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12 UNITED STATES DISTRICT COURT
 13 NORTHERN DISTRICT OF CALIFORNIA
 14 SAN JOSE DIVISION

15 IN RE PERSONALWEB TECHNOLOGIES,
 16 LLC, ET AL., PATENT LITIGATION

CASE NO.: 5:18-md-02834-BLF

FIRST AMENDED COMPLAINT

DEMAND FOR JURY TRIAL

19 PERSONALWEB TECHNOLOGIES, LLC, a
 20 Texas limited liability company, and
 LEVEL 3 COMMUNICATIONS, LLC, a
 21 Delaware limited liability company,

Case No.: 5:18-cv-05201-BLF

22 Plaintiffs,

23 v.

24 NRT LLC, a Delaware limited liability
 company, and NRT NEW YORK LLC, a
 25 Delaware limited liability company d/b/a Citi
 Habitats,

26 Defendant.
 27
 28

1 Plaintiff PersonalWeb Technologies, LLC (“Plaintiff” or “PersonalWeb”) files this First Amended
2 Complaint (“Complaint”) for patent infringement against Defendants NRT LLC, a Delaware limited
3 liability company, and NRT New York LLC, a Delaware limited liability company d/b/a Citi Habitats.
4 (collectively, “Defendant”). Plaintiff PersonalWeb Technologies, LLC alleges:

5
6 **PRELIMINARY STATEMENT**

7 1. PersonalWeb and Level 3 Communications, LLC (“Level 3”) are parties to an
8 agreement between Kinetech, Inc. and Digital Island, Inc. dated September 1, 2000 (the “Agreement”).
9 Pursuant to the Agreement, PersonalWeb and Level 3 each own a fifty percent (50%) undivided
10 interest in and to the patents at issue in this action: U.S. Patent Nos. 6,928,442, 7,802,310, 7,945,544,
11 and 8,099,420 (“Patents-in-Suit”). Level 3 has joined in this Complaint pursuant to its contractual
12 obligations under the Agreement, at the request of PersonalWeb.

13 2. Pursuant to the Agreement, Level 3 has, among other rights, certain defined rights to
14 use, practice, license, sublicense and enforce and/or litigate the Patents-in-Suit in connection with a
15 particular field of use (“Level 3 Exclusive Field”). Pursuant to the Agreement PersonalWeb has,
16 among other rights, certain defined rights to use, practice, license, sublicense, enforce and/or litigate
17 the Patents-in-Suit in fields other than the Level 3 Exclusive Field (the “PersonalWeb Patent Field”).

18 3. All infringement allegations, statements describing PersonalWeb, statements
19 describing any Defendant (or any Defendant’s products) and any statements made regarding
20 jurisdiction and venue are made by PersonalWeb alone, and not by Level 3. PersonalWeb alleges that
21 the infringements at issue in this case all occur within, and are limited to, the PersonalWeb Patent
22 Field. Accordingly, PersonalWeb has not provided notice to Level 3—under Section 6.4.1 of the
23 Agreement or otherwise—that PersonalWeb desires to bring suit in the Level 3 Exclusive Field in its
24 own name on its own behalf or that PersonalWeb knows or suspects that Defendant is infringing or
25 has infringed any of Level 3’s rights in the patents.

THE PARTIES

1
2 4. Plaintiff PersonalWeb Technologies, LLC is a limited liability company duly organized
3 and existing under the laws of Texas with its principal place of business at 112 E. Line Street, Suite
4 204, Tyler, TX 75702.

5 5. Plaintiff Level 3 Communications, LLC is a limited liability company organized under
6 the laws of Delaware with its principal place of business at 100 CenturyLink Drive, Monroe,
7 Louisiana, 71203.

8 6. PersonalWeb’s infringement claims asserted in this case are asserted by PersonalWeb
9 and all fall outside the Level 3 Exclusive Field. Level 3 is currently not asserting patent infringement
10 in this case in the Level 3 Exclusive Field against any Defendant.

11 7. Defendant NRT LLC is, upon information and belief, a Delaware limited liability
12 company having a principal place of business or regular and established place of business at 175 Park
13 Avenue, Madison, New Jersey 07940.

14 8. Defendant NRT New York LLC is, upon information and belief, a Delaware limited
15 liability company having a principal place of business or regular and established place of business at
16 387 Park Avenue South, 4th Floor, New York, New York 10016.

17
18 **JURISDICTION AND VENUE**

19 9. The court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a)
20 because this action arises under the patent laws of the United States, 35 U.S.C. § 1 *et seq.*

21 10. Venue is proper in this federal district pursuant to 28 U.S.C. §§ 1391(b)–(c) and
22 1400(b) because on information and belief, Defendant NRT LLC and Defendant NRT New York LLC
23 d/b/a Citi Habitats were each formed in the State of Delaware and thus both reside in this District.

24 11. Venue is also proper in this Court because this action has been transferred to this
25 District by the Judicial Panel on Multidistrict Litigation for consolidated pretrial proceedings pursuant
26 to 28 U.S.C. § 1407.

27 12. This court has personal jurisdiction over Defendants NRT LLC and NRT New York
28 LLC d/b/a Citi Habitats because, in addition to the allegations in above paragraphs, on information

1 and belief, Defendants NRT LLC and NRT New York LLC are both domiciled in this District, being
2 incorporated in the State of Delaware. Further, on information and belief, Defendant purposefully
3 directed activities at residents of Delaware, the claims herein