AKAMAI'S STATE OF THE INTERNET

Q1 2014 REPORT | VOLUME 7 NUMBER 1

Includes insight on mobile traffic and connected devices from Ericsson

Prolexic Quarterly Global DDoS Attack Report

To view the latest Global Attack Report,
please visit **prolexic.com/attackreports**

PROLEXIC
Now part of Akamai

www.prolexic.com

Letter From the Editor

This issue of the *State of the Internet Report* marks the beginning of the seventh year of publication. In this edition of the report, we are introducing several updated data sets, as well as some new data. These changes include:

- **IPv6:** During 2013, in Section 2.3 of the report, Akamai reported on IPv6 adoption across top universities and colleges, as well as across a selected set of network service providers. Starting with this issue, we will no longer be reporting on IPv6 adoption across universities and colleges. We have also tweaked the list of network service providers included in the section. Previously, the list was adapted from one available on the World IPv6 Launch Web site, but it now reflects the top 20 network providers by number of IPv6 requests made to Akamai during the quarter. We believe that this will help us present a more accurate picture of IPv6 adoption across the Internet. In addition, we will no longer be including graphs of IPv6 traffic to the Akamai Intelligent Platform, but these remain available at *http://www.akamai.com/IPv6*.

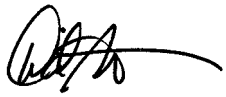
- **4K Readiness:** Given the growing interest in the streaming delivery of 4K ("Ultra HD") video, we thought it would be interesting to begin tracking a "4K readiness" metric in the *State of the Internet Report*. With 4K adaptive bitrate streams generally requiring between10–20 Mbps of bandwidth, starting with this issue of the report, we'll be providing insight into the percentage of connections to Akamai from a given country/region with an average connection speed above 15 Mbps, similar to the high broadband (>10 Mbps) and broadband (>4 Mbps) rankings that we have published for the last several years. The rankings presented within the report are not intended to specify who can/cannot view 4K content, but rather which countries/regions have higher concentrations of 4K "capable" connectivity, resulting in a larger complement of subscribers being able to enjoy a quality experience when streaming 4K content.

- **Mobile Connectivity:** With this issue of the *State of the Internet Report*, we have changed the mobile connection speed data presented within Section 8. Akamai is now leveraging mobile device identification data to greatly expand the number of networks that are considered to be mobile. However, the number of networks now identified as mobile is significantly larger than could be manageably published within this report, so we are now publishing mobile connectivity metrics aggregated at a country/region level, similar to what is done in Sections 3–7 for fixed connections. Metrics presented for mobile connectivity include average and average peak connection speeds, as well as broadband adoption.

- **Appendix:** In previous issues of the report, the Appendix included data on the countries/regions included within the report, as well as a handful of other countries/regions—the reasons that these others were included are lost to history. The Appendix has, starting with this issue, been revised to include a consolidated view of the metric values for just those countries/regions covered within the report. (In other words, all of the metrics can be found in a single place, rather than across the various sections of the report.) The revised Appendix also includes the new 4K Readiness metric, and may include mobile metrics in the future as well.

Additional changes will be coming to the *State of the Internet* throughout 2014, including an updated look & feel for the report, updates to the visualization tools at *http://www.akamai.com/stateoftheinternet,* and some additional data sets, as well as the consolidation of the *Prolexic Quarterly DDoS Attack Report* with the *State of the Internet Report*.

As always, if you have questions, comments, or suggestions regarding the *State of the Internet Report*, connect with us via e-mail at stateoftheinternet@akamai.com or on Twitter at @akamai_soti.



–David Belson

Table of Contents

Executive Summary

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

This quarter's report includes data gathered from across the Akamai Intelligent Platform in the first quarter of 2014, covering attack traffic, Internet connection speeds and broadband adoption, and mobile connectivity, as well as trends seen in this data over time. In addition, this quarter's report includes insight into NTP reflection & WordPress XML-RPC pingback attacks, the states of IPv4 exhaustion and IPv6 adoption, Internet disruptions that occurred during the quarter, and observations from Akamai partner Ericsson regarding data and voice traffic growth on mobile networks.

Security

During the first quarter of 2014, Akamai observed attack traffic originating from source IP addresses in 194 unique countries/regions. Note that our methodology captures the source IP address of an observed attack and cannot determine attribution of an attacker. China remained in the top slot, but dropped to 41% of observed attack traffic. The United States also saw a decline in observed attack traffic, responsible for 11%. Overall attack traffic concentration across the top 10 countries/regions was down significantly from the fourth quarter of 2013, declining to 75% of observed attacks. Port 445 remained the most targeted port, though its traffic share dropped to 14% of observed attacks. The volume of attacks targeting Port 80 also dropped, falling to 8.0%. During the first quarter, Akamai customers reported being targeted by 283 DDoS attacks, 18% fewer than in the prior quarter, but nearly 36% more than in the first quarter of 2013. Enterprise and Commerce customers together accounted for approximately 55% of the reported attacks during the quarter, while just under half of the total attacks were reported by customers in the Americas. In addition, the first quarter saw the rise of attacks that leverage vulnerabilities in Network Time Protocol (NTP) servers and installations of WordPress blogging software.

Internet and Broadband Adoption

In the first quarter, Akamai observed a 1.6% increase in the number of unique IPv4 addresses connecting to the Akamai Intelligent Platform, growing to just over 795 million, or about 12.5 million more than were seen in the fourth quarter of 2013. Looking at connection speeds, the global average connection speed grew 1.8% to 3.9 Mbps and the global average peak connection speed fell 8.6%, starting off 2014 at 21.2 Mbps. At a country/region level, South Korea continued to have the highest average connection speed at 23.6 Mbps, and South Korea had the highest average peak connection speed at 68.5 Mbps. Globally, high broadband (>10 Mbps) adoption grew 9.4% to 21%, and South Korea remained the country with the highest level of high broadband adoption, at 77%. Global broadband (>4 Mbps) adoption grew 1.7% quarter-over-quarter to 56%, and South Korea maintained a 94% adoption rate in the first quarter. 11% of global connections were considered to be "4K Ready" (>15 Mbps), with South Korea having 52% of connections to Akamai at those speeds.

Mobile Connectivity

In the first quarter of 2014, average mobile connection speeds (aggregated at a country level) ranged from a high of 14.7 Mbps in South Korea down to a low of 1.0 Mbps in Argentina. Average peak mobile connection speeds ranged from 114.2 Mbps in Australia down to 5.0 Mbps in Iran. The Ukraine had 89% of its mobile connections at broadband (>4 Mbps) rates, while three countries had only 0.1% of connections at those speeds. Based on traffic data collected by Ericsson, the volume of mobile data traffic grew approximately 15% between the fourth quarter of 2013 and the first quarter of 2014.

Analysis of Akamai IO data collected during the first quarter from a sample of requests to the Akamai Intelligent Platform indicates that for traffic from mobile devices on cellular networks, Android Webkit accounted for approximately 37% of requests, with Apple Mobile Safari trailing at just under 29%. However, for traffic from mobile devices on all networks, Apple Mobile Safari was responsible for just under 47% of requests, while Android Webkit drove just more than 35% of requests.

Akamai maintains a distributed set of agents deployed across the Internet that monitor attack traffic. Based on data collected by these agents, Akamai is able to identify the top countries from which attack traffic originates, as well as the top ports targeted by these attacks. Note that the originating country as identified by the source IP address is not attribution—for example, a criminal in Russia may be launching attacks from compromised systems in China. This section provides insight into port-level attack traffic, as observed and measured by Akamai, during the first quarter of 2014.

It also includes insight into DDoS attacks that targeted Akamai customers during the first quarter of 2014, as well as information about NTP reflection and WordPress XML-RPC pingback attacks. Within this report, all representations represent our view of the best and most consistent ways of attributing attacks we have seen, based not only on published claims, but on analysis of the tools, tactics, and methods that tend to provide a consistent signature for different adversaries.

1.1 Attack Traffic, Top Originating Countries

During the first quarter of 2014, Akamai observed attack traffic originating from 194 unique countries/regions, up six from the fourth quarter of 2013. As shown in Figure 1, China was once again firmly ensconced in the first place slot, responsible for 41% of observed attacks. This volume is down slightly from the prior quarter, and is nearly 4x that seen in the United States, which saw observed attack traffic levels decline more than 40% from the end of 2013. Indonesia held the third-place position, responsible for almost 7% of observed attacks, up slightly quarter-over-quarter, but well below the levels seen a year prior.

After seeing a 25x quarter-over-quarter increase in attacks in the fourth quarter, vaulting it to third place in the top 10 list, Canada fell just as quickly in the first quarter, dropping to 30th place globally. Germany and the Netherlands also saw declines that pushed them out of the top 10, while India, Turkey, and South Korea all saw quarterly increases large enough to push them up into the top 10. In addition to these three countries and Indonesia (as previously mentioned), quarterly increases in attack traffic volume were also seen in Romania, Russia, and Brazil. The overall concentration of attacks decreased significantly as compared to the fourth quarter of 2013, with the top 10 countries/regions originating 75% of observed attacks, down from 88% in the prior quarter.

After declining quarter-over-quarter in the fourth quarter of 2013, observed attack traffic concentration from the Asia Pacific region saw an increase in the first quarter of 2014, growing from 56% to nearly 63% of observed attacks. The concentration in the Asia Pacific region was nearly 4x the volume seen from Europe, which contributed just over 16%

	Country/Region	Q1 '14 Traffic %	Q4 '13 %
1	China	41%	43%
2	United States	11%	19%
3	Indonesia	6.8%	5.7%
4	Taiwan	3.4%	3.4%
5	Brazil	3.2%	1.1%
6	Russia	2.9%	1.5%
7	India	2.6%	0.7%
8	Turkey	1.7%	0.4%
9	South Korea	1.6%	0.6%
10	Romania	1.6%	0.9%
–	Other	25%	12%

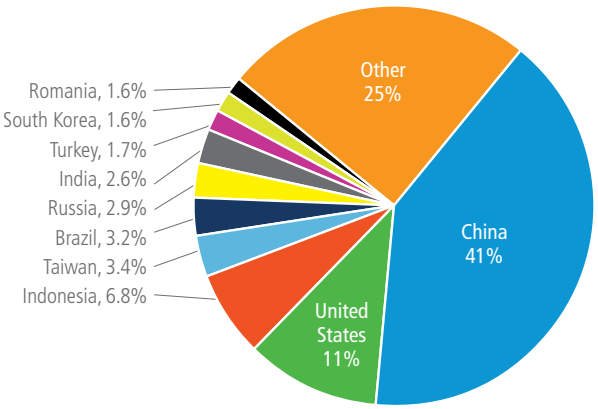


Figure 1: Attack Traffic, Top Originating Countries (by source IP address, not attribution)

Port	Port Use	Q1 '14 Traffic %	Q4 '13 %
445	Microsoft-DS	14%	30%
5000	Universal Plug & Play	12%	<0.1%
23	Telnet	8.7%	3.0%
80	WWW (HTTP)	8.0%	14%
443	SSL (HTTPS)	2.9%	8.2%
3389	Microsoft Terminal Services	2.8%	4.9%
1433	Microsoft SQL Server	2.3%	4.9%
22	SSH	2.0%	3.6%
8080	HTTP Alternate	1.5%	2.7%
135	Microsoft-RPC	1.0%	2.0%
Various	Other	45%	–

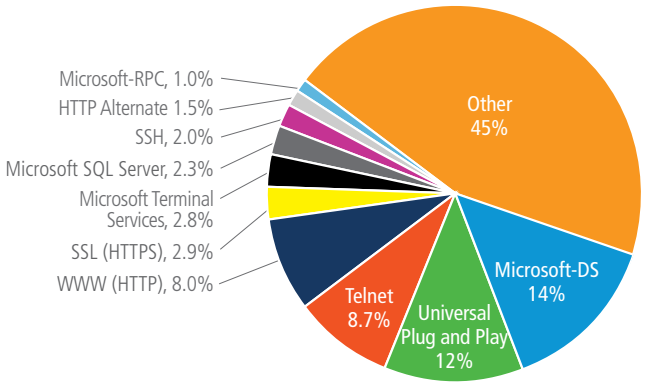


Figure 2: Attack Traffic, Top Ports

of observed attacks. Together, North and South America drove slightly more than 20% of observed attacks, with nearly twice as much coming from North America than South America. The Americas concentration was down nearly 30% from the prior quarter. The percentage of observed attacks originating from African countries increased by half from the prior quarter, though it remained extremely low, reaching 0.6% in the first quarter of 2014.

1.2 Attack Traffic, Top Ports

As shown in Figure 2, Port 445 (Microsoft-DS) continued its run as the most targeted port in the first quarter of 2014, though the associated attack traffic volume was down by over half quarter-over-quarter, with the port seeing 14% of observed attack traffic. However, this significant decline can be contrasted with the massive increase seen in attacks targeting Port 5000 (Universal Plug & Play/UPnP) during the quarter, which grew from less of a tenth of a percent in the fourth quarter of 2013 to 12% this quarter—an increase of well over 100x. Data collected by the Internet Storm Center (ISC)[1] corroborates this observation, as its monitoring shows attack traffic volume targeting the port increasing in February and remaining high throughout March. A blog post[2] from ISC indicates that the attacks targeting Port 5000 may be related to Bitcoin mining malware that has infected Hikvision DVRs, which are commonly used to record video from surveillance cameras. The post notes that the malware is likely scanning for vulnerable devices to infect with an actual exploit to come later. Port 23 (Telnet) was the only other port among the top 10 that also saw traffic volume grow quarter-over-quarter, up almost 3x to 8.7%. Fairly significant declines, on the order of 40-50% or more, were seen across the remaining ports in the top 10—this likely also contributed to the lower overall concentration of attacks, with the top 10 ports attracting only 55% of attacks in the first quarter, down from 75% at the end of 2013.

As the most targeted port in the first quarter, Port 445 was the top target port in just four of the top 10 countries: Taiwan, Russia, India, and Romania, while it was the second most targeted port in the United States, Brazil, and South Korea. Port 5000 was the top target port in China, Brazil, Turkey, and South Korea, and the second most targeted port in India and Romania. The United States and Indonesia were anomalous in comparison, with Port 80 the top target port for attacks observed to be originating in the U.S., while Port 443 was the top target port for Indonesian attacks, indicating that the attacks originating in these countries may be searching for Web-based applications with known vulnerabilities that can be exploited. Port 80 was the second most targeted port in Indonesia, with just slightly fewer attacks on an absolute count basis, which supports the theory. Port 23 placed within the top three in China, Brazil, India, Turkey, South Korea, and Romania, likely associated with attacks looking for open Telnet ports, where brute force or default logins can be attempted in an effort to gain access to, and control of, a target system.

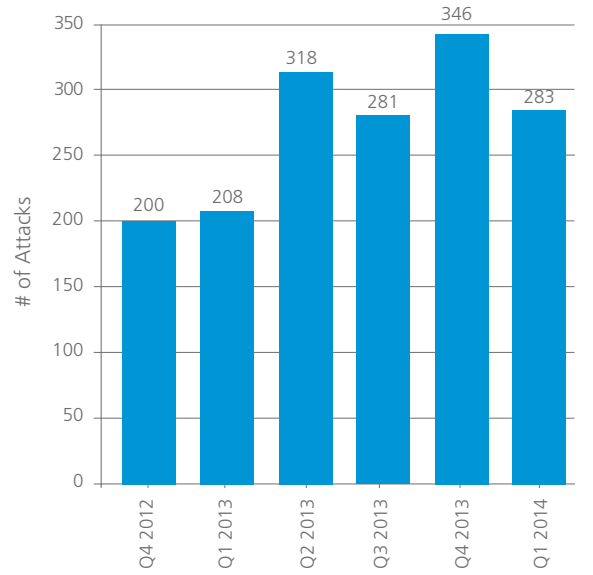


Figure 3: DDoS Attacks Reported by Akamai Customers by Quarter

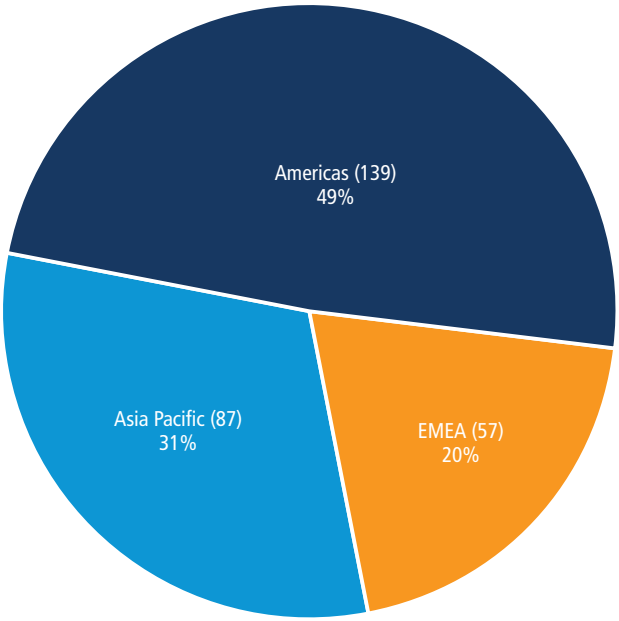


Figure 4: Q1 2014 DDoS Attacks by Region

1.3 Observations on DDoS Attacks

In the first quarter of 2014, Akamai experienced a slight decline in the number of attacks reported by customers, with a total of 283 reported during the quarter, compared to 346 in the last quarter of 2013, as shown in Figure 3. While this represents nearly a 20% decrease from the previous quarter, it is still a 27% increase over the first quarter of 2013. This decline clearly does not align with projections made last quarter in the *State of the Internet Report*, which predicted a 10% quarter-over-quarter growth rate. However, a 25% year- over-year increase in reported DDoS attacks against Akamai clients could still lead to more than 1450 attacks in 2014. This observed trend does support the analysis published in the *Prolexic Q1 Global DDoS Attack Report,* stating that application layer attacks are on the decline in favor of volumetric attacks in the form of NTP reflection, DNS reflection, and blended attacks.

