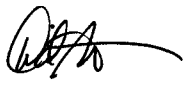
akamai's [state of the internet]

If you're reading this issue of *the State of the Internet Report* as a PDF, or in printed/bound form, you'll notice that it looks very different than it has in the past. Akamai's Creative & Brand Development group has redesigned the report to be more legible, user-friendly and reflect the modern, forward-thinking look of Akamai's evolving brand visuals. We're very proud of how the report has evolved over time, and think that this redesign reinforces the value and importance of the data contained within it.

In addition to the report redesign, we're also excited about an associated Web site that we are launching in October. The dedicated *State of the Internet* Web site, to be located at *www.stateoftheinternet.com*, is intended to provide a permanent home for the quarterly *State of the Internet Report*, as well as future derivatives, such as the upcoming security-focused report. The site is designed to be fully responsive, consumable on both desktop and mobile devices, with a user interface design that is clearly associated with the report. It will include assets associated with the quarterly report, including report downloads, infographics, data visualizations, and eventually data set downloads as well. In addition, it will include content, visualizations, and data previously found on *www.prolexic.com*, including PLXsert reports and threat advisories. Over time, we plan to include additional analysis and commentary on relevant topics and trends through blog posts, podcasts, and other interactive features. Ultimately, Akamai is part of a community that wants to make the Internet fast, reliable and secure for all, and with this dedicated Web site, we will share relevant data and trends, with insight into why you should care (and take action if necessary). Expect a formal launch announcement later in October.

Finally, as a further complement to the redesigned report and the new Web site, we are launching an Android-friendly version of the *State of the Internet* application that was launched for Apple iOS devices back in January 2014. Similar to the iOS application, the Android version of the application will allow users to read both current and archived versions of the *State of the Internet Report*, visualize data from key report metrics, and read the latest content shared by @akamai_soti on Twitter. Look for the Android-friendly version of the *State of the Internet* application in the Google Play app store in October.

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



—David Belson

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

This quarter's report includes data gathered from across the Akamai Intelligent Platform during the second quarter of 2014, covering attack traffic and Internet connection speeds/broadband adoption across both fixed and mobile networks, as well as trends seen in this data over time. In addition, this quarter's report includes insight into the OpenSSL "Heartbleed" vulnerability, SNMP Reflection Attacks, Storm and Zeus crimeware, 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 second quarter of 2014, Akamai observed attack traffic originating from source IP addresses in 161 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, growing to 43% of observed attack traffic. Indonesia saw a significant increase in observed attack traffic, more than doubling to 15%, while the United States increased nominally to 13%. Overall attack traffic concentration across the top 10 countries/regions increased from the first quarter of 2014, growing to 84% of observed attacks. Attack volume targeting Port 80 nearly doubled from the first quarter to 15%, placing it as the most targeted port in the second quarter, pushing Port 445 out of the top slot for only the third time in the history of the report. During the second quarter, Akamai customers reported being targeted by 270 DDoS attacks, 5% fewer than in the prior quarter, and 15% fewer than in the second quarter of 2013. Enterprise and Commerce customers together accounted for nearly 60% of the reported attacks during the quarter, with more than half of the total attacks reported by customers in the Americas region. In addition, the second quarter saw growth in Simple Network Management Protocol (SNMP) reflection attacks, the spread of "Storm" and "Zeus" crimeware kits, and the discovery of a flaw known as "Heartbleed" in the widely-used OpenSSL code base.

Internet and Broadband Adoption / In the second quarter, Akamai observed a 0.9% decrease in the number of unique IPv4 addresses connecting to the Akamai Intelligent Platform, falling to over 788 million, or about seven million fewer than were seen in the first quarter of 2014. Looking at connection speeds, the global average connection speed grew 21% to 4.6 Mbps and the global average peak connection speed grew 20%, reaching 25.4 Mbps. At a country/region level, South Korea continued to have the highest average connection speed at 24.6 Mbps but Hong Kong had the highest average peak connection speed at 73.9 Mbps. Globally, high broadband (>10 Mbps) adoption grew 12% to reach 23%, and South Korea remained the country with the highest level of high broadband adoption, at 78%. Global broadband (>4 Mbps) adoption grew 5.6% quarter-over-quarter to 59%, and South Korea's broadband adoption rate inched up to 95% in the second quarter. "4K-ready" (>15 Mbps) connections grew to 12% on a global basis, and in top country South Korea, 62% of connections were at those speeds.

Mobile Connectivity / In the second quarter of 2014, average mobile connection speeds (aggregated at a country level) ranged from a high of 15.2 Mbps in South Korea down to a low of 0.9 Mbps in Vietnam. Average peak mobile connection speeds ranged from 108 Mbps in Australia down to 4.7 Mbps in Vietnam. Denmark had 92% of its mobile connections to Akamai at speeds above the 4 Mbps "broadband" threshold, while five countries had less than 1% of connections at those speeds. Based on traffic data collected by Ericsson, the volume of mobile data traffic grew approximately 10% between the first and second quarters of 2014.

Analysis of Akamai IO data collected during the second quarter from a sample of requests to the Akamai Intelligent Platform indicates that for traffic from mobile devices on cellular networks, Apple Mobile Safari accounted for approximately 36% of requests, with Android Webkit trailing at nearly 33%. For traffic from mobile devices on all networks, Apple Mobile Safari was responsible for nearly 49% of requests, while Android Webkit drove nearly 32%.

[SECTION][1] SECURITY

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 second 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 Heartbleed, SNMP Reflection Attacks, and Storm/Zeus Crimeware. Within this report, all representations denote 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 Ports / During the second quarter of 2014, Akamai observed attack traffic originating from 161 unique countries/regions, down from 194 in the first quarter. As shown in Figure 1, China once again remained squarely ahead of the other countries/regions in the top 10, originating 43% of observed attacks, or nearly 3x as much as Indonesia, which saw observed attack volume more than double quarter-over-quarter. The United States was the only other entrant among the top 10 that originated more than 10% of observed attack traffic, growing slightly to 13% in the second quarter. Among the remaining members of the list, only Taiwan saw a quarterly increase, while the other six had lower observed attack volumes as compared to the prior quarter. The composition of the top 10 list remained consistent between the first and second quarters. The overall concentration of observed attack traffic increased in the second quarter, with the top 10 countries/regions originating 84% of observed attacks, up from 75% in the first quarter.

Likely related to the percentage increases seen in China and Indonesia, observed attack traffic concentration from the Asia Pacific region saw further growth in the second quarter of 2014, reaching 70%. This is 5x the concentration seen in North America, which originated 14% of observed attacks. Europe had the next lowest concentration of attacks, at 11%, while the lowest attack volumes came from countries/regions in South America and Africa, contributing 4.3% and 0.3% respectively. Though minimal at under 1%, Africa's percentage was half that seen in the first quarter.

1.2 Attack Traffic, Top Ports / As shown in Figure 2, attack traffic targeting Port 80 (WWW/HTTP) nearly doubled from the first quarter, growing to 15%, and pushing Port 445 (Microsoft-DS) down to second place. This marks only the third time that Port 445 has not held the top slot, and it is interesting to note that this same shift also occurred in the second quarter of 2013. However, unlike last year, the attack traffic percentage targeting Port 445 remained consistent quarter-over-quarter, and it was the only port among the top 10 that did not see an increase as compared to the prior quarter. To that end, attack traffic concentration across the top 10 targeted ports was up significantly on a quarterly basis, as they attracted 71% of observed attacks, compared to just 55% last quarter.

Although it was the most targeted port in the second quarter, Port 80 was not the most targeted port among any of the top 10 countries/regions. It was, however, the second-most targeted port among three of the top four countries/regions by a significant margin as compared to the remaining ports. Half of the top 10 countries/regions saw the largest number of observed attacks targeting Port 445, while Port 23 was the most popular in China, South Korea, and Turkey, indicating ongoing efforts to identify open Telnet ports, where brute force or default logins are often leveraged in an attempt to gain access to, and control of, vulnerable target systems. The remaining two countries of the top 10, Indonesia and the United States, saw the largest number of attacks targeting Port 443 and Port 1433 respectively, indicating ongoing attempts to locate and compromise vulnerable Web-based applications and associated databases.

1.3 Observations on DDoS Attacks / For the second quarter in a row, Akamai customers reported fewer DDoS attacks, dropping from 346 attacks in the fourth quarter of 2013 and 283 in the first quarter of 2014 to 270 attacks in the second quarter, as illustrated in Figure 3. This represents a 5% drop from the previous quarter and a 15% year-over-year decline. This reduction in attacks mirrors the attack trends reported in the *Prolexic Q2 Global DDoS Attack Report*, which reports that volumetric attacks have continued to increase in numbers and volume while application attacks (Layer 7) have declined.

Figure 4 shows that, while the overall number of attacks reported to Akamai by customers in the second quarter were down, attacks in the Americas were up, increasing 11% from 139 to 154 attacks and accounting for 57% of all reported attacks. The Asia Pacific (APAC) region saw the largest decline in attacks, from a high of 87 attacks in the first quarter to 67 in the second, a 23% reduction. The region accounted for 25% of worldwide attacks. The Europe/Middle East/Africa (EMEA) region also experienced a modest decline of 14%, with

	Country/Region	Q2 '14 Traffic %	Q1 '14 %
1	China	43%	41%
2	Indonesia	15%	6.8%
3	United States	13%	11%
4	Taiwan	3.7%	3.4%
5	India	2.1%	2.6%
6	Russia	2.0%	2.9%
7	Brazil	1.7%	3.2%
8	South Korea	1.4%	1.6%
9	Turkey	1.2%	1.7%
10	Romania	1.2%	1.6%
–	Other	16%	25%

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

Port	Country/Region	Q2 '14 Traffic %	Q1 '14 %
80	WWW (HTTP)	15%	8.0%
445	Microsoft-DS	14%	14%
23	Telnet	10%	8.7%
443	SSL (HTTPS)	7.7%	2.9%
1433	Microsoft SQL Server	6.7%	2.3%
8080	HTTP Alternate	5.5%	1.5%
3389	Microsoft Terminal Services	4.3%	2.8%
22	SSH	3.4%	2.0%
3306	MySQL	2.1%	0.5%
135	Microsoft-RPC	1.9%	1.0%
Various	Other	29%	–

Figure 2: Attack Traffic, Top Ports

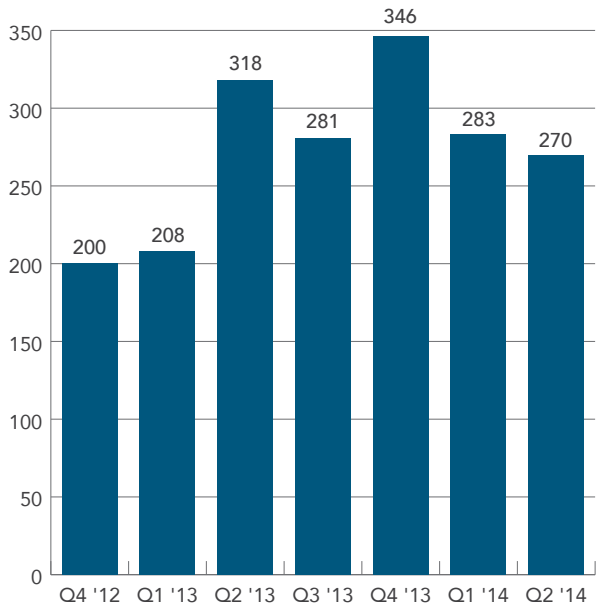


Figure 3: DDoS Attacks Reported by Akamai Customers by Quarter

49 reported attacks in the second quarter, down from 57 reported attacks in the first quarter, with the region accounting for 18% of all reported attacks.

The distribution of attacks by industry makes it immediately obvious that the decrease in attacks between the first and second quarter occurred primarily in the Public Sector, while the Commerce and Enterprise verticals remained nearly unchanged from the previous quarter, as seen in Figure 5. Attacks against the High Tech sector grew 60%, which appears to be an industry trend and not indicative of a large number of attacks against any single entity. While attacks against the Media and Entertainment vertical shrank a modest 11%, the biggest reduction in attacks was seen in the Public Sector vertical, which saw 26 fewer attacks than the quarter before, or slightly more than half (54%) the number of attacks reported in the first quarter.

One of the most interesting aspects of the second quarter of 2014 is the fact that Akamai saw a decrease in the number of repeated attacks against targets, highlighted in Figure 6. In the second quarter, attacks were reported by 184 different targets, the most since tracking of the number of repeated attacks started. The percentage of customers that saw subsequent attacks shrank from one in four (26%) to nearly one in six (18%). Only two customers were targeted by DDoS attacks more than five times and the most attacks on a single target were seven, as opposed to 17 in the prior quarter. There is no clear explanation as to why repeated attacks have become less common, though this change in tactics came as a welcome respite for their targets.

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

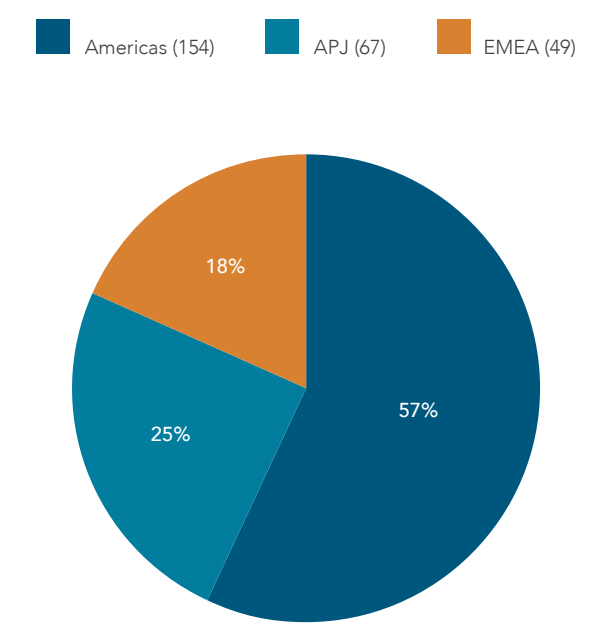


Figure 4: Q2 2014 DDoS Attacks by Region

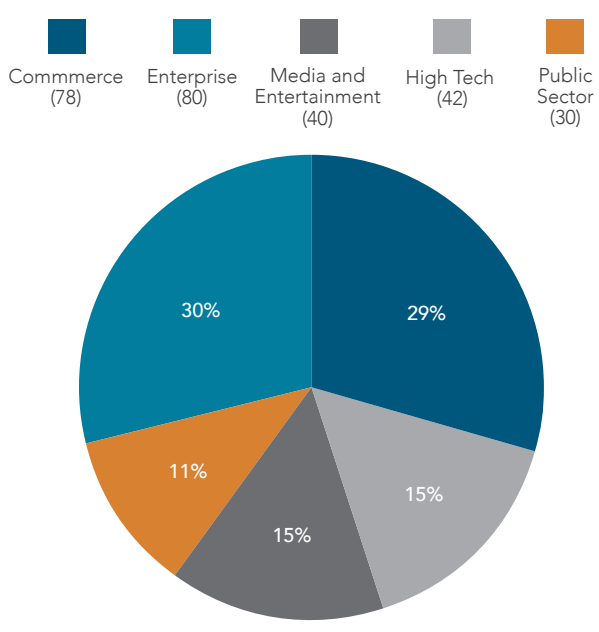
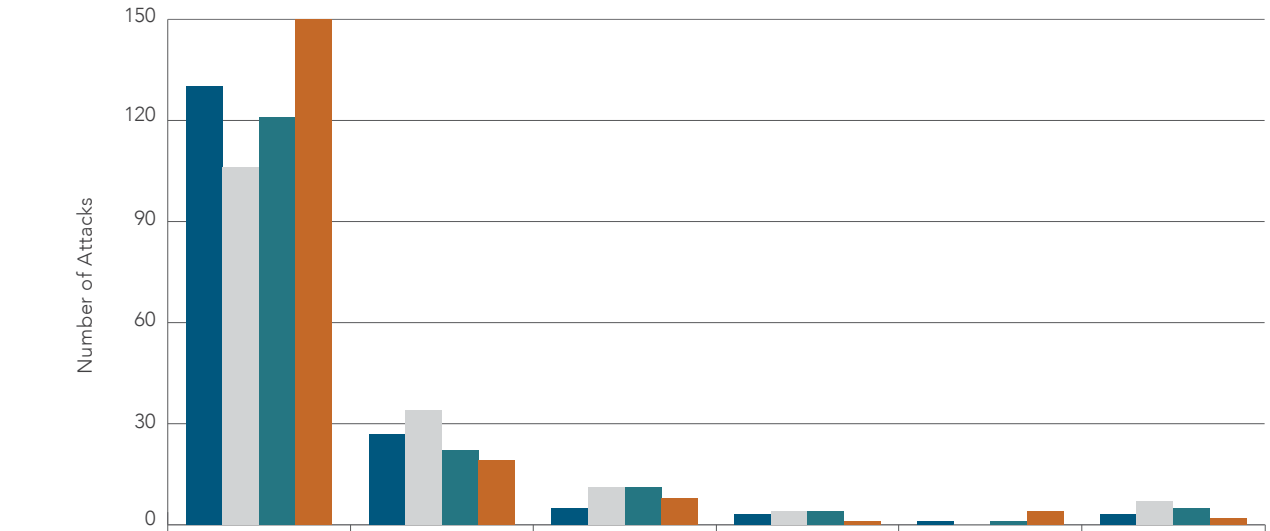


Figure 5: Q2 2014 DDoS Attacks by Sector



	1	2	3	4	5	>5
2013 Q3	130	27	5	3	1	3
2013 Q4	106	34	11	4	0	7
2014 Q1	121	22	11	4	1	5
2014 Q2	150	19	8	1	4	2

Figure 6: Frequency of Repeated DDoS Attacks

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 attacks that Akamai is reporting on are 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 Heartbleed, SNMP Reflection Attacks, Storm & Zeus Crimeware / Heartbleed / In the second quarter of 2014, the world became aware of a serious vulnerability affecting OpenSSL users, including Akamai. It would become infamously known as Heartbleed. As the company investigated the vulnerability and took actions to address it, Akamai's Chief Security Officer Andy Ellis wrote a series of blog posts to keep customers and the wider public informed — links to the full posts can be found at *https://bitly.com/bundles/dbelson/2*. What follows is a summary of the problem, and Akamai's response to it.

Heartbleed is a bug in the TLS heartbeat implementation where an adversary sends a request to be echoed back and specifies a length of the response to be echoed. Because the length to be echoed back is not checked against the length of the inbound request, a server can respond with information that happened to be in memory: up to 64KB of it per request.

There are two distinct ways in which memory is exposed. The first exposure reveals the contents of OpenSSL buffers. OpenSSL manages its own memory space for requests and replies and aggressively reuses them without clearing them. In and of itself, this is not a bug, but it does aggravate the impact of Heartbleed. When a user logs in to a Web-based application, the username and password are stored inside a chunk of OpenSSL buffer memory (at least 16 KB in size); then a Heartbleed attack comes in, and that request is assigned the same chunk of memory. Because the attacker only sends a small amount of data, it only overwrites the first few bytes of that chunk of memory, and the rest of the memory is now available to the attacker.

The second memory exposure occurs when OpenSSL reads past that 16KB buffer into the additional 48KB of memory that follows it. That 48KB chunk of memory is not necessarily owned by

OpenSSL; it might belong to other code running in the same process. So, OpenSSL first copies the 16KB chunk of memory (the first bug) and then it copies whatever happens to be in the next 48KB.

