IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

OPTIMORPHIX, INC., ***Plaintiff,*** v. **AKAMAI TECHNOLOGIES, INC.,** ***Defendant.***	**Civil Action No._____** **JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

OptiMorphix, Inc. ("OptiMorphix" or "Plaintiff") brings this action and makes the following allegations of patent infringement relating to U.S. Patent Nos.: 7,099,273 (the "'273 Patent"); 7,616,559 (the "'559 patent"); 9,275,167 (the "'167 Patent"); 10,412,388 (the "'388 Patent"); 9,894,361 (the "'361 Patent"); 9,936,040 (the "'040 Patent"); and 9,167,021 (the "'021 Patent") (collectively, the "Patents-in-Suit"). Defendant Akamai Technologies, Inc. ("Akamai" or "Defendant") infringes the patents-in-suit in violation of the patent laws of the United States of America, 35 U.S.C. § 1 *et seq*.

THE PARTIES

1. Plaintiff OptiMorphix, Inc. ("Plaintiff" or "OptiMorphix") is a Delaware corporation that holds a portfolio of over 250 patent assets that were developed at Citrix Systems, Inc. ("Citrix") and Bytemobile, Inc.

2. Bytemobile, Inc. ("Bytemobile") was a global leader in mobile internet solutions for network operators. The company was founded in 2000. Bytemobile's mission was to optimize video and web content services for mobile network operators to improve users' experiences while maximizing the efficiency of network infrastructure.

3. Bytemobile was established during a time when the mobile landscape was evolving rapidly. The advent of 3G technology, coupled with increasingly sophisticated smartphones, led to a surge in demand for data services. However, mobile networks at the time were not optimized to handle this influx, particularly for data-rich services like video streaming. Recognizing this opportunity, Bytemobile sought to create solutions that would enable network operators to deliver high-quality, consistent mobile data services. By 2011, Bytemobile was a "market leader in video and web optimization, with more than 125 cumulative operator deployments in 60 countries.[1]

Andrew Zipern, *Vodafone in Deal with Start-Up Bytemobile*, NYTimes at C4 (January 29, 2002) ("Bytemobile, a wireless data start-up . . . reached a deal with Vodafone, Britain's largest mobile phone operator"); *NTT DoCoMo Launches Bytemobile Optimization Solution in its Core Network*, WIRELESSWATCH IP (October 5, 2004) ("NTT DoCoMo has deployed Bytemobile's optimization solution in its core network"); *China Mobile Selects Bytemobile for Nationwide Web Gateway Project*, BUSINESS WIRE (July 8, 2009) ("A Bytemobile customer since 2004, CMCC has deployed its web optimization solutions"); *Bytemobile Juices Up Orange*, ESPICOM TELECOMMUNICATION NEWS (October 10, 2002) ("Orange customers will experience faster application performance and Web page downloads"); *ByteMobile Wins 2013 LTE Award for Best LTE Traffic Management Product*, MARKETSCREENER (July 1, 2013) ("ByteMobile technology has been deployed . . . in networks serving nearly two billion subscribers.").

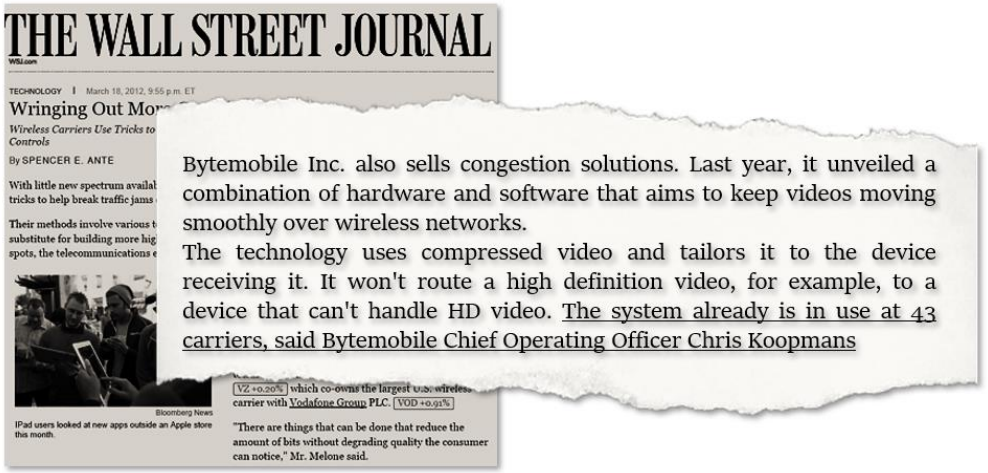
[1] *Bytemobile: Importance of Video and Web Optimizations*, TELECOM REVIEW at 58 (2011); *see also Bytemobile Secures Its 36th Video Optimisation Win for MNO Deployment*, TOTAL TELECOM & TOTAL TELECOM MAGAZINE (March 21, 2011).

4. Bytemobile products, such as the Unison platform and the T3100 Adaptive Traffic Manager, were designed to optimize mobile data traffic in real-time, ensuring a high-quality mobile internet experience for end-users. This approach was groundbreaking at the time and set the stage for many of the mobile data optimization techniques used today.

5. Bytemobile's innovative technologies and customer-centric approach led to rapid growth and success. Bytemobile's innovative product portfolio included: the T3100 Adaptive Traffic Manager which was designed to handle high volumes of traffic efficiently and provide real-time optimization, compression, and management of mobile data; Bytemobile's T2000 Series Video Cache, which supported transparent caching of content; and Bytemobile's T1000 Series Traffic Director, which enabled traffic steering and load balancing for high availability of applications.

Bytemobile Adaptive Traffic Management Product Family, BYTEMOBILE DATA SHEET at 1-2 (2014).

6. Bytemobile's groundbreaking technologies also included products for data optimization. Bytemobile's data optimization solutions were designed to compress and accelerate data transfer. By reducing the size of data packets without compromising quality, these technologies allowed faster data transmission and minimized network congestion. Bytemobile also offered solutions to analyze and manage network traffic, allowing network operators to identify patterns, allocate bandwidth intelligently, and prioritize different types of content.


THE WALL STREET JOURNAL

TECHNOLOGY | March 18, 2012, 9:55 p.m. ET

Wringing Out Mor

Wireless Carriers Use Tricks to
Controls

By SPENCER E. ANTE

With little new spectrum availal
tricks to help break traffic jams

Their methods involve various t
substitute for building more hig
spots, the telecommunications

Bloomberg News

IPad users looked at new apps outside an Apple store this month.

Bytemobile Inc. also sells congestion solutions. Last year, it unveiled a combination of hardware and software that aims to keep videos moving smoothly over wireless networks.

The technology uses compressed video and tailors it to the device receiving it. It won't route a high definition video, for example, to a device that can't handle HD video. The system already is in use at 43 carriers, said Bytemobile Chief Operating Officer Chris Koopmans

VZ +0.20% which co-owns the largest U.S. wireless carrier with Vodafone Group PLC. VOD +0.91%

"There are things that can be done that reduce the amount of bits without degrading quality the consumer can notice," Mr. Melone said.

Spencer E. Ante, *Wringing Out More Capacity*, WALL STREET JOURNAL at B3 (March 19, 2012) (emphasis added).

7. In July 2012, Bytemobile was acquired by Citrix Systems, Inc. ("Citrix") for $435 million. Bytemobile "became part of [Citrix's] Enterprise division and extend[ed] [Citrix's] industry reach into the mobile and cloud markets."[2]

8. OptiMorphix owns a portfolio of patents developed at Bytemobile and later Citrix. Highlighting the importance of the patents-in-suit is the fact that the OptiMorphix's patent portfolio has been cited by over 4,800 U.S. and international patents and patent applications assigned to a wide variety of the largest companies operating in the networking, content delivery, and cloud computing fields. OptiMorphix's patents have been cited by companies such as:

[2] CITRIX SYSTEMS, INC. 2012 ANNUAL REPORT at 33 (2013).

- Amazon.com, Inc. (263 citing patents and applications)[3]
- Oracle (59 citing patents and applications)[4]
- Alphabet, Inc. (103 citing patents and applications)[5]
- Broadcom Ltd. (93 citing patents and applications)[6]
- Cisco Systems, Inc. (277 citing patents and applications)[7]
- Lumen Technologies, Inc. (77 citing patents and applications)[8]
- Intel Corporation (45 citing patents and applications)[9]
- Microsoft Corporation (150 citing patents and applications)[10]
- AT&T, Inc. (93 citing patents and applications)[11]
- Verizon Communications, Inc. (31 citing patents and applications)[12]
- Juniper Networks, Inc. (29 citing patents and applications)[13]

9. Defendant Akamai Technologies, Inc. is a Delaware corporation with its principal place of business at 145 Broadway, Cambridge, Massachusetts 02142. Akamai may be served through its registered agent Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808.

JURISDICTION AND VENUE

10. This action arises under the patent laws of the United States, Title 35 of the United States Code. Accordingly, this Court has exclusive subject matter jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338(a).

11. This Court has personal jurisdiction over Akamai in this action because Akamai has committed acts within the State of Delaware giving rise to this action and has established minimum contacts with this forum such that the exercise of jurisdiction over Defendant would not

[3] *See e.g.*, U.S. Patent Nos. 7,817,563; 9,384,204; 9,462,019; 11,343,551; and 11,394,620.
[4] *See e.g.*, U.S. Patent Nos. 7,475,402; 7,574,710; 8,589,610; 8,635,185; and 11,200,240.
[5] *See e.g.*, U.S. Patent Nos. 7,743,003; 8,458,327; 9,166,864; 9,665,617; and 10,733,376.
[6] *See e.g.*, U.S. Patent Nos. 7,636,323; 8,448,214; 9,083,986; 9,357,269; and 10,091,528.
[7] *See e.g.*, U.S. Patent Nos. 7,656,800; 7,930,734; 8,339,954; 9,350,822; and 10,284,484.
[8] *See e.g.*, U.S. Patent Nos. 7,519,353; 8,315,179; 8,989,002; 10,511,533; and 11,233,740.
[9] *See e.g.*, U.S. Patent Nos. 7,394,809; 7,408,932; 9,515,942; 9,923,821; and 10,644,961.
[10] *See e.g.*, U.S. Patent Nos. 8,248,944; 9,071,841; 9,852,118; 10,452,748; and 11,055,47.
[11] *See e.g.*, U.S. Patent Nos. 8,065,374; 8,429,302; 9,558,293; 9,800,638; and 10,491,645.
[12] *See e.g.*, U.S. Patent Nos. 8,149,706; 8,930,559; 9,253,231; 10,003,697; and 10,193,942.
[13] *See e.g.*, U.S. Patent Nos. 8,112,800; 8,509,071; 8,948,174; 9,407,726; and 11,228,631.

offend traditional notions of fair play and substantial justice. Akamai, directly and/or through subsidiaries or intermediaries (including distributors, retailers, and others), has committed and continues to commit acts of infringement in this District by, among other things, offering to sell and selling products and/or services that infringe the patents-in-suit. Moreover, Akamai actively directs its activities to customers located in the State of Delaware.

12. The Court further has personal jurisdiction over Akamai because it is organized and existing under the laws of the State of Delaware and maintains a registered agent in Delaware.

13. Venue is proper in this District under 28 U.S.C. §§ 1391(b)-(d) and 1400(b). Defendant is organized and existing under the laws of the State of Delaware.

THE ASSERTED PATENTS

U.S. PATENT NO. 7,099,273

14. U.S. Patent No. 7,099,273 entitled, *Data Transport Acceleration and Management Within a Network Communication System*, was filed on January 29, 2002. The '273 patent is subject to a 35 U.S.C. § 154(b) term extension of 1,021 days. The '273 Patent claims priority to U.S. Provisional Patent Application No. 60/309,212 filed on July 31, 2001, and U.S. Provisional Patent Application No. 60/283,542 filed on April 12, 2001. A true and correct copy of the '273 Patent is attached hereto as Exhibit 1.

15. The '273 Patent has been in full force and effect since its issuance. OptiMorphix, Inc. owns by assignment the entire right, title, and interest in and to the '273 Patent.

16. The technologies disclosed in the '273 Patent improve the efficiency and speed of data transmission within network communication systems. The '273 Patent introduces methods and apparatuses that enhance data transport, especially in environments where network conditions

are variable or unpredictable and "provide systems and method for data transport acceleration and management within a network communication system." '273 Patent, col. 3:31-33.

17. The '273 Patent is directed to solving the problem of inefficient data transport within network communication systems. This inefficiency can lead to poor utilization of network resources, increased latency, and reduced overall performance.

18. The '273 Patent identifies the shortcomings of the prior art. Specifically, the specification describes that traditional methods of data transport in network communication systems often fail to efficiently manage and accelerate data transport, especially in environments with variable or unpredictable network conditions. These methods may not adequately handle network congestion, leading to poor utilization of network resources, increased latency, and reduced overall performance. "This bursty nature of data transmission may under-utilize the available bandwidth on the downlink channel, and may cause some applications requiring a steady flow of data, such as audio or video, to experience unusually poor performance." '273 Patent, col. 2:1-6.

19. The '273 Patent identifies several shortcomings of the prior art, particularly in the context of the Transport Control Protocol (TCP) which is commonly used in modern data communication networks. The patent specification describes that:

> Many of the problems associated with conventional TCP architectures stem from the flow control, congestion control and error recovery mechanisms used to control transmission of data over a communication network.

'273 Patent, col. 1:38-41.

20. Conventional TCP architectures assume that the network employs symmetric communication channels that enable data packets and acknowledgements to be equally spaced in time. This assumption often does not hold true in networks that employ asymmetric uplink and downlink channels, such as wireless communication networks. Bursty data transmission might

result in the inefficient use of the available bandwidth on the downlink channel, leading to suboptimal performance in applications that need a consistent data flow, such as those involving audio or video.

21. Another shortcoming identified is that conventional TCP architectures react to both random loss and network congestion by significantly and repeatedly reducing the congestion window, which can lead to significant and potentially unjustified deterioration in data throughput. This is particularly problematic in wireless and other bandwidth constrained networks where random packet loss due to fading, temporary degradation in signal quality, signal handoffs or large propagation delays occur with relatively high frequency.

22. The ‘273 Patent also points out that conventional TCP congestion control mechanisms tend to exhibit sub-optimal performance during initialization of data connections over reduced-bandwidth channels, such as wireless links. When a connection is initiated, the congestion control mechanism aggressively increases the size of the congestion window until it senses a data packet loss. This process may adversely impact other connections that share the same reduced-bandwidth channel as the connection being initialized attempts to maximize its data throughput without regard of the other pre-existing connections. This can lead to inefficient use of resources with decreased overall throughput.

23. The ‘273 Patent teaches the use of various techniques to accelerate and manage data transport in network communication systems. These techniques include the use of congestion control mechanisms, timers, and other methods to optimize data transmission. By implementing these techniques, the patent aims to improve the efficiency of data transport, particularly in environments with variable or unpredictable network conditions. This can lead to better utilization of network resources, reduced latency, and improved overall performance. The inventions

disclosed in the '273 Patent provide significant benefits and improvements to the function of the hardware in a computer network.

24. On March 8, 2024, Unified Patents, LLC filed a Request for *Ex Parte* Reexamination of the '273 Patent with the United States Patent and Trademark Office. The Patent Office entered an Order Granting *Ex Parte* Reexamination of the '273 Patent on April 29, 2024. On September 11, 2024, the Primary Examiner assigned to the Reexamination of the '273 Patent issued an Order confirming the patentability of all claims of the '273 Patent. On November 14, 2024, the United States Patent and Trademark Office issued *Ex Parte* Reexamination Certificate No. 12770 confirming the patentability of Claims 1-15 of the '273 Patent. A true and correct copy of that Certificate is attached hereto as Exhibit 2.

25. The '273 Patent family has been cited by 1,466 United States and international patents and patent applications as relevant prior art. Specifically, patents issued to the following companies and research institutions have cited the '273 Patent family as relevant prior art:

- Cisco Technology, Inc.
- Qualcomm Incorporated
- International Business Machines Corporation
- Intel Corporation
- Microsoft Corporation
- Broadcom Corporation
- Google Inc.
- AKAMAI Networks, Inc.
- Adobe Systems Incorporated
- Apple Inc.
- Lumen Technologies, Inc
- Oracle Corporation
- Amazon.com, Inc.

