Akamai
FASTER FORWARD

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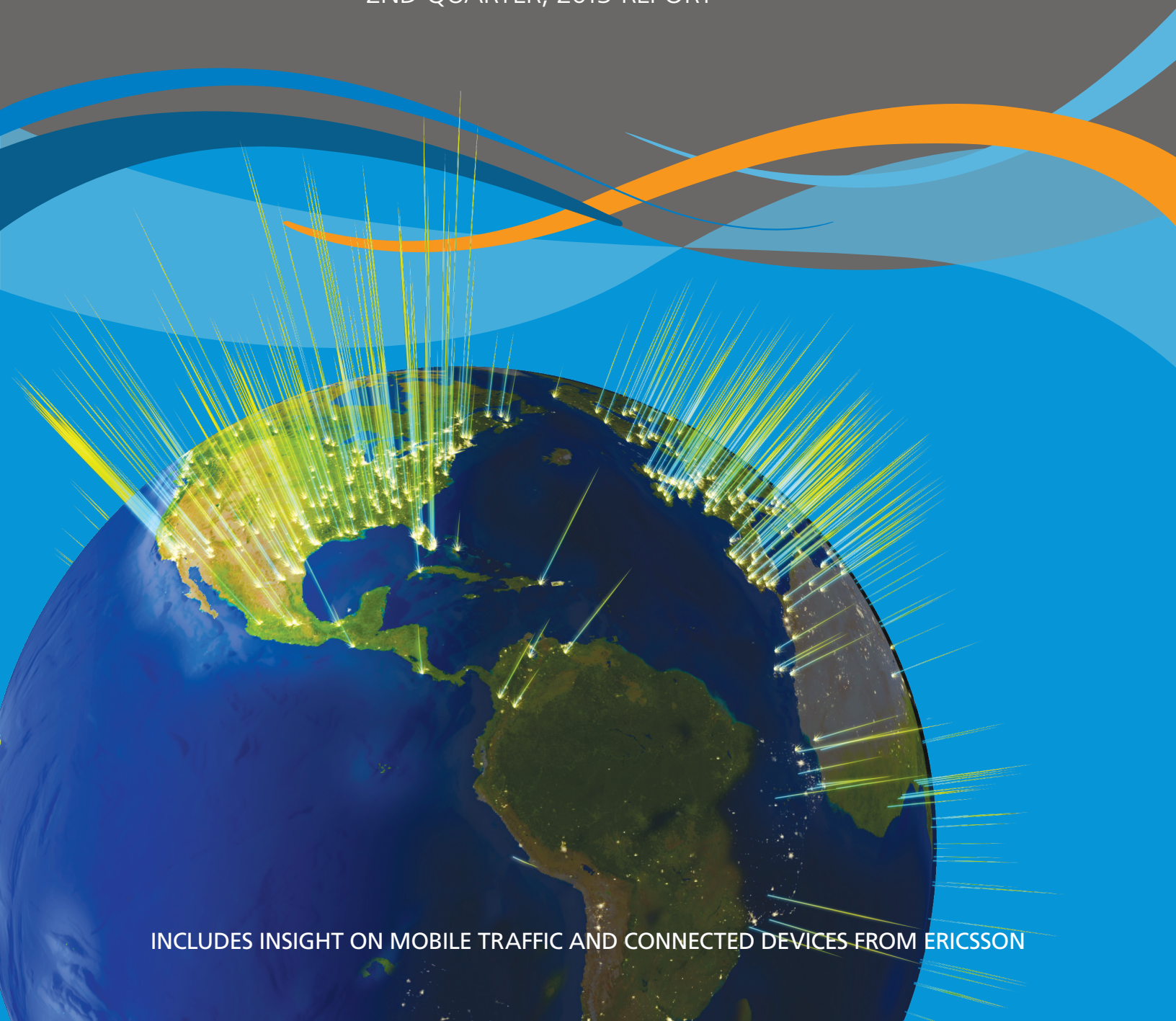
The State of the Internet

2ND QUARTER, 2013 REPORT



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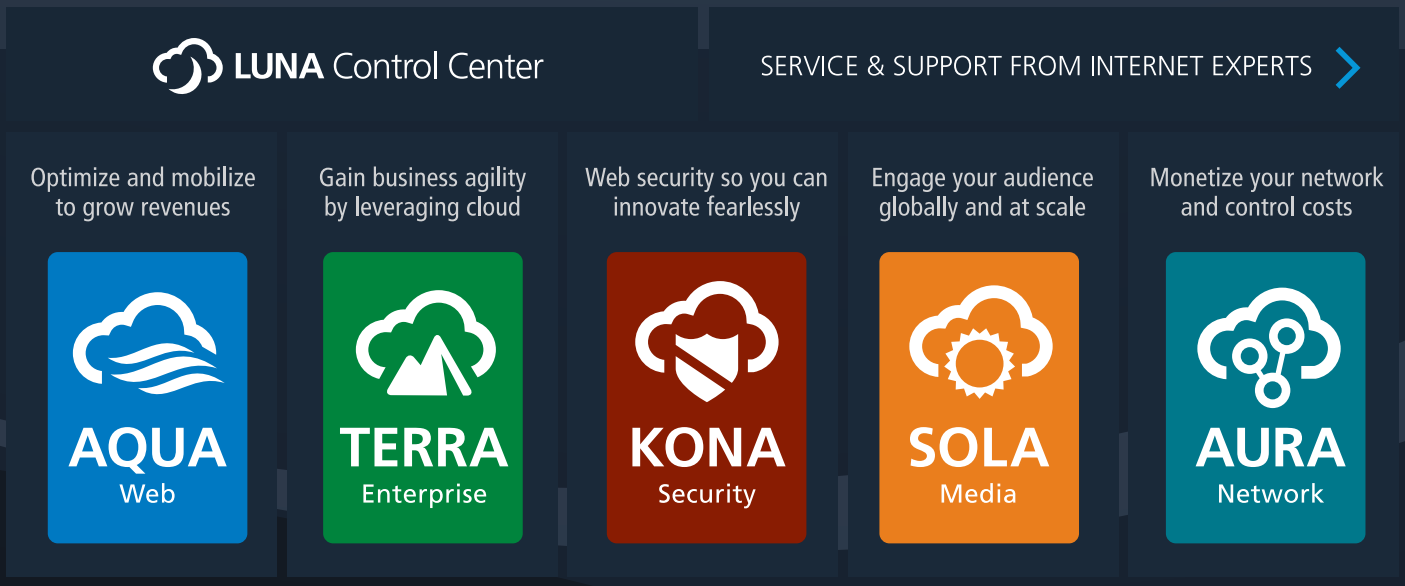

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Letter From the Editor

IPv6 deployment and adoption is a topic that has been covered in the *State of the Internet Report* in some fashion over the last five years, and is an area that is of critical importance to the future of the Internet. It is worth noting that June 6, 2013 marked the one-year anniversary of the World IPv6 Launch event, itself a follow-on to World IPv6 Day in June 2011. Both events were intended to highlight the importance of IPv6, and to raise its profile among network service providers, equipment manufacturers, content providers, and others. Based on data published by APNIC Chief Scientist Geoff Huston at *http://www.circleid.com/posts/20130610_world_ipv6_day_a_year_in_the_life/*, it appears that IPv6 support has been making progress around the world, though it still has a long way to go. Key observations from Mr. Huston's data include:

- A doubling (from 0.6% to nearly 1.3%) of Internet user systems that prefer IPv6 in a dual-stack situation, where the same content is available over both IPv4 and IPv6.
- Significant growth in IPv6 deployment as a percentage of national users in countries including Switzerland, Belgium, Germany, Peru, the Czech Republic and Greece.
- Large increases in the number of IPv6 users in the United States (adding over 4.2 million), Japan (adding over 2.3 million), and Germany (adding nearly 2 million)

In addition to the ongoing growth of IPv6, efforts continue in many countries around the world to improve the quality and speed of Internet connectivity available to subscribers, with gigabit initiatives still a key focus. However, improving connectivity to underserved areas often requires innovative solutions, and in the second quarter, Google announced trial implementations of two such technologies. In Cape Town, South Africa, a "white space" pilot program is delivering Internet connectivity over unused radio spectrum between television channels. In New Zealand, a pilot of "Project Loon" endeavored to connect users to the Internet through high-altitude balloons—Google envisions a ring of such balloons eventually encircling the Earth. While Google's efforts are by no means the only innovative solutions being pursued to improve Internet connectivity and reach, they are high-profile and likely serve as a harbinger of things to come.

Of course, with a growing number of users online, and as connection speeds improve over time, the importance of security will grow as well. Botnets have grown beyond leveraging end-user systems to leveraging the massive bandwidth available through compromised servers running software packages with known vulnerabilities, and successful phishing attacks have continued to prove that humans remain the weak link in the security chain. In addition, revelations over the last several months indicate that encrypting communications may not provide complete privacy of those communications. While there is no silver bullet to address any of these issues in their entirety, ongoing education of users and administrators alike, the practice of good network hygiene (including regularly updating/patching systems), and a healthy level of skepticism can help to keep things in check.

As always, you can expect that these topics will be covered in future issues of the *State of the Internet Report*. If you have questions, comments, or suggestions regarding the report, connect with us via e-mail at *stateoftheinternet@akamai.com*, or on Twitter at *@akamai_soti*.

–David Belson

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Executive Summary

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

This quarter's report includes data gathered from across the Akamai Intelligent Platform in the second quarter of 2013 about attack traffic, broadband adoption, and mobile connectivity, as well as trends seen in this data over time. In addition, this edition of the report includes insight into attacks for which a group known as the Syrian Electronic Army has claimed responsibility, the states of IPv4 exhaustion and IPv6 adoption, Internet disruptions that occurred during the quarter and observations from Akamai partner Ericsson on data and voice traffic growth on mobile networks.

Security

During the second quarter of 2013, Akamai observed attack traffic originating from source IP addresses in 175 unique countries/regions. Note that our methodology captures the source IP address of an observed attack and cannot determine attribution of an attacker. Indonesia grew its share of observed attack traffic, nearly doubling from the first quarter, growing to 38% and pushing China down to second place, with 33% of observed attack traffic. Attack traffic from the United States once again declined, dropping to 6.9%. Attack traffic continued to become more concentrated, with the top 10 ports seeing 82% of observed attacks. Thanks to the increased attack traffic seen from Indonesia, Ports 80 and 443 were the most commonly targeted ports, accounting for 41% of observed attacks combined. Port 445, the perennial top target, fell from first place for the first time since the first quarter of 2008, dropping to 15% of observed attacks. During the second quarter, Akamai's customers reported being targeted by 318 DDoS attacks, 54% more than the prior quarter. Enterprise customers were the most frequently targeted, hit by 42% of the reported attacks. In addition, a group known as the Syrian Electronic Army claimed responsibility for a number of attacks launched against high-profile news and media sites.

Internet and Broadband Adoption

In the second quarter, Akamai observed a 2.0% increase in the number of unique IPv4 addresses connecting to the Akamai Intelligent Platform, growing to over 752 million, or approximately 18 million more than were seen in the first quarter of 2013. Looking at connection speeds, the global average connection speed climbed 5.2% to 3.3 Mbps, but the global average peak connection speed increased just 0.1% to 18.9 Mbps. At a country level, South Korea had the highest average connection speed at 13.3 Mbps, while Hong Kong once again remained the region with the highest average peak connection speed at 65.1 Mbps. Globally, high broadband (>10 Mbps) adoption grew 13% quarter-over-quarter to 14%, and South Korea remained the country with the highest level of high broadband adoption, declining slightly to 45%. Global broadband (>4 Mbps) adoption grew 11% to reach the 50% mark, with Switzerland remaining in the top spot with 90% broadband adoption.

Mobile Connectivity

In the second quarter of 2013, average connection speeds on surveyed mobile network providers ranged from a high of 9.7 Mbps down to a low of 0.5 Mbps. Average peak connection speeds ranged from 54.9 Mbps down to 2.2 Mbps. Based on traffic data collected by Ericsson, the volume of mobile data traffic almost doubled from the second quarter of 2012 to the second quarter of 2013, and grew 14% between the first and second quarters of 2013, while mobile voice traffic increased 5% from the second quarter of 2012 to the second quarter of 2013.

Analysis of Akamai IO data collected across the second quarter from a sample of requests to the Akamai Intelligent Platform indicates that for users of devices on cellular networks, slightly more requests came from Android Webkit-based browsers than from Apple Mobile Safari, with Webkit accounting for 38% of requests, and Safari 34%. However, for users of mobile devices across all networks (not just cellular), Apple Mobile Safari accounted for just over 54% of requests, with Android Webkit approximately half that, at over 27% of requests.

Akamai maintains a distributed set of agents deployed across the Internet that monitor attack traffic. Based on data collected by these agents, Akamai is able to identify the top countries from which attack traffic originates, as well as the top ports targeted by these attacks. Note that the originating country as identified by the source IP address is not attribution — for example, a criminal in Russia may be launching attacks from compromised systems in China. This section provides insight into port-level attack traffic, as observed and measured by Akamai, during the second quarter of 2013.

It also includes insight into DDoS attacks that targeted Akamai customers during the second quarter of 2013, as well as insight into attacks for which a group known as the Syrian Electronic Army has claimed responsibility. Note that it is difficult at best to provide 100% attribution, not only tying the handle of an adversary to a real-world entity, but in tying any given action to a specific adversary handle. Within this report, all representations represent our view of the best and most consistent ways of attributing attacks we are seeing, based not only on published claims, but on analysis of the tools, tactics, and procedures which tend to provide a consistent signature for different adversaries.

1.1 Attack Traffic, Top Originating Countries

During the second quarter of 2013, Akamai observed attack traffic originating from 175 unique countries/regions, which was two fewer than was observed in the first quarter. As shown in Figure 1, Indonesia pushed China out of the top spot this quarter, almost doubling its traffic percentage from the first quarter, originating 38% of observed attack traffic. China's share of observed attack traffic remained roughly consistent with the first quarter, as the country originated a third of the observed attack traffic. The United States remained a distant third, accounting for slightly less than 7% of observed attacks. The remaining countries comprising the top 10 remained the same as in the first quarter, but the overall concentration of attacks was greater, with the top 10 countries originating 89% of observed attacks, up from 82% in the prior quarter.

With Indonesia and China originating significantly more observed attack traffic than any other country/region, the regional distribution of observed attack traffic is heavily weighted towards the Asia Pacific/Oceania region. In the second quarter, the region was responsible for just over 79% of observed attacks, up from 68% in the first quarter, and 56% in the fourth quarter of 2012. Europe accounted for just over 10%, while North and South America also accounted for just over 10% combined. Africa's contribution continued to decline, as it was responsible for just three-tenths of a percent.

1.2 Attack Traffic, Top Ports

As shown in Figure 2, the concentration of attack traffic among the top 10 targeted ports once again increased during the second quarter of 2013, with 82% of observed attacks targeting these ports. The increased concentration was again driven by

	Country	Q2 '13 % Traffic	Q1 '13 %
1	Indonesia	38%	21%
2	China	33%	34%
3	United States	6.9%	8.3%
4	Taiwan	2.5%	2.5%
5	Turkey	2.4%	4.5%
6	India	2.0%	2.6%
7	Russia	1.7%	2.7%
8	Brazil	1.4%	2.2%
9	Romania	1.0%	2.0%
10	South Korea	0.9%	1.4%
–	Other	11%	18%

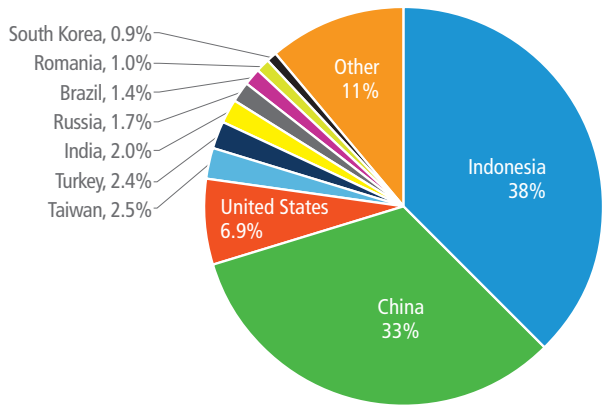

Figure 1: Attack Traffic, Top Originating Countries (by source IP address, not attribution)

Port	Port Use	Q2 '13 % Traffic	Q1 '13 %
80	WWW (HTTP)	24%	14%
443	SSL (HTTPS)	17%	11%
445	Microsoft-DS	15%	23%
1433	Microsoft SQL Server	9.5%	8.3%
3389	Microsoft Terminal Services	4.7%	5.4%
23	Telnet	3.9%	9.3%
3306	MySQL	2.8%	2.7%
22	SSH	1.9%	2.6%
6666	IRCU (IRC Undernet Daemon)	1.7%	1.2%
8080	HTTP Alternate	1.4%	1.5%
Various	Other	18%	–

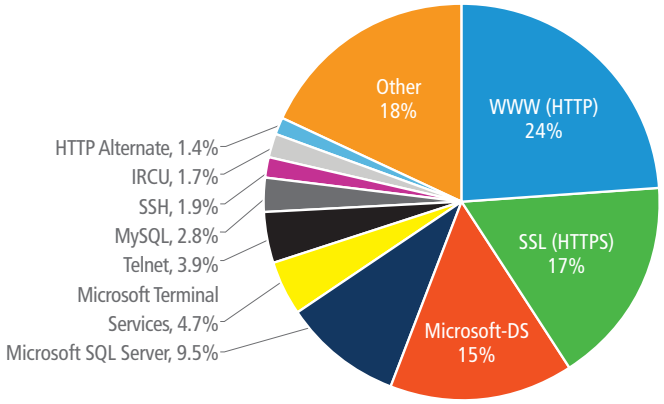

Figure 2: Attack Traffic, Top Ports

significant increases in attack volume targeting Ports 80 (WWW/HTTP) and 443 (SSL/HTTPS). This increased attack volume also pushed Ports 80 and 443 into the top two spots among the top 10, pushing Port 445 (Microsoft-DS) into third place. Other than in the inaugural *1st Quarter, 2008 State of the Internet Report*, this is the first time that Port 445 has not held the top spot among the most targeted ports. Increasing from 80% in the last quarter, 90% of the attacks targeting Ports 80 and 443 were observed to be originating in Indonesia in the second quarter. In addition to the significant quarterly growth seen in the traffic percentages associated with these two ports, Ports 1433 (Microsoft SQL Server), 3306 (MySQL), and 6666 (IRCU) all saw quarter-over-quarter increases in traffic percentages. Pushed out of the top 10 in the first quarter, Port 8080 (HTTP Alternate) resurfaced on the list in the second quarter, though it saw a slight quarterly decline. Ports 445, 3389 (Microsoft Terminal Services), 23 (Telnet), and 22 (SSH) also saw lower traffic percentages quarter-over-quarter.