Most regions of the world saw a decline in reported DDoS attacks during the first quarter of 2014, with the Americas continuing to account for approximately 49% (139) of all attacks, followed by the Asia Pacific region with 31% (87) of attacks and Europe, Middle East and Africa (EMEA) receiving the remaining 20% (57) of DDoS traffic, as shown in Figure 4. The Americas saw only a modest increase (3%) in attacks over the same quarter of 2013, which was a significant decrease (-19%) in the attacks from the previous quarter. Figure 5 highlights that the Asia Pacific region continues to be the second-most popular region to attack, a position it assumed during the second quarter of 2013. While it saw a large reduction (-37%) in attacks from the previous quarter, nearly 50% of all attacks (43) were concentrated on financial institutions and government sites within Singapore. In contrast to other regions, EMEA experienced a 50% increase in DDoS attacks from the previous quarter. This

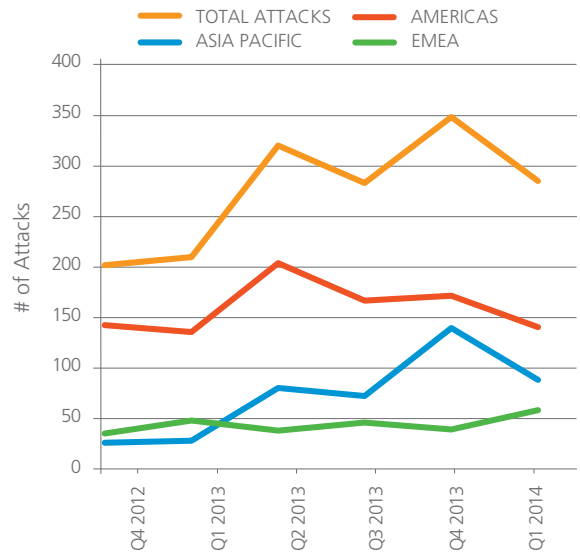


Figure 5: Attacks by Region Over Time

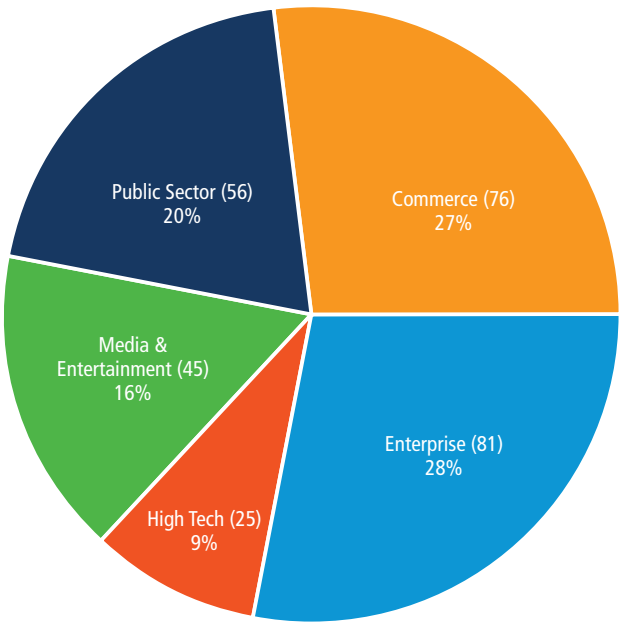


Figure 6: Q1 2014 DDoS Attacks by Sector

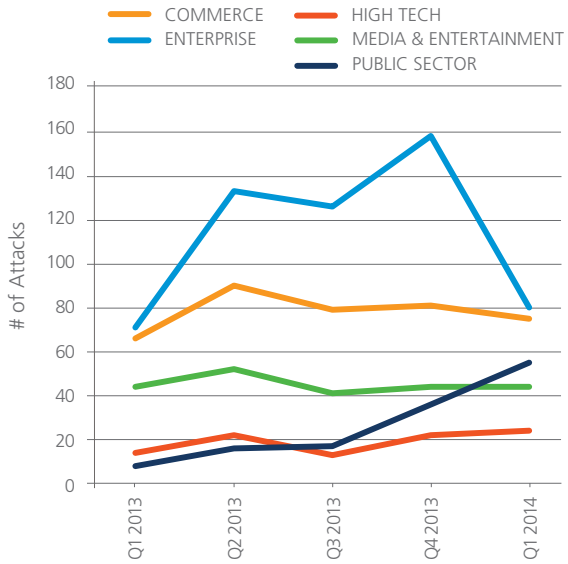
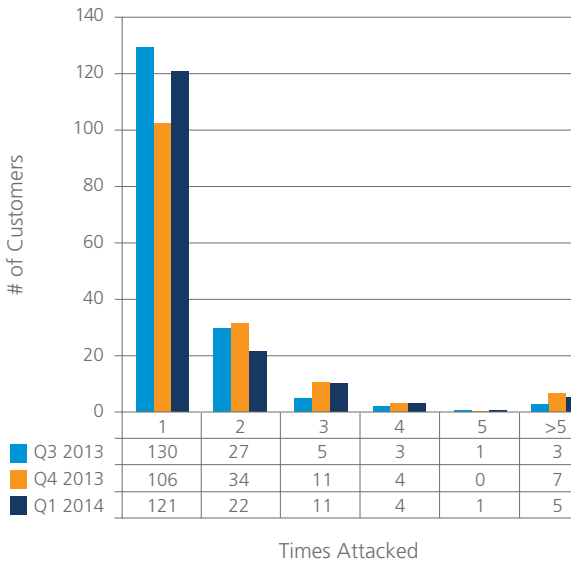


Figure 7: Attacks by Sector Over Time

surge in attacks was primarily against large retail outlets within the United Kingdom, and against sites supporting the 2014 Winter Olympics in Sochi, Russia.

When we look at the number of attacks aggregated by industry, as shown in Figure 6, it is easy to see that the most significant decrease was in the Enterprise sector, which saw 78 (-49%) fewer attacks in the first quarter of 2014 as compared to the last quarter of 2013. This is still a year-over-year increase of 11% for the Enterprise sector, but represents a significant quarter-over-quarter decline, particularly in the Business Services and Financial Services verticals. The Public Sector made up for some of the decrease in attacks on Enterprise, with a 34% increase in attack traffic, led largely by the attacks against government targets within Singapore. Commerce, High Tech and Media & Entertainment targeted attacks remain largely unchanged from the previous quarter, but all industries experienced more attacks in the first quarter of 2014 as compared to the first quarter of 2013, as Figure 7 shows.

Beginning in the third quarter of 2013, Akamai started looking at the probability of repeated attacks against the same target. Akamai observed that the chances of a repeat attack are approximately one in four within the same quarter and one in three within the same year, numbers that are continuing to hold true overall, as demonstrated in Figure 8. Of the 164 organizations that faced DDoS attacks in the first quarter of 2014, 43 (26%) suffered repeated attacks. Five organizations were targeted more than five times within the quarter, with 17 distinct attacks the most attacks on one target.



	1	2	3	4	5	>5
Q3 2013	130	27	5	3	1	3
Q4 2013	106	34	11	4	0	7
Q1 2014	121	22	11	4	1	5

Figure 8: Frequency of Repeated DDoS Attacks

Akamai has been analyzing Distributed Denial of Service (DDoS) attacks aimed at our customers for the *State of the Internet Report* since the end of 2012. The Akamai platform is a massively distributed network of systems that is designed to serve Internet traffic from systems as close to the end user as possible. Part of the value of the Akamai platform is to enable our clients to deal with the sudden spikes in Web site requests, such as during holiday sales or flash mobs created by news events. Malicious traffic often attempts to overload sites by mimicking this type of event and the difference is often only distinguishable through human analysis and intervention. Akamai combats these attacks by serving the traffic for the customer while the analysis is being performed and creating specific web application firewall rules or implementing other protections such as blocking specific regions or IP addresses as necessary.

An additional aspect of the Akamai platform is that some of the most common methodologies that are used in DDoS attacks are simply ignored. Attacks that target the lower levels of the TCP/IP stack, such as UDP floods and SYN floods hit the edge of the Akamai platform and are dropped. Specifically, Layer 1-4 traffic does not contain the information needed by Akamai to route it to a specific customer, and is automatically assumed to be either malicious or malformed traffic.

The vast majority of the attacks that Akamai is reporting on are the based on traffic in layers 5-7 of the TCP stack, such as volumetric attacks like HTTP GET floods and repeated file downloads, or application and logical layer attacks, which require much less traffic to be effective. These statistics are based on the higher level attacks reported by our customers.

1.4 NTP Reflection & WordPress XML-RPC Pingback Attacks

NTP Reflection Attacks

In February, Akamai warned customers of an increase in DDoS activity utilizing Network Time Protocol (NTP) amplification attacks. NTP is a widely deployed time synchronization service listening on UDP Port 123. The attacker spoofs source IP addresses and sends a small query to a vulnerable NTP server, which generates a large amount of response data to the spoofed addresses. This asymmetric attack can saturate network links, thereby preventing legitimate traffic from reaching its destination. According to the US-CERT advisory,[3] the amplification factor of this attack is 556.9x, meaning that each request made by an attacker will be able to send over 500 times the data to the target; i.e., an attacker who has access to a gigabit connection could theoretically send enough traffic to generate over 500 Gbps of replies to a target. Until all public NTP servers have the monlist feature blocked or disabled AND BCP38 network policies are in place with all backbone operators, NTP amplification attacks will continue to be a DDoS threat.

Akamai automatically defends customer Web properties from this threat. By default, the Akamai Intelligent Platform ignores all inbound traffic except for authoritative DNS (53/tcp and 53/udp), HTTP (80/tcp), and HTTPS (443/tcp). Thus, all inbound NTP traffic destined for 123/udp is dropped by Akamai's edge servers. Combining our global footprint with these simple rules, the Akamai platform deflects enormous volumes of DDoS traffic 24/7/365 without active intervention. These defenses are in place across the global footprint of the Akamai Intelligent Platform, which includes over 1,200 networks in over 90 countries.

Akamai's CSIRT also gave customers additional advice[4] on how they could pinpoint and address the problem on their own:

- If possible, we advised, customers should separate DNS and NTP infrastructure from HTTP(S) services. By applying stricter network ACLs and using different network capacity, in the event of an UDP-based amplification attack, HTTP(S) services will be segregated from UDP-based amplification attacks and thus be easier to detect and defend.
- To prevent their network from unknowingly participating in an amplification attack, we also advised limiting outbound NTP traffic to only those network devices which serve as NTP time synchronization masters.

WordPress XML-RPC Pingback Attacks

Akamai researchers discovered WordPress XML-RPC pingback exploits used in a series of DDoS attacks in early March. The attacks exploited a seemingly innocuous feature of WordPress, a content management system that currently runs approximately 20% of all Web sites.[5]

All default installations of WordPress 3.5 ship with the vulnerable feature enabled. A simple POST to a specific target URL on an affected WordPress server is all that is required to exploit this vulnerability. No special tools are required; a simple 'curl' command is enough. The WordPress XML-RPC pingback feature has been abused to DDoS target sites, using legitimate vulnerable WordPress sites as unwilling participants.

The pingback feature in WordPress can be accessed through the xmlrpc.php file. One of the methods available in this API is the pingback.ping function. This function takes two parameters, the source URI and the target URI. With this function, other WordPress blogs can announce pingbacks. When WordPress processes pingbacks, it attempts to resolve the URL supplied to this function, and if it succeeds, will make a request to the URL specified and check the response for a link to a certain WordPress blog post.

This vulnerability essentially creates an open proxy allowing any malicious user to use a WordPress site to direct Layer 7 (application layer) attacks at a target. It can also be abused to target internal systems if the Web server is hosted on an internal network. Adversaries can attempt to enumerate or identify internal services and systems by specifying RFC1918 addresses and ports as target URLs. They can also change the configuration on certain Web-enabled devices by placing login credentials in the target URL. An attacker could direct attacks at internal systems if the Web server is located behind the corporate firewall by setting the target URL to a commonly found DNS entry on most corporate networks. For example: a target URL with the port specified can be used to enumerate which internal hosts have open ports, as the responses are different if the port is open or closed.

Akamai advised customers to look for log entries similar to the following:

> *192.168.0.20 - - [13/Mar/2014:18:32:33 -0400] "GET /?23823 HTTP/1.0" 200 2932 "-" "WordPress/3.8.1; http://192.168.0.27/wordpress"*

Furthermore, Akamai advised customers to see if their sites had been used in a DDoS attack by leveraging an external tool located at *http://labs.sucuri.net/?is-my-wordpress-ddosing*.

Finally, Akamai determined that the threat could be remedied by disabling the pingback feature and instructed customers on how to do so.

2.1 Unique IPv4 Addresses

Through its globally-deployed Intelligent Platform, and by virtue of the approximately two trillion requests for Web content that it serves on a daily basis, Akamai has unique visibility into levels of Internet penetration around the world. In the first quarter of 2014, over 795 million IPv4 addresses, from 240 unique countries/regions, connected to the Akamai Intelligent Platform—1.6% more than in the fourth quarter of 2013, and 7.8% more than in the first quarter of that year. Although we saw nearly 800 million unique IPv4 addresses, Akamai believes that this represents well over one billion Web users. In some cases, multiple individuals may be represented by a single IPv4 address (or a small number of IPv4 addresses) because they access the Web through a firewall or proxy server; in other cases, individual users may have multiple IPv4 addresses associated with them due to their use of multiple connected devices. Unless otherwise specified, the use of "IP address" within Section 2.1 refers to IPv4 addresses.

As shown in Figure 9, the global number of unique IPv4 addresses seen by Akamai grew by about 12.5 million quarter-over-quarter. Quarterly growth was also seen in six of the top 10 countries, with Brazil continuing to show the strongest increases, adding 12% from the fourth quarter of 2013 (or over four million IPv4 addresses). Among the four countries that saw IPv4 address counts decline from the prior quarter, the losses were fairly nominal, ranging from just over two million in the United States to approximately two thousand in Germany. Given general Internet adoption trends, it is unlikely that these

	Country/Region	Q1 '14 Unique IPv4 Addresses	QoQ Change	YoY Change
–	Global	795,443,250	1.6%	7.8%
1	United States	162,676,451	-1.4%	8.6%
2	China	123,526,069	2.4%	11%
3	Brazil	41,298,964	12%	50%
4	Japan	40,042,679	-0.8%	-3.3%
5	Germany	37,176,442	-<0.1%	-2.4%
6	United Kingdom	28,509,857	-0.6%	-1.2%
7	France	28,451,546	2.4%	5.7%
8	South Korea	20,987,274	3.0%	-1.6%
9	Italy	20,021,068	1.0%	-2.4%
10	Russia	18,752,316	2.1%	3.3%

Figure 9: Unique IPv4 Addresses Seen by Akamai

losses represent shrinking levels of Internet usage/penetration in these countries. Looking at the full set of global countries/regions, 70% of them saw a quarter-over-quarter increase in unique IPv4 address counts, with 42 countries/regions growing 10% or more. Of the 28% of countries/regions that saw unique IPv4 address counts decline, just 13 of them lost 10% or more from the prior quarter. Five countries/regions, all with a single observed unique IPv4 address, remained unchanged.

Looking at year-over-year changes, Brazil and China were the only two countries among the top 10 to see double-digit percentage increases, with Brazil growing its count by half over the preceding 12 months. Interestingly, half of the top 10 saw unique IPv4 address counts decline from the first

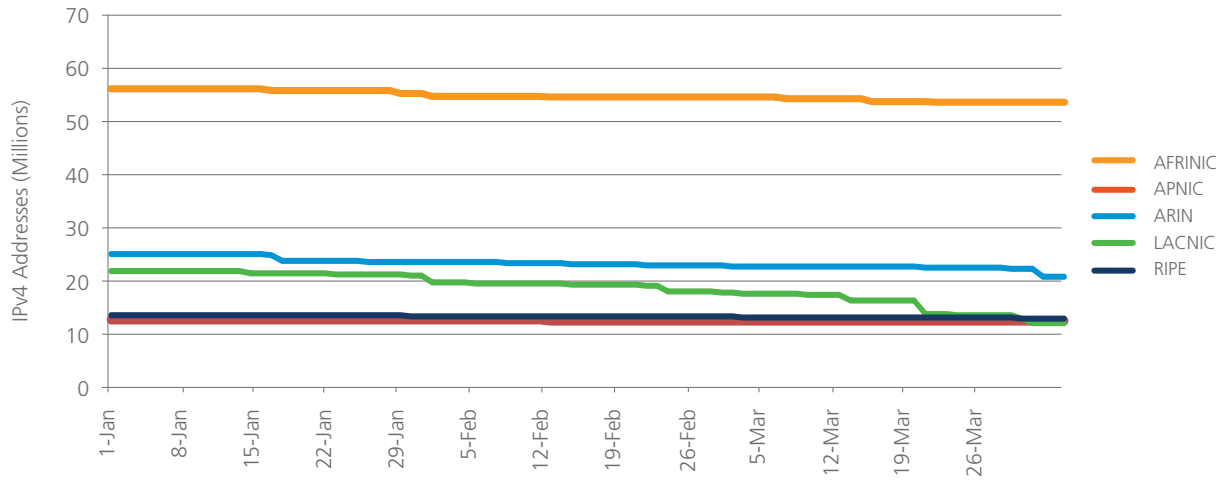


Figure 10: Available IPv4 Address Pool Size by RIR, Q1 2014

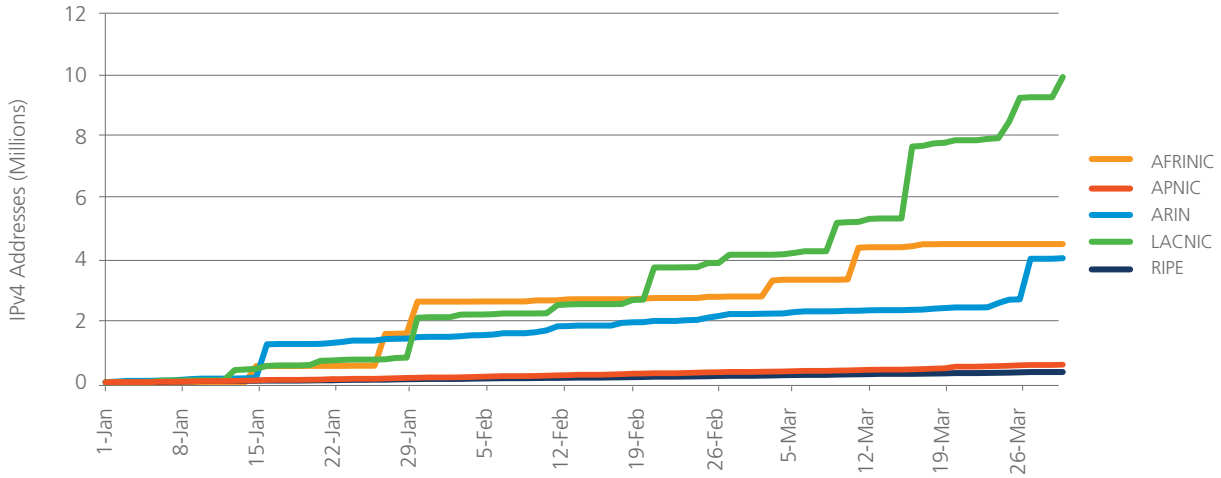


Figure 11: Total Number of IPv4 Addresses Assigned/Allocated by RIR, Q1 2014

quarter of 2013, but as noted above, these losses are likely not indicative of long-term declines in Internet usage within those geographies. Rather, they are more likely due to changes in IP address management practices within local network service providers and/or updates to the underlying database used by Akamai for IP address geolocation. On a global basis, 75% of countries/regions around the world had higher unique IPv4 address counts year-over-year, with growth rates above 100% seen in just three countries (Congo, Guinea-Bissau, and the Holy See). However, these three countries all had comparatively lower address counts, so smaller changes tend to drive large percentage shifts.

