as well as to connect remote areas of the country that are underserved by existing broadband providers.³⁰ Deployment could begin as early as June, with a three- to five-year timeline for completion.³¹

5.2 ASIA PACIFIC AVERAGE PEAK CONNECTION SPEEDS (IPv4) / As seen in Figure 24, Singapore once again led the region and the world with an average peak connection speed of 184.5 Mbps in the first quarter of 2017, up from 162.0 Mbps in the third quarter of 2016 (the last time average peak connection speeds were published in the *State of the Internet Report*). The gap between average peak

| Global Rank | Country/Region | Q1 2017 Peak Mbps | QoQ Change | YoY Change |
|-------------|----------------|-------------------|------------|------------|
| 1 | Singapore | 184.5 | n/a | 26% |
| 4 | Hong Kong | 129.5 | n/a | 17% |
| 5 | South Korea | 121.0 | n/a | 17% |
| 8 | Thailand | 106.6 | n/a | 53% |
| 13 | Taiwan | 94.7 | n/a | 14% |
| 14 | Japan | 94.5 | n/a | 12% |
| 35 | New Zealand | 70.8 | n/a | 42% |
| 43 | Indonesia | 66.1 | n/a | -40% |
| 50 | Malaysia | 64.1 | n/a | 38% |
| 61 | Vietnam | 59.0 | n/a | 73% |
| 62 | Sri Lanka | 57.3 | n/a | 62% |
| 64 | Australia | 55.7 | n/a | 27% |
| 86 | China | 45.9 | n/a | 48% |
| 88 | Philippines | 45.0 | n/a | 50% |
| 97 | India | 41.4 | n/a | 62% |

Figure 24: Average Peak Connection Speed (IPv4) by APAC Country/Region

connection speeds in the top- and bottom-ranked countries/regions in the region continued to widen, increasing from 135 Mbps in the third quarter of 2016 to 143 Mbps in the first quarter of 2017. South Korea, Hong Kong, and Singapore all had average peak connection speeds above 100 Mbps, and 12 of the surveyed countries/regions saw average peak speeds above 50 Mbps.

Except for Indonesia, which posted a 40% yearly decline after several quarters of large gains, year-over-year changes were positive throughout the Asia Pacific region in the first quarter. Vietnam had the largest yearly increase at 73%, while Japan posted the smallest at 12%.

While the Asia Pacific region has some the fastest connectivity in the world, and most of the surveyed countries/regions have average peak connection speeds above the global average, first-quarter developments reveal that the push for faster broadband has not slowed down. In India, the bottom-ranked Asia Pacific country/region, broadband ISP ACT announced the launch of gigabit-speed Internet in Hyderabad, claiming to be the first Indian provider to offer such speeds to its customers.³² New Zealand announced an expansion of its state-owned UFB (Ultra-Fast Broadband) network to reach 200,000 homes in an additional 151 towns, increasing coverage from 75% of the population to “up to 85%” by 2020. The UFB is a FTTH project providing minimum speeds of 100 Mbps, and its expansion is estimated to cost the government an additional \$200 million (NZ\$300 million).³³ In neighboring Australia, the National Broadband Network (NBN) revealed that it expects to reach 5.4 million premises by June (nearly reaching its halfway milestone) and reiterated confidence in reaching its 2020 goal of 8 million connected premises across the country, although it has missed milestones in the past.³⁴ The NBN also announced that it would be

upgrading its fixed-wireless service to offer download speeds of 100 Mbps, up from current speeds of 50 Mbps, with widespread availability around the first quarter of 2018.³⁵

5.3 ASIA PACIFIC 4 MBPS BROADBAND ADOPTION (IPv4) /

In the first quarter of 2017, South Korea once again led the Asia Pacific region in 4 Mbps broadband adoption, with 98% of its IPv4 addresses connecting to Akamai at average connection speeds above this threshold, as shown in Figure 25. Quarterly changes in adoption were positive across the region except for Sri Lanka and Singapore, which posted small declines of 6.5% and 0.8%, respectively. The Philippines, the lowest-ranking country/region in Asia Pacific for this metric, enjoyed the largest quarterly increase at 26%. Remaining increases were modest, ranging from 0.1% in Japan to 11% in India and China.

Seven of the surveyed Asia Pacific countries/regions enjoyed 4 Mbps broadband adoption rates of 90% or higher in the first quarter—same as in the fourth quarter—and the difference in adoption levels between the top- and bottom-ranked countries/regions in Asia Pacific continued to narrow, dropping from 66 to 59 percentage points.

Looking at year-over-year changes, all surveyed countries/regions saw improvements in the first quarter except for Hong Kong, which posted a negligible 0.1% decline, just as in the preceding quarter. Yearly growth rates varied from a mere 0.6% in South Korea to a robust 111% in the Philippines, with five countries/regions seeing double-digit growth compared with one year prior.

5.4 ASIA PACIFIC 10 MBPS BROADBAND ADOPTION (IPv4) /

Five of the top 10 countries/regions in the world for 10 Mbps broadband adoption were all found in the Asia Pacific region in the first quarter, with South Korea holding on to the top spot

| Global Rank | Country/Region | % Above 4 Mbps | QoQ Change | YoY Change |
|-------------|----------------|----------------|------------|------------|
| 2 | South Korea | 98% | 0.3% | 0.6% |
| 4 | Thailand | 97% | 1.0% | 1.2% |
| 13 | Taiwan | 95% | 1.6% | 2.4% |
| 17 | Singapore | 94% | -0.8% | 3.2% |
| 20 | Hong Kong | 94% | 0.6% | -0.1% |
| 28 | Japan | 93% | 0.1% | 0.8% |
| 32 | New Zealand | 91% | 1.5% | 0.9% |
| 49 | Vietnam | 86% | 4.2% | 57% |
| 57 | Sri Lanka | 82% | -6.5% | 16% |
| 59 | China | 81% | 11% | 85% |
| 61 | Australia | 81% | 6.0% | 3.8% |
| 71 | Indonesia | 76% | 7.0% | 66% |
| 80 | Malaysia | 72% | 4.6% | 5.6% |
| 104 | India | 42% | 11% | 81% |
| 107 | Philippines | 39% | 26% | 111% |

Figure 25: 4 Mbps Broadband Adoption (IPv4) by APAC Country/Region

| Global Rank | Country/Region | % Above 10 Mbps | QoQ Change | YoY Change |
|-------------|----------------|-----------------|------------|------------|
| 1 | South Korea | 85% | 3.1% | 1.7% |
| 3 | Japan | 73% | 1.0% | 11% |
| 4 | Singapore | 72% | -2.1% | 9.8% |
| 5 | Thailand | 72% | 26% | 83% |
| 6 | Hong Kong | 71% | 1.0% | 8.1% |
| 15 | Taiwan | 65% | 9.9% | 14% |
| 31 | New Zealand | 52% | 17% | 60% |
| 48 | Vietnam | 37% | 48% | 656% |
| 50 | Australia | 35% | 16% | 54% |
| 52 | Malaysia | 32% | 17% | 179% |
| 62 | China | 20% | 84% | 880% |
| 64 | India | 19% | 30% | 285% |
| 68 | Indonesia | 18% | 22% | 496% |
| 78 | Philippines | 11% | 53% | 330% |
| — | Sri Lanka | 22% | 54% | 399% |

Figure 26: 10 Mbps Broadband Adoption (IPv4) by APAC Country/Region

in the world with an 85% adoption rate—12 percentage points above second-place Japan. As seen in Figure 26, the gap between South Korea and the qualifying Asia Pacific country/region with the lowest adoption levels narrowed slightly from 75 percentage points in the preceding quarter to 74 in the first quarter.

All 14 qualifying countries/regions saw quarterly growth in adoption rates in the first quarter, except for Singapore, which saw a small 2.1% drop. China had the largest gain among the qualifying Asia Pacific countries/regions, as it enjoyed an 84% boost in adoption rates compared with the previous quarter. Eight additional countries/regions saw double-digit increases, while Japan and Hong Kong posted the smallest gains at 1.0% each.

Year-over-year changes in 10 Mbps adoption were positive across the board in the first quarter, just as they were in the previous quarter. Five qualifying Asia Pacific countries/regions saw double-digit increases in adoption rates, and six saw triple-digit jumps, led by China with an 880% yearly increase. Global leader South Korea again had the smallest yearly gain in the region at 1.7%.

5.5 ASIA PACIFIC 15 MBPS BROADBAND ADOPTION (IPv4) / In the first quarter, South Korea continued to lead the region (and the world) in the 15 Mbps broadband adoption metric, with 69% of its IPv4 addresses connecting to Akamai at average connection speeds above 15 Mbps, a 7.8% increase from the fourth quarter of 2016. The spread between South Korea and China, the Asia Pacific country/region with the lowest adoption rate, widened slightly from 61 percentage points in the preceding quarter to 64 in the current one, despite China's robust, region-leading 122% quarterly gain.

As Figure 27 shows, all qualifying surveyed Asia Pacific countries/regions posted increases in 15 Mbps adoption in the first quarter, except for Singapore, which had a small 1.4% decline. As previously noted, China enjoyed the largest gain in the region, while other increases ranged from 2.8% in Hong Kong to 72% in the Philippines.

Yearly growth in the Asia-Pacific region was positive across the board except for South Korea, which posted a negligible 0.4% decline. Vietnam and China saw the biggest yearly growth, with adoption levels rising an impressive 1,222% and 1,146% respectively, compared with one year prior. Six additional countries/regions more than doubled their adoption levels compared with the preceding year, while Hong Kong posted the smallest yearly growth in the region at 13%.

| Global Rank | Country/Region | % Above 15 Mbps | QoQ Change | YoY Change |
|-------------|----------------|-----------------|------------|------------|
| 1 | South Korea | 69% | 7.8% | -0.4% |
| 4 | Hong Kong | 54% | 2.8% | 13% |
| 5 | Japan | 52% | 3.3% | 20% |
| 6 | Singapore | 51% | -1.4% | 20% |
| 13 | Thailand | 43% | 56% | 186% |
| 19 | Taiwan | 38% | 16% | 17% |
| 27 | New Zealand | 32% | 26% | 111% |
| 47 | Australia | 19% | 21% | 90% |
| 52 | Malaysia | 14% | 28% | 339% |
| 57 | Vietnam | 11% | 69% | 1,222% |
| 58 | India | 10% | 38% | 405% |
| 63 | Philippines | 6.2% | 72% | 509% |
| 69 | Indonesia | 5.0% | 16% | 520% |
| 70 | China | 5.0% | 122% | 1,146% |
| - | Sri Lanka | 11% | 101% | 556% |

Figure 27: 15 Mbps Broadband Adoption (IPv4) by APAC Country/Region







[SECTION]⁶

GEOGRAPHY

EUROPE

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.