Though it fell to third place overall, Port 445 remained the top targeted port in seven of the top 10 countries and, in four of those countries, it was responsible for a significantly larger volume of attack traffic than the second most targeted port, ranging from 7x to 80x more. Port 1433 (Microsoft SQL Server) remained the top target of attacks observed to originate in China, potentially representing ongoing efforts to find and exploit known, but long since patched (by Microsoft), vulnerabilities in the software platform. Port 6666 (IRCU) found its way into the top 10 in the second quarter thanks to China, where observed attack volume made it the fourth most targeted port. While the port is officially associated with IRC, it is also apparently used[1] by several pieces of malware. A Web search did not find any indication of increased reports of infection by that malware during the quarter. Port 23 (Telnet) remained the top target for attacks from Turkey, which has been the case for the last several years, while in South Korea and Taiwan, it was the second most targeted port. Though Port 80 topped the list of targets from Indonesia, it was the second most popular target for attacks from the United States and Brazil, but significantly lower on the list of top ports targeted by attacks from the remaining countries.

1.3 Observations on DDoS Attacks

Since the end of 2012, Akamai has been analyzing the Distributed Denial of Service (DDOS) attacks reported by our customers for the *State of the Internet Report*. Adversaries conducting DDoS attacks spend increasing effort to make their attacks look more and more like legitimate 'flash mobs' in an effort to elude automated defenses; this creates an ever-escalating arms race to automate the manual analysis that often goes into assessing whether an event was an attack or legitimate traffic due to an unplanned event. Because of this, Akamai must rely upon customers to report DDoS attacks and help differentiate between legitimate and malicious traffic. Additionally, attacks that target lower level network layers, such as SYN floods, UDP floods and similar types of volumetric attacks are not tracked by Akamai, as they are automatically mitigated with minimal human interaction under most circumstances. Higher level attacks that target the application and logical layers, such as HTTP GET floods or attacks that repeatedly download large files, are mitigated using Akamai's KONA Site Defender solution and require the intervention of Akamai analysts to create, implement and disseminate the rules to stop these attacks.

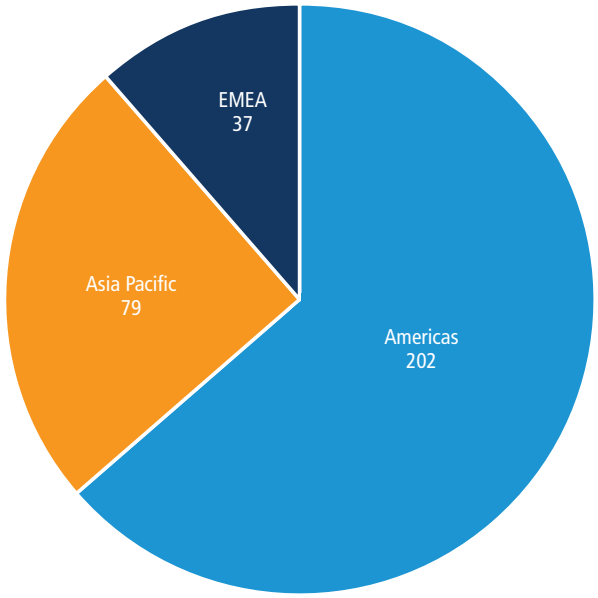

Figure 3: Q2 2013 DDoS Attacks by Region

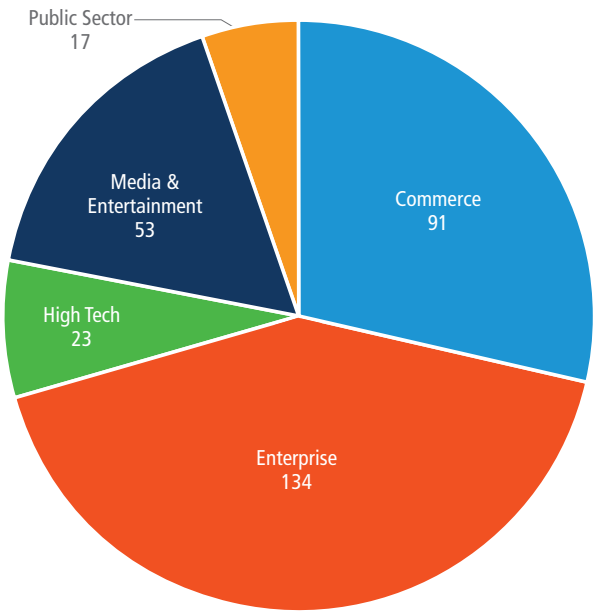

Figure 4: Q2 2013 DDoS Attacks by Sector

Akamai has continued to see an increase in the number of attacks reported each quarter. While a total of 768 attacks were reported in 2012, in the first half of 2013 Akamai received 516 attack reports. In the second quarter of 2013 alone, Akamai received reports of 318 attacks, a 54% increase over the first quarter. Surprisingly, few of these attacks can be attributed to the Izz ad-Dim al-Qassam Cyber Fighters (QCF), as the organization was more silent than expected. This may signify a change of tactics or may be due to law enforcement efforts, but the effect is the same.

While the Americas still accounted for nearly two-thirds of all attacks reported to Akamai, as illustrated in Figure 3, there was a significant shift of attacks from Europe, the Middle East and Africa to the Asia Pacific region. The number of attacks reported by customers in Asia nearly tripled in the second quarter, climbing to 79 from the 27 seen in the first quarter. Europe was the only region to see a decline in attacks, dropping from 47 attacks in the first quarter down to 37 in the second quarter. The increased attacks in Asia were primarily driven by a continuing series of attacks on a small number of companies within the region, and as such may not indicate a long-term change to the distribution of attacks worldwide.

As shown in Figure 4, the Enterprise sector, which is comprised primarily of large businesses, continued to be the leading target of DDoS attacks, with Commerce and Media & Entertainment coming in second and third, respectively. Enterprise also saw the most significant increase this quarter, nearly doubling the number of reported attacks, from 72 in the first quarter to 134 in the second. Commerce customers also saw a significant increase in attacks, from 67 to 91, but the Media & Entertainment sector saw relatively minimal growth, from 45 attacks in the first quarter to 53 in the second. The number of reported attacks targeting Public Sector and High Tech customers continued to grow, but those sectors were relatively minor targets in comparison to the Enterprise and Commerce sectors.

As stated earlier and highlighted in Figure 5, the rise in attacks in the Enterprise vertical were primarily driven by a series of attacks on business services customers in the Asia Pacific region. Despite a lull in attacks from the QCF, financial services companies continued to see an increase in the number of attacks on their systems, though at a slower rate than many other sectors. This did not stop business services from taking the lead in number of attacks for the first time. Pharmaceuticals and healthcare made their first appearance in this report, while customers in the energy and utilities vertical did not report being targeted by any DDoS attacks in the second quarter.

Within the Commerce sector, the retail vertical accounted for all of the growth seen in reported attacks, increasing from 46 attacks in the first quarter to 71 in the second quarter, as seen in Figure 6. Unlike the attacks in Asia within the business services vertical, these attacks were spread across a number of targets,

rather than being concentrated on a small group of businesses. The spread of targets appears to be a continuing thread within the Commerce sector, likely due in part to the fact that a continuing attack on a small group of merchants would quickly require the businesses to adapt or cease doing business online.

The Media & Entertainment sector saw relatively minimal growth in the number of reported DDoS attacks on their systems in comparison to the overall DDoS attack numbers. Nearly all attacks in this sector were against media companies, with only one attack against a gaming company reported in the second quarter, as opposed to four in the first quarter. The number of reported attacks targeting Public Sector customers grew significantly quarter-over-quarter, nearly doubling from 9 to 17 attacks, but as an overall target, the sector remained a minor component of the overall attack traffic volume.

In the second quarter of 2013, Akamai saw a 54% increase in the number of attacks as compared to the previous quarter. There is a very real possibility this trend will continue, and perhaps even accelerate, as the current geopolitical environment heats up over events in Syria and elsewhere in the world. While it is difficult to attribute the origin of specific attacks to specific actors or groups of actors, it has been observed in the past that political unrest does increase the potential for attacks. If we continue to see a 50% quarter-over-quarter increase in DDoS attacks in coming quarters, the impact on the Internet as a whole will become a much bigger concern than it is now.

1.4 Syrian Electronic Army Attacks

During the second quarter of 2013, a hacktivist group calling itself the Syrian Electronic Army (SEA) claimed responsibility[2] for several high profile attacks against news and media companies. The attacks were designed to spread propaganda about the regime of Syrian President Bashar al-Assad.

One of the most notable attacks attributed to the SEA was on the Associated Press (AP) Twitter feed. After a fictional story about a bombing at the White House was planted on the feed, there was a 150-point drop of the Dow Jones Industrial Average (DJIA) due to automated high-speed trading engines reacting to the false story and selling assets. This drop caused the DJIA to lose $140 billion or 1% of its value in just 90 seconds.[3]

Since then, the SEA has also been credited with attacks against other news and media sites including the Guardian, the Financial Times and even the Onion. In each of these attacks, the tactics used were extremely similar. The attacker launched a spear-phishing attack against the target and was able to compromise at least one internal email account. Using that account, further attacks were launched, until the attackers were able to collect credentials that provided access to Twitter feeds, RSS feeds or other sensitive information.

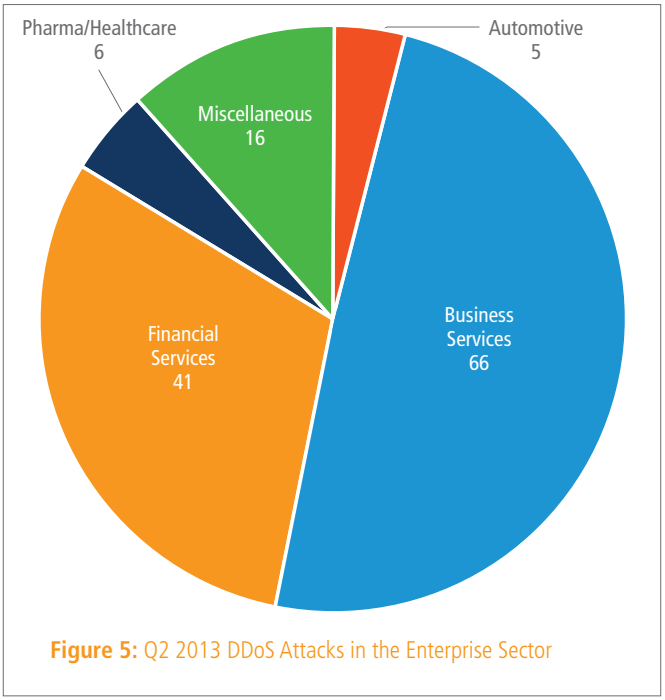

Figure 5: Q2 2013 DDoS Attacks in the Enterprise Sector

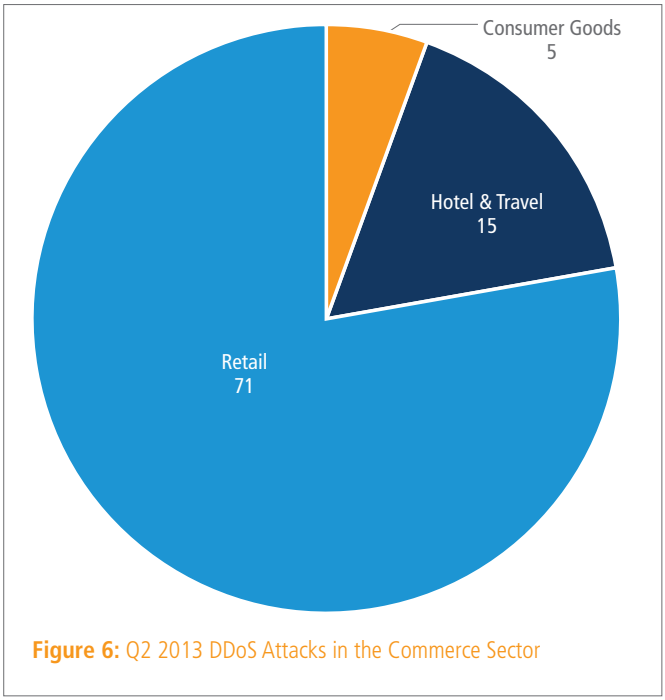

Figure 6: Q2 2013 DDoS Attacks in the Commerce Sector

In all cases in the second quarter, the SEA seemed interested in pushing pro-Syrian propaganda by leveraging the audience for popular social media feeds. It also has been associated with the posting of pro-Syrian propaganda to the Facebook pages of the U.S. Embassy in Damascus, U.S. Department of State, U.S. Department of Treasury, Hillary Clinton, Brad Pitt, Oprah Winfrey, ABC News, the White House, and President Barack Obama. To date, the organization has preferred to attack targets that have been publically supportive of the Syrian rebels rather than perform Web site defacements or data exfiltration.

The SEA attacks started primarily via social engineering, usually via phishing attacks. Some intelligence indicates that an SEA member is related to a Syrian intelligence officer and ambassador. This may explain how the SEA is successful in targeting and compromising large media and news organizations.

It does not appear that the SEA is directly supported by the Syrian regime, unlike APT1 in China. The Syrian government is aware of the SEA and approves of their actions. President Assad said in a speech in June, "The army consists of the brothers of every Syrian citizen, and the army always stands for honour and dignity. Young people have an important role to play at this stage, because they have proven themselves to be an active power. … There is the electronic army which has been a real army in virtual reality."[4]

The SEA also took credit for recent attacks against the DNS infrastructure of the New York Times, the Huffington Post, and some Twitter domains; however, those attacks occurred during the third quarter, and will be covered in the next *State of the Internet Report*.

Internet Penetration

2.1 Unique IPv4 Addresses

Through its globally-deployed Intelligent Platform, and by virtue of the approximately two trillion requests for Web content that it serves on a daily basis, Akamai has unique visibility into levels of Internet penetration around the world. In the second quarter of 2013, over 752 million IP addresses, from 242 unique countries/regions, connected to the Akamai Intelligent Platform — 2% more than in the first quarter, and 13% more than in the second quarter of 2012. Although we see 750 million unique IPv4 addresses, Akamai believes that we see 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, while in other cases, individual users can have multiple IPv4 addresses associated with them due to their use of multiple connected devices. Unless otherwise specified, the use of "IP address" within section 2.1 refers to IPv4 addresses.

As shown in Figure 7, the global number of unique IPv4 addresses seen by Akamai grew by almost 19 million quarter-over-quarter. Quarterly growth was also seen in six of the top 10 countries, with the largest increase found in Brazil, growing 12% through the addition of nearly 4.5 million IP addresses. Four of the top 10 countries saw IP address counts decline quarter-over-quarter, but the percentage losses were minimal, and are likely due to updates to the underlying database used by Akamai for IP address geolocation. (In other words, given prior trends, it is unlikely that these losses represent a reduction in Internet penetration/usage in these countries.) Looking at the full set of global countries/regions, just over 60% of them saw a quarterly increase in unique IP counts, with both Tanzania and Mozambique more than doubling quarter-over-quarter, growing 177% and 131% respectively.

	Country/Region	Q2 '13 Unique IPv4 Addresses	QoQ Change	YoY Change
–	Global	752,349,857	2.0%	13%
1	United States	154,515,420	3.2%	8.1%
2	China	113,908,551	2.0%	22%
3	Japan	40,794,484	-1.5%	2.3%
4	Germany	38,102,044	-<0.1%	5.3%
5	Brazil	30,921,154	12%	44%
6	United Kingdom	29,131,348	0.9%	9.6%
7	France	27,098,901	0.7%	3.8%
8	South Korea	21,338,140	0.1%	8.5%
9	Italy	20,180,584	-1.6%	12%
10	Russia	17,571,549	-3.2%	14%

Figure 7: Unique IPv4 Addresses Seen by Akamai

As noted in last quarter's report (regarding growth observed in Angola, Sudan, and Kenya), the driver of such growth is not immediately clear, though it could be related to improved Internet connectivity becoming available in these countries from submarine cables including EASSy[5] and SEACOM.[6]

Looking at year-over-year changes, China's unique IP address count is still growing aggressively over the long term, with its yearly growth rate continuing to eclipse that seen in the United States. However, among the top 10 countries, Brazil continues to have the most aggressive long-term growth rate, up 44% over the same period in the prior year. IP address counts in Italy and Russia also grew significantly over the past year, with both countries seeing yearly growth rates above 10%. On a global basis, just over three-quarters of countries around the world had higher unique IP address counts year-over-year, with growth rates over 100% seen in a handful of countries, including Angola, which increased 101% and Sudan, which grew 316%.