U.S. PATENT NO. 7,616,559

26. U.S. Patent No. 7,616,559 entitled, *Multi-Link Network Architecture, Including Security, In Seamless Roaming Communications Systems And Methods*, was filed on September 2,

2004. The '559 Patent claims priority to Provisional Application No. 60/499,648, which was filed on September 3, 2003. The '559 Patent is subject to a 35 U.S.C. § 154(b) term extension of 638 days. A true and correct copy of the '559 Patent is attached hereto as Exhibit 3.

27. The '559 Patent has been in full force and effect since its issuance. OptiMorphix, Inc. owns by assignment the entire right, title, and interest in and to the '559 Patent.

28. The '559 Patent generally relates to a communications system that provides secure communications of information over multiple communication links. This system includes a client device, a server device, and at least one communication channels, elements, modes, and links for connecting the devices for communication of information between them. The system includes a link detector for determining the existence and usability of the communication links for communication of the information, a pathfinder for selecting one or more of the communication links for communication of at least some of the information, a link handover for switching to the selected one or more communication links for communication of the information or portion thereof, and an auto reconnector for re-connecting to detected and selected one or more communication links for communication of the information or portions of it in the event that any communication is hindered, terminated, or upset.

29. The '559 Patent is directed to solving the problem of ensuring secure and reliable communication over multiple communication links, especially in environments that include mobile or other roaming devices capable of communicating over multiple channels and with channel switching characteristics.

30. The '559 Patent identifies the shortcomings of the prior art. Specifically, the specification describes that when multiple links, both physical elements and the bands or channels within each such element, are employed for communications in data networks, substantial

coordination of communicated information, as well as security of the information, is exponentially complicated. In wireless communications, concurrent or sequential operations can occur over cellular or wireless LAN technologies. Each of these wireless communications methods experiences substantially greater complexity in timing, security, packet sequencing, data loss, and connectivity, over wired communications conditions.

31. The ‘559 Patent teaches the use of a system that includes a link detector for determining the existence and usability of the communication links for communication of the information, a pathfinder for selecting one or more of the communication links for communication of at least some of the information, a link handover for switching to the selected one or more communication links for communication of the information or portion thereof, and an auto reconnector for re-connecting to detected and selected one or more communication links for communication of the information or portions of it in the event that any communication is hindered, terminated, or upset.

32. The inventions disclosed in the ‘559 Patent provide significant benefits and improvements to the function of the hardware in a computer network by ensuring secure and reliable communication over multiple communication links. This is particularly beneficial in environments that include mobile or other roaming devices capable of communicating over multiple channels and with channel switching characteristics. The system’s ability to detect usable communication links, select the most suitable ones, switch between them as needed, and reconnect in the event of communication disruption greatly enhances the reliability and efficiency of data transmission in a computer network.

33. The ‘559 Patent family has been cited by 17 United States and international patents and patent applications as relevant prior art. Specifically, patents issued to the following companies and research institutions have cited the ‘559 Patent family as relevant prior art:

- International Business Machines Corporation
- Samsung Electronics Co., Ltd
- Alphabet Inc.
- Research In Motion Limited
- BT Group plc

U.S. PATENT NO. 9,275,167

34. U.S. Patent No. 9,275,167 entitled, *Content Adaptation*, was filed on May 14, 2012. The ‘167 Patent claims priority to U.S. Provisional Patent Application No. 11/636,033, which was filed on December 8, 2006. The ‘167 Patent is subject to a 35 U.S.C. § 154(b) term extension of 607 days. A true and correct copy of the ‘167 Patent is attached hereto as Exhibit 4.

35. The ‘167 Patent has been in full force and effect since its issuance. OptiMorphix, Inc. owns by assignment the entire right, title, and interest in and to the ‘167 Patent.

36. The ‘167 Patent is directed to solving the problem of efficient data management in a distributed storage system. In distributed storage systems, data is spread across multiple nodes, which can be geographically dispersed. This presents challenges in terms of ensuring data availability, redundancy, and efficient retrieval. The ‘167 Patent addresses these shortcomings in existing systems by providing methods and systems that can manage data in a distributed storage system more effectively.

37. The ‘167 Patent identifies the shortcomings of the prior art. The specification describes that traditional methods of data management in distributed storage systems often suffer from inefficiencies and limitations. For instance, they may not provide sufficient data redundancy, which can lead to data loss if a node fails. Additionally, they may not distribute data evenly across

the nodes, leading to some nodes being overloaded while others are underutilized. Furthermore, data retrieval can be slow and inefficient in these systems.

38. The inventions taught by the ‘167 Patent solves discrete, technological problems associated with computer systems, specifically those related to data management in distributed storage systems. These are technical problems because they involve the design and operation of computer systems, including how data is stored, distributed, and retrieved in a network of computers.

39. The ‘167 Patent family has been cited by 539 United States and international patents and patent applications as relevant prior art. Specifically, patents issued to the following companies and research institutions have cited the ‘167 Patent family as relevant prior art:

- Cisco Systems, Inc.
- Microsoft Corporation
- International Business Machines Corp.
- Amazon.com, Inc.
- Alphabet Inc.
- Meta Platforms, Inc.
- Apple Inc.
- Broadcom Limited
- Xerox Corporation
- Samsung Electronics Co., Ltd.
- AT&T Inc.
- NEC Corporation
- Telefonaktiebolaget LM Ericsson
- Verizon Communications Inc.
- Qualcomm, Inc.
- Brunoco, Inc.
- Nokia Corporation
- LG Electronics Inc.
- Adobe Inc.
- Oracle Corporation
- Fujitsu Limited

U.S. PATENT NO. 10,412,388

40. U.S. Patent No. 10,412,388 entitled, *Framework for Quality-Aware Video Optimization*, was filed on January 8, 2018. The '388 Patent claims priority to U.S. Patent Application No. 12/751,951, which was filed on March 31, 2010, and which claims priority to U.S. Provisional Patent Application No. 61/165,224, which was filed on March 31, 2009. A true and correct copy of the '388 Patent is attached hereto as Exhibit 5.

41. The '388 Patent has been in full force and effect since its issuance. OptiMorphix, Inc. owns by assignment the entire right, title, and interest in and to the '388 Patent.

42. The '388 Patent generally relates to a method and system for quality-aware video optimization. It teaches receiving an encoded video frame, decompressing it, extracting a first quantization parameter (QP), and acquiring a delta QP based on the first QP. The method also includes acquiring a second QP based on the delta QP and the first QP, compressing the decompressed video frame based on the second QP, and providing the compressed video frame. The process allows for fine control of quality degradation in byte-reduced content and can be applied to transcoding scenarios where the input and output compression formats are different.

43. The '388 Patent identifies the shortcomings of the prior art. Specifically, existing single-pass rate control techniques had a problem in that the relationship between the compressed byte size of a video frame and its quantization parameter were only known after the frame is encoded. This made it challenging to achieve byte reduction and controllable quality degradation in a single pass.

44. The '388 Patent teaches the use of a quality-aware video optimization technique that modifies a video frame sequence to reduce the byte size while limiting perceptual quality degradation to a controllable level.

45. The inventions disclosed in the '388 Patent provide significant benefits and improvements to the function of hardware in a computer network by enabling efficient video optimization. The method allows for single-pass, on-the-fly quality-aware optimization, making it well-suited for various environments, including live video feeds and storage arrays.

46. The '388 Patent family has been cited by 30 United States and international patents and patent applications as relevant prior art. Specifically, patents issued to the following companies and research institutions have cited the '388 Patent family as relevant prior art:

- Interdigital, Inc.
- Tencent Holdings Ltd
- Microsoft Corporation
- Qualcomm, Inc.
- Lattice Semiconductor
- Openwave Mobility, Inc.
- Samsung Electronics Co., Ltd.
- Beijing Dajia Interconnection Information Technology Co., Ltd.

U.S. PATENT NO. 9,894,361

47. U.S. Patent No. 9,894,361 entitled, *Framework for Quality-Aware Video Optimization*, was filed on March 31, 2010. The '361 Patent claims priority to U.S. Provisional Application No. 61/165,224, which was filed on March 31, 2009. The '361 Patent is subject to a 35 U.S.C. § 154(b) term extension of 1,038 days. A true and correct copy of the '361 Patent is attached hereto as Exhibit 6.

48. The '361 Patent has been in full force and effect since its issuance. OptiMorphix, Inc. owns by assignment the entire right, title, and interest in and to the '361 patent.

49. The '361 Patent relates to a method and system for quality-aware video optimization. Specifically, it teaches receiving an encoded video frame, decompressing it, extracting a first quantization parameter (QP), and acquiring a delta QP based on the first QP. The method further includes acquiring a second QP based on the delta QP and the first QP, compressing

the decompressed video frame based on the second QP, and providing the compressed video frame. The process is designed to reduce the byte size of the video stream as much as possible while limiting perceptual quality degradation to a controllable level.

50. The ‘361 Patent is directed to solving the problem of optimizing video quality in a way that balances the reduction of byte size with the preservation of perceptual quality. This involves a nuanced understanding of how quantization parameters (QPs) affect both the perceptual quality and the bitrate of a video frame, and how to manipulate these QPs to achieve the desired balance.

51. The ‘361 Patent identifies the shortcomings of the prior art. Specifically, existing single-pass rate control techniques had a problem in that the relationship between the compressed byte size of a video frame and its quantization parameter was only known after the frame was encoded. This made it challenging to achieve byte reduction and controllable quality degradation in a single pass.

52. The ‘361 Patent teaches the use of a quality-aware video optimization technique that requires only a single pass over the previously encoded video frame sequence to optimize the video frame sequence. It introduces a novel function that defines ΔQP according to the value of QPInput, allowing fine control of quality degradation in the byte-reduced content. It also considers differences between input and output compression formats (codecs) and computes codec adjustment that accounts for these differences.

53. The inventions disclosed in the ‘361 Patent provide significant benefits and improvements to the function of hardware in a computer network by enabling efficient video optimization. By allowing for single-pass, on-the-fly, quality-aware optimization, the patent’s methods can be applied in various environments, including optimizing live video feeds before they

traverse a low-capacity network segment, or optimizing surveillance video before archiving, thus saving storage space and network bandwidth.

54. The ‘361 Patent family has been cited by 30 United States and international patents and patent applications as relevant prior art. Specifically, patents issued to the following companies and research institutions have cited the ‘361 Patent family as relevant prior art:

- Interdigital, Inc.
- Tencent Holdings Ltd
- Microsoft Corporation
- Qualcomm, Inc.
- Lattice Semiconductor
- Openwave Mobility, Inc.
- Samsung Electronics Co., Ltd.
- Beijing Dajia Interconnection Information Technology Co., Ltd.

U.S. PATENT NO. 9,936,040

55. U.S. Patent No. 9,936,040 entitled, *Systems and Methods of Partial Video Caching*, was filed on December 19, 2014. The ‘040 Patent is subject to a 35 U.S.C. § 154(b) term extension of 336 days. A true and correct copy of the ‘040 Patent is attached hereto as Exhibit 7.

56. The ‘040 Patent has been in full force and effect since its issuance. OptiMorphix, Inc. owns by assignment the entire right, title, and interest in and to the ‘040 Patent.

57. The ‘040 Patent relates to systems and methods for caching and keying segments for efficient data retrieval. The ‘040 Patent outlines a technical framework that stores a set of instructions for acquiring, storing, and managing segments of data (e.g., video, image, and audio files) in response to requests generated by client devices. This framework is designed to optimize the delivery of content over networks by reducing the amount of data that needs to be transmitted from content servers to client devices, thereby decreasing network congestion and improving the efficiency of content delivery.

58. The ‘040 Patent is directed to solving the problem of high network congestion and inefficient use of network resources caused by the delivery of large content files over the Internet. This issue places a substantial processing load on the network infrastructure and web servers, particularly affecting networks employing wireless technology, which generally offer lower throughput and suffer from greater packet loss and location-dependent throughput variations compared to wired networks.

59. The ‘040 Patent identifies the shortcomings of the prior art by highlighting the inefficiencies in existing methods of content delivery. The specification describes that traditional methods do not adequately address the challenges of real-time streaming adjustments, such as bitrate and frame resolution changes, especially in formats like MPEG-4 Part 14 (MP4), which require advance transmission of index data. This limitation significantly constrains the ability to adjust the bitrate in real-time, leading to inefficient use of network resources and a degraded user experience.

60. The ‘040 Patent teaches the use of a cache server to store segments of data associated with user requests. This approach involves acquiring segments from a content server, storing these segments if they meet certain criteria (e.g., exceeding a threshold value), and generating keys for efficient retrieval. By caching only parts of the media data that are likely to be requested again, the system reduces the need for repeated data transmissions from the content server, thereby alleviating network congestion and improving content delivery efficiency.

61. The inventions disclosed in the ‘040 Patent provide significant benefits and improvements to the function of the hardware in a computer network by optimizing the delivery of data. This is achieved through a reduction in the amount of data that needs to be transmitted across the network, which not only decreases network congestion but also minimizes the

processing load on network infrastructure and web servers. As a result, the network and server capacity can be utilized more effectively, enabling a larger number of users to be served with electronic data without necessitating a proportional increase in network or server resources.

62. The inventions taught by the '040 Patent solve discrete, technological problems associated with computer systems and networks, particularly those related to the efficient delivery and caching of large amounts of data. These problems are inherently technical because they involve optimizing network resource usage, reducing bandwidth consumption, and improving the scalability of content delivery systems. The solutions provided by the '040 Patent address these challenges by introducing innovative methods for partial caching and content delivery optimization, which are crucial for enhancing the performance and reliability of modern computer networks.

63. The '040 Patent family has been cited by 26 United States and international patents and patent applications as relevant prior art. Specifically, patents issued to the following companies and research institutions have cited the '040 Patent family as relevant prior art:

- Cisco Systems, Inc.
- Comcast Corporation
- EchoStar Corporation
- Salesforce, Inc.
- Telefonaktiebolaget Lm Ericsson
- Tencent Holdings Ltd.
- Hughes Network Systems, LLC
- Verizon Digital Media Services Inc.

U.S. PATENT NO. 9,167,021

64. U.S. Patent No. 9,167,021 entitled, *Measuring Web Browsing Quality of Experience in Real-Time at An Intermediate Network Node*, was filed on March 30, 2012. The '021 Patent is subject to a 35 U.S.C. § 154(b) term extension of 265 days. A true and correct copy of the '021 Patent is attached hereto as Exhibit 8.

65. The ‘021 Patent has been in full force and effect since its issuance. OptiMorphix, Inc. owns by assignment the entire right, title, and interest in and to the ‘021 Patent.

66. The ‘021 Patent is directed to solving the problem of accurately measuring the time needed to download a web page at an intermediate network node. Traditional methods of measuring download time at the client or server level are straightforward, but complications arise when content for a single web page is distributed across several physical servers or when measuring at an intermediate network node. The patent addresses these challenges by introducing a method to evaluate and compute the page unit time.

67. The ‘021 Patent identifies the shortcomings of the prior art. Specifically, measuring the web page download time at an intermediate network node is practically not feasible due to the complexity of web page transactions. The prior art lacks an effective method to measure the time taken to download a complete web page at an intermediate network node, especially when content is distributed across several servers or when dynamic URLs are generated by client-side scripts.

68. The ‘021 Patent teaches the use of a method that includes acquiring current HTTP transactions, determining their relation to web browsing for a specific client, and evaluating whether they belong with the previous transactions set. By grouping transactions into page units and computing a page unit time, the method provides a way to measure the Quality of Experience (QoE) of web browsing in real-time at an intermediate network node.

69. The inventions disclosed in the ‘021 Patent provide significant benefits and improvements to the function of the hardware in a computer network by enabling real-time measurement of web browsing QoE at an intermediate network node. This allows service providers to optimize network performance and take actions to enhance the browsing experience.