6.1 EUROPEAN AVERAGE CONNECTION SPEEDS (IPv4) / Despite a slight 0.4% decrease in average connection speeds, Norway retained the top spot for this metric among the surveyed European countries in the first quarter of 2017. As seen in Figure 28, the difference in average connection speeds between Norway and Cyprus, the slowest country in the region, was nearly 17 Mbps in the first quarter—the same as in the previous quarter. Also like the previous quarter, 27 of the 31 surveyed European countries had average connection speeds at or above the 10 Mbps threshold. Quarter-over-quarter changes in average

| Global Rank | Country/Region | Q1 2017 Avg. Mbps | QoQ Change | YoY Change |
|-------------|----------------|-------------------|------------|------------|
| 2 | Norway | 23.5 | -0.4% | 10% |
| 3 | Sweden | 22.5 | -1.3% | 9.2% |
| 5 | Switzerland | 21.7 | 2.1% | 16% |
| 6 | Finland | 20.5 | -0.7% | 15% |
| 9 | Denmark | 20.1 | -2.9% | 17% |
| 12 | Netherlands | 17.4 | -1.1% | -2.9% |
| 13 | Romania | 17.0 | 5.4% | 5.7% |
| 14 | Czech Republic | 16.9 | -1.8% | -4.7% |
| 15 | United Kingdom | 16.9 | 3.6% | 13% |
| 17 | Latvia | 16.6 | -3.5% | -9.5% |
| 19 | Belgium | 16.3 | 2.2% | 6.5% |
| 22 | Ireland | 15.6 | 2.2% | 8.5% |
| 23 | Bulgaria | 15.5 | -0.2% | -1.7% |
| 24 | Spain | 15.5 | 0.8% | 16% |
| 25 | Germany | 15.3 | 4.9% | 9.8% |
| 26 | Hungary | 14.8 | 3.6% | 7.7% |
| 28 | Lithuania | 14.6 | 0.4% | -3.2% |
| 29 | Austria | 14.1 | 1.3% | 5.1% |
| 34 | Slovenia | 13.7 | -2.3% | -5.7% |
| 35 | Slovakia | 13.0 | 0.1% | -5.5% |
| 36 | Portugal | 12.9 | 2.5% | -1.9% |
| 38 | Malta | 12.8 | -0.8% | 1.0% |
| 41 | Poland | 12.6 | 2.1% | -1.1% |
| 44 | Russia | 11.8 | 2.1% | -2.7% |
| 45 | Luxembourg | 11.6 | 4.8% | 9.6% |
| 46 | Estonia | 11.6 | 1.0% | -1.2% |
| 51 | France | 10.8 | 7.4% | 8.9% |
| 61 | Italy | 9.2 | 6.2% | 13% |
| 64 | Croatia | 8.6 | 5.0% | 16% |
| 72 | Greece | 7.9 | 4.9% | 0.3% |
| 78 | Cyprus | 6.9 | -2.8% | -3.6% |

Figure 28: Average Connection Speed (IPv4) by European Country

speeds were mixed but modest, with 20 countries seeing increases. France had the largest gain at 7.4%, while Slovakia had the smallest at 0.1%. On the declining side, losses ranged from 0.2% in Bulgaria to 3.5% in Latvia.

Yearly changes among the surveyed European countries were mixed as well, with 19 countries seeing gains. These ranged from 0.3% in Greece to 17% in Denmark, and eight surveyed countries enjoyed double-digit yearly gains. Among the 12 countries to see losses, declines varied between Poland's 1.1% and Latvia's 9.5%.

While the metrics above provide a view into broadband speeds seen by connected users across Europe, the European Commission's Digital Economy and Society Index (DESI) offers a complementary

| Global Rank | Country/Region | Q1 2017 Peak Mbps | QoQ Change | YoY Change |
|-------------|----------------|-------------------|------------|------------|
| 10 | Sweden | 95.3 | n/a | 20% |
| 12 | Romania | 95.0 | n/a | 15% |
| 15 | Switzerland | 93.4 | n/a | 23% |
| 17 | Norway | 85.9 | n/a | 23% |
| 18 | Belgium | 85.5 | n/a | 24% |
| 20 | Spain | 84.8 | n/a | 31% |
| 21 | Netherlands | 82.7 | n/a | 17% |
| 23 | Latvia | 79.5 | n/a | 5.8% |
| 25 | Hungary | 78.3 | n/a | 24% |
| 26 | United Kingdom | 76.1 | n/a | 25% |
| 28 | Finland | 75.1 | n/a | 26% |
| 29 | Czech Republic | 74.4 | n/a | 17% |
| 30 | Denmark | 74.4 | n/a | 27% |
| 34 | Ireland | 70.8 | n/a | 17% |
| 38 | Russia | 69.3 | n/a | 8.7% |
| 39 | Slovakia | 69.3 | n/a | 24% |
| 40 | Malta | 67.1 | n/a | 34% |
| 42 | Portugal | 66.9 | n/a | 30% |
| 44 | Poland | 65.6 | n/a | 24% |
| 45 | Germany | 65.6 | n/a | 22% |
| 46 | Bulgaria | 65.5 | n/a | 11% |
| 51 | Austria | 63.1 | n/a | 23% |
| 56 | Lithuania | 61.3 | n/a | 22% |
| 57 | Estonia | 60.8 | n/a | 22% |
| 59 | Slovenia | 60.0 | n/a | 25% |
| 60 | Luxembourg | 59.6 | n/a | -1.9% |
| 67 | Croatia | 54.8 | n/a | 54% |
| 74 | Italy | 51.0 | n/a | 40% |
| 77 | France | 49.7 | n/a | 21% |
| 100 | Greece | 39.7 | n/a | 25% |
| 104 | Cyprus | 35.4 | n/a | 25% |

Figure 29: Average Peak Connection Speed (IPv4) by European Country

metric gauging broadband infrastructure reach among the European Union member countries. The DESI 2017 report estimates that fixed broadband is available to 98% of Europeans, with 76% of European homes having access to broadband at speeds of at least 30 Mbps. DESI lists the Netherlands, Luxembourg, and Belgium as having the highest connectivity score among the European countries, while Croatia, Bulgaria, and Poland had the lowest.³⁶

6.2 EUROPEAN AVERAGE PEAK CONNECTION SPEEDS (IPv4) /
In the first quarter of 2017, Sweden overtook prior leader Romania as the surveyed European country with the highest average peak connection speed. As seen in Figure 29, the difference between it and lowest-ranked Cyprus was a sizeable 60 Mbps. Twenty-eight countries had average peak connection speeds of at least 50 Mbps.

Except for Luxembourg, which posted a 1.9% year-over-year decline in adoption, yearly changes were positive across the board for the surveyed European countries in the first quarter. Croatia led the region with a 54% yearly increase, while Latvia had the smallest gain at 5.8%. In all, 28 of the 31 surveyed countries enjoyed double-digit yearly growth in average peak connection speeds.

6.3 EUROPEAN 4 MBPS BROADBAND ADOPTION (IPv4) /

In the first quarter, Malta maintained its leading position in 4 Mbps adoption among the surveyed European countries, with 97% of its unique IPv4 addresses connecting to Akamai at average speeds of at least 4 Mbps. As Figure 30 shows, many countries in the region have adoption rates that are not far behind, with 18 of the 31 surveyed

countries having at least 90% of their IPv4 addresses connecting to Akamai at speeds of 4 Mbps or higher — up from 17 countries in the preceding quarter.

Changes in adoption rates were modest in the first quarter, with 22 countries seeing growth in adoption, 6 seeing declines, and 3 holding steady. Gains ranged from 0.1% in Luxembourg and Sweden to 3.8% in France, while losses ranged from 0.1% in the Netherlands to 3.0% in Cyprus. This decline pushed Cyprus to the bottom spot for 4 Mbps adoption among the surveyed European countries, replacing France as the country with the lowest adoption rate in the region. Cyprus' adoption rate was 70% — 27 percentage points lower than the regional leader Malta. The gap between the top and bottom countries in the fourth quarter of 2016 was also 27 points.

| Global Rank | Country/Region | % Above 4 Mbps | QoQ Change | YoY Change |
|-------------|----------------|----------------|------------|------------|
| 5 | Malta | 97% | 0% | -0.1% |
| 7 | Bulgaria | 96% | -0.3% | -0.8% |
| 9 | Netherlands | 95% | -0.1% | -0.1% |
| 11 | Switzerland | 95% | 0.6% | -0.7% |
| 12 | Belgium | 95% | 0.8% | 1.1% |
| 16 | Sweden | 94% | 0.1% | 0.2% |
| 19 | Latvia | 94% | 0% | -1.2% |
| 21 | Hungary | 94% | 1.2% | -1.0% |
| 23 | Finland | 93% | 0.5% | 0.8% |
| 24 | Romania | 93% | -0.2% | -1.9% |
| 25 | Denmark | 93% | -0.8% | -2.6% |
| 29 | United Kingdom | 92% | 1.2% | 1.2% |
| 30 | Austria | 92% | 1.3% | -2.6% |
| 31 | Norway | 91% | 0.6% | 0.1% |
| 33 | Russia | 91% | 0.9% | -1.0% |
| 34 | Spain | 90% | 0% | 0.2% |
| 35 | Lithuania | 90% | -0.3% | 1.2% |
| 36 | Germany | 90% | 1.5% | -1.3% |
| 41 | Luxembourg | 88% | 0.1% | -1.3% |
| 43 | Poland | 88% | 1.0% | -4.1% |
| 45 | Czech Republic | 87% | 1.1% | -4.6% |
| 46 | Portugal | 86% | 0.2% | -2.9% |
| 47 | Estonia | 86% | 1.3% | -1.9% |
| 50 | Slovakia | 86% | 0.4% | -5.1% |
| 52 | Slovenia | 85% | 1.7% | -3.8% |
| 53 | Croatia | 85% | 2.9% | 1.3% |
| 54 | Greece | 83% | 2.5% | -5.7% |
| 55 | Ireland | 83% | 1.4% | -0.6% |
| 65 | Italy | 79% | 2.2% | -4.0% |
| 79 | France | 73% | 3.8% | -10% |
| 81 | Cyprus | 70% | -3.0% | -14% |

Figure 30: 4 Mbps Broadband Adoption (IPv4) by European Country

Year-over-year changes were mixed and mostly modest among the surveyed European countries. Eight countries saw gains, ranging from 0.1% in Norway to 1.3% in Croatia, while 23 saw losses. Cyprus and France had the largest yearly drops in adoption, at 14% and 10% respectively, while the remaining declines were small, ranging from 0.1% in Malta and the Netherlands to 5.7% in Greece.

While the United Kingdom sits in the middle of the pack for broadband adoption among European countries, the first quarter saw numerous announcements that marked progress for the Broadband Delivery U.K. initiative, which has a goal of reaching 97% of U.K. homes with speeds of at least 24 Mbps by 2020. First-quarter announcements relating to the initiative included an additional government commitment of more than \$250 million (£200 million) in funding for fiber broadband deployments through the initiative,³⁷ as well as the deployment of broadband to an additional 3,000 homes as part of the Superfast Worcestershire project,³⁸ and funding for a subsea cable to bring broadband to the Caribbean island of Montserrat, a British territory that has lost more than half of its population since volcano eruptions began in 1995.³⁹ Now home to about 5,000 people, Montserrat expects to enjoy universal broadband across the island by 2018. Also in the first quarter, BT announced the 200th community served under its Community Fibre Partnership program, whereby underserved areas co-fund the cost of deployment with BT in order to bring fast broadband service to their locale. Through the program, BT has brought service to 20,000 hard-to-reach premises across the U.K.⁴⁰

6.4 EUROPEAN 10 MBPS BROADBAND ADOPTION (IPv4) /

With an adoption rate of 75%, Switzerland remained in the top spot among surveyed European countries for 10 Mbps adoption in the first quarter of 2017, as seen in Figure 31, and 18 European countries had at least half of their unique IPv4 addresses connecting to Akamai at average speeds of 10 Mbps or higher — the same number as in the fourth quarter of 2016. Meanwhile, the gap between the highest and lowest adoption rates in the region widened slightly from 58 percentage points to 60, as bottom-ranking Cyprus posted a quarterly decline of 5.4%. While Cyprus's decline was the largest among the surveyed European countries in the first quarter, five other countries also saw drops in adoption. These losses were small, ranging from 0.1% in the Netherlands to 3.6% in Denmark.