2.2 IPv4 Exhaustion

To nobody's surprise, the number of available IPv4 addresses continued to decline in the second quarter of 2013, as Regional Internet Registries continued to allocate/assign blocks of IPv4 address space to organizations within their respective territories.[7] This was underscored by a pair of Tweets made by @IPv4Countdown in June, which noted "Europe's registry RIPE now has less than fifteen million IPv4s left to delegate."[8] and "South America's registry LACNIC now has less than forty million IPv4s left to delegate."[9] Leveraging data[10] collected by Geoff Huston,[11] Chief Scientist at APNIC, the *State of the Internet Report* can now provide a perspective on the size of the available IPv4 address pool at each RIR, and how the pool sizes are shrinking over time. In addition, the report also uses data published by the RIRs to highlight IPv4 address assignment/allocation activity by the individual RIRs over the course of the quarter.

Figure 8 illustrates the data provided by Mr. Huston, showing how the size of the available IPv4 address pools at each of the RIRs changed over the course of the second quarter of 2013. Once again, the lowest rate of delegation was seen in AFRINIC, which ended the quarter with 12,544 fewer available IP addresses than in the beginning of the quarter. However, as is shown in Figure 8, it appears that the number of available IPv4 addresses at the RIR actually increased on June 7, when it added over 398,000 addresses to its available pool. In diving into the source data, it appears that the available IPv4 pool sizes at all of the RIRs increased slightly on that day. Mr. Huston notes[12] that this seem-

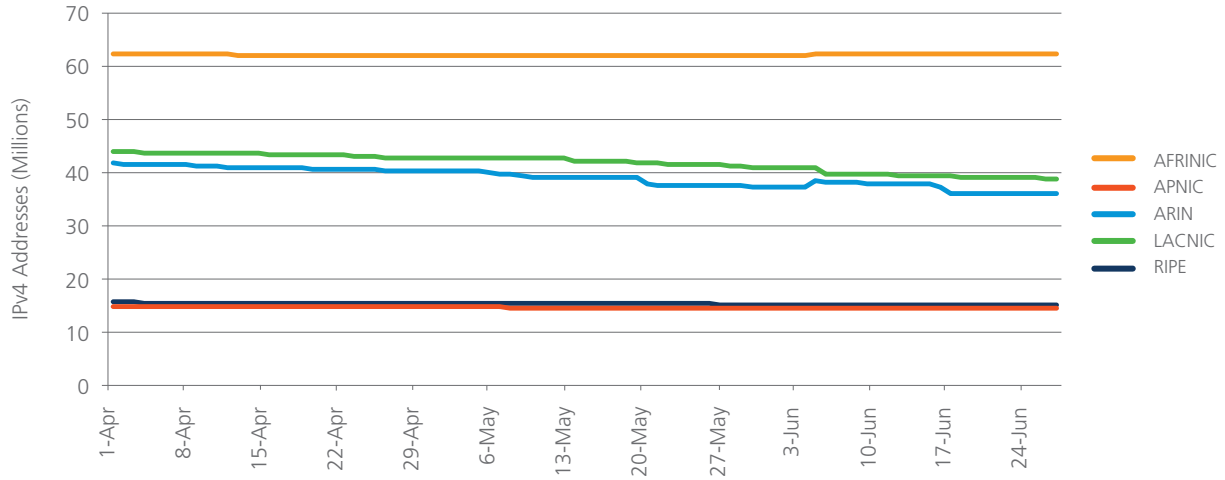

Figure 8: Available IPv4 Address Pool Size by RIR, Q2 2013

ing anomaly may be due to RIRs identifying IPv4 address space that was not previously correctly recorded (as transient inconsistencies get cleaned up), or that it may be due to IPv4 address space being returned to the RIRs.

Because they are both currently delegating IPv4 address space from their last "/8" address block, both RIPE and APNIC once again had comparatively small drawdowns from their available pool, handing out 3.1% and 2.6% of their available space, respectively. ARIN delegated just over 13% of its available pool during the quarter (5.4 million IPv4 addresses), while LACNIC delegated nearly 4.7 million IPv4 addresses, comprising nearly 11% of its available pool. Based on projections published by Mr. Huston,[13] it is estimated that address pool "exhaustion" will take place at both LACNIC and ARIN in 2014, while AFRINIC is not expected to reach that point until 2020. However, Mr. Huston also clarifies[14] his prediction regarding ARIN's estimated exhaustion date, noting that "exhaustion" is defined somewhat differently as it applies to ARIN, and applies further statistical modeling against ARIN's allocation activity to arrive at a date range (which still falls largely within 2014) during which exhaustion is likely to occur.

Figure 9 illustrates the IPv4 allocation/assignment activity across each of the RIRs during the second quarter. As it shows, assignment/allocation activity across APNIC, RIPE, and AFRINIC was fairly low, with each RIR delegating fewer than half a million IPv4 addresses. Though hard to see within the figure, comparatively significant delegations occurred on April 8, when a "/16"

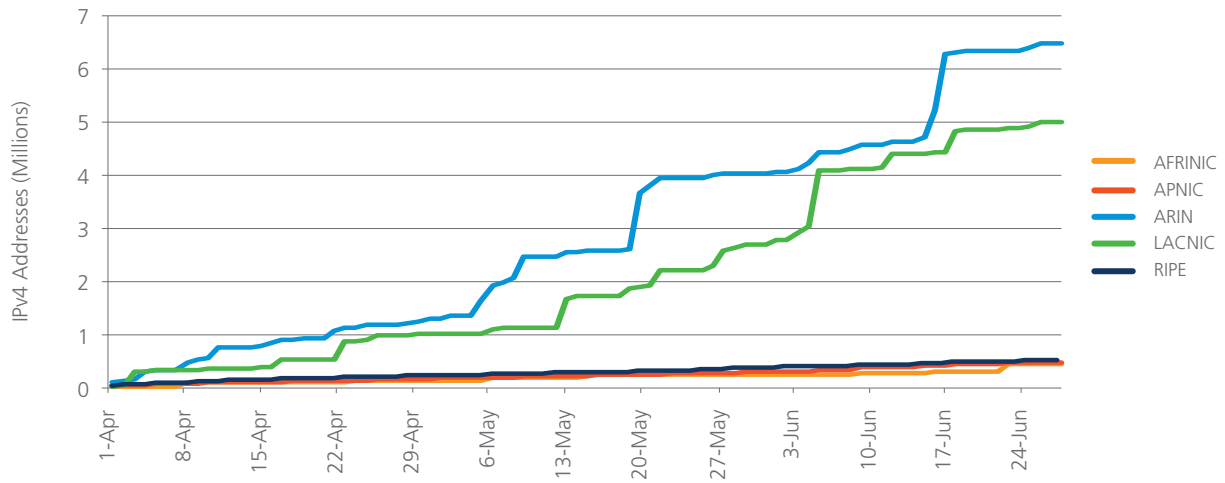

Figure 9: Total Number of IPv4 Addresses Assigned/Allocated by RIR, Q2 2013

(65,536 IPv4 addresses) was allocated to Jamii Telecommunications Limited,[15] a residential and corporate carrier in Kenya; May 7, when a "/16" was allocated to Telecom Namibia;[16] and on June 25, when a "/15" (131,072 IPv4 addresses) was allocated to mobile provider Bharti Airtel (Ghana) Limited.[17] Within APNIC, the biggest delegation was seen on June 11, when a "/16" was allocated to Telewings Communications Services Private Limited,[18] which is apparently the Indian operating unit of Norwegian telecommunications company Telenor. Within LACNIC, the most active day was June 7, when four separate "/14" (262,144 IPv4 addresses) blocks were allocated, with three going to Vivo S.A.[19] and one to Nextel Telecomunicações Ltda.[20] The biggest jumps in activity at ARIN took place on May 21, when a "/12" (1,048,576 IPv4 addresses) block was allocated to AT&T Internet Services;[21] on June 18, when a "/13" (524,288 IPv4 addresses) block was assigned to Microsoft;[22] and on June 19, when a "/12" was allocated to Amazon.com.[23]

2.3 IPv6 Adoption

As Akamai continues to roll out IPv6 support across its solution portfolio, we will endeavor to include additional observations in the *State of the Internet Report* about IPv6 requests to, and traffic delivered by, the Akamai Intelligent Platform. While we expect to begin to do this in greater depth over the next several quarters, until that time, we will continue to supplement with third-party data.

One such data source is network service provider Hurricane Electric, which claims that it is "considered the largest IPv6 backbone in the world as measured by number of networks connected."[24] A white paper[25] available from Hurricane Electric highlights more than a decade of experience in working with IPv6, and it also publishes the "Global IPv6 Deployment Progress Report", available at *http://bgp.he.net/ipv6-progress-report.cgi*.

As is shown in Figure 10, the 3.8% rate of growth in the second quarter of 2013 was significantly lower than that seen in any of the previous four years, though the quarter ended with nearly 7,200 autonomous systems in the IPv6 routing table, gaining 263 ASes during the quarter. In comparison, 369 ASes were added during the second quarter of 2012, representing a 6.8% year-over-year growth rate, while 773 were added in the second quarter of 2011, representing a year-over-year growth rate of just under 22%. Note that World IPv6 Day took place during the second quarter of 2011, which likely served as a driver for many networks to add IPv6 support. While this metric provides some perspective on global IPv6 adoption, it is also important to recognize that not all ASes are equivalent — ASes associated with large numbers of users/subscribers are ultimately more meaningful for measuring the success of IPv6 adoption than ASes not directly associated with end user connectivity/traffic. Ongoing analysis of data collected by Akamai does indicate that ASes associated with end user traffic are starting to see meaningful levels of IPv6 adoption. A June blog post[26] from Akamai Chief Architect Eric Nygren highlights that nearly 35% of requests seen

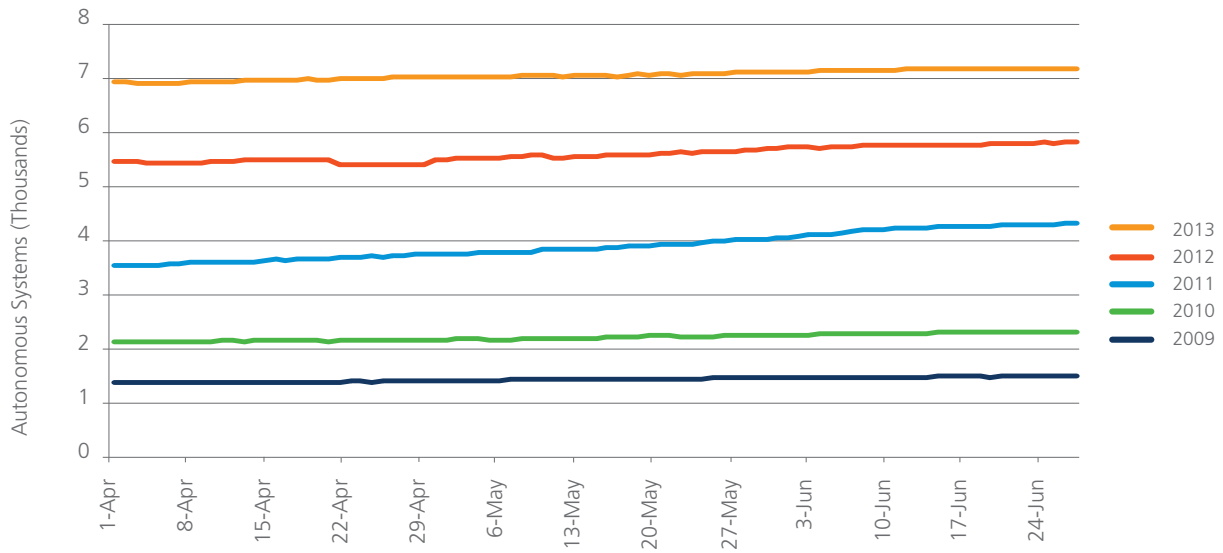

Figure 10: Total Number of Autonomous Systems in the IPv6 Routing Table

from U.S. mobile provider Verizon Wireless come to Akamai over IPv6, while nearly 30% of requests from Belgian provider Brutele (VOO) are via IPv6. In addition, in April, the deputy director at China's Ministry of Industry and Information Technology (MIIT) said China Mobile, China Unicom and China Telecom are upgrading their networks to IPv6 in 20 cities across 14 provinces.[27] China Mobile plans to introduce commercial trials of IPv6 in 10 cities during 2013, aiming to get 3 million users on board, while China Telecom plans to expand its IPv6 deployment to over 20 cities across the country with 3 million IPv6 users this year.

Since mid-2012, we have been tracking IPv6 traffic levels on the Akamai Intelligent Platform. The graph in Figure 11 is based on data taken from *http://www.akamai.com/IPv6*, which provides both rolling 24-hour and historical views of IPv6 request volume seen by Akamai (in hits/second), and shows peak traffic volume on a daily basis across the second quarter of 2013. A somewhat cyclical weekly pattern remains evident, as was noted in prior quarters. Absolute volume grew from just over 123,000 hits/second at the beginning of the second quarter to nearly 170,000 hits/second at the end of the quarter, with a peak of 185,767 seen on May 10. Similar to the observation made in the first quarter, the last month of the second quarter also saw a significant shift in the peak/trough cycle, with differences in the range of 40,000 hits/second evident during the last several weeks. (This gap has doubled from the observation made in the first quarter, where the peaks/troughs were separated by 20,000 or so hits/second.) It will be interesting to see if a similar cycle repeats itself during the last month of the third quarter, and if the peak/trough differences continue to grow.

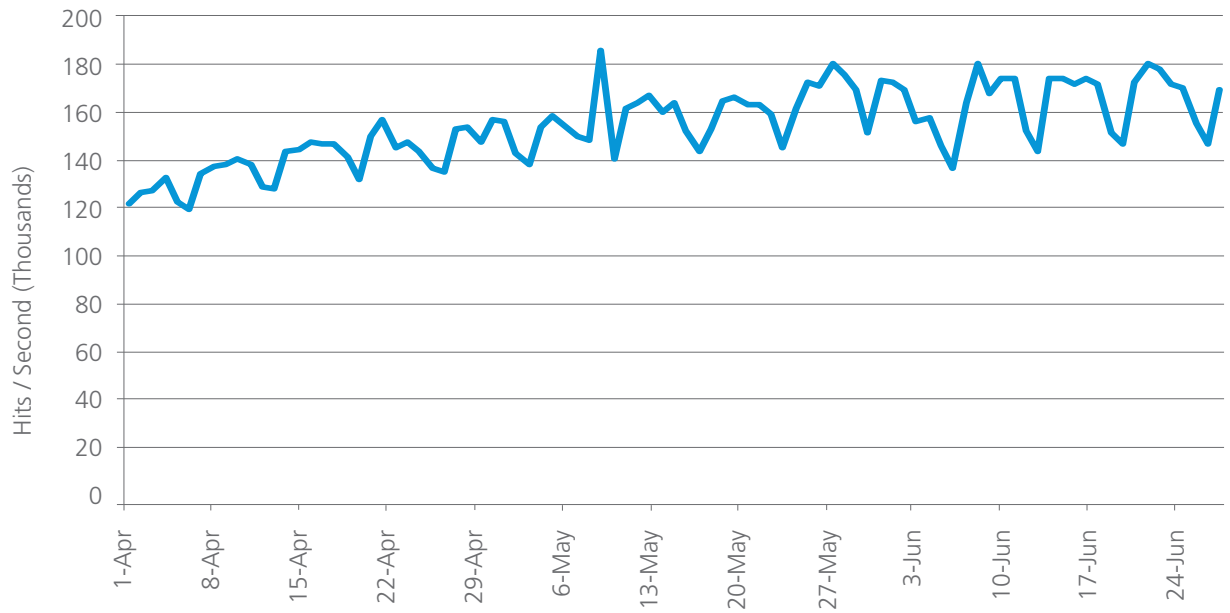

Figure 11: IPv6 Traffic to the Akamai Intelligent Platform, Q2 2013

DID YOU KNOW?

Akamai regularly delivers on the order of 20 billion content requests per day over IPv6, representing between 1-2% of total request volume. This is roughly double the level seen in the second half of 2012.

[Source: http://www.akamai.com/ipv6, https://blogs.akamai.com/2013/06/world-ipv6-launch-anniversary-measuring-adoption-one-year-later.html#more]

SECTION 3:
Geography – Global

The data presented within this section was collected during the second quarter of 2013 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 purposes of classification within this report, the "high broadband" data included below is for connections at 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.

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

3.1 Global Average Connection Speeds

The global average connection speed continued to increase in the second quarter of 2013, growing 5.2% quarter-over-quarter to 3.3 Mbps. As shown in Figure 12, quarterly increases were seen in nine of the top 10 countries/regions, with the largest increases seen among European countries — Latvia and the United Kingdom both added more than 10%, while growth just above/below 9% was seen in Switzerland and the Czech Republic. Latvia and the Netherlands also saw quarter-over-quarter increases large enough to push their average connection speeds over the 10 Mbps "high broadband" threshold. Looking back a year, only South Korea and Japan had average connection speeds higher than 10 Mbps in the second quarter of 2012, so the addition of four more countries/regions, with the Czech Republic close to the threshold as well, is a very encouraging trend. Globally, a total of 129 countries/regions that qualified for inclusion saw average connection speeds increase in the second quarter, ranging from an increase of just 0.1% in Bulgaria (to 6.7 Mbps) to a 93% increase in Sudan (to 2.1 Mbps) and 90% in the Bahamas (to 6.1 Mbps). Quarterly losses among qualifying countries/regions ranged from a loss of 0.7% in Singapore (to 6.5 Mbps) to a loss of 39% in Syria (to 1.3 Mbps).