Heartbleed impacted everyone using versions of the OpenSSL library between 1.0.1 and 1.0.1f, including Akamai. Because memory was exposed in two different fashions, not only could parts of previous user sessions be exposed, other parts of the Web server's memory were also at risk for exposure. In August 2012, Akamai upgraded to the version of OpenSSL that contained the heartbeat functionality, and became vulnerable to Heartbleed attacks.

Akamai learned about Heartbleed slightly ahead of public notice of the vulnerability. On April 4th, as recommended, we patched our Secure Content Delivery Network by disabling heartbeats. On April 5th, we patched our core HTTP content delivery network.

In addition to updating OpenSSL as recommended, Akamai also evaluated whether we may have had the advantage of additional protections in place between August 2012 and April 2014 as a result of our unique OpenSSL implementation, which leveraged a secure memory arena we added to the Akamai system in 2001.

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We suspected that some of the special characteristics of the Akamai implementation, beyond applying the standard recommended patch, might have already mitigated the worst of the vulnerability.

After submitting our secure memory allocator to the community for review, it was determined that the code included some bugs, which led us to acknowledge the need to rotate all customer certificates on the evening of April 13th, with rotation of SSL keys starting the next day.

Spike in SNMP Reflection DDoS Attacks / Akamai's Prolexic Security Engineering and Response Team (PLXsert) saw a significant resurgence in the use of Simple Network Management Protocol (SNMP) reflection attacks in the second quarter of 2014.

These DDoS attacks abuse the SNMP protocol, which is commonly supported by network devices such as printers, switches, firewalls and routers.

Older devices (those manufactured approximately three or more years ago) used SNMP version 2 and were commonly delivered with the SNMP protocol openly accessible to the public by default.

Through the use of GetBulk requests against SNMP version 2, malicious actors can cause a large number of networked devices to send their stored data all at once to a target in an attempt to overwhelm the resources of the target. This kind of DDoS attack, called a distributed reflection and amplification (DrDoS) attack, allows attackers to use a relatively small amount of their own resources to create a massive amount of malicious traffic.

Attackers appeared to be using a malicious tool to automate their GetBulk requests, possibly using multiple threads. First, an attacker would need to scan the Internet for hosts that are listening on port 161 and using a community string of "public". Selected scanning tools or a paid DDoS service may provide lists of such devices. The list of IP addresses would be placed in a text file, which is used as input for the attack tool or service.

Using the IP address of the attacker's target as a spoofed source from which the requests will appear to originate, the attacker generates snmpbulkget requests to the list of reflectors. These actions lead to a flood of SNMP GetResponse data sent from the reflectors to the target. The target will see this inflow of data as coming from the victim devices queried by the attacker. The IP address of the actual attack source will be hidden.

Storm Stress Tester Crimeware Kit / Akamai's PLXsert team discovered a new tool in the second quarter of 2014 that attackers could use to target systems running Microsoft Windows.

The Storm kit is capable of infecting machines running Windows XP, as well as newer versions of the Windows operating system, for malicious uses, including execution of DDoS attacks. Once a system is infected, the Storm Network Stress Tester crimeware kit establishes remote administration (RAT) capabilities on the infected machine, enabling file uploads and downloads and the launching of executables, including four DDoS attack vectors.

A single PC infected by the new Storm crimeware kit can generate up to 12 Mbps of DDoS attack traffic with a single attack, depending on the capacity of the system's connection. As a result, orchestrated botnet attacks pose a significant DDoS threat. The RAT capabilities

provide criminals with an all-purpose crimeware platform that can be used for a variety of malicious activity, including the infection of other devices.

Remote administration lets malicious actors take over a PC from a distance, even from another continent. The Storm kit appeared to have been custom designed to infect and control vulnerable Windows XP machines in China.

High-Risk Zeus Crimeware Kit / Akamai's PLXsert team has discovered new payloads from the Zeus crimeware kit in the wild, highlighting that the Zeus framework has evolved from focusing on the harvesting of banking credentials to being used in the control of compromised hosts (zombies) for criminal activity, including DDoS attacks and attacks customized for specific platform-as-a-service (PaaS) and software-as-a-service (SaaS) infrastructures.

Malicious actors using the Zeus crimeware kit have been responsible for several recent high-profile cybersecurity breaches of Fortune 500 firms. Computers, smart phones and tablets infested with the Zeus bot (zbot) malware become agents for criminals — serving a malicious master, sharing user data, and becoming part of a botnet to attack computer systems.

Using the kit, attackers could harvest data, such as usernames and passwords, as entered in a Web browser on an infected device. In addition, an attacker may insert additional fields into the display of a Web form on a legitimate Web site to trick the user into supplying more data than a site usually requires, such as a PIN number on a banking site. Attackers can even remotely request the user's machine take a screenshot of the current display at any time.

All data requested by the attacker is sent back to a command and control panel, where it can be sorted, searched, used, or sold. The harvested data is likely to be used for identify theft but could also be sold to a company's competitors or used to publicly embarrass a firm.

The Zeus crimeware kit is considered high risk because an increasing number of enterprise applications and cloud-based services are accessible from the Web. PaaS and SaaS vendors are at risk of being victimized and may face the loss of confidential customer information, trade secrets, data integrity, reputation and more. Employees, customers and business partners could unintentionally download the malware onto their enterprise computers or personal devices. When they subsequently log in to a Web site or application from the compromised device, they may inadvertently hand confidential information to malicious actors.

Meanwhile, antivirus software has proven ineffective against Zeus because of how files are hidden, content is obfuscated and firewalls are disabled.

PLXsert recommended the following defensive actions:

- Since Zeus is mainly a client-based attack vector, users are tricked into running programs that infect their devices, so organizational security policies and user education can help. Enforce security policies for system security and patches and updates. Educate users about how this type of attack is executed from email clients and Web browsers.

- Clean-up effort by the security community is fundamental. Initiatives such as Zeus Tracker (*https://zeustracker.abuse.ch/*) are necessary to contain and manage this threat. Takedown follow-up efforts must also be implemented to reduce the number of infected command and control centers.

- Learn how to prevent, detect and remove Zeus infections. Symantec Security Response provides extensive information to help you do this (*http://www.symantec.com/security_response/writeup.jsp?docid=2010-011016-3514-99&tabid=3*).

- Write Snort rules for Zeus traffic. Sourcefire VRT Labs has an excellent source for writing Snort rules based on Zeus traffic (*http://labs.snort.org/papers/zeus.html*).

[SECTION]^2 INTERNET PENETRATION

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 second quarter of 2014, over 788 million IPv4 addresses, from 238 unique countries/regions, connected to the Akamai Intelligent Platform — 0.9% fewer than in the first quarter of 2014, and 4.8% more than in the second quarter of 2013. 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.

2.1 Unique IPv4 Addresses / As seen in Figure 7, the global number of unique IPv4 addresses seen by Akamai declined by about seven million quarter-over-quarter. Although this is believed to be the first time in the history of the report that the global unique IP address count has declined quarter-over-quarter, as it is a decline of less than one percent, it is not cause for concern. On the contrary, it may be indicative of more providers implementing carrier-grade network address translation (CGN) solutions in an effort to conserve limited IPv4 address space, or more likely, increased support for and availability of IPv6 connectivity among leading network service providers — both driven by increases in Internet-connected devices as well as increased Internet usage. Among the top 10 countries, only Brazil and Japan saw IP address counts increase from the prior quarter, while the remaining countries in the list all saw nominal declines in their counts. Looking at the full global set of countries, 46% of them saw a quarter-over-quarter increase in unique IPv4 address counts, with 26 countries/regions growing 10% or more. Of the 52% of countries/regions that saw unique IPv4 address counts decline, 17 lost 10% or more as compared to the previous quarter. Unique IP address counts in six countries/regions remained unchanged quarter-over-quarter, with Akamai seeing just a single unique IPv4 address in three of those regions.

Looking at year-over-year changes, Brazil was the only country among the top 10 to see a double-digit percentage increase, though it was not quite as large as the change seen in the first quarter. Four other countries/regions in the top 10 also saw yearly growth, while nominal yearly declines in unique IP address counts were seen in four other countries/regions. The losses seen in these countries/regions are not indicative of long-term declines in Internet usage within these geographies, but as noted above, are more likely related to changes in IP address management/conservation practices or increased IPv6 adoption and/or updates to the underlying database used by Akamai for IP address geolocation. Japan's count remained effectively unchanged from the second quarter of 2013. On a global basis, 69% of countries/regions around the world had higher unique IPv4 address counts year-over-year. Yearly growth rates above 100% were seen in seven countries/regions, although five of the seven had particularly low address counts, so smaller changes result in larger percentage shifts.

	Country/Region	Q2 '14 Unique IPv4 Addresses	QoQ Change	YoY Change
–	Global	788,592,111	-0.9%	4.8%
1	United States	156,767,641	-3.6%	1.5%
2	China	123,192,094	-0.3%	8.2%
3	Brazil	44,085,558	6.7%	43%
4	Japan	40,796,367	1.9%	0.0%
5	Germany	36,839,575	-0.9%	-3.3%
6	United Kingdom	28,206,499	-1.1%	-3.2%
7	France	28,091,943	-1.3%	3.7%
8	South Korea	20,774,241	-1.0%	-2.6%
9	Italy	19,252,087	-3.8%	-4.6%
10	Russia	18,152,617	-3.2%	3.3%

Figure 7: Unique IPv4 Addresses Seen by Akamai

2.2 IPv4 Exhaustion / The second 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 Americas region, ARIN announced[1] on April 23 that it was "down to its final /8 of available space in its inventory and has moved into Phase Four of its IPv4 Countdown Plan." In the Latin American/Caribbean region, LACNIC announced[2] in May that it was down to a /9 of available IPv4 address space, which served to trigger a new phase of its exhaustion plan. In June, LACNIC announced[3] that it only had a /10 remaining, noting, "In practice, this means that IPv4 addresses are now exhausted for Latin American and Caribbean operators." (A reference table translating the /nn notations used to express IP address block sizes used in this section to unique IP address counts can be found at *https://www.arin.net/knowledge/cidr.pdf*.)

Leveraging data[4] collected by Geoff Huston, Chief Scientist at APNIC,[5] 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 uses data published by the individual RIRs to highlight IPv4 address space delegation activity within each region over the course of the quarter.

Figure 8 illustrates the data made available by Mr. Huston, showing how the size of the available IPv4 address pools at each RIR changed during the second quarter of 2014. As discussed above, LACNIC saw the most aggressive rate of depletion in the second quarter, delegating over 10 million IPv4 addresses, or 72% of the IPv4 address space that it had available at the start of the quarter. Though not quite as aggressive, ARIN came close, delegating over 9.7 million IPv4 addresses, or nearly 39% of its available pool. APNIC and RIPE both delegated under one million IPv4 addresses in the second quarter, amounting to 5.0% and 4.0% of their available pools respectively. Although it was the most active RIR in the first quarter, AFRINIC was the least active in the second quarter from a depletion perspective, delegating only 3.9% of its available pool, equivalent to nearly 2.2 million IPv4 addresses.

Figure 9 illustrates the IPv4 allocation/assignment activity across each of the RIRs during the second quarter of 2014. With activity so low at both APNIC and RIPE during the course of the quarter, there are not any days that stand out at either RIR where significant assignments/allocations were made. At AFRINIC, the biggest allocation was made on June 1, when a /10 block of IPv4 addresses went to SEACOM, a pan-African network service provider.[6] April 23 and 29 were the next most active days for the RIR, when /14 blocks were allocated to Airtel Networks Kenya[7] and Meditel, a Moroccan mobile service provider.[8] A /10 allocated to Akamai Technologies on April 22 made it ARIN's most active day.[9] Other notably active days for the North American RIR in the second quarter included May 6, when a /12 was allocated to AT&T,[10] and June 20, when a /12

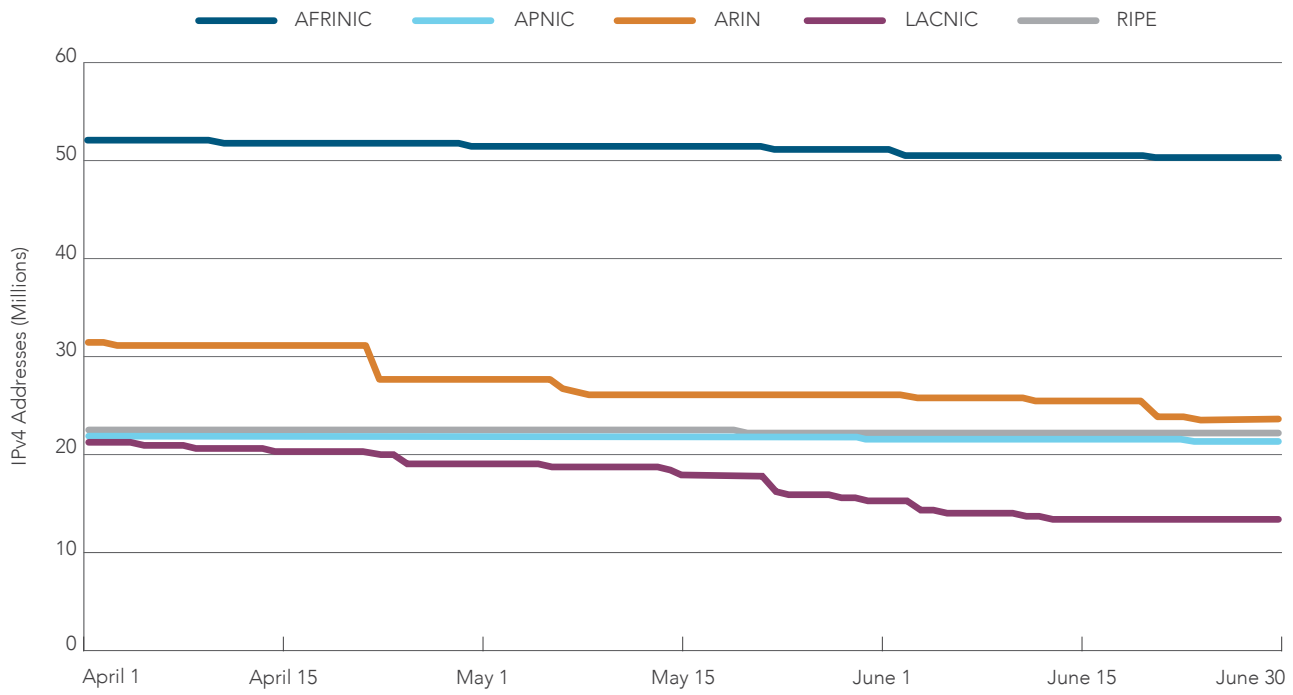


Figure 8: Available IPv4 Address Pool Size by RIR, Q2 2014

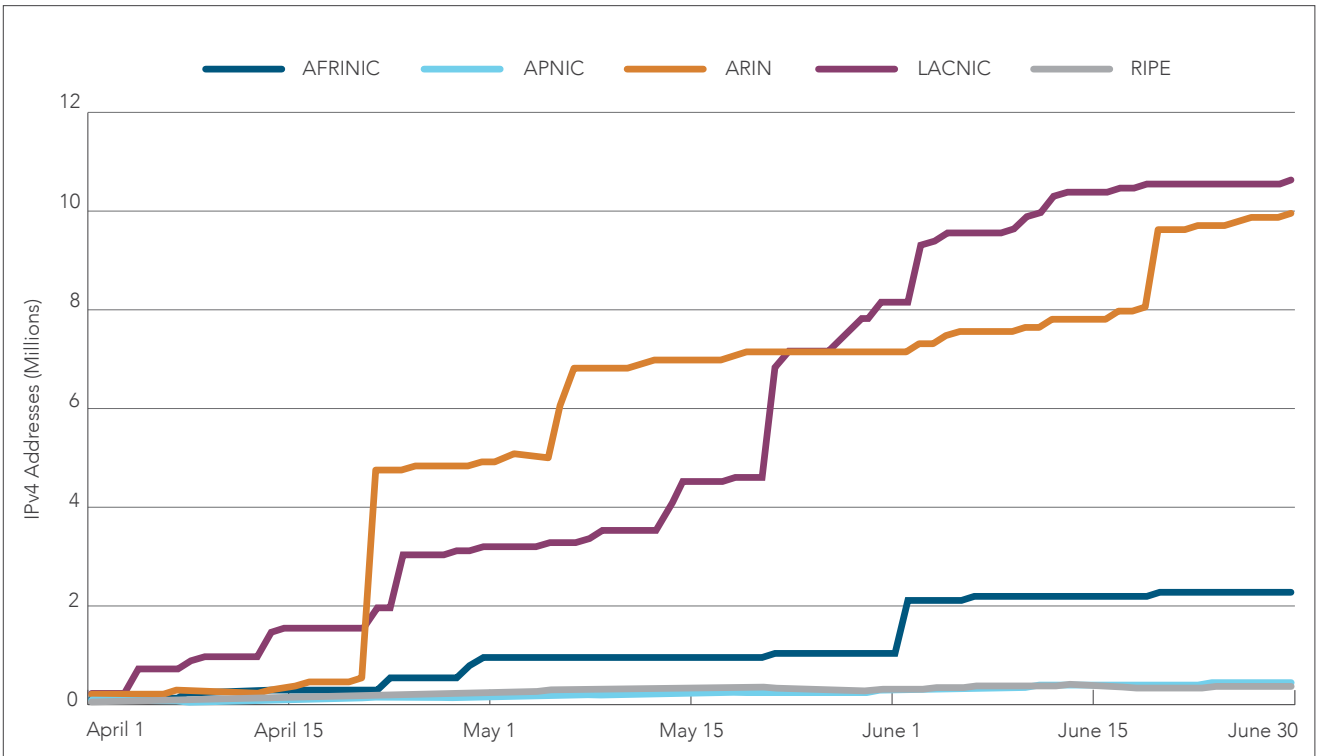


Figure 9: Total Number of IPv4 Addresses Assigned/Allocated by RIR, Q2 2014

was allocated to Amazon Technologies (Amazon Web Services).[11] Assignment/allocation activity at LACNIC continued to exhibit a "stair step" pattern, similar to that seen in previous quarters. The RIR's most active day was June 2, with several large allocations made that day, along with quite a few smaller ones. NET Serviços de Comunicação S.A. in Brazil received a /13[12] and a /14[13] , while Algar Telecom in Brazil received a /15[14]. Other significant LACNIC allocations during the quarter occurred on April 24, when a /12 went to Telefônica Brazil S.A.,[15] and on May 21, when a /11 apparently went to LACNIC itself.[16]

"Redistributing increasingly small blocks of IPv4 address space is not a sustainable way to grow the Internet. IPv6 deployment is a requirement for any network that needs to survive."

Further highlighting the increasing urgency of the need to transition to IPv6 because of IPv4 exhaustion, in May ICANN announced that it had begun the process of allocating the remaining blocks of IPv4 addresses to the five RIRs,[17] triggered when LACNIC's supply of addresses dropped to below 8 million. These remaining IPv4 addresses are coming from the "Recovered IPv4 Pool"[18] and are redistributed based on a policy established by the policy making communities in each RIR. While helpful, such a process is only a temporary bandage for the situation, as an ICANN representative noted, "Redistributing increasingly small blocks of IPv4 address space is not a sustainable way to grow the Internet. IPv6 deployment is a requirement for any network that needs to survive."

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 10 and Figure 11 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. 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 second quarter of 2014 was required to qualify for inclusion.