| Global Rank | Country/Region | % Above 10 Mbps | QoQ Change | YoY Change |
|-------------|----------------|-----------------|------------|------------|
| 2 | Switzerland | 75% | 2.5% | 10% |
| 7 | Netherlands | 70% | -0.1% | 5.0% |
| 8 | Romania | 70% | 1.2% | 9.0% |
| 9 | Norway | 69% | 0.8% | 4.9% |
| 10 | Belgium | 68% | 0.5% | 2.8% |
| 12 | Finland | 66% | 1.3% | 9.5% |
| 13 | Sweden | 66% | 1.0% | 5.5% |
| 14 | Denmark | 66% | -3.6% | 4.4% |
| 17 | Bulgaria | 64% | -2.2% | -3.4% |
| 18 | Latvia | 62% | -2.5% | 0.9% |
| 21 | United Kingdom | 60% | 4.5% | 13% |
| 22 | Hungary | 56% | 4.2% | 5.8% |
| 24 | Spain | 56% | 0.8% | 19% |
| 25 | Czech Republic | 54% | 0.4% | -2.9% |
| 27 | Ireland | 54% | 1.9% | 13% |
| 28 | Lithuania | 54% | 0.4% | 11% |
| 29 | Malta | 53% | -1.7% | -5.5% |
| 30 | Germany | 53% | 6.5% | 12% |
| 34 | Portugal | 49% | 1.8% | 2.4% |
| 35 | Russia | 49% | 2.0% | -1.5% |
| 37 | Austria | 46% | 2.2% | 8.5% |
| 40 | Slovenia | 43% | 0.4% | 0.5% |
| 41 | Estonia | 42% | 2.7% | 6.1% |
| 42 | Poland | 42% | 0.7% | -5.4% |
| 43 | Slovakia | 41% | 1.4% | 9.3% |
| 46 | Luxembourg | 38% | 7.9% | 26% |
| 53 | France | 31% | 12% | 8.5% |
| 56 | Italy | 26 | 11% | 47% |
| 59 | Croatia | 24% | 12% | 79% |
| 67 | Greece | 18% | 19% | 12% |
| 71 | Cyprus | 15% | -5.4% | 23% |

Figure 31: 10 Mbps Broadband Adoption (IPv4) by European Country

The remaining 25 countries posted gains, led by Greece with a 19% increase. Lithuania, Slovenia, and the Czech Republic had the smallest gains in the region, as each posted a 0.4% increase in adoption compared with the fourth quarter of 2016.

Year-over-year, 26 surveyed European countries posted gains in the first quarter, led by Croatia, which saw adoption levels jump 79% compared with one year prior. Among the remaining gaining countries, increases varied from 0.5% in Slovenia to 47% in Italy. Five surveyed European countries posted small yearly losses, ranging from 1.5% in Russia to 5.5% in Malta.

6.5 EUROPEAN 15 MBPS BROADBAND ADOPTION (IPv4) /

As seen in Figure 32, with an adoption rate of 56%, up 3.9% quarter-over-quarter, Sweden overtook Norway to gain the top spot for 15 Mbps broadband adoption among surveyed European countries in the first quarter of 2017. Twenty-six of the thirty qualifying surveyed European countries had at least one in five IPv4 addresses connecting to Akamai at average speeds above 15 Mbps—up from twenty-five in the previous quarter—while two countries, Switzerland and Norway, had adoption rates above 50%. Greece, the qualifying surveyed country with the lowest adoption level in the region, lagged nearly 50 percentage points behind the regional leader in the first quarter, despite a 22% quarterly increase.

| Global Rank | Country/Region | % Above 15 Mbps | QoQ Change | YoY Change |
|-------------|----------------|-----------------|------------|------------|
| 2 | Switzerland | 56% | 3.9% | 26% |
| 3 | Norway | 54% | 0.1% | 8.1% |
| 7 | Sweden | 49% | 0.6% | 7.1% |
| 9 | Romania | 47% | 5.6% | 14% |
| 10 | Denmark | 46% | -4.5% | 14% |
| 11 | Netherlands | 46% | -0.4% | 8.4% |
| 12 | Finland | 45% | 1.6% | 21% |
| 14 | United Kingdom | 42% | 5.4% | 16% |
| 15 | Belgium | 41% | 1.4% | 6.8% |
| 17 | Ireland | 39% | 2.1% | 29% |
| 18 | Latvia | 38% | -6.7% | -10% |
| 20 | Bulgaria | 38% | -3.0% | -5.2% |
| 22 | Spain | 36% | 1.2% | 29% |
| 23 | Czech Republic | 36% | -0.2% | 0.9% |
| 24 | Hungary | 34% | 6.2% | 14% |
| 25 | Germany | 33% | 10% | 27% |
| 28 | Lithuania | 32% | -0.9% | -4.3% |
| 31 | Portugal | 29% | 2.4% | -5.6% |
| 35 | Austria | 26% | 2.8% | 19% |
| 36 | Malta | 25% | -4.6% | -2.3% |
| 37 | Poland | 25% | 0.1% | 3.5% |
| 39 | Slovenia | 24% | -2.9% | 0.6% |
| 40 | Slovakia | 23% | 2.2% | 4.3% |
| 42 | Russia | 21% | 1.3% | -9.1% |
| 43 | Estonia | 21% | 3.6% | -2.2% |
| 44 | Luxembourg | 20% | 14% | 43% |
| 49 | France | 18% | 14% | 33% |
| 55 | Italy | 12% | 17% | 73% |
| 59 | Croatia | 8.3% | 14% | 76% |
| 64 | Greece | 6.2% | 22% | 43% |
| - | Cyprus | 5.8% | -4.4% | 62% |

Figure 32: 15 Mbps Broadband Adoption (IPv4) by European Country

Twenty-two of the qualifying countries saw quarterly gains in adoption in the first quarter, compared with twenty-eight in the previous quarter. Greece had the largest quarterly increase at 22%, while Norway and Poland had the smallest at 0.1%. Among the European countries seeing declines in adoption, losses ranged between 0.2% in the Czech Republic and 6.7% in Latvia.

Year-over-year changes were mixed across the European region, with 23 countries posting gains. Croatia and Italy had the largest yearly increases, as their adoption levels jumped 76% and 73%, respectively. Increases among the remaining countries ranged from 0.6% in Slovenia to 43% in Greece and Luxembourg. Among the seven countries that posted losses in 15 Mbps adoption compared with one year prior, Latvia had the largest decline at 10%, while Estonia had the smallest at 2.2%.

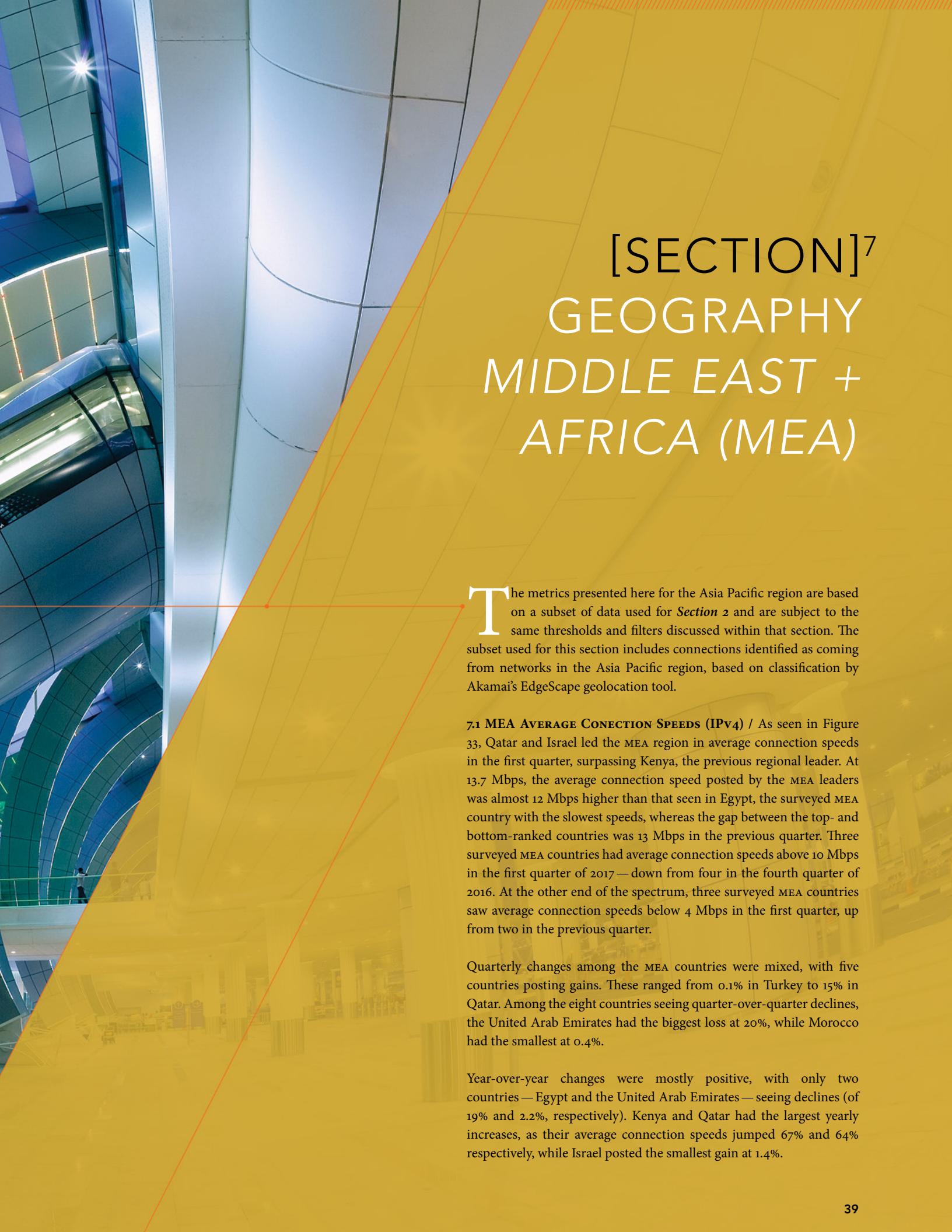
Continuing the trend of the past several quarters, Europe continued to see high-speed service launches throughout the first quarter. In the United Kingdom, BT announced a rollout of its 330 Mbps service to 138,000 pilot premises throughout the country, with full commercial deployment expected in the second half of the year. BT expects to reach 10 million homes and businesses with the service by 2020.⁴¹ Meanwhile, BT competitor Virgin Media U.K. unveiled speed increases across all of its service tiers, with entry-level packages enjoying free boosts from 50 Mbps to 100 Mbps, and top-level packages jumping from 200 Mbps to 300 Mbps.⁴²

New gigabit Internet announcements in the U.K. included Gigaclear's contract to bring service to 6,330 homes and businesses in rural Northamptonshire by the end of 2018,⁴³ as well as Hyperoptic's FTTH rollout to thousands of homes in Nottingham⁴⁴ and 865 homes in the Battersea Power Station area of South West London.⁴⁵ Hyperoptic plans to reach more than 500,000 homes with gigabit speeds by the end of 2019.

Other first quarter announcements in Europe included Vodafone Iceland's launch of 500 Mbps fiber-based Internet services to users across northern Iceland,⁴⁶ and Telecom Italia brand TIM's plans for a new ISP to deliver 300 Mbps fiber-based broadband to rural, underserved areas of Italy. TIM hopes the new company will provide "ultrabroadband" coverage to 99% of Italy by 2019, two years ahead of its goal.⁴⁷

Finally, on the high end of the speed spectrum, the now Finnish-owned Baltic cable company Starman announced a partnership with Nokia to bring the first 10 Gbps service to customers in Europe. Launching in Estonia, the companies aim to offer the service at a cost-effective price to at least 50,000 customers in the next five years, using Nokia's Turbo EPON technology as an upgrade to Starman's current DOCSIS3.0 network.⁴⁸





[SECTION]⁷

GEOGRAPHY

MIDDLE EAST + AFRICA (MEA)

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.