2.2 IPv4 Exhaustion

The first quarter of 2014 saw continued depletion of available IPv4 address space as Regional Internet Registries (RIRs) assigned/allocated blocks of IPv4 address space to organizations within their respective territories. In the Latin America/Caribbean region, this drove LACNIC's available pool space below 15 million IPv4 addresses, according to a Tweet posted by @IPv4Countdown in March.[6] Leveraging data[7] collected by Geoff Huston, Chief Scientist at APNIC,[8] the *State of the Internet Report* provides a perspective on the size of the available IPv4 address pool at each RIR, and how the sizes of the available pools are shrinking over time. In addition, the report also uses data published by the individual RIRs to highlight IPv4 address space delegation activity within each region over the course of the quarter.

Figure 10 illustrates the data made available by Mr. Huston, showing how the size of the available IPv4 address pools at each RIR changed during the first quarter of 2014. As both are delegating from their final "/8" block of IPv4 addresses, activity at APNIC and RIPE remained low. APNIC delegated just 2.4% of its available pool space, amounting to just over 334,000 IPv4 addresses, while RIPE delegated 3.9% of its available pool space, or just over 569,000 IPv4 addresses. AFRINIC was once again the next most active RIR, delegating 7.9% of its available pool space, or just over 4.5 million IPv4 addresses. ARIN delegated slightly less than that, at over four million IPv4 addresses, which amounted to 16% of its available pool space. Finally, LACNIC was again the most active RIR during the first quarter, delegating just under 42% of its available pool, accounting for nearly 9.4 million IPv4 addresses.

Figure 11 illustrates the IPv4 allocation/assignment activity across each of the RIRs during the first quarter of 2014. As compared to the other RIRs, activity at both RIPE and APNIC was relatively flat during the quarter. RIPE was the more active of the two, with the biggest single block assigned by RIPE a "/17" (32,768 IPv4 addresses) on March 21, apparently to "The Gathering 2014",[9] described as "the second largest computer party" in the world, held annually in Norway.[10] ARIN was the next most active RIR, with two days during the quarter that saw "/12" blocks (1,048,576 IPv4 addresses) being assigned/allocated. On January 16, one such block was allocated to AT&T Internet Services,[11] and on March 28, another one was assigned to CloudFlare.[12] At AFRINIC, there were several particularly active days in

both January and March. On January 16, a "/13" (524,288 IPv4 addresses) was allocated to Zain, the Sudanese mobile telephone company.[13] January 27 and January 30 saw "/12" blocks allocated to Inwi,[14] a telecommunications company in Morocco,[15] and Safaricom Limited in Kenya.[16] On March 4, AFRINIC allocated a "/13" to MWEB Connect in South Africa,[17] and a "/12" to Mobinil ("The Egyptian Company for Mobile Services").[18] A "stair step" activity pattern has become the norm at LACNIC, as the RIR made major delegations of IPv4 address space every three weeks or so during the first quarter. Large assignments/allocations made by the RIR during the quarter include five "/14" blocks of 262,144 IPv4 addresses each allocated on January 30, all to Telefonica Brasil S.A.,[19] a "/12" block allocated to Comcel S.A. in Colombia on February 21, and "/14" and "/12" blocks allocated to Tim Celular S.A. in Brazil on March 17.[20]

2.3 IPv6 Adoption

Starting with the *Third Quarter, 2013 State of the Internet Report*, Akamai began including insight into IPv6 adoption across a number of vectors based on data gathered across the Akamai Intelligent Platform. The traffic percentages cited in Figure 12 and Figure 13 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. As previously discussed, 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.[21] While not all of Akamai's customers have yet chosen to implement IPv6 delivery, the data set used for this section includes traffic from a number of leading Web properties and software providers, so we believe that it is sufficiently representative. Note that in compiling the data for the figures in this section, a minimum of 90 million total requests to Akamai during the first quarter of 2014 was required to qualify for inclusion.

The two previous editions of the *State of the Internet Report* included data on the IPv6 traffic percentage seen by top colleges and universities. We will no longer be including this data within the report going forward. In addition, the report also previously included IPv6 adoption statistics for selected network providers; the list was adapted from one available on the World IPv6 Launch Web site.[22] Starting with this quarter's issue of the report, we will shift instead to looking at the top

	Country/Region	Q1'14 IPv6 Traffic %	QoQ Change
1	Belgium	14%	198%
2	Switzerland	9.3%	<0.1%
3	Germany	7.7%	33%
4	Luxembourg	7.4%	10%
5	Romania	7.3%	-7.6%
6	United States	6.2%	19%
7	Peru	6.0%	9.1%
8	France	4.5%	<0.1%
9	Norway	2.5%	56%
10	Czech Republic	2.3%	21%

Figure 12: IPv6 Traffic Percentage, Top Countries/Regions

20 network providers by number of IPv6 requests made to Akamai during the quarter. In addition, we will no longer be including a graph of IPv6 traffic levels on the Akamai Intelligent Platform within the *State of the Internet Report*, but the data will remain available at *http://www.akamai.com/IPv6*, including rolling 24-hour and historical views of IPv6 request volume seen by Akamai (in hits/second).

Figure 12 provides some perspective on the countries/regions that had the largest percentage of content requests made to Akamai over IPv6 during the first quarter. European countries far and away lead the way for IPv6 adoption, taking eight of the top 10 slots. Belgium vaulted into the top slot, with 14% of traffic over IPv6, growing nearly 200% quarter-over-quarter. This massive increase is likely related to additional IPv6 deployment by Telenet during the quarter.[23] Within the Americas, the United States and Peru were the only two countries from the region within the top 10, while Japan fell out of the top 10, leaving the Asia Pacific region unrepresented within the group. (It did place 11th globally, however, falling slightly to 2.1% IPv6 adoption.) Strong quarterly growth was seen in Germany, Luxembourg, Norway, the Czech Republic, and the United States, while Switzerland and France saw infinitesimal growth. Romania was the only country among the top 10 to see IPv6 adoption decline quarter-over-quarter, but as mentioned in past reports, this is due to the IPv4 request count growing more aggressively than the IPv6 request count, resulting in a decline in the calculated percentage of IPv6 traffic.

Figure 13 lists the top 20 network providers by number of IPv6 requests made to Akamai during the first quarter. Unsurprisingly, the largest volume of requests comes from cable and wireless providers in the United States. Of these, Verizon

Wireless had the highest percentage of requests over IPv6, both among these four U.S.-based providers, as well as across the full set of examined networks. Looking at the list, European providers are heavily represented, with three providers from Belgium making strong showings. KDDI (Japan) and Telekom Malaysia are the only two providers to represent the Asia Pacific region, while Telefonica del Peru is the only South America provider on the list. Noticeably absent from the figure are providers from the Middle East/Africa, and the region is very poorly represented within the full data set as well.

For these top 20 network providers, it is interesting to note the broad spread of IPv6 adoption rates. As noted above, Verizon Wireless had the highest percentage, at 45%. Twelve additional providers also had more than 10% of their requests to Akamai over IPv6 during the first quarter. In contrast, Telekom Malaysia had just 1.2% of requests over IPv6, but in terms of actual request volume, this was enough to place them among the top 20 network providers.

Country	Network Provider	Q1'14 IPv6 Traffic %
United States	Comcast Cable	13%
United States	Verizon Wireless	45%
United States	AT&T	11%
United States	Time Warner Cable	4.7%
France	Proxad/Free	19%
Germany	Deutsche Telekom	9.2%
Romania	RCS & RDS	17%
Germany	Kabel Deutschland	30%
Belgium	Telenet	24%
Peru	Telefonica Del Peru	7.4%
Switzerland	Swisscom	20%
Japan	KDDI Corporation	12%
Germany	Unitymedia KabelBW	19%
United States	Hughes Network Systems (DISH Network)	22%
Belgium	Brutele	24%
United States	T-Mobile	6.2%
Belgium	Belgacom	5.9%
Malaysia	Telekom Malaysia	1.2%
Czech Republic	o2 (Telefonica)	6.3%
Norway	Get AS	16%

Figure 13: IPv6 Traffic Percentage, Top Network Providers by IPv6 Request Volume

SECTION 3:
Geography – Global

The data presented within this section was collected during the first quarter of 2014 through Akamai's globally-deployed Intelligent Platform and includes all countries that had more than 25,000 unique IP addresses make requests for content to Akamai during the quarter. For the purposes of classification within this report, the "high broadband" data included below is for connections to Akamai at speeds greater than 10 Mbps, and "broadband" is for connections of 4 Mbps or greater.

In addition to providing insight into high broadband and broadband adoption levels, the report also includes data on average and average peak connection speeds—the latter provides insight into the peak speeds that users can likely expect from their Internet connections. (See the blog post at *https://blogs.akamai.com/2013/04/clarifying-state-of-the-internet-report-metrics.html* for more information on how these metrics are calculated.)

Finally, traffic from known mobile networks is analyzed and reviewed in a separate section of the report; mobile network data has been removed from the data set used to calculate the metrics in the present section, as well as subsequent regional "Geography" sections.

3.1 Global Average Connection Speeds

The global average connection speed continued its gradual increase heading into 2014, growing 1.8% quarter-over-quarter to reach 3.9 Mbps. Given the long-term trending seen for this metric, it is likely that the global average connection speed will finally reach, and hopefully surpass, the 4 Mbps broadband threshold in the second quarter. As Figure 14 shows, quarterly growth was also seen across nine of the top ten countries/regions, including an 8% increase in first place South Korea, placing it a full 9 Mbps ahead of Japan, which saw a solid 12% growth rate from the fourth quarter of 2013. In addition to Japan, Latvia and Finland also saw quarterly changes above 10%. The only quarterly decline among the top 10 occurred in the Czech Republic, which dropped nearly 2% to an average connection speed of 11.2 Mbps. Globally, a total of 98 qualifying countries/regions saw average connection speeds increase in the first quarter, ranging from the Netherlands' 0.3% gain to growth of 77% in Sudan (to 3.2 Mbps). A total of 39 countries/regions saw quarter-over-quarter increases of 10% or more. Another 39 countries saw average connection speeds drop in the first quarter, with losses ranging from 0.1% in France (to 6.6 Mbps) to 28% in Nepal (to 1.1 Mbps).

	Country/Region	Q1'14 Avg. Mbps	QoQ Change	YoY Change
–	Global	3.9	1.8%	24%
1	South Korea	23.6	8.0%	145%
2	Japan	14.6	12%	29%
3	Hong Kong	13.3	8.5%	24%
4	Switzerland	12.7	5.8%	26%
5	Netherlands	12.4	0.3%	28%
6	Latvia	12.0	15%	26%
7	Sweden	11.6	6.6%	30%
8	Czech Republic	11.2	-1.9%	24%
9	Finland	10.7	18%	37%
10	Ireland	10.7	4.3%	47%

Figure 14: Average Connection Speed by Country/Region

The first quarter of 2014 saw extremely strong growth in average connection speeds, both at a global level and across the top 10 countries/regions. Globally, the average connection speed was up 24% over the same period a year prior, and this same level of growth was also seen in Hong Kong and the Czech Republic. Yearly growth was higher across all of the other countries/regions in the top 10, with South Korea's 145% increase more than triple the next largest increase seen in the group, which was Ireland's 47% jump. On a global basis, year-over-year increases were seen in all but seven qualifying countries/regions, with increases ranging from just 0.7% in Panama (to 2.6 Mbps) to 196% in Sudan. Five others also saw average connection speeds more than double year-over-year. Among the few countries where average connection speeds declined on a yearly basis, losses ranged from 5.7% in Libya (to 0.5 Mbps) to 43% in Guatemala (to 1.9 Mbps).

In the first quarter of 2014, six qualifying countries/regions had average connection speeds of 1 Mbps or less, the same as last quarter. Bangladesh had an average connection speed of 1.0

Mbps, while Bolivia, Cameroon, Botswana, and Yemen had speeds of 0.9 Mbps. Libya continued its year-long run as the country with the lowest average connection speed, at 0.5 Mbps.

3.2 Global Average Peak Connection Speeds

The average peak connection speed metric represents an average of the maximum measured connection speeds across all of the unique IP addresses seen by Akamai for a particular geography and is more representative of Internet connection capacity. The average is used to mitigate the impact of unrepresentative maximum measured connection speeds.

As shown in Figure 15, the global average peak connection speed dropped 8.6% in the first quarter of 2014 to 21.2 Mbps, giving back some of the strong growth seen in the fourth quarter of 2013. Among the top 10 countries/regions, Hong Kong, Singapore, and Latvia also saw quarterly declines, though all were rather nominal. The quarterly increases seen among the remainder of the top 10 were relatively nominal and all below 10%, with the exception of Uruguay's impressive 24% increase. On a global basis, a total of just 46 qualifying countries/regions saw higher average peak connection speeds quarter-over-quarter, with increases ranging from 0.2% in Colombia (to 16.8 Mbps) to 76% in Sudan (to 13.4 Mbps). Surprisingly, 92 qualifying countries/regions saw average peak connection speeds decline quarter-over-quarter, with losses ranging from 0.1% in Guam (to 22.1 Mbps) to 61% in Libya (to 6.2 Mbps). This lopsided increase/decrease balance differed significantly from that seen in the fourth quarter of 2013, when 138 qualifying countries/regions saw average peak connection speeds increase quarter-over-quarter, while only two saw declines.

The global year-over-year trend was more positive, up 13%, and all of the top 10 countries/regions also saw average connection speeds increase over the prior year. Yearly growth rates among the group ranged from a meager 0.3% in Hong Kong to a whopping 206% in Uruguay. Other than in Hong Kong, average peak connection speeds grew more than 10% across the remaining members of the top 10. Looking at all of the qualifying countries/regions, a total of 103 saw average peak connection speeds grow year-over-year, with increases ranging from just 0.2% in Brazil (to 17.9 Mbps) to Uruguay's 206%; it was joined by Palestine and Oman in seeing speeds more than double, while Kenya fell just short with a 99% year-over-year change. Negative changes were seen in 35 qualifying countries/regions, with losses ranging from 0.7% in Italy (to 21.4 Mbps) to 77% in Iraq (to 29.7 Mbps).

Iran remained the country with the lowest average peak connection speed in the first quarter, after taking the position from Kenya in the fourth quarter of 2013. Iran had an average peak connection speed of 6.0 Mbps, but it was up 8.2% quarter-over-quarter and up 87% year-over-year—encouraging growth rates that may help it move out of last place in the future.

3.3 Global High Broadband Connectivity

In the first quarter, the global high broadband adoption rate saw a solid 9.4% quarterly increase, surpassing 20% for the first time, as seen in Figure 16. South Korea remained firmly ensconced as the country with the largest high broadband adoption rate, growing 8.2% quarter-over-quarter to have more than three-quarters of all requests to Akamai at speeds above 10 Mbps in the first quarter. Quarterly growth in high broadband

	Country/Region	Q1 '14 Peak Mbps	QoQ Change	YoY Change
–	Global	21.2	-8.6%	13%
1	South Korea	68.5	6.5%	52%
2	Hong Kong	66.0	-3.3%	0.3%
3	Singapore	57.7	-2.5%	32%
4	Israel	57.6	5.3%	53%
5	Japan	55.6	4.7%	17%
6	Romania	54.4	7.0%	13%
7	Taiwan	52.6	2.1%	61%
8	Latvia	48.6	-1.0%	15%
9	Uruguay	45.4	24%	206%
10	Netherlands	45.2	3.6%	22%

Figure 15: Average Peak Connection Speed by Country/Region

	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
–	Global	21%	9.4%	65%
1	South Korea	77%	8.2%	146%
2	Japan	54%	11%	32%
3	Switzerland	45%	7.3%	49%
4	Netherlands	44%	-3.0%	52%
5	Hong Kong	43%	14%	30%
6	Latvia	37%	15%	26%
7	United States	36%	10%	62%
8	Denmark	35%	7.6%	81%
9	Belgium	35%	-0.5%	73%
10	Czech Republic	34%	-9.3%	54%

Figure 16: High Broadband (>10 Mbps) Connectivity

adoption among the other members of the top 10 was similarly as strong, with most seeing increases above 10%. However, nominal quarterly declines were seen in the Netherlands and Belgium, while the Czech Republic shed 9.3% from the fourth quarter of 2013. Once again, all of the countries/regions in the top 10 had high broadband adoption rates above 30%. Among the 58 countries/regions around the world that qualified for inclusion, quarter-over-quarter increases were seen in all but nine of them. Quarter-over-quarter growth ranged from 1.2% in Ireland (to 26% adoption) to 113% in Uruguay (to 4.5% adoption). Declines in the countries/regions that saw quarterly losses ranged from just 0.5% in Belgium to an unexpectedly large 32% drop in China.

Looking at year-over-year changes, the global high broadband adoption rate was up 65%. The top 10 countries/regions saw extremely strong long-term growth, led by the 146% change in South Korea's adoption rate. Five additional countries/regions saw yearly increases above 50%, while increases at the remaining four were all above 25%. Globally, South Africa and the United Arab Emirates were the only two countries to see high broadband adoption rates decline year-over-year, losing 12% (to 1.4% adoption) and 74% (to 3.1% adoption) respectively. Among the remaining geographies where adoption grew from the first quarter of 2013, increases ranged from 16% in Greece (to 4.2%) to an astonishing 9858% in Uruguay. Kazakhstan also had an extremely large growth rate, improving 2421% year-over-year.

India saw both quarterly and yearly increases similar to those seen in the fourth quarter of 2013, which were enough to move it out of the position as the country with the lowest high broadband adoption rate in the first quarter. That slot now belongs to Colombia, which finally qualified for inclusion within this section. Despite 39% quarter-over-quarter growth and 152% year-over-growth, the country's 0.4% high broadband adoption rate was the lowest among qualifying countries/regions in the first quarter.

3.4 Global Broadband Connectivity

In the first quarter of 2014, the global broadband adoption rate grew nominally, increasing 1.7% to reach 56% of all connections to Akamai taking place at speeds of 4 Mbps or above. Figure 17 shows that among the top 10 qualifying countries/regions, the largest quarterly increases were seen in Romania and Bulgaria, which grew 14% and 13% respectively.

Growth rates in the other top countries/regions were more nominal, in line with the global rate of change. Only Curaçao saw broadband adoption decline quarter-over-quarter, losing a scant 0.3%. Globally, 76 countries/regions that qualified for inclusion had higher broadband adoption rates as compared to the fourth quarter of 2013. Observed increases ranged from 0.2% in Canada (to 82% adoption) to an astonishing 1208% in Sudan (to 21% adoption). Across the 15 qualifying countries/regions that saw broadband adoption levels decline quarter-over-quarter, losses ranged from the aforementioned 0.3% in Curaçao to 28% in Venezuela (to 1.0% adoption). (Readers will note that the Isle of Man is first appearing the top 10 this quarter, ranked fourth globally. It finally crossed the 25,000 unique IP address threshold, qualifying it for inclusion. All of the other members of the top 10, except Curaçao, had millions of unique IP addresses in the first quarter.)