Long-term trends remained generally positive in the second quarter. At a global level, the average connection speed was up 9.2% year-over-year, and nine of the top 10 countries/regions saw positive year-over-year changes, and all greater than 10% at that. Among the group, the largest quarter-over-quarter change was seen in the United Kingdom, which improved by 48%, followed closely by Sweden, which grew by 44%. The lowest growth rate among the top 10 was seen in Japan, which saw its average connection speed increase by 11% from the second quarter of 2012. Around the world, 127 qualifying countries/regions saw a year-over-year increase in average connection speeds, ranging from growth of just 0.6% in Argentina (to 2.0 Mbps) to growth of more than 100% in Sudan (up 101%), Indonesia (up 125% to 1.7 Mbps), and Côte d'Ivoire (up 262% to 1.6 Mbps). Year-over-year declines were seen in just 10 qualifying countries/regions, ranging from a drop of 1.4% in Chile (to 2.9 Mbps) to a loss of 42% in Kenya (to 1.0 Mbps).

In the second quarter, 11 qualifying countries/regions had average connection speeds of 1 Mbps or less, down from 14 in the first quarter, and 18 in the fourth quarter of 2012. Seeing this count continue to decline over time is extremely encouraging, as the trend is likely driven by improved broadband connectivity across the slowest geographies. Libya remained the country with the lowest average connection speed, remaining at 0.6 Mbps, but growing 2.8% quarter-over-quarter and 10% year-over-year.

	Country/Region	Q2 '13 Avg. Mbps	QoQ Change	YoY Change
–	Global	3.3	5.2%	9.2%
1	South Korea	13.3	-6.3%	-6.4%
2	Japan	12.0	6.5%	11%
3	Switzerland	11.0	9.1%	31%
4	Hong Kong	10.8	0.8%	21%
5	Latvia	10.6	12%	22%
6	Netherlands	10.1	6.2%	27%
7	Czech Republic	9.8	8.7%	36%
8	United States	8.7	3.4%	22%
9	Sweden	8.4	0.7%	44%
10	United Kingdom	8.4	11%	48%

Figure 12: Average Connection Speed by Country/Region

3.2 Global Average Peak Connection Speeds

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

As shown in Figure 13, the global average peak connection speed saw a very slight increase during the second quarter of 2013, growing just 0.1% to 18.9 Mbps. However, among the top 10 countries/regions that saw higher average peak connection speeds quarter-over-quarter, increases ranged from 3.1% in Japan to 22% in Taiwan. Hong Kong continued to remain well above 50 Mbps, while South Korea's solid 19% quarterly increase also pushed it above the 50 Mbps mark. Hong Kong was also one of only two countries/regions in the top 10 that saw average peak connection speeds decline in the second quarter — Romania was the other one. As the declines were both under 1%, they are not of any significant concern, and are well within the range of reasonable quarterly fluctuations. On a global basis, 107 qualifying countries/regions saw higher average peak connection speeds quarter-over-quarter, with increases ranging from just 0.3% in Côte d'Ivoire (to 16.7 Mbps) to increases of more than 50% in the Bahamas (up 74% to 26.5 Mbps), Lesotho (up 58% to 7.0 Mbps), and Iran (up 55% to 5.0 Mbps).

	Country/Region	Q2 '13 Peak Mbps	QoQ Change	YoY Change
–	Global	18.9	0.1%	17%
1	Hong Kong	65.1	-0.9%	32%
2	South Korea	53.3	19%	14%
3	Japan	48.8	3.1%	21%
4	Romania	47.5	-0.6%	23%
5	Singapore	45.6	4.1%	61%
6	Latvia	44.6	5.4%	33%
7	Switzerland	41.4	3.9%	38%
8	Israel	40.1	6.4%	53%
9	Belgium	39.9	8.1%	35%
10	Taiwan	39.5	22%	61%

Figure 13: Average Peak Connection Speed by Country/Region

Looking at year-over-year changes, global long-term growth was solid at 17%, and was also very strong among the top 10 countries/regions. In the second quarter, yearly growth rates among the top 10 ranged from 14% in South Korea to 61% in both Singapore and Taiwan. South Korea's year-over-year change was the only one among the top 10 that was lower than the global average. Around the rest of the world, all but six of the qualifying countries/regions saw yearly growth in average peak connection speeds, ranging from a surprising high 8.5% in Bermuda (to 13.4 Mbps) to increases of more than 200% in Bahrain (up 284% to 40.3 Mbps) and Iraq (up 247% to 27.3 Mbps). Of the qualifying countries/regions that saw yearly declines, losses ranged from just 0.8% in Chile (to 19.3 Mbps) to a 38% drop in Kenya (to 4.5 Mbps). The lowest average peak connection speed among qualifying countries in the second quarter was found in Kenya.

3.3 Global High Broadband Connectivity

The global high broadband adoption rate continued to increase in the second quarter of 2013, growing to 14% on top of a 13% quarter-over-quarter increase. Although a nominal decline seen in South Korea pushed its high broadband adoption rate back below 50%, adoption among the top 10 countries/regions remained strong, with all except the United States seeing at least one of every four connections to Akamai at speeds above 10 Mbps. (The United States fell just short with a 24% high broadband adoption rate.) Réunion saw the highest rate of quarterly growth, at 35%, while Switzerland, the Czech Republic, and Belgium also grew

DID YOU KNOW?

According to new research from the International Telecommunications Union, data indicates that countries with a National Broadband Plan have fixed broadband penetration 8.7% higher on average than countries without plans and that countries with such plans also have mobile broadband penetration some 7.4% higher on average than countries without plans.

[Source: http://www.itu.int/net/pressoffice/press_releases/2013/27.aspx]

	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
–	Global	14%	13%	38%
1	South Korea	45%	-8.6%	-6.5%
2	Japan	43%	5.8%	18%
3	Switzerland	37%	21%	71%
4	Latvia	33%	13%	29%
5	Réunion	33%	35%	-
6	Hong Kong	32%	-1.9%	23%
7	Netherlands	31%	8.5%	66%
8	Czech Republic	27%	24%	88%
9	Belgium	25%	23%	80%
10	United States	24%	2.3%	43%

Figure 14: High Broadband (>10 Mbps) Connectivity

more than 20% quarter-over-quarter. Among the 50 countries/regions around the world that qualified for inclusion, 40 saw high broadband adoption rates increase from the first quarter, with growth ranging from 2.3% in the United States to 141% in China (to 1.1% adoption) and 105% in Taiwan (to 8.3% adoption). Of the 10 countries/regions that saw high broadband adoption rates drop quarter-over-quarter, losses ranged from just 0.5% in South Africa (to 1.6% adoption) to a surprisingly high 51% decline in the United Arab Emirates (to 5.9% adoption). With the massive growth observed in China, India slipped back into the position as the country with the lowest level of high broadband adoption among qualifying countries, at 0.2%.

Looking at year-over-year changes, the global high broadband adoption rate saw extremely strong growth, up 38%. Half of the top 10 countries/regions saw yearly increases even larger than the global measure, with Switzerland increasing 71%, the Netherlands increasing 66%, the Czech Republic up a massive 88%, Belgium up an impressive 80%, and the United States adding 43%. South Korea saw a minor decline as compared to the second quarter of 2012, while the high broadband adoption rate in Réunion remained flat year-over-year. Yearly changes among the qualifying countries around the world ranged from 8.1% in Australia (to 5.1% adoption) to an impressively high 731% in China (to 1.1% adoption). Ten additional countries/regions joined China in seeing high broadband adoption rates more than double year-over-year, including Moldova, which increased 324% (to 21% adoption), the Ukraine, which increased 322% (to 21% adoption), and the United Kingdom, which increased 200% (to 23% adoption). Yearly declines among qualifying countries were only seen in South Korea and the United Arab Emirates (down 22% to 5.9% adoption).

3.4 Global Broadband Connectivity

In the second quarter, the global broadband adoption rate improved 11% and reached a milestone, with half of all connections to Akamai from around the world taking place at speeds of at least 4 Mbps. Among the top 10 countries/regions, more than three of every four connections to Akamai were at speeds of at least 4 Mbps, with broadband adoption levels ranging from 77% in Hong Kong and Belgium to 90% in Switzerland. Nominal quarter-over-quarter growth in broadband adoption was seen in nine of the top 10 countries/regions, with the largest increase seen in Austria, which grew 10% from the prior quarter. Hong Kong had the lowest growth rate among the group, increasing just 1.9%. Globally, a total of 76 countries/regions that qualified for inclusion had higher levels of broadband adoption quarter-over-quarter, with growth ranging from just 0.8% in Israel (to 74% adoption) to an increase of 290% in the Bahamas (to 72% adoption). Morocco and Kazakhstan also saw adoption levels more than double as compared to the first quarter, adding 106% (to 12% adoption) and 105% (to 19% adoption) respectively. Forty-one countries/regions around the world (up from 37 in the first quarter) saw at least half of their connections to Akamai occurring at speeds above 4 Mbps. In contrast, Venezuela once again had the lowest level of broadband adoption, reaching 1.6% in the second quarter (up 32% quarter-over-quarter).

Global broadband adoption also grew nicely year-over-year, increasing 24% from the second quarter of 2012. It was also up in all of the top 10 countries/regions, with increases ranging from 2.1% in South Korea to 39% in Austria, and seven of the top 10 growing more than 10% year-over-year. While strong in and of themselves, the increases seen among the top 10 for broadband adoption once again generally paled in comparison to those seen for high broadband adoption. Looking across the whole world, 77 qualifying countries/regions saw higher broadband adoption levels year-over-year. Growth rates ranged from 2.1% in South Korea to a staggering 503% in China (to 19% adoption). Five other countries/regions saw yearly growth above 300%, while another five grew by more than 200%, and an additional 11 increased by more than 100%. Only two countries that qualified for inclusion saw yearly declines in broadband adoption rates — Vietnam declined 19% (to 2.4% adoption) and the United Arab Emirates dropped 20% (to 41% adoption).

Although Venezuela has held the position as the country with the lowest broadband adoption rate during the first and second quarters of 2013, an announcement by Venezuela's dominant

broadband operator CANTV in April may point to an eventual shift out of that position. According to a post[28] from telecommunication analyst firm Telegeography, CANTV plans to upgrade its DSL Internet access speeds, doubling its standard 512 kbps (download) package to 1 Mbps while also making a 'premium' 4 Mbps package available to subscribers for the equivalent of approximately $80 USD per month. India has also had a historically low broadband adoption rate, and it appears that things may get worse there before they get better, as published reports[29] indicate that consumers may be adopting mobile Internet connectivity over fixed broadband. According to a report released in May by the Telecom Regulatory Authority of India (TRAI), India's broadband subscriber base increased to 15.05 million in March from 15 million in February. While just 50,000 subscribers were added, this meager growth rate was better than was seen in February, when the number of broadband users actually shrank by 10,000 as compared with January.

	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
–	Global	50%	11%	24%
1	Switzerland	90%	2.3%	14%
2	South Korea	85%	-2.2%	2.1%
3	Netherlands	83%	2.6%	5.5%
4	Czech Republic	82%	4.6%	30%
5	Canada	80%	5.3%	16%
6	Japan	80%	4.5%	8.2%
7	Romania	79%	2.5%	27%
8	Austria	79%	10%	39%
9	Hong Kong	77%	1.9%	13%
10	Belgium	77%	2.0%	11%

Figure 15: Broadband (>4 Mbps) Connectivity

Geography – United States

The metrics presented here for the United States are based on a subset of data used for Section 3 and are subject to the same thresholds and filters discussed within that section. The subset used for this section includes connections identified as coming from networks within the United States, based on classification by Akamai's EdgeScape geolocation tool. For the purposes of this section, the District of Columbia is treated as a state.

4.1 United States Average Connection Speeds

The second quarter of 2013 saw mixed quarter-over-quarter changes across the top 10 states, as shown in Figure 16. Seven of the listed states saw nominal growth from the first quarter, including the District of Columbia, which added a scant 0.1% for an average connection speed of 11.4 Mbps. Connecticut saw a similarly tiny increase (to 10.0 Mbps), while the highest rate of growth was seen in Washington, at just 4.7% (to 10.1 Mbps). Slight quarterly declines were seen in three of the top 10 states — Utah lost just 0.4% (to 10.3 Mbps), Delaware lost 3.0% (to 10.8 Mbps), and New Hampshire lost 7.9% (to 10.7 Mbps). In addition to these declines, Vermont saw a 27% quarter-over-quarter loss that dropped it not only out of first place, but also out of the top 10 entirely. Investigating this unusually large decline further, it appears related to a number of IP address blocks from a single network provider shifting from another nearby state into Vermont — the average connection speed associated with these IP address blocks was low enough to pull down Vermont's average connection speed. This is also the same reason for New Hampshire's quarter-over-quarter loss. However, despite the nominal increases and slight declines, all of the top 10 states once again remained at or above the 10 Mbps "high broadband" threshold. Across the whole country, average connection speeds were up in 43 states overall, with increases ranging from 0.1% in Connecticut, the District of Columbia, and New York (to 9.8 Mbps) up to 17% growth in Idaho (to 5.7 Mbps). In general, the quarterly growth rates across the United States were significantly lower this quarter than in the first quarter. Among the states that saw lower average connection speeds, losses ranged from just 0.4% in Utah to Vermont's aforementioned 27% drop. Arkansas continued to maintain its position as the state with the lowest average connection speed, at 4.5 Mbps, including a 5.6% quarterly increase.

	State	Q2 '13 Avg. Mbps	QoQ Change	YoY Change
1	District Of Columbia	11.4	0.1%	17%
2	Massachusetts	11.2	4.6%	27%
3	Virginia	11.1	4.2%	33%
4	Delaware	10.8	-3.0%	-10%
5	New Hampshire	10.7	-7.9%	5.7%
6	Maryland	10.6	3.5%	23%
7	Utah	10.3	-0.4%	28%
8	New Jersey	10.2	0.9%	20%
9	Washington	10.1	4.7%	22%
10	Connecticut	10.0	0.1%	15%

Figure 16: Average Connection Speed by State

On a year-over-year basis, growth was generally positive, and reasonably strong, among the top 10 states. Observed yearly increases ranged from 5.7% in New Hampshire to 33% in Virginia — other than in New Hampshire, yearly increases were above 10% in the other states (with the exception of Delaware, which saw a surprising 10% decline year-over year, although this was likely related to the average connection speed in the second quarter of 2012 having spiked to an uncharacteristically high level). Looking at the whole country, year-over-year increases of 10% or more were seen in 45 states, ranging from 10% in Hawaii (to 6.4 Mbps) to 49% in both Ohio (to 9.3 Mbps) and Kentucky (to 6.5 Mbps). In addition to the two states that grew in excess of 40%, two more (Missouri and Virginia) grew more than 30%, and an additional 23 states added 20% or more year-over-year, while the remaining 18 states grew 10% or more. Nevada, Maine, New Hampshire, and New Mexico also saw yearly growth, though at levels lower than seen in the other states. Only Delaware and Vermont (down 7.5%) had average connection speeds lower than those seen in the same period a year prior.

4.2 United States Average Peak Connection Speeds

The second quarter of 2012 saw generally positive, though relatively muted, quarter-over-quarter changes in average peak connection speeds, as shown in Figure 17. With only a single state among the top 10 seeing an increase greater than 10% (Washington, at 11%), quarterly growth rates among the top 10 states were significantly lower than were seen in the first quarter. In contrast to Washington's 11% quarterly increase,

New York grew just 0.1% from the previous quarter, reaching an average peak connection speed of 42.6 Mbps. New Hampshire was the only state among the group to have a lower average peak connection speed, dropping 2.0% to 43.8 Mbps — this decline is likely related to the IP address shift highlighted in Section 4.1. Looking across all of the states in the country, we find that a total of 39 states experienced quarterly increases, ranging from New York's tiny 0.1% increase to Washington's 11% increase — Idaho was the only other state to see double digit quarterly growth, adding 10% (to 24.3 Mbps). Among the dozen states that saw average peak connection speeds decline on a quarterly basis, losses ranged from just 0.3% in Iowa (to 26.2 Mbps) down to a surprisingly large 24% drop in Vermont (to 36.0 Mbps) — again, likely due to the previously noted IP address shift. Overall, 13 states had average peak connection speeds above 40 Mbps, 24 more states were above 30 Mbps, and the remaining 14 states came in above 20 Mbps. Coming in last once again was Arkansas, which had the lowest average peak connection speed at 21.2 Mbps, up 5.4% from the first quarter.

Year-over-year increases were fairly strong across all of the top 10 states except Delaware, which saw unexpectedly low 1.1% growth from the second quarter of 2012. All of the other states in the group added more than 20% year-over-year, with increases ranging from 21% in Rhode Island to 43% in neighboring Massachusetts. Strong yearly growth was seen across most of the rest of the country, as well. Kentucky had a very solid 63% year-over-year change (to 32.7 Mbps), while Missouri and Oregon joined Massachusetts growing in excess of 40%, adding 43% and 41% (to 33.5 Mbps and 40.3 Mbps) respectively. An additional 10 states increased by 30% or more year-over-year, another 22 states increased by 20% or more, and 10 more states grew in excess of 10%. Only Maine, Vermont, and Delaware had yearly growth rates below 10%, while Ohio was the only state to see a year-over-year decline, dropping 9.7% to 23.7 Mbps.

4.3 United States High Broadband Connectivity

As shown in Figure 18, quarterly changes in high broadband adoption across the top 10 states were largely negative in the second quarter. Losses ranged from just 0.2% in Massachusetts to a significant 14% decline in neighboring New Hampshire. Declines seen among the other states in the group were relatively muted. Maryland (up 2.2%), Rhode Island (up 7.6%), and Pennsylvania (up 2.5%) were the only states among the top 10 to see quarter-over-quarter increases in high broadband adoption. Across the whole country, all but four states had high broadband adoption rates above 10%. Kansas (8.4% adoption), Hawaii (7.0% adoption), and Idaho (6.6% adoption) all fell below the threshold, while Arkansas once again had the lowest rate of high broadband adoption, at just 4.1%. Quarter-over-quarter changes among all states were split, with 28 states growing adoption rates from the first quarter, while 23 saw adoption rates fall. For those states where high broadband adoption had a quarterly increase, growth ranged from 1.4% in Oklahoma (to 14% adoption) to 37% in Nebraska (to 14% adoption). In those states where high broadband adoption fell quarter-over-quarter, losses ranged from just 0.2% in Massachusetts to 37% in Vermont (to 27%). (As noted in Section 4.1, the significant declines observed in New Hampshire and Vermont were likely related to the IP address blocks that shifted into the states.)