Figure 10 highlights the 10 countries/regions with the largest percentage of content requests made to Akamai over IPv6 in the second quarter. Once again, European countries dominated the list, holding seven of the top 10 positions. North and South America were represented by the United States and Peru respectively, while China was the only country from the Asia Pacific region. Given an April announcement[19] by the Chinese government regarding a CNY20 billion investment to promote IPv6, China should hopefully continue to maintain a position on the top 10 list, as well as improving its rank over time. The biggest quarterly increases in IPv6 traffic percentages were seen in China and the Czech Republic, where IPv6 traffic volumes more than doubled from the previous quarter. Top country Belgium also saw significant growth, with IPv6 traffic up by more than a third. Romania and Germany were the only two countries among the top 10 to see IPv6 adoption levels decline quarter-over-quarter, with Germany dropping 25%. However, 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 11 lists the top 20 network providers by number of IPv6 requests made to Akamai during the second quarter. The largest volume of IPv6 requests continued to come from cable and wireless providers, many of whom are leading the way for IPv6 adoption in their countries. Verizon Wireless led the pack, with 50% of requests from this United States-based wireless provider being made over IPv6. This observation is in line with statistics published by the Internet Society in a blog post in April, which noted that Verizon Wireless was approaching 50% IPv6 as of that month.[20] An additional four providers (Telenet, Brutele, Kabel Deutschland, and XS4ALL) all had more than a third of requests to Akamai over IPv6. Eleven more providers sent at least 10% of their content requests to Akamai over IPv6. Only the remaining four providers of the top 20 had IPv6 request volumes below 10% — in the first quarter,

	Country/Region	Q2 '14 IPv6 Traffic %	QoQ Change
1	Belgium	19%	35%
2	Switzerland	10%	7.5%
3	Luxembourg	8.8%	18%
4	Romania	7.1%	-3.0%
5	United States	6.8%	10%
6	Peru	6.2%	2.3%
7	Germany	5.8%	-25%
8	France	4.8%	6.2%
9	Czech Republic	4.7%	102%
10	China	3.9%	133%

Figure 10: IPv6 Traffic Percentage, Top Countries/Regions

Country/Region	Network Provider	Q2 '14 IPv6 Traffic %
United States	Comcast Cable	17%
United States	Verizon Wireless	50%
United States	AT&T	13%
United States	Time Warner Cable	7.7%
Germany	Deutsche Telekom	12%
France	Proxad/Free	20%
Belgium	Telenet	43%
Germany	Kabel Deutschland	34%
Peru	Telefonica Del Peru	7.6%
Germany	Unitymedia KabelBW	22%
Romania	RCS & RDS	16%
Japan	KDDI Corporation	14%
Switzerland	Swisscom	22%
United States	T-Mobile	14%
Belgium	Brutele	36%
Belgium	Belgacom	8.8%
United States	Hughes Network Systems (DISH Network)	23%
Czech Republic	o2 (Telefonica)	15%
Malaysia	Telekom Malaysia	2.7%
Netherlands	XS4ALL	34%

Figure 11: IPv6 Traffic Percentage,
Top Network Providers by IPv6 Request Volume

seven providers fell into this range, so this is a very encouraging trend in terms of increasing IPv6 adoption. To that end, Telekom Malaysia once again had the lowest IPv6 request volume among the top 20, but at 2.7%, it was more than double the level seen in the first quarter.

Included in this group of 20 providers is Romanian provider RCS & RDS, which collaborated with the Internet Society on a case study around its experience deploying IPv6 over the past decade. Despite amazing growth in the first half of 2012, it also notes "Unfortunately, the IPv6 adoption rate in our network has not increased much over time mainly because the lack of IPv6 support on CPEs and the high percentage of Windows XP users whose PPPoE native client doesn't support IPv6." RCS & RDS is not alone in facing this issue — older customer premises equipment (CPE) and operating systems will limit the growth of IPv6 adoption until they are replaced and/or upgraded.

[SECTION]^3 GEOGRAPHY *GLOBAL*

The data presented within this section was collected during the second 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 saw significant growth in the second quarter, increasing 21% to 4.6 Mbps, pushing it above the 4 Mbps "broadband" threshold for the first time. As Figure 12 shows, large quarter-over-quarter increases were very common among the top 10 countries/regions, with eight of them seeing double-digit percentage increases. South Korea, however, was one of the two outliers, growing only 4.0% from the first quarter, but its 24.6 Mbps average connection speed was well ahead of (more than 50% higher than) Hong Kong, where an 18% quarterly jump pushed it above the "4K Readiness" threshold. The other outlier was regional neighbor Japan, where the average connection speed increased just 1.7% quarter-over-quarter to just below the "4K readiness" threshold. Globally, a total of 136 qualifying countries/regions saw average connection speeds increase in the second quarter, with growth rates ranging from 81% in Bangladesh (to 1.9 Mbps) down to just 1.1% in the Dominican Republic (to 1.6 Mbps). Only three qualifying countries saw quarterly declines in average connection speeds: Zambia, which lost 15% (to 1.1 Mbps), Kenya, which dropped 1.4% (to 1.8 Mbps) and Côte d'Ivoire, which declined just 0.1% (to 2.0 Mbps).

In addition to strong quarterly growth in average connection speeds among the top 10 countries/regions, strong yearly growth was also seen in the second quarter. Among the top 10, four countries/regions experienced year-over-year increases of more than 50%, led by South Korea's 84% growth rate. With the exception of Japan's 23% increase, which was the smallest of the group, the other listed countries/regions all saw average speeds increase by more than 25% year-over-year. On a global basis, yearly increases were seen in 136 qualifying countries/regions, with growth rates ranging from more than 100% in Uruguay (up 197% to 5.6 Mbps), Argentina (up 111% to 4.2 Mbps), Algeria (up 110% to 2.0 Mbps), Sudan (up 108% to 4.4 Mbps) and Bangladesh (up 108% to 1.9 Mbps) down to just 1.2% in the United Arab Emirates (to 4.6 Mbps). Only three qualifying countries had lower average connection speeds as compared to the second quarter of 2013: El Salvador (down 17% to 2.1 Mbps), the Dominican Republic (down 13% to 1.6 Mbps), and Lebanon (down 1.7% to 1.3 Mbps).

In the second quarter of 2014, only two qualifying countries had average connection speeds of 1.0 Mbps or less, down from six in the prior couple of quarters. Yemen had an average connection speed of 1.0 Mbps, while Libya continued to have the slowest speeds, growing 13% quarter-over-quarter to 0.6 Mbps.

3.2 Global Average Peak Connection Speeds / Similar to the strong quarterly growth rates for the average connection speed metric, the average peak connection speeds also saw significant improvements as compared to the first quarter. As shown in Figure 13, a 20% increase pushed the global average peak connection speed up to 25.4 Mbps, while a 12% increase to 73.9 Mbps pushed Hong Kong past South Korea, making Hong Kong the region with the highest average peak connection speed in the second quarter. South Korea's average peak speeds also increased from the prior quarter, but at only 5.2%, making it the only country/region among the top 10 to grow less than 10% on a quarterly basis. Among the other countries in the top 10, quarterly growth rates were in the 10-20% range. On a global basis, all but one of the 139 qualifying countries/regions saw higher average peak connection speeds, with increases ranging from 2.3% in Iraq (to 30.4 Mbps) up to 65% in Jersey (to 43.2 Mbps). Only Zambia saw a quarterly decline, dropping an unusually high 55% to 3.8 Mbps.

The global year-over-year trend was also very positive, up 34% as compared to the second quarter of 2013. Strong yearly increases were also seen across the top 10 countries/regions, with the highest rate of growth seen in Israel, which added 71% over the past year.

	Country/Region	Q2 '14 Avg. Mbps	QoQ Change	YoY Change
–	Global	4.6	21%	42%
1	South Korea	24.6	4.0%	84%
2	Hong Kong	15.7	18%	45%
3	Switzerland	14.9	17%	35%
4	Japan	14.9	1.7%	23%
5	Netherlands	14.3	15%	42%
6	Sweden	13.6	17%	52%
7	Latvia	13.5	13%	27%
8	Ireland	12.6	18%	58%
9	Czech Republic	12.6	12%	28%
10	Romania	11.8	27%	57%

Figure 12: Average Connection Speed by Country/Region

	Country/Region	Q2 '14 Peak Mbps	QoQ Change	YoY Change
–	Global	25.4	20%	34%
1	Hong Kong	73.9	12%	14%
2	South Korea	72.1	5.2%	34%
3	Israel	68.6	19%	71%
4	Singapore	64.9	13%	42%
5	Romania	63.0	16%	33%
6	Japan	61.5	11%	25%
7	Taiwan	58.2	11%	47%
8	Latvia	53.8	11%	20%
9	Netherlands	53.2	18%	37%
10	Switzerland	53.1	19%	28%

Figure 13: Average Peak Connection Speed by Country/Region

Despite having the highest average peak connection speed, Hong Kong had the smallest year-over-year increase among the top 10 countries/regions, with strong 14% growth. Looking across all of the qualifying countries/regions, a total of 125 saw average peak connection speeds grow during the past year, with increases ranging from a scant 0.1% in Lebanon (to 14.2 Mbps) to an impressive 225% in Uruguay (to 49.7 Mbps). An additional five countries/regions also saw year-over-year increases of more than 100%. Fourteen countries/regions saw average peak connection speeds decline year-over-year. Losses were as low as 0.4% in Côte d'Ivoire (to 16.6 Mbps), while Zambia's average peak speed was sliced in half.

With these significant quarterly and yearly losses, Zambia displaced Iran as the country with the lowest average peak connection speed. Iran actually saw impressive growth in the second quarter, with a 35% quarter-over-quarter increase — as predicted last quarter, recent strong quarterly and yearly growth rates would help it move out of its last place position in the future.

3.3 Global High Broadband Connectivity / On the heels of nearly 10% growth in the first quarter, the global high broadband adoption rate continued to see strong improvement in the second quarter, increasing 12% to a 23% adoption rate. As seen in Figure 14, South Korea remained the country with the highest level of high broadband adoption, well ahead of Switzerland, despite being the only country in the top 10 with a quarterly increase below 10%. Among the other countries/regions in the group, both Romania and Israel saw adoption rates increase by more than 60% quarter-over-quarter, and Japan was the only country to see a quarter-over-quarter decline, with its adoption rate falling a minuscule 0.3%. Across the top 10, six countries/regions, up from two in the previous quarter, had more than half of their connections to Akamai at speeds of 10 Mbps or above in the second quarter. Among the 63 countries/regions around the world that qualified for inclusion, quarter-over-quarter increases in high broadband adoption were seen in all but two — Taiwan and Japan both saw losses of 0.3%. Among the others, growth rates ranged from the aforementioned 2.0% in South Korea to a whopping 534% in Vietnam. In addition to Vietnam, eight other countries also saw high broadband adoption rates more than double quarter-over-quarter.

Looking at year-over-year changes, the global high broadband adoption rate was again up 65%, the same as in the first quarter. Extremely strong growth was also seen across the top 10 countries/regions, with Romania adding more than 200% over the prior year, and Israel adding 156%. Japan's solid 24% increase was the smallest of the group. Globally, only the United Arab Emirates saw a lower high broadband adoption rate as compared to the second quarter of 2013. Among the other 62 qualifying countries/regions, year-over-year increases ranged from Japan's 24% to a massive 14917% in Uruguay, which also experienced very strong growth across multiple metrics in the second quarter as well as prior quarters over the last year. Kazakhstan and Argentina both saw improvements of over 1000% year-over-year, and 31 additional qualifying countries regions saw high broadband adoption rates more than double during the same time period.

Thanks to both quarterly and yearly increases of more than 100%, boosting it to 1.1% adoption, Colombia was able to move out of the position as the country with the lowest high broadband adoption rate in the second quarter. That spot was assumed by Indonesia where, despite a 72% quarterly increase and 320% yearly increase, high broadband adoption only reached 0.5%.

3.4 Global Broadband Connectivity / In the second quarter of 2014, the global broadband adoption rate grew 5.6% quarter-over-quarter to reach 59%, as shown in Figure 15. Nominal quarterly increases in both South Korea and Bulgaria enabled both to reach 95% broadband adoption (tied due to rounding). Five additional countries/regions in the top 10 also had at least nine of every 10 connections to Akamai at speeds above 4 Mbps, though the remaining three (Israel, Hong Kong, and Curaçao) were not far behind. In contrast to the strong double-digit percentage quarterly increases seen for the high broadband adoption metric,

	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
–	Global	23%	12%	65%
1	South Korea	78%	2.0%	72%
2	Switzerland	56%	25%	53%
3	Japan	54%	-0.3%	24%
4	Netherlands	52%	20%	71%
5	Hong Kong	52%	21%	61%
6	Romania	50%	63%	202%
7	Latvia	44%	18%	33%
8	Belgium	43%	24%	74%
9	Israel	42%	67%	156%
10	Czech Republic	42%	25%	56%

Figure 14: High Broadband (>10 Mbps) Connectivity

	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
–	Global	59%	5.6%	18%
1	South Korea	95%	1.0%	11%
2	Bulgaria	95%	2.6%	26%
3	Switzerland	92%	1.9%	2.5%
4	Isle Of Man	92%	2.6%	22%
5	Denmark	91%	4.8%	15%
6	Romania	91%	3.8%	14%
7	Netherlands	90%	1.5%	8.0%
8	Israel	89%	4.4%	20%
9	Hong Kong	89%	5.3%	14%
10	Curaçao	88%	1.3%	16%

Figure 15: Broadband (>4 Mbps) Connectivity

quarter-over-quarter changes for the top 10 countries/regions for broadband adoption were much more muted, with Hong Kong's 5.3% growth rate the largest of the group. Globally, a total of 94 countries/regions qualified for inclusion, and quarter-over-quarter increases were seen in all but two of them. Growth rates ranged from just 0.3% in Japan (to 86% adoption) to an impressive 1263% in Algeria (to 3.0% adoption); Vietnam, Sudan, Sri Lanka, Costa Rica, Peru, and Kuwait also saw quarterly growth rates above 100%. Only the United States and the Bahamas saw lower broadband adoption rates in the second quarter, losing 1.6% (to 72% adoption) and 3.3% (to 71% adoption) respectively.

The global broadband adoption rate increased 18% from the second quarter of 2013, a yearly growth rate slightly lower than 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 2.5% in Switzerland to 26% in Bulgaria. In addition to Switzerland, the Netherlands was the only other country among the top 10 to have a year-over-year change below 10%. Looking across all of the qualifying countries/regions, only the Bahamas and Morocco saw broadband adoption levels drop over the past year, losing 0.1% (to 71% adoption) and 16% (to 9.9% adoption) respectively. Among the other 92 qualifying countries/regions, Austria saw adoption grow by just 1% (to 85% adoption), while Algeria, Sudan, an Uruguay all saw yearly increases of more than 2,000%, adding 2169%, 2649% (to 52% adoption), and 3455% (to 53% adoption) respectively.

Thanks to a 60% quarterly increase, Venezuela was no longer the country with the lowest level of broadband adoption in the second quarter. That spot was assumed by Egypt, which had an adoption rate of just 0.9%, even after a 25% quarter-over-quarter increase and a 69% year-over-year increase.

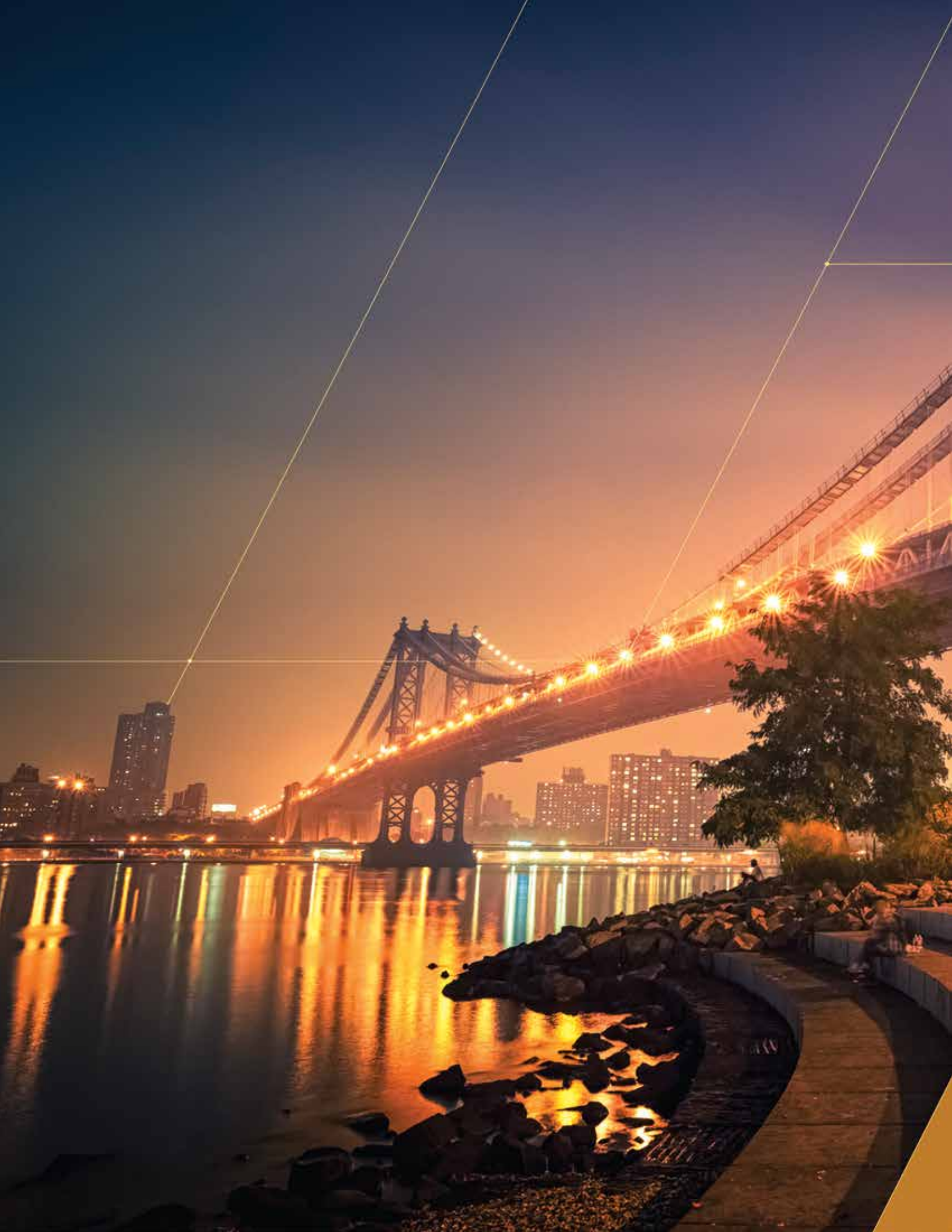
3.5 Global 4K Readiness / Given the growing interest in the streaming delivery of 4K[21] ("Ultra HD") video, we thought it would be interesting to begin tracking a "4K readiness" metric in the *State of the Internet Report*. With 4K adaptive bitrate streams generally requiring between 10–20 Mbps of bandwidth, 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.)[22, 23] 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 media players.