The global broadband adoption rate increased 24% from the first quarter of 2013, a yearly growth rate roughly in line with those seen in the past few quarters. Broadband adoption rates were also up year-over-year in all of the top 10 countries/regions, with increases ranging from just 2.9% in Switzerland to 52% in Curaçao, with double-digit percentages increases seen in eight of the top 10. Looking across the whole world, 89 qualifying countries saw had higher broadband adoption levels year-over-year, with growth ranging from 1.9% in Hungary (to 74% adoption) to an astonishingly high 5926% in Sudan. Uruguay's year-over-year increase was also extremely large, at 3298% (to 34% adoption), while Kenya was up 1100% year-over-year (to 4.9% adoption). An additional 25 qualifying countries/regions had broadband adoption rates

	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
–	Global	56%	1.7%	24%
1	South Korea	94%	0.5%	25%
2	Bulgaria	93%	13%	31%
3	Switzerland	91%	0.2%	2.9%
4	Isle Of Man	89%	2.5%	30%
5	Netherlands	88%	1.4%	6.9%
6	Romania	87%	14%	12%
7	Denmark	87%	4.3%	15%
8	Curaçao	87%	-0.3%	52%
9	Japan	86%	2.2%	12%
10	Israel	85%	3.2%	16%

Figure 17: Broadband (>4 Mbps) Connectivity

more than double on a yearly basis. Venezuela and the United Arab Emirates were the only two qualifying countries in the first quarter to see broadband adoption rates decline year-over-year. Venezuela dropped 14%, and the UAE lost 26% (to 44% adoption).

In addition to seeing these quarterly and yearly losses, Venezuela once again remained the country with the lowest level of broadband adoption, starting 2014 with an adoption rate of 1.0%

3.5 Global 4K Readiness

Given the growing interest in the streaming delivery of 4K[24] ("Ultra HD") video, we thought it would be interesting to begin tracking a "4K readiness" metric in the *State of the Internet Report*. With 4K adaptive bitrate streams generally requiring between10–20 Mbps of bandwidth, the rankings presented within this section identify candidate geographies most likely to be able to sustain such streams within this range. (Note that this bandwidth estimate currently applies to AVC encoded content, and that the 15 Mbps threshold may change once alternate codecs, such as HEVC or VP9 are deployed.)[25,26] Note that the rankings presented here are not intended to specify who can/cannot view 4K content, but rather which countries/regions have higher concentrations of 4K "capable" connectivity, resulting in a larger complement of subscribers being able to enjoy a quality experience when streaming 4K content. The notion of "readiness" presented here also does not consider the availability of 4K-encoded content within a given geography, nor the availability/affordability/uptake of 4K-capable televisions and players.

Globally, just 11% of connections to Akamai in the first quarter were at speeds of 15 Mbps or above, as illustrated in Figure 18. This average is significantly lower than those seen across the top 10 countries/regions. Unsurprisingly, South Korea led the list with 60% 4K readiness, a level almost twice that of Japan, which had 32% of its connections at that level in the first quarter. The Czech Republic had the lowest level of 4K readiness among the top 10, coming in at 17%. Not surprisingly, the makeup of the top 10 list for this metric is very similar to the global high broadband rankings, with seven countries/regions appearing on both lists. Sweden, Norway, and Finland appear within the top 10 for this metric, while they are absent from the top high broadband countries list, with the United States, Denmark, and Belgium appearing on that list in their stead. Overall, only 47 countries/regions qualified for inclusion in this metric. Of those, 23 countries/regions had 4K readiness rates above 10%, while just six had rates below 1%. The lowest readiness rates in the first quarter were found in India and China, which had just 0.3% and 0.2% (respectively) of their connections to Akamai at speeds above 15 Mbps.

As this is the initial review of this metric, we are not discussing specific quarterly or yearly changes among the top 10, or among the full complement of countries/regions that qualified for inclusion. However, in looking at the year-over-changes for both sets of geographies, it is encouraging to note that they were all positive, which points to ongoing improvements in broadband connectivity around the world.

	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
–	Global	11%	19%	99%
1	South Korea	60%	15%	272%
2	Japan	32%	20%	52%
3	Hong Kong	26%	19%	39%
4	Switzerland	23%	14%	85%
5	Latvia	23%	25%	40%
6	Netherlands	22%	-0.9%	75%
7	Sweden	20%	5.6%	49%
8	Norway	18%	24%	85%
9	Finland	18%	29%	116%
10	Czech Republic	17%	-5.6%	75%

Figure 18: 4K Ready (>15 Mbps) Connectivity

SECTION 4:
Geography – United States

The metrics presented here for the United States are based on a subset of data used for Section 3 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 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.

4.1 United States Average Connection Speeds

The first quarter of 2014 saw generally positive quarterly changes among the top 10 states, as shown in Figure 19. Virginia was the only state among the group that saw its average connection speed decline, dropping 4.3% from the fourth quarter of 2013. Among the other states, connection speed increases ranged from 2.6% in Massachusetts to 13% in Michigan. Across the whole country, Louisiana was the only other country to see a lower average connection speed quarter-over-quarter, losing 1.9% (to 7.7 Mbps). Improvements in average connection speeds across the other states ranged from 1.1% in Arizona (to 8.7 Mbps) to 40% in Ohio (to 11.2 Mbps). Overall, a total of 26 states had average connection speeds above the 10 Mbps "high broadband" threshold and all were well above the 4 Mbps "broadband" threshold.

On a year-over-year basis, all of the states in the top 10 saw higher average connection speeds as compared to the first quarter of 2013. The smallest change was seen in New Hampshire, where the 6.0% increase was the only one under 10% among the top 10 states, while Michigan had the largest yearly increase, at 42%. Vermont was the only state across the whole country to see a year-over-year decline in its average connection speed—the cause of this decline has been discussed in prior issues of the *State of the Internet Report*. Year-over-year connection speed increases across the other states ranged from 6.0% in neighboring New Hampshire to an impressive 91% in Kansas (to 8.6 Mbps).

Alaska remained the state with the lowest average connection speed, despite a quarterly increase of 7.8% and a yearly increase of 33% pushing it to 7.0 Mbps. However, it was not that much slower than Montana, Kentucky, or Arkansas, which all had average connection speeds of 7.3 Mbps in the first quarter.

4.2 United States Average Peak Connection Speeds

In the first quarter of 2014, quarterly changes in average peak connection speeds across the top 10 states were decidedly negative, as seen in Figure 20. Losses among the group ranged from 0.8% in Michigan to 13% in Massachusetts, Washington, and New Jersey. Rhode Island was the lone standout, seeing its average peak connection speed increase 1.2% in the first quarter. This broad decline is markedly different than the prior quarter, when all of the top 10 states saw fairly strong increases in average peak connection speeds. Looking across the whole country, Rhode Island was joined by only five other states in seeing higher average peak speeds quarter-over-quarter. Ohio's

	State	Q1 '14 Avg. Mbps	QoQ Change	YoY Change
1	Virginia	13.7	-4.3%	30%
2	Delaware	13.1	6.3%	18%
3	Massachusetts	13.1	2.6%	22%
4	Rhode Island	12.9	11%	35%
5	District Of Columbia	12.8	5.0%	18%
6	Washington	12.5	8.5%	29%
7	New Hampshire	12.3	4.0%	6.0%
8	Utah	12.1	6.0%	17%
9	Michigan	11.8	13%	42%
10	Connecticut	11.7	7.2%	18%

Figure 19: Average Connection Speed by State

	State	Q1 '14 Peak Mbps	QoQ Change	YoY Change
1	Virginia	53.8	-8.5%	24%
2	Rhode Island	53.2	1.2%	35%
3	Massachusetts	52.4	-13%	17%
4	Delaware	51.8	-1.8%	24%
5	District Of Columbia	51.6	-2.3%	15%
6	Washington	50.2	-13%	23%
7	New Jersey	49.2	-13%	26%
8	Maryland	48.1	-4.4%	68%
9	New York	47.9	-7.7%	13%
10	Michigan	47.1	-0.8%	31%

Figure 20: Average Peak Connection Speed by State

31% increase was the largest seen this quarter, and was the only one over 10%. Across the states that saw average peak connection speeds decline, losses ranged from 0.6% in Alaska (to 33.8 Mbps) to 18%, seen in New Hampshire (to 46.7 Mbps), Connecticut (to 46.8 Mbps), and Louisiana (to 32.9 Mbps).

In contrast to the overwhelmingly negative nature of the quarterly changes, year-over-year changes in average peak connection speeds were completely positive, and rather strong, among the top 10 states. Across the group, yearly increases ranged from 13% in New York to an impressive 68% in Maryland. Year-over-year changes were also overwhelmingly positive across the whole country, with only Ohio and Vermont seeing lower speeds, dropping 14% (to 25.5 Mbps) and 17% (to 39.4 Mbps) respectively. Of the remaining states, five saw increases below 10%, with the lowest Kentucky's 0.8% increase (to 31.2 Mbps), while the biggest jump was the 97% improvement seen in Kansas (to 34.4 Mbps).

Despite a 31% quarterly increase, Ohio's 25.5 Mbps average peak connection speed placed it as the state with the lowest average peak connection speed in the first quarter of 2014.

Interestingly, although Kansas saw the largest yearly increase in average peak connection speeds, future growth in the state could potentially be limited, as a bill was introduced to the state legislature in January that would effectively prevent municipalities within the state from getting involved in building their own broadband infrastructure, even in collaboration with private companies.[27] Panned as being overly restrictive, the Kansas Cable Telecommunications Association (KCTA) subsequently "tweaked" language within the bill they submitted,[28] but it does not appear that any action was ultimately taken on it during the 2013-2014 legislative session.[29] Similarly restrictive legislation was also introduced in Utah, in the form of a proposed bill that would prevent a regional fiber consortium from building infrastructure outside the boundaries of its member cities and towns.[30] In contrast, in February, Google asked 34 cities in nine metropolitan areas across the United States to explore what it would take to deploy new (presumably gigabit) broadband networks in their areas.[31]

4.3 United States High Broadband Connectivity

As shown in Figure 21, quarterly changes in high broadband adoption among the top 10 states were generally positive, if nominal. Eight of the top 10 states saw growth quarter-over-quarter, with increases ranging from 1.4% in both Massachusetts and Delaware to 12% in Michigan. The other two states, New Jersey and Virginia, saw lower high broadband adoption rates as compared to the previous quarter, with New Jersey losing 3.0% and Virginia 1.5%. New Jersey's quarterly loss meant that only three states had more than half of their connections to Akamai at speeds above 10 Mbps in the first quarter. In looking at the whole United States, Maryland and Louisiana also saw high broadband adoption rates decline quarter-over-quarter, losing 2.6% (to 42% adoption) and 5.1% (to 23% adoption) respectively. Growth rates among the remaining states were fairly reasonable, with New York having the smallest increase (0.6%, to 44% adoption). A total of 28 states saw quarterly changes above 10%, with the biggest change seen in Ohio, which added 41% (to 35% adoption).

Yearly changes in high broadband adoption among the top 10 states were all positive in the first quarter, ranging from growth of 12% in New Hampshire to 101% in Michigan. Across the whole country, sixteen states saw high broadband adoption more than double year-over-year, with the biggest growth seen in Arkansas (up 330% to 18% adoption) and Kansas (up 270% to 28% adoption). All but two of the remaining states saw growth rates above 10%, with New Hampshire's 12% increase the smallest seen. Yearly declines were only seen in the District of Columbia, which lost 8.4% (to 36% adoption) and Vermont, which lost 12% (to 37% adoption).

Idaho remained the state with the lowest level of high broadband adoption, after taking the position in the fourth quarter of 2013. Even after a 19% quarterly increase and a 179% yearly increase, it remained 193 kbps slower than Arkansas, which had held the spot previously in 2013. Both states had a (rounded) high broadband adoption rate of 18% in the first quarter.

	State	% Above 10 Mbps	QoQ Change	YoY Change
1	Rhode Island	55%	5.1%	61%
2	Massachusetts	54%	1.4%	29%
3	New Hampshire	52%	5.2%	12%
4	Delaware	48%	1.4%	30%
5	New Jersey	48%	-3.0%	39%
6	Connecticut	47%	8.0%	42%
7	Michigan	45%	12%	101%
8	Washington	45%	9.8%	38%
9	Virginia	44%	-1.5%	49%
10	Pennsylvania	44%	4.6%	39%

Figure 21: High Broadband (>10 Mbps) Connectivity, U.S. States

4.4 United States Broadband Connectivity

As shown in Figure 22, quarterly changes were mixed, with just four states seeing growth in broadband adoption rates. The biggest increase, relatively speaking, was only 0.8%, which was seen in South Dakota; Massachusetts' change of less than a tenth of a percent was the smallest among the group. Of the six states in the top 10 that saw broadband adoption levels drop from the previous quarter, losses ranged from 0.2% in Rhode Island to 3.0% in Delaware. Looking across the whole country, gainers slightly outnumbered losers, with a total of 28 states seeing higher levels of broadband adoption. Increases ranged from the barely perceptible in Massachusetts to 16% in Ohio. The quarterly declines seen in the remaining 21 states ranged from 0.1% in Illinois (to 63% adoption) up to 7.2% in Louisiana (to 65% adoption).

Yearly changes across the top 10 states were more positive, ranging from 1.4% in New York to 26% in Hawaii. In addition to Hawaii, Florida and South Dakota both saw year-over-year growth above 10%. New Hampshire was the only state among the top 10 to see a drop from the year prior, losing 6.6%. However, it was one of six states across the whole country to see lower broadband adoption rates, with losses ranging from 0.6% in Illinois to 24% in Vermont (to 65% adoption). New York's 1.4% yearly increase was also the smallest seen across the whole country, while the 81% increases seen in both Kansas and Arkansas were the largest (to 71% and 58% adoption respectively). In addition to those two states, 26 others also had double-digit year-over-year percentage increases.

Claiming the spot from Arkansas last quarter, West Virginia remained the state with the lowest broadband adoption rate in the first quarter at 55%, declining 0.4% on a quarterly basis, but growing 31% year-over-year.

4.5 United States 4K Readiness

As described above in Section 3, given the growing interest in the streaming delivery of 4K ("Ultra HD") video, we thought it would be interesting to begin tracking a "4K readiness" metric in the *State of the Internet Report*. With 4K adaptive bitrate streams generally requiring between10–20 Mbps of bandwidth, the rankings presented within this section provide insight into the states most likely to be able to sustain such streams within this range. Note that the rankings presented here are not intended to specify who can/cannot view 4K content, but rather which states have higher concentrations of 4K "capable" connectivity, resulting in a larger complement of subscribers being able to enjoy a quality experience when streaming 4K content. The notion of "readiness" presented here also does not consider the availability of 4K-encoded content within a given state, nor the availability/affordability/uptake of 4K-capable televisions and players.

Looking at the top 10 states in Figure 23, 4K readiness levels are approximately half the levels of high broadband adoption shown in Figure 21. Massachusetts and Delaware had just over a quarter of their connections to Akamai at speeds above 15 Mbps, while the remaining states in the top 10 all had between 20% and 25% of their connections at those speeds. Looking across the whole United States, a total of 39 states had 4K readiness levels of 10% or more. Hawaii and Kentucky had the lowest readiness rates, at 6.2% and 6.1% respectively.

As this is the initial review of this metric, we are not discussing specific quarterly or yearly changes among the top 10, or across the full United States. However, in looking at the year-over-changes, all were extremely positive, pointing to improved adoption of high-speed broadband connectivity across the country over time.

	State	% Above 4 Mbps	QoQ Change	YoY Change
1	Delaware	92%	-3.0%	2.2%
2	Rhode Island	92%	-0.2%	7.5%
3	Hawaii	87%	0.1%	26%
4	Connecticut	85%	0.5%	7.0%
5	New Hampshire	84%	-1.2%	-6.6%
6	Massachusetts	83%	<0.1%	5.4%
7	South Dakota	83%	0.8%	14%
8	New York	82%	-0.5%	1.4%
9	Florida	81%	-0.3%	10%
10	New Jersey	81%	-1.6%	9.8%

Figure 22: Broadband (>4 Mbps) Connectivity, U.S. States

	State	% Above 15 Mbps	QoQ Change	YoY Change
1	Massachusetts	27%	6.8%	64%
2	Delaware	26%	26%	73%
3	New Hampshire	24%	13%	35%
4	Rhode Island	24%	38%	167%
5	Washington	22%	21%	63%
6	District Of Columbia	22%	7.5%	27%
7	Virginia	21%	7.1%	66%
8	New Jersey	21%	9.1%	99%
9	Michigan	21%	40%	169%
10	Pennsylvania	21%	20%	75%

Figure 23: 4K Ready (>15 Mbps) Connectivity, U.S. States

SECTION 5:
Geography – Americas

The metrics presented here for the Americas region (North and South America) are based on a subset of data used for Section 3 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.

5.1 Americas Average Connection Speeds

In the first quarter of 2014, the average connection speeds seen in the United States and Mexico remained more than twice as fast as the next fastest country, as shown in Figure 24. Uruguay's 37% quarterly increase was the largest seen in the region, and pushed the country just ahead of Mexico, which was previously ranked behind the United States and Canada. Among the surveyed countries, quarterly changes were rather mixed, with Argentina, Colombia, and Peru joining the top three countries in seeing higher average connection speeds, while the other nine surveyed countries saw average connection speeds decline quarter-over-quarter. Most of the quarterly declines were fairly nominal and of little concern, although the largest losses were seen in the three slowest surveyed countries in the region, with Bolivia dropping just over 9%, while Venezuela and Paraguay both saw losses greater than 10%.

On a year-over-year basis, the situation was much more positive, with growth seen in all of the surveyed countries. However, there was an extremely wide variance in the changes seen, with increases ranging from less than 1% in Panama and Costa Rica, all the way up to 151% in Uruguay. Paraguay was the only other surveyed country within the region (aside from Panama and Costa Rica) to see a yearly increase less than 10%, and Argentina was the only other country (aside from Uruguay) to see a yearly increase above 50%. Although the average connection speeds observed among many of the surveyed countries in the Americas region are lower, in comparison, to countries in other regions, the generally solid long-term growth trends are an encouraging sign. With continued investment and adoption, broadband connectivity within the region should continue to improve heading into the future.