Year-over-year changes among the top 10 states were more positive, with very strong increases noted in nine of the states. Similar to the average connection speed metric, Delaware was the lone outlier, seeing a 7.8% yearly loss. Among the other states in the group, year-over-year changes ranged from 19% in New Hampshire to 46%

	State	Q2 '13 Peak Mbps	QoQ Change	YoY Change
1	District Of Columbia	49.6	4.3%	32%
2	New Jersey	46.4	3.6%	37%
3	Massachusetts	46.1	2.6%	43%
4	Maryland	45.1	5.2%	39%
5	Washington	45.0	11%	38%
6	Virginia	44.0	0.9%	29%
7	New Hampshire	43.8	-2.0%	28%
8	New York	42.6	0.1%	29%
9	Delaware	42.1	0.6%	1.1%
10	Rhode Island	40.7	3.2%	21%

Figure 17: Average Peak Connection Speed by State

	State	% Above 10 Mbps	QoQ Change	YoY Change
1	Massachusetts	42%	-0.2%	44%
2	New Jersey	41%	-1.7%	42%
3	District Of Columbia	40%	-4.3%	26%
4	New Hampshire	40%	-14%	19%
5	Maryland	39%	2.2%	46%
6	Rhode Island	37%	7.6%	28%
7	Delaware	36%	-4.1%	-7.8%
8	Pennsylvania	32%	2.5%	41%
9	Connecticut	32%	-2.1%	37%
10	New York	32%	-2.6%	42%

Figure 18: High Broadband (>10 Mbps) Connectivity, U.S. States

in Maryland. Looking at yearly changes in high broadband adoption across the whole country, 48 states had higher adoption rates than in the second quarter of 2012, with 46 of the states seeing growth in excess of 10%. The largest changes in high broadband adoption were seen in Ohio and Missouri, which grew 117% (to 23% adoption) and 103% (to 17% adoption) respectively. The smallest changes in adoption rates were seen in the only two states to grow less than 10% year-over-year: Hawaii, which increased 7.3% (to 7.0% adoption) and Colorado, which increased 3.2% (to 19% adoption). Delaware and Vermont were the only two states in the country to see lower year-over-year high broadband adoption rates.

Though deployments are currently limited to a city level, the Google Fiber initiative was active in the second quarter. The company also made a number of announcements about the next cities to join the gigabit network, including Austin, Texas[30] and Provo, Utah,[31] as well as ongoing expansion of the network's Kansas City-area footprint.[32] Interestingly, on the heels of Google's Austin announcement, AT&T announced that it also intends to build out a gigabit network in the city.[33] Elsewhere in the country, Vermont Telephone Company started to offer[34] gigabit connectivity packages to subscribers for $35/month, CenturyLink announced its intention[35] to start offering gigabit connections to subscribers in Omaha, Nebraska, and broadband firm Gigabit Squared released pricing for its previously-announced gigabit network in Seattle, which will bring subscribers symmetrical gigabit speeds for $80/month. While some incumbent telecommunications companies are arguably feeling the competitive pressure from the Google Fiber initiative, it is also encouraging to see gigabit connectivity packages being made available at comparatively affordable prices in a number of cities throughout the country.

4.4 United States Broadband Connectivity

Quarter-over-quarter changes in broadband adoption rates among the top 10 states were largely positive in the second quarter, though once again fairly nominal in nature, as illustrated in Figure 19. Growth rates ranged from a low of 0.9% in Maryland to a high of 6.7% in South Dakota. The sole quarterly decline was seen in New Hampshire, which lost 8.1%. Once again, at least three of every four requests to Akamai from the top 10 states were at speeds of 4 Mbps or above, with Delaware having more than nine of every 10 requests at those speeds. Across the whole country, all but three states (Idaho, West Virginia, and Arkansas) had at least half of their connections to Akamai at speeds above 4 Mbps, with Arkansas having the lowest broadband adoption rate in the country, at 37%, despite a strong 17% quarter-over-quarter increase. Quarterly changes across all states were mostly positive in the second quarter, with 47 states seeing increases, which ranged from 0.5% in Indiana (to 67% adoption) to 18% in Kansas (to 61% adoption). In addition to the expected declines in New Hampshire and Vermont, Maine and Ohio also saw short-term declines in broadband adoption.

Year-over-year changes among the top 10 states were generally positive, although not as large as those seen for the high broadband adoption metric. Increases ranged from 8.2% in Rhode Island to 18% in South Dakota, while Delaware and New Hampshire both saw minor year-over-year declines in broadband adoption. Vermont was the only other state across the whole country to see a long-term decline in broadband adoption, losing 24% (to 63% adoption). Among all of the states where broadband adoption grew over the prior year, increases ranged from just half a percent in Maine (to 68% adoption) up to an impressive 82% in Kentucky (to 70% adoption). In addition to Maine, six other states grew less than 10% year-over-year. Akamai's home state of Massachusetts remained among the top 10 states, with mid-line short- and long-term growth in the second quarter. In April, the state activated[36] the first segment of the new 1,200 mile MassBroadband 123 network to 51 out of 120 community institutions in cities from Springfield to Sandisfield. Slated for completion in late 2013, the network will bring broadband access to 1,200 "anchor institutions", including schools, libraries, municipal buildings, public safety and health care facilities in 120 communities across the state. Even though these institutions account for a fraction of the connections to Akamai seen within the state, and as such these new broadband connections likely won't drive up adoption rates within the state significantly, it is extremely encouraging to see higher speed Internet connectivity being brought not only to consumers, but also to key public institutions.

	State	% Above 4 Mbps	QoQ Change	YoY Change
1	Delaware	92%	2.3%	-2.0%
2	Rhode Island	89%	3.6%	8.2%
3	New Jersey	87%	1.5%	13%
4	Maryland	85%	0.9%	13%
5	New York	83%	2.3%	13%
6	New Hampshire	83%	-8.1%	-4.0%
7	Massachusetts	82%	4.9%	15%
8	Connecticut	82%	2.5%	11%
9	South Dakota	77%	6.7%	18%
10	District Of Columbia	77%	1.2%	11%

Figure 19: Broadband (>4 Mbps) Connectivity, U.S. States

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 in North and South America, based on classification by Akamai's EdgeScape geolocation tool.

5.1 Americas Average Connection Speeds

In the second quarter of 2013, the United States and Canada once again had the fastest average connection speeds in the Americas region, more than twice as fast as Mexico, which had the next highest average connection speed, as shown in Figure 20. At 8.8 Mbps and 8.2 Mbps respectively, the United States and Canada were the only two Americas countries that had average connection speeds in the broadband range, with Mexico's 3.6 Mbps average speeds falling just below it. Within Latin and South America, average connection speeds ranged from 3.6 Mbps in Mexico down to 0.9 Mbps in Bolivia, which also made it the only country in the region with an average speed below 1 Mbps. Quarter-over-quarter changes among the surveyed countries in the Americas region were all positive, with six countries growing less than 10% quarter-over-quarter, and eight countries growing 10% or more. Quarterly increases ranged from 3.4% in both the United States and Chile to 31% in Ecuador.

On a year-over-year basis, changes in average connection speeds were generally positive, with only Chile falling lower, losing 1.4%. Observed growth was relatively strong as well, with Argentina's 0.6% yearly increase the only one below 10%. In contrast, Ecuador grew 48% from the second quarter of 2012, and Mexico (up 31%), Uruguay (up 32%), and Bolivia (up 36%) all grew in excess of 30%. The United States, Canada, and Venezuela all saw average connection speeds improve by more than 20%, while Colombia, Brazil, Costa Rica, Peru, and Paraguay all had yearly growth rates above 10%.

5.2 Americas Average Peak Connection Speeds

Very similar to the difference seen in the average connection speed metric, the United States and Canada had average peak connection speeds relatively close to one another, and significantly higher than the other countries in the Americas region, as shown in Figure 21. With average peak connection speeds of 36.3 Mbps and 34.4 Mbps respectively, the United States and Canada were the only two surveyed countries in the region with average peak speeds above 20 Mbps. Ecuador came relatively close, at 19.6 Mbps, and was joined by joined by eight other countries in Central and South America in having average peak connection speeds above 10 Mbps. However, Paraguay, Bolivia, and Venezuela fell below that mark, reaching average peak speeds of 9.7 Mbps, 8.8 Mbps, and 8.4 Mbps respectively. Quarter-over-quarter changes within the region were somewhat mixed, with nine Americas countries seeing quarterly increases, ranging from 1.2% in the United States to 9.0% in Mexico, while five countries saw speeds fall from the first quarter, with losses ranging from just 0.2% in Venezuela to 3.0% in Costa Rica.

Global Rank	Country/Region	Q2 '13 Avg. Mbps	QoQ Change	YoY Change
8	United States	8.7	3.4%	22%
12	Canada	8.2	8.7%	26%
58	Mexico	3.6	11%	31%
66	Chile	2.9	3.4%	-1.4%
67	Ecuador	2.9	31%	48%
68	Colombia	2.9	6.9%	15%
80	Brazil	2.4	11%	15%
90	Costa Rica	2.1	5.7%	13%
93	Peru	2.1	10%	15%
96	Argentina	2.0	5.2%	0.6%
102	Uruguay	1.9	10%	32%
118	Paraguay	1.3	16%	10%
120	Venezuela	1.3	20%	29%
133	Bolivia	0.9	15%	36%

Figure 20: Average Connection Speed by Americas Country

Global Rank	Country/Region	Q2 '13 Peak Mbps	QoQ Change	YoY Change
16	United States	36.3	1.2%	25%
19	Canada	34.4	2.8%	36%
64	Ecuador	19.6	6.3%	29%
67	Chile	19.3	-2.4%	-0.8%
70	Mexico	18.9	9.0%	37%
71	Brazil	18.7	2.1%	25%
79	Colombia	16.8	6.6%	26%
85	Peru	16.0	4.0%	25%
90	Uruguay	15.3	3.4%	56%
93	Argentina	14.5	-2.3%	9.9%
106	Costa Rica	12.4	-3.0%	18%
121	Paraguay	9.7	3.3%	-3.8%
124	Bolivia	8.8	-2.5%	26%
126	Venezuela	8.4	-0.2%	24%

Figure 21: Average Peak Connection Speed by Americas Country

Fairly strong long-term growth in average peak connection speeds was seen across surveyed countries in the Americas region, with quarterly increases above 30% seen in Uruguay, Mexico, and Canada, and growth above 20% seen in the United States, Ecuador, Brazil, Colombia, Peru, Bolivia, and Venezuela. Only Costa Rica and Argentina grew less than 20% year-over-year, with Costa Rica adding 18% and Argentina adding 9.9%. Slight yearly declines in average peak connection speeds were seen in Chile, which lost 0.8% and Paraguay, which lost 3.8%. It is positive to see that long-term growth in average peak connection speeds in Central and South America has remained generally strong, pointing to ongoing improvement in the quality of broadband connectivity within the region.

5.3 Americas High Broadband Connectivity

As highlighted in Figure 22, high broadband adoption in the Americas region remained rather lopsided, with only five countries qualifying for inclusion in the global rankings, along with a rather large disparity seen between high broadband adoption in the United States (24% adoption) and Canada (20% adoption) and that seen in the remaining three qualifying countries — Mexico saw just 1.0% adoption, while Brazil and Argentina were below that level, at 0.7% and 0.4% adoption respectively. The remaining countries in the region that did not qualify for global ranking are included in the figure for the sake of completeness. Calculated high broadband adoption rates in these countries ranged from 0.9% in Ecuador, down to imperceptible levels of adoption in Peru and Paraguay. Among the five qualifying countries, strong double-digit levels of quarterly growth were seen in Brazil, Mexico, and Canada, while growth in the United States was more limited, at 2.3%. Quarter-over-quarter changes across the countries that did not qualify for inclusion ranged from a high of 132% in Bolivia (though the country still has only 0.1% high broadband adoption) down to 11% in Peru. Paraguay saw the largest quarterly loss, at 45%.

Among the five qualifying countries, the year-over-year changes in high broadband adoption rates were extremely strong. Mexico grew by 126% from the second quarter of 2012, while the lowest growth rate among the five was seen in the United States, at a still very solid 43%. A broad range of yearly changes was seen among the countries that did not qualify for inclusion, with Uruguay increasing by nearly 600%, and Ecuador and Bolivia more than doubling adoption levels year-over-year, down to Costa Rica, which grew by 11%. However, as these countries did not qualify for inclusion, these particularly high rates of change, coupled with their extremely low adoption rates, should be considered inconclusive, and not taken as evidence of significant improvement in broadband connectivity within the country.

5.4 Americas Broadband Connectivity

As shown in Figure 23, nine of the 14 countries in the Americas region qualified for inclusion in the broadband adoption rankings, consistent with the first quarter. Among the countries that qualified for inclusion, Canada had the highest level of broadband adoption, at 80%, followed by the United States, at 72% adoption. Mexico led the remaining surveyed countries that qualified for inclusion with a broadband adoption rate of

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
10	United States	24%	2.3%	43%
17	Canada	20%	19%	83%
47	Mexico	1.0%	31%	126%
48	Brazil	0.7%	43%	48%
49	Argentina	0.4%	-12%	76%
–	Ecuador	0.9%	53%	155%
–	Chile	0.6%	-3.0%	-2.3%
–	Costa Rica	0.4%	-9.4%	11%
–	Colombia	0.2%	21%	-31%
–	Venezuela	0.1%	66%	83%
–	Uruguay	0.1%	53%	590%
–	Bolivia	0.1%	132%	168%
–	Peru	0.0%	11%	-29%
–	Paraguay	0.0%	-45%	-14%

Figure 22: High Broadband (>10 Mbps) Connectivity by Americas Country

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
5	Canada	80%	5.3%	16%
19	United States	72%	3.4%	15%
59	Mexico	25%	35%	157%
63	Ecuador	17%	52%	110%
64	Brazil	15%	24%	30%
65	Chile	15%	14%	23%
66	Colombia	14%	24%	82%
72	Argentina	8.3%	7.5%	8.6%
80	Venezuela	1.6%	32%	101%
–	Costa Rica	2.9%	10%	17%
–	Peru	1.9%	48%	39%
–	Uruguay	1.5%	48%	557%
–	Bolivia	0.7%	88%	167%
–	Paraguay	0.2%	2.8%	-49%

Figure 23: Broadband (>4 Mbps) Connectivity by Americas Country

25%, while the lowest level of broadband adoption was seen in Venezuela, at 1.6%. Among the surveyed countries that did not qualify for inclusion, broadband adoption rates were fairly low, ranging from 0.2% in Paraguay to 2.9% in Costa Rica. Quarter-over-quarter changes observed across qualifying Americas countries were all positive, and ranged from 3.4% in the United States to an impressive 52% in Ecuador. Among the other countries, growth was also fairly strong, with Bolivia turning in an 88% quarterly gain (though still below 1.0% broadband adoption), and both Peru and Uruguay seeing quarterly increases of 48%.

Yearly changes among qualifying countries in the Americas region were all positive, and extremely strong among a number of countries, with Mexico, Ecuador, and Venezuela all doubling broadband adoption levels as compared to the second quarter of 2012. Yearly growth of 10% or more was seen in all of the other qualifying countries with the exception of Argentina, which added a still respectable 8.6%. Among the countries that did not qualify for inclusion, Paraguay's broadband adoption rate fell 49% year-over-year, while Bolivia's more than doubled, and Uruguay's was up over 500%.

Although Cuba is not among the surveyed countries in the Americas region, we noted in the first quarter *State of the Internet Report* that international Internet connectivity showed signs of improvement, due to the activation of the ALBA-1 submarine cable carrying traffic from Cuba to Venezuela. In the second quarter, Internet monitoring form Renesys observed[37] traffic flowing from Cuba to the neighboring island of Jamaica, also over the ALBA-1 cable (though on a different segment). This secondary activation brings some critical redundancy to Cuba's international Internet connectivity.

SECTION 6:

Geography – Asia Pacific Region

The metrics presented here for the Asia Pacific region are based on a subset of data used for Section 3 and are subject to the same thresholds and filters discussed within that section. The subset used for this section includes connections identified as coming from networks in the Asia Pacific region, based on classification by Akamai's EdgeScape geolocation tool.

6.1 Asia Pacific Average Connection Speeds

In the second quarter of 2013, South Korea, Japan, and Hong Kong once again all had average connection speeds above the 10 Mbps "high broadband" threshold, as shown in Figure 24. Aside from minor quarterly declines seen in South Korea and Singapore, the surveyed Asia Pacific countries/regions saw continued short-term growth in average connection speeds. The smallest quarterly increase was seen in Hong Kong (up 0.8%), while Japan, New Zealand, and India all also grew less than 10% quarter-over-quarter. Vietnam and China both had quarterly increases of more than 20%, and five other countries/regions grew in excess of 10%, but the greatest quarterly rate of growth was seen in Taiwan, at 36%. Though it saw a 6.8% quarter-over-quarter change, India's average connection speed remained unchanged at 1.3 Mbps, once again placing it as the slowest among the surveyed Asia Pacific countries/regions.

Looking at the year-over-year changes in the Asia Pacific region, we find that they were generally positive, and continued to be fairly strong, in the second quarter. Only Australia and Vietnam saw yearly changes below 10%, with Australia missing it just slightly (up 9.8%) and Vietnam having the lowest year-over-year change in the region (up 4.4%). Indonesia once again saw the most significant increase from the prior year, growing 125%. China had aggressive year-over-year growth as well, adding 92%. Among the remainder of the surveyed countries/regions, three had yearly growth rates above 40%, and another five added 20% or more. South Korea was the only country in the Asia Pacific region to see its average connection speed drop from the second quarter of 2012, losing 6.4%.