70. The inventions taught by the '021 Patent solve discrete, technological problems associated with computer systems and network performance. Specifically, it addresses the technical challenges of measuring web browsing Quality of Experience (QoE) at an intermediate network node, considering the complexities of web page transactions, distributed content across servers, and dynamic URL generation. The solution provided by the '021 Patent is rooted in technological innovation and contributes to the optimization of network performance and user experience.

71. The '021 Patent family has been cited by 17 United States and international patents and patent applications as relevant prior art. Specifically, patents issued to the following companies and research institutions have cited the '021 Patent family as relevant prior art:

- BT Group plc
- Meta Platforms, Inc.
- Cisco Systems, Inc.
- Telefonaktiebolaget Lm Ericsson
- Tencent Holdings Ltd
- Apple Inc.
- Nippon Telegraph & Telephone Corp.
- EchoStar Corporation
- Intel Corporation

COUNT I
INFRINGEMENT OF U.S. PATENT NO. 7,099,273

72. Plaintiff references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

73. Akamai designs, makes, uses, sells, and/or offers for sale in the United States products comprising systems and methods for data transport acceleration and management within a network communication system.

74. Akamai designs, makes, sells, offers to sell, imports, and/or uses Akamai Products and Services that use TCP-BBR congestion control, including the Akamai Content Delivery Platform (collectively, the "Akamai '273 Product(s)").

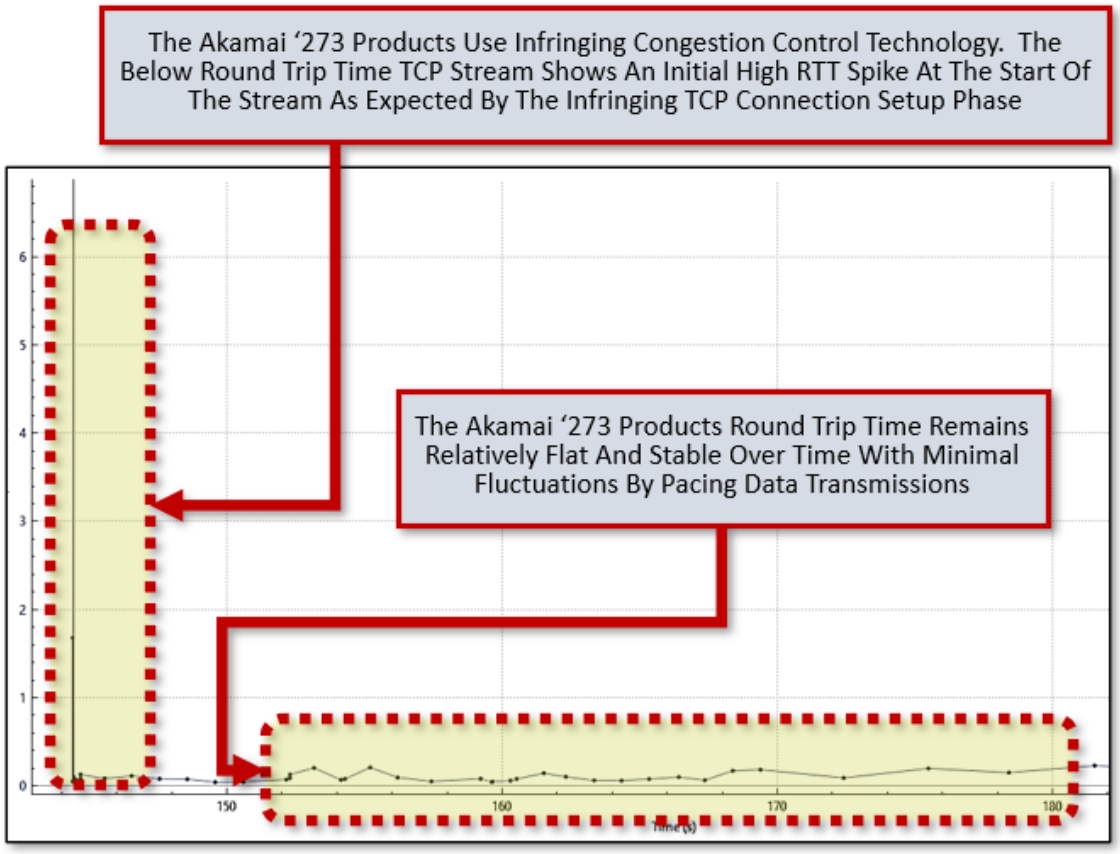
75. One or more Akamai subsidiaries and/or affiliates use the Akamai '273 Products in regular business operations.

76. One or more of the Akamai '273 Products include technology that performs the step of establishing a data connection between a sender and receiver using a handshake process. Akamai uses the TCP-BBR congestion control technology in the Akamai '273 Products. Akamai described on its blog "As part of Akamai's ongoing investments in improving delivery performance, last month we completed the worldwide deployment of the Bottleneck Bandwidth and RTT (BBR) TCP congestion control algorithm across our Edge Platform." *Akamai Improves Global Delivery Performance*, AKAMAI BLOG (December 19, 2019).

77. The Akamai '273 Products send a TCP packet with the SYN (Synchronize) flag set to the server. This packet contains an initial sequence number (ISN), which helps the server and client synchronize their sequence numbers. The ISN used by the Akamai '273 Products are represented as "x." Upon receiving the SYN packet, the Akamai '273 Products sends a TCP packet back with both the SYN and ACK flags set. This packet contains two pieces of information: the responsive ISN, usually represented as 'y,' and an acknowledgment number, which is the ISN plus one (x+1). The acknowledgment number is used to confirm that the sender has received the SYN packet.

78. In establishing a connection between the sender and the receiver after receiving the SYN-ACK packet, the Akamai '273 Products send another packet with the ACK flag set. This packet contains an acknowledgment number, which is the ISN plus one (y+1).

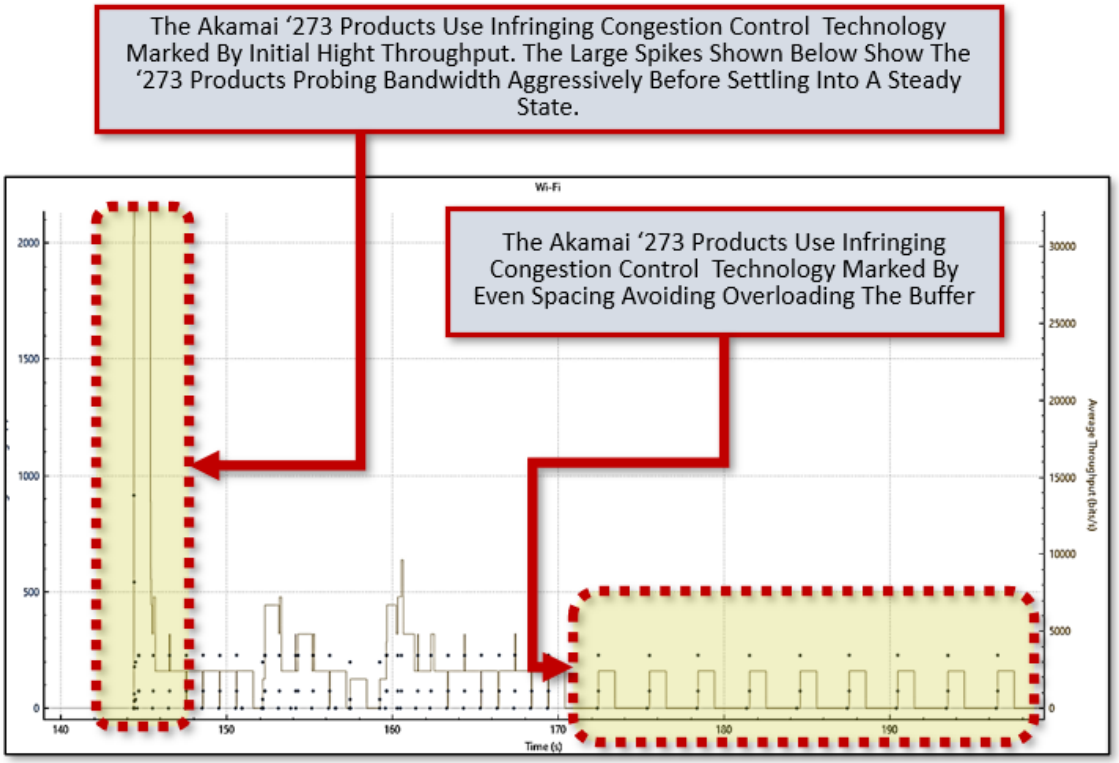
79. The Akamai '273 Products measure round trip times (RTT) of packets sent between a client and server over a network. The Akamai '273 Products utilize TCP-BBR congestion control which measures round trip times of data packets sent from the sender to a receiver. The below excerpt shows the Akamai '273 Products exhibit stable round trip time behavior. After an initial spike, the RTT remains relatively flat and stable over time, with minimal fluctuations. By using TCP-BBR the Akamai '273 Products avoid network-induced RTT increases by pacing data transmissions and preventing buffer bloat.



AKAMAI PLATFORM TCP STREAM ROUND TRIP TIME (December 2024) (emphasis added).

80. The Akamai '273 Products utilize TCP-BBR congestion control as shown in the below TCP Stream Throughput graph. The periodic and evenly spaced patterns show TCP-BBR packet pacing wherein the Akamai '273 Products match the bottleneck bandwidth, avoiding overloading the buffer.

81. The Akamai '273 Products perform timestamping. Specifically, when a Akamai '273 Product transmits a data packet, it records the current time as a timestamp. The timestamp is stored in the transmission control block (TCB), which maintains the state of the TCP connection, including RTT measurements and other relevant information.

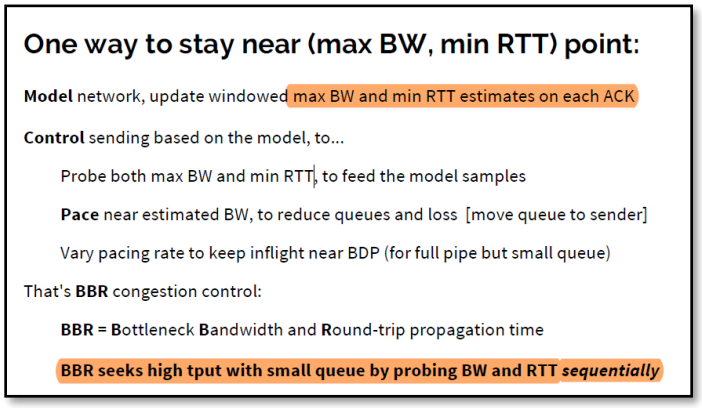


AKAMAI PLATFORM TCP STREAM THROUGHPUT (December 2024) (emphasis added).

82. The Akamai '273 Products perform acknowledgment processing. Specifically, the Akamai '273 Products send an acknowledgment (ACK) for a specific packet, the sender processes the ACK and identifies the corresponding packet in the TCB. By matching the ACK with the original packet, the Akamai '273 Products retrieve the original timestamp associated with that packet.

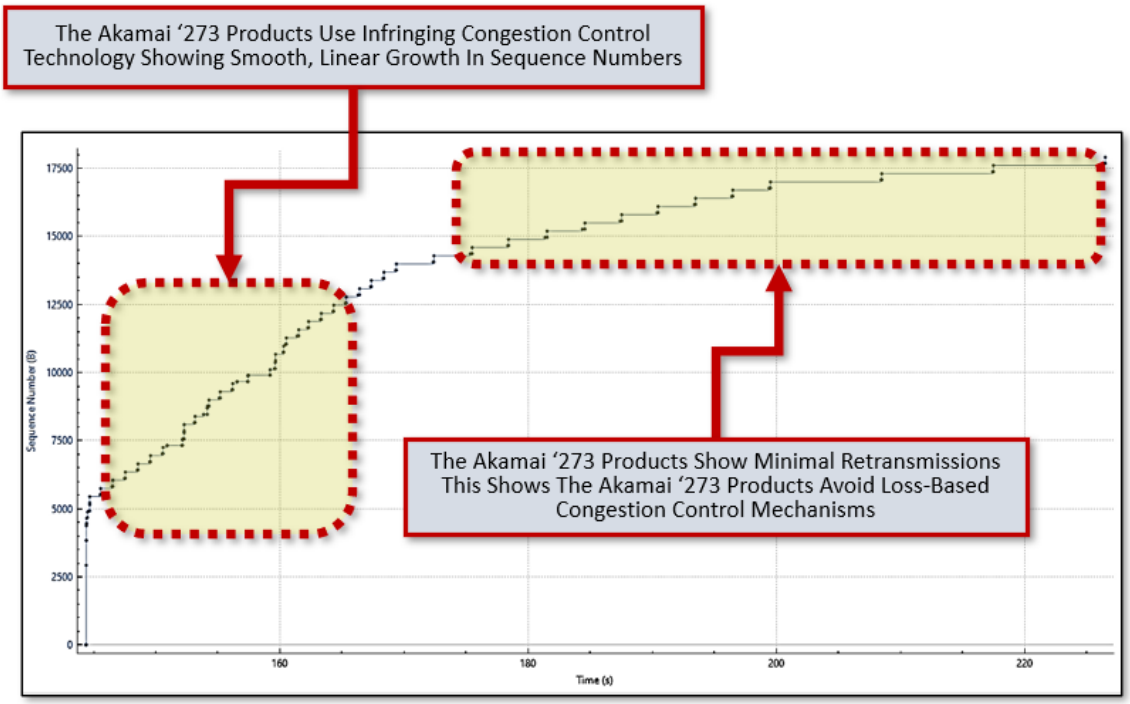
83. The Akamai '273 Products perform a round-trip time (RTT) calculation. Specifically, the Akamai '273 Products calculate the RTT for a specific packet by subtracting the

original timestamp from the current time when the ACK is received. This gives an individual RTT sample for that packet as explained in the below excerpt.



Neal Cardwell, Yunchung Cheng, et al,, *BBR Congestion Control*, GOOGLE IETF 97: SEOUL PRESENTATION at 9 (November 2016) (emphasis added) (describing RTT_sample = ACK_receive_time - original_timestamp).

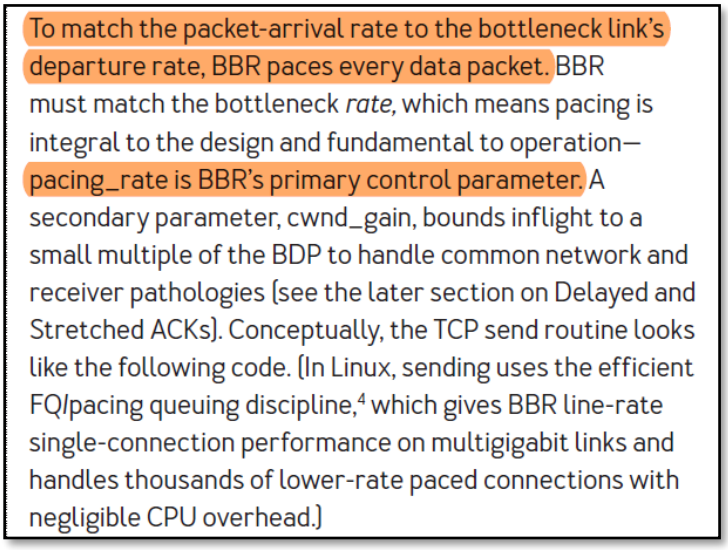
84. The Akamai '273 Products manage congestion using TCP-BBR as shown in the below Time/Sequence graph from the Akamai '273 Products. The below excerpt shows the Akamai '273 Products transmit packets with sequence numbers that increase in a relatively smooth, linear fashion over time, with no major dips or stalls. The Akamai '273 Products use of TCP-BBR enables packet packing and avoids congestion by transmitting at the optimal rate for the bottleneck bandwidth.



AKAMAI PLATFORM TCP STREAM TIME / SEQUENCE (December 2024) (emphasis added).

85. The Akamai '273 Products perform the step of MinRTT estimation. Specifically, the Akamai '273 Products maintain a running estimate of the minimum RTT observed (MinRTT) over a specified time window. The MinRTT is used by the Akamai '273 Products to estimate the base round-trip propagation time without queuing delay. When a new RTT sample is calculated, the Akamai '273 Products compare it with the current MinRTT value. If the new sample is lower than the existing MinRTT, the Akamai '273 Products update MinRTT with a new value.