5.2 Americas Average Peak Connection Speeds

With a 24% quarter-over-quarter increase in its average peak connection speed, Uruguay vaulted past the United States to rank within the top 10 globally, as well as topping the list of surveyed countries in the Americas region. As shown in Figure 25, it was also one of only three countries to see average peak connection speeds grow in the first quarter. Chile saw a nominal 3.0% increase, while Colombia's was barely noticeable, at just 0.2%. Among the other dozen surveyed countries in the region where average peak connection speeds

Global Rank	Country/Region	Q1 '14 Avg. Mbps	QoQ Change	YoY Change
12	United States	10.5	9.0%	31%
16	Canada	9.7	8.7%	29%
57	Uruguay	4.3	37%	151%
65	Mexico	4.0	-0.3%	24%
71	Ecuador	3.3	-2.9%	47%
72	Chile	3.3	-2.3%	17%
77	Argentina	3.2	3.7%	65%
81	Colombia	3.0	2.0%	14%
85	Peru	2.7	2.5%	46%
87	Brazil	2.6	-3.1%	23%
88	Panama	2.6	-5.5%	0.7%
109	Costa Rica	2.0	-2.8%	0.8%
125	Venezuela	1.3	-15%	20%
128	Paraguay	1.2	-14%	8.5%
134	Bolivia	0.9	-9.1%	15%

Figure 24: Average Connection Speed by Americas Country

Global Rank	Country/Region	Q1 '14 Peak Mbps	QoQ Change	YoY Change
9	Uruguay	45.4	24%	206%
17	United States	40.6	-4.6%	19%
19	Canada	39.7	-1.9%	19%
69	Chile	20.9	3.0%	6.7%
75	Mexico	19.3	-9.1%	11%
76	Ecuador	19.0	-15%	3.2%
79	Argentina	18.8	-4.5%	27%
82	Brazil	17.9	-12%	0.2%
86	Peru	17.1	-6.3%	11%
87	Colombia	16.8	0.2%	9.2%
107	Panama	12.5	-15%	-5.6%
122	Costa Rica	10.1	-23%	-21%
128	Paraguay	9.0	-14%	-4.7%
130	Bolivia	8.4	-22%	3.7%
134	Venezuela	7.9	-24%	-6.8%

Figure 25: Average Peak Connection Speed by Americas Country

declined from the fourth quarter of 2013, seven saw double-digit percentage losses, while the smallest decline was Canada's 1.9% drop. Both the number of surveyed countries seeing quarterly declines, as well as the size of some of those declines, is surprisingly high. Interestingly, in the fourth quarter of 2013, all of the surveyed countries had average peak connection speeds above 10 Mbps. However, quarterly declines pushed Paraguay, Bolivia, and Venezuela back below that point.

Year-over-year changes within the region were also mixed, though decidedly more positive than the quarterly changes. Along with its region-leading quarterly change, Uruguay also saw the largest yearly increase, up 206%. Five additional surveyed countries also grew more than 10%, while the smallest yearly increase was seen in Brazil, at just 0.2%. Though not the long-term trend that we hope to see, only four surveyed countries in the Americas region saw average peak connection speeds decline year-over-year, with the losses in most fairly nominal, although Costa Rica's 21% drop is unexpectedly high.

5.3 Americas High Broadband Connectivity

Figure 26 shows that heading into 2014, there is still significant disparity in high broadband adoption, and likely availability, across surveyed countries in the Americas region. Nearly half of the surveyed countries within the region did not see enough connections to Akamai above 10 Mbps in the first quarter to qualify for global ranking, and among those countries that are ranked globally, the high broadband adoption rates remain fairly low. The United States and Canada remain the only two countries within the region with adoption rates above 10%, while the remaining countries struggle to approach even 5% adoption. On the bright side, seven of the eight qualifying countries saw strong quarterly increases, all above 10%, with Uruguay more than doubling quarter-over-quarter. Only Chile saw a lower high broadband adoption rate as compared to the fourth quarter of 2013, losing 11%. Among the surveyed countries that did not qualify for inclusion, all saw quarterly increases in high broadband adoption, but the adoption rates for these countries remain extremely low, with Ecuador the only one above 1%.

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
7	United States	36%	10%	62%
14	Canada	32%	20%	89%
42	Uruguay	4.5%	113%	9858%
50	Mexico	2.2%	13%	188%
51	Argentina	2.0%	47%	396%
55	Chile	1.1%	-11%	71%
56	Brazil	1.0%	15%	95%
58	Colombia	0.4%	39%	152%
–	Ecuador	1.4%	18%	145%
–	Panama	0.5%	1.2%	82%
–	Costa Rica	0.5%	37%	15%
–	Peru	0.3%	62%	619%
–	Venezuela	0.1%	9.6%	54%
–	Bolivia	0.1%	6.3%	353%
–	Paraguay	<0.1%	64%	50%

Figure 26: High Broadband (>10 Mbps) Connectivity by Americas Country

Among the eight surveyed Americas countries that qualified for inclusion in the global rankings, the observed year-over-year changes were all positive, and were fairly significant. Uruguay's high broadband adoption rate was up nearly 100x over the prior year, while Mexico, Argentina, and Colombia all saw adoption rates more than double over the same period. Similarly strong yearly growth was also seen across the seven surveyed countries in the region that did not qualify for inclusion in the global rankings, with three of these countries also seeing increases of more than 100%. (Yet two of the three remain below 1% adoption, as noted above.)

Uruguay's strong increases across key metrics may be due, in part, to continued deployment of fiber-to-the-home (FTTH) by the national telecommunications operator, Administracion Nacional de Telecomunicaciones (Antel). In February, Antel revealed that over 270,000 households within the country are connected to its FTTH network, which it said passes 717,000 homes.[32] Antel aims to cover all towns with over 3,500 residents with FTTH in 2015, as part of a multi-hundred million dollar investment that includes the rollout and expansion of its FTTH infrastructure.

5.4 Americas Broadband Connectivity

As shown in Figure 27, all but three of the surveyed Americas countries qualified for inclusion in this metric, in contrast to the high broadband adoption metric. Similar to the observation made above with the average connection speed metric, Canada and the United States are far ahead of the other countries, with broadband adoption rates more than twice that of Uruguay's, which again rode a strong quarterly increase to push just ahead of Mexico. Among the dozen qualifying countries, quarter-over-quarter changes were split. Of the six

that saw broadband adoption rates increase, changes ranged from a bump of just 0.2% in Canada to Uruguay's 72% jump. Among the other six, quarterly losses ranged from just 0.4% in Ecuador to 28% in Venezuela.

Venezuela was the lone outlier when looking at year-over-year changes among qualifying Americas countries, as its broadband adoption rate dropped 14% over the preceding year. Among the remaining qualifying countries, Uruguay again had the largest yearly increase, up nearly 33x from the first quarter of 2013; Argentina and Peru also saw broadband adoption rates increase several hundred percent over the same period. Double-digit percentage increases were seen in all but one of the other qualifying countries, with Canada's 8.7% yearly growth the smallest seen.

Among the three non-qualifying countries, two saw minor quarterly declines, but all saw strong yearly increases.

5.5 Americas 4K Readiness

Section 3.5 provides additional context around the addition of this metric to the *State of the Internet Report*, noting that the rankings presented here are not intended to specify who can/cannot view 4K content, but rather which countries/regions have higher concentrations of 4K "capable" connectivity, resulting in a larger complement of subscribers being able to enjoy a quality experience when streaming 4K content. The notion of "readiness" presented here also does not consider the availability of 4K-encoded content within a given geography, nor the availability/affordability/uptake of 4K-capable televisions and players.

As Figure 28 clearly illustrates, 4K readiness is fairly limited across most of the surveyed countries in the Americas region. With strong broadband infrastructures, the United States and Canada both had more than 10% of their connections to Akamai at speeds above 15 Mbps in the first quarter, while Mexico and Brazil both failed to see even 1% of their connections at those speeds. Despite strong growth over time, Uruguay failed to qualify for inclusion in the global ranking for this metric. Among the remaining surveyed countries, all failed to see even 1% of their connections to Akamai at 15 Mbps or above.

As this is the initial review of this metric, we are not discussing specific quarterly or yearly changes among the surveyed countries in the Americas region. However, in looking at the year-over-changes, all were strongly positive. These long-term trends are extremely encouraging, and point to improved adoption of high-speed broadband connectivity across the region over time.

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
15	Canada	82%	0.2%	8.7%
27	United States	73%	1.7%	10%
63	Uruguay	34%	72%	3298%
65	Mexico	33%	-4.9%	78%
67	Argentina	26%	12%	231%
69	Chile	25%	-5.9%	91%
70	Ecuador	23%	-0.4%	99%
71	Brazil	21%	-2.3%	83%
76	Colombia	17%	19%	62%
79	Panama	12%	-19%	14%
82	Peru	7.9%	30%	520%
91	Venezuela	1.0%	-28%	-14%
–	Costa Rica	4.0%	-1.9%	50%
–	Bolivia	0.7%	-6.9%	176%
–	Paraguay	0.5%	36%	112%

Figure 27: Broadband (>4 Mbps) Connectivity by Americas Country

Global Rank	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
13	United States	17%	26%	95%
17	Canada	13%	43%	127%
44	Mexico	0.7%	28%	174%
45	Brazil	0.3%	25%	112%
–	Uruguay	1.9%	128%	20533%
–	Ecuador	0.4%	11%	80%
–	Argentina	0.4%	57%	326%
–	Chile	0.3%	9.1%	31%
–	Costa Rica	0.3%	48%	6.5%
–	Panama	0.1%	6.6%	76%
–	Colombia	0.1%	56%	121%
–	Peru	0.1%	54%	329%
–	Venezuela	–	12%	123%
–	Bolivia	–	-28%	600%
–	Paraguay	–	25%	150%

Figure 28: 4K Ready (>15 Mbps) Connectivity by Americas Country

SECTION 6:

Geography – Asia Pacific Region

The metrics presented here for the Asia Pacific region are based on a subset of data used for Section 3 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 Asia Pacific Average Connection Speeds

Figure 29 shows that South Korea, Japan, and Hong Kong maintained their solid lead in the average connection speed metric both globally (taking the top three slots) and within the Asia Pacific region. South Korea led as the only country with an average connection speed above 20 Mbps, while Japan and Hong Kong were the only two with average connection speeds above 10 Mbps. Among the remaining surveyed countries/regions, average connection speeds ranged from 8.9 Mbps in Taiwan down to 1.7 Mbps in India. The three top countries cemented their leads with solid quarterly increases, although similar increases were also seen across all but one (China) of the surveyed Asia Pacific countries/regions. Across the region, quarterly changes ranged from 2.6% in Australia up to an impressive 46% in Indonesia; Vietnam, Malaysia, and Japan joined Indonesia in seeing quarterly increases above 10%.

Looking at year-over-year changes seen across the Asia Pacific region in the first quarter, we see that all of the surveyed countries/regions experienced very strong growth in average connection speeds. Both South Korea and Taiwan saw average connection speeds more than double from the first quarter of 2013, while Indonesia was up by more than half. Impressively, all of the remaining surveyed countries/regions had yearly increases above 20%, with Hong Kong having the smallest year-over-year increase at 24%. As always, it remains encouraging to see these long-term trends continue to grow aggressively over time, pointing to improved Internet connectivity across the region.

6.2 Asia Pacific Average Peak Connection Speeds

As shown in Figure 30, South Korea and Hong Kong remain the only two surveyed Asia Pacific countries/regions with average peak connection speeds above 60 Mbps, while Singapore, Japan, and Taiwan remain the only others with average peak speeds above 50 Mbps. Within the Asia Pacific region, quarter-over-quarter changes were somewhat mixed in the first quarter, with five surveyed countries/regions seeing speeds increase, while nine saw speeds decrease. The most aggressive growth was seen in Indonesia, which added 55% from the fourth quarter of 2013, while Taiwan added only 2.1%. New Zealand was the only other country to see a double-digit percentage increase. Declines ranged from a 1.2% loss in China to a

Global Rank	Country/Region	Q1 '14 Avg. Mbps	QoQ Change	YoY Change
1	South Korea	23.6	8.0%	145%
2	Japan	14.6	12%	29%
3	Hong Kong	13.3	8.5%	24%
20	Taiwan	8.9	6.4%	118%
24	Singapore	8.4	6.1%	28%
42	Australia	6.0	2.6%	39%
45	New Zealand	5.6	5.7%	30%
48	Thailand	5.2	6.8%	31%
69	Malaysia	3.5	16%	30%
79	China	3.2	-6.4%	46%
93	Indonesia	2.4	46%	55%
105	Philippines	2.1	5.7%	49%
107	Vietnam	2.0	12%	47%
118	India	1.7	8.4%	34%

Figure 29: Average Connection Speed by Asia Pacific Country/Region

Global Rank	Country/Region	Q1 '14 Peak Mbps	QoQ Change	YoY Change
1	South Korea	68.5	6.5%	52%
2	Hong Kong	66.0	-3.3%	0.3%
3	Singapore	57.7	-2.5%	32%
5	Japan	55.6	4.7%	17%
7	Taiwan	52.6	2.1%	61%
30	Thailand	34.4	-11%	14%
41	Australia	31.6	-10%	20%
51	Malaysia	27.9	-6.9%	10%
59	New Zealand	24.3	12%	20%
74	Indonesia	19.4	55%	42%
78	Philippines	18.8	-42%	26%
96	China	13.6	-1.2%	43%
110	Vietnam	12.3	-3.2%	-1.9%
112	India	12.0	-1.5%	7.6%

Figure 30: Average Peak Connection Speed by Asia Pacific Country/Region

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
1	South Korea	77%	8.2%	146%
2	Japan	54%	11%	32%
5	Hong Kong	43%	14%	30%
19	Taiwan	26%	11%	532%
26	Singapore	21%	9.3%	57%
38	Australia	11%	11%	163%
40	New Zealand	7.4%	11%	125%
45	Thailand	4.1%	35%	171%
49	Malaysia	2.6%	51%	94%
54	China	1.2%	-32%	165%
57	India	0.7%	39%	106%
–	Indonesia	0.3%	135%	123%
–	Philippines	0.3%	37%	83%
–	Vietnam	0.1%	19%	75%

Figure 31: High Broadband (>10 Mbps) Connectivity by Asia Pacific Country/Region

surprisingly high 42% drop in the Philippines. Unfortunately, this caused the Philippines to give back nearly all of the gains made in the fourth quarter, when it saw a 103% increase. In addition to the Philippines, Thailand and Australia both also saw double-digit percentage losses.

With the exception of a slight decline seen in Vietnam, year-over-year changes in the remainder of the surveyed Asia Pacific countries/regions were all positive, and most were fairly strong. Hong Kong saw the smallest increase, at just 0.3%, and India was the only other country with an increase below 10%. Among the other countries/regions, Taiwan had the biggest increase, at 61%, followed by South Korea, which grew 52%, and China and Indonesia, which added 43% and 42% respectively. Four more countries/regions saw year-over-year changes in excess of 20%, including the Philippines, which was the country with the largest year-over-year increase in the fourth quarter.

6.3 Asia Pacific High Broadband Connectivity

Once again, all but three of the surveyed Asia Pacific countries/regions qualified for inclusion in the global rankings for the high broadband adoption metric in the first quarter of 2014, as shown in Figure 31. South Korea led both the Asia Pacific region and the world in having more than three-quarters of its connections to Akamai at speeds above 10 Mbps, while Japan held the second place slot with more than half of its connections at those speeds. An additional four surveyed countries/regions had high broadband adoption rates above 10%, while the lowest was seen in India, at 0.7%. Quarterly changes across qualifying countries/regions were generally positive, and relatively strong in the first quarter, with China the only country seeing a quarterly decline, and Singapore the only region seeing a quarterly change below 10%. Among the three countries (Indonesia, the Philippines, Vietnam) that did not qualify for inclusion, high broadband adoption rates remained well below 1%, in spite of strong quarterly increases.

Year-over-year changes across the qualifying Asia Pacific countries/regions were once again extremely strong, with seven seeing high broadband adoption rates more than double; Taiwan's 532% increase was the largest seen. After seeing increases of more than 500% in the third and fourth quarters of 2013, China's year-over-year change was more moderate this quarter, though still impressive at 165%. The remaining qualifying countries/regions all saw double-digit percentage increases, with the lowest rates of growth seen in Japan and Hong Kong, at 32% and 30% respectively. The three countries that did not qualify for inclusion also saw extremely strong year-over-year changes. However, as these three countries had such low high broadband adoption rates and fewer than 25,000 unique IP addresses connecting to Akamai at speeds above 10 Mbps in the first quarter, these large changes do not necessarily reflect significant improvements to connectivity within the countries.

6.4 Asia Pacific Broadband Connectivity

In the first quarter of 2014, South Korea continued to slowly inch towards complete broadband adoption in the country, gaining 0.5% from the end of 2013 but remaining at 94% adoption. As shown in Figure 32, Japan and Hong Kong are following in South Korea's footsteps, both with more than eight of every ten requests to Akamai during the quarter at speeds of 4 Mbps or above. Among the remaining surveyed Asia Pacific countries/regions, all but four (Indonesia, India, the Philippines, and Vietnam) had broadband adoption rates above 10%. Indonesia, one of the four below 10%, saw a 262% increase quarter-over-quarter—if such aggressive growth becomes a trend, it will quickly achieve double-digit adoption. It does look like we could see such growth continue over time, as the incumbent telecommunications company announced plans in February to pass 20 million homes on Indonesia's roughly 900 inhabited islands with 10 Gbps down/2.5 Gbps up broadband services using XGPON technologies.[33] Indonesia's massive increase was also the largest seen across the region, with South Korea's 0.5% the smallest. China saw the only quarterly decline, losing 10%.

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
1	South Korea	94%	0.5%	25%
9	Japan	86%	2.2%	12%
11	Hong Kong	84%	4.3%	11%
29	Singapore	73%	8.5%	21%
32	Taiwan	71%	3.2%	141%
43	Thailand	61%	11%	36%
44	New Zealand	60%	9.0%	50%
49	Australia	55%	3.3%	70%
64	Malaysia	33%	31%	56%
68	China	25%	-10%	147%
84	Indonesia	6.6%	262%	111%
85	India	4.9%	17%	111%
88	Philippines	4.2%	16%	147%
89	Vietnam	3.8%	39%	155%

Figure 32: Broadband (>4 Mbps) Connectivity by Asia Pacific Country/Region

Year-over-year changes in broadband adoption across all of the surveyed Asia Pacific countries/regions were extremely strong in the first quarter. An impressive six countries/regions saw broadband adoption rates more than double from the first quarter of 2013, while an additional three countries saw growth rates of 50% or more. All of the surveyed countries/regions saw adoption rates increase by at least 10%. After seeing year-over-year growth rates above 100% during each quarter of 2013, China's broadband adoption experienced a similar rate of growth this quarter as well, reinforcing this positive long-term trend. In looking at historical data, broadband adoption in China is up approximately 8x since the first quarter of 2012 (two years), and approximately 25x since the first quarter of 2011 (three years).

6.5 Asia Pacific 4K Readiness

Section 3.5 provides additional context around the addition of this metric to the *State of the Internet Report*, noting that the rankings presented here are not intended to specify who can/cannot view 4K content, but rather which countries/regions have higher concentrations of 4K "capable" connectivity, resulting in a larger complement of subscribers being able to enjoy a quality experience when streaming 4K content. The notion of "readiness" presented here also does not consider the availability of 4K-encoded content within a given geography, nor the availability/affordability/uptake of 4K-capable televisions and players.

As Figure 33 clearly illustrates, there are widely varying levels of 4K readiness across surveyed Asia Pacific countries/regions. South Korea led the region, and the world, with 60% of its connections to Akamai in the first quarter at speeds of 15 Mbps or above. This level was nearly twice that seen in Japan, just over twice that seen in Hong Kong, and four times more than in Taiwan. Six of the remaining countries/regions that qualified for inclusion in the metric had less than 10% of connections to Akamai at 4K-ready speeds, while two of those countries (India and China) had less than 1% of their connections at those levels. Four countries did not see enough connections to Akamai at speeds over 15 Mbps in the first quarter to qualify for inclusion—among these countries, less than 1% of the connections that were seen could be considered 4K-ready.