	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
–	Global	12%	17%	98%
1	South Korea	62%	2.9%	123%
2	Hong Kong	34%	29%	85%
3	Japan	33%	1.3%	37%
4	Switzerland	33%	41%	108%
5	Netherlands	30%	36%	109%
6	Latvia	28%	25%	48%
7	Sweden	25%	25%	98%
8	Czech Republic	23%	34%	90%
9	Romania	22%	111%	281%
10	Norway	22%	20%	134%

Figure 16: 4K Ready (>15 Mbps) Connectivity

Globally, 12% of connections to Akamai were at speeds of 15 Mbps or above, up 17% from the first quarter. As shown in Figure 16, South Korea remained the country with the highest level of 4K readiness, at 62%, up 2.9% quarter-over-quarter. Norway had the lowest level among the top 10, at 22%, after a 20% quarterly increase. Romania had the largest quarterly growth rate, more than doubling its readiness to 22%, while Japan had the smallest increase, at just 1.3%. Overall, 51 countries around the world qualified for inclusion in this metric. Of those, a total of 30 had 4K readiness rates of 10% or more, while only Brazil, India, and China were below 1%. Extremely strong quarterly increases were seen across a number of countries, with six countries more than doubling quarter-over-quarter, followed closely by Israel at a 99% quarterly change. Only Taiwan saw its 4K readiness rate drop from the first quarter, losing 3.4% to 13%.

Year-over-year, the global 4K readiness rate has nearly doubled, growing 98%. Among the top 10 countries/regions, it more than doubled in five countries, with Romania seeing the biggest increase, at 281%. Across all of the qualifying countries/regions, Uruguay far and away saw the largest year-over-year change, growing nearly 30,000% to 3.9% 4K readiness. Kazakhstan and Argentina also grew more than 1,000% over the prior year, adding 3,438% (to 3.3% readiness) and 1,958% (to 1.5% readiness) respectively. Yearly increases were again seen across all of the qualifying countries/regions, which points to ongoing improvements in broadband connectivity around the world.



[SECTION]4 GEOGRAPHY *USA*

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 / Modest to strong quarterly increases in average connection speeds were seen across most of the top 10 states in the second quarter, as shown in Figure 17. Delaware's 24% increase from the first quarter was particularly significant, pushing it above the "4K readiness" threshold, with Washington State and Connecticut also seeing double-digit percentage increases. Among the top 10, only Rhode Island saw a quarterly decline, losing 0.4%. All of the top 10 states had average connection speeds above the "high broadband" threshold, as did 19 additional states across the country. The quarter-over-quarter trend was overwhelmingly

positive, with four additional states joining Delaware, Washington, and Connecticut in having quarterly growth rates of 10% or more. Maine had the smallest quarter-over-quarter change, at 1.5% (to 8.9 Mbps), while Nevada was the only other state to see a lower average connection speed as compared to the previous quarter, losing 0.2% (to 10.1 Mbps).

On a year-over-year basis, all of the states in the top 10 saw significantly higher average connection speeds as compared to the second quarter of 2013. New Hampshire had the smallest yearly increase across the group, at a still impressive 20%, while Delaware's 50% jump was the largest. Across the whole country, only Kansas saw its average connection speed more than double over the last year, up 106% (to 3.4 Mbps). Every state saw more than 10% growth on a yearly basis, with North Carolina's 16% increase the smallest seen this quarter.

A 9.7% quarterly increase to 7.6 Mbps meant that Alaska was no longer the state with the lowest average connection speed in the second quarter, handing the title to Arkansas, which saw its speed increase 2.6% to 7.5 Mbps. (In actuality, the gap between the two states is fairly slim, with Alaska's average connection speed only 185 kbps faster than Arkansas.)

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. However, Figure 18 shows that the opposite was true in the second quarter of 2014, with all of the top 10 states seeing quarterly growth, with growth rates above 10% in nine of the 10. This return to strong quarterly growth in this group of states in similar to the changes seen in the fourth quarter of 2013. In addition, for the first time, all of the top 10 states saw average peak connection speeds above 50 Mbps. Looking across the whole country, every state saw a higher average peak connection speed quarter-over-quarter, with increases ranging from 24% in Missouri (to 39.2 Mbps) down to 2.6% in Maine (to 33.4 Mbps). More than half of the states, including Maine, saw growth rates below 10% in the second quarter.

Year-over-year changes were also particularly strong across the top 10 states, with all of them seeing higher average peak connection speeds. Maryland's 88% yearly increase was the largest of the group, while the 21% increases seen in New Hampshire and the District of Columbia were the smallest. The trend was similar when looking at the whole United States, with only Kentucky growing less than 10% over the past year — its average peak connection speed rose 3.6% (to 33.9 Mbps). Across the other states, yearly increases ranged from 13% in North Carolina (to 41.8 Mbps) to 90% in Kansas (to 37.1 Mbps).

Similar to the average connection speed metric, Arkansas was also the state with the lowest average peak connection speed in the second quarter of 2014 at 30.9 Mbps, after 6.1% quarter-over-quarter and 46% year-over-year increases.

Announcements made in the second quarter point towards a strong likelihood of continuing to see extremely positive growth in average peak connection speeds going forward. In April, AT&T announced[24] "a major initiative to expand its ultra-fast fiber network to up to 100 candidate cities and municipalities nationwide, including 21 new major metropolitan areas. The fiber network will deliver AT&T U-verse® with GigaPower℠ service, which can deliver broadband speeds up to 1 Gbps." The release noted that the list of 21 candidate metropolitan areas includes: Atlanta, Augusta, Charlotte, Chicago, Cleveland, Fort Worth, Fort Lauderdale, Greensboro, Houston, Jacksonville, Kansas City, Los Angeles, Miami, Nashville, Oakland, Orlando, San Antonio, San Diego, St. Louis, San Francisco, and San Jose. Not to be outdone, the president of competing provider Cox Communications said in April that his company will roll out gigabit broadband to residential customers this year.[25] The company said it will start upgrading its network in Phoenix, Las Vegas and Omaha, with gigabit speeds available to the first residential customers in the fourth quarter of 2014.[26] In May, telecommunications service provider C Spire announced that it was starting construction on its ultra-high speed 1 Gbps Fiber to the Home (FTTH) initiative in nine Mississippi cities.[27] In addition to major cities, rural areas are also starting to get access to higher speed broadband. Blue Valley

	State	Q2 '14 Avg. Mbps	QoQ Change	YoY Change
1	Delaware	16.2	24%	50%
2	Virginia	14.6	6.0%	33%
3	Washington	14.2	13%	40%
4	District of Columbia	13.9	8.3%	23%
5	Massachusetts	13.8	5.8%	24%
6	Connecticut	13.7	17%	37%
7	Rhode Island	12.9	-0.4%	30%
8	New Hampshire	12.8	4.2%	20%
9	Utah	12.8	5.8%	24%
10	Oregon	12.8	9.4%	42%

Figure 17: Average Connection Speed by State

	State	Q2 '14 Peak Mbps	QoQ Change	YoY Change
1	Delaware	62.5	21%	49%
2	Virginia	59.4	10%	37%
3	District of Columbia	59.4	15%	21%
4	Massachusetts	58.5	12%	27%
5	New Jersey	57.5	17%	39%
6	Connecticut	56.9	21%	42%
7	Washington	56.6	13%	26%
8	Rhode Island	56.2	5.7%	38%
9	Maryland	55.5	15%	88%
10	New Hampshire	52.9	13%	21%

Figure 18: Average Peak Connection Speed by State

Tele-Communications announced in June that it is deploying ultra-fast broadband in 17 rural Kansas communities, leveraging existing FTTH deployments.[28] In Oklahoma, the Northeast Oklahoma Electric Cooperative, serving a five-county rural region, plans to begin offering gigabit service in its territory by the end of 2014.[29]

4.3 United States High Broadband Connectivity / As shown in Figure 19, quarterly changes among the top 10 states were all positive in the second quarter, though they spanned quite a wide range. As with the average and average peak connection speed metrics, Delaware held the top spot, and also had the largest quarter-over-quarter increase in the group at 33%. In contrast, number two state Rhode Island had the smallest increase, both among the top 10 and across the whole country, at just 0.6%. Six of the top 10 states had more than half of their connections to Akamai at speeds above 10 Mbps in the second quarter, and with another several quarters of reasonable growth, we will see all of the top 10 states above that threshold. Although Delaware had the largest quarter-over-quarter change among the top 10, in looking across the whole country, it was edged out by Montana and Wyoming, which grew 36% (to 29% adoption) and 35% (to 32% adoption) respectively. Minnesota was the only state to see a lower high broadband adoption rate in the second quarter, seeing a minor 0.7% decline to 35% adoption.

Yearly changes in high broadband adoption among the top 10 states were all positive, and extremely strong, in the second quarter. Yearly growth rates among these states ranged from a low of 31% in Massachusetts to a high of 84% in Michigan. Similar improvements were also seen across all 50 states, with Massachusetts also having the lowest growth in the nation. Year-over-year changes above 100% were seen in 20 states, with improvements ranging from 103% in Alaska (to 24% adoption) and Montana to a whopping 436% in Kansas (to 29% adoption). Only the District of Columbia had a lower high broadband adoption rate year-over-year, dropping 0.9% to 39% adoption.

Similar to the earlier metrics, Arkansas was the state with the lowest high broadband adoption rate in the second quarter, at 20% adoption, after a 9.0% quarterly increase, and a 375% yearly increase. By virtue of a 16% quarter-over-quarter improvement to 21% adoption, Idaho moved out of the last-place spot that it held in the first quarter.

4.4 United States Broadband Connectivity / In sharp contrast to the generally positive quarterly changes seen in the previous three metrics, Figure 20 shows that quarterly changes for broadband adoption were more mixed among the top 10 states for the second quarter. Half of the states saw nominal quarterly increases in broadband adoption rates, while the other half saw nominal quarterly decreases. Among the five states where broadband adoption increased, growth rates ranged from 0.7% in Virginia to 8.1% in Connecticut, and in the other five states, losses ranged from 0.2% in South Dakota to 1.2% in New York. Looking across the whole country, quarterly changes were also mixed, though they leaned slightly positive, with a total of 29 states seeing broadband adoption rates increase. Growth rates ranged from 0.1% in Louisiana (to 66% adoption) to Connecticut's 8.1% bump. For the states that saw broadband adoption rates decline from the prior quarter, losses ranged from just 0.2% in Ohio (to 68% adoption), West Virginia (to 55% adoption), and South Dakota to 3.9% in Nebraska (to 64% adoption). Despite these modest changes, both up and down, once again every state saw more than half of its connections to Akamai occur at speeds over 4 Mbps.

Yearly changes across the top 10 states were more positive, with only New York seeing a minor year-over-year decline. Across the remaining states, increases ranged from 0.1% in Massachusetts to 22% in Hawaii. When looking at the whole country, New York was joined by five other states, with losses ranging from 1.2% in Illinois (to 63% adoption) to 18% in the District of Columbia (to 63% adoption). Across the states that saw broadband adoption levels increase from the second quarter of 2013, Massachusetts grew the

	State	% Above 10 Mbps	QoQ Change	YoY Change
1	Delaware	65%	33%	81%
2	Rhode Island	55%	0.6%	51%
3	Massachusetts	55%	1.1%	31%
4	Connecticut	54%	16%	68%
5	New Jersey	53%	11%	57%
6	New Hampshire	53%	1.2%	32%
7	Virginia	49%	9.5%	59%
8	New York	47%	7.4%	47%
9	Washington	47%	4.8%	51%
10	Michigan	46%	2.1%	84%

Figure 19: High Broadband (>10 Mbps) Connectivity, U.S. States

	State	% Above 4 Mbps	QoQ Change	YoY Change
1	Delaware	95%	2.8%	2.7%
2	Connecticut	92%	8.1%	13%
3	Rhode Island	92%	-0.6%	3.1%
4	Hawaii	87%	1.0%	22%
5	New Hampshire	84%	-0.5%	1.3%
6	New Jersey	83%	2.8%	10%
7	Massachusetts	83%	-0.4%	0.1%
8	South Dakota	82%	-0.2%	6.7%
9	Virginia	81%	0.7%	7.5%
10	New York	81%	-1.2%	-2.1%

Figure 20: Broadband (>4 Mbps) Connectivity, U.S. States

least, and Kansas the most, more than doubling to 72% adoption. The next largest increase was seen in Arkansas, which was up 53% over the year to 57% adoption.

For the third consecutive quarter, West Virginia remained the state with the lowest broadband adoption rate, still with 55% of its connections to Akamai at speeds over 4 Mbps.

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 between 10 – 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 shown in Figure 21, 4K readiness levels saw some fairly strong growth in the second quarter. Seven states saw quarterly increases above 10%, with Delaware topping this metric as well, both with the highest rate of 4K readiness as well as the largest quarterly increase. Geographic neighbors New Hampshire, Massachusetts, and Rhode Island saw quarterly growth below 10%. Among the top 10 states, only Oregon had less than a quarter of its connections to Akamai at speeds below 15 Mbps. Expanding our perspective, every state in the country also saw a quarterly increase in 4K readiness rates, ranging from Rhode Island's 1.4% increase to an impressive 54% jump in Montana (to 12% readiness).

Year-over-year, half of the top 10 states saw 4K readiness rates increase by 100% or more, while the lowest growth rate in the group was seen in the District of Columbia, at a still impressive 51%. It was, notably, also the lowest yearly growth rate in the country, while the highest was seen in Kansas (to 11% readiness). Including Kansas and five of the top 10 states, a total of 39 states saw 4K readiness rates more than double over the past year.

At 7.7%, and as one of eight states below 10%, Arkansas was the state with the lowest 4K readiness rate. With the exception of the broadband adoption, Arkansas placed last in each of the surveyed metrics in the second quarter.

	State	% Above 15 Mbps	QoQ Change	YoY Change
1	Delaware	35%	35%	158%
2	Massachusetts	29%	6.2%	68%
3	New Hampshire	26%	5.3%	60%
4	District of Columbia	26%	17%	51%
5	New Jersey	26%	20%	137%
6	Connecticut	25%	27%	110%
7	Washington	25%	11%	82%
8	Rhode Island	25%	1.4%	132%
9	Virginia	25%	15%	91%
10	Oregon	23%	18%	100%

Figure 21: 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 second quarter of 2014, the United States had the fastest average connection speed among surveyed Americas countries, a full megabit per second above Mexico. As shown in Figure 22, these two countries remained well ahead of the other countries in the region, with Mexico nearly 5 Mbps faster than Uruguay. Strong quarter-over-quarter changes were seen across all of the surveyed Americas countries, led by Chile, Argentina, and Uruguay, which all saw average connection speeds grow in excess of 30% from the first quarter. An additional five countries had quarterly growth rates above 10%, while the smallest increase seen during the quarter was in Panama, which added 6.6%.

On a year-over-year basis, extremely strong increases were seen across most countries in the region. Uruguay saw its speed grow by nearly 200% from the same period a year earlier, while Argentina's was up 111%. Ten additional countries saw double-digit percentage increases, while just three grew by less than 10% year-over-year, with Paraguay's 3.3% increase the smallest seen in the quarter. Looking back, the last time a surveyed Americas country saw a yearly decline in average connection speeds was the second quarter of 2013, when Chile posted a 1.4% loss. Given the extremely positive trends over the last year, it is clear that broadband connectivity is improving in the region, and should continue to benefit going forward from continued investment and adoption. This ongoing improvement is important, as only six of the surveyed Americas countries currently have an average connection speed above the 4 Mbps "broadband" threshold, while only two have a speed above the 10 Mbps "high broadband" threshold.

5.2 Americas Average Peak Connection Speeds / As shown in Figure 23, Uruguay maintained its solid lead ahead of the United States, with an average peak connection speed just shy of 50 Mbps. However, the United States and Canada were not too far behind, both with average peak speeds above 40 Mbps, and well ahead of the remaining surveyed countries in the region. In contrast to the first quarter, all of the Americas countries saw average peak connection speeds increase quarter-over-quarter, with growth rates above 10% seen in all but three countries. Within the region, Chile posted the largest quarter-over-quarter change at 36%, while the smallest was seen in Paraguay at 6.6%. Similar to the first quarter, Paraguay, Venezuela, and Bolivia were the only countries in the region to have average peak speeds below 10 Mbps, though continued quarterly improvements should help push them above that mark in short order.

From a year-over-year perspective, the largest growth was seen in Uruguay, which was up 225% from the second quarter of 2013. This impressive growth was much larger than that seen in any of the other countries, with Argentina's 63% increase the next biggest. In addition to Uruguay, nine surveyed countries in the region saw average peak connection speeds grow by more than 10% year-over-year. Bolivia had the smallest yearly increase at 1.8%, while Costa Rica and Paraguay again saw average peak connection speeds decline year-over-year, though losses in both countries were smaller than the year-over-year losses seen last quarter.

5.3 Americas High Broadband Connectivity / As observed last quarter, Figure 24 makes it clear that there is still a significant gap in high broadband adoption rates across the surveyed countries in the Americas region, with the disparity getting slightly larger in the second quarter. The United States and Canada remained far ahead of the other countries, with both nations again seeing more than a third of their connections to Akamai at speeds above 10 Mbps. Uruguay again saw its adoption rate more than double quarter-over-quarter, pushing it to a 10% adoption rate. However, the remaining countries in the region all had high broadband adoption rates well below 10%, with Paraguay's still not quite large enough to register. Having said that, observed quarterly growth in high broadband adoption was very strong in the second quarter. Among the surveyed countries that qualified for inclusion, four saw adoption rates more than double from the previous quarter, led by Chile's 429% increase. The smallest increase was seen in the United States, where high broadband adoption grew 7.6% quarter-over-quarter. Among the countries that did not qualify for inclusion, four also saw adoption rates more than double, though all of them also had adoption rates below 1%, meaning that relative small shifts can result in large quarter-over-quarter changes.

Global Rank	Country/Region	Q2 '14 Avg. Mbps	QoQ Change	YoY Change
14	United States	11.4	8.9%	39%
19	Canada	10.4	6.8%	27%
51	Uruguay	5.6	31%	197%
65	Chile	4.4	35%	51%
67	Mexico	4.4	9.4%	23%
70	Argentina	4.2	34%	111%
76	Ecuador	3.6	9.2%	23%
82	Colombia	3.4	12%	17%
85	Peru	3.1	13%	51%
89	Brazil	2.9	11%	19%
93	Panama	2.8	6.6%	6.0%
107	Costa Rica	2.3	14%	8.7%
128	Venezuela	1.4	9.1%	10%
132	Paraguay	1.3	9.7%	3.3%
137	Bolivia	1.1	16%	20%

Figure 22: Average Connection Speed by Americas Country

Global Rank	Country/Region	Q2 '14 Peak Mbps	QoQ Change	YoY Change
13	Uruguay	49.7	9.7%	225%
17	United States	45.3	12%	30%
20	Canada	43.9	11%	28%
61	Chile	28.5	36%	48%
74	Argentina	23.5	25%	63%
78	Mexico	22.3	16%	18%
83	Ecuador	21.8	15%	11%
86	Colombia	21.0	25%	25%
88	Peru	20.2	18%	27%
89	Brazil	20.2	13%	8.1%
111	Panama	14.3	14%	5.9%
127	Costa Rica	11.4	13%	-7.8%
132	Paraguay	9.6	6.6%	-0.9%
133	Venezuela	9.4	19%	11%
134	Bolivia	8.9	6.8%	1.8%

Figure 23: Average Peak Connection Speed by Americas Country

Among the eight surveyed Americas countries that qualified for inclusion in the global rankings for this metric, year-over-year increases were impressively strong across all of them. Uruguay's high broadband adoption rate grew by nearly 15,000% from the second quarter of 2013, while Argentina's was up over 1,500%. Four of the other qualifying countries saw triple-digit percentage changes, while only the United States and Canada grew by less than 100% over the last year. Among the remaining countries, yearly growth rates were also extremely strong, with Peru adding more than 1,500%, and only Costa Rica increasing less than 100%.