86. The Akamai '273 Products perform round-trip time-based pacing. Specifically, the Akamai products use the MinRTT estimate in performing pacing rate and congestion window calculations to ensure the sending rate is adapted based on the observed network conditions. BBR's pacing rate and congestion window calculations factor in the MinRTT value to maintain a balance between efficient data transfer and minimal congestion.



To match the packet-arrival rate to the bottleneck link's departure rate, BBR paces every data packet. BBR must match the bottleneck *rate*, which means pacing is integral to the design and fundamental to operation—pacing_rate is BBR's primary control parameter. A secondary parameter, cwnd_gain, bounds inflight to a small multiple of the BDP to handle common network and receiver pathologies (see the later section on Delayed and Stretched ACKs). Conceptually, the TCP send routine looks like the following code. (In Linux, sending uses the efficient FQ/pacing queuing discipline,[4] which gives BBR line-rate single-connection performance on multigigabit links and handles thousands of lower-rate paced connections with negligible CPU overhead.)

Neal Cardwell, Yuchung Cheng, C. Stephen Gunn, Soheil Hassas Yeganeh, Van Jacobson, *BBR: Congestion-Based Congestion Control*, ACM Queue, Sep/Oct 2016 and CACM, Feb 2017 (emphasis added).

87. The Akamai '273 Products calculate a congestion window parameter, which defines the maximum quantity of unacknowledged data packets permitted to be transmitted to the recipient.

88. The Akamai '273 Products calculate a pacing rate based on these estimates to determine how quickly it should transmit data.

89. The Akamai '273 Products calculate a congestion window. Specifically, the Akamai '273 Products calculate a cwnd value based on the estimated bottleneck bandwidth (BtlBw) and RTT to ensure the congestion window is large enough not to limit the sending rate derived from the BtlBw and RTT estimates. This is done by setting the cwnd to the product of the estimated BtlBw and RTT: cwnd = BtlBw * RTT. The calculation done by the Akamai '273 Products ensures that the cwnd value is large enough to accommodate the in-flight data based on the BtlBw and RTT estimates, while also accounting for potential variations in network conditions.

90. The Akamai '273 Products calculate a congestion window (cwnd) based on the bottleneck bandwidth (BtlBw) and round-trip time (RTT) estimates to ensure the sending rate is not constrained by the window size. The cwnd effectively sets a limit on the number of unacknowledged data packets in transit, but it is not set by a specific parameter for the maximum number of unacknowledged packets.

91. The Akamai '273 Products transmit additional data packets to the receiver in response a transmit timer expiration. The period of the transmit timer is based on the round-trip time measurements and the congestion window parameter.

92. Akamai has directly infringed and continues to directly infringe the '273 Patent by, among other things, making, using, offering for sale, and/or selling technology for transferring data from a sender to a receiver in a communication network, including but not limited to the Akamai '273 Products.

93. The Akamai '273 Products are available to businesses and individuals throughout the United States.

94. The Akamai '273 Products are provided to businesses and individuals located in the State of Delaware.

95. By making, using, testing, offering for sale, and/or selling products and services for transferring data from a sender to a receiver in a communication network, including but not limited to the Akamai '273 Products, Akamai has injured Plaintiff and is liable to Plaintiff for directly infringing one or more claims of the '273 Patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

96. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '273 Patent.

97. As a result of Akamai's infringement of the '273 Patent, Plaintiff has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Akamai's infringement, but in no event less than a reasonable royalty for the use made of the invention by Akamai together with interest and costs as fixed by the Court.

COUNT II
INFRINGEMENT OF U.S. PATENT NO. 7,616,559

98. Plaintiff references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

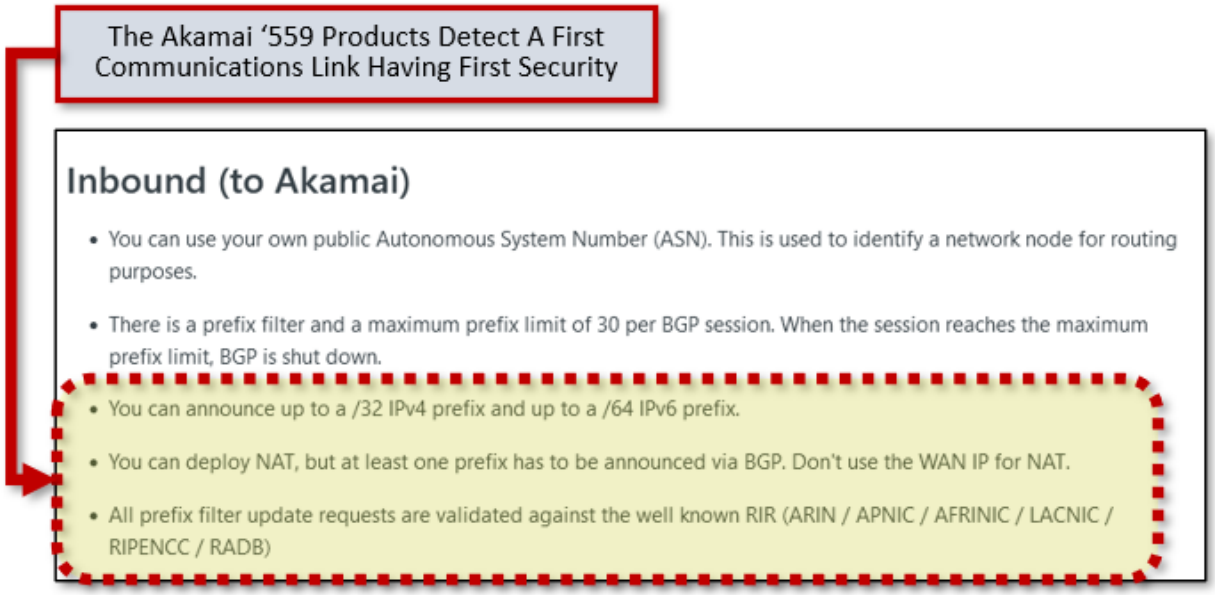
99. Akamai designs, makes, uses, sells, and/or offers for sale in the United States products that communicate information over multiple communications links.

100. Akamai designs, makes, sells, offers to sell, imports, and/or uses Akamai Products and Services that include Akamai Direct Connect, including: Akamai Adaptive Media Delivery; Akamai Cloud Wrapper; Akamai Download Delivery; Akamai Media Services Live; Akamai Object Delivery; Akamai Ion Standard; Akamai Ion Premium; Akamai API Acceleration; Akamai Image & Video Manager; Akamai Dynamic Site Accelerator; Akamai Global Traffic Management; Akamai Image & Video Manager; Akamai Resource Optimizer; Akamai Resource Optimizer Extended Compatibility; Akamai IP Accelerator; and Akamai Origin IP Access Control List (collectively, the "Akamai '559 Product(s)").

101. One or more Akamai subsidiaries and/or affiliates use the Akamai '559 Products in regular business operations.

102. The Akamai '559 Products identify an initial communication path with a specific security protocol for the transmission of data between a client system and a server system.

103. The Akamai '559 Products detect a first communications link having a first security feature for communicating data between a client device and a server device.

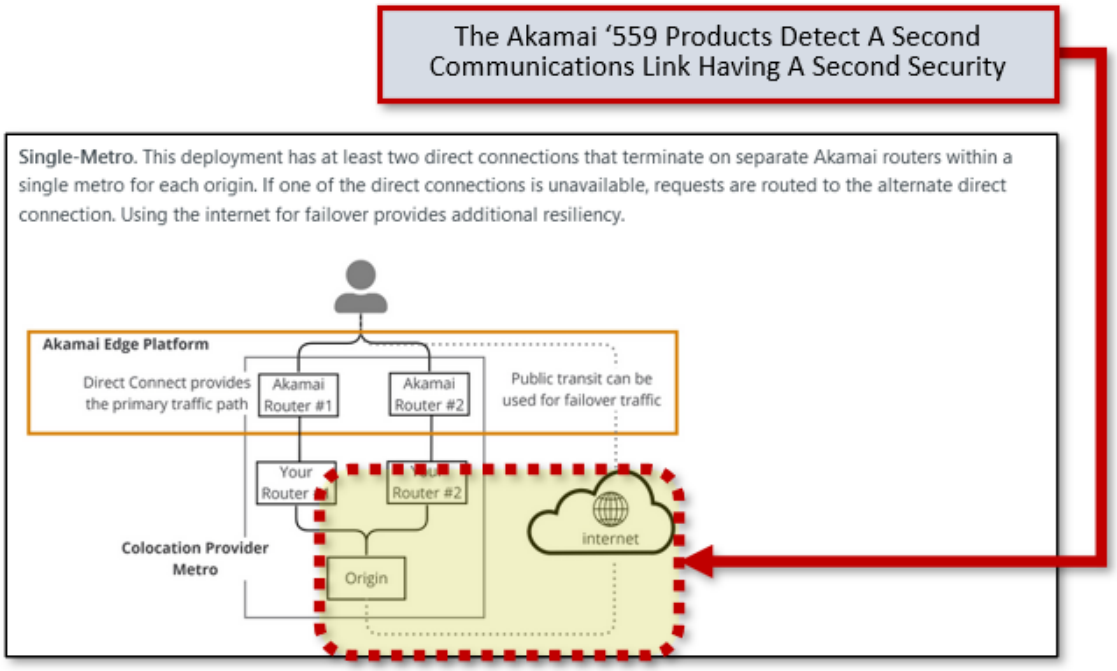


Direct Connect – Routing Policy, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/direct-connect/docs/routing-policy (last visited December 2024) (annotation added).

104. The Akamai '559 Products utilize algorithms to ensure the first security level's parameters, such as encryption and authentication protocols are met. By identifying the presence of this first communications link, the Akamai '559 Products can prioritize a communications link for use based on predefined security requirements or other criteria.

105. The Akamai '559 Products contain functionality for identifying an alternate communication pathway that possesses a different level of security for exchanging data between a client and a server.

106. The Akamai '559 Products detect a second communications link having a second security feature.



Direct Connect – Network Architecture and Failover, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/direct-connect/docs/deployments (last visited December 2024) (annotation added).

107. The second communications link enables data to be sent between a client and server. Further, the Akamai '559 Products monitor network channels and enable security protocols to evaluate the parameters of the second communications link. The security features used by the Akamai '559 Products include encryption standards and/or authentication technology. The second communications link serves to ensure continuous data transfer by the Akamai '559 Products if the first communications link is unavailable.

108. The Akamai '559 Products determine if the initial communication path is inaccessible, opting for the alternate communication pathway with its distinct security level, to facilitate data transmission between a client and server.

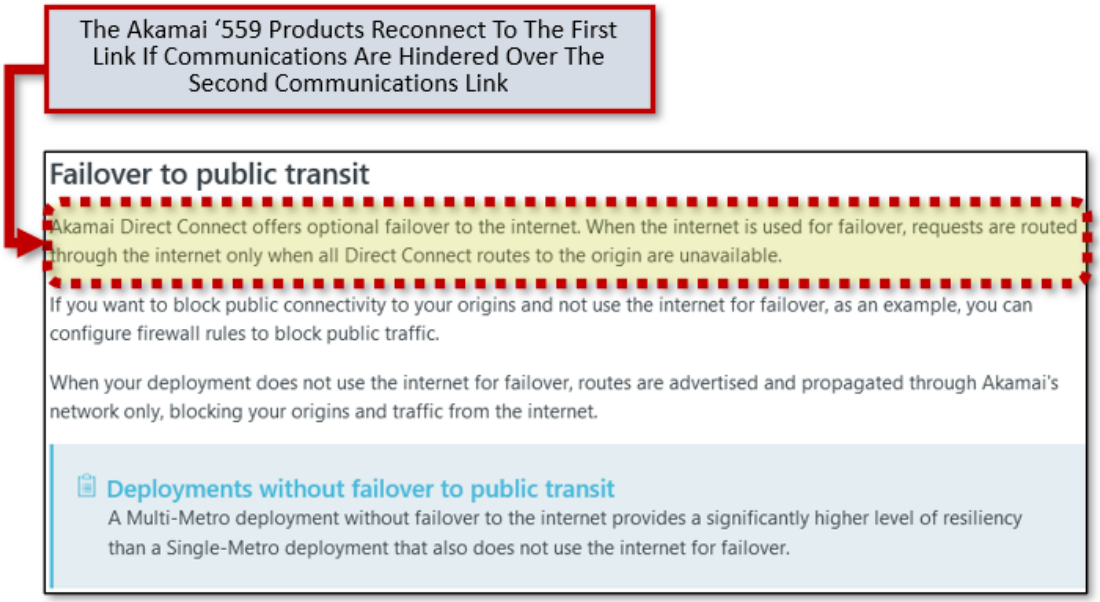
109. The Akamai '559 Products select the first communications link, having first security, for communicating between a client device and a server. After the detection of both the first and second communications links, the Akamai '559 Products prioritize the link with the higher

security features (e.g., first link) for data transmission. This prioritization by the Akamai '559 Products is based on pre-established security criteria and network conditions. If the first link meets the requirements, it is selected by the Akamai '559 Products to provide enhanced security and reliability.

110. The Akamai '559 Products maintain a connection with one of either the initial or alternate communication pathways, to ensure uninterrupted data exchange between the client system and the server system.

111. If the first communications link is not available, the Akamai '559 Products select the second communications link having second security, for communicating between the client device and the server device. This action is prompted when the preferred first link, typically with higher security, is unavailable or fails to meet a criteria. The Akamai '559 Products switch to the second link, ensuring continuous communication. While generally considered less secure, the second link serves as a contingency, allowing uninterrupted information flow between a client and server.

112. If the data transmission is interrupted over the alternate communication pathway, the Akamai '559 Products contain functionality for restoring the connection to the initial communication link to continue exchanging information between the client and the server.



Direct Connect – Network Architecture and Failover, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/direct-connect/docs/deployments (last visited December 2024) (annotation added).

113. The Akamai '559 Products enable linking to one of either the first communications link and the second communications link, to maintain communicative connectivity during communications between the client and server. The Akamai '559 Products establish a dynamic link management process, maintaining an active connection by continuously evaluating both communication links.

114. The Akamai '559 Products contain functionality where if communication disruption occurs over the primary communication link, the alternate communication link is reestablished to facilitate the exchange of information between the client and server.

115. The Akamai '559 Products enable reconnecting to the first communications link for communicating information between the client and server if communications are hindered over the second communications link. This step is a part of a resilient communication strategy that actively monitors both links and switches back to the first link when issues are detected with the second communications link.

116. The Akamai '559 Products enable reconnecting to the second communications link for communicating information between the client device and the server device, if communications are hindered over the first communications link. If issues are detected on the primary link, the Akamai '559 Products automatically switch to the secondary link, maintaining the communication while also adhering to the security protocols.

117. Akamai has directly infringed and continues to directly infringe the '559 Patent by, among other things, making, using, offering for sale, and/or selling technology comprising a method of communicating information over multiple communications links, including but not limited to the Akamai '559 Products.

118. The Akamai '559 Products are available to businesses and individuals throughout the United States.

119. The Akamai '559 Products are provided to businesses and individuals located in this District.

120. By making, using, testing, offering for sale, and/or selling products and services comprising a method of communicating information over multiple communications links, including but not limited to the Akamai '559 Products, Akamai has injured Plaintiff and is liable to Plaintiff for directly infringing one or more claims of the '559 Patent, including at least claim 5 pursuant to 35 U.S.C. § 271(a).

121. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '559 Patent.

122. As a result of Akamai's infringement of the '559 Patent, Plaintiff has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Akamai's

infringement, but in no event less than a reasonable royalty for the use made of the invention by Akamai together with interest and costs as fixed by the Court.