As this is the initial review of this metric, we are not discussing specific quarterly or yearly changes among the surveyed Asia Pacific countries/regions. However, in looking at the year-over-changes, all were strongly positive. These long-term trends are extremely encouraging, and point to improved adoption of high-speed broadband connectivity across the region over time, and will ultimately drive higher levels of 4K readiness.

Global Rank	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
1	South Korea	60%	15%	272%
2	Japan	32%	20%	52%
3	Hong Kong	26%	19%	39%
15	Taiwan	14%	16%	599%
26	Singapore	8.4%	8.9%	57%
34	Australia	4.4%	17%	154%
37	New Zealand	2.3%	22%	150%
41	Thailand	1.2%	29%	144%
46	India	0.3%	50%	91%
47	China	0.2%	-29%	153%
–	Malaysia	0.6%	47%	80%
–	Philippines	0.1%	29%	44%
–	Indonesia	0.1%	75%	63%
–	Vietnam	–	14%	106%

Figure 33: 4K Ready (>15 Mbps) Connectivity by Asia Pacific Country/Region

SECTION 7:

Geography—Europe/Middle East/Africa (EMEA)

The metrics presented here for the EMEA region are based on a subset of data used for Section 3 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 the EMEA region, based on classification by Akamai's EdgeScape geolocation tool.

7.1 EMEA Average Connection Speeds

With a 5.8% quarter-over-quarter increase, Switzerland pushed ahead of the Netherlands, regaining the top slot among the surveyed countries in the EMEA region, reaching an average connection speed of 12.7 Mbps. As Figure 34 shows, the Netherlands remained close behind, with an average speed of 12.4 Mbps in the first quarter. An additional seven countries in the region had average connection speeds above the 10 Mbps "High broadband" threshold, and once again, all of the surveyed countries in the EMEA region, with the exception of South Africa, had average connection speeds above the 4 Mbps "broadband" threshold. Quarter-over-quarter changes across the region were generally positive, with increases ranging from less than 1% in the Netherlands, Austria, and Italy, to 24% in Turkey and 28% in Romania. Just three countries saw lower average connection speeds from the fourth quarter, with the Czech Republic losing 1.9%, Poland losing just 0.2%, and France seeing a slight 0.1% loss.

Looking at year-over-year changes, only the United Arab Emirates had a lower average connection speed than in the first quarter of 2013, losing 27%. Across the remaining surveyed countries in the EMEA region, double-digit percentage yearly increases were seen in all, with growth rates ranging from a solid 17% in Hungary to 65% in Turkey. In total, four countries saw year-over-year changes in excess of 40%, another seven had yearly growth rates of 30% or more, and eleven more had average connection speeds grow 20% or more over the past year.

Global Rank	Country/Region	Q1'14 Avg. Mbps	QoQ Change	YoY Change
4	Switzerland	12.7	5.8%	26%
5	Netherlands	12.4	0.3%	28%
7	Sweden	11.6	6.6%	30%
8	Czech Republic	11.2	-1.9%	24%
9	Finland	10.7	18%	37%
10	Ireland	10.7	4.3%	47%
11	Denmark	10.5	7.0%	31%
13	Norway	10.1	13%	39%
14	Belgium	10.0	2.7%	33%
15	United Kingdom	9.9	5.1%	31%
17	Austria	9.4	<0.1%	22%
18	Romania	9.3	28%	20%
19	Israel	8.9	8.7%	29%
22	Russia	8.6	15%	44%
26	Germany	8.1	5.7%	19%
29	Hungary	7.5	8.7%	17%
30	Poland	7.5	-0.2%	24%
31	Slovakia	7.3	11%	20%
32	Spain	7.2	7.6%	43%
39	France	6.6	-0.1%	31%
40	Portugal	6.4	5.9%	28%
47	Italy	5.2	0.4%	22%
49	Turkey	5.0	24%	65%
58	United Arab Emirates	4.3	3.0%	-27%
89	South Africa	2.6	11%	20%

Figure 34: Average Connection Speed by EMEA Country/Region

7.2 EMEA Average Peak Connection Speeds

As Figure 35 shows, Israel and Romania remained the only two surveyed EMEA countries with average peak connection speeds above 50 Mbps in the first quarter. Across the region, an additional six countries had average peak connection speeds above 40 Mbps, 13 more were above 30 Mbps, and three more were above 20 Mbps—counts all consistent with the prior quarter. South Africa remained the country with the lowest average connection speed in the region, but an 11% quarterly increase pushed it up to 10 Mbps. Along with South Africa, 14 other surveyed countries also saw quarter-over-quarter increases in average peak speeds, with growth rates ranging from 1.2% in both the Czech Republic and Slovakia up to 15% in Russia. Of the 10 countries in the region that saw lower average peak speeds as compared to the prior quarter, losses ranged from just 0.7% in Sweden and Hungary to 22% in the United Arab Emirates. This gain/loss split is a departure from the fourth quarter of 2013, where all countries saw quarter-over-quarter increases.

Year-over-year changes were nearly all positive, and were generally strong across the EMEA region. The United Arab Emirates and Italy were the only countries to see a long-term decline in average peak connection speeds, with Italy dropping just 0.7% and the UAE shedding a much larger 66%. Among the other countries within the region, only five had yearly growth rates below 10%. The balance all had double-digit percentage increases, with Israel's 53% year-over-year change the largest seen in the first quarter. This general trend towards fairly strong year-over-year increases in average peak connection speeds highlights the ongoing improvements in the quality of broadband Internet connectivity across the EMEA region.

7.3 EMEA High Broadband Connectivity

Switzerland and the Netherlands traded places in the global ranking for high broadband adoption in the first quarter of 2014, but remained the only two surveyed countries in the EMEA region with high broadband adoption rates above 40%. Figure 36 shows that adoption remained fairly strong across the region, with eight additional countries having more than 30%

Global Rank	Country/Region	Q1 '14 Peak Mbps	QoQ Change	YoY Change
4	Israel	57.6	5.3%	53%
6	Romania	54.4	7.0%	13%
10	Netherlands	45.2	3.6%	22%
11	Switzerland	44.8	1.4%	12%
12	Belgium	44.6	3.5%	22%
13	Sweden	42.7	-0.7%	23%
14	United Kingdom	42.2	-3.0%	20%
16	Russia	41.3	15%	40%
20	Czech Republic	38.8	1.2%	12%
21	Ireland	38.7	2.1%	27%
22	Hungary	37.6	-0.7%	7.2%
23	Portugal	36.7	-1.3%	9.1%
24	Finland	36.5	8.1%	21%
25	Austria	36.0	-4.3%	17%
27	Norway	35.7	8.3%	27%
28	Denmark	35.5	1.3%	19%
29	Germany	35.4	-1.1%	13%
34	Poland	32.8	4.7%	4.8%
36	United Arab Emirates	32.4	-22%	-66%
38	Spain	32.2	2.7%	6.7%
39	Slovakia	32.1	1.2%	9.3%
53	Turkey	26.6	-2.1%	18%
55	France	25.8	-2.4%	13%
67	Italy	21.4	-2.8%	-0.7%
123	South Africa	10.0	11%	25%

Figure 35: Average Peak Connection Speed by EMEA Country/Region

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
3	Switzerland	45%	7.3%	49%
4	Netherlands	44%	-3.0%	52%
8	Denmark	35%	7.6%	81%
9	Belgium	35%	-0.5%	73%
10	Czech Republic	34%	-9.3%	54%
11	Finland	34%	16%	53%
12	Sweden	34%	4.2%	34%
13	United Kingdom	32%	5.9%	72%
15	Romania	31%	101%	62%
16	Norway	30%	18%	57%
17	Russia	27%	33%	123%
20	Ireland	26%	1.2%	111%
21	Israel	25%	23%	115%
23	Austria	24%	-2.9%	58%
27	Germany	21%	14%	61%
28	Hungary	18%	20%	75%
29	Poland	18%	-5.8%	45%
32	Spain	16%	25%	188%
33	Slovakia	15%	16%	58%
35	France	12%	1.5%	144%
37	Portugal	12%	14%	138%
43	Italy	4.3%	-6.4%	56%
46	Turkey	3.2%	88%	250%
48	United Arab Emirates	3.1%	-11%	-74%
53	South Africa	1.4%	6.6%	-12%

Figure 36: High Broadband (>10 Mbps) Connectivity by EMEA Country/Region

of connections to Akamai at speeds above 10 Mbps, five more countries with more than a fifth of their connections at those speeds, and another six countries with at least one of every 10 connection above 10 Mbps. Only four countries (Italy, Turkey, United Arab Emirates, and South Africa) had high broadband adoption rates below 10% in the first quarter, with Italy and the UAE seeing nominal quarterly declines. They were joined by five other surveyed countries that also saw nominal losses in the first quarter. Across the other countries that saw positive year-over-year changes, increases ranged from 1.2% in Ireland to 88% in Turkey and 101% in Romania.

In addition to having one of the highest quarter-over-quarter changes, for the third straight quarter Turkey had the largest year-over-year change as well, growing 250% from the first quarter of 2013. In addition to this significant increase seen in Turkey, six other surveyed countries had high broadband adoption rates grow by more than 100% over the past year. All but two of the remaining surveyed countries also saw extremely strong yearly growth, with Sweden's 34% increase the smallest seen. Only two countries were outliers, having year-over-year declines. Similar to the long-term trend seen across other metrics, the United Arab Emirates lost 74% on a yearly basis, while South Africa dropped 12%.

The observed high broadband adoption rates and strong year-over-year increases point towards ongoing improvements in high speed broadband across the EMEA region, but some countries may need to do more in order to meet the broadband goals set by the Digital Agenda for Europe.[34] A report[35] published in January said it expects 50% of Italians to have access to 30 Mbps broadband by 2017, and suggests that 70% coverage for 30 Mbps connectivity by 2020 may be a more feasible goal, which falls short of the short of the published broadband goals. In order to keep progress moving forward, the country's prime minister noted that Italy's government will put together a checklist and a timeline based on the plans the operators have announced, and will monitor step by step how they progress in the actual implementation of the plans.[36]

7.4 EMEA Broadband Connectivity

Switzerland remained the surveyed EMEA country with the highest level of broadband adoption in the first quarter of 2014, with 91% of connections to Akamai at speeds over 4 Mbps, as shown in Figure 37. Adoption levels were extremely strong across nearly all of the surveyed countries in the region. In addition to Switzerland, nine other countries had broadband adoption rates of 80% or more, seven more countries had at least 70% adoption, and another six had at least half of their connections at broadband rates. The lowest rate of broadband adoption was found in South Africa, at 7.8%—this placed it as the only surveyed EMEA country that had an adoption rate below 10%. Quarterly changes across the region were largely positive, if relatively modest. All but three of the surveyed countries saw higher broadband adoption rates quarter-over-quarter, with increases ranging from just 0.2% in Switzerland to 58% in Turkey—it was one of six total countries that saw double-digit percentage increases. Only three countries (Austria, the Czech Republic, and France) saw broadband adoption rates drop from the fourth quarter of 2013, all with very nominal declines.

Similar to the last several quarters, Turkey was the only surveyed EMEA country turning in a year-over-year increase above 100%. This quarter's impressive yearly growth rate (331%) was almost 10% higher than that seen (311%) in the fourth quarter of 2013. Increases across the remaining countries were much more

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
3	Switzerland	91%	0.2%	2.9%
5	Netherlands	88%	1.4%	6.9%
6	Romania	87%	14%	12%
7	Denmark	87%	4.3%	15%
10	Israel	85%	3.2%	16%
12	Austria	83%	-2.0%	9.5%
14	Czech Republic	83%	-1.9%	4.8%
16	United Kingdom	80%	2.1%	15%
17	Sweden	80%	9.7%	28%
18	Belgium	80%	1.5%	7.3%
21	Russia	77%	5.0%	27%
22	Germany	76%	1.1%	8.0%
23	Finland	75%	6.8%	12%
24	Spain	74%	4.5%	48%
26	Hungary	74%	6.9%	1.9%
30	Poland	73%	2.9%	28%
33	Portugal	70%	5.6%	25%
36	France	68%	-1.6%	32%
38	Slovakia	66%	10%	36%
39	Ireland	65%	1.5%	18%
40	Norway	62%	12%	29%
42	Turkey	61%	58%	331%
46	Italy	58%	0.9%	54%
56	United Arab Emirates	44%	11%	-26%
80	South Africa	8.2%	11%	5.5%

Figure 37: Broadband (>4 Mbps) Connectivity by EMEA Country/Region

modest; Italy's 54% increase was the next highest. Overall, a total of 16 surveyed countries saw yearly increases above 10%, while eight countries grew less than 10%. The United Arab Emirates was the only surveyed country in the EMEA region to see broadband adoption decline year-over-year, losing 26%.

7.5 EMEA 4K Readiness

Section 3.5 provides additional context around the addition of this metric to the *State of the Internet Report*, noting that the rankings presented here are not intended to specify who can/cannot view 4K content, but rather which countries/regions have higher concentrations of 4K "capable" connectivity, resulting in a larger complement of subscribers being able to enjoy a quality experience when streaming 4K content. The notion of "readiness" presented here also does not consider the availability of 4K-encoded content within a given geography, nor the availability/affordability/uptake of 4K-capable televisions and players.

As shown in Figure 38, over half of the surveyed EMEA countries had more than 10% of their connections to Akamai at speeds over 15 Mbps in the first quarter, with the top three countries (Switzerland, the Netherlands, Sweden) seeing more than a fifth of their connections at those speeds. Within the region, Switzerland's 23% 4k readiness rate was the highest seen, while the lowest levels seen were in Turkey and South Africa, both at 0.8% These two countries were also the only ones within the region to have a 4K readiness rate below 1%.

As this is the initial review of this metric, we are not discussing specific quarterly or yearly changes among the surveyed EMEA countries. However, in looking at the year-over-changes, nearly all were strongly positive. These long-term trends are extremely encouraging, and point to improved adoption of high-speed broadband connectivity across the region over time, and will ultimately drive higher levels of 4K readiness.

Global Rank	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
4	Switzerland	23%	14%	85%
6	Netherlands	22%	-0.9%	75%
7	Sweden	20%	5.6%	49%
8	Norway	18%	24%	85%
9	Finland	18%	29%	116%
10	Czech Republic	17%	-5.6%	75%
11	Denmark	17%	20%	140%
12	United Kingdom	17%	9.2%	112%
14	Belgium	16%	4.2%	131%
18	Ireland	13%	7.3%	109%
20	Austria	12%	5.7%	88%
21	Russia	11%	60%	225%
22	Romania	11%	95%	58%
24	Israel	9.1%	33%	105%
27	Germany	8.0%	20%	78%
28	Poland	7.9%	-5.5%	62%
29	Slovakia	7.6%	23%	62%
30	Hungary	6.7%	22%	118%
32	Spain	6.1%	27%	192%
35	France	4.2%	7.4%	138%
36	Portugal	3.7%	18%	152%
38	Italy	1.6%	2.4%	49%
42	Turkey	0.8%	68%	133%
43	South Africa	0.8%	14%	4.8%
–	United Arab Emirates	0.7%	-11%	-78%

Figure 38: 4K Ready (>15 Mbps) Connectivity by EMEA Country/Region

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. 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.

Historically, the *State of the Internet Report* included data for a selected set of mobile providers that had a minimum of 1,000 unique IP addresses connecting to Akamai during the quarter, where Akamai believed that the entire autonomous system (AS) was mobile. We are now leveraging mobile device identification data to greatly expand the number of networks that are considered to be mobile. However, the number of networks now identified as mobile is significantly larger than could be manageably published within the report. As such, we are now publishing mobile connectivity metrics aggregated at a country/region level. This section also uses the 25,000 unique IP address threshold to qualify countries/regions for inclusion within the section.

8.1 Connection Speeds on Mobile Networks

Figure 39 shows that across the 56 countries around the world that qualified for inclusion in the mobile section, South Korea

Country/Region	Q1'14 Avg. Mbps	Q1'14 Peak Mbps	% Above 4 Mbps
AFRICA			
Egypt	2.0	11.6	2.5%
Morocco	1.8	14.6	1.1%
South Africa	1.7	6.0	4.8%
ASIA			
China	4.8	12.2	57%
Hong Kong	4.9	23.4	42%
India	1.3	8.7	2.7%
Indonesia	2.0	10.8	3.5%
Iran	2.0	5.0	3.9%
Japan	5.7	47.3	61%
Kazakhstan	2.0	7.8	1.7%
Kuwait	3.5	33.1	17%
Malaysia	2.3	19.8	7.6%
Pakistan	1.5	14.7	2.8%
Singapore	3.6	23.2	19%
South Korea	14.7	41.3	78%
Sri Lanka	2.3	23.7	3.6%
Taiwan	3.4	27.8	13%
Thailand	2.0	35.1	4.6%
Vietnam	1.1	6.5	0.1%
EUROPE			
Austria	6.1	32.2	63%
Belgium	3.2	9.2	17%
Croatia	2.2	9.1	1.8%
Czech Republic	4.9	18.6	58%
Denmark	7.0	30.4	84%
France	5.9	34.0	66%
Germany	2.9	14.8	11%
Hungary	2.9	16.6	10%
Ireland	5.1	27.6	40%
Italy	4.6	36.6	47%
Lithuania	3.4	24.4	20%
Moldova	3.8	17.9	26%
Netherlands	3.3	16.0	17%
Norway	4.3	17.9	36%
Poland	3.9	24.7	35%
Romania	3.2	24.5	13%
Russia	6.1	35.1	63%
Slovakia	7.0	37.0	71%
Slovenia	3.5	13.9	26%
Spain	4.8	27.3	46%
Sweden	6.6	34.3	81%
Turkey	2.7	21.1	5.3%
Ukraine	7.3	28.4	89%
United Kingdom	5.6	34.6	53%
NORTH AMERICA			
Canada	6.3	21.5	60%
El Salvador	2.3	12.8	3.4%
United States	5.5	15.1	33%
OCEANIA			
Australia	4.6	114.2	40%
New Zealand	3.0	14.3	25%
SOUTH AMERICA			
Argentina	1.0	6.6	1.6%
Bolivia	1.2	7.1	0.1%
Brazil	1.2	9.3	0.4%
Chile	1.4	11.2	1.4%
Colombia	1.7	9.1	0.2%
Paraguay	1.4	8.5	0.1%
Uruguay	1.6	11.1	3.2%
Venezuela	4.3	19.9	69%

Figure 39: Average and Average Peak Connection Speeds, Broadband (>4 Mbps) Connectivity for Mobile Connections by Country/Region

had the highest average connection speed, at 14.7 Mbps, in line with its position as the country with the highest [fixed] average connection speed. Argentina had the lowest average connection speed, at just 1.0 Mbps. South Korea was the only country with an average connection speed above the 10 Mbps high broadband threshold, but 20 countries/regions had an average connection speed of between 4 Mbps and 10 Mbps. With Argentina's speed the slowest, all of the qualifying countries had average connection speeds above 1 Mbps. Within the individual continental regions, the following countries had the highest average mobile connection speeds:

- **Africa:** Egypt, 2.0 Mbps
- **Asia:** South Korea, 14.7 Mbps
- **Europe:** Ukraine, 7.3 Mbps
- **North America:** Canada, 6.3 Mbps
- **Oceania:** Australia, 4.6 Mbps
- **South America:** Venezuela, 4.3 Mbps

Average peak mobile connection speeds among qualifying countries spanned a rather significant range, from 114.2 Mbps in Australia down to just 5.0 Mbps in Iran. Australia's impressive average peak mobile connection speed is not surprising, given that one of the providers in the country achieved an average peak speed of over 130 Mbps in the fourth quarter of 2013, thanks to an initial rollout of "LTE Advanced" technology. Australia's average peak speed was more than twice as fast as the next highest, which was seen in Japan (47.3 Mbps). In total, 43 countries had average peak connection speeds above 10 Mbps. Within the individual continental regions, the following countries had the highest average peak mobile connection speeds:

- **Africa:** Morocco, 14.6 Mbps
- **Asia:** Japan, 47.3 Mbps
- **Europe**: Slovakia, 37 Mbps
- **North America:** Canada, 21.5 Mbps
- **Oceania:** Australia, 114.2 Mbps
- **South America:** Chile: 11.2 Mbps

We also thought it would be interesting to track "broadband" level mobile connectivity — that is, mobile connection speeds above 4 Mbps. As such, we are now including a broadband adoption statistic within the Mobile Connectivity section of the *State of the Internet Report*. As shown in Figure 39, Ukraine had the highest level of mobile broadband adoption, with 89% of mobile connections to Akamai from the country at speeds above 4 Mbps. At the lower end, there were three countries (Vietnam, Paraguay, and Bolivia) that had adoption rates of just 0.1% in the first quarter. Across the whole set of qualifying countries, four had mobile broadband adoption rates above 75%, another nine above 50%, eleven more above 25%, and nine additional above 10%. Within the individual continental regions, the following countries had the highest mobile broadband adoption rates:

- **Africa:** South Africa, 4.8%
- **Asia:** South Korea, 78%
- **Europe:** Ukraine, 89%
- **North America:** Canada, 60%
- **Oceania:** Australia, 40%
- **South America:** Venezuela, 69%

8.2 Mobile Browser Usage Data

In June 2012, Akamai launched the "Akamai IO" destination site *(http://www.akamai.com/io)*, with an initial data set that highlighted browser usage across PCs and other connected devices, connecting via fixed and mobile networks. The data and graphs below are derived from Akamai IO.