7.1 MEA AVERAGE CONNECTION SPEEDS (IPV4) / As seen in Figure 33, Qatar and Israel led the MEA region in average connection speeds in the first quarter, surpassing Kenya, the previous regional leader. At 13.7 Mbps, the average connection speed posted by the MEA leaders was almost 12 Mbps higher than that seen in Egypt, the surveyed MEA country with the slowest speeds, whereas the gap between the top- and bottom-ranked countries was 13 Mbps in the previous quarter. Three surveyed MEA countries had average connection speeds above 10 Mbps in the first quarter of 2017—down from four in the fourth quarter of 2016. At the other end of the spectrum, three surveyed MEA countries saw average connection speeds below 4 Mbps in the first quarter, up from two in the previous quarter.

Quarterly changes among the MEA countries were mixed, with five countries posting gains. These ranged from 0.1% in Turkey to 15% in Qatar. Among the eight countries seeing quarter-over-quarter declines, the United Arab Emirates had the biggest loss at 20%, while Morocco had the smallest at 0.4%.

Year-over-year changes were mostly positive, with only two countries—Egypt and the United Arab Emirates—seeing declines (of 19% and 2.2%, respectively). Kenya and Qatar had the largest yearly increases, as their average connection speeds jumped 67% and 64% respectively, while Israel posted the smallest gain at 1.4%.

| Global Rank | Country/Region | Q1 2017 Avg. Mbps | QoQ Change | YoY Change |
|-------------|----------------------|-------------------|------------|------------|
| 32 | Qatar | 13.7 | 15% | 64% |
| 33 | Israel | 13.7 | -5.0% | 1.4% |
| 43 | Kenya | 12.2 | -19% | 67% |
| 65 | United Arab Emirates | 8.6 | -20% | -2.2% |
| 71 | Kuwait | 7.9 | -12% | 20% |
| 75 | Turkey | 7.6 | 0.1% | 4.4% |
| 82 | South Africa | 6.7 | 2.1% | 3.6% |
| 84 | Saudi Arabia | 6.7 | 6.1% | 44% |
| 104 | Morocco | 5.2 | -0.4% | 22% |
| 107 | Iran | 4.7 | 14% | 33% |
| 114 | Nigeria | 3.9 | -6.7% | 16% |
| 130 | Namibia | 2.9 | -3.8% | 29% |
| 143 | Egypt | 2.0 | -8.9% | -19% |

Figure 33: Average Connection Speed (IPv4) by MEA Country

| Global Rank | Country/Region | Q1 2017 Peak Mbps | QoQ Change | YoY Change |
|-------------|----------------------|-------------------|------------|------------|
| 7 | Qatar | 107.9 | n/a | 21% |
| 9 | Israel | 99.1 | n/a | 51% |
| 22 | United Arab Emirates | 81.1 | n/a | 34% |
| 65 | Kuwait | 55.3 | n/a | 16% |
| 69 | Saudi Arabia | 52.3 | n/a | 57% |
| 76 | Turkey | 50.0 | n/a | 23% |
| 101 | Kenya | 38.5 | n/a | 59% |
| 108 | South Africa | 32.4 | n/a | 7.6% |
| 115 | Nigeria | 29.1 | n/a | 25% |
| 121 | Morocco | 25.9 | n/a | 13% |
| 123 | Namibia | 24.3 | n/a | 83% |
| 124 | Iran | 24.2 | n/a | 36% |
| 137 | Egypt | 17.0 | n/a | 6.2% |

Figure 34: Average Peak Connection Speed (IPv4) by MEA Country

7.2 MEA AVERAGE PEAK CONNECTION SPEEDS (IPv4) / With a 107.9 Mbps average peak connection speed in the first quarter, Qatar led the MEA region once again, surpassing the 100 Mbps threshold for the first time. As seen in Figure 34, second-place Israel came close to this threshold as well, posting a 99.1 Mbps average peak connection speed. At the other end of the spectrum, Egypt clocked in at 17.0 Mbps, again coming in last in the region with an average peak connection speed nearly 91 Mbps slower than the regional leader. Six of the surveyed MEA countries posted average peak speeds of at least 50 Mbps in the first quarter of 2017 (up from four in the third quarter of 2016, the last time this metric was published in the *State of the Internet Report*), and 10 had speeds of at least 25 Mbps (up from eight in the third quarter of 2016).

Year-over-year changes were positive across the MEA region in the first quarter, led by Namibia with an 83% gain. Egypt and South Africa had the smallest increases at 6.2% and 7.6% respectively, while the remaining surveyed countries all saw double-digit speed gains compared with one year prior.

7.3 MEA 4 MBPS BROADBAND ADOPTION (IPv4) / As seen in Figure 35, Israel maintained the top spot in the MEA region for 4 Mbps adoption in the first quarter with a 95% adoption rate, down a slight 0.2% from the fourth quarter of 2016. Nine of the thirteen qualifying surveyed countries in the region had at least half of their unique IPv4 addresses connecting to Akamai at average speeds of at least 4 Mbps—down from 10 in the previous quarter. Additionally, the gap between the top- and bottom-ranked MEA countries widened from 86 percentage points to 89. Egypt remained the bottom-ranked country in the region and the only surveyed country with fewer than 1 in 10 IPv4 addresses connecting to Akamai with average speeds of at least 4 Mbps; the next lowest-ranking country in the region, Namibia, had 21% of its IPv4 addresses connecting at average speeds above this threshold.

Quarterly changes in the region were mixed, with 5 of the 13 countries seeing gains. Iran saw the largest growth at 22%, while the United Arab Emirates saw the smallest at 0.6%. Among the eight countries seeing losses in adoption, declines ranged from 0.4% in Israel to 34% in Egypt.

On a year-over-year basis, changes were mixed as well. Namibia led the gaining countries with a 108% yearly increase, and six additional countries saw adoption rates more than double compared to the first quarter of 2016. The United Arab Emirates saw the smallest yearly growth among the countries that experienced gains, as it posted a 4.2% increase. On the flip side, year-over-year losses in 4 Mbps broadband adoption among the MEA countries ranged from 0.4% in Israel to 38% in Egypt.

Although broadband adoption lags the world in many parts of the MEA region, some first-quarter announcements show promise of progress. In February, Facebook announced an initiative to lay 500 miles of fiber optic cable in Uganda by year end, with the goal of providing Internet access to more than 3 million people. Facebook will partner with Airtel and BCS to provide wireless Internet access to Uganda, supported by the fiber infrastructure.⁴⁹ Also, Ooredoo launched a 10 Gbps FTTH service in Qatar after a successful December 2016 trial.⁵⁰

7.4 MEA 10 MBPS BROADBAND ADOPTION (IPv4) / As seen in Figure 36, 10 surveyed MEA countries qualified for inclusion in the 10 Mbps broadband adoption metric in the first quarter. This is the same number as in the fourth quarter of 2016; however, Egypt just made the cut off this quarter, while Kuwait just missed it. The reverse happened in the fourth quarter as Kuwait joined the qualifying group while Egypt dropped out. With a 27% quarter-over-quarter boost in its adoption levels, Qatar took the top spot for this metric in the first quarter, as 62% of its IPv4 addresses connected to Akamai at speeds of 10 Mbps or higher. Kenya, the leader in the previous quarter, saw adoption levels fall 25% quarter over quarter, dropping it to third place among qualifying surveyed countries in the MEA region.

| Global Rank | Country/Region | % Above 4 Mbps | QoQ Change | YoY Change |
|-------------|----------------------|----------------|------------|------------|
| 10 | Israel | 95% | -0.2% | -0.4% |
| 15 | United Arab Emirates | 94% | 0.6% | 4.2% |
| 51 | Qatar | 86% | 1.1% | 8.7% |
| 72 | Turkey | 76% | -2.6% | -13% |
| 74 | Saudi Arabia | 75% | 6.3% | 48% |
| 78 | Kenya | 73% | -15% | 16% |
| 91 | Iran | 61% | 22% | 70% |
| 96 | South Africa | 58% | 14% | 38% |
| 98 | Morocco | 57% | -1.2% | 32% |
| 100 | Kuwait | 48% | -8.3% | -12% |
| 108 | Nigeria | 38% | -8.4% | 28% |
| 117 | Namibia | 21% | -1.0% | 108% |
| 123 | Egypt | 6.0% | -34% | -38% |

Figure 35: 4 Mbps Broadband Adoption (IPv4) by MEA Country

Two MEA countries achieved adoption rates above 50% in the first quarter of 2017—the same as in the fourth quarter of 2016, while the gap between the top- and bottom-ranked MEA countries widened from 59 to 61 percentage points. Seven of the 10 qualifying surveyed countries had at least 10% of their unique IPv4 addresses connecting to Akamai at average speeds of 10 Mbps or higher in the first quarter, down from eight in the fourth quarter of 2016.

Unlike the robust gains seen across the board in the fourth quarter of 2016, quarterly changes were mixed among the MEA countries in the first quarter. Egypt saw the largest gain by far, with a 120% increase over the previous quarter, but, as noted previously, Egypt had a very small adoption rate and was just over the qualifying threshold in terms of IP addresses, so it is more susceptible to large percentage swings. Among the four remaining countries that saw increases, growth ranged from 3.3% in Turkey to 27% in Qatar. Conversely, the United Arab Emirates saw the largest quarterly drop in adoption at 44%, while Morocco posted the smallest decline at 0.4%.

Yearly changes were also mixed, with 7 of the 10 qualifying surveyed countries posting gains. Saudi Arabia and Morocco led the region with jumps of 363% and 303% respectively, while Iran, Kenya, and Qatar also more than doubled their adoption levels compared with one year prior. Israel again posted the smallest annual increase in the region at a modest 5.8%.

7.5 MEA 15 MBPS BROADBAND ADOPTION (IPv4) / With a robust 36% quarterly gain, Qatar took the top spot in the region for 15 Mbps broadband adoption in the first quarter of 2017, while Kenya, the leader from the previous quarter, posted a 30% decline in adoption, dropping it to second place among the qualifying surveyed MEA countries. As seen in Figure 37, Qatar's 33% adoption rate was more than 31 percentage points higher than that of Morocco, the qualifying surveyed MEA country with the lowest 15 Mbps adoption rate.

| Global Rank | Country/Region | % Above 10 Mbps | QoQ Change | YoY Change |
|-------------|----------------------|-----------------|------------|------------|
| 19 | Qatar | 62% | 27% | 137% |
| 26 | Israel | 54% | -6.2% | 5.8% |
| 39 | Kenya | 45% | -25% | 151% |
| 60 | United Arab Emirates | 23% | -44% | -11% |
| 63 | Turkey | 19% | 3.3% | 53% |
| 72 | Saudi Arabia | 14% | 19% | 363% |
| 77 | South Africa | 11% | 6.0% | -11% |
| 83 | Morocco | 5.6% | -0.4% | 303% |
| 85 | Iran | 1.3% | -6.0% | 284% |
| 86 | Egypt | 0.6% | 120% | -65% |
| — | Kuwait | 15% | -23% | 94% |
| — | Nigeria | 2.8% | -15% | 92% |
| — | Namibia | 1.5% | -20% | 158% |

Figure 36: 10 Mbps Broadband Adoption (IPv4) by MEA Country

Quarterly changes in 15 Mbps adoption were mixed in the first quarter, as half the qualifying surveyed countries saw gains while the other half saw losses. Gains ranged between Morocco's 0.1% and Qatar's 36%, while losses ranged between South Africa's 6.1% and the United Arab Emirates's 61%. Three MEA countries had more than 1 in 10 unique IPv4 addresses connecting to Akamai at average speeds of at 15 Mbps or more—down from four countries in the fourth quarter of 2016.