COUNT III
INFRINGEMENT OF U.S. PATENT NO. 9,275,167

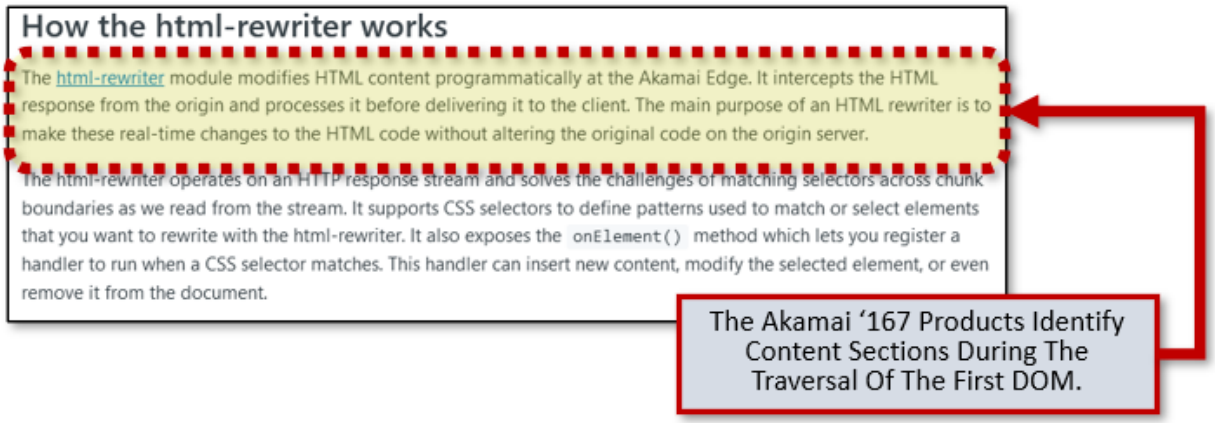
123. Plaintiff references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

124. Akamai designs, makes, uses, sells, and/or offers for sale in the United States products for rendering a webpage.

125. Akamai designs, makes, sells, offers to sell, imports, and/or uses Akamai Products and Services, including Akamai ION, which incorporate the following functionality: adaptive acceleration, resource optimizer, property manager API, device characterization, and mobile detection and redirect (collectively, the "Akamai '167 Product(s)").

126. One or more Akamai subsidiaries and/or affiliates use the Akamai '167 Products in regular business operations.

127. The Akamai '167 Products identify content sections during a traversal of a first Document Object Model (DOM) representing a webpage. Specifically, the Akamai '167 Products modify HTML content by traversing and parsing the DOM, matching elements with CSS selectors, and registering callbacks to modify the elements.



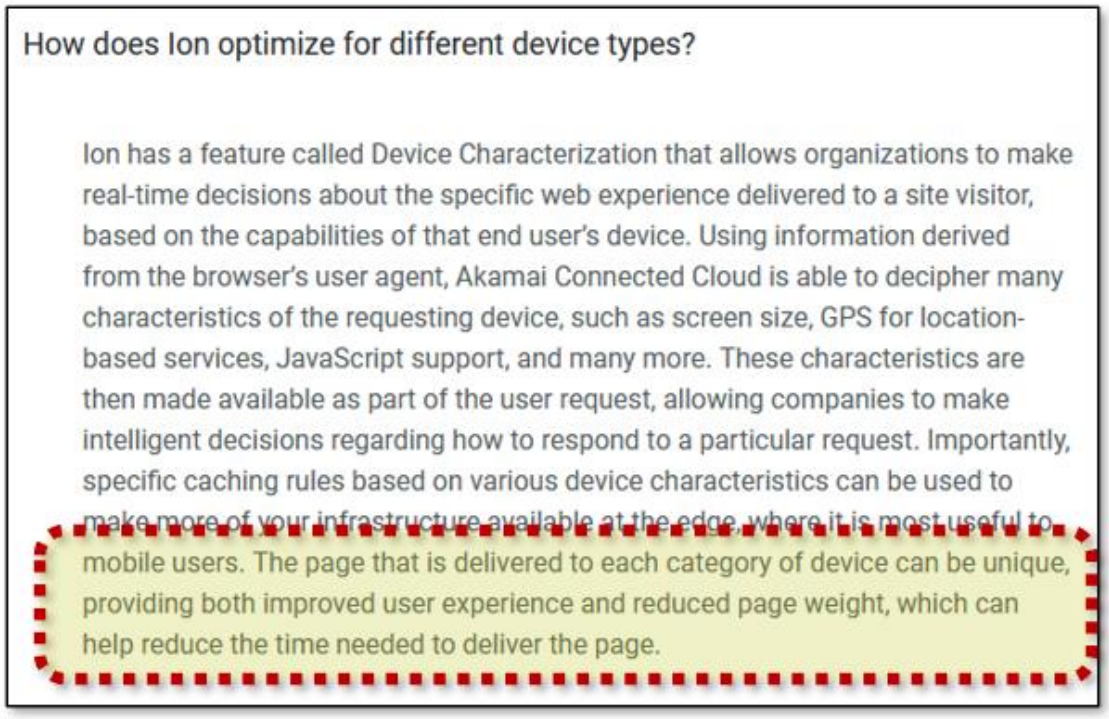
Dynamic Content Assembly using the html-rewriter, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/edgeworkers/docs/html-rewriter-dynamic-content-assembly (last visited December 2024).

128. Further, the Akamai '167 Products perform a systematic visitation of the nodes in the DOM tree to identify particular content sections, such as headers, paragraphs, images, or other elements.

129. The Akamai '167 Products transform the initial Document Object Model (DOM) to a subsequent DOM, guided by an adaptation criterion detailing characteristics of a mobile device. The transformation of the DOM by the Akamai '167 Products involves identifying and maintaining nodes associated with a tab box in the revised DOM.

130. The Akamai '167 Products transform the first DOM to a second DOM based on an adaptation parameter that describes features of a mobile device. This transformation by the Akamai '167 Products involves analyzing the content and structure of the first DOM and applying specific rules or algorithms to modify the DOM according to the given adaptation parameters. Specifically, the Akamai '167 Products use real-user monitoring (RUM) data to adapt content for performance optimization. The Akamai '167 Products adjust delivery and layout optimization based on device types, including mobile devices. Further, the Akamai '167 Products optimize HTML, CSS, and JavaScript, allowing transformations that align with mobile device capabilities

(e.g., preloading fonts, compressing scripts) using Adaptive Acceleration functionality. In addition, the Akamai '167 Products enable traversal and transformation of the DOM using "html-rewriter." The Akamai '167 Products identify and defers or prioritizes scripts critical to functionality of a webpage, including JavaScript controlling visibility states this ensures that functionality essential to tab boxes (e.g, dynamic content toggling) is maintained for supported devices.

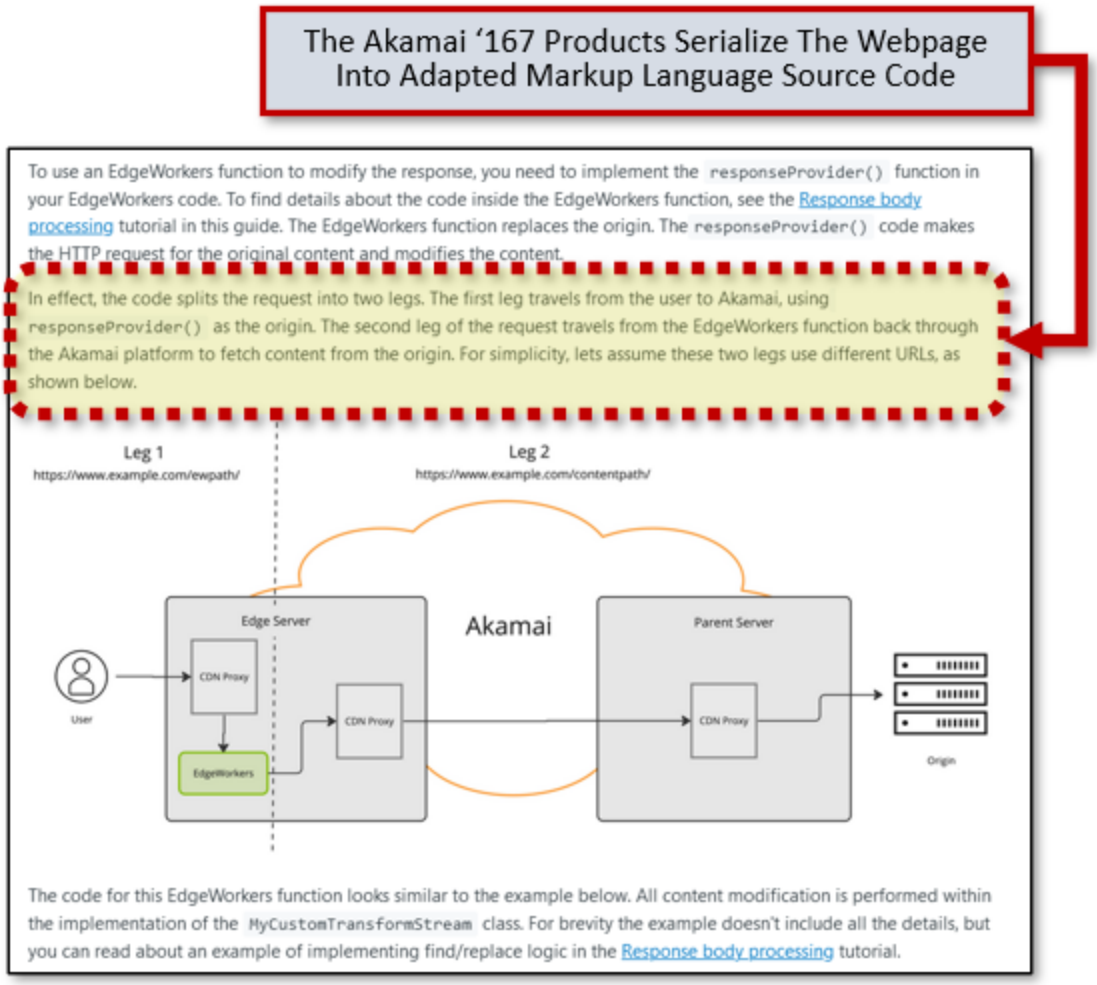


Akamai ION Product Page, AKAMAI WEBSITE, *available at*: https://www.akamai.com/products/web-performance-optimization (last visited December 2024).

131. The Akamai '167 Products serialize the second DOM by transforming it into modified source code using markup language and then preparing the second DOM for further processing and adaptation.

132. The Akamai '167 Products serialize the second DOM by converting the second DOM into adapted markup language source code. The Akamai '167 Product "html-rewriter" functionality perform real-time traversal and transformation of the DOM, allowing for selective

modifications based on device requirements. Once these transformations are applied by the Akamai '167 Products the resulting DOM structure—optimized for mobile or other target environments—is serialized into markup language (such as HTML or XML) for delivery to the client.



Response Content Transformation, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/edgeworkers/docs/transform-response-content (last visited December 2024).

133. The Akamai '167 Products use the transformed markup language source code to generate an adapted version of the original webpage. This newly created webpage (generated by Akamai '167 Products) is designed for compatibility with characteristics of a mobile device.

134. The Akamai '167 Products construct an adapted webpage from the markup language source code. Specifically, the Akamai '167 Products include an "html-rewriter" which modifies the original webpage's DOM structure to create an optimized version tailored to the characteristics of the requesting mobile device. This process is performed by the Akamai '167 Products and includes adapting layout, preloading critical resources, and compressing content so that the resulting webpage is serialized into a consumable markup format (e.g., HTML) and delivered to the mobile device.

Dynamic Content Assembly using the html-rewriter, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/edgeworkers/docs/html-rewriter-dynamic-content-assembly (last visited December 2024).

135. The resulting adapted webpage is made available by the Akamai '167 Products for downloading by a mobile device.

136. Akamai has directly infringed and continues to directly infringe the '167 patent by, among other things, making, using, offering for sale, and/or selling technology for rendering a webpage, including but not limited to the Akamai '167 Products.

137. The Akamai '167 Products are available to businesses and individuals throughout the United States.

138. The Akamai '167 Products are provided to businesses and individuals located in this District.

139. By making, using, testing, offering for sale, and/or selling products and services comprising a method of rendering a webpage, including but not limited to the Akamai '167 Products, Akamai has injured Plaintiff and is liable to Plaintiff for directly infringing one or more claims of the '167 Patent, including at least claim 14 pursuant to 35 U.S.C. § 271(a).

140. Akamai also indirectly infringes the '167 Patent by actively inducing infringement under 35 U.S.C. § 271(b).

141. Akamai has had knowledge of the '167 Patent since at least service of this Complaint or shortly thereafter, and Akamai knew of the '167 Patent and knew of its infringement, including by way of this lawsuit.

142. Alternatively, Akamai has had knowledge of the '167 Patent since at least August 8, 2017, when U.S. Patent No. 9,729,605, which is owned by Akamai and cites the '167 Patent as relevant prior art, was issued. Alternatively, Akamai has had knowledge of the '167 Patent since at least June 14, 2012, when U.S. Patent Application No. 13/281,615, which is owned by Akamai and cites the '167 Patent as relevant prior art, was published.

143. Akamai intended to induce patent infringement by third-party customers and users of the Akamai '167 Products and had knowledge that the inducing acts would cause infringement

or was willfully blind to the possibility that its inducing acts would cause infringement. Akamai specifically intended and was aware that the normal and customary use of the accused products would infringe the '167 Patent. Akamai performed the acts that constitute induced infringement, and would induce actual infringement, with knowledge of the '167 Patent and with the knowledge that the induced acts would constitute infringement. For example, Akamai provides the Akamai '167 Products that have the capability of operating in a manner that infringe one or more of the claims of the '167 Patent, including at least claim 14, and Akamai further provides documentation and training materials that cause customers and end users of the Akamai '167 Products to utilize the products in a manner that directly infringe one or more claims of the '167 Patent.[14] By providing instruction and training to customers and end-users on how to use the Akamai '167 Products in a manner that directly infringes one or more claims of the '167 Patent, including at least claim 14, Akamai specifically intended to induce infringement of the '167 Patent. Akamai engaged in such inducement to promote the sales of the Akamai '167 Products, e.g., through Akamai user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '167 Patent. Accordingly, Akamai has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '167 Patent, knowing that such use constitutes infringement of the '167 Patent.

[14] *See, e.g.*, *Dynamic Content Assembly using the html-rewriter*, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/edgeworkers/docs/html-rewriter-dynamic-content-assembly (last visited December 2024); *Akamai ION Product Page,* AKAMAI WEBSITE, *available at*: https://www.akamai.com/products/web-performance-optimization (last visited December 2024); *Response Content Transformation*, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/edgeworkers/docs/transform-response-content (last visited December 2024).

144. The '167 Patent is well-known within the industry as demonstrated by multiple citations to the '167 Patent in published patents and patent applications assigned to technology companies and academic institutions. Akamai is utilizing the technology claimed in the '167 Patent without paying a reasonable royalty. Akamai is infringing the '167 Patent in a manner best described as willful, wanton, malicious, in bad faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate.

145. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '167 Patent.

146. As a result of Akamai's infringement of the '167 Patent, Plaintiff has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Akamai's infringement, but in no event less than a reasonable royalty for the use made of the invention by Akamai together with interest and costs as fixed by the Court.

COUNT IV
INFRINGEMENT OF U.S. PATENT NO. 10,412,388

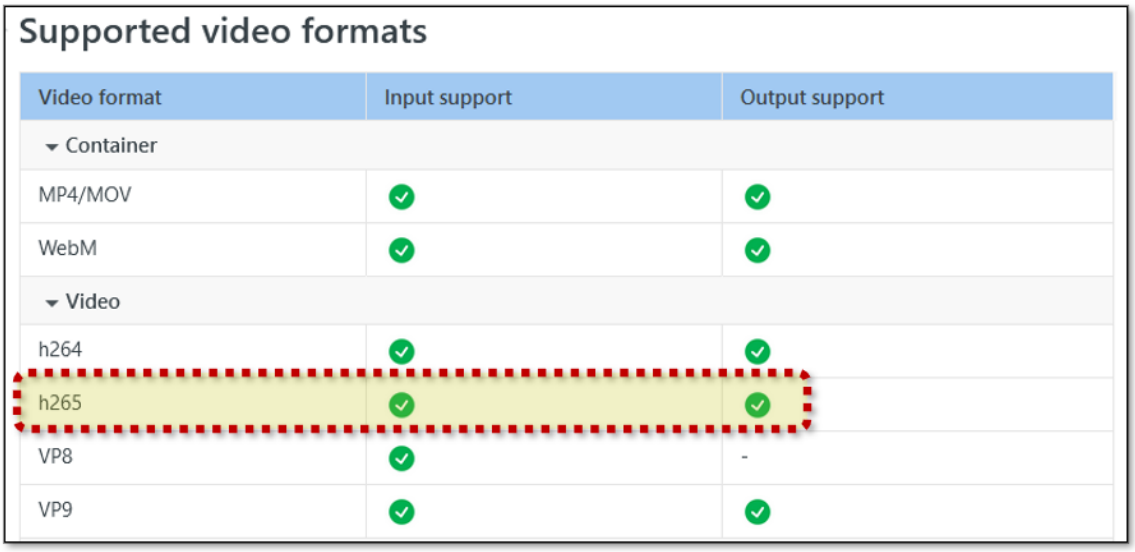
147. Plaintiff references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

148. Akamai designs, makes, uses, sells, and/or offers for sale in the United States products comprising technology for video compression using adaptive re-quantization using extracted and derived quantization parameters.