6.2 Asia Pacific Average Peak Connection Speeds

As shown in Figure 25, at 65.1 Mbps, Hong Kong once again had the highest average peak connection speed in the Asia Pacific Region by a wide margin, topping second place South Korea by nearly 12 Mbps. South Korea was the only other Asia Pacific country in the second quarter with an average connection speed above 50 Mbps, posting an impressive 19% quarterly gain to 53.3 Mbps. In addition to South Korea, Taiwan, Australia, Vietnam, and China all saw average peak connection speeds grow by 10% or more quarter-over-quarter. Among the surveyed countries/regions, all had average peak connection speeds above 10 Mbps, with three above 20 Mbps, two more above 30 Mbps,

Global Rank	Country/Region	Q2 '13 Avg. Mbps	QoQ Change	YoY Change
1	South Korea	13.3	-6.3%	-6.4%
2	Japan	12.0	6.5%	11%
4	Hong Kong	10.8	0.8%	21%
27	Singapore	6.5	-0.7%	27%
39	Taiwan	5.5	36%	46%
45	Australia	4.8	13%	9.8%
49	New Zealand	4.6	7.5%	20%
51	Thailand	4.5	14%	42%
64	Malaysia	3.1	14%	42%
71	China	2.8	29%	92%
108	Indonesia	1.7	13%	125%
111	Vietnam	1.7	22%	4.4%
114	Philippines	1.6	12%	29%
119	India	1.3	6.8%	23%

Figure 24: Average Connection Speed by Asia Pacific Country/Region

Global Rank	Country/Region	Q2 '13 Peak Mbps	QoQ Change	YoY Change
1	Hong Kong	65.1	-0.9%	32%
2	South Korea	53.3	19%	14%
3	Japan	48.8	3.1%	21%
5	Singapore	45.6	4.1%	61%
10	Taiwan	39.5	22%	61%
22	Thailand	33.0	9.1%	73%
35	Australia	29.1	10%	34%
44	Malaysia	26.6	5.4%	63%
62	New Zealand	21.0	3.5%	27%
84	Philippines	16.0	7.8%	47%
97	Vietnam	14.1	15%	58%
108	China	11.4	20%	93%
109	Indonesia	11.3	-17%	35%
112	India	10.5	3.5%	44%

Figure 25: Average Peak Connection Speed by Asia Pacific Country/Region

and another two above 40 Mbps. Quarter-over-quarter declines in average peak connection speeds were only seen in Hong Kong, which lost just 0.9%, and in Indonesia, which saw an unexpectedly high 17% drop. Across the region, India returned to its position as the country with the lowest average peak connection speed, which it last held in the third quarter of 2012.

Year-over-year changes across surveyed Asia Pacific countries/regions were all positive in the second quarter, and exceedingly so. China saw the largest yearly increase, growing 93%, with Thailand, Malaysia, Taiwan, and Singapore all seeing average peak connection speeds improve by more than 60% over the prior year. Vietnam's average peak speed grew by 58% year-over-year, while the Philippines and India saw increases above 50%, with Indonesia, Australia, and Hong Kong adding more than 30% each. The lowest average peak connection speed increase seen over the past year occurred in South Korea, which added 14%.

A number of Asia Pacific countries/regions have historically had (affordable) high speed Internet connections. Ongoing long-term growth in average peak connection speeds observed across the whole region highlights that high speed connectivity is continuing to become more widely available (likely at affordable prices) across more and more countries. Even the countries that have historically lagged, such as India and China, are seeing aggressive growth rates and peak connection speeds in the 10 Mbps range.

6.3 Asia Pacific High Broadband Connectivity

The second quarter saw a wide range of high broadband adoption rates across the surveyed Asia Pacific countries/regions that qualified for inclusion, as illustrated in Figure 26. The strongest adoption was seen in South Korea, at 45% despite an 8.6% quarterly decline, and in Japan, which grew 5.8% to a 43% adoption rate. Hong Kong and Singapore were the only two other countries/regions to have a high broadband adoption rate above 10% in the second quarter, at 32% and 13% respectively. With a 141% quarter-over-quarter increase to 1.1% adoption, China was no longer the qualifying country with the lowest rate of high broadband adoption — that spot fell to India, which slipped 22% from the first quarter to 0.2% adoption. Quarterly changes were mixed, with Hong Kong and Singapore joining South Korea and India in seeing adoption rates fall, while double digit growth rates were seen in four other countries. Taiwan joined China in having its high broadband adoption rate more than double compared to the first quarter. Indonesia, Vietnam, and the Philippines did not qualify for inclusion in the global rankings, but are included here for the sake of completeness. All three had high broadband adoption rates of just a tenth of a percent, and only Vietnam saw its adoption rate rise quarter-over-quarter.

Year-over-year changes across the qualifying Asia/Pacific countries/regions were, by and large, rather strong in the second quarter. Only South Korea saw a slight decline, and only Australia saw a long-term increase below 10%. Among the others, Thailand and Taiwan more than doubled adoption rates from the second quarter of 2013, and China's 731% increase was astoundingly large, while increases among the balance of the group ranged from 18% in Japan to 87% in Singapore. Across Indonesia, Vietnam, and the Philippines, none of which qualified for inclusion, only Indonesia saw a yearly increase in high broadband adoption, growing 24% — Vietnam and the Philippines both saw declines in the 7% range.

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
1	South Korea	45%	-8.6%	-6.5%
2	Japan	43%	5.8%	18%
6	Hong Kong	32%	-1.9%	23%
26	Singapore	13%	-1.0%	87%
33	Taiwan	8.3%	105%	152%
38	Australia	5.1%	26%	8.1%
39	New Zealand	3.9%	17%	66%
42	Thailand	2.1%	39%	120%
43	Malaysia	2.0%	50%	65%
46	China	1.1%	141%	731%
50	India	0.2%	-22%	37%
–	Indonesia	0.1%	-8.8%	24%
–	Vietnam	0.1%	15%	-7.7%
–	Philippines	0.1%	-14%	-7.6%

Figure 26: High Broadband (>10 Mbps) Connectivity by Asia Pacific Country/Region

DID YOU KNOW?

A new cable broadband service in Vietnam is expected to provide users with download speeds between 2 and 10 Mbps.

[Source: https://www.abiresearch.com/blogs/vietnam-get-new-cable-broadband-service/]

6.4 Asia Pacific Broadband Connectivity

In contrast to the high broadband metric, all of the surveyed Asia Pacific countries/regions qualified for inclusion in the global rankings of broadband adoption. As shown in Figure 27, adoption rates were quite strong across nine of the 14 surveyed countries/regions. Topping the list in the second quarter was South Korea, which saw 85% of its connections to Akamai take place at 4 Mbps or more. Japan was not far behind, with four of every five connections to Akamai at 4 Mbps or better. Hong Kong, Singapore, Thailand, and Taiwan joined South Korea and Japan in having broadband adoption rates of at least 50%. Among the remaining surveyed Asia Pacific countries/regions, just four had broadband adoption rates below 10%, with Indonesia at 3.2%, and Vietnam, the Philippines, and India all below that level. India found itself ranked last among its peers for broadband adoption, with an adoption rate of just 2.1%, an increase of 7.3% quarter-over-quarter. India's quarterly growth rate was highest among the five Asia Pacific countries/regions that saw quarter-over-quarter changes below 10%. In contrast, the largest increases from the first quarter were seen in China, which grew a surprising 79%, Taiwan, which grew 71%, and Vietnam, which grew 67%. The only quarterly decline in high broadband adoption was found in South Korea, which lost 2.2%.

With the exception of a 19% year-over-year decline in Vietnam, the balance of the surveyed Asia Pacific countries all saw long-term growth in broadband adoption rates, albeit over a very wide range of changes. At the low end, only Japan, Australia, and South Korea saw broadband adoption increase by less than 10% on a yearly basis, with South Korea's 2.1% increase the smallest of the group. However, extremely large growth rates were seen in Malaysia, Thailand, Indonesia, and China, all of which more than doubled their levels of broadband adoption from the second quarter of 2012. The most impressive growth rates were seen in Indonesia, which grew by nearly 3x year-over-year, and in China, which was up over 500% during the same period. All four countries saw yearly growth rates above 100% in the first quarter as well, so continued aggressive growth in this metric is an extremely encouraging trend.

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
2	South Korea	85%	-2.2%	2.1%
6	Japan	80%	4.5%	8.2%
9	Hong Kong	77%	1.9%	13%
31	Singapore	61%	1.9%	30%
39	Thailand	51%	16%	195%
41	Taiwan	50%	71%	56%
45	New Zealand	47%	18%	37%
50	Australia	41%	25%	7.9%
58	Malaysia	27%	25%	127%
62	China	19%	79%	503%
76	Indonesia	3.2%	2.7%	292%
77	Vietnam	2.4%	67%	-19%
78	Philippines	2.2%	31%	76%
79	India	2.1%	7.3%	46%

Figure 27: Broadband (>4 Mbps) Connectivity by Asia Pacific Country/Region

DID YOU KNOW?

- In April, Japanese ISP So-net introduced a 2 Gbps FTTH broadband package for ¥4,980 (~$50 USD) per month.

[Source: http://www.ispreview.co.uk/index.php/2013/04/isp-in-japan-launches-worlds-fasted-2gbps-home-ftth-broadband.html]

- In an effort to boost Indonesia's relatively low levels of Internet penetration, the state-owned telecommunications company (Telkom) signed a deal in May with Intel in which computers (including notebooks and laptops) will be offered as part of discounted packages that include low-cost Internet services provided by Telkom.

[Source: http://www.oxfordbusinessgroup.com/economic_updates/indonesia-boost-internet-use]

- The number of broadband subscribers in Thailand has more than doubled over the last five years, although the total number of fixed line subscribers has fallen by over 15%, highlighting a shift to mobile broadband connectivity.

[Source: http://www2.nbtc.go.th/TTID/]

Geography – Europe/Middle East/Africa (EMEA)

The metrics presented here for the EMEA region are based on a subset of data used for Section 3 and are subject to the same thresholds and filters discussed within that section. The subset used for this section includes connections identified as coming from networks in the EMEA region, based on classification by Akamai's EdgeScape geolocation tool.

7.1 EMEA Average Connection Speeds

With a strong 9.1% increase over the prior quarter, Switzerland remained the EMEA country with the highest average connection speed, at 11 Mbps. As shown in Figure 28, the Netherlands joined Switzerland as the only other country in the EMEA region with an average connection speed above the 10 Mbps "high broadband" threshold, thanks to a 6.2% quarter-over-quarter increase. Looking at quarter-over-quarter changes, nearly all of the countries in the region saw higher average connection speeds in the second quarter, with growth ranging from just 0.7% in Sweden to 19% in Russia. In addition to Russia, the United Kingdom, Belgium, Ireland, Spain, France, Italy, and Turkey all saw average connection speeds grow by more than 10% quarter-over-quarter.

Only Romania and the United Arab Emirates saw average connection speeds decline, losing 2.2% and 22% respectively. (The rather large decline in the United Arab Emirates appears to be associated with a 'correction' of sorts reflected across multiple metrics this quarter.) At just 2.3 Mbps, up 5.6% from the first quarter, South Africa had the lowest average speed among surveyed EMEA countries.

With the exception of the 13% yearly decline seen in the United Arab Emirates, the surveyed countries in the EMEA region all saw average connection speeds increase year-over-year. The United Kingdom and Israel had the largest yearly gains, both adding 48%. In addition, Russia and Sweden also grew in excess of 40%

Global Rank	Country/Region	Q2 '13 Avg. Mbps	QoQ Change	YoY Change
3	Switzerland	11.0	9.1%	31%
6	Netherlands	10.1	6.2%	27%
7	Czech Republic	9.8	8.7%	36%
9	Sweden	8.4	0.7%	44%
10	United Kingdom	8.4	11%	48%
11	Belgium	8.4	11%	29%
13	Finland	8.1	3.5%	24%
14	Austria	8.1	9.8%	28%
15	Denmark	8.1	5.7%	21%
16	Ireland	8.0	11%	29%
19	Romania	7.5	-2.2%	15%
20	Israel	7.4	6.1%	48%
21	Norway	7.4	1.9%	34%
22	Germany	7.3	6.5%	27%
24	Russia	7.0	19%	46%
29	Hungary	6.5	1.4%	15%
30	Slovakia	6.4	5.5%	17%
31	Poland	6.3	4.6%	27%
35	Spain	5.9	17%	27%
37	France	5.7	14%	23%
40	Portugal	5.4	8.7%	15%
44	Italy	4.9	11%	23%
50	United Arab Emirates	4.6	-22%	-13%
56	Turkey	3.7	16%	36%
85	South Africa	2.3	5.6%	26%

Figure 28: Average Connection Speed by EMEA Country

Global Rank	Country/Region	Q2 '13 Peak Mbps	QoQ Change	YoY Change
4	Romania	47.5	-0.6%	23%
7	Switzerland	41.4	3.9%	38%
8	Israel	40.1	6.4%	53%
9	Belgium	39.9	8.1%	35%
11	Netherlands	38.8	6.4%	39%
12	United Arab Emirates	38.4	-60%	-63%
14	United Kingdom	37.1	5.3%	52%
15	Hungary	36.3	3.4%	30%
17	Czech Republic	35.4	2.2%	37%
18	Portugal	35.1	4.1%	26%
20	Sweden	33.7	2.1%	43%
23	Germany	32.6	4.4%	36%
25	Spain	32.1	6.5%	35%
26	Austria	31.6	7.1%	41%
27	Finland	31.0	3.0%	37%
28	Poland	31.0	-0.9%	36%
29	Ireland	30.9	1.4%	38%
30	Russia	30.8	4.8%	45%
32	Denmark	29.9	4.5%	31%
33	Slovakia	29.8	1.3%	27%
37	Norway	28.7	2.5%	46%
43	Turkey	26.7	11%	54%
54	France	24.2	6.4%	32%
56	Italy	23.3	5.6%	34%
127	South Africa	8.3	3.4%	50%

Figure 29: Average Peak Connection Speed by EMEA Country

year-over-year. Four additional countries had increases of more than 30%, while another 12 countries grew more than 20% from the second quarter of 2012. The smallest yearly increase was a still solid 15%, seen in Romania, Hungary, and Portugal.

7.2 EMEA Average Peak Connection Speeds

Despite a slight decline from the first quarter, Romania's second quarter average peak connection speed of 47.5 Mbps remained well ahead of the other surveyed countries in the EMEA region, as shown in Figure 29. The next fastest country was Switzerland, with an average peak connection speed of 41.4 Mbps, while Israel, at 40.1 Mbps, joined these two countries in having an average peak speed above 40 Mbps. An additional 15 countries saw average peak speeds over 30 Mbps, while six more were higher than 20 Mbps. South Africa continued to be the only country within the EMEA region with an average peak connection speed below 10%, at 8.3 Mbps after a 3.4% quarterly increase. In addition to the decline seen in Romania, a slight quarterly decline was also seen in Poland, where the average peak connection speed declined by just under a percent, while the much larger decline seen in the United Arab Emirates is part of the "correction" referenced in Section 7.1. (Over the last two years, the average peak connection speed seen in the United Arab Emirates was anomalously high for unknown reasons, but it returned to levels more in line with expectations in the second quarter of 2013.) Across the balance of the surveyed countries, quarterly increases were fairly nominal, ranging from 1.3% in Slovakia to 11% in Turkey.

Looking at year-over-year changes, all of the surveyed countries but the United Arab Emirates saw long term increases in average peak connection speeds, with aggressive growth rates. Turkey, Israel, the United Kingdom, and South Africa all saw average peak speeds increase by 50% or more on a yearly basis, while another four countries grew by more than 40% over the same time period. Thirteen additional countries saw average peak speeds increase by 30% or more year-over-year, while the lowest rates of growth were seen in Slovakia, Portugal, and Romania, which all had growth rates above 20%. With such high rates of growth, these long-term trends are extremely encouraging and point to ongoing improvements in the quality of Internet connectivity, and likely the availability/affordability of high speed Internet services, available within the region.

7.3 EMEA High Broadband Connectivity

As shown in Figure 30, a 21% quarterly gain placed Switzerland's 37% high broadband adoption rate squarely ahead of the 31% adoption rate seen in the Netherlands in the second quarter. In addition to these two countries, the Czech Republic and Belgium also had at least one of every four requests to Akamai at speeds above 10 Mbps. Finland, the United Kingdom, Sweden, and Denmark had adoption rates above 20% in the second quarter, while 10 more surveyed countries in the EMEA region had high broadband adoption rates of 10% or more. Similar to prior quarters, Turkey remained the EMEA country with the lowest level of high broadband adoption at 1.4%, but it also once again saw a strong quarterly increase, growing 28%. Although strong, Turkey's increase was not the largest seen in the second quarter. The 52% quarter-over-quarter change seen in both Russia and Spain topped the list, while the lowest rate of quarterly changes was seen in Finland, which added just 3.3%. Five surveyed countries saw high broadband adoption rates fall quarter-over-quarter, with losses ranging from just half a percent in South Africa to the United Arab Emirates dropping 51%.