Except for South Africa, which posted a yearly decline in adoption of 25%, the qualifying surveyed countries in the MEA region saw across-the-board growth in 15 Mbps broadband adoption levels compared with one year prior. Saudi Arabia and Morocco had the largest gains, with significant boosts of 363% and 303% respectively, while the remaining countries enjoyed increases ranging between 11% in the United Arab Emirates and 247% in Kenya.

| Global Rank | Country/Region | % Above 15 Mbps | QoQ Change | YoY Change |
|-------------|----------------------|-----------------|------------|------------|
| 26 | Qatar | 33% | 36% | 242% |
| 29 | Kenya | 31% | -30% | 247% |
| 32 | Israel | 28% | -7.6% | 16% |
| 60 | Turkey | 7.5% | 5.9% | 77% |
| 62 | United Arab Emirates | 6.3% | -61% | 11% |
| 67 | South Africa | 5.8% | -6.1% | -25% |
| 71 | Saudi Arabia | 4.7% | 21% | 363% |
| 76 | Morocco | 1.4% | 0.1% | 303% |
| — | Kuwait | 8.9% | -1.0% | 67% |
| — | Nigeria | 0.9% | -5.5% | 83% |
| — | Namibia | 0.3% | -31% | 231% |
| — | Egypt | 0.3% | 243% | -61% |
| — | Iran | 0.1% | 15% | 35% |

Figure 37: 15 Mbps Broadband Adoption (IPv4) by MEA Country





[SECTION]⁸ 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. Mobile connectivity metrics are aggregated at a country/region level. 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.

8.1 CONNECTION SPEEDS ON MOBILE NETWORKS (IPv4) /
Beginning with the *Second Quarter, 2016 State of the Internet Report*, the countries/regions covered in this section, along with their categorization, were altered slightly to align with the rest of the *State of the Internet Report*. This section now provides mobile data and analysis for the same surveyed countries/regions covered in Sections 4 through 7 of this report, and the countries/regions will be categorized in the same way: Americas, Asia Pacific, Europe, and Middle East/Africa. Countries/regions marked with an asterisk in Figure 38 have not met

| Country/Region | Q1 2017 Avg. Mbps | Country/Region | Q1 2017 Avg. Mbps | | |
|---------------------|-------------------|---------------------------|-------------------|--|--|
| AMERICAS | | | | | |
| Argentina | 5.1 | Denmark | 16.6 | | |
| Bolivia | 4.0 | Estonia | 11.1 | | |
| Brazil | 5.2 | Finland | 21.6 | | |
| Canada | 10.3 | France | 17.4 | | |
| Chile | 7.2 | Germany | 24.1 | | |
| Colombia | 6.7 | Greece | 11.4 | | |
| Costa Rica * | 3.7 | Hungary | 12.0 | | |
| Ecuador * | 4.5 | Ireland | 13.2 | | |
| Mexico * | 7.5 | Italy | 12.4 | | |
| Panama | 4.2 | Latvia * | 14.8 | | |
| Paraguay | 7.5 | Lithuania | 9.8 | | |
| Peru | 8.3 | Luxembourg * | 10.4 | | |
| United States | 10.7 | Malta * | 8.5 | | |
| Uruguay | 4.6 | Netherlands | 15.0 | | |
| Venezuela | 2.8 | Norway | 17.3 | | |
| ASIA PACIFIC | | | | | |
| Australia | 15.7 | Poland | 9.5 | | |
| China | 9.3 | Portugal | 6.9 | | |
| Hong Kong | 6.8 | Romania | 15.9 | | |
| India | 4.9 | Russia | 9.9 | | |
| Indonesia | 12.8 | Slovakia | 14.0 | | |
| Japan | 15.6 | Slovenia | 11.3 | | |
| Malaysia | 4.4 | Spain | 13.8 | | |
| New Zealand | 13.0 | Sweden | 13.2 | | |
| Philippines * | 8.7 | Switzerland * | 22.4 | | |
| Singapore | 8.6 | United Kingdom | 26.0 | | |
| South Korea | 11.8 | MIDDLE EAST/AFRICA | | | |
| Sri Lanka | 6.9 | Egypt | 12.2 | | |
| Taiwan | 13.0 | Iran | 7.5 | | |
| Thailand | 8.6 | Israel | 9.2 | | |
| Vietnam | 5.3 | Kenya | 13.7 | | |
| EUROPE | | | | | |
| Austria | 13.5 | Kuwait | 10.2 | | |
| Belgium | 16.2 | Morocco | 5.3 | | |
| Bulgaria * | 9.5 | Namibia | 3.8 | | |
| Croatia | 9.4 | Nigeria * | 3.9 | | |
| Cyprus * | 24.2 | Qatar * | 13.6 | | |
| Czech Republic | 7.4 | Saudi Arabia | 6.0 | | |

Figure 38: Average Connection Speeds (IPv4) for Mobile Connections by Country/Region

* Fewer than 25,000 unique IPv4 addresses classified as mobile observed in Q1 2017

the minimum requirement of 25,000 unique IPv4 addresses seen by Akamai and identified as coming from a mobile network during the quarter. These countries/regions do not qualify for inclusion this quarter and are not included in this section's analysis, although their data is included in Figure 38 for reference.

In the first quarter of 2017, 62 surveyed countries/regions around the world qualified for inclusion in the mobile section, up from 61 in the fourth quarter of 2016. Figure 38 shows that across these countries/regions, the United Kingdom once again had the fastest average mobile connection speed at 26.0 Mbps (down from 26.8 Mbps in the fourth quarter), with Germany again in second place at 24.1 Mbps. Venezuela again had the lowest average connection speed at 2.8 Mbps (down from 2.9 in the fourth quarter), followed by Namibia, with an average connection speed of 3.8 Mbps.

Among the qualifying surveyed countries/regions, 32 in total had an average mobile connection speed at or exceeding the 10 Mbps broadband threshold (up from 30 in the previous quarter), while 60 achieved average speeds at or above the 4 Mbps broadband level (up from 58). Within the individual continental regions, the following qualifying surveyed countries/regions had the highest average mobile connection speeds:

- **Americas:** United States, 10.7 Mbps
- **Asia Pacific:** Australia, 15.7 Mbps
- **Europe:** United Kingdom, 26.0 Mbps
- **Middle East/Africa:** Kenya, 13.7 Mbps

Continuing the trend of quarters past, the first quarter of 2017 saw rapid gains in mobile networks, from 4G and LTE-A deployments to 5G developments. After many delays, 4G services finally launched in Egypt in the first quarter,⁵¹ while in New Zealand, the government revealed that 90% of the country's population now had access to 4G mobile services, roughly two years ahead of schedule, due to aggressive rollouts by mobile providers Vodafone New Zealand and Spark.⁵²

On the LTE-A front, Ooredoo Qatar announced the launch of its 4.5G service, with speeds up to 800 Mbps, for customers in Doha, the country's capital.⁵³ Telstra rolled out its business gigabit LTE service in Sydney, Australia, offering download speeds of nearly 1 Gbps and upload speeds of 150 Mbps.⁵⁴ Singtel launched its 450 Mbps LTE-A offering to all its 4G customers in Singapore, and announced plans to start rolling out 4x4 MIMO technology that can deliver speeds up to 1 Gbps in 2018.⁵⁵ TIM (the mobile brand of Telecom Italia) revealed its intentions to upgrade its Brazilian network with Nokia's 4.5G technology.⁵⁶ In the United States, T-Mobile also announced it would move to an all-LTE infrastructure in 2020, deprecating its 2G and 3G networks.⁵⁷ T-Mobile and Nokia also claimed to achieve near-gigabit speeds using three-carrier aggregation on T-Mobile's current LTE network.⁵⁸ In addition, Sprint announced the launch of its pre-5G services in New Orleans as the first commercial deployment of "Gigabit Class LTE" in the U.S., although no specific speeds were cited.⁵⁹

In first-quarter 5G news, the International Telecommunication Union (ITU) published its draft report on 5G standards. Draft specifications require download capacities of at least 20 Gbps and upload capacities of at least 10 Gbps for each 5G cell, as well as the ability to support 1 million devices per square kilometer. The draft is expected to be finalized and approved by the end of the year.⁶⁰ Meanwhile, carriers are beginning to roll out 5G services. Etisalat revealed it was in the last phase of rolling out 5G in Dubai.⁶¹ Verizon announced it would launch 5G services in 11 U.S. markets in the first half of 2017,⁶² and AT&T announced plans to launch 5G services in late 2018.⁶³ Finally, Deutsche Telekom unveiled plans to rollout 5G services across Europe by 2020.⁶⁴ Achieving any 5G-like speeds, however, requires the use of phones that support 5G technologies. As 5G specifications are not yet finalized, these phones are not yet on the market, but at the Mobile World Congress in Barcelona, Chinese company ZTE showcased what it claims to be the first gigabit-capable smartphone.⁶⁵

5G research continued to push speed boundaries in the first-quarter as well. Orange and Ericsson demonstrated a "live field trial" of 5G technology in France, achieving speeds of 15.4 Gbps, although details about the technologies and test environment used were not provided.⁶⁶ Also in France, Bouygues Telecom and Ericsson achieved speeds of 25.2 Gbps using prototype mobile devices connected to an Ericsson base station.⁶⁷ Turkcell and Ericsson reached speeds of 24.7 Gbps in Turkey's first ever 5G test.⁶⁸ Finally, in a trial at its operations center in Jurong, Singapore telecommunications provider M1 claimed to reach mobile speeds of 35 Gbps in a 5G trial using Huawei's technology. Coming only a year after achieving 1 Gbps speeds, this achievement underscores the speed at which the industry is advancing.⁶⁹ Due to technological advances such as MIMO, millimeter wave, and spectrum sharing that have driven tremendous speed and capacity increases in mobile connectivity over the past year, some analysts believe wireless capacity growth of 50 to 100 times is possible in the near-term future.⁷⁰