149. Akamai designs, makes, sells, offers to sell, imports, and/or uses Akamai Products and Services that perform H.265 video encoding, including at least the following: Akamai Connected Cloud (including GPU Compute Instances, NETINT Hosted VPUs, and Bitmovin's VOD Encoder); Akamai Media Services Live; and Akamai Image & Video Manager (collectively, the "Akamai '388 Product(s)").

150. Akamai designs, makes, sells, offers to sell, imports, and/or uses Akamai '388 products that comply with the H.265 video encoding standard.

151. The Akamai '388 Products perform video processing compliant with the High Efficiency Video Coding (HEVC) standard, which is also often referred to as the H.265 standard. For example, Akamai's Image & Video Manager supports encoding and transcoding data in compliance with the H.265 standard as shown in the below excerpt from Akamai's documentation.



Akamai Image and Video Manager - Supported Image and Video Formats, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/ivm/docs/supported-image-and-video-formats (last visited December 2024) (annotation added).

152. One or more Akamai subsidiaries and/or affiliates use the Akamai '388 Products in regular business operations.

153. The Akamai '388 Products identify an initial quantization parameter employed to compress a previously decoded frame.

154. The Akamai '388 Products, as part of the encoding process use an initial quantization parameter (QP) for encoding each frame or coding unit (CU). In conforming to the HEVC standard, the Akamai '388 Products must set an initial QP value that serves as the baseline for encoding the decoded frame.

155. The Akamai '388 Products calculate a delta quantization parameter as influenced by the initial quantization parameter, where the function is designed to yield this delta parameter at least in part to achieve a bitrate reduction while sustaining a given quality threshold.

156. The Akamai '388 Products calculate a delta QP based on the initial quantization parameter. This function aims to minimize bitrate while retaining the required video quality.

157. The Akamai '388 Products ascertain a subsequent quantization parameter for the purpose of compressing the decoded frame, based on both the initial and delta quantization parameters.

158. The Akamai '388 Products determine a second quantization parameter using the initial QP and the delta QP. The Akamai '388 Products calculate the second quantization parameter as QP1 + Delta QP. This second quantization parameter is the one used for encoding either the entire frame or specific coding units within the frame.

159. The Akamai '388 Products compress the decoded frame utilizing the second quantization parameter.

160. The Akamai '388 Products encode the video frames using the newly derived second quantization parameter.

161. By complying with the HEVC standard, the Akamai '388 Products necessarily infringe the '388 Patent. Mandatory sections of the HEVC standard require the elements required by certain claims of the '388 Patent, including but not limited to claim 1. High Efficiency Video Coding, Series H: Audiovisual And Multimedia Systems: Infrastructure Of Audiovisual Services – Coding Of Moving Video Rec. ITU-T H.265 (August 2021). The following sections of the HEVC Standard are relevant to Akamai's infringement of the '388 Patent: "7.3.2.2.3 Sequence parameter set screen content coding extension syntax;" "7.3.8.4 Coding quadtree syntax;"

"7.3.8.14 Delta QP syntax;" "7.4.3.3.1 General picture parameter set RBSP semantics;" "7.4.7.1 General slice segment header semantics;" "7.4.9.14 Delta QP semantics;" "8.6.1 Derivation process for quantization parameters;" and "9.3.3.10 Binarization process for cu_qp_delta_abs."

162. All implementations of the HEVC standard necessarily infringe the '388 patent as every implementation of the standard requires compliant devices to carry out the following: Each frame or coding unit (CU) is encoded using a pre-defined initial Quantization Parameter (QP) which serves as a baseline for various optimizations. The standard mandates that a first QP (QP1) be identified before any encoding can occur. The Akamai '388 Products are, therefore, required to have mechanisms to set this initial QP1 for the to-be-encoded (or re-encoded) frame. Further, the HEVC standard sets out a structured way to adjust this initial QP based on a delta value. The objective of introducing a delta QP is generally to adapt to the complexity variations within a video sequence and to optimize rate-distortion performance. The HEVC encoding standard sets forth calculating a new QP (QP2) after determining the delta QP. This is done by adding the initial QP (QP1) and the delta QP. This step is essential for maintaining granular control over the rate-distortion tradeoff during encoding. Finally, the final encoding of the frame or CU takes place using QP2. The HEVC standard specifies that this is a requisite step for the encoding process to be considered compliant. The Akamai '388 Products must, therefore, encode frames using this newly computed QP2 to meet the standard's rate and quality stipulations.

163. Akamai has directly infringed and continues to directly infringe the '388 Patent by, among other things, making, using, offering for sale, and/or selling technology for video compression using adaptive re-quantization using extracted and derived quantization parameters, including but not limited to the Akamai '388 Products.

164. The Akamai '388 Products are available to businesses and individuals throughout the United States.

165. The Akamai '388 Products are provided to businesses and individuals located in this District.

166. By making, using, testing, offering for sale, and/or selling products and services comprising technology for video compression using adaptive re-quantization using extracted and derived quantization parameters, including but not limited to the Akamai '388 Products, Akamai has injured Plaintiff and is liable to Plaintiff for directly infringing one or more claims of the '388 patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

167. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '388 Patent.

168. As a result of Akamai's infringement of the '388 Patent, Plaintiff has suffered monetary damages, and seek recovery in an amount adequate to compensate for Akamai's infringement, but in no event less than a reasonable royalty for the use made of the invention by Akamai together with interest and costs as fixed by the Court.

COUNT V
INFRINGEMENT OF U.S. PATENT NO. 9,894,361

169. Plaintiff references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

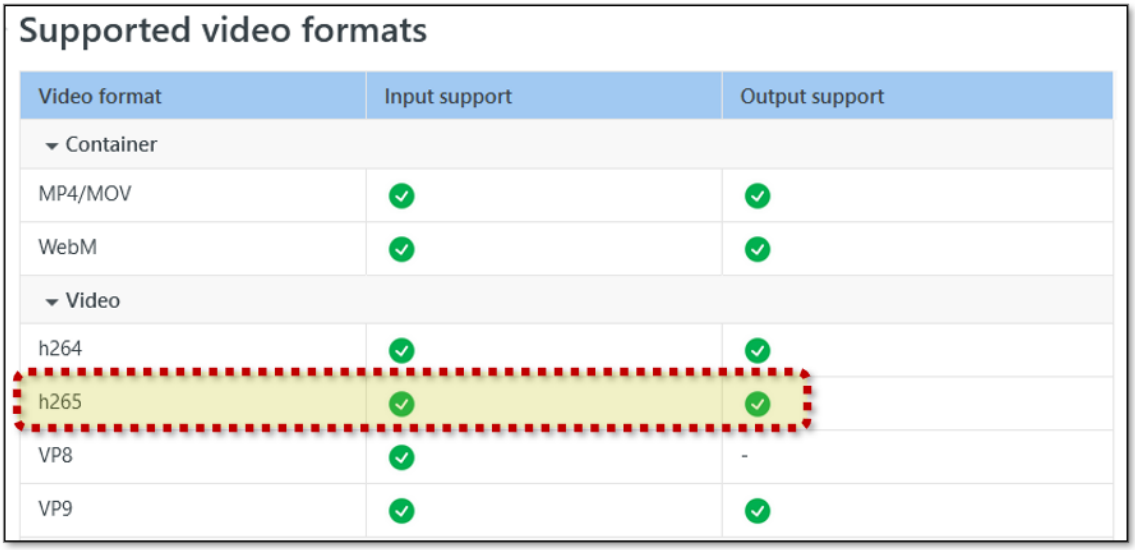
170. Akamai designs, makes, uses, sells, and/or offers for sale in the United States products containing technology for quality-aware video optimization.

171. Akamai designs, makes, sells, offers to sell, imports, and/or uses Akamai Products and Services that perform H.265 video encoding, including at least the following: Akamai Connected Cloud (including GPU Compute Instances, NETINT Hosted VPUs, and Bitmovin's

VOD Encoder); Akamai Media Services Live; and Akamai Image & Video Manager (collectively, the "Akamai '361 Product(s)").

172. Akamai designs, makes, sells, offers to sell, imports, and/or uses Akamai '361 Products that comply with the H.265 video encoding standard.

173. The Akamai '361 Products perform video processing compliant with the High Efficiency Video Coding (HEVC) standard, which is also often referred to as the H.265 standard. For example, Akamai's Image & Video Manager supports encoding and transcoding data in compliance with the H.265 standard as shown in the below excerpt from Akamai's documentation.



Supported video formats

Video format	Input support	Output support
▾ Container		
MP4/MOV	✓	✓
WebM	✓	✓
▾ Video		
h264	✓	✓
h265	✓	✓
VP8	✓	-
VP9	✓	✓

Akamai Image and Video Manager - Supported Image and Video Formats, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/ivm/docs/supported-image-and-video-formats (last visited December 2024) (annotation added).

174. One or more Akamai subsidiaries and/or affiliates use the Akamai '361 Products in regular business operations.

175. The Akamai '361 Products unpack a compressed video frame from a series containing multiple video frames.

176. The Akamai '361 Products take an encoded video frame as input. This frame is one in a series that consists of multiple frames. The encoded frame is then passed through a decoding pipeline by the Akamai '361 Products. The Akamai '361 Products use inverse quantization and inverse DCT (Discrete Cosine Transform) functions, to revert the video data to a decompressed state suitable for further manipulation.

177. The Akamai '361 Products obtain an initial Quantization Parameter (QP) from the unpacked video frame, where this initial QP is indicative of the quantization configurations initially applied to compress the video frame.

178. The Akamai '361 Products extract a first Quantization Parameter (QP) from the video frame metadata or from the bitstream itself. This first QP reflects the quantization settings initially applied during the original encoding. This first QP is read from the slice header or similar control structures and used to modulate the quantization matrices in the decoding process.

179. The Akamai '361 Products calculate a delta QP influenced by the initial QP.

180. Upon acquiring the first QP, a delta QP is calculated by the Akamai '361 Products. This delta QP value is computed through a set of heuristic functions to optimize for certain objectives like bitrate reduction, video quality, or computational efficiency. The delta QP acquired by the Akamai '361 Products is a function of the first QP and other parameters, such as frame type (I-frame, P-frame, etc.).

181. The Akamai '361 Products derive an inflation factor through comparing the total byte size of video frames after and before decompression, where both the newly received compressed frame and those previously decompressed belong to the same series of multiple video frames.

182. The Akamai '361 Products compute an inflation adjustment factor based on the total byte size of previously decompressed frames and those frames post-compression. This comparison aids in estimating the compression efficiency.

183. The Akamai '361 Products acquire a subsequent QP influenced by both the delta QP and the inflation factor, wherein this subsequent QP is indicative of the quantization configurations to be applied for recompressing the unpacked frame.

184. The second QP is then acquired by the Akamai '361 Products by combining the calculated delta QP and the inflation adjustment. This second quantization parameter acquired by the Akamai '361 Products aims to balance the trade-offs between quality and bitrate, taking into account the information gleaned from previous frames as indicated by the inflation adjustment.

185. The Akamai '361 Products compress the unpacked video frame utilizing the subsequent QP.

186. The decompressed video frame is re-encoded based on the second QP by the Akamai '361 Products. The frame is then serialized into a bitstream and packaged with appropriate headers and metadata for transmission.

187. Akamai has directly infringed and continues to directly infringe the '361 patent by, among other things, making, using, offering for sale, and/or selling technology for quality-aware video optimization, including but not limited to the Akamai '361 Products.

188. The Akamai '361 Products are available to businesses and individuals throughout the United States.

189. The Akamai '361 Products are provided to businesses and individuals located in this District.

190. By making, using, testing, offering for sale, and/or selling products and services comprising technology for quality-aware video optimization, including but not limited to the Akamai '361 Products, Akamai has injured Plaintiff and is liable to Plaintiff for directly infringing one or more claims of the '361 Patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

191. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '361 Patent.

192. As a result of Akamai's infringement of the '361 Patent, Plaintiff has suffered monetary damages, and seek recovery in an amount adequate to compensate for Akamai's infringement, but in no event less than a reasonable royalty for the use made of the invention by Akamai together with interest and costs as fixed by the Court.

COUNT VI
INFRINGEMENT OF U.S. PATENT NO. 9,936,040

193. Plaintiff references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

194. Akamai designs, makes, uses, sells, and/or offers for sale in the United States products for caching and keying segments for efficient data retrieval.

195. Akamai designs, makes, sells, offers to sell, imports, and/or uses Akamai Products and Services, including the Akamai Content Delivery Network, that include the following functionality: Akamai Object Delivery, Akamai Download Delivery, Akamai Adaptive Media Delivery, and Property Manager API (collectively, the "Akamai '040 Product(s)").

196. One or more Akamai subsidiaries and/or affiliates use the Akamai '040 Products in regular business operations.

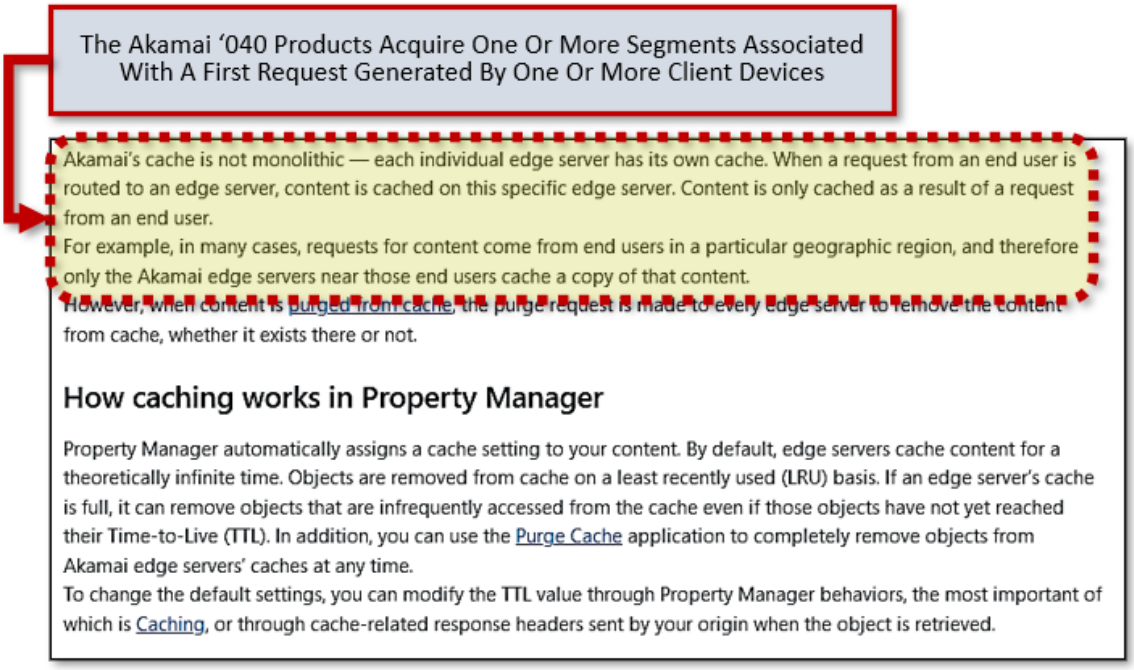
197. The Akamai '040 Products generate a cache key based on aspects of the request that uniquely identify the requested content, such as the request URI, headers, or query parameters.