With particularly large quarterly and yearly increases in high broadband adoption seen in the second quarter, wired Internet connectivity in Chile is clearly improving. With rural areas often hard to reach with wired connections, two announcements in the second quarter point to potential improvements to Internet access in those areas. In April, a Google executive said that Chile would be the second country to test the company's "Loon" broadband project, which uses hot-air balloons to provide Internet connectivity at 3G speeds.[30] In May, Telefonica[31] announced that it had launched satellite broadband services in Chile, with services initially offered to 50,000 customers living in 125 rural and semi-urban communities of Chile's Coquimbo, Valparaiso, O'Higgins and Metropolitan regions at tiers between 2 – 6 Mbps.

5.4 Americas Broadband Connectivity / As Figure 25 shows, the United States was the only surveyed Americas country to see a decline in broadband adoption in the second quarter, though the loss was fairly small at just 1.6%. Neighboring Canada had the smallest quarterly increase at 1.3%, dwarfed by the 130% and 132% quarterly changes seen in Peru and Costa Rica respectively. The remaining countries that qualified for inclusion all saw double-digit percentage increases quarter-over-quarter, as did Bolivia and Paraguay, which did not qualify for global ranking. Similar to the high broadband metric, there is a significant range of broadband adoption rates across the surveyed Americas countries as well, with Canada having more than 80% of its connections to Akamai at speeds over 4 Mbps, while Venezuela, Bolivia, and Paraguay had less than 2% of connections at those speeds.

Given the extremely positive trends over the last year, it is clear that broadband connectivity is improving in the region, and should continue to benefit going forward from continued investment and adoption.

Year-over-year changes across the qualifying Americas countries were all positive in the second quarter, with Uruguay seeing the largest increase for this metric as well, growing 3,455% over the past year. Chile, Argentina, Peru, and Costa Rica all saw broadband

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
14	United States	39%	7.6%	72%
17	Canada	35%	12%	77%
43	Uruguay	10%	131%	14917%
48	Argentina	5.9%	195%	1569%
49	Chile	5.8%	429%	816%
53	Mexico	4.0%	77%	288%
58	Brazil	1.8%	92%	149%
61	Colombia	1.1%	155%	409%
–	Ecuador	2.8%	98%	217%
–	Panama	0.9%	88%	261%
–	Peru	0.7%	162%	1598%
–	Costa Rica	0.6%	30%	65%
–	Venezuela	0.2%	121%	101%
–	Bolivia	0.2%	122%	196%
–	Paraguay	<0.1%	122%	567%

Figure 24: High Broadband (>10 Mbps) Connectivity by Americas Country

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
17	Canada	84%	1.3%	4.6%
35	United States	72%	-1.6%	6.2%
55	Uruguay	53%	55%	3455%
64	Chile	42%	72%	183%
67	Mexico	38%	15%	53%
69	Argentina	36%	42%	340%
74	Colombia	26%	50%	89%
75	Brazil	26%	22%	71%
76	Ecuador	25%	11%	45%
80	Peru	18%	130%	865%
82	Panama	15%	23%	37%
87	Costa Rica	9.2%	132%	214%
93	Venezuela	1.6%	60%	1.9%
–	Bolivia	13%	90%	93%
–	Paraguay	1.0%	96%	356%

Figure 25: Broadband (>4 Mbps) Connectivity by Americas Country

adoption rates more than double year-over-year, as did Paraguay, though it did not qualify for inclusion in the global rankings. Three qualifying countries saw much smaller changes, with the United States, Canada, and Venezuela all seeing broadband adoption rates increase by less than 10% year-over-year, with the Venezuela's 1.9% growth the smallest in the region.

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 media players.

As Figure 26 plainly shows, 4K readiness is still extremely limited across the surveyed countries in the Americas region. The United States and Canada remained the only two countries in the region to have more than 10% of connections to Akamai at speeds above 15 Mbps in the second quarter, while Brazil was the only qualifying country to see less than 1% of its connections at those speeds. More than half of the surveyed countries in the Americas region failed to qualify for inclusion in the global rankings, and among these countries, 4K readiness levels were below 1%.

Observed quarterly and yearly growth rates among the qualifying countries were strongest in the countries with the lowest readiness rates. The greatest increases were seen in Uruguay, Chile, and Argentina — all three countries had failed to qualify for inclusion in the first quarter. Brazil was the only qualifying country to see 4K readiness grow by less than 100% year-over-year. As noted in the inaugural review of this metric in the first quarter, the observed 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 15 Mbps	QoQ Change	YoY Change
15	United States	19%	17%	122%
21	Canada	16%	24%	129%
39	Uruguay	3.9%	110%	29862%
43	Chile	1.8%	468%	882%
46	Argentina	1.5%	294%	1958%
48	Mexico	1.3%	78%	268%
49	Brazil	0.6%	68%	88%
–	Ecuador	0.8%	95%	173%
–	Costa Rica	0.3%	11%	35%
–	Colombia	0.3%	138%	426%
–	Panama	0.3%	79%	230%
–	Peru	0.2%	150%	838%
–	Venezuela	0.1%	162%	217%
–	Bolivia	0.1%	152%	130%
–	Paraguay	<0.1%	160%	<0.1%

Figure 26: 4K Ready (>15 Mbps) Connectivity by Americas Country

[SECTION]6 GEOGRAPHY *ASIA PACIFIC (APAC)*

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 / With a strong 24% quarterly increase, Singapore became the fourth surveyed Asia Pacific country/region to have an average connection speed above the 10 Mbps "high broadband" threshold, joining Japan, Hong Kong, and South Korea. The latter remained in its position as the country with the highest average connection speed, reaching 24.6 Mbps in the second quarter, as shown in Figure 27, well ahead of Hong Kong. South Korea also remained the only surveyed Asia Pacific country with an average speed above 20 Mbps. Among the remaining countries/regions, connection speeds ranged from 9.5 Mbps in Taiwan down to 2.0 Mbps in India. Solid quarter-over-quarter changes were seen across all

surveyed geographies, with increases ranging from 1.7% in Japan to an unexpectedly strong 42% in Vietnam. Ten of the 14 Asia Pacific countries/regions had quarterly growth rates above 10%, compared to just four in the previous quarter.

Looking at year-over-year changes seen across the Asia Pacific region in the second quarter, we see that all of the surveyed countries/regions again experienced very strong growth in average connection speeds. Although none saw speeds double over the prior year, South Korea gained 84%, while both Taiwan and Vietnam added 73%. The smallest yearly change was 23%, seen in Japan. As noted in the past, the continued aggressive growth of both the short- and long-term trends is very encouraging, and points to ongoing improvements in Internet connectivity across the region.

6.2 Asia Pacific Average Peak Connection Speeds / Figure 28 shows that in the first quarter, Hong Kong and South Korea were the only two surveyed Asia Pacific countries/regions with average peak connection speeds above 60 Mbps. In the second quarter, they remained set apart from their peers, as solid quarter-over-quarter increases made them the only two with average peak connection speeds above 70 Mbps, with Hong Kong's 12% growth rate pushing it just ahead of South Korea. Strong quarterly growth in Singapore and Japan made them the only other two countries/regions with average peak speeds above 60 Mbps. In contrast to the first quarter, all of the surveyed Asia Pacific countries/regions saw quarterly growth, with increases ranging from 5.2% in South Korea to 49% in Vietnam. In addition to South Korea, only Malaysia had a quarterly growth rate below 10%.

Year-over-year changes in average peak connection speeds across surveyed Asia Pacific countries/regions were also very strong in the second quarter. The largest increase over the past year was seen in Indonesia, which grew 107%. Among the remaining countries/regions, both New Zealand and China saw average peak speeds grow by slightly more than 50% over the prior year, while Hong Kong's 14% year-over-year change was the smallest of the group. After a slight decline seen in the first quarter, the long term trend in Vietnam turned positive, as its average peak connection speed increased 29% from the second quarter of 2013.

6.3 Asia Pacific High Broadband Connectivity / The availability of high speed Internet connectivity is presumably improving across the Asia Pacific region, as the Philippines was the only surveyed country that did not qualify for inclusion in the second quarter, down from three in the prior two quarters. Among the remaining qualifying countries/regions, there was a significant spread of high broadband adoption rates, as illustrated in Figure 29. South Korea again topped the list, with 78% of connections to Akamai at speeds above 10 Mbps. In addition to South Korea, Japan and Hong Kong also had high broadband adoption rates above 50%. At the lower end, both Vietnam and Indonesia had less than 1% of connections to Akamai at those speeds, as did the Philippines. In addition to the broad range of adoption rates, there was also a broad range of quarterly changes. Japan and Taiwan were the only two surveyed countries/regions to see quarter-over-quarter declines, both at 0.3%. Quarter-over-quarter increases ranged from 2.0% in South Korea to a surprisingly high 534% in Vietnam, with Thailand and Malaysia also seeing high broadband adoption rates more than double from the first quarter.

Year-over-year changes across the qualifying surveyed Asia Pacific countries/regions evidenced another quarter of strong growth. Nine countries/regions saw high broadband adoption rates more than double over the past year; Vietnam's 883% increase was the largest seen. China's yearly growth continued to shift to a more moderate pace, as this was the first quarter in the past year when it grew less than 100% year-over-year, increasing "just" 61% in the

Global Rank	Country/Region	Q2 14 Avg. Mbps	QoQ Change	YoY Change
1	South Korea	24.6	4.0%	84%
2	Hong Kong	15.7	18%	45%
4	Japan	14.9	1.7%	23%
21	Singapore	10.4	24%	59%
26	Taiwan	9.5	6.7%	73%
41	Australia	7.1	18%	46%
43	New Zealand	6.8	21%	47%
47	Thailand	6.3	22%	42%
69	Malaysia	4.3	21%	37%
73	China	3.7	18%	32%
90	Vietnam	2.9	42%	73%
101	Indonesia	2.5	5.1%	44%
103	Philippines	2.5	19%	58%
115	India	2.0	15%	46%

Figure 27: Average Connection Speed by Asia Pacific Country/Region

Global Rank	Country/Region	Q2 '14 Peak Mbps	QoQ Change	YoY Change
1	Hong Kong	73.9	12%	14%
2	South Korea	72.1	5.2%	34%
4	Singapore	64.9	13%	42%
6	Japan	61.5	11%	25%
7	Taiwan	58.2	11%	47%
28	Thailand	41.3	20%	25%
40	Australia	36.8	16%	27%
53	New Zealand	31.8	31%	52%
54	Malaysia	30.5	9.5%	15%
73	Indonesia	23.5	21%	107%
85	Philippines	21.6	15%	35%
94	Vietnam	18.2	48%	29%
97	China	17.4	28%	52%
110	India	14.4	20%	24%

Figure 28: Average Peak Connection Speed by Asia Pacific Country/Region

second quarter. Hong Kong also saw a 61% yearly increase, and was joined by South Korea and Japan as the only other qualifying countries/regions that had yearly growth rates below 100%. At 430%, the Philippines' year-over-year increase was particularly strong, as was its 150% quarter-over-quarter increase. However, with such a low high broadband adoption rate and fewer than 25,000 unique IP addresses connecting to Akamai at speeds over 10 Mbps in the second quarter, these large changes do not necessarily represent significant improvements to connectivity within the country.

Despite having the lowest adoption rate in the second quarter, broadband connectivity in India is clearly improving over the long-term. In looking at historical data, we find that India's broadband adoption rate has grown over 5x since the second quarter of 2012 (two years), and over 10x since the second quarter of 2011 (three years).

6.4 Asia Pacific Broadband Connectivity / In the second quarter, South Korea continued to creep towards complete broadband adoption, growing 1.0% to 95% broadband adoption. Small quarterly increases were also seen in Hong Kong and Japan, as seen in Figure 30. The remaining surveyed Asia Pacific countries/regions all saw broadband adoption grow by 10% or more from the first quarter, with the Philippines falling just short of doubling, with a 99% quarterly increase and Vietnam delivering an impressive 427% increase. All but two of the surveyed countries/regions had more than one in 10 of their connections to Akamai at speeds above 4 Mbps in the second quarter, with just the Philippines (8.3% adoption) and India (7.6% adoption) lagging behind; four countries/regions fell below the 10% adoption threshold in the first quarter. With continued strong growth in these two countries, all of the surveyed Asia Pacific countries should be above 10% broadband adoption by the end of the year, which is an encouraging milestone.

Interestingly, the largest year-over-year changes in broadband adoption rates across the surveyed Asia Pacific countries/regions were seen in the four countries with the lowest levels of adoption. Vietnam led the group, growing 722% year-over-year, followed by Indonesia and the Philippines, which added more than 200% over the past year, and India, which saw a 179% increase. In contrast, Japan only managed a 6.9% increase from the second quarter of 2013. The remaining countries/regions all saw yearly growth rates above 10%. Despite having the lowest adoption rate in the second quarter, broadband connectivity in India is clearly improving over the long-term. In looking at historical data, we find that India's broadband adoption rate has grown over 5x since the second quarter of 2012 (two years), and over 10x since the second quarter of 2011 (three years). With a June announcement[32] that the country's Department of Telecom

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
1	South Korea	78%	2.0%	72%
3	Japan	54%	-0.3%	24%
5	Hong Kong	52%	21%	61%
21	Singapore	33%	57%	149%
28	Taiwan	26%	-0.3%	210%
38	Australia	15%	45%	202%
41	New Zealand	13%	81%	248%
44	Thailand	8.2%	102%	294%
51	Malaysia	5.5%	112%	174%
59	China	1.8%	47%	61%
60	India	1.2%	66%	315%
62	Vietnam	0.6%	534%	883%
63	Indonesia	0.5%	72%	320%
–	Philippines	0.7%	150%	430%

Figure 29: High Broadband (>10 Mbps) Connectivity by Asia Pacific Country/Region

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
1	South Korea	95%	1.0%	11%
9	Hong Kong	89%	5.3%	14%
12	Japan	86%	0.3%	6.9%
20	Singapore	80%	10%	31%
21	Taiwan	80%	13%	61%
24	Thailand	79%	30%	53%
36	New Zealand	72%	21%	53%
44	Australia	65%	18%	61%
65	Malaysia	40%	22%	52%
71	China	33%	31%	80%
79	Vietnam	20%	427%	722%
84	Indonesia	10%	52%	213%
88	Philippines	8.3%	99%	276%
89	India	7.2%	46%	179%

Figure 30: Broadband (>4 Mbps) Connectivity by Asia Pacific Country/Region

was expected to finalize a National Broadband Policy within 100 days that would treat high-speed Internet access as a basic right like education and health, we can expect that this long-term trend will continue to accelerate going into the future.

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 media players.

Figure 31 highlights that widely varying levels of 4K readiness remain across surveyed Asia Pacific countries/regions. South Korea once again led the region, and the world, with 62% of its connections to Akamai at speeds of 15 Mbps or above. Similar to first quarter observations, this remains nearly 2x the readiness rates seen in Hong Kong and Japan, and over 4x those seen in Singapore and Taiwan. Five of the remaining countries/regions that qualified for inclusion in the metric had less than 10% of connections to Akamai at 4K-ready speeds, with India and China again showing readiness levels below 1%. Similar to the first quarter, four countries did not qualify for global ranking, and of these four, only Malaysia had a readiness rate above 1%.

Observed quarterly changes in qualifying countries regions ranged from just 1.3% in Japan and 2.9% in South Korea up to 95% in New Zealand. Taiwan was the only surveyed region to see a quarterly decline, losing 3.4%. Yearly changes in 4K readiness rates were all positive, and very strong. Among qualifying countries/regions, Japan, China, and Hong Kong saw double-digit percentage improvements, while seven others saw readiness more than double over the last year, led by the 389% improvement in New Zealand. As noted in the inaugural review of this metric in the first quarter, the observed 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 15 Mbps	QoQ Change	YoY Change
1	South Korea	62%	2.9%	123%
2	Hong Kong	34%	29%	85%
3	Japan	33%	1.3%	37%
24	Singapore	14%	73%	188%
26	Taiwan	13%	-3.4%	286%
35	Australia	6.7%	53%	221%
38	New Zealand	4.5%	95%	389%
42	Thailand	2.2%	88%	238%
50	India	0.5%	57%	263%
51	China	0.3%	48%	60%
–	Malaysia	1.5%	136%	175%
–	Philippines	0.2%	115%	257%
–	Indonesia	0.2%	73%	227%
–	Vietnam	0.1%	300%	780%

Figure 31: 4K Ready (>15 Mbps) Connectivity by Asia Pacific Country/Region

[SECTION]7 GEOGRAPHY *EUROPE, MIDDLE EAST AND AFRICA (EMEA)*

The metrics presented here for the EMEA region are based on a subset of data used for Section 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 / For a second consecutive quarter, Switzerland led the surveyed EMEA countries in the average connection speed metric at 14.9 Mbps, slightly under the 15 Mbps 4K-ready threshold. It was just ahead of the Netherlands, which held the top spot at the end of 2013. As Figure 32 shows, 11 additional EMEA countries had average connection speeds above 10 Mbps "high broadband" threshold in the second quarter, with another eleven above the 4 Mbps "broadband" threshold. Quarterly changes were fairly solid across the surveyed countries, with all seeing higher average speeds quarter-over-quarter. Russia and France had the lowest growth rates, at 7.4%, and were joined by two other countries in having growth rates

below 10%. The biggest increase was seen in Romania, at 27%; Portugal and Israel were the only two other EMEA countries to see quarterly increases above 20%.

Looking at year-over-year changes, the smallest increase was seen in the United Arab Emirates which added 1.2%. Across the other surveyed countries, yearly growth rates were extremely strong, ranging from a low of 22% in Austria and Italy to a high of 58% in Ireland. In addition to Ireland, five additional EMEA countries saw average connection speeds grow by 50% or more over the last year. These long-term trends continue to be strongly positive, and are reflective of ongoing improvements in Internet connectivity across the region.

7.2 EMEA Average Peak Connection Speeds / Figure 33 shows that average peak connection speeds in Israel and Romania remained well ahead of the other surveyed countries in the EMEA region, as they were the only two with average peak speeds above 60 Mbps, thanks to strong quarterly growth rates. In the first quarter, these two were also the only two countries above 50 Mbps, but large quarter-over-quarter increases pushed the Netherlands, Switzerland, and Belgium above that threshold, with Sweden just shy of it. Across the region, South Africa had the lowest average peak connection, even after seeing the largest quarter-over-quarter change, at 31%. The smallest change was seen in the United Arab Emirates, at 6.2%, placing it as the only country to grow less than 10%. None of the surveyed EMEA countries saw average peak connection speeds decline from the previous quarter.

With the exception of a 10% loss observed in the United Arab Emirates, year-over-year changes were all strongly positive. Growth rates among the surveyed EMEA countries ranged from 13% in Poland to 71% in Israel, with South Africa and Russia also seeing speeds improve by 50% or more from the preceding year. In comparing the EMEA region with the other regions covered within the report, we find the yearly growth trends to be roughly in line with those seen in the Asia Pacific region and generally stronger than those seen across countries in the Americas region.