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
3	Switzerland	37%	21%	71%
7	Netherlands	31%	8.5%	66%
8	Czech Republic	27%	24%	88%
9	Belgium	25%	23%	80%
11	Finland	23%	3.3%	66%
12	United Kingdom	23%	20%	200%
13	Sweden	22%	-4.1%	88%
16	Denmark	21%	16%	58%
18	Russia	19%	52%	173%
19	Norway	18%	-4.1%	62%
20	Austria	17%	22%	57%
21	Romania	17%	-12%	30%
22	Israel	17%	40%	178%
23	Ireland	16%	29%	93%
24	Germany	15%	18%	82%
27	Poland	13%	6.9%	82%
29	Hungary	12%	9.8%	47%
31	Slovakia	10%	9.9%	42%
34	Spain	8.3%	52%	83%
35	Portugal	6.9%	38%	57%
36	France	6.8%	37%	76%
37	United Arab Emirates	5.9%	-51%	-22%
41	Italy	3.7%	16%	40%
44	South Africa	1.6%	-0.5%	48%
45	Turkey	1.4%	28%	207%

Figure 30: High Broadband (>10 Mbps) Connectivity by EMEA Country

Extremely strong year-over-year increases were seen across a number of EMEA countries, with both Turkey and the United Kingdom up 200% or more, and Israel and Russia up over 100%. Ireland's yearly growth fell just short at 93%, though it led a group of 15 additional countries that saw high broadband adoption rates increase by more than 50% from the second quarter of 2012. Four additional countries had year-over-year growth rates of 40% or more, while the smallest yearly increase was seen in Romania, at a still very respectable 30%.

Building on a multi-quarter trend of large year-over-year changes, Israel may continue to see aggressive long-term growth in high broadband adoption going forward as well. In June, an announcement was made[38] that a group led by Sweden's Viaeuropa was chosen to build a gigabit network across Israel, in partnership with the state-run Israel Electric Corporation, to compete with incumbent phone and cable companies. Officials expressed hope that deployment of the necessary infrastructure could begin with six months of the announcement, though it is expected to take five to seven years for the network to become fully operational.

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
1	Switzerland	90%	2.3%	14%
3	Netherlands	83%	2.6%	5.5%
4	Czech Republic	82%	4.6%	30%
7	Romania	79%	2.5%	27%
8	Austria	79%	10%	39%
10	Belgium	77%	2.0%	11%
11	Denmark	76%	6.9%	16%
13	Germany	75%	6.5%	32%
16	United Kingdom	75%	7.3%	33%
17	Israel	74%	0.8%	62%
18	Hungary	72%	-	26%
24	Russia	69%	15%	45%
25	Finland	67%	0.9%	21%
26	Spain	64%	28%	50%
29	France	62%	22%	39%
30	Ireland	62%	12%	30%
32	Portugal	61%	9.3%	21%
33	Poland	61%	8.0%	42%
34	Sweden	61%	2.1%	36%
35	Slovakia	59%	21%	51%
38	Italy	52%	37%	88%
42	Norway	49%	2.2%	19%
49	United Arab Emirates	41%	-30%	-20%
56	Turkey	28%	64%	246%
73	South Africa	7.7%	-1.0%	12%

Figure 31: Broadband (>4 Mbps) Connectivity by EMEA Country

7.4 EMEA Broadband Connectivity

With nine of every 10 connections to Akamai at speeds of 4 Mbps or above, Switzerland's 90% broadband adoption rate ranked it first not only among surveyed countries in the EMEA region, but also across the world, as shown in Figure 31. Extremely strong broadband adoption rates were seen in nearly all of the surveyed countries in the EMEA region, with a total of 21 countries having at least half of their connections to Akamai in the second quarter take place at speeds of 4 Mbps or greater. Of the remaining countries, only one had a broadband adoption rate below 10% — that was South Africa, where the 7.7% adoption rate represented a decline of 1% from the prior quarter. Among the surveyed EMEA countries that saw broadband adoption rates grow on a quarterly basis, the largest increase was seen in Turkey, which improved by 64%. An additional seven countries also saw double digit percentage increases in broadband adoption rates from the first quarter, while growth rates below 10% were seen in 14 countries, with Israel's 0.8% quarterly increase the smallest seen in the second quarter.

In addition to posting the largest quarter-over-quarter change, Turkey also had the largest year-over-year change in broadband adoption, growing nearly 250%. It was the only country in the EMEA region with a yearly growth rate above 100%, though Italy, Israel, Slovakia, and Spain all saw broadband adoption rates grow by 50% or more year-over-year. Long-term growth of 20% or more was seen in 13 countries, while five additional countries saw broadband adoption rates grow by more than 10% over the prior year. The smallest year-over-year change was seen in the Netherlands, which added 5.5%, and the only yearly decline was seen in the United Arab Emirates, where broadband adoption dropped 20%.

Although South Africa's broadband adoption rate was the lowest in the EMEA region, it may eventually see greater growth over the long term. In the second quarter, Google introduced, on a trial basis, innovative "white space" technology[39] to deliver Internet connectivity to 10 schools across Cape Town at speeds significantly higher than existing ADSL or satellite connections. The technology makes use of the so-called "white space" (unused radio spectrum) between television channels. While the trial is limited in scope and timeframe, a more widespread deployment across the country over time could bring higher-speed Internet connectivity to a larger percentage of the population. In addition to testing this white space technology, Google also announced[40] "Project Loon" in June, which is a plan to bring Internet connectivity to underserved regions using high altitude balloons.

SECTION 8:
Mobile Connectivity

The source data in this section encompasses usage not only from smartphones, but also laptops, tablets, and other devices that connect to the Internet through mobile networks. In addition, this edition of the *State of the Internet Report* once again includes insight into mobile traffic growth and data traffic patterns contributed by Ericsson, a leading provider of telecommunications equipment and related services to mobile and fixed network operators globally.

The source data in this section encompasses usage not only from smartphones, but also laptops, tablets, and other devices that connect to the Internet through these mobile networks. In addition, this edition of the *State of the Internet Report* once again includes insight into mobile traffic growth and data traffic patterns contributed by Ericsson, a leading provider of telecommunications equipment and related services to mobile and fixed network operators globally.

As has been noted in prior quarters, the source data set for this section is subject to the following constraints:

- A minimum of 1,000 unique IP addresses connecting to Akamai from the network in the second quarter of 2013 was required for inclusion in the list.
- In countries where Akamai had data for multiple network providers, only the top three are listed, based on unique IP address count.
- The names of specific mobile network providers have been made anonymous, and providers are identified by a unique ID.
- Data is included only for networks where Akamai believes that the entire Autonomous System (AS) is mobile – that is, if a network provider mixes traffic from fixed/wireline (DSL, cable, etc.) connections with traffic from mobile connections on a single network identifier, that AS was not included in the source data set.
- Akamai's EdgeScape database was used for the geographic assignments.

8.1 Connection Speeds on Mobile Networks

In the second quarter of 2013, Russian provider RU-1 remained the mobile provider with the highest average connection speed, posting solid 13% quarterly growth to 9.7 Mbps. It was just over 0.5 Mbps faster than Ukrainian provider UA-1, which surged 53% quarter-over-quarter to an average connection speed of 9.2 Mbps. In reviewing the full list of mobile providers shown in Figure 32, we find that there are 11 providers (RU-1, UA-1, CZ-3, RU-4, GR-1, AT-1, DE-2, AT-2, IE-1, CA-2, and IT-3) that had average connection speeds in the "broadband" (>4 Mbps) range. Down one from the first quarter, 62 mobile providers had average connection speeds above 1 Mbps in the second quarter, including provider RU-3, which fell just 19 kbps over the threshold, helped by a scant 0.4% quarterly increase. This increase was the smallest seen and contrasts sharply with the 77% quarter-over-quarter increase seen in Qatar provider QA-1, which grew to an average connection speed of 2.5 Mbps. Quarterly declines were seen in 14 mobile providers, ranging from a loss of 0.5% at Slovakian provider SK-2 to a surprisingly large 61% drop at Argentinian provider AR-2. South African provider ZA-1 had the lowest average connection speed at 0.5 Mbps. Including ZA-1, a total of six providers had average connection speeds below 1 Mbps in the second quarter.

Examining the average peak connection speed data for the second quarter of 2013, we find that Greek provider GR-1 climbed to the top of the list at 54.9 Mbps, owing to a 153% quarter-over-quarter increase. Provider QA-1, from Qatar, was not far behind with an average peak connection speed of 54.2 Mbps, thanks to a massive 340% quarterly increase. Mobile providers SA-1 in Saudi Arabia and RU-1 in Russia also had average peak connection speeds above 50 Mbps, at 53.9 Mbps and 51.8 Mbps respectively. None of the other surveyed providers saw average peak connection speeds above 40 Mbps, while only two providers (MY-2 and SK-2) had average peak connection speeds above 30 Mbps. A total of 17 more providers saw average peak connection speeds above 20 Mbps in the second quarter, and 33 additional providers had average peak speeds above 10 Mbps. The lowest average peak connection speed in the second quarter, 2.2 Mbps, was once again seen on South African provider ZA-1, after a 21% decline quarter-over-quarter. QA-1's previously mentioned 340% growth was the largest quarterly increase seen, while the smallest change was seen at Brazilian provider BR-2, which added just 0.9% quarter-over-quarter. A total of 24 mobile providers saw average peak connection speeds decline from the first quarter, with losses ranging from just 0.7% at Estonian provider EE-1 to a surprisingly large 62% decline at Argentinian provider AR-2.

Year-over-year trends for the average connection speed metric continued to be generally encouraging in the second quarter, with most of the surveyed providers seeing yearly growth. Mobile provider US-2 once again had the largest increase, growing 238% from the second quarter of 2012. Providers BE-2 and AT-1 also saw average connection speeds more than double year-over-year. The smallest yearly increase was seen in the Czech Republic, where provider CZ-2 added just 3.1%. Yearly declines in average connection speed were seen across eight providers, with losses ranging from 0.9% at ZA-1 in South Africa to 59% at AR-2 in Argentina. For the average peak connection speed metric, year-over-year trends were also generally positive. Thirteen providers saw average peak speeds more than double over the past year, with growth led by Qatar provider

Country	ID	Q2 '13 Avg. Mbps	Q2 '13 Peak Mbps
AFRICA			
Egypt	EG-1	1.2	9.1
Morocco	MA-1	1.6	14.3
South Africa	ZA-1	0.5	2.2
ASIA			
Hong Kong	HK-2	3.6	20.0
Hong Kong	HK-1	2.2	19.2
Indonesia	ID-1	0.9	14.1
Kuwait	KW-1	2.1	29.9
Malaysia	MY-3	1.6	13.9
Malaysia	MY-2	3.4	39.8
Pakistan	PK-1	1.9	14.2
Qatar	QA-1	2.5	54.2
Saudi Arabia	SA-1	2.5	53.9
Singapore	SG-3	2.4	13.7
Sri Lanka	LK-1	1.7	18.9
Taiwan	TW-1	2.4	18.6
Taiwan	TW-2	1.9	20.5
Thailand	TH-1	1.2	26.0
United Arab Emirates	AE-1	2.9	16.2
EUROPE			
Austria	AT-1	5.3	25.8
Austria	AT-2	4.9	18.6
Belgium	BE-2	2.3	17.9
Belgium	BE-2	2.9	11.8
Czech Republic	CZ-3	6.4	20.1
Czech Republic	CZ-1	1.8	10.1
Czech Republic	CZ-2	1.3	8.5
Estonia	EE-1	1.6	8.6
France	FR-2	3.1	11.5
Germany	DE-1	1.6	7.1
Germany	DE-2	5.2	24.0
Greece	GR-1	5.6	54.9
Hungary	HU-1	1.9	12.1
Hungary	HU-2	2.6	13.8
Ireland	IE-1	4.3	22.7
Ireland	IE-2	2.2	18.5
Ireland	IE-4	3.0	24.2
Italy	IT-2	3.4	28.5
Italy	IT-3	4.1	21.9
Italy	IT-4	2.7	18.9
Lithuania	LT-2	2.9	22.0
Moldova	MD-1	3.4	14.6
Netherlands	NL-2	2.1	7.2
Norway	NO-1	3.9	21.4
Poland	PL-2	3.0	17.8
Poland	PL-4	3.2	28.1
Poland	PL-3	2.2	15.2
Russia	RU-1	9.7	51.8
Russia	RU-4	5.9	26.6
Russia	RU-3	1.0	6.9
Slovakia	SK-2	3.1	30.6
Slovenia	SI-1	2.7	10.8
Spain	ES-1	3.8	26.8
Turkey	TR-1	2.4	16.6
Ukraine	UA-1	9.2	29.8
United Kingdom	UK-3	2.7	14.7
United Kingdom	UK-2	3.7	20.3
United Kingdom	UK-1	2.8	23.6
NORTH AMERICA			
Canada	CA-2	4.1	15.2
El Salvador	SV-2	2.3	15.4
El Salvador	SV-1	2.0	13.0
El Salvador	SV-3	1.2	6.3
United States	US-1	2.8	9.5
United States	US-2	3.8	17.7
United States	US-3	1.8	7.3
OCEANIA			
Australia	AU-3	2.7	16.9
New Caledonia	NC-1	0.8	6.1
New Zealand	NZ-2	2.5	14.1
SOUTH AMERICA			
Argentina	AR-1	0.9	4.7
Argentina	AR-2	0.9	9.4
Bolivia	BO-1	1.0	6.4
Brazil	BR-1	1.0	9.1
Brazil	BR-2	1.6	11.7
Chile	CL-3	1.4	7.9
Chile	CL-4	1.6	15.4
Colombia	CO-1	1.4	7.9
Paraguay	PY-2	1.4	8.6
Uruguay	UY-1	1.6	12.0
Venezuela	VE-1	1.4	9.5

Figure 32: Average and Average Peak Connection Speeds by Mobile Provider

QA-1, which saw a massive 1131% increase. In stark contrast, the smallest yearly gain was in Spain, at provider ES-1, which added just 3.7%. At total of 11 surveyed mobile providers saw average peak connection speeds decline year-over-year, with losses ranging from 2.5% at Polish provider PL-4 up to a drop of 47% at provider UK-1 in the United Kingdom.

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 highlights browser usage across PC and mobile devices, connecting via fixed and mobile networks. The original Akamai IO data set came from sampling traffic across several hundred top-tier sites delivering content through Akamai, most of which are focused on a U.S. audience, biasing the data presented in favor of U.S. users. However, the initial release of an updated data source in mid-February 2013 expanded the sample set, providing us with a more global view of the data. Future updates will allow us to provide insight into browser version trends as well as geo-specific trends in upcoming issues of the *State of the Internet Report*. The data and graphs included below are derived from Akamai IO.

Figure 33 illustrates browser usage by users identified to be on cellular networks in the second quarter of 2013.[41] Similar to last quarter, the figure focuses on the usage of Android Webkit, Apple Mobile Safari, and other browsers, designated as "Others" in the graph. As is shown in the graph, a reasonable gap separated usage of Android Webkit and Apple Mobile Safari throughout April, while a surge in Safari usage occurred in early May, resulting in very similar usage levels. However, an apparent jump in Webkit usage in late May pushed it comfortably back ahead of Safari throughout June. Overall, throughout the

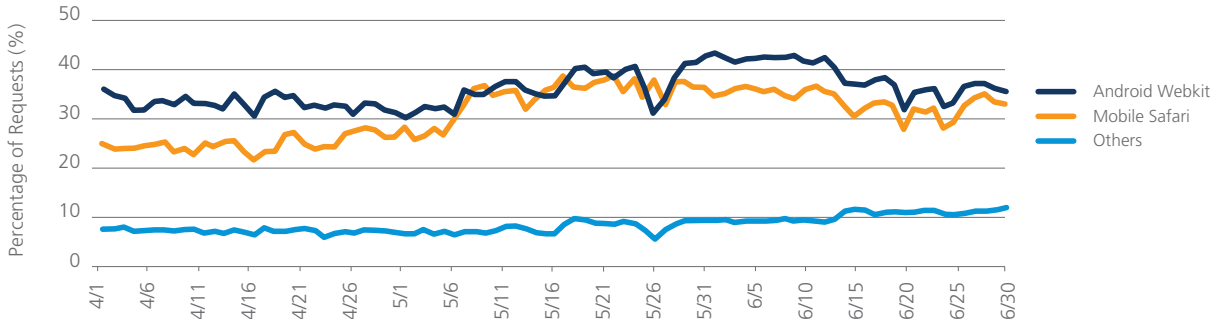

Figure 33: Mobile Browsers Seen Across Cellular Networks, Q2 2013

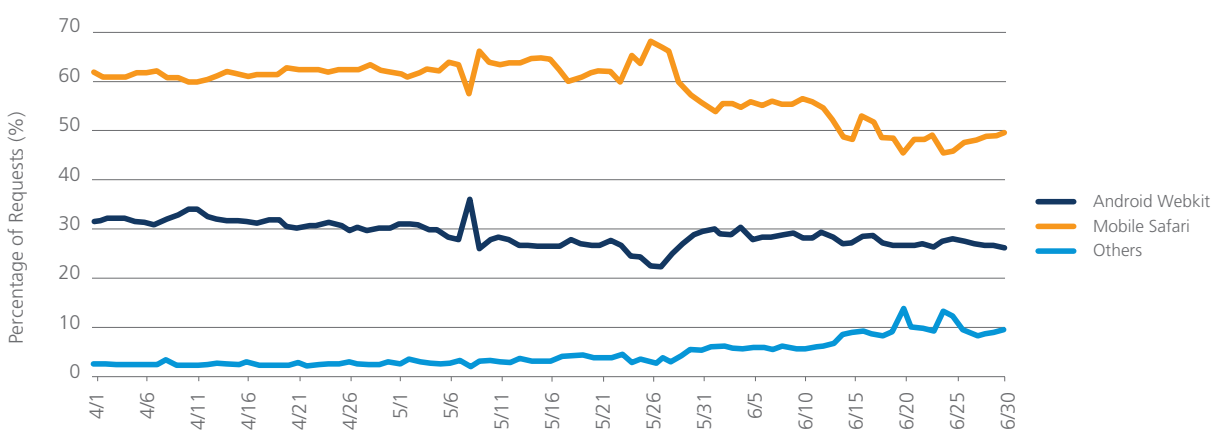

Figure 34: Mobile Browsers Seen Across All Networks, Q2 2013

quarter, Android Webkit trended to an average of just under 38% of requests, while Apple Mobile Safari saw almost 34% of requests.[42] Other mobile browsers seen on cellular networks throughout the quarter included Opera Mini, BlackBerry browser, Google Chrome Mobile, Openwave Mobile Browser, and Microsoft Internet Explorer Mobile.