Figure 40 illustrates mobile browser usage by users identified to be on cellular networks in the first quarter of 2014.[37] As in prior issues of this report, the figure focuses on the usage of Android Webkit and Apple Mobile Safari, with other browsers designated as "Others" in the graph. As the graph shows, a gap of approximately 7-8% once again separated Android Webkit and Apple Mobile Safari throughout the quarter, with the difference remaining fairly consistent over this period. Overall, Android Webkit trended to an average of 36.6% of requests throughout the quarter (up slightly quarter over quarter), while Apple Mobile Safari saw 28.5% of requests (down slightly quarter-over-quarter).[38] Other top mobile browsers connecting to Akamai from cellular networks in the first quarter included Opera Mini, Microsoft Internet Explorer Mobile, Google's Chrome Mobile, the Blackberry browser, and Openwave Mobile Browser, among others.[39]

Expanding the data set to all networks[40] (not just those defined as cellular), we see a gap of approximately 15% between Apple Mobile Safari and Android Webkit at the start of the quarter that gradually narrows to approximately 10% by the end of the quarter, as shown in Figure 41. Usage across "Other" mobile browsers remained relatively consistent across the quarter, though it did decline slightly throughout March. Averaged across the entire quarter, Apple Mobile Safari accounted for 46.8% of requests (down slightly from last quarter), while Android Webkit accounted for 35.1% of requests (up nearly 10% from last quarter).[41]

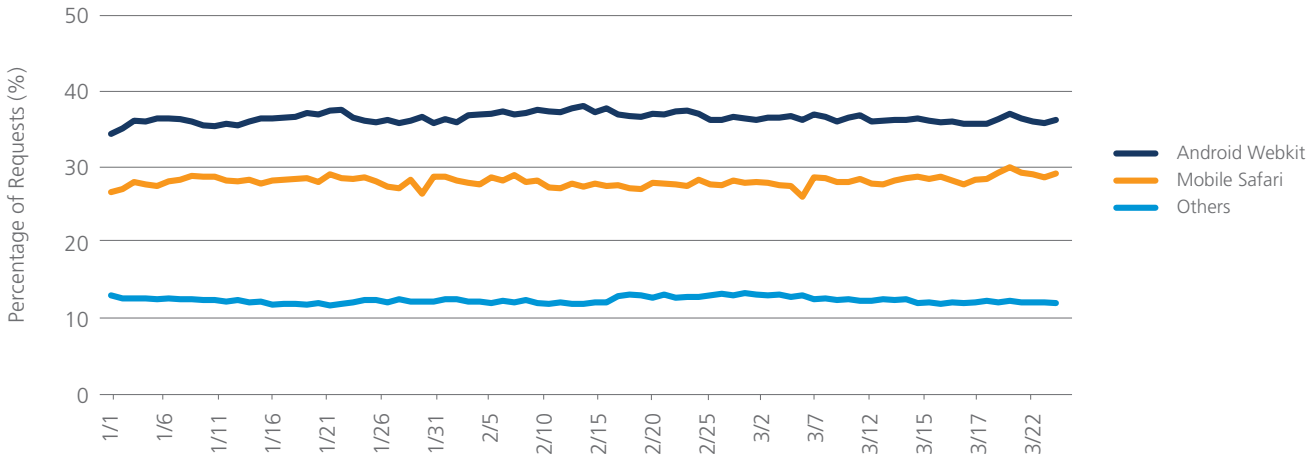


Figure 40: Leading Mobile Browsers Seen Across Cellular Networks, Q1 2014

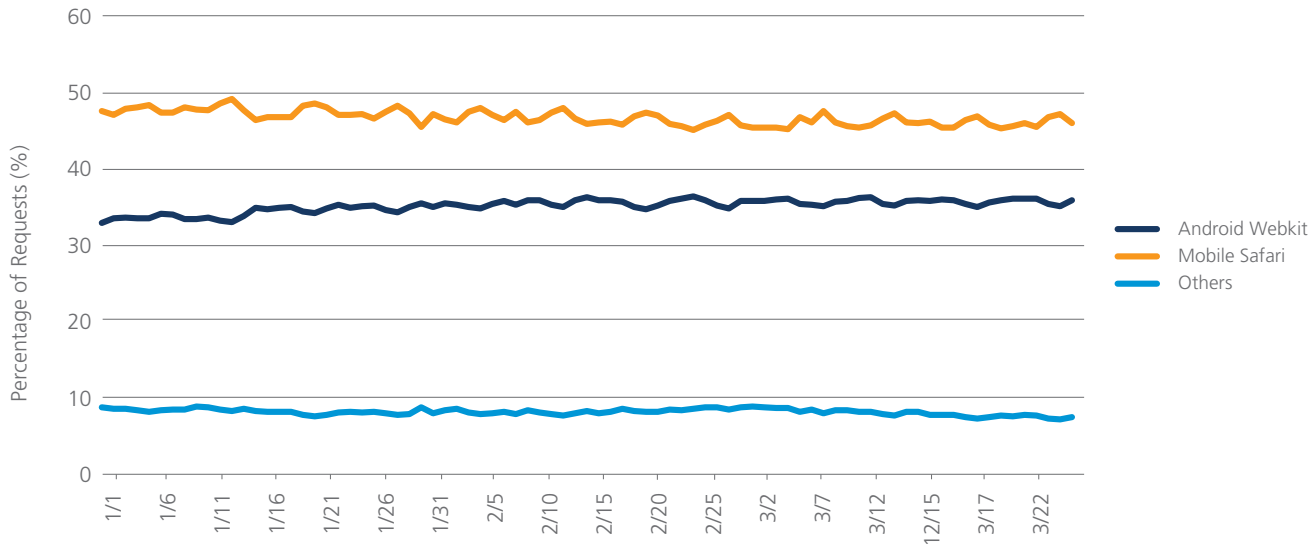


Figure 41: Leading Mobile Browsers Seen Across All Networks, Q1 2014

8.3 Mobile Traffic Growth Observed by Ericsson

In mobile networks, the access medium (spectrum) is being shared by different users in the same cell. It is important to understand traffic volumes and usage patterns in order to enable a good customer experience. Ericsson's presence in more than 180 countries and its customer base representing more than 1,000 networks enable it to measure mobile voice and data volumes. The result is a representative base for calculating world total mobile traffic in 2G, 3G, and 4G networks (not including DVB-H, Wi-Fi, and Mobile WiMAX).

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

Figure 42 shows total global monthly data and voice traffic. It depicts a strong increase in data traffic growth but flat voice traffic development. The number of mobile data subscriptions has been increasing rapidly, driving growth in data traffic along with a continuous increase in the average data volume per subscription. Data traffic grew around 15% between fourth quarter of 2013 and the first quarter of 2014.

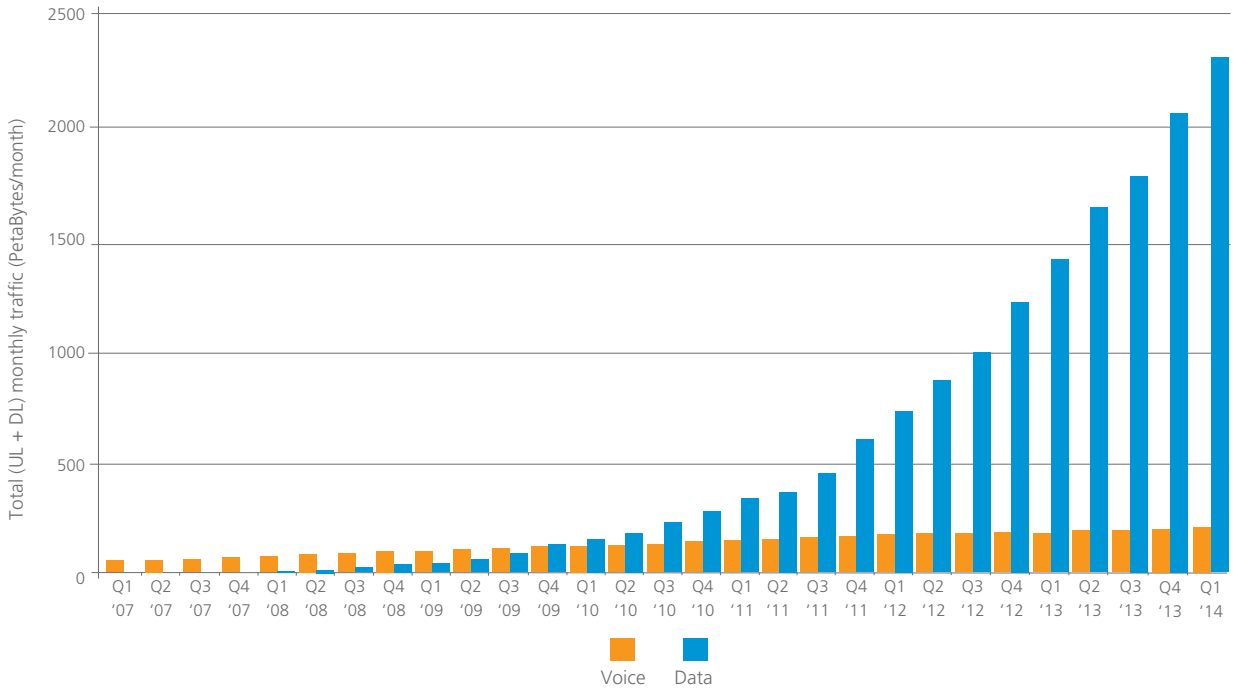


Figure 42: Total Monthly Mobile Voice and Data as Measured by Ericsson

Situational Performance

In June 2013, Akamai announced[42] the latest release of Aqua Ion, a solution designed to meet the unique challenges of optimizing both the desktop and mobile Web experience. One component of Aqua Ion is a capability known as Real User Monitoring (RUM), which takes passive performance measurements from actual users of a Web experience to provide insight into performance across devices and networks. RUM is a complementary capability to synthetic testing, and the two can and should be used to gain a comprehensive picture of user experience.

Note that there are a few different RUM measurement methodologies. The first is using what is known as "navigation timing"[43] ("navtiming"), which allows JavaScript to collect page load time component information directly from the user agent (browser) through an API. The second is to use a framework for timing Web pages, like Web Episodes,[44] which leverages JavaScript events such as "onload." While navtiming is the preferred methodology for collecting RUM measurements, note that not every user agent supports it at this time.[45] One key observation is the current lack of support in Apple's Safari browser, both on OSX and iOS. In addition, Android first added support starting with v4.0 of the operating system, and Microsoft's Internet Explorer in v9 of the browser.

Figure 43 shows average page load times for users on both broadband and mobile connections, based on RUM data collected by Akamai during the first quarter of 2014. The underlying data was collected with navtiming; therefore, as noted above, it does not include measurements from users of Safari on iOS devices or OSX systems, users on older versions of Android, or users on older versions of Internet Explorer. The countries included within the table were selected based on several criteria, including the availability of measurements from users on networks identified as broadband as well as networks identified as mobile, and more than 90,000 measurements (1,000 per day, on average) from mobile networks having been made across the quarter. Note that these criteria are subject to change in the future as we expand the scope of RUM measurements included within the *State of the Internet Report*.

In reviewing the average page load time measurements shown in Figure 43, we find the lowest values for broadband connections in Japan, Hong Kong, and Sweden—they were on the order of 2.5–3x lower than the load times seen in Indonesia and Brazil, which had the highest average page load times for broadband connections. As Japan, Hong Kong, and Sweden have historically ranked fairly high for average connection speeds, it is not surprising that these countries/regions have the lowest average page load times on broadband connections. Ukraine and Japan had the lowest average page load times for mobile connections, which is in line with the observations and data presented in Section 8.1. The load times in these two countries were on the order of 3.5x faster than that seen in Brazil, and 5.5–6x faster than that seen in Canada, which surprisingly had the highest average page load times on mobile connections, especially given the data presented in Figure 39.

Region	Country/ Region	Avg. Page Load Time Broadband (ms)	Avg. Page Load Time Mobile (ms)	Mobile Penalty
Asia Pacific	Australia	4207	4510	1.1x
Asia Pacific	China	4825	5516	1.1x
Asia Pacific	Hong Kong	1994	5637	2.8x
Asia Pacific	India	5563	7987	1.4x
Asia Pacific	Indonesia	5945	6701	1.1x
Asia Pacific	Japan	1810	3325	1.8x
Asia Pacific	Malaysia	5269	6414	1.2x
Asia Pacific	Singapore	3995	5837	1.5x
Asia Pacific	Taiwan	2813	3684	1.3x
Asia Pacific	Thailand	4129	4749	1.2x
EMEA	Austria	2618	4214	1.6x
EMEA	France	4351	4394	1.0x
EMEA	Germany	3185	4788	1.5x
EMEA	Ireland	4202	7118	1.7x
EMEA	Italy	4036	4628	1.1x
EMEA	Kuwait	5114	5232	1.0x
EMEA	Poland	3075	3660	1.2x
EMEA	Spain	3990	5182	1.3x
EMEA	Sweden	2325	3730	1.6x
EMEA	Ukraine	3252	3182	1.0x
EMEA	U.K.	5164	8149	1.6x
North America	Canada	3032	18456	6.1x
North America	U.S.	3758	4845	1.3x
South America	Argentina	4011	7497	1.9x
South America	Brazil	6610	11200	1.7x
South America	Colombia	3753	6674	1.8x

Figure 43: Average Page Load Times Based on Real User Monitoring

In comparing the average broadband page load times to those observed on mobile, we find a broad variance in what we've dubbed the "mobile penalty" — that is, how much slower does a page load for mobile users than for users on a broadband connection? In Ukraine, France, and Kuwait, load times were nearly equivalent, with the mobile experience in Ukraine just slightly faster than that of a broadband user. China's mobile experience was previously equivalent with that of broadband, but slipped slightly in the first quarter to a mobile penalty of 1.1x. All but two of the surveyed countries/regions had a mobile penalty less than 2.0x — the outliers were Hong Kong, where mobile load times were 2.8x those seen on broadband connections, and Canada, where the differential was 6.1x.

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

10.1 Syria

Consistent with previous quarters, Syria experienced a number of multi-hour disruptions to its Internet connectivity during the first quarter of 2014. On January 13, a near complete disruption of Internet services to the country took place, starting at 1:05 PM UTC and lasting approximately 1 hour and 15 minutes, as shown in Figure 44. A Tweet posted[46] by Internet monitoring firm BGPmon noted "Only Syrian networks still reachable are 7 prefixes via AS24814 (Syria Computer Society), connected via Turk Telecom AS2481" — as a few networks were still reachable, this is likely why Akamai traffic to the region did not drop completely to zero during the outage. Another brief disruption also apparently occurred just after 9:00 PM UTC, based on the drop evident in Figure 44.

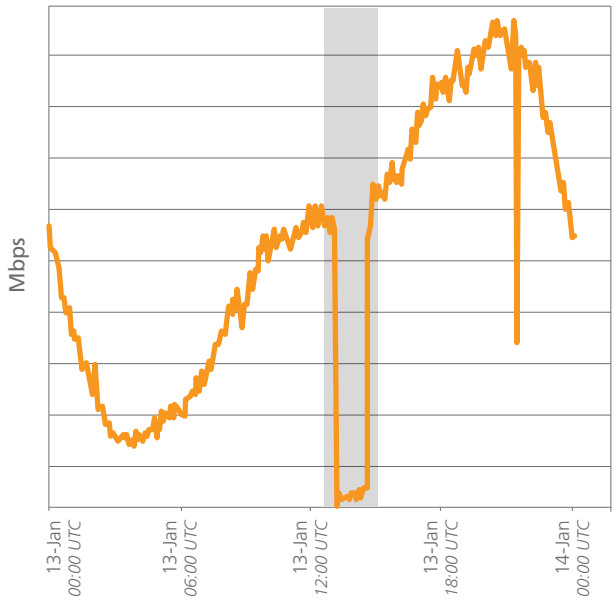


Figure 44: Akamai Traffic Served to Syria, January 13, 2014

On February 20, two Internet disruptions occurred, as shown in Figure 45. The first started at 12:38 PM UTC and only lasted for a few minutes. However, a second longer disruption started approximately an hour later and lasted until approximately 2:30 PM UTC. Again, it appears the networks reachable via AS24814 remained available during the disruption.