Global Rank	Country/Region	Q2 '14 Avg. Mbps	QoQ Change	YoY Change
3	Switzerland	14.9	17%	35%
5	Netherlands	14.3	15%	42%
6	Sweden	13.6	17%	52%
8	Ireland	12.6	18%	58%
9	Czech Republic	12.6	12%	28%
10	Romania	11.8	27%	57%
11	Denmark	11.7	11%	39%
12	Finland	11.6	7.9%	43%
13	Norway	11.5	14%	57%
15	Belgium	11.2	12%	34%
16	United Kingdom	11.1	12%	32%
17	Israel	11.0	23%	50%
20	Austria	10.4	10%	22%
27	Russia	9.2	7.4%	30%
28	Germany	8.9	9.8%	23%
29	Hungary	8.8	18%	36%
31	Slovakia	8.2	12%	28%
32	Poland	8.1	8.6%	23%
34	Spain	8.0	11%	36%
35	Portugal	7.9	23%	45%
40	France	7.1	7.4%	24%
48	Italy	5.8	11%	22%
53	Turkey	5.5	10%	56%
61	United Arab Emirates	4.6	7.7%	1.2%
87	South Africa	3.0	16%	32%

Figure 32: Average Connection Speed by EMEA Country/Region

Global Rank	Country/Region	Q2 '14 Peak Mbps	QoQ Change	YoY Change
3	Israel	68.6	19%	71%
5	Romania	63.0	16%	33%
9	Netherlands	53.2	18%	37%
10	Switzerland	53.1	19%	28%
11	Belgium	52.9	19%	33%
12	Sweden	49.8	17%	41%
15	United Kingdom	46.6	10%	25%
16	Russia	46.2	12%	50%
18	Ireland	44.7	16%	45%
19	Portugal	44.1	20%	26%
22	Czech Republic	43.1	11%	22%
24	Hungary	42.1	12%	16%
25	Germany	41.8	18%	29%
26	Austria	41.5	15%	25%
29	Finland	40.9	12%	32%
30	Denmark	40.7	15%	32%
31	Norway	40.1	12%	40%
39	Spain	36.9	15%	15%
42	Poland	36.4	11%	13%
44	Slovakia	36.0	12%	21%
47	United Arab Emirates	34.4	6.2%	-10%
51	Turkey	32.5	22%	30%
56	France	30.1	17%	24%
65	Italy	26.4	23%	15%
120	South Africa	13.2	31%	59%

Figure 33: Average Peak Connection Speed by EMEA Country/Region

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
2	Switzerland	56%	25%	53%
4	Netherlands	52%	20%	71%
6	Romania	50%	63%	202%
8	Belgium	43%	24%	74%
9	Israel	42%	67%	156%
10	Czech Republic	42%	25%	56%
11	Denmark	41%	16%	84%
12	Sweden	40%	19%	67%
15	United Kingdom	36%	12%	58%
16	Finland	36%	5.0%	55%
18	Norway	34%	14%	88%
20	Ireland	33%	29%	112%
24	Russia	32%	16%	70%
26	Hungary	28%	53%	144%
27	Austria	28%	19%	52%
29	Germany	25%	22%	67%
31	Portugal	23%	92%	231%
32	Poland	22%	24%	55%
34	Spain	20%	29%	144%
36	Slovakia	19%	33%	91%
40	France	15%	22%	118%
47	Italy	6.6%	52%	102%
52	Turkey	5.1%	59%	334%
54	United Arab Emirates	3.7%	21%	-37%
56	South Africa	2.5%	81%	61%

Figure 34: High Broadband (>10 Mbps) Connectivity by EMEA Country/Region

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
3	Switzerland	92%	1.9%	2.5%
5	Denmark	91%	4.8%	15%
6	Romania	91%	3.8%	14%
7	Netherlands	90%	1.5%	8.0%
8	Israel	89%	4.4%	20%
11	Belgium	86%	8.1%	13%
14	Austria	85%	2.4%	1.0%
15	Sweden	85%	6.0%	33%
16	Czech Republic	85%	1.9%	2.1%
19	United Kingdom	84%	0.8%	8.3%
23	Germany	81%	3.3%	5.1%
25	Russia	79%	1.6%	12%
27	Hungary	78%	3.8%	5.8%
29	Spain	76%	3.3%	19%
30	Finland	76%	1.9%	13%
31	Portugal	76%	6.6%	22%
32	Poland	75%	2.5%	14%
34	Norway	74%	17%	49%
39	Slovakia	73%	5.4%	18%
41	France	70%	0.7%	9.0%
42	Ireland	69%	4.8%	10%
43	Turkey	68%	9.5%	186%
45	Italy	65%	11%	28%
60	United Arab Emirates	47%	8.9%	15%
83	South Africa	13%	56%	66%

Figure 35: Broadband (>4 Mbps) Connectivity by EMEA Country/Region

7.3 EMEA High Broadband Connectivity / While none of the surveyed EMEA countries had more than half of their connections to Akamai at speeds above 10 Mbps in the first quarter, the second quarter saw three of them reach that goal, as Switzerland, the Netherlands, and Romania had high broadband adoption rates of 50% or more. Figure 34 shows that adoption again remained fairly strong across the region, with all but four countries (Italy, Turkey, the United Arab Emirates, and South Africa) seeing high broadband adoption rates above 10%, the same as in the first quarter. Quarter-over-quarter changes were positive across all surveyed countries and were particularly strong. Finland was the only country to see its high broadband adoption rate increase less than 10%, growing just 5% from the first quarter, while the highest growth rates were seen in Portugal (up 92%) and South Africa (up 82%).

Despite having the largest quarterly increase, Portugal did not have the largest yearly increase. That honor went to Turkey, which improved by 334% year-over-year; however, Portugal was one of eight other countries in the EMEA region that saw high broadband adoption levels more than double from the second quarter of 2013. Among the remaining countries, all but the United Arab Emirates saw double-digit percentage increases, with Austria's 52% growth the lowest; the United Arab Emirates lost 37% year-over-year.

While neither Germany nor Italy led the region in high broadband adoption, their relative positions may increase if initiatives publicized in the second quarter are successful and gain traction more broadly across the countries. In Germany, it was reported[33] in June that residents of a fairly small village collected funds and built their own fiber broadband network after the major local network service providers could not provide "reasonable" Internet service. (Unfortunately, published reports do not mention the connection speeds available through this crowdfunded municipal network.) In Italy, it was reported[34] that a fiber-to-the-premises project was launched in the Lombardy Region to connect 600 residents, including households, schools, and businesses, with broadband service provided for free at speeds of up to 100 Mbps, with speeds as high as 1 Gbps after a future upgrade.

7.4 EMEA Broadband Connectivity / Romania, Denmark, and the Netherlands joined Switzerland in being the only surveyed countries in the EMEA region with broadband adoption rates of 90% or more, as shown in Figure 35. Israel and five other countries were not too far behind, with eight of every 10 connections to Akamai in the second quarter at speeds of 4 Mbps or above. Once again, all but two of the surveyed EMEA countries had broadband adoption rates above 50%, with the United Arab Emirates (47% adoption) and South Africa (13% adoption) the two outliers. Quarter-over-quarter changes across the region were all positive, but were for the most part more limited than those seen in the other regions, with only Norway, Italy, and South Africa growing more than 10%; South Africa's 56% increase was the largest in the EMEA region in the second quarter. The smallest quarterly increases were seen in the United Kingdom and France, both of which grew less than 1% from the first quarter.

Turkey continued its multi-quarter run as the only surveyed EMEA country to see a year-over-year change above 100%, growing 186% from the second quarter of 2013. South Africa had the next highest increase, at 66%, and was joined by 15 other countries in seeing a double-digit percentage yearly increase. Among the remaining surveyed countries, Austria's 1% year-over-year growth was the smallest increase seen in the region in the second quarter. The long-term trend in the United Arab Emirates also turned positive in the second quarter, after being the only surveyed country in the EMEA region to see a yearly loss in the first quarter.

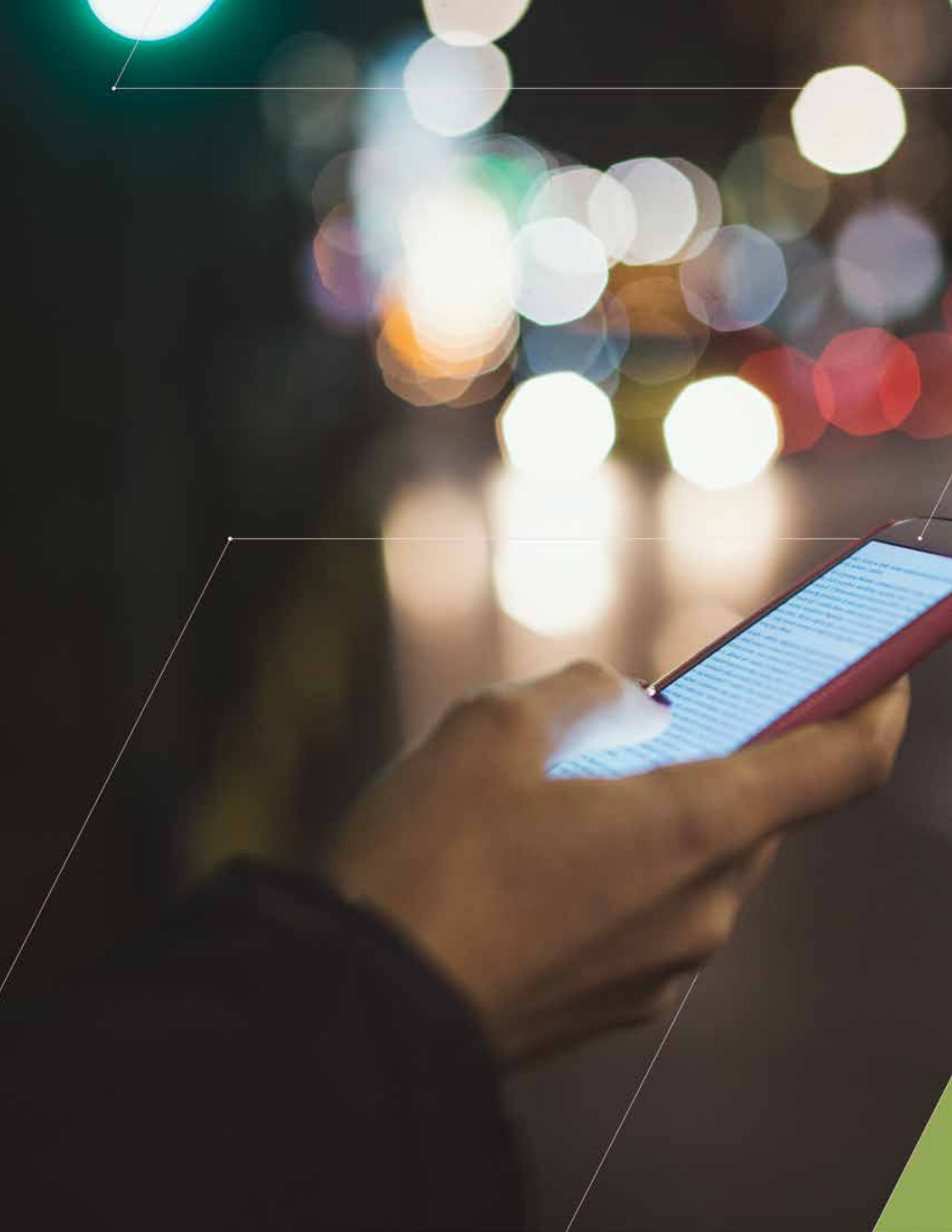
7.5 EMEA 4K Readiness / Section 3.5 provides additional context around the addition of this metric to the *State of the Internet Report*, noting that the rankings presented here are not intended to specify who can/cannot view 4K content, but rather which countries/regions have higher concentrations of 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 media players.

As shown in Figure 36, nearly three-quarters of the surveyed EMEA countries had more than 10% of their connections to Akamai at speeds above 15 Mbps in the second quarter, with the top three countries (Switzerland, the Netherlands, Sweden) seeing more than a quarter of their connections at those speeds. Switzerland's 33% 4K readiness rate was the highest seen in the region, while the lowest levels were again found in Turkey and South Africa, both below 2%. (The United Arab Emirates did not qualify for inclusion in the global rankings for this metric.)

Global Rank	Country/Region	% Above 15 Mbps	QoQ Change	YoY Change
4	Switzerland	33%	41%	108%
5	Netherlands	30%	36%	109%
7	Sweden	25%	25%	98%
8	Czech Republic	23%	34%	90%
9	Romania	22%	111%	281%
10	Norway	22%	20%	134%
11	United Kingdom	21%	26%	99%
12	Denmark	21%	24%	157%
13	Belgium	21%	31%	107%
14	Finland	20%	14%	129%
17	Ireland	19%	49%	160%
18	Israel	18%	99%	227%
23	Austria	16%	30%	86%
25	Russia	14%	26%	125%
27	Hungary	12%	75%	219%
28	Germany	11%	32%	101%
29	Slovakia	11%	39%	110%
30	Poland	10%	28%	68%
32	Spain	9.0%	48%	198%
34	Portugal	8.3%	123%	307%
37	France	5.9%	39%	154%
41	Italy	2.5%	54%	106%
45	Turkey	1.6%	92%	264%
47	South Africa	1.4%	73%	68%
–	United Arab Emirates	1.0%	42%	-26%

Figure 36: 4K Ready (>15 Mbps) Connectivity by EMEA Country/Region

Both quarterly and yearly changes were extremely strong across the qualifying countries. Both Romania and Portugal saw 4K readiness rates more than double quarter-over-quarter, while the smallest increase was 14%, seen in Finland. On a year-over-year basis, 18 countries saw growth of more than 100%, with Portugal's 307% increase the largest in the second quarter. Poland and South Africa had the lowest growth rates, both at a still extremely strong 68%. As noted in the inaugural review of this metric in the first quarter, the observed long-term trends are extremely encouraging, and point to improved adoption of high-speed broadband connectivity across the region over time.



[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.

Starting with the the *First Quarter, 2014 State of the Internet Report*, we have changed the connection speed data presented within this section. Historically, the report included data for a selected set of 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. As has been discussed in the past, 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 the report. As such, similar to the methodology employed for Sections 3–7 of the report,

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 for inclusion within the section.

8.1 Connection Speeds on Mobile Networks / Figure 37 shows that across the 56 countries/regions around the world that qualified for inclusion in the mobile section, South Korea again achieved the highest average connection speed, at 15.2 Mbps. Vietnam had the lowest average connection speed, at 0.9 Mbps, and was the only qualifying country with an average speed below 1 Mbps in the second quarter. South Korea remained the only country with an average connection speed above the 10 Mbps "high broadband" threshold, but 24 additional countries/regions achieved an average connection speed above the 4 Mbps "broadband" threshold. Within the individual continental regions, the following countries had the highest average mobile connection speeds:

- **Africa:** Egypt, 2.3 Mbps
- **Asia Pacific:** South Korea, 15.2 Mbps
- **Europe:** Slovakia, 8.0 Mbps
- **North America:** Canada, 7.0 Mbps
- **South America:** Venezuela, 3.7 Mbps

As noted in the first quarter, average peak mobile connection speeds again spanned an extremely broad range, from 108 Mbps in Australia down to 4.7 Mbps in Vietnam. In total, 45 qualifying countries/regions had average peak mobile connection speeds above 10 Mbps, with Australia the only one above 100 Mbps; it was more than 2x faster than Japan, which had the next highest average peak mobile connection speed. Within the individual continental regions, the following countries had the highest average peak mobile connection speeds:

- **Africa:** Morocco, 13.2 Mbps (11 kbps faster than Egypt)
- **Asia Pacific:** Australia, 108.0 Mbps
- **Europe:** Russia, 39.3 Mbps
- **North America:** Canada, 21.8 Mbps
- **South America:** Venezuela, 16.8 Mbps

Similar to the regional connectivity sections of this report, we are also including insight into "broadband" adoption levels for mobile connectivity — that is, the percentage of connections to Akamai from mobile network providers at speeds over 4 Mbps. In the second quarter, Denmark had the highest level of mobile broadband adoption, at 92%, edging out first quarter leader Ukraine, which remained at 89%. In contrast, a total of five countries (Brazil, Croatia, Paraguay, Vietnam, Bolivia) all had mobile broadband adoption rates below 1.0% in the second quarter. Within the individual continental regions, the following countries had the highest mobile broadband adoption rates:

- **Africa:** South Africa, 5.5%
- **Asia Pacific:** South Korea, 76%
- **Europe:** Denmark, 92%
- **North America:** Canada, 63%
- **South America:** Uruguay, 7.0%

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. (Note that we are now rolling up all non-Webkit/Safari browsers within the "Others" line within the graph — previous editions of the report simply included the "Others" line as generated by Akamai IO.)

Figure 38 illustrates mobile browser usage by users identified to be on cellular networks in the second quarter of 2014. 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 2 – 3% separated Mobile Safari and Android Webkit during the first month of the quarter. The changes obvious in early May were the result of an update to the underlying Akamai IO database which properly reclassified several "other" browsers as Android Webkit. Usage of the two browsers appears to be extremely similar for the next couple of weeks, but by the end of the quarter, the gap had widened to 4 – 5% in Mobile Safari's favor. Overall, Apple Mobile Safari trended to an average of 35.9% of requests, while Android Webkit trended to an average of 32.6% of requests. While usage of Android Webkit and Apple Mobile Safari on cellular networks has been fairly close in the two years that we have been publishing this data in the State of the Internet Report, this is the first quarter where Safari essentially led Webkit on cellular networks across the full 90 day observation period.

Expanding the data set to all networks (not just those defined as cellular), we observe usage patterns in Figure 39 to those seen in prior quarters. At the start of the quarter, a gap of approximately 19% separated Apple Mobile Safari and Android Webkit. As noted above, the early May reclassification helped boost the observed usage of Android Webkit, but by the end of the quarter, the gap had only narrowed slightly, to around 17%. Averaged across the entire quarter, Apple Mobile Safari accounted for 48.5% of requests, while Android Webkit accounted for 31.6% of requests.

Country/Region	Q2 '14 Avg. Mbps	Q2 '14 Peak Mbps	% Above 4 Mbps
AFRICA			
Egypt	2.3	13.2	3.6%
Morocco	1.9	13.2	1.3%
South Africa	1.8	6.1	5.5%
ASIA			
Australia	4.9	108.0	48%
China	4.5	12.5	52%
Hong Kong	5.6	28.5	48%
India	1.4	9.1	3.2%
Indonesia	2.1	11.8	4.8%
Iran	2.1	6.4	4.2%
Japan	6.5	47.5	71%
Kazakhstan	2.1	7.7	2.0%
Kuwait	4.2	37.6	37%
Malaysia	2.4	20.2	9.4%
New Zealand	3.2	13.8	28%
Pakistan	1.7	15.6	4.0%
Singapore	4.3	33.3	32%
South Korea	15.2	41.9	76%
Sri Lanka	2.7	25.5	5.2%
Taiwan	3.5	28.2	15%
Thailand	2.2	32.5	4.2%
Vietnam	0.9	4.7	0.2%
EUROPE			
Austria	6.2	32.7	66%
Belgium	3.5	9.6	27%
Croatia	2.4	9.2	0.4%
Czech Republic	5.0	18.7	59%
Denmark	7.7	36.6	92%
France	6.2	35.9	69%
Germany	3.2	16.1	15%
Hungary	3.3	17.7	17%
Ireland	5.2	27.1	42%
Italy	4.7	35.7	52%
Lithuania	3.9	24.9	37%
Moldova	4.0	18.6	29%
Netherlands	3.6	15.1	21%
Norway	4.5	18.1	42%
Poland	4.0	25.6	37%
Romania	3.1	19.8	12%
Russia	6.9	39.3	66%
Slovakia	8.0	36.9	83%
Slovenia	4.0	12.9	41%
Spain	5.1	28.9	47%
Sweden	7.0	34.6	88%
Turkey	3.2	21.1	11%
Ukraine	7.7	28.0	89%
United Kingdom	6.1	36.9	63%
NORTH AMERICA			
Canada	7.0	21.8	63%
El Salvador	2.4	12.7	4.9%
United States	6.5	15.9	37%
SOUTH AMERICA			
Argentina	1.0	6.5	2.0%
Bolivia	1.4	7.4	0.0%
Brazil	1.5	10.2	0.5%
Chile	1.5	11.6	2.0%
Colombia	2.1	9.9	2.0%
Paraguay	1.3	6.4	0.2%
Uruguay	2.0	12.9	7.0%
Venezuela	3.7	16.8	44%

Figure 37: Average and Average Peak Connection Speeds, Broadband (>4 Mbps) Adoption for Mobile Connections by Country/Region

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

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

Figure 40 shows total global monthly data and voice traffic. It depicts a strong increase in data traffic growth with moderating rate of growth and flat voice traffic development. The number of mobile data subscriptions is increasing rapidly, and driving growth in data traffic along with a continuous increase in the average data volume per subscription. Data traffic grew around 10 percent between the first and second quarters of 2014.

