

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Protecting and Promoting the Open Internet)	GN Docket No. 14-28
)	
Framework for Broadband Internet Service)	GN Docket No. 10-127
)	
)	

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July 15, 2014

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Akamai is an Internet pioneer whose industry-leading technology innovations have afforded Internet content and application service providers the needed platform for their own innovation. And though largely invisible to them, consumers benefit from Akamai’s services through shorter wait times for content, improved access to a wider array of content offerings, increased reliability, and better security. Akamai provides a primarily software and cloud-based suite of content delivery and acceleration technologies that has quietly revolutionized the Internet. Akamai’s solutions benefit not just its wide variety of customers and consumers, but also create efficiencies that benefit all participants in the Internet ecosystem.

As a critical component of the Internet ecosystem, Akamai values an open Internet and fully supports the Commission’s goal to “find the best approach to protecting and promoting Internet openness.”¹ In doing so, however, the FCC must be careful that its actions do not inadvertently thwart the critical contributions Akamai and its competitors make to the Internet ecosystem, or the associated benefits to content providers, carriers, and consumers around the world. Instead, the Commission should continue to limit its actions

¹ See *Protecting and Promoting the Open Internet*, Notice of Proposed Rulemaking, FCC 14-61, GN Docket No. 14-28, ¶ 4 (rel. May 15, 2014) (“NPRM”).

only to those necessary to promote competition, and foster the continued development of the Internet and the innovation it enables. This means avoiding the imposition of unnecessary regulatory overlays that risk adding uncertainty, limiting innovation, and creating counterproductive international consequences as well.

Akamai also supports the Commission's approach to mobile services that recognizes the inherent differences between wireline and wireless broadband networks. This approach will become even more critical as the use of mobile services for Internet traffic increases, and Akamai and others help improve the usage and efficiency of mobile broadband Internet services. Regulatory certainty and traffic management flexibility will be critical to overcome the technical challenges associated with such traffic.

The Commission has embarked on a commendable path to maintain openness as the primary framework under which all parties in the Internet ecosystem function. Akamai looks forward to working with the Commission to ensure that this framework continues to foster the Internet innovation that Akamai has played a key role in developing.

I. AKAMAI IS A LEADER IN INTERNET INNOVATION

A. The Development of Akamai at MIT

Akamai develops solutions to the many issues that businesses confront on the dynamic landscape of the Internet. Based in Cambridge, Massachusetts, Akamai has eleven offices in the United States, and thirty-one international offices located on five continents. It employs over 4,500 people.

A spirit of entrepreneurship and innovation has driven Akamai since its genesis at the Massachusetts Institute of Technology (MIT). In 1995, Tim Berners-Lee—inventor of the World Wide Web—recognized that Internet congestion would become a problem and challenged his MIT colleagues to devise a solution. Then-professor Dr. Tom Leighton (now Akamai's CEO), who headed MIT's Algorithms Group, recruited graduate student

Danny Lewin to help solve the problem. Leighton and Lewin collaborated with their colleagues to develop innovative algorithms that would allow for the replication of content over a wide network of distributed servers, and the routing of consumer or “end user” requests for content to optimal servers. In 1997, the group entered the renowned MIT \$50k Entrepreneurship Competition. After being selected as one of six finalists, the founding team began adding members and planning the business that, in 1998, would become Akamai, with the goal of making the Internet faster, more reliable, and more secure.

Today, the ever-increasing volume and sophistication of online communications has made cost, congestion, and security global concerns. To address these concerns and improve the overall functionality of the Internet, Akamai has developed technologies that allow its customers to interact with the global community of Internet users in an efficient, reliable, sophisticated, and secure fashion. Akamai is a pioneer in the content delivery industry and, while there are many companies that offer content delivery services today, Akamai’s extensive distributed platform architecture remains unique. Whereas typical content delivery companies serve content at (or outside) network peering points—which are often highly congested—Akamai deploys its technologies deep in the networks of last mile broadband Internet providers and caches content locally. Indeed, so far, Akamai has deployed approximately 150,000 servers in thousands of locations inside over 1,200 global networks located in over 650 cities and 92 countries. The content and applications provided by Akamai’s customers (web sites, web application providers and enterprises) are thus distributed across these networks, and consumer requests for the particular content or application are processed in the most geographically efficient location. Akamai also uses specialized technologies—such as advanced domain name service mapping, communication protocols, load balancing, and data analysis—to further direct consumer requests for information in the most efficient manner in order to avoid much of the Internet’s congested

infrastructure. Akamai does all of this using a virtual, rather than a physical, platform. Simply put, Akamai allows more content to be delivered faster, more reliably and more securely, while using fewer physical network resources. The result is a better-performing and more cost-effective Internet for everyone, whether or not they are accessing content on the Akamai platform.