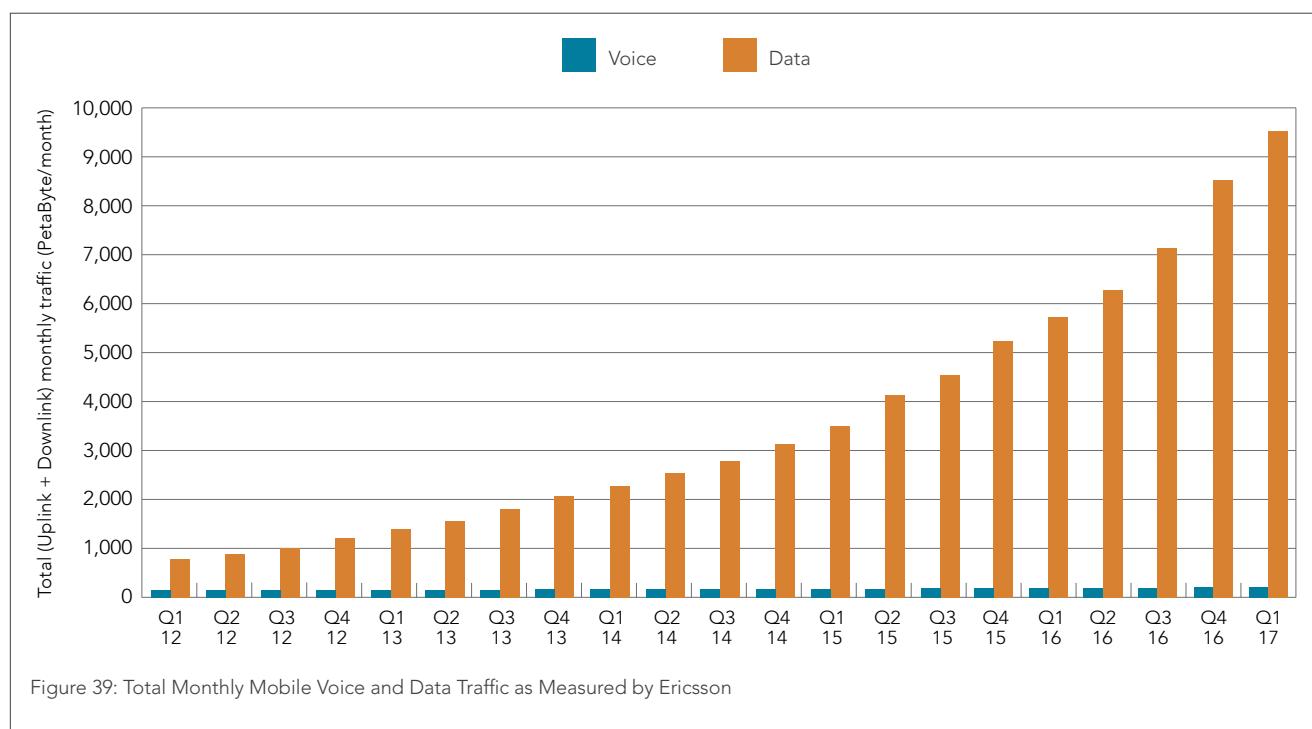
Finally, new research announced in the first quarter showcased the promise of wireless for truly ultra-high-speed connectivity. A team of Japanese scientists developed a transmitter that enables 100 Gbps transmissions over a single 300 GHz channel. Roughly 10 times faster than 5G networks, this transmitter opens the door to enabling satellite-based communications that are as fast as fiber optic ones.⁷¹

8.2 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 as well as between operators, due to their different customer profiles.

Mobile data traffic has continued to grow, and Figure 39 shows total global monthly data and voice traffic from the first quarter of 2012 to the first quarter of 2017. It depicts a continued strong increase in data traffic, with voice traffic growth having diminished to the low 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 first quarter of 2017, data traffic grew nearly 12% quarter-over-quarter and nearly 70% year-over-year. Looking at the full five-year period shown in Figure 39, cumulative voice traffic growth was 28%, while cumulative data traffic growth was more than 1,200%.







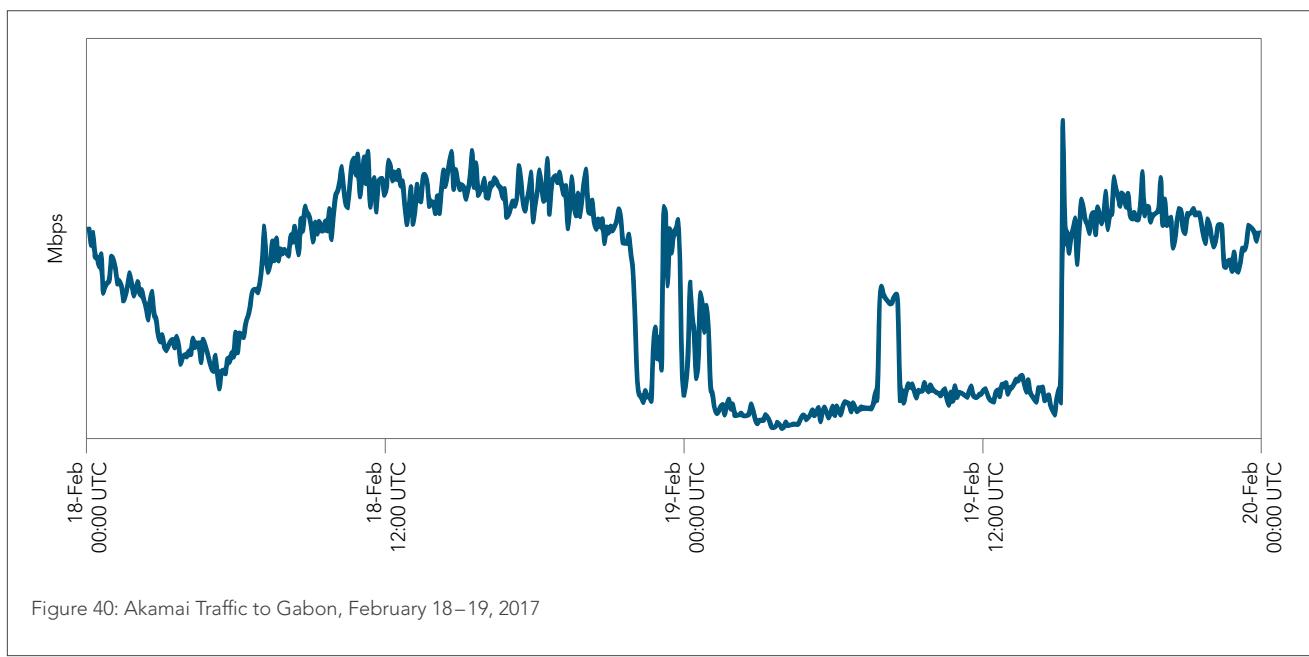


[SECTION]⁹ INTERNET DISRUPTIONS + EVENTS

Internet disruptions are unfortunately still 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). Because Akamai customer content is consumed by users around the world, the effect of these disruptions 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 other events, during the first quarter of 2017.

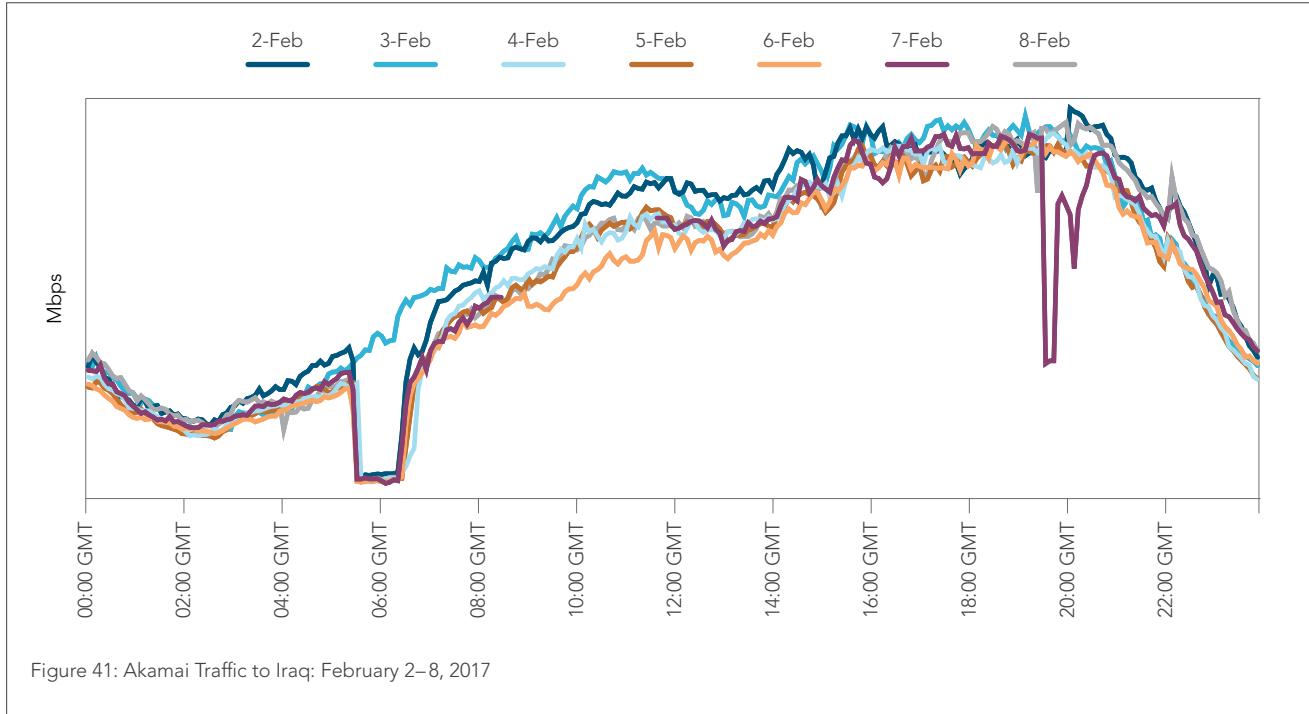
9.1 GABON / As Figure 40 shows, on February 18, around 10:25 p.m. UTC, Akamai traffic to Gabon dropped suddenly to roughly a quarter of normal levels. After about half an hour, traffic appeared to return closer to normal but fell back to depressed levels at approximately 1:25 a.m. UTC on February 19. Traffic remained low until approximately



3:45 p.m. UTC, apart from another brief spike around 8:20 a.m. The routing monitor at RIPE NCC (Europe's Regional Internet Registry) corroborated the event, showing that 8 of the Gabon's networks (ASNs), representing about 40% of the country's IP address prefixes, were down for much of the event.⁷² The cause of the outage is not known, however.

9.2 IRAQ / Just as in numerous previous quarters, Akamai saw significant drops in traffic to Iraq on several dates in the first quarter of 2017, as seen in Figure 41. Once again, these disruptions are due to

the Iraqi government's policy of blocking Internet access across the country (except in the independent region of Kurdistan) to prevent cheating during middle and high school exams. The outages occurred from approximately 5:30 a.m. to 6:30 a.m. UTC on February 2, 4, 5, 6, 7, and 8. While prior exam-driven outages had been three hours in length, the Iraqi Ministry of Communications apparently decided to shorten these outages to one hour.⁷³



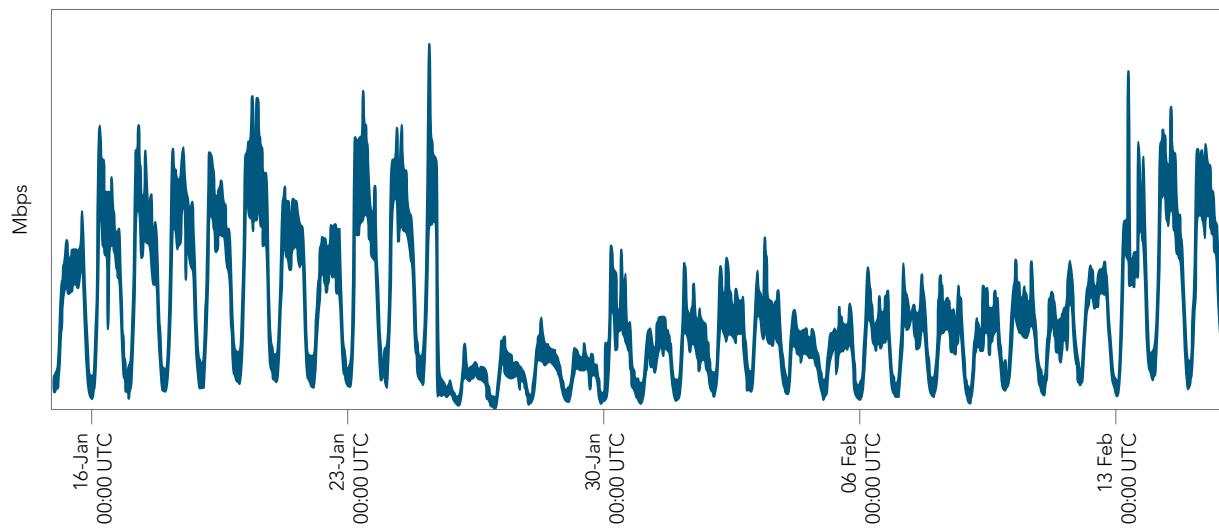


Figure 42: Akamai Traffic to Madagascar, January 15–February 15, 2017

9.3 MADAGASCAR / On January 25, at approximately 11:05 a.m. UTC, Akamai-delivered traffic to Madagascar dropped suddenly to roughly one-tenth of typical levels, as Figure 42 depicts. While Madagascar continued to see some traffic over the following days, increasing somewhat after about five days, traffic levels did not return to normal until February 13, nearly three weeks later. The Internet disruption was caused by a cut in the submarine cable providing connectivity to the country, impacting millions.⁷⁴ Dyn Research noted the outages affected 48 networks in Madagascar, 46 of which belonged to network provider TELMA.⁷⁵ TELMA used a satellite backup to get service back online initially, as repairs were originally estimated to take 15 days.⁷⁶