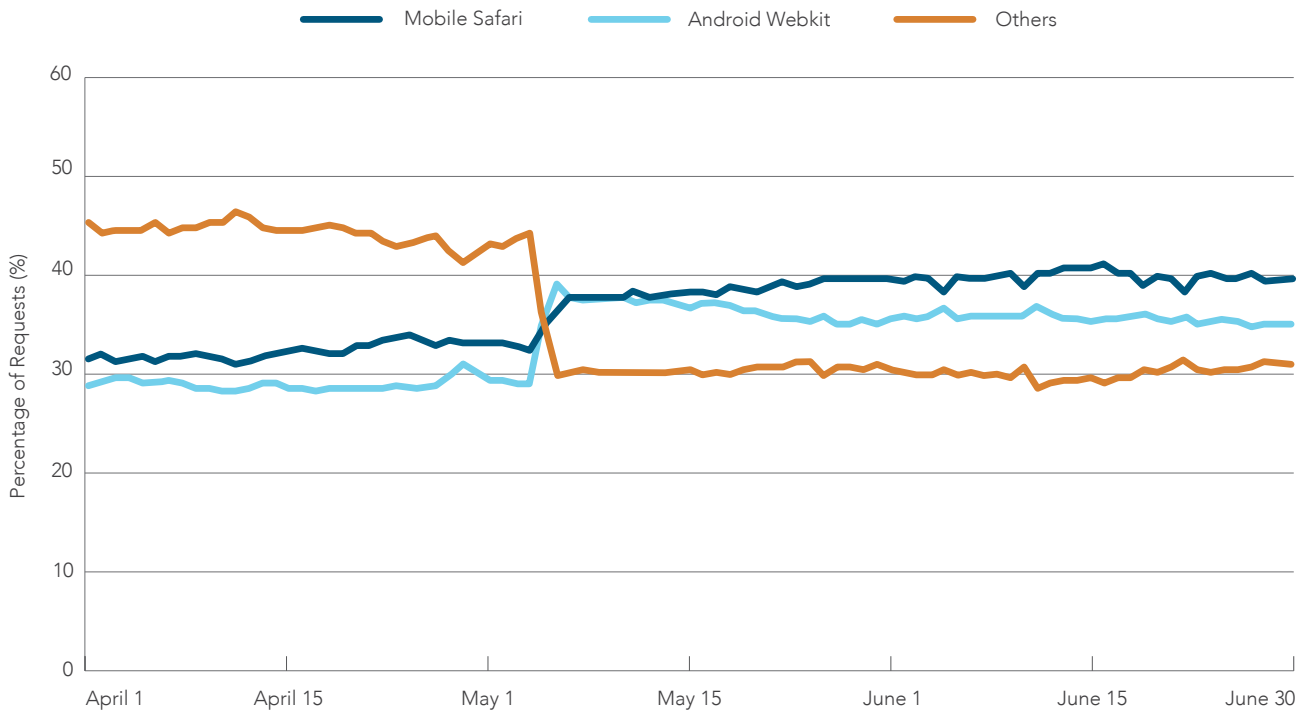


Figure 38: Leading Mobile Browsers Seen Across Cellular Networks, Q2 2014

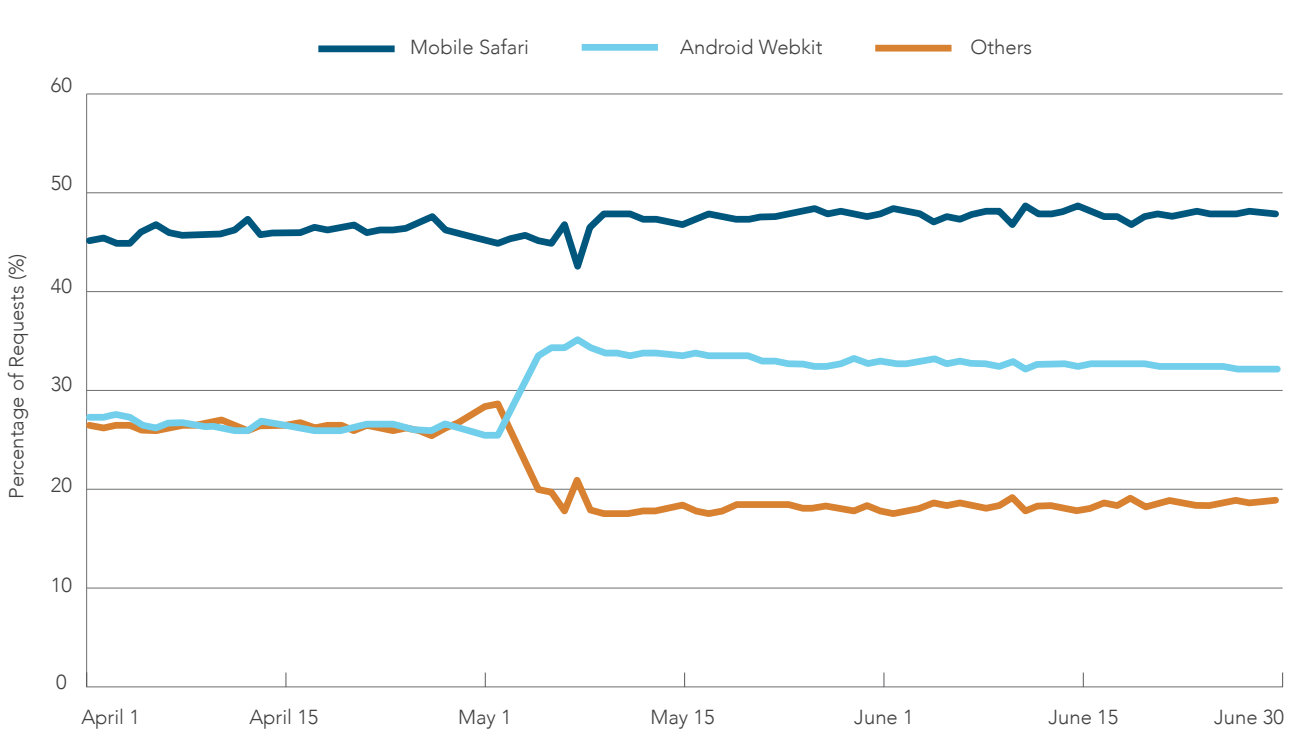


Figure 39: Leading Mobile Browsers Seen Across All Networks, Q2 2014

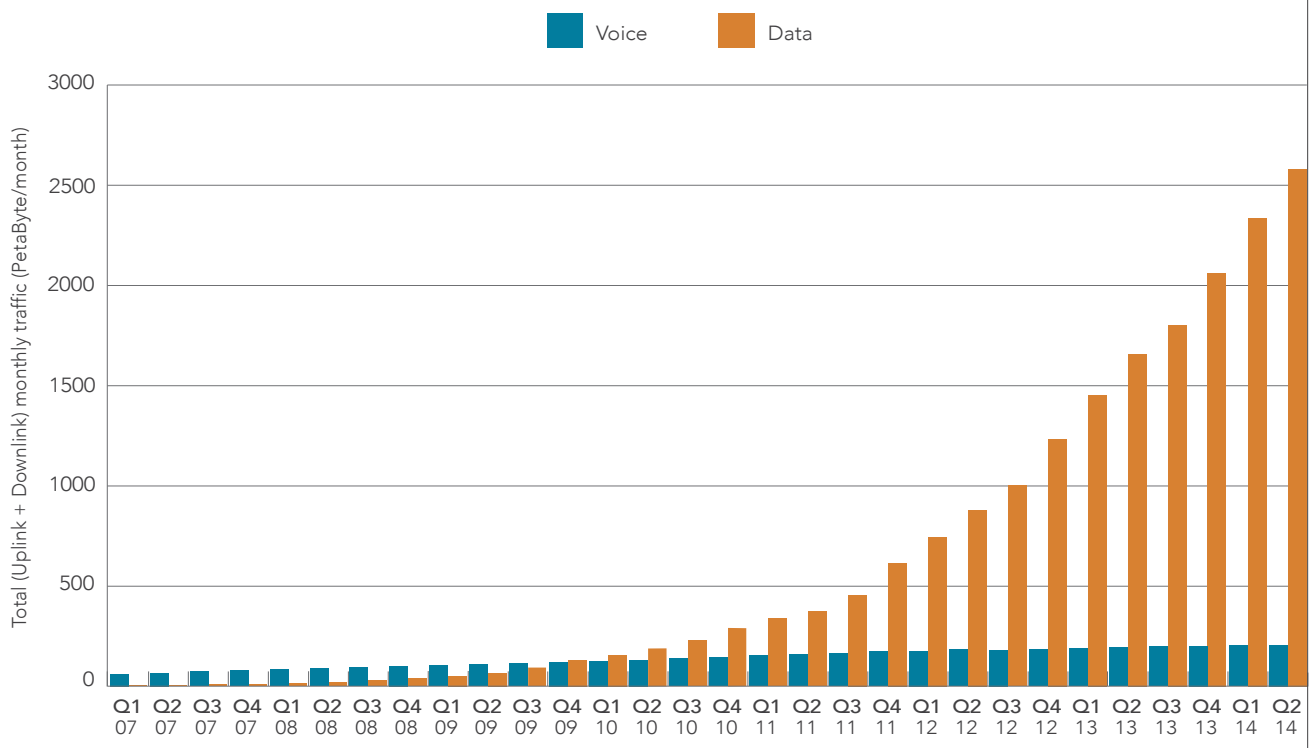


Figure 40: Total Monthly Mobile Voice and Data as Measured by Ericsson

[SECTION]9 SITUATIONAL PERFORMANCE

In June 2013, Akamai announced[35] 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 complementary 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"[36] ("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,[37] which leverages JavaScript events such as "onload." While navtiming is the preferred methodology for collecting RUM measurements, not every user agent supports it at this time.[38] 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. (However, it was discovered in July that a beta version of Safari for OSX and iOS 8 included support for the navigation timing API, meaning that Akamai will be able to collect RUM data from these browsers once production support for navtiming is available.)[39]

Figure 41 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 for broadband connections shown in Figure 41, we find the lowest values in Japan, Ireland, and Hong Kong — on the order of 4 – 8x lower than the load times seen in Paraguay and Brazil, which had the highest average page load times for broadband connections. While Japan and Hong Kong have historically had strong broadband, it is surprising to see Ireland at the top of this list as well. Turkey and Mexico had the lowest average page load times for mobile connections, which is also unexpected, as neither has historically been a leader in the mobile speed measurements presented in Section 8. The load times in these two countries were on the order of 4 – 5x faster than those seen in the Philippines and Brazil, which had the highest average page load times on mobile connections. In the last couple of reports, Canada fared rather poorly, with unusually high average page load times on mobile connections. However, this no longer seems to be the case, as the mobile load times within the country have dropped to a level more in line with expectations.

In comparing the average broadband page load times to those observed on mobile, we find a variance in what we have dubbed the "mobile penalty" — that is, how much slower does a page load for users on one type of connection versus the other. In looking at second quarter data, we find that in Turkey, Kuwait, Paraguay, Mexico, South Korea, and Vietnam, the mobile penalty was less than 1.0, meaning that average page load times on mobile connections were lower than those on broadband connections. In contrast, mobile penalties greater than 2.0 were calculated for Taiwan, the Philippines, Japan, Hong Kong, and Ireland, meaning that pages loaded more than twice as fast on broadband connections as they did on mobile connection.

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*.

Region	Country/Region	Avg. Page Load Time Broadband (ms)	Avg. Page Load Time Mobile (ms)	Mobile Penalty
Asia Pacific	Australia	3522	4551	1.3x
Asia Pacific	China	4704	5161	1.1x
Asia Pacific	Hong Kong	1958	5584	2.9x
Asia Pacific	India	6069	9601	1.6x
Asia Pacific	Indonesia	6227	6588	1.1x
Asia Pacific	Japan	1097	3118	2.8x
Asia Pacific	Kuwait	5380	3932	0.7x
Asia Pacific	Malaysia	5231	6860	1.3x
Asia Pacific	Philippines	5588	11110	2.0x
Asia Pacific	Singapore	3604	5344	1.5x
Asia Pacific	South Korea	2777	2530	0.9x
Asia Pacific	Taiwan	3199	6497	2.0x
Asia Pacific	Thailand	4111	5531	1.3x
Asia Pacific	Vietnam	4104	3720	0.9x
EMEA	Austria	2454	3947	1.6x
EMEA	France	4288	5449	1.3x
EMEA	Germany	3002	4706	1.6x
EMEA	Ireland	1508	5353	3.6x
EMEA	Israel	5265	10051	1.9x
EMEA	Italy	3796	4663	1.2x
EMEA	Morocco	5647	5982	1.1x
EMEA	Poland	2746	3566	1.3x
EMEA	Russia	3115	4530	1.5x
EMEA	Spain	3182	4090	1.3x
EMEA	Sweden	2354	3964	1.7x
EMEA	Turkey	3320	2335	0.7x
EMEA	Ukraine	3567	3839	1.1x
EMEA	United Arab Emirates	4399	5128	1.2x
EMEA	United Kingdom	4328	6849	1.6x
North America	Canada	3014	5321	1.8x
North America	Mexico	2608	2465	0.9x
North America	United States	3354	5299	1.6x
South America	Argentina	3875	6641	1.7x
South America	Brazil	8251	12577	1.5x
South America	Chile	2756	3982	1.4x
South America	Colombia	3451	5242	1.5x
South America	Paraguay	7993	6421	0.8x
South America	Peru	3828	5567	1.5x

Figure 41: Average Page Load Times Based on Real User Monitoring

[SECTION]10 INTERNET DISRUPTIONS + EVENTS

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

In working with leading content providers, Akamai also has a unique perspective on how major events, whether sports, entertainment, or software related, drive increasingly larger volumes of Internet traffic.

The content presented here provides insights into how Akamai traffic was impacted by major Internet disruptions and events during the second quarter.

10.1 World Cup / Although matches were split almost evenly between the second and third quarter, the 2014 FIFA World Cup Brazil™ was one of the most significant Internet events in recent memory, so it is worth covering in the second quarter report. Fifty-five customers leveraged Akamai's Media Delivery Solutions to reach viewers in over 80 countries/regions around the world. In the context of sporting events streamed over the Internet, the scope and scale of the World Cup was unprecedented, larger even than the Sochi Olympics, which took place a few months prior. The scale of the World Cup led to several new records being set within Akamai, including the most traffic delivered for a single event (221.6 Petabytes), and a new peak daily traffic volume (23.14 Tbps), set on July 8, the day of the first semifinal match.

Figure 42 illustrates Akamai's peak streaming traffic levels by match for the 64 World Cup games that took place. As it shows, four matches drove traffic peaks above 6 Tbps on three distinct days (in one case, two matches took place on a single day). The Akamai traffic levels reached during these matches included:

- 6.99 Tbps: USA vs. Germany, Portugal vs. Ghana
- 6.87 Tbps: Netherlands vs. Argentina Semifinal
- 6.72 Tbps: Germany vs. Argentina Final

10.2 Iraq / During the week of June 8 – 15, Internet connectivity in Iraq experienced several disruptions, as Figure 43 shows. On June 9, Akamai traffic to the country saw a significant decline for approximately two hours, concurrent with reports that the country's largest network provider had gone offline.[40] Several days later, on June 12, another anomalous drop in traffic is evident, as two major network providers became largely unreachable.[41] A day later, it was reported[42] that the Iraqi government was blocking access to major social media tools in an effort to disrupt insurgent communications. This blocking is evident in the graph as a generally lower level of traffic starting on June 13, and extending through the end of the week. Two additional disruptions reportedly occurred the following week, but are not graphed in Figure 43 — these include a three-hour outage on June 20[43] and a five-hour issue on June 22.[44]

10.3 Syria / Internet connectivity in Syria continued to be vulnerable to disruptions in the second quarter, with several near-complete outages taking place. As Figure 44 shows, Akamai traffic to Syria declined significantly just before 11:00 PM UTC on May 19, remaining lower than normal for approximately six hours before starting to resettle into its regular diurnal pattern. While there was no root cause for the disruption publicly reported, it appears that traffic levels did not drop completely to zero because while the country's main link to the Internet was down, a connection from the major city of Aleppo to Turkey remained available.[45]

Another significant disruption occurred later in the month, as shown in Figure 45. At approximately 7:00 PM UTC on May 31, Akamai traffic to Syria dropped precipitously, and remained lower than normal for the next 23 hours. As the figure shows, a reduced diurnal pattern is still evident from the start of the disruption through 2:00 PM on June 1, while a more significant disruption is seen in the five-hour traffic drop evident at the end of the 23-hour period. Similar to the prior disruption, no specific information about the cause was published for this one either, although monitoring indicates that it was related to issues with the Syrian Telecommunications Establishment.[46] An additional significant disruption occurred on June 21,[47] clearly evident in a reduction in Akamai traffic to the country for approximately 90 minutes. (However, we have not included a figure within the report illustrating this specific disruption.)