Not surprisingly, Akamai's content delivery platform and products are relied upon by a diverse array of enterprises. Its customers include one third of the Global 500 companies, the top 30 media and entertainment companies, all 20 top global eCommerce sites, 97 of the top 100 online U.S. retailers, 9 of the top 10 global banks, all branches of the U.S. military, and 14 out of the 15 U.S. government cabinet-level agencies. At any given time Akamai delivers between 15-30% of all web traffic, resulting in over two trillion interactions delivered daily.

Akamai's unique global position—a content delivery and cloud services provider that delivers a large portion of the world's online content—gives it unusual insight into the working of the Internet. In 2008, Akamai began publishing a quarterly “State of the Internet” report, which is extrapolated from information gathered across its network of servers.² The report, which is available online at no cost, includes data on the origins of attack traffic, network outages, mobile connectivity, and broadband adoption by geography. In addition, Akamai also offers a free app, the Akamai Internet Visualization App, showing real-time global Internet traffic conditions and cyber-attacks.³ In sum, Akamai figured out how to attack the hard problem of Internet congestion using math—not extensive

² *The Akamai State of the Internet Report*, AKAMAI TECHNOLOGIES, INC., <http://www.akamai.com/stateoftheinternet/>.

³ *Visualizing Global Internet Performance with Akamai*, AKAMAI TECHNOLOGIES, INC., http://www.akamai.com/html/technology/visualizing_akamai.html.

hardware—and subsequently figured out how to leverage its technology to create a world-class defender against cyber-attacks.

B. Akamai’s Extensive Distributed Content Delivery Platform Yields Numerous Benefits to the Internet Ecosystem

Internet architecture was not designed for transmitting information in the fastest, most reliable, secure, or cost-effective manner to a multitude of geographically dispersed users. In the early days, most Internet content resided on content providers’ centralized origin servers. If a lot of end users sought to access content at the same time, such usage spikes could quickly overwhelm a provider’s servers, slowing—or stopping—content delivery. Moreover, there was no network intelligence to help route Internet traffic around congestion or other network problems. Providers had to choose between suffering these setbacks, and paying for the hardware, software and facilities—and the IT experts—needed to increase capacity to handle peak traffic levels. But making the capital expenditure necessary to handle peak traffic, if peaks were infrequent, was burdensome and inefficient. Moreover, because all of a provider’s content resided in a centralized origin server, the provider was especially vulnerable to cyber-attacks.

Akamai’s distributed architecture allowed content providers to move away from this inefficient and vulnerable situation. Using Akamai’s services, content providers were able to distribute their content at the edge of the Internet, on servers close to end users, thereby increasing speed and reliability even during usage spikes without additional capital costs. In addition, Akamai’s algorithms enabled the intelligent delivery of Internet traffic, which further increased the speed and reliability of content delivery.

Akamai’s distributed architecture platform also enhances the security of networks. Akamai both inspects and mitigates attacks closer to the attacker at the edge of the Internet and further away from the content providers’ origin servers and it provides protections

across all pathways to data centers. By blocking attack traffic originating overseas before it can reach the U.S., Akamai keeps enormous volumes of attack traffic from clogging U.S. networks, thereby benefitting all Internet users in the U.S., whether or not they are accessing content on the Akamai platform. Akamai's platform also allows visibility into the web traffic of the world's largest and most attacked web properties, yielding valuable insights to help thwart future attacks.

In addition, Akamai's services help augment physical infrastructure and provide a dynamic capacity solution allowing content providers to rely on shared infrastructure, further conserving network resources and reducing the need for construction of additional physical facilities. Akamai is able to use its capacity to serve the needs of its more than 5,000 customers, balancing out the traffic peaks and valleys attributable to any single customer. Akamai supports peak traffic loads of over 23 Tbps and supports single customer events (*e.g.*, major sporting events or Internet-wide software updates) of over 8 Tbps. In addition, Akamai's global platform reach enables content providers to offer their content at scale across the entire Internet. Akamai's services also increase the quality of web applications, which increases demand for such applications and the broadband services that deliver them.

Finally, Akamai's intelligent routing algorithms also reduce congestion and help to alleviate challenges faced by the capacity limits of the "middle mile"—the facilities between the core of telecommunications networks and the local network plant. In particular, because Akamai caches content at the network edge, located closer to end users, content often is already on a server close to the end user. When users request particular content (*e.g.*, downloads a song or video), Akamai directs that user request to an optimal edge server that is likely close to the user and not overloaded, and the content need not transit and re-transit the entire ISP network with each individual request. As a result,

Akamai's services effectively offload traffic from the middle mile, enabling content to bypass the Internet's often congested and costly peering and interconnection points, saving carriers money and improving performance for both big and small content providers. In fact, on a typical day, Akamai's content delivery platform offloads more than 17 Tbps from the middle mile. Akamai's congestion-management and capacity-enhancement practices benefit not only Akamai's customers, but also other content providers and carriers, who gain in general from networks with reduced congestion and increased capacity.