9.4 MARSHALL ISLANDS / The Marshall Islands also experienced a multi-week outage caused by a subsea cable break, as shown in Figure 43. Around 8:00 a.m. UTC on December 28, 2016, Akamai saw traffic levels to the Marshall Islands drop to zero for about one and a half hours. Very small amounts of traffic were delivered in the subsequent days, but traffic levels did not return to normal until January 17, 2017 due to the length of repair time. Repair took a total of 23 days, instead of an initially estimated 9 days, in part because it took longer than expected to find the exact location of the damage.⁷⁷ During the time the cable was offline, high-latency satellite back up connectivity was available, but due to the limited bandwidth,

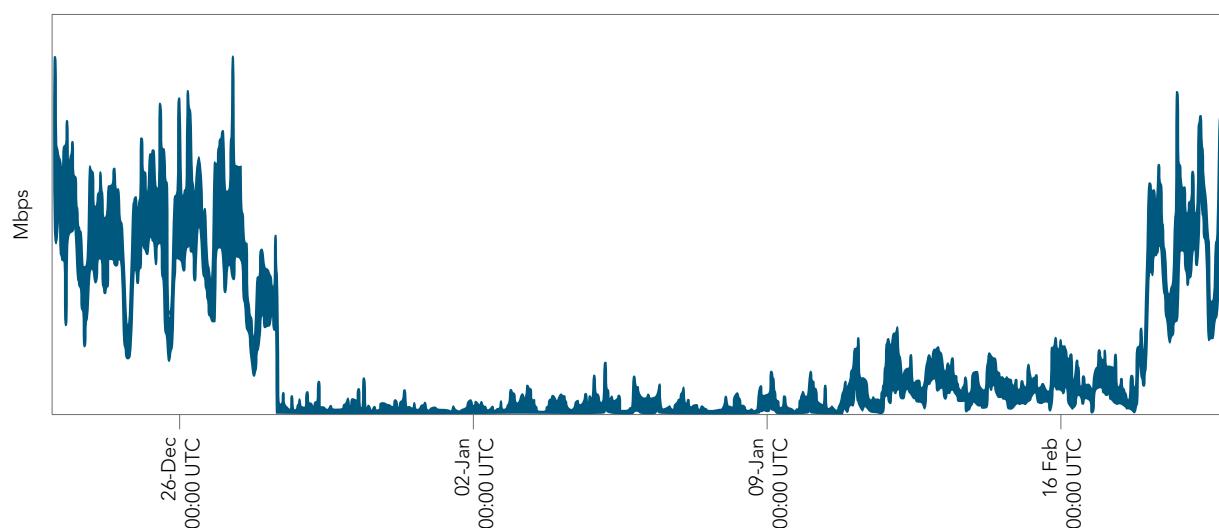


Figure 43: Akamai Traffic to the Marshall Islands, December 23, 2016–January 19, 2017

the Marshall Islands' National Telecommunications Authority restricted all Internet access to email only, with certain business customers allowed web access on a rotating basis.⁷⁸

9.5 SOMALIA / Akamai saw traffic to Somalia drop to roughly one-third of former levels around 6:00 p.m. UTC on January 30, the same time as it observed a similar drop in traffic to the Seychelles and a smaller drop in Mozambique.⁷⁹ As Figure 44 illustrates, traffic levels remained depressed until approximately 9:30 a.m. on January 31. The cause of the Internet disruption is unknown; while some have reported suspicions that the outage was a political move orchestrated by the government ahead of a key presidential debate, the Somali government has deemed the outage accidental.⁸⁰

9.6 UNITED STATES PRESIDENTIAL INAUGURATION / On January 20, during the u.s. Presidential Inauguration, traffic delivered by Akamai for its Media and Entertainment customers peaked at 8.7 Tbps. As seen in Figure 45, the peak occurred at 5:04 p.m. UTC during the opening of the president's speech, and marked the largest live-streamed news event Akamai had delivered to date. The previous record of 7.5 Tbps occurred on November 8, 2016 during the presidential election, while the final match of the uefa Euro soccer tournament on July 10, 2016 saw a peak of 7.3 Tbps.⁸¹

It is interesting to note that Akamai also saw a sustained increase in traffic served to the u.s. for its Retail industry customers on Inauguration Day. As Figure 46 shows, beginning around 3:10 p.m. UTC, about two hours before the president began speaking at his inauguration, retail traffic levels trended about 20% higher than that seen on the previous two days, and remained elevated throughout the day.

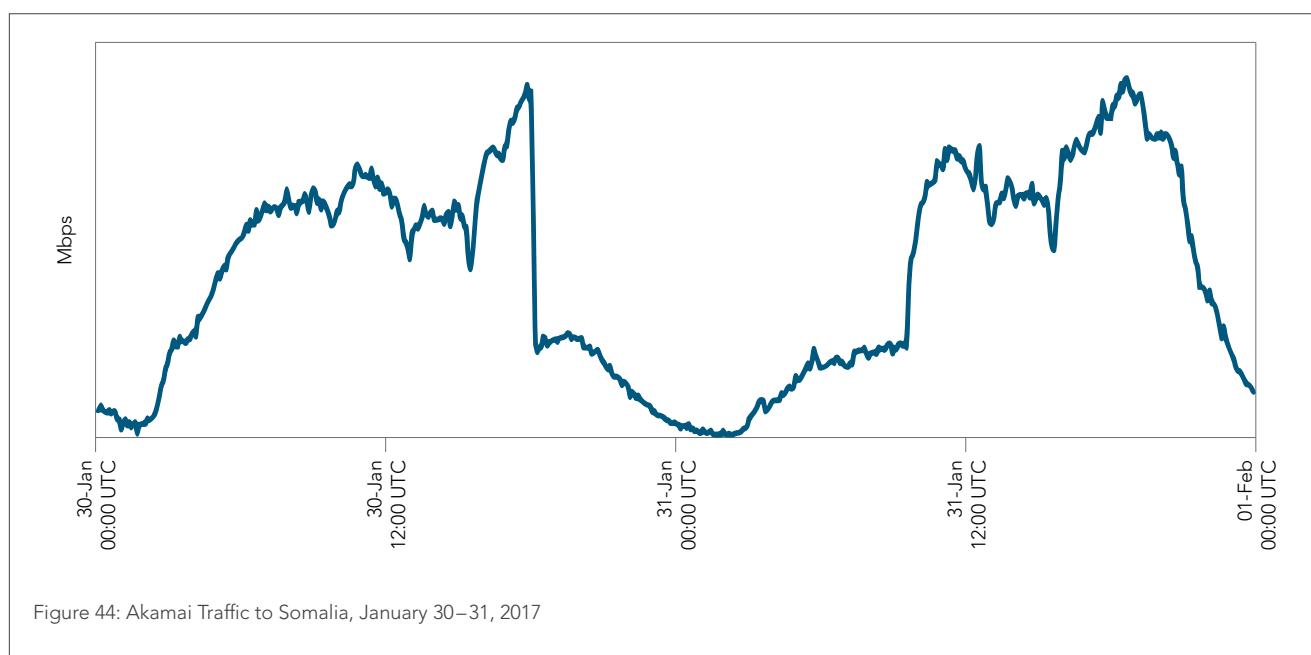
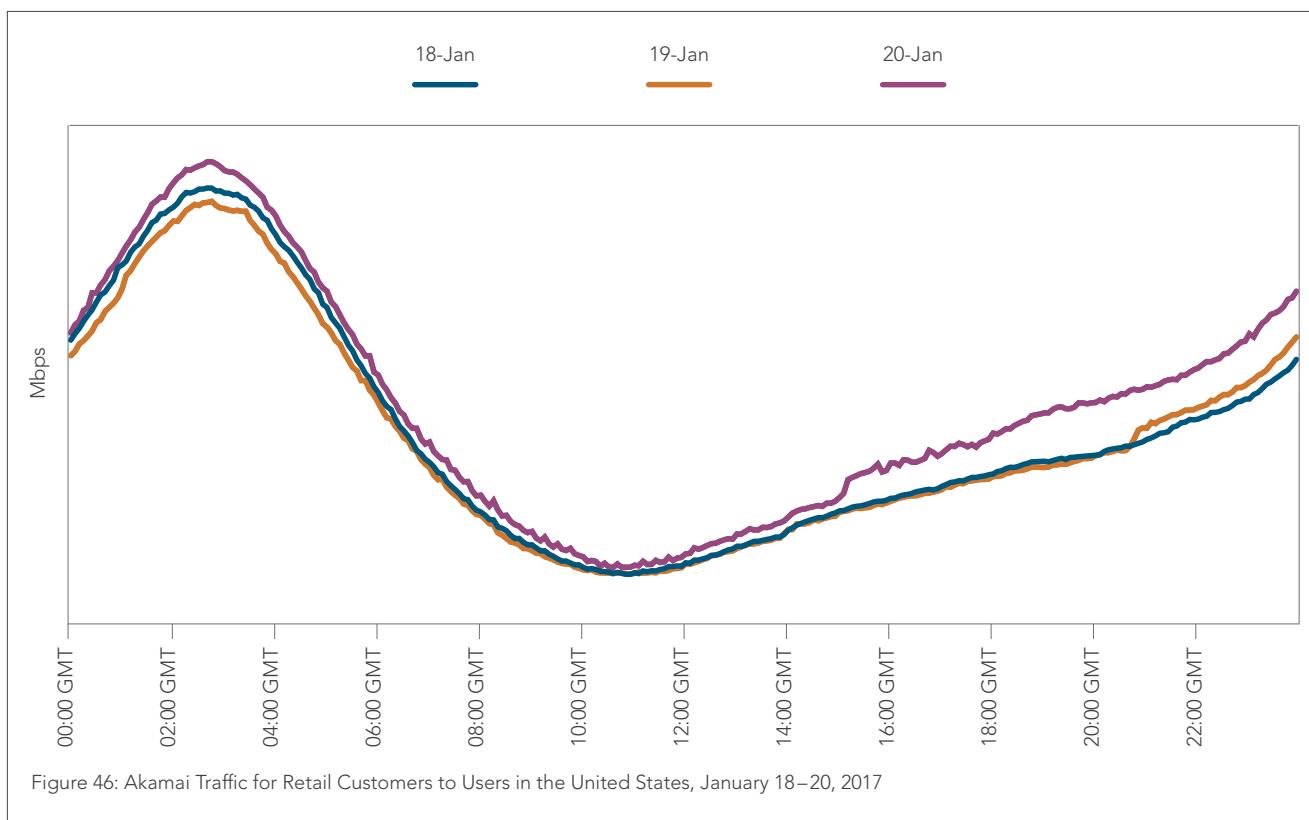
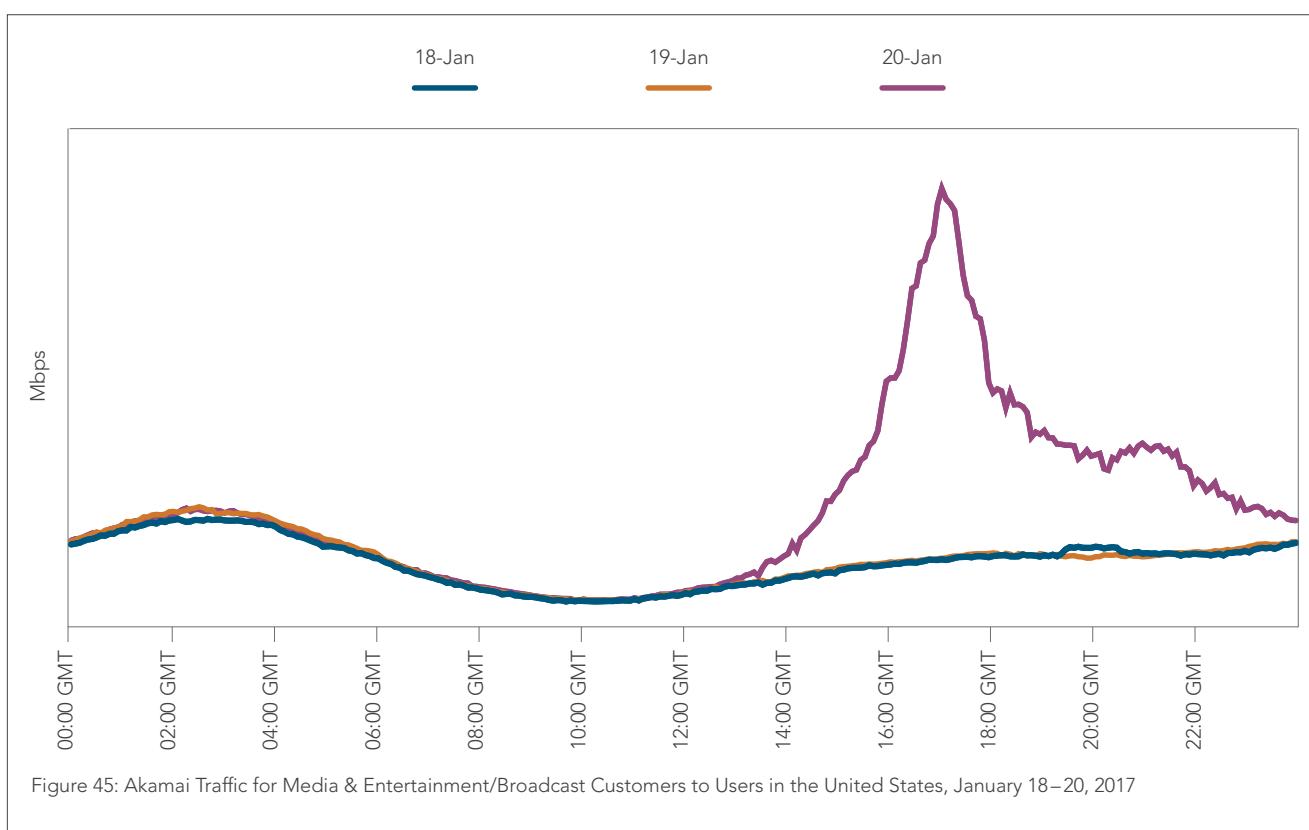