The Akamai ‘040 Products allows for the customization of cache keys through its configuration directives, enabling precise control over how content is cached and retrieved.

198. The Akamai ‘040 Products generate a unique cache key for each slice of the content. This allows the Akamai ‘040 Products to differentiate between the slices of a large file in the cache.

199. The Akamai ‘040 Products append information about the slice range to the cache key, ensuring that each slice is uniquely identifiable.

200. The Akamai ‘040 Products generate a first set entry that includes a first set key for the one or more segments associated with the first request. Specifically, the Akamai ‘040 Products acquire segments in response to client device requests. Akamai’s documentation states that “Content is only cached as a result of a request from an end user.” According to Akamai’s documentation, when a client device sends a request for a piece of content (such as a video segment), the Akamai edge server receiving that request checks its local cache. If the requested segments aren’t present, the server acquires the segment by making an origin fetch—i.e., it retrieves the content from the original content server or another upstream source.



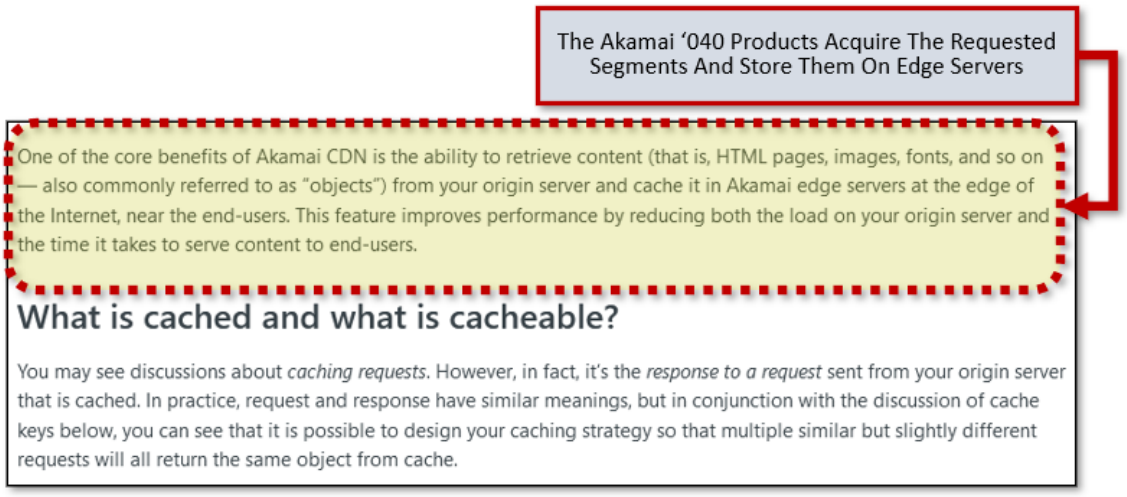
Learn About Akamai's Caching – Akamai Property Manager Guide, AKAMAI TECHDOCS WEBSITE, *available at*: https://techdocs.akamai.com/property-mgr/docs/know-caching (last visited December 2024) (annotation added).

201. The Akamai '040 Products perform the step of acquiring one or more segments related to an initial request, which originates from one or multiple client devices.

202. The Akamai '040 Products perform the step of acquiring one or more segments associated with a first request through HTTP requests. When a client device initiates a request for content, the Akamai '040 Products, acting as a reverse proxy or direct web server, receive this request. The Akamai '040 Products then processes the request according to the configured rules and directives. If the content is not locally available or is designated to be fetched from a backend server, the Akamai '040 Products establish a connection to the appropriate backend server(s) to retrieve the requested segments of data.

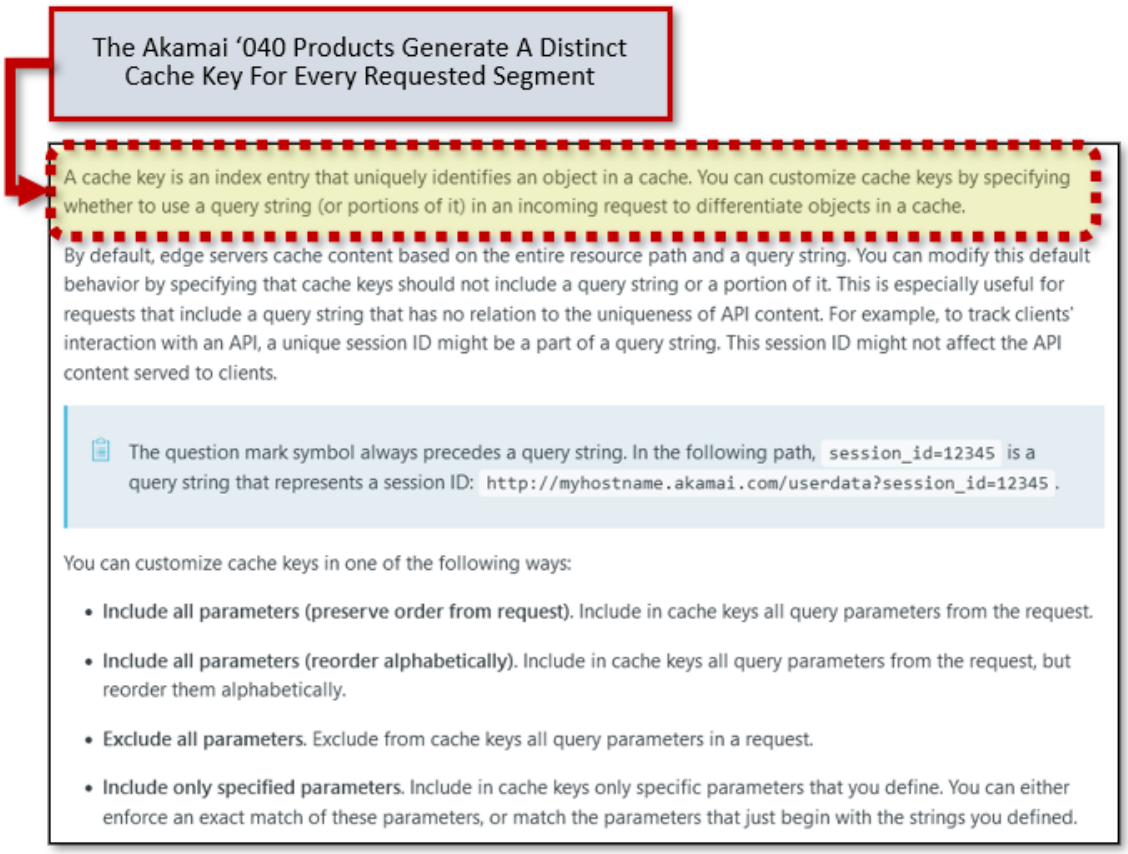
203. The Akamai '040 Products store the acquired segments related to the initial request on a cache server. Specifically, when a client device's first request for a piece of content (e.g., a media segment) arrives, the Akamai edge server first attempts to serve it from its local cache. If

it is not found locally, the server fetches the segment from the origin and then stores it in its cache. This stored segment can then be served in response to subsequent requests.



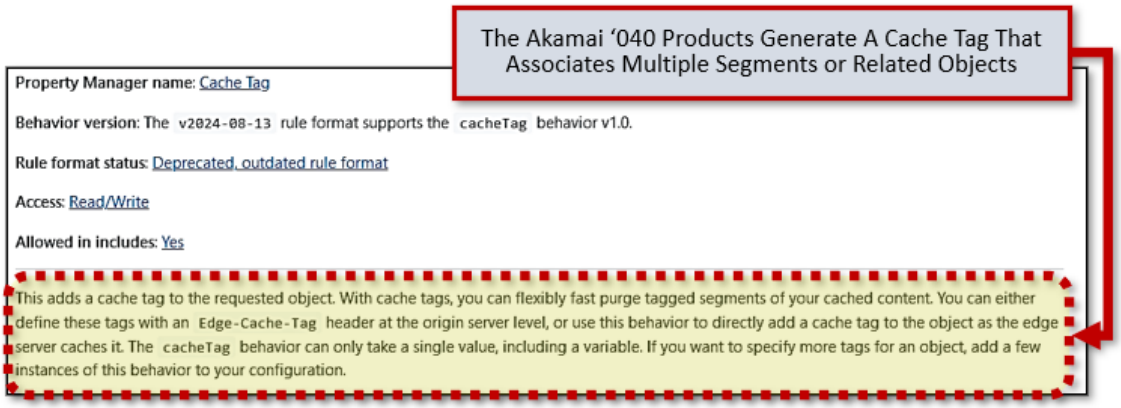
Learn About Akamai's Caching – Akamai Property Manager Guide, AKAMAI TECHDOCS WEBSITE, *available at*: https://techdocs.akamai.com/property-mgr/docs/know-caching (last visited December 2024) (annotation added).

204. The Akamai '040 Products generate a key for each segment of the one or more segments associated with the first request. Specifically, the Akamai '040 Products generate cache keys by incorporating various request attributes such as URLs, query parameters, headers, and cookies. Each segment requested by a client device is associated by the Akamai '040 Products with a cash key. Because each segment's cache key is derived from properties of the incoming request and the segment's own metadata (including its URL and any controlling parameters), the Akamai '040 Products generate a distinct cache key for every requested segment.



Caching – Akamai API Definitions, AKAMAI TECHDOCS WEBSITE, *available at*: https://techdocs.akamai.com/api-definitions/docs/caching (last visited December 2024) (annotation added).

205. The Akamai '040 Products produce an initial set entry that encompasses a primary set key for the one or more segments tied to the initial request. Specifically, the Akamai '040 Products group of multiple related segments (e.g., segments of a video file or adaptive bitrate streaming segments) under a common identifier that can be managed collectively. By assigning a cache tag—or a similarly structured identifying key— the Akamai '040 Products create a logical "set" of these segments. This set entry is used by the Akamai '040 Products to purge or update all associated segments at once. The Akamai '040 Products cache tagging and variable-based cache key manipulation—where multiple segments or related objects are associated with a single tag or key—generate a first set entry that includes a first set key for one or segments associated with a first request.



cacheTag – Akamai Property Manager API, AKAMAI TECHDOCS WEBSITE, *available at*: https://techdocs.akamai.com/property-mgr/reference/deprecated-cache-tag (last visited December 2024) (annotation added).

206. Akamai has directly infringed and continues to directly infringe the '040 Patent by, among other things, making, using, offering for sale, and/or selling technology for caching and keying segments for efficient data retrieval, including but not limited to the Akamai '040 Products.

207. The Akamai '040 Products are available to businesses and individuals throughout the United States.

208. The Akamai '040 Products are provided to businesses and individuals located in this District.

209. By making, using, testing, offering for sale, and/or selling products and services for caching and keying segments for efficient data retrieval, including but not limited to the Akamai '040 Products, Akamai has injured Plaintiff and is liable to Plaintiff for directly infringing one or more claims of the '040 Patent, including at least claim 14 pursuant to 35 U.S.C. § 271(a).

210. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '040 Patent.

211. As a result of Akamai's infringement of the '040 Patent, Plaintiff has suffered monetary damages, and seeks recovery in an amount adequate to compensate for Akamai's

infringement, but in no event less than a reasonable royalty for the use made of the invention by Akamai together with interest and costs as fixed by the Court.

COUNT VII
INFRINGEMENT OF U.S. PATENT NO. 9,167,021

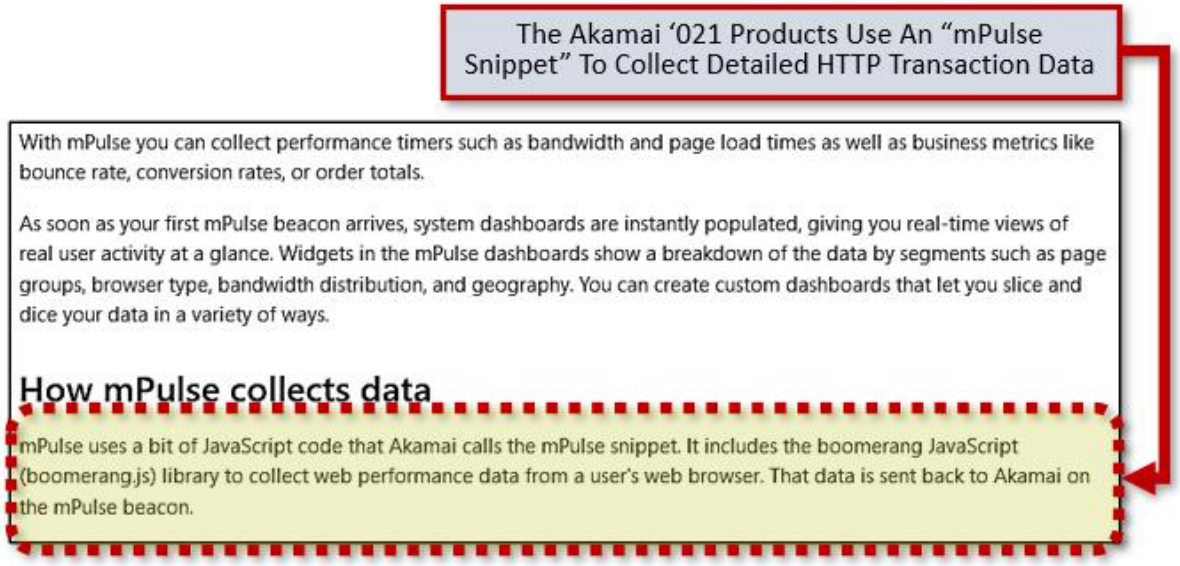
212. Plaintiff references and incorporates by reference the preceding paragraphs of this Complaint as if fully set forth herein.

213. Akamai designs, makes, uses, sells, and/or offers for sale in the United States products comprising technology for HTTP transaction analysis for web browsing session segmentation.

214. Akamai designs, makes, sells, offers to sell, imports, and/or uses Akamai mPulse (the "Akamai '021 Product(s)").

215. One or more Akamai subsidiaries and/or affiliates use the Akamai '021 Products in regular business operations.

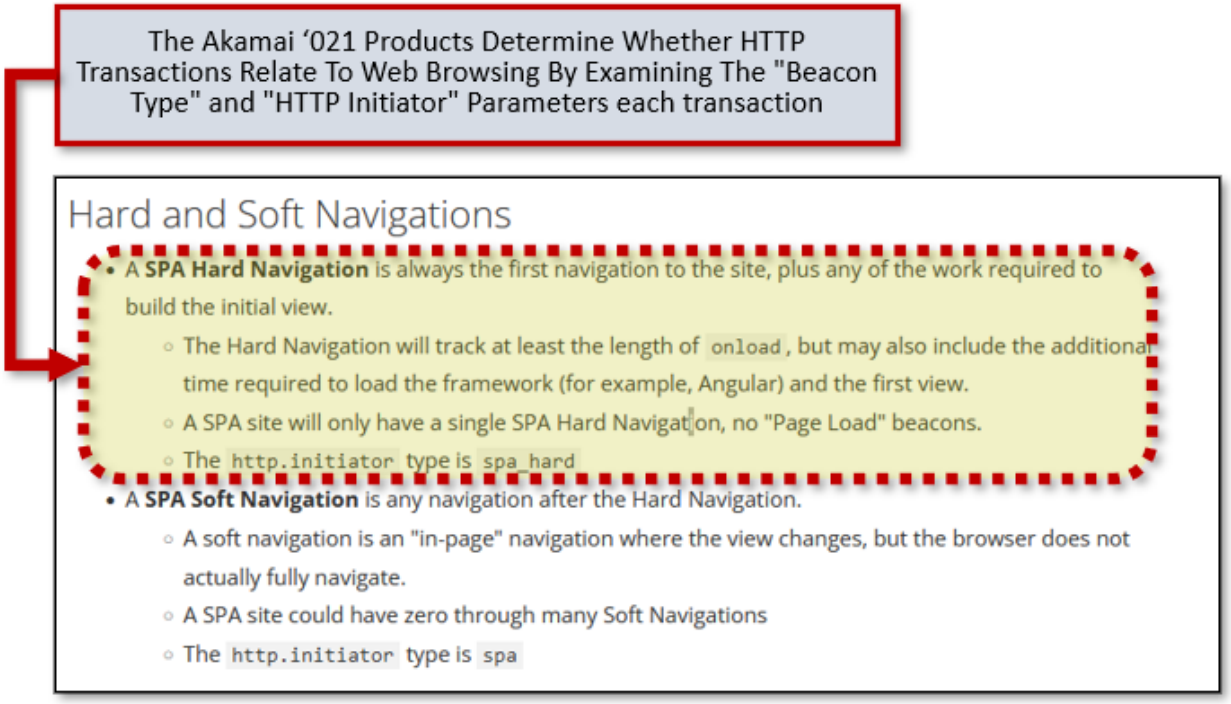
216. The Akamai '021 Products capture an ongoing Hypertext Transfer Protocol (HTTP) interaction. Specifically, the Akamai '021 Products acquire current HTTP transactions through a beaconing system. When a visitor requests a page, the Akamai '021 Products JavaScript snippet (called the "mPulse snippet") is injected by the Akamai edge server or placed directly on the page at the origin. This snippet collects detailed HTTP transaction data including request/response headers, timing information, URL details, HTTP methods used, and other transaction parameters. The data is then sent back to the Akamai '021 Product collectors via "beacons" - special HTTP requests that contain all the captured transaction information.