The bottom line is that Akamai helps carriers and content providers deliver the fast, reliable, and secure Internet experience that today's consumers demand. As a result, consumers have seen significant improvements in the quality and reliability of a wide array of Internet-based services—from online banking services to online shopping to live streaming of sporting and major news events. Indeed, Akamai serves some of the largest online events (*e.g.*, the World Cup, the Grammys, and the Sochi 2014 Olympic Games). Consumers also benefit from the cost-savings that content and application providers realize from working with Akamai. Since Akamai handles a substantial amount of the global Internet traffic, it is able to negotiate better terms for access to the networks and pass along these economies of scale to content owners that would otherwise be unable to negotiate such terms individually. In simple terms, the Internet would not function as effectively as it does without Akamai's services.

II. CHARTING A COURSE FOR THE INTERNET'S FUTURE

The Internet is the most dynamic technology ecosystem that regulators have ever had to confront. As important as the services provided by Akamai and other Internet innovators have been to the development and success of the Internet to date, the projected exponential growth of Internet traffic will make these services increasingly important to the robust functioning of the Internet. Moreover, as Internet traffic increasingly comes from,

and is destined to, sources that present greater technical challenges—including mobile devices and the Internet of Things (that is, previously off-line hardware)—the value of services that optimize and secure the delivery of content and applications will increase. Thus, the Commission must ensure that its open Internet framework fosters the growth of these services in order to ensure all members of the ecosystem are adequately protected and able to innovate. Most importantly, the FCC should also ensure that consumers must be able to access desired content at the speeds and with the reliability they demand.

A. Understanding the Dynamic Internet

The dynamic nature of the Internet can best be understood by reviewing its development over the course of a decade. Within the last ten years alone, there has been a four hundred percent increase in the number of global Internet users, from 608 million in 2003, to 2.7 billion in 2013.⁴ People are also doing a lot more on the Internet. Global Internet traffic grew from 784 Petabytes (PB) per month in 2003 to 55,553 PB per month in 2013.⁵ Moreover, content is increasingly accessed from smart mobile devices, which were virtually non-existent in 2003. Although traffic from mobile websites did not even register as a full percent of overall web traffic in 2003, it constituted an estimated 17% of overall traffic in 2013.⁶ High-speed connectivity in the U.S. has also increased significantly. In 2003, only 19% of all U.S. households had broadband access, compared to 78% in 2013.⁷

This dramatic growth has been reflected in the growth of Akamai's presence, which has helped enable these dramatic ecosystem changes. In 2003, Akamai had 14,733 servers

⁴ *Internet Growth Statistics*, Internet World Stats, <http://www.internetworldstats.com/emarketing.htm>.

⁵ *Internet Traffic*, Wikipedia, http://en.wikipedia.org/wiki/Internet_traffic.

⁶ *Id.*

⁷ *Broadband Access & Services in the Home 2013*, LEICHTMAN RESEARCH GROUP (Sept. 26, 2013), available at <http://www.leichtmanresearch.com/press/092613release.html>.

deployed in 71 different countries, compared to over 140,000 servers in 90 countries by 2013. Traffic on its platform has also grown: there were 1 billion network hits daily in 2003 and *1 trillion networks hits daily last year*. Peak traffic in 2003 was 45 Gbps compared to 21 Tbps in 2013. This dramatic upward trajectory is universally expected to continue as consumers demand ever-greater bandwidth, while simultaneously seeking fast performance across multiple devices.

B. The Open Internet Framework Should Foster the Continued Development of the Internet Ecosystem

As recognized by the FCC, the “increases in [Internet] investment and innovation seen in recent years” has been remarkable.⁸ “Both within the network and at its edges, investment and innovation have flourished while the open Internet rules were in force.”⁹ Indeed, during this time, Akamai and other Internet innovators have continued to develop services that help improve the overall functionality of the Internet, benefitting consumers, content and applications providers.

A key factor contributing to this investment and innovation has been the relaxed regulatory environment in which the Internet ecosystem historically has been allowed to operate. While the original principles of Internet freedom—freedom to access lawful content, freedom to use applications, freedom to attach personal devices to the network, and freedom to obtain service plan information¹⁰—remain valid and must be protected, imposing an additional regulatory overlay could slow innovation. Thus the Commission should act in this space with caution and humility.