Figure 44: Akamai Traffic to Somalia, January 30–31, 2017



| Region | Unique IPv4 Addresses | Average Connection Speed (Mbps) | Average Peak Connection Speed (Mbps) | % Above 4 Mbps | % Above 10 Mbps | % Above 15 Mbps |
|---------------------|-----------------------|---------------------------------|--------------------------------------|----------------|-----------------|-----------------|
| AMERICAS | | | | | | |
| Argentina | 8,611,149 | 6.3 | 40.3 | 60% | 16% | 5.1% |
| Bolivia | 496,224 | 2.7 | 19.3 | 14% | 1.1% | 0.4% |
| Brazil | 47,684,097 | 6.8 | 46.5 | 63% | 18% | 5.8% |
| Canada | 15,748,996 | 16.2 | 78.7 | 90% | 61% | 40% |
| Chile | 4,413,226 | 9.3 | 65.5 | 78% | 30% | 15% |
| Colombia | 9,059,108 | 5.5 | 32.4 | 61% | 7.6% | 2.1% |
| Costa Rica | 534,098 | 4.1 | 28.6 | 36% | 3.3% | 1.0% |
| Ecuador | 792,343 | 6.2 | 41.7 | 63% | 12% | 4.3% |
| Mexico | 13,325,374 | 7.5 | 45.2 | 78% | 19% | 6.1% |
| Panama | 579,828 | 5.9 | 35.3 | 58% | 12% | 4.4% |
| Paraguay | 374,806 | 1.4 | 10.1 | 2.8% | 0.2% | 0.1% |
| Peru | 1,068,857 | 6.2 | 47.5 | 64% | 13% | 4.4% |
| United States | 142,764,621 | 18.7 | 86.5 | 90% | 67% | 48% |
| Uruguay | 1,192,344 | 9.5 | 70.0 | 86% | 35% | 13% |
| Venezuela | 2,643,008 | 1.8 | 14.6 | 3.6% | 0.2% | 0.1% |
| ASIA PACIFIC | | | | | | |
| Australia | 10,538,918 | 11.1 | 55.7 | 81% | 35% | 19% |
| China | 116,682,392 | 7.6 | 45.9 | 81% | 20% | 5.0% |
| Hong Kong | 3,248,227 | 21.9 | 129.5 | 94% | 71% | 54% |
| India | 15,327,977 | 6.5 | 41.4 | 42% | 19% | 10% |
| Indonesia | 3,201,102 | 7.2 | 66.1 | 76% | 18% | 5.0% |
| Japan | 46,179,708 | 20.2 | 94.5 | 93% | 73% | 52% |
| Malaysia | 2,036,612 | 8.9 | 64.1 | 72% | 32% | 14% |
| New Zealand | 2,047,756 | 14.7 | 70.8 | 91% | 52% | 32% |
| Philippines | 1,550,940 | 5.5 | 45.0 | 39% | 11% | 6.2% |
| Singapore | 1,882,779 | 20.3 | 184.5 | 94% | 72% | 51% |
| South Korea | 26,226,184 | 28.6 | 121.0 | 98% | 85% | 69% |
| Sri Lanka | 117,996 | 8.5 | 57.3 | 82% | 22% | 11% |
| Taiwan | 9,524,660 | 16.9 | 94.7 | 95% | 65% | 38% |
| Thailand | 3,100,080 | 16.0 | 106.6 | 97% | 72% | 43% |
| Vietnam | 8,791,007 | 9.5 | 59.0 | 86% | 37% | 11% |
| EUROPE | | | | | | |
| Austria | 2,970,621 | 14.1 | 63.1 | 92% | 46% | 26% |
| Belgium | 5,102,284 | 16.3 | 85.5 | 95% | 68% | 41% |
| Bulgaria | 1,710,798 | 15.5 | 65.5 | 96% | 64% | 38% |
| Croatia | 1,621,159 | 8.6 | 54.8 | 85% | 24% | 8.3% |
| Cyprus | 385,294 | 6.9 | 35.4 | 70% | 15% | 5.8% |
| Czech Republic | 1,878,155 | 16.9 | 74.4 | 87% | 54% | 36% |

| Region | Unique IPv4 Addresses | Average Connection Speed (Mbps) | Average Peak Connection Speed (Mbps) | % Above 4 Mbps | % Above 10 Mbps | % Above 15 Mbps |
|---------------------------------|-----------------------|---------------------------------|--------------------------------------|----------------|-----------------|-----------------|
| Denmark | 3,054,634 | 20.1 | 74.4 | 93% | 66% | 46% |
| Estonia | 582,305 | 11.6 | 60.8 | 86% | 42% | 21% |
| Finland | 2,588,860 | 20.5 | 75.1 | 93% | 66% | 45% |
| France | 31,052,551 | 10.8 | 49.7 | 73% | 31% | 18% |
| Germany | 38,894,612 | 15.3 | 65.6 | 90% | 53% | 33% |
| Greece | 3,449,000 | 7.9 | 39.7 | 83% | 18% | 6.2% |
| Hungary | 2,669,213 | 14.8 | 78.3 | 94% | 56% | 34% |
| Ireland | 2,274,468 | 15.6 | 70.8 | 83% | 54% | 39% |
| Italy | 17,108,083 | 9.2 | 51.0 | 79% | 26% | 12% |
| Latvia | 890,498 | 16.6 | 79.5 | 94% | 62% | 38% |
| Lithuania | 1,494,077 | 14.6 | 61.3 | 90% | 54% | 32% |
| Luxembourg | 179,734 | 11.6 | 59.6 | 88% | 38% | 20% |
| Malta | 196,288 | 12.8 | 67.1 | 97% | 53% | 25% |
| Netherlands | 9,944,810 | 17.4 | 82.7 | 95% | 70% | 46% |
| Norway | 3,092,941 | 23.5 | 85.9 | 91% | 69% | 54% |
| Poland | 7,933,123 | 12.6 | 65.6 | 88% | 42% | 25% |
| Portugal | 3,802,596 | 12.9 | 66.9 | 86% | 49% | 29% |
| Romania | 3,694,094 | 17.0 | 95.0 | 93% | 70% | 47% |
| Russia | 19,432,455 | 11.8 | 69.3 | 91% | 49% | 21% |
| Slovakia | 1,069,771 | 13.0 | 69.3 | 86% | 41% | 23% |
| Slovenia | 1,083,597 | 13.7 | 60.0 | 85% | 43% | 24% |
| Spain | 16,874,604 | 15.5 | 84.8 | 90% | 56% | 36% |
| Sweden | 6,129,690 | 22.5 | 95.3 | 94% | 66% | 49% |
| Switzerland | 3,866,533 | 21.7 | 93.4 | 95% | 75% | 56% |
| United Kingdom | 31,812,059 | 16.9 | 76.1 | 92% | 60% | 42% |
| MIDDLE EAST & AFRICA | | | | | | |
| Egypt | 10,513,800 | 2.0 | 17.0 | 6.0% | 0.6% | 0.3% |
| Iran | 8,787,364 | 4.7 | 24.2 | 61% | 1.3% | 0.1% |
| Israel | 2,511,205 | 13.7 | 99.1 | 95% | 54% | 28% |
| Kenya | 2,773,897 | 12.2 | 38.5 | 73% | 45% | 31% |
| Kuwait | 631,799 | 7.9 | 55.3 | 48% | 15% | 8.9% |
| Morocco | 5,902,336 | 5.2 | 25.9 | 57% | 5.6% | 1.4% |
| Namibia | 209,756 | 2.9 | 24.3 | 21% | 1.5% | 0.3% |
| Nigeria | 218,356 | 3.9 | 29.1 | 38% | 2.8% | 0.9% |
| Qatar | 345,650 | 13.7 | 107.9 | 86% | 62% | 33% |
| Saudi Arabia | 4,038,853 | 6.7 | 52.3 | 75% | 14% | 4.7% |
| South Africa | 6,368,528 | 6.7 | 32.4 | 58% | 11% | 5.8% |
| Turkey | 8,812,294 | 7.6 | 50.0 | 76% | 19% | 7.5% |
| United Arab Emirates | 1,541,799 | 8.6 | 81.1 | 94% | 23% | 6.3% |

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Notes

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