How mPulse Works – Akamai mPulse Guide, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/mpulse/docs/how-mpulse-works (last visited December 2024) (annotation added).

217. The Akamai '021 Products ascertain if the active HTTP interaction is associated with web browsing. Specifically, the Akamai '021 Products determine whether HTTP transactions relate to web browsing by examining the "Beacon Type" and "HTTP initiator" parameters that are captured with each transaction. Specifically, the Akamai '021 Products classify transactions into distinct categories: page views (regular web browsing), Single Page App (SPA) navigations (both "hard" initial page loads and "soft" in-page transitions), XHR/AJAX requests, and error events. This classification is captured in the beacon data through parameters like "http.initiator" which explicitly identifies if a request originated from normal web browsing ("spa", "spa_hard") versus background API calls ("xhr"). Additionally, Akamai '021 Products examine the URL patterns, page domains, and navigation types (navigate, reload, back/forward) to determine if the transaction represents actual web browsing activity versus other types of HTTP requests. The Akamai '021 Products track the "vis.st" (visibility state) parameter to understand if pages are being actively viewed by users, and uses "mob.ct" (mobile connection type) along with device/browser

information to provide context about the browsing environment. Together, these signals allow the Akamai '021 Products to identify and categorize transactions that represent true web browsing activity.

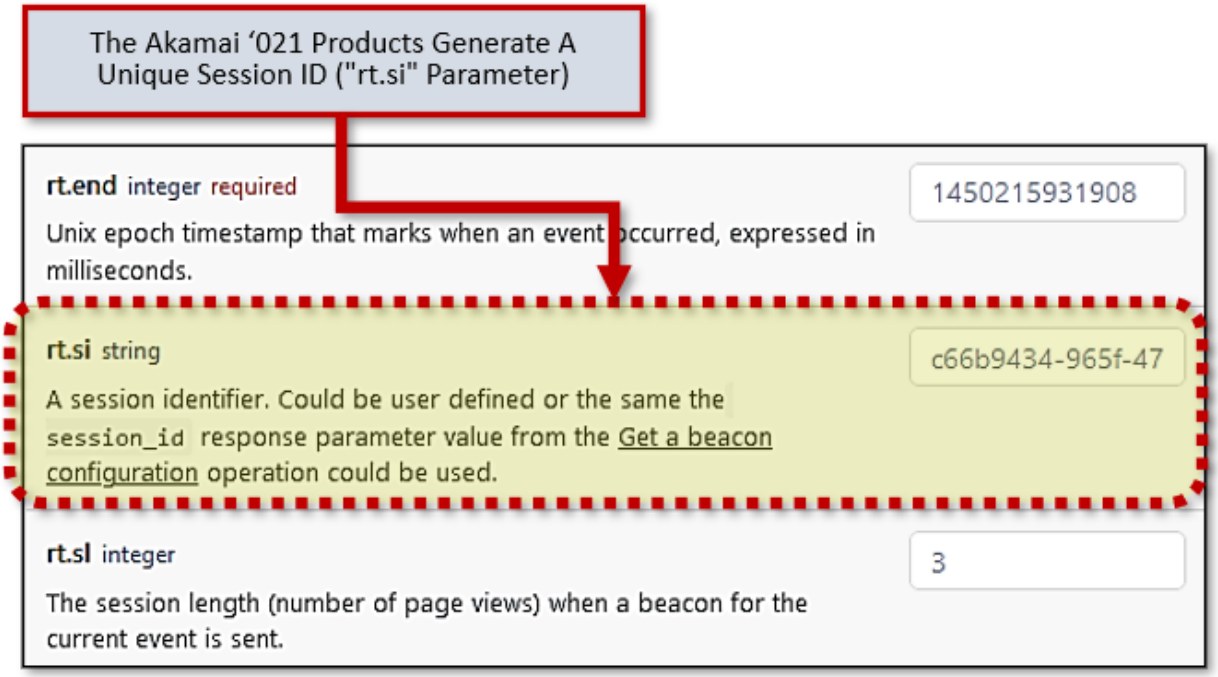


mPulse OSS Boomerang Class, AKAMAI GITHUB REPOSITORY, *available at*: https://akamai.github.io/boomerang/oss/BOOMR.plugins.SPA.html (last visited December 2024) (annotation added).

218. The Akamai '021 Products analyze the "User-Agent" string within HTTP headers to distinguish between various types of HTTP traffic. This includes differentiating between actual web browsers and, for example, API requests or bots.

219. The Akamai '021 Products retrieve a historical set of transactions for a designated client. Specifically, the Akamai '021 Products maintain previous transaction sets for clients through its session tracking and cookie-based system. For each client, the Akamai '021 Products generate a unique session ID ("rt.si" parameter) and records both the session start time ("rt.ss") and latest session timestamp ("rt.end") to maintain the sequence of transactions. The Akamai '021 Products use cookies to persist this session information across page views and domains, with the

Akamai '021 Products cross-domain session tracking capability allowing it to maintain a coherent transaction history even as users move between different subdomains or related sites. In addition, the Akamai '021 Products store previous page/referrer information through parameters like "r" (cookie referrer) and "r2" (current referrer). Each transaction is associated with the session ID, allowing the Akamai '021 Products to build a complete set of previous transactions for each client. For cross-domain tracking, the Akamai '021 Products use a special HTML iframe-based approach where an HTML file is hosted either on the origin server or via Akamai's Property Manager to maintain session continuity and ensure all previous transactions remain associated with the correct client.



mPulse API – Send A Beacon, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/mpulse/reference/post-beacons (last visited December 2024) (annotation added).

220. The Akamai '021 Products employ browser cookies, LocalStorage, and server-side session IDs to store and fetch a historical set of transactions specific to a client.

221. The Akamai '021 Products assess if the active HTTP interaction is related to the archived set of transactions for that client.

222. The Akamai '021 Products employ sequence pattern recognition to understand whether a current HTTP transaction logically fits within a set of prior transactions. Specifically, the Akamai '021 Products evaluate whether a current HTTP transaction belongs with the previous transaction set using session analysis and page grouping. The Akamai '021 Products use the session ID ("rt.si" parameter) as a correlation mechanism - if a new transaction shares the same session ID as previous transactions and falls within the session timeframe (tracked via "rt.ss" session start and "rt.end" session latest timestamps), the Akamai '021 Products consider it part of the same transaction set. This evaluation is enhanced by the Akamai '021 Products' page group functionality, which uses URL patterns, JavaScript variables, and other configurable rules to determine if transactions logically belong together as part of the same user flow. In addition, the Akamai '021 Products evaluate transaction relationships by analyzing navigation types and timing. Through parameters like "nt_nav_type" (navigation type) and the beacon type classification (page view, SPA navigation, XHR), the Akamai '021 Products can determine if a new transaction represents a continuation of the current browsing session versus a new independent session. For Single Page Applications (SPAs), the Akamai '021 Products specifically tracks route changes via "spa.t_click" and evaluate whether a navigation represents a "soft" transition within the same transaction set or a "hard" navigation that could indicate a new set.

223. The Akamai '021 Products, upon confirming the active HTTP interaction's relation to the historical set, incorporate the current interaction into that set.

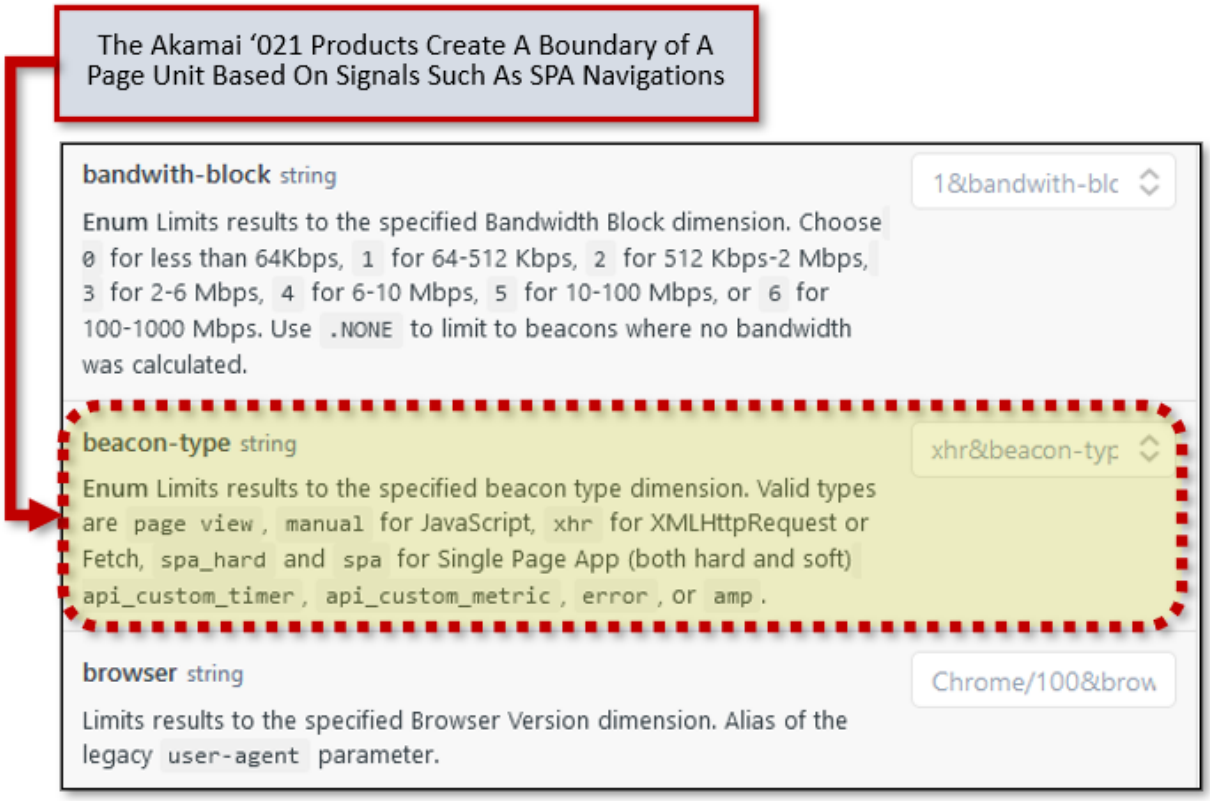
224. Upon determining that a transaction is related to the prior set, the Akamai '021 Products update their data structures to include the new transaction as a part of the existing set.

This involves manipulating data objects that contain HTTP transactions as properties or list elements. Specifically, if the Akamai '021 Products determine that a current HTTP transaction belongs with the previous set, the Akamai '021 Products add it to that set through its session management system. The Akamai '021 Products maintain the session state through the unique session ID ("rt.si") and updates the "rt.end" (session latest) timestamp to incorporate the new transaction. For each transaction that belongs to the existing session, the Akamai '021 Products collect detailed beacon data including timing, navigation, and page load information, and associates this data with the ongoing session through the shared session ID. In addition, the Akamai '021 Products use page grouping functionality to aggregate related transactions. When a new transaction matches the page group rules defined for an existing transaction set (whether through URL patterns, JavaScript variables, or other configured criteria), the Akamai '021 Products add it to that group's metrics and analytics. For Single Page Applications, the Akamai '021 Products group related "soft" navigations together under the same session context, maintaining the relationship between these connected transactions.

225. When the active HTTP interaction is deemed unrelated to the historical transaction set, the Akamai '021 Products delineate a page unit comprising the archived HTTP interactions for the purpose of calculating page unit time.

226. In cases where a transaction is evaluated as not belonging to the current set, a 'page boundary' is created by the Akamai '021 Products. Specifically, if the Akamai '021 Products determine that a current HTTP transaction does not belong with the previous set, the Akamai '021 Products create page unit boundaries session and page group boundary detection functionality. The Akamai '021 Products recognize several key signals that indicate a page unit boundary should be created: new session IDs being generated, "hard" SPA navigations (versus "soft" transitions),

unload events between pages ("t_other" parameter for custom events), and navigation timing boundaries. When these boundaries are detected, the Akamai '021 Products complete the timing calculations for the previous page unit before starting metrics collection for the new transaction. For the previous page unit's timing calculations, the Akamai '021 Products use timing data to compute metrics like back-end time (from navigation start to response start), front-end time (from response start to load event end), and total page load time. In addition, the Akamai '021 Products collect detailed timing data through parameters like "t_done" (page load), "t_resp" (back-end time), "t_page" (front-end time), along with navigation timing markers that establish precise boundaries for performance calculations.



Pulse API – Get Timers And Metrics, AKAMAI TECHDOCS, *available at*: https://techdocs.akamai.com/mpulse/reference/get-timers-metrics (last visited December 2024) (annotation added).

227. Akamai has directly infringed and continues to directly infringe the ‘021 Patent by, among other things, making, using, offering for sale, and/or selling technology comprising HTTP transaction analysis for web browsing session segmentation, including but not limited to the Akamai ‘021 Products.

228. The Akamai ‘021 Products are available to businesses and individuals throughout the United States.

229. The Akamai ‘021 Products are provided to businesses and individuals located in this District.

230. By making, using, testing, offering for sale, and/or selling products and services comprising technology for HTTP transaction analysis for web browsing session segmentation, including but not limited to the Akamai ‘021 Products, Akamai has injured Plaintiff and is liable to Plaintiff for directly infringing one or more claims of the ‘021 Patent, including at least claim 1 pursuant to 35 U.S.C. § 271(a).

231. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the ‘021 Patent.

232. As a result of Akamai’s infringement of the ‘021 Patent, Plaintiff has suffered monetary damages, and seek recovery in an amount adequate to compensate for Akamai’s infringement, but in no event less than a reasonable royalty for the use made of the invention by Akamai together with interest and costs as fixed by the Court.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff OptiMorphix, Inc. respectfully requests that this Court enter:

A. A judgment in favor of Plaintiff that Akamai has infringed, either literally and/or under the doctrine of equivalents, the '273, '559, '167, '388, '361, '040, and '021 Patents;

B. An award of damages resulting from Akamai's acts of infringement in accordance with 35 U.S.C. § 284;

C. A judgment and order finding that Akamai's infringement of the '167 Patent was willful, wanton, malicious, bad-faith, deliberate, consciously wrongful, flagrant, or characteristic of a pirate within the meaning of 35 U.S.C. § 284 and awarding to Plaintiff enhanced damages;

D. A judgment and order finding that this is an exceptional case within the meaning of 35 U.S.C. § 285 and awarding to Plaintiff reasonable attorneys' fees against Akamai;

E. Any and all other relief to which Plaintiff may show themselves to be entitled.

JURY TRIAL DEMANDED

Pursuant to Rule 38 of the Federal Rules of Civil Procedure, Plaintiff OptiMorphix, Inc. requests a trial by jury of any issues so triable by right.

Dated: December 6, 2024

BAYARD, P.A.

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