Expanding the data set to include all networks[43] (not just those identified as "cellular"), we again (similar to the first quarter) see a pronounced gap between usage of Android Webkit and Apple Mobile Safari. As shown in Figure 34, usage of Apple Mobile Safari was approximately double that of Android Webkit during the first two months of the second quarter, while June saw it with a lead of approximately 60%. Interestingly, it appears that usage of both Safari and Webkit trended slightly lower over the course of the quarter, while usage of "other" browsers grew between 3–4x. While not shown on the graph, usage of Microsoft Internet Explorer Mobile appears to have grown from approximately 0.5% at the start of the second quarter to over 7% at the end of the quarter.[44] Averaged across the entire quarter, Apple Mobile Safari accounted for just over 54% of usage, while Android Webkit was responsible just over half of that, at 27.6%. [45]

8.3 Mobile Traffic Growth as Observed by Ericsson

In mobile networks, the access medium (spectrum) is being shared by different users in the same cell. It is important to understand traffic volumes and usage patterns in order to enable a good customer experience. Ericsson's presence in more than 180 countries and its customer base representing more than 1,000 networks enables Ericsson 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, WiFi, 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.

As illustrated in Figure 35, the volume of mobile data traffic almost doubled from the second quarter of 2012 to the second quarter of 2013, and grew 14% between the first and second quarter of 2013. Note that mobile voice traffic continues to grow as well, though at a slower rate, increasing 5% from the second quarter of 2012 to the second quarter of 2013.

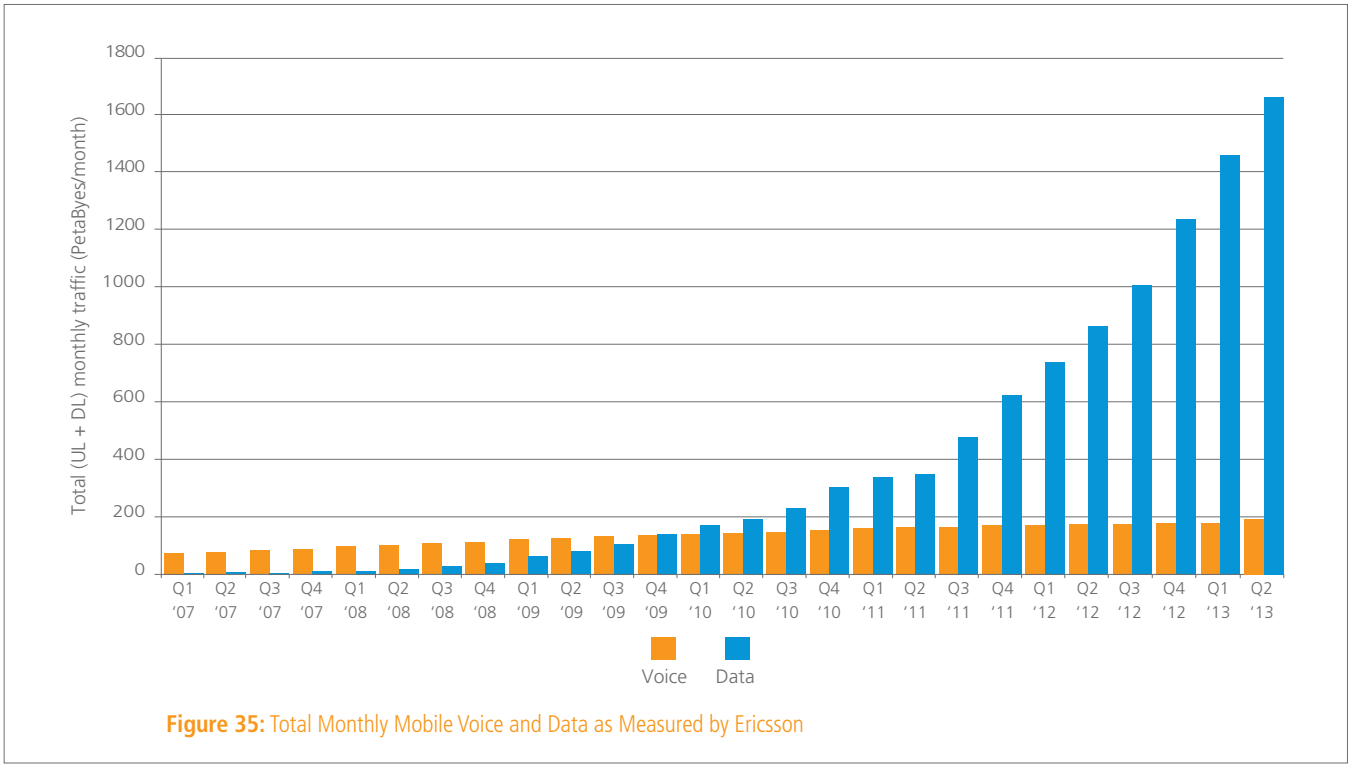

Figure 35: Total Monthly Mobile Voice and Data as Measured by Ericsson

Internet Disruptions

9.1 Sudan

On June 29, a posting[46] on Twitter from Internet monitoring company Renesys noted that Sudanese telecommunications provider Sudatel had been down for nearly eight hours. An associated Twitter posting[47] from an individual in Sudan suggested that the government had cut off Internet connectivity within the country ahead of a rally. HTTP traffic delivered from Akamai to users in Sudan, shown in Figure 36, experienced a sharp decline at approximately 5:00 AM UTC, although it began a slow recovery almost immediately. Traffic levels saw a more significant increase about two hours after the disruption began, and continued to grow gradually for approximately another six hours until around 1:00 PM UTC, when it reached a level roughly consistent with the same time the day before, as shown in the graph.

9.2 Syria

Disruptions to Internet connectivity in Syria have been covered in several previous issues of the *State of the Internet Report*, and connectivity within the country experienced several problems during the second quarter of 2013.

Figure 37 illustrates the impact of a disruption to Syrian Internet connectivity that lasted almost two full days, on May 7 & 8. Starting just after 6:00 PM UTC on May 7, Akamai HTTP traffic to users in Syria dropped to zero, and stayed that way until starting to recover at approximately 3:00 PM UTC on May 8. Published reports[48] noted that "Local state-run media had reported earlier that a 'fault in optical fibre cables' was to blame for the blackout." However, Akamai's research at the time indicated that Syria maintained international Internet connectivity through at least four providers. In addition, submarine cable maps[49] published by Internet research firm Telegeography show four cables landing in the coastal city of Tartous. In addition to the nearly two-day disruption, Akamai's monitoring showed another brief disruption in traffic delivered to Syria later in the day, occurring just after 6:00 PM UTC, and lasting for just a few minutes.

Nearly a week later, Internet connectivity in Syria was disrupted once again. As shown in Figure 38, Akamai HTTP traffic to Syria dropped to zero at approximately 7:00 AM UTC, and did not recover until around 3:30 PM UTC, eight and a half hours later. According to a report[50] on technology news site C|Net, Syria's state-run news agency claimed that the disruption was due to an unspecified "technical problem", and pointed to speculation that the disruption may have been related to a possible United Nations decision regarding Syria due to be made that day.

Finally, Figure 39 shows the impact of a brief disruption to Internet connectivity in Syria on May 29. According to a Twitter posting[51] from Internet monitoring firm Renesys, nearly all of the networks (autonomous systems) within Syria became unreachable for a seven-minute period between 10:30 and 10:45 AM UTC. In contrast to the disruptions discussed above, this particular disruption was not publicly highlighted by any additional Internet monitoring firms, nor was any comment offered on it by Syria's state-run media.

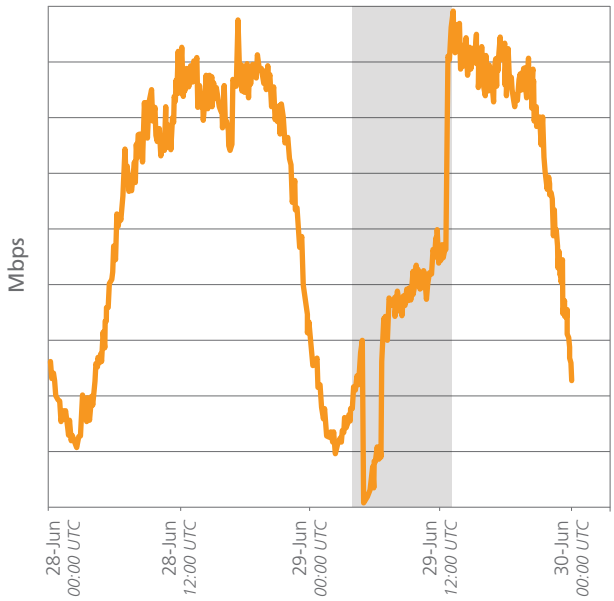

Figure 36: HTTP Traffic Served to Sudan, June 29, 2013

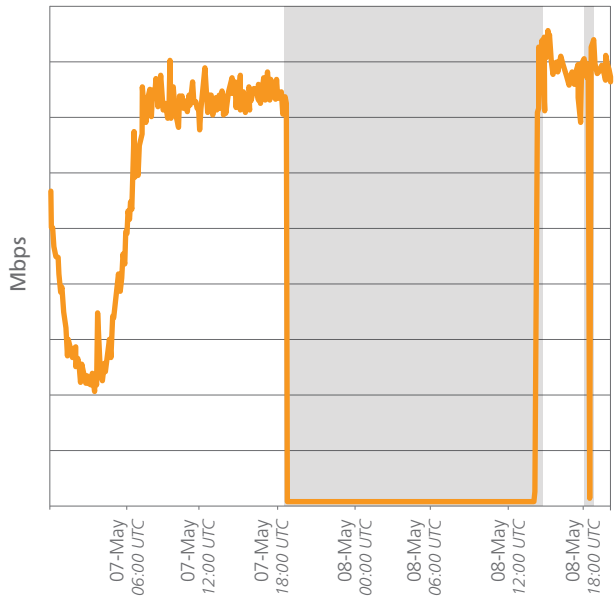

Figure 37: HTTP Traffic Served to Syria, May 7-8, 2013

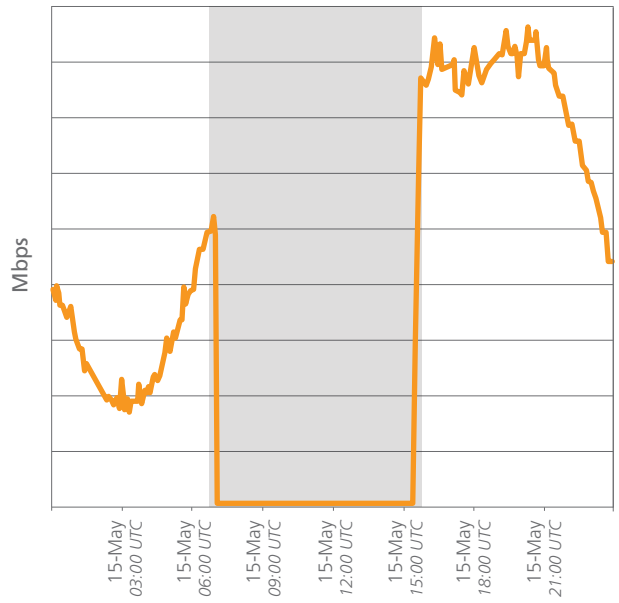

Figure 38: HTTP Traffic Served to Syria, May 15, 2013

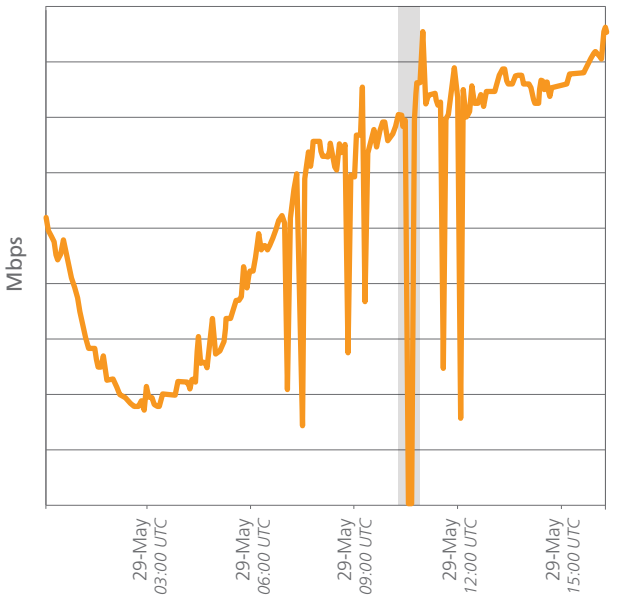

Figure 39: HTTP Traffic to Syria, May 29, 2013

Region	% Attack Traffic	Unique IP Addresses	Avg. Connection Speed (Mbps)	Peak Connection Speed (Mbps)	% Above 10 Mbps*	% Above 4 Mbps*
Europe						
Austria	<0.1%	2,634,232	8.1	31.6	17%	79%
Belgium	<0.1%	4,701,620	8.4	39.9	25%	77%
Czech Republic	0.1%	1,884,865	9.8	35.4	27%	82%
Denmark	<0.1%	2,900,700	8.1	29.9	21%	76%
Finland	<0.1%	2,689,487	8.1	31.0	23%	67%
France	0.4%	27,098,901	5.7	24.2	6.8%	62%
Germany	0.6%	38,102,044	7.3	32.6	15%	75%
Greece	<0.1%	3,186,314	4.8	26.0	3.8%	47%
Hungary	0.4%	2,862,427	6.5	36.3	12%	72%
Iceland	<0.1%	157,557	7.2	32.2	12%	64%
Ireland	<0.1%	1,706,588	8.0	30.9	16%	62%
Italy	0.5%	20,180,584	4.9	23.3	3.7%	52%
Luxembourg	<0.1%	162,696	6.1	25.0	6.4%	72%
Netherlands	0.2%	9,264,969	10.1	38.8	31%	83%
Norway	<0.1%	3,761,015	7.4	28.7	18%	49%
Poland	0.3%	9,310,294	6.3	31.0	13%	61%
Portugal	<0.1%	3,453,192	5.4	35.1	6.9%	61%
Romania	1.0%	2,843,527	7.5	47.5	17%	79%
Russia	1.7%	17,571,549	7.0	30.8	19%	69%
Slovakia	<0.1%	1,070,134	6.4	29.8	10%	59%
Spain	0.2%	14,018,302	5.9	32.1	8.3%	64%
Sweden	0.1%	6,758,946	8.4	33.7	22%	61%
Switzerland	<0.1%	3,479,166	11.0	41.4	37%	90%
Turkey	2.4%	9,652,143	3.7	26.7	1.4%	28%
United Kingdom	0.5%	29,131,348	8.4	37.1	23%	75%
Asia/Pacific						
Australia	0.1%	8,786,066	4.8	29.1	5.1%	41%
China	33%	113,908,551	2.8	11.4	1.1%	19%
Hong Kong	0.5%	3,009,880	10.8	65.1	32%	77%
India	2.0%	17,519,442	1.3	10.5	0.2%	2.1%
Indonesia	38%	5,801,165	1.7	11.3	0.1%	3.2%
Japan	0.5%	40,794,484	12.0	48.8	43%	80%
Malaysia	0.1%	2,208,141	3.1	26.6	2.0%	27%
New Zealand	<0.1%	2,127,052	4.6	21.0	3.9%	47%
Singapore	0.1%	1,525,939	6.5	45.6	13%	61%
South Korea	0.9%	21,338,140	13.3	53.3	45%	85%
Taiwan	2.5%	12,069,563	5.5	39.5	8.3%	50%
Vietnam	0.5%	5,118,665	1.7	14.1	0.1%	2.4%
Middle East & Africa						
Egypt	0.2%	3,707,293	1.1	9.8	<0.1%	0.5%
Israel	0.2%	2,388,186	7.4	40.1	17%	74%
Kuwait	<0.1%	1,098,424	2.4	27.3	0.6%	6.4%
Saudi Arabia	0.1%	4,069,845	2.5	15.4	0.1%	5.4%
South Africa	<0.1%	6,617,569	2.3	8.3	1.6%	7.7%
Sudan	<0.1%	282,233	2.1	9.0	<0.1%	1.9%
Syria	<0.1%	639,976	1.3	8.6	<0.1%	0.7%
United Arab Emirates (UAE)	0.2%	1,482,451	4.6	38.4	5.9%	41%
Latin & South America						
Argentina	0.4%	8,499,559	2.0	14.5	0.4%	8.3%
Brazil	1.4%	30,921,154	2.4	18.7	0.7%	15%
Chile	0.1%	4,123,230	2.9	19.3	0.6%	15%
Colombia	0.1%	7,070,696	2.9	16.8	0.2%	14%
Mexico	0.3%	11,380,873	3.6	18.9	1.0%	25%
Peru	0.1%	1,180,484	2.1	16.0	<0.1%	1.9%
Venezuela	0.6%	3,097,633	1.3	8.4	0.1%	1.6%
North America						
Canada	0.3%	13,631,909	8.2	34.4	20%	80%
Costa Rica	<0.1%	446,098	2.1	12.4	0.4%	2.9%
United States	6.9%	154,515,420	8.7	36.3	24%	72%

SECTION 11:
Endnotes

[1] https://isc.sans.edu/port.html?port=6666
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[4] http://www.theguardian.com/technology/2013/apr/29/hacking-guardian-syria-background
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[8] https://twitter.com/ipv4countdown/status/343147890392326145
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[18] http://whois.domaintools.com/136.185.0.0
[19] http://whois.domaintools.com/179.116.0.0, http://whois.domaintools.com/179.128.0.0, http://whois.domaintools.com/179.132.0.0
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