The third major disruption of the quarter in Syria took place on March 20, as illustrated in Figure 46. Akamai detected a significant drop in traffic to the country starting at approximately 12:30 PM UTC. Traffic returned to normal levels just after 7:00 PM UTC, after briefly dropping to zero at approximately 2:30 PM UTC. A published report[47] indicated that the Internet disruption was due to a "breakdown in the optical fiber cable" in the Damascus countryside. Internet monitoring firm Renesys observed that a day later, the Internet connection from the Syrian city of Aleppo to Turkey was down for over two hours.[48]

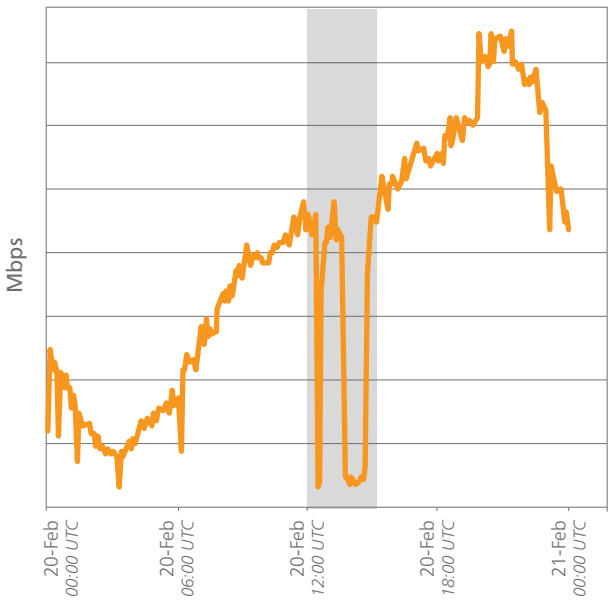


Figure 45: Akamai Traffic Served to Syria, February 20, 2014

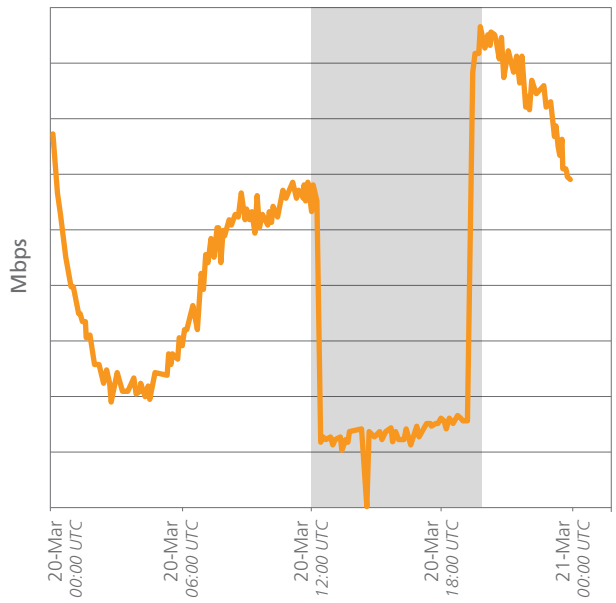


Figure 46: Akamai Traffic Served to Syria, March 20, 2014

10.2 Uzbekistan

During the morning of January 16, Internet connectivity in Uzbekistan saw several brief disruptions, as shown in Figure 47. The first was a brief near complete outage that occurred between 7:00 and 8:00 AM UTC. Just after 8:00 AM UTC, Akamai traffic to the country dropped significantly, recovered, and then disappeared completely, returning just after 9:00 AM UTC, nearly an hour after the initial drop occurred. A similar pattern occurred approximately an hour later. Internet monitoring firm Renesys also observed[49] multiple Internet disruptions within the country during the morning of January 16.

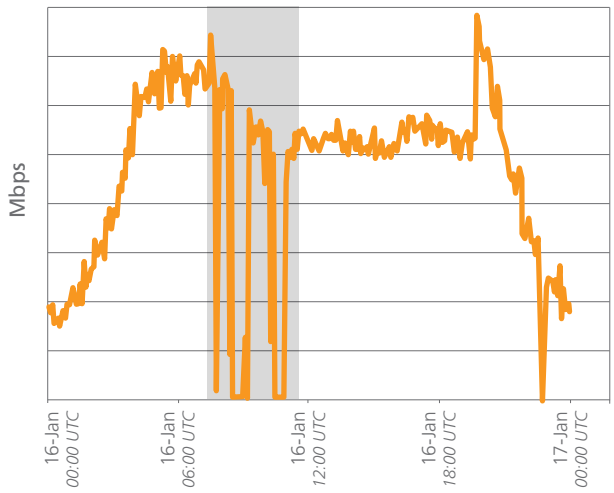


Figure 47: Akamai Traffic Served to Uzbekistan, January 16, 2014

10.3 Sierra Leone

According to published reports,[50,51] just before the end of 2013, three (AFCOM, Limeline, AFRICELL) of Sierra Leone's nine Internet service providers had their services deactivated by Sierra Leone Cable Limited (SALCAB), which manages the country's connection to the Africa Coast to Europe (ACE) submarine cable system. It was reported that these three firms owed SALCAB money for use of its services. As Figure 48 shows, Akamai traffic to Sierra Leone declined significantly starting just after 1:00 PM UTC on December 31. Traffic volumes remained lower until the morning of January 6, though the traffic continued to exhibit regular, if smaller, diurnal patterns during the nearly six day disruption. As shown in the graph, traffic levels appeared to make a full recovery on January 6, with levels trending slightly higher than normal during the following days.

10.4 Iraq

On the morning of March 22 , it was reported that a double bombing in the Iraqi city of Tikrit killed at seven people.[52] While it is unclear if there is any direct relationship, later that day, Internet connectivity in Iraq saw a disruption that lasted over two hours. As Figure 49 shows, Akamai traffic to Iraq saw a sharp decline at approximately 3:15 PM UTC and remained lower than normal until about 5:30 PM UTC. A brief drop in traffic occurred again between 6:00 and 7:00 PM UTC, but then returned to its normal pattern immediately thereafter.

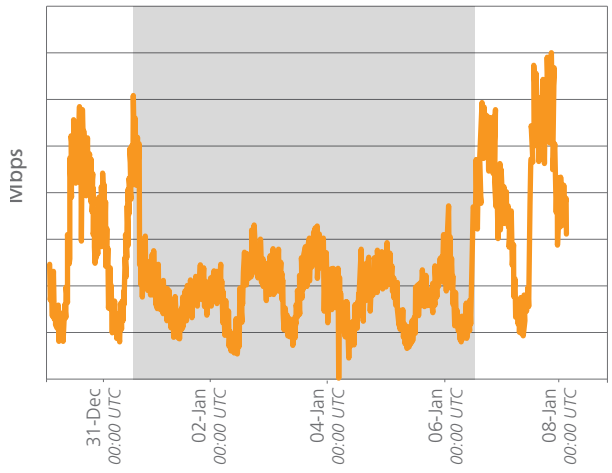


Figure 48: Akamai Traffic Served to Sierra Leone, December 30, 2013 to January 9, 2014

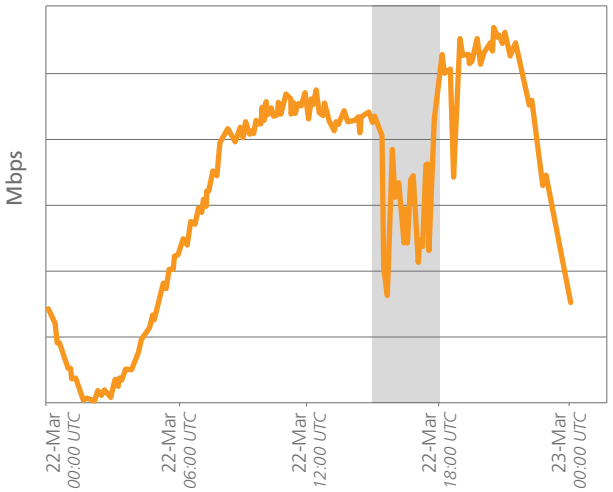


Figure 49: Akamai Traffic Served to Iraq, March 22, 2014

Region	% Attack Traffic	Unique IPv4 Addresses	Avg. Connection Speed (Mbps)	Peak Connection Speed (Mbps)	% Above 10 Mbps	% Above 4 Mbps	% Above 15 Mbps
AMERICAS							
Argentina	0.8%	7,372,074	3.2	18.8	2.0%	26%	0.4%
Bolivia	<0.1%	416,484	0.9	8.4	0.1%	0.7%	–
Brazil	3.2%	41,298,964	2.6	17.9	1.0%	21%	0.3%
Canada	0.5%	14,156,635	9.7	39.7	32%	82%	13%
Chile	0.3%	4,403,839	3.3	20.9	1.1%	25%	0.3%
Colombia	1.4%	9,986,212	3.0	16.8	0.4%	17%	0.1%
Costa Rica	0.1%	466,586	2.0	10.1	0.5%	4.0%	0.3%
Ecuador	0.2%	847,388	3.3	19.0	1.4%	23%	0.4%
Mexico	1.4%	12,308,233	4.0	19.3	2.2%	33%	0.7%
Panama	0.2%	502,706	2.6	12.5	0.5%	12%	0.1%
Paraguay	<0.1%	741,794	1.2	9.0	<0.1%	0.5%	–
Peru	0.1%	1,176,012	2.7	17.1	0.3%	7.9%	0.1%
United States	11%	162,676,451	10.5	40.6	36%	73%	17%
Uruguay	0.1%	1,112,243	4.3	45.4	4.5%	34%	1.9%
Venezuela	1.3%	3,894,506	1.3	7.9	0.1%	1.0%	–
ASIA PACIFIC							
Australia	0.2%	9,062,511	6.0	31.6	11%	55%	4.4%
China	41%	123,526,069	3.2	13.6	1.2%	25%	0.2%
Hong Kong	1.1%	3,100,714	13.3	66.0	43%	84%	26%
India	2.6%	18,075,494	1.7	12.0	0.7%	4.9%	0.3%
Indonesia	6.8%	7,760,546	2.4	19.4	0.3%	6.6%	0.1%
Japan	0.6%	40,042,679	14.6	55.6	54%	86%	32%
Malaysia	0.9%	2,038,875	3.5	27.9	2.6%	33%	0.6%
New Zealand	<0.1%	2,132,600	5.6	24.3	7.4%	60%	2.3%
Philippines	0.2%	1,309,301	2.1	18.8	0.0%	4.2%	0.1%
Singapore	0.3%	1,767,290	8.4	57.7	21%	73%	8.4%
South Korea	1.6%	20,987,274	23.6	68.5	77%	94%	60%
Taiwan	3.4%	10,949,391	8.9	52.6	26%	71%	14%
Thailand	1.3%	3,528,305	5.2	34.4	4.1%	61%	1.2%
Vietnam	0.6%	5,743,296	2.0	12.3	0.1%	4%	–
EUROPE, MIDDLE EAST & AFRICA							
Austria	<0.1%	2,861,982	9.4	36.0	24%	83%	12%
Belgium	0.1%	4,914,322	10.0	44.6	35%	80%	16%
Czech Republic	0.3%	1,901,734	11.2	38.8	34%	83%	17%
Denmark	0.1%	2,947,905	10.5	35.5	35%	87%	17%
Finland	<0.1%	2,815,032	10.7	36.5	34%	75%	18%
France	0.7%	28,451,546	6.6	25.8	12%	68%	4.2%
Germany	0.9%	37,176,442	8.1	35.4	21%	76%	8.0%
Hungary	0.7%	2,951,646	7.5	37.6	18%	74%	6.7%
Ireland	0.1%	1,938,670	10.7	38.7	26%	65%	13%
Israel	0.5%	2,482,872	8.9	57.6	25%	85%	9.1%
Italy	0.9%	20,021,068	5.2	21.4	4.3%	58%	1.6%
Netherlands	0.6%	9,223,366	12.4	45.2	44%	88%	22%
Norway	<0.1%	3,851,419	10.1	35.7	30%	62%	18%
Poland	0.7%	8,985,038	7.5	32.8	18%	73%	7.9%
Portugal	0.2%	3,568,706	6.4	36.7	12%	70%	3.7%
Romania	1.6%	3,143,611	9.3	54.4	31%	87%	11%
Russia	2.9%	18,752,316	8.6	41.3	27%	77%	11%
Slovakia	0.1%	1,073,253	7.3	32.1	15%	66%	7.6%
South Africa	0.1%	5,465,719	2.6	10.0	1.4%	8.2%	0.8%
Spain	0.6%	14,476,395	7.2	32.2	16%	74%	6.1%
Sweden	0.2%	6,862,418	11.6	42.7	34%	80%	20%
Switzerland	0.1%	3,677,680	12.7	44.8	45%	91%	23%
Turkey	1.7%	9,999,114	5.0	26.6	3.2%	61%	0.8%
United Arab Emirates	0.2%	1,513,455	4.3	32.4	3.1%	44%	0.7%
United Kingdom	0.7%	28,509,857	9.9	42.2	32%	80%	17%

SECTION 12:
Endnotes

[1] https://isc.sans.edu/port.html?startdate=2014-01-01&enddate=2014-03-31&port=5000&yname=sources&y2name=targets
[2] https://isc.sans.edu/diary/More+Device+Malware%3A+This+is+why+your+DVR+attacked+my+Synology+Disk+Station+%28and+now+with+Bitcoin+Miner!%29/17879
[3] http://www.us-cert.gov/ncas/alerts/TA14-017A
[4] http://www.akamai.com/dl/akamai/Akamai-Security-Advisory-NTP-Reflection-Attacks.pdf
[5] http://venturebeat.com/2013/07/27/19-percent-of-the-web-runs-on-wordpress/
[6] https://twitter.com/IPv4Countdown/status/445899963315539968
[7] http://www.potaroo.net/tools/ipv4/
[8] https://www.apnic.net/publications/research-and-insights/geoff-huston
[9] http://www.tcpiputils.com/browse/ip-address/151.216.128.0
[10] http://en.wikipedia.org/wiki/The_Gathering_%28computer_party%29
[11] http://whois.domaintools.com/104.0.0.0
[12] http://whois.domaintools.com/104.16.0.0
[13] http://whois.domaintools.com/154.96.0.0
[14] http://whois.domaintools.com/105.64.0.0
[15] http://en.wikipedia.org/wiki/Inwi
[16] http://whois.domaintools.com/105.48.0.0
[17] http://whois.domaintools.com/197.88.0.0
[18] http://whois.domaintools.com/105.32.0.0
[19] http://whois.domaintools.com/191.12.0.0, http://whois.domaintools.com/191.16.0.0, http://whois.domaintools.com/191.20.0.0, http://whois.domaintools.com/191.24.0.0, http://whois.domaintools.com/191.28.0.0
[20] http://whois.domaintools.com/191.120.0.0, http://whois.domaintools.com/191.128.0.0
[21] https://labs.ripe.net/Members/emileaben/hampered-eyeballs
[22] http://www.worldipv6launch.org/measurements/
[23] http://www.worldipv6launch.org/monthly-ipv6-measurements-belgiums-telenet-joins-the-ipv6-club/
[24] http://www.cnet.com/uk/news/what-is-4k-uhd-next-generation-resolution-explained/
[25] http://en.wikipedia.org/wiki/H.264/MPEG-4_AVC
[26] http://en.wikipedia.org/wiki/High_Efficiency_Video_Coding
[27] http://gigaom.com/2014/01/30/the-google-fiber-effect-kansas-legislature-writes-a-bill-to-stop-muni-broadband/
[28] http://arstechnica.com/tech-policy/2014/01/cable-lobby-will-tweak-bill-banning-municipal-broadband-in-kansas/
[29] http://kslegislature.org/li/b2013_14/measures/sb304/
[30] http://arstechnica.com/tech-policy/2014/02/utah-bill-would-stop-regional-fiber-networks-from-expanding/
[31] http://arstechnica.com/business/2014/02/google-fiber-chooses-nine-metro-areas-for-possible-expansion/
[32] http://www.telegeography.com/products/commsupdate/articles/2014/02/04/antel-ftth-network-passes-717000-homes/
[33] http://www.theregister.co.uk/2014/03/11/indonesia_plans_10_gbps_broadband_sprint/
[34] http://ec.europa.eu/digital-agenda/en
[35] http://www.slideshare.net/Palazzo_Chigi/achieving-the-objectives-of-the-digital-agenda-for-europe-dae-in-italy-prospects-and-challenges
[36] http://www.zdnet.com/should-italians-really-be-cautiously-optimistic-about-the-state-of-their-superfast-broadband-7000025832/
[37] http://www.akamai.com/html/io/io_dataset.html#stat=mobile_browser&top=5&type=line&start=20140101&end=20140331&net=m&hide=opera%20mini+docomo+opera%20tablet
[38] http://www.akamai.com/html/io/io_dataset.html#stat=mobile_browser&top=5&type=pie&start=20140101&end=20140331&net=m
[39] http://www.akamai.com/html/io/io_dataset.html#stat=mobile_browser&top=15&type=pie&start=20140101&end=20140331&net=m
[40] http://www.akamai.com/html/io/io_dataset.html#stat=mobile_browser&top=5&type=line&start=20140101&end=20140331&net=both&hide=ucweb+opera%20mini+chrome%20mobile
[41] http://www.akamai.com/html/io/io_dataset.html#stat=mobile_browser&top=5&type=pie&start=20140101&end=20140331&net=both
[42] http://www.akamai.com/html/about/press/releases/2013/press_061113.html
[43] http://www.w3.org/TR/navigation-timing/
[44] http://stevesouders.com/episodes/
[45] http://caniuse.com/nav-timing
[46] https://twitter.com/bgpmon/statuses/422734582866141184
[47] http://sana.sy/eng/21/2014/03/20/534371.htm
[48] https://twitter.com/renesys/status/447011332353585153/photo/1
[49] https://twitter.com/renesys/status/423790827802861568/photo/1
[50] http://www.telegeography.com/products/commsupdate/articles/2014/01/10/face-off-operators-government-clash-over-submarine-cable-access/
[51] http://politicosl.com/2014/01/sierra-leone-deactivates-3-isps/
[52] http://www.aljazeera.com/news/middleeast/2014/03/deadly-double-bombing-rocks-iraq-tikrit-201432293320675914.html

We're social, **follow us**

@Akamai

facebook.com/AkamaiTechnologies

linkedin.com/company/Akamai-Technologies

youtube.com/AkamaiTechnologies

blogs.akamai.com

pinterest.com/AkamaiTech

slideshare.net/AkamaiTechnologies

Akamai
FASTER FORWARD

Editor
David Belson

Design
Brendan O'Hara, Art Direction
Carolynn DeCillo, Graphic Design

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

Contributors
Jon Thompson
Martin McKeay
Bill Brenner
Richard Möller (Ericsson)
Mathias Sintorn (Ericsson)
Geoff Huston (APNIC)

Akamai® is a leading provider of cloud services for delivering, optimizing and securing online content and business applications. At the core of the company's solutions is the Akamai Intelligent Platform™ providing extensive reach, coupled with unmatched reliability, security, visibility and expertise. Akamai removes the complexities of connecting the increasingly mobile world, supporting 24/7 consumer demand, and enabling enterprises to securely leverage the cloud. To learn more about how Akamai is accelerating the pace of innovation in a hyperconnected world, please visit www.akamai.com or blogs.akamai.com, and follow @Akamai on Twitter.

Akamai is headquartered in Cambridge, Massachusetts in the United States with operations in more than 40 offices around the world. Our services and renowned customer care enable businesses to provide an unparalleled Internet experience for their customers worldwide. Addresses, phone numbers and contact information for all locations are listed on www.akamai.com/locations.