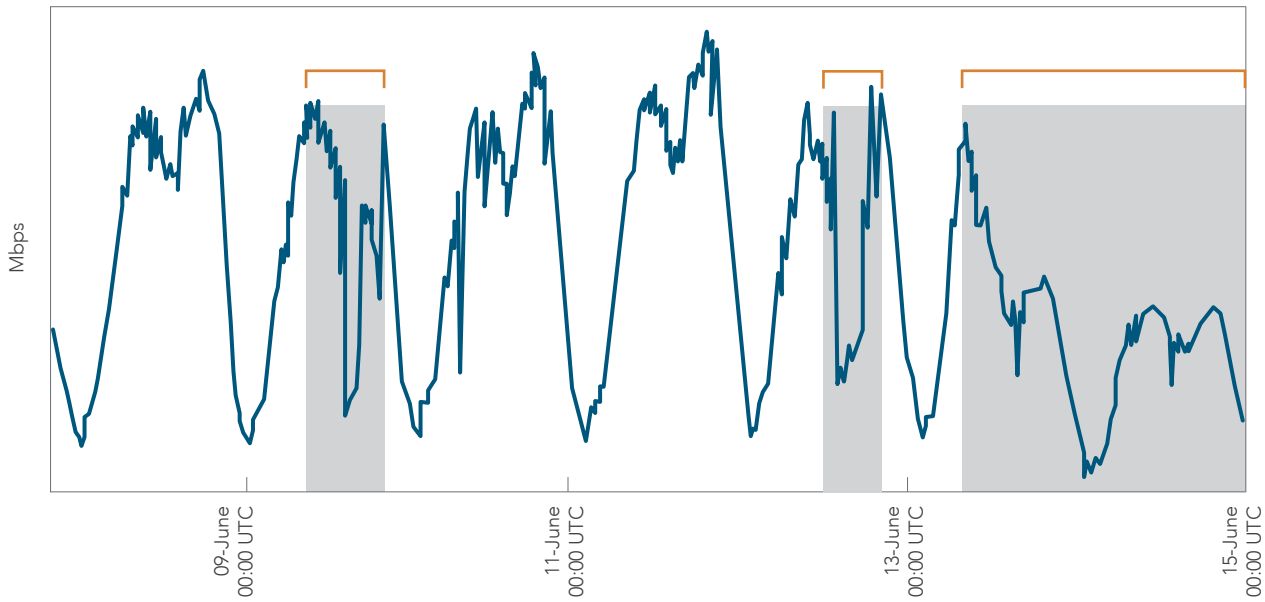


Figure 43: Akamai Traffic Served to Iraq, June 8–15, 2014

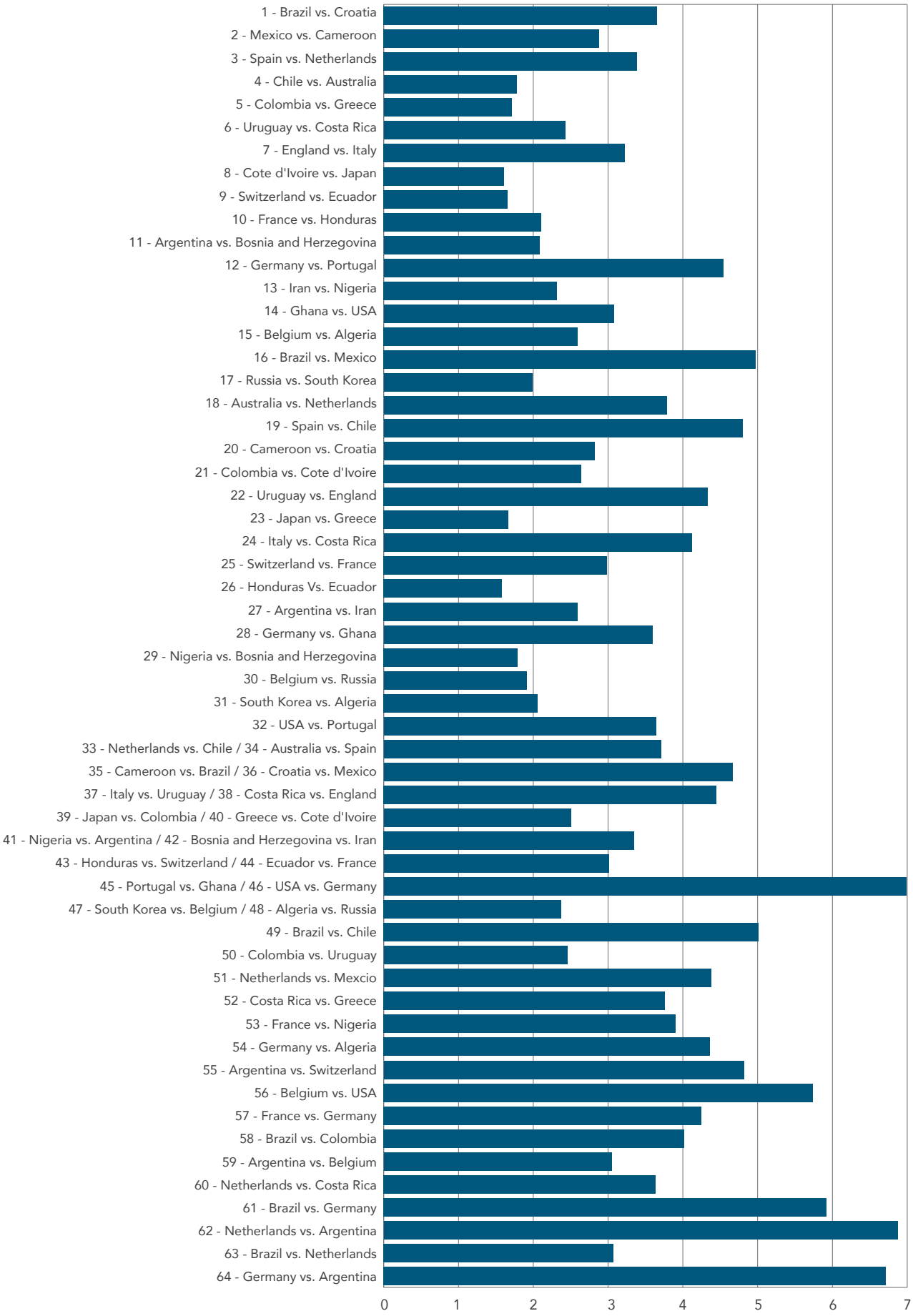


Figure 42: Peak Akamai Streaming Traffic (Tbps) by Match World Cup 2014

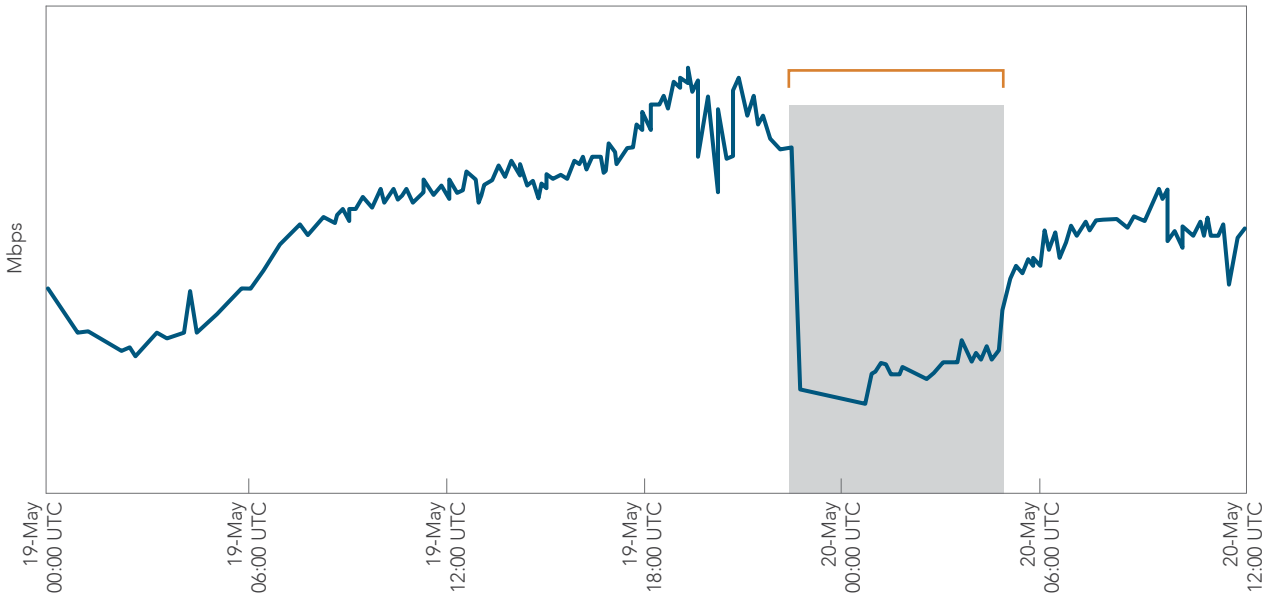


Figure 44: Akamai Traffic Served to Syria, May 19–20, 2014

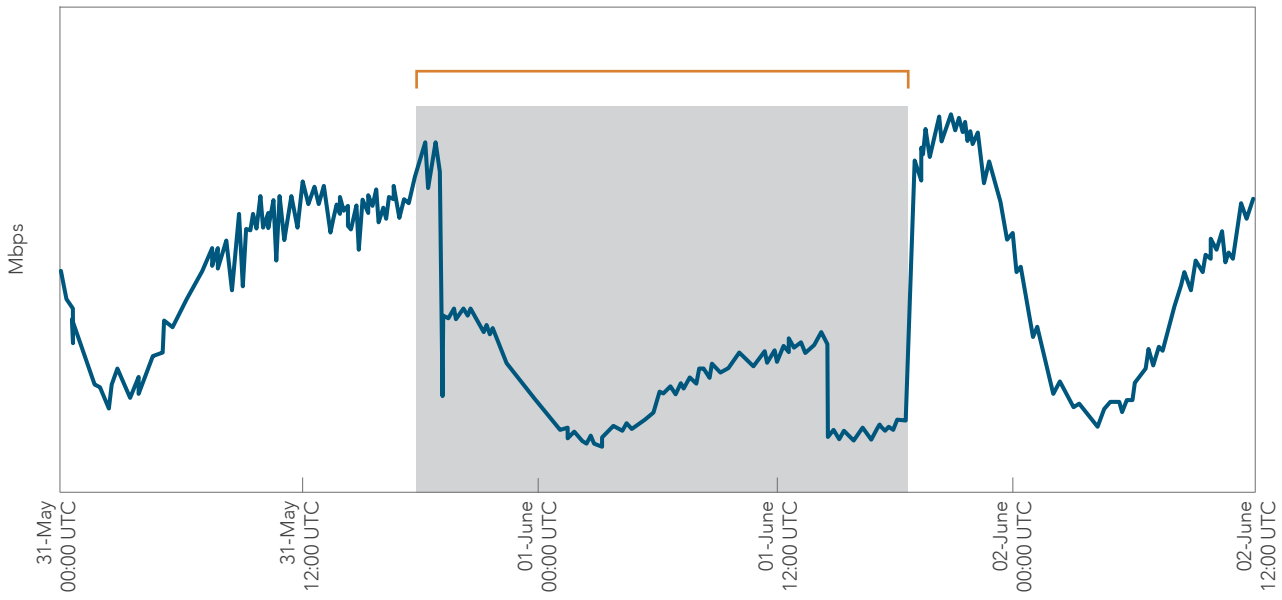


Figure 45: Akamai Traffic Served to Syria, May 31–June 1, 2014

Region	% Attack Traffic	Unique IPv4 Addresses	Average Connection Speed (Mbps)	Peak Connection Speed (Mbps)	% Above 10 Mbps	% Above 4 Mbps	% Above 15 Mbps
AMERICAS							
Argentina	0.1%	7,499,200	4.2	36.8	5.9%	36%	1.5%
Bolivia	<0.1%	416,788	1.1	8.9	0.2%	1.3%	0.1%
Brazil	0.3%	44,085,558	2.9	20.2	1.8%	26%	0.6%
Canada	0.1%	14,061,268	10.4	43.9	35%	84%	16%
Chile	<0.1%	4,359,948	4.4	28.5	5.8%	42%	1.8%
Colombia	0.1%	10,969,850	3.4	21.0	1.1%	26%	0.3%
Costa Rica	<0.1%	454,346	2.3	11.4	0.6%	9.2%	0.3%
Ecuador	<0.1%	886,264	3.6	21.8	2.8%	25%	0.8%
Mexico	0.1%	12,450,405	4.4	22.3	4.0%	38%	1.3%
Panama	<0.1%	504,094	2.8	14.3	0.9%	15%	0.3%
Paraguay	<0.1%	729,576	1.3	9.6	<0.1%	1.0%	<0.1%
Peru	<0.1%	1,165,907	3.1	20.2	0.7%	18%	0.2%
United States	52%	156,767,641	11.4	45.3	39%	72%	19%
Uruguay	<0.1%	1,143,401	5.6	49.7	10%	53%	3.9%
Venezuela	0.2%	3,971,010	1.4	9.4	0.2%	1.6%	0.1%
ASIA PACIFIC							
Australia	<0.1%	8,926,525	7.1	36.8	15%	65%	6.7%
China	39%	123,192,094	3.7	17.4	1.8%	33%	0.3%
Hong Kong	0.2%	3,068,316	15.7	73.9	52%	89%	34%
India	0.3%	17,284,345	2.0	14.4	1.2%	7.2%	0.5%
Indonesia	2.3%	7,045,455	2.5	23.5	0.5%	10%	0.2%
Japan	0.1%	40,796,367	14.9	61.5	54%	86%	33%
Malaysia	<0.1%	2,046,491	4.3	30.5	5.5%	40%	1.5%
New Zealand	<0.1%	2,121,220	6.8	31.8	13%	72%	4.5%
Philippines	<0.1%	1,396,336	2.5	21.6	0.7%	8.3%	0.2%
Singapore	<0.1%	1,640,638	10.4	64.9	33%	80%	14%
South Korea	0.2%	20,774,241	24.6	72.1	78%	95%	62%
Taiwan	0.6%	10,831,404	9.5	58.2	26%	80%	13%
Thailand	0.1%	3,470,610	6.3	41.3	8.2%	79%	2.2%
Vietnam	0.1%	5,477,969	2.9	18.2	0.6%	20%	0.1%
EUROPE, MIDDLE EAST & AFRICA							
Austria	<0.1%	2,891,077	10.4	41.5	28%	85%	16%
Belgium	<0.1%	4,863,876	11.2	52.9	43%	86%	21%
Czech Republic	<0.1%	1,890,979	12.6	43.1	42%	84%	23%
Denmark	<0.1%	2,990,905	11.7	40.7	41%	91%	21%
Finland	<0.1%	2,901,603	11.6	40.9	36%	76%	20%
France	0.3%	28,091,943	7.1	30.1	15%	69%	5.9%
Germany	0.1%	36,839,575	8.9	41.8	25%	79%	11%
Hungary	0.1%	2,967,266	8.8	42.1	28%	76%	12%
Ireland	0.2%	1,857,474	12.6	44.7	33%	68%	19%
Israel	<0.1%	2,442,045	11.0	68.6	42%	89%	18%
Italy	0.1%	19,252,087	5.8	26.4	6.6%	65%	2.5%
Netherlands	0.3%	9,085,967	14.3	53.2	52%	90%	30%
Norway	<0.1%	3,776,901	11.5	40.1	34%	73%	22%
Poland	0.1%	8,673,670	8.1	36.4	22%	74%	10%
Portugal	<0.1%	3,522,809	7.9	44.1	23%	75%	8.3%
Romania	0.2%	3,090,606	11.8	63.0	50%	91%	22%
Russia	0.3%	18,152,617	9.2	46.2	32%	78%	14%
Slovakia	<0.1%	1,038,172	8.2	36.0	19%	70%	11%
South Africa	<0.1%	5,064,941	3.0	13.2	2.5%	13%	1.4%
Spain	0.1%	14,541,353	8.0	36.9	20%	76%	9.0%
Sweden	<0.1%	6,245,821	13.6	49.8	40%	85%	25%
Switzerland	<0.1%	3,568,665	14.9	53.1	56%	92%	33%
Turkey	0.2%	9,923,910	5.5	32.5	5.1%	67%	1.6%
United Arab Emirates	<0.1%	1,515,049	4.6	34.4	3.7%	47%	1.0%
United Kingdom	0.1%	28,206,499	11.1	46.6	36%	81%	21%

[1] https://www.arin.net/announcements/2014/20140423.html
[2] http://www.lacnic.net/en/web/anuncios/2014-el-stock-de-direcciones-de-IPv4-de-lacnic-alcanzo-el-9
[3] http://www.lacnic.net/en/web/anuncios/2014-no-hay-mas-direcciones-IPv4-en-lac
[4] http://www.potaroo.net/tools/IPv4/
[5] https://www.apnic.net/publications/research-and-insights/geoff-huston
[6] http://whois.domaintools.com/105.16.0.0
[7] http://whois.domaintools.com/154.76.0.0
[8] http://whois.domaintools.com/105.188.0.0
[9] http://whois.domaintools.com/104.64.0.0
[10] http://whois.domaintools.com/104.48.0.0
[11] http://whois.domaintools.com/54.160.0.0
[12] http://whois.domaintools.com/181.216.0.0
[13] http://whois.domaintools.com/187.180.0.0
[14] http://whois.domaintools.com/191.54.0.0
[15] http://whois.domaintools.com/152.240.0.0
[16] http://whois.domaintools.com/45.160.0.0
[17] https://www.icann.org/news/announcement-2-2014-05-20-en
[18] https://www.icann.org/resources/pages/allocation-IPv4-post-exhaustion-2012-05-08-en
[19] http://www.chinatechnews.com/2014/04/30/20482-chinese-government-will-invest-cny20-billion-to-promote-IPv6
[20] http://www.internetsociety.org/deploy360/blog/2014/04/verizon-wireless-approaching-50-IPv6-in-latest-world-IPv6-launch-measurements
[21] http://www.cnet.com/uk/news/what-is-4k-uhd-next-generation-resolution-explained/
[22] http://en.wikipedia.org/wiki/H.264/MPEG-4_AVC
[23] http://en.wikipedia.org/wiki/High_Efficiency_Video_Coding
[24] http://about.att.com/story/att_eyes_100_u_s_cities_and_municipalities_for_its_ultra_fast_fiber_network.html
[25] http://arstechnica.com/information-technology/2014/04/cox-plans-gigabit-internet-for-residential-customers-this-year/
[26] http://online.wsj.com/news/articles/SB10001424052702303749904579578490176075118
[27] http://www.cspire.com/company_info/about/news_detail.jsp?entryId=20400013
[28] http://www.telecompetitor.com/blue-valley-gigabit-network-upgrade-existing-ftth-system/
[29] http://www.muninetworks.org/content/get-gig-oklahoma-rural-cooperative-deploying-ftth-northeast-corner-state
[30] http://www.bnamericas.com/news/telecommunications/chile-will-be-second-country-to-test-googles-loon-balloon-broadband-project
[31] http://www.telecompaper.com/news/telefonica-launches-satellite-broadband-service-in-chile--1016670
[32] http://articles.economictimes.indiatimes.com/2014-06-19/news/50710986_1_national-broadband-policy-broadband-penetration-175-million-broadband-connections
[33] http://www.thelocal.de/20140601/german-villagers-build-own-broadband-network
[34] http://www.zdnet.com/want-1gbps-broadband-want-it-for-free-italys-innovative-plan-to-increase-fibre-takeup-7000030149/
[35] http://www.akamai.com/html/about/press/releases/2013/press_061113.html
[36] http://www.w3.org/TR/navigation-timing/
[37] http://stevesouders.com/episodes/
[38] http://caniuse.com/nav-timing
[39] http://blog.catchpoint.com/2014/07/25/navigation-timing-safari/
[40] https://twitter.com/renesys/statuses/476092606439768064
[41] https://twitter.com/renesys/status/477161076178825218/photo/1
[42] http://www.washingtonpost.com/business/technology/iraq-tries-to-censor-social-media-but-its-success-is-limited/2014/06/13/19e1e918-f325-11e3-bf76-447a5df6411f_story.html
[43] https://twitter.com/renesys/status/479999294838439937/photo/1
[44] https://twitter.com/bgpmon/status/480813903132119043/photo/1
[45] https://twitter.com/renesys/status/468539082420027392/photo/1
[46] http://b2b.renesys.com/eventsbulletin/2014/06/SY-1401630900.html#more
[47] http://b2b.renesys.com/eventsbulletin/2014/06/SY-1403333670.html#more

Editor
David Belson

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