⁸ NPRM ¶ 29.

⁹ *Id.*

¹⁰ *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, Policy Statement, FCC 05-151, FCC Rcd. 14986, 14987-88, ¶ 4 (2005).

One significant concern is that new regulation can create uncertainty. In particular, vague or unclear regulatory requirements could stymie rather than encourage innovation. And aggressive assertions of authority can lead to litigation uncertainty and force industry into regulatory limbo.

A second concern is that an unnecessarily regulatory framework could discourage continued investment in broadband infrastructure. Providers of broadband Internet access service have been adamant that the imposition of overly proscriptive regulations would adversely affect investment in broadband infrastructure.¹¹ There is surely some truth in these assertions and any slowing of investment in the underlying networks will make it more difficult for providers, like Akamai, to deploy innovative services and handle the vastly increasing volume of Internet traffic. Indeed, all players in the Internet ecosystem must work in tandem to provide consumers with the capabilities they demand. Without new investment in networks, the existing incentives to further innovate on those networks will diminish.

Finally, and of concern to global companies like Akamai, are the international implications of Commission action. The global reach of Akamai and other technology companies and, indeed, the global reach of the Internet mean that actions taken in the U.S.

¹¹ See, e.g., Letter from Robert W. Quinn, Jr., AT&T, to Marlene H. Dortch, Secretary, FCC, GN Docket 14-28 (June 6, 2014), attaching AT&T Blog Post, Jim Cicconi, “Net Neutrality and Modern Memory (June 6, 2014) (“If [Title II] is the road we choose to travel, the investment uncertainty alone will have a massive negative impact on American broadband deployment for years to come.”); Letter from Kathleen Grillo to Marlene H. Dortch, Secretary, FCC, GN Docket 14-28 (June 5, 2014) (“A shift to common carriage regulation would strip the U.S. of its global leadership position and slow down investment and innovation throughout the Internet ecosystem.”); Letter from Walter B. McCormick, Jr., United States Telecom Association, to Chairman Wheeler, et al., FCC, GN Docket 14-28 (May 14, 2014) (“Lost in calls to classify broadband Internet access service as a Title II service is the negative effect such classification would have on continued broadband investment.”); Letter from Matthew Brill, Counsel, National Cable and Telecommunications Association, to Marlene H. Dortch, Secretary, FCC, GN Docket 14-28 (May 14, 2014) (“[A] Title II reclassification theory would be immensely destabilizing and would undermine the ongoing network investment necessary to fuel the “virtuous cycle” of deployment, innovation, and adoption that the Commission has long sought to promote.”).

will have implications across the world, for content providers, broadband access providers, and consumers. About two thirds of Akamai's traffic is destined for users outside of the United States. The FCC is rightly considered the "gold standard" by communications regulators around the world, and they will carefully review the approach adopted by the Commission. The Commission must, therefore, be mindful of how other governments will view its actions. It must avoid inadvertently encouraging a patchwork of burdensome regulations around the world that could harm all Internet users, regardless of location.

For all of these reasons, the Commission, as noted, should proceed with caution and humility to ensure it does more good than harm. To that end, the Commission should take only those actions that are necessary and narrowly tailored to promote competition, innovation, and the growth of broadband networks that inure to benefit the public. Akamai thus supports an open Internet framework that fosters services that support the fast, reliable, and scalable Internet capabilities that the public demands. Doing so will help drive the continued development of innovative online applications and services of both the most nascent providers to the largest enterprises. In particular, mobile broadband Internet services require flexibility to ensure consumers are adequately protected and can access the content they seek. One of the biggest impediments to wireless services reaching comparability to their wireline counterparts is the finite quantity and resulting capacity limitations of radio spectrum suitable for mobile services. Deployment of technologies like Akamai's in the mobile environment, whether in the device or within the network, will help improve the spectrum efficiency, enabling consumers' access to a wide array of enhanced mobile broadband services within the spectrum available.

For this to occur, however, it is important that mobile operators retain as much flexibility as possible to manage the traffic on their networks in order to deliver promising new services that seek to maximize the use and functionality of wireless networks. The

Commission's actions should reflect the enormous growth that mobile Internet has seen under the Commission's current flexible treatment of such services and proceed with extreme caution as it considers expanding the scope of the open Internet rules to include mobile traffic management.

CONCLUSION

Akamai supports policies that protect an open Internet. As it advances those policies, though, the Commission should tread carefully and make sure it is enhancing competition, innovation, and efficiency—and that the reliability and security of the Internet is increased for all users.

Respectfully submitted,

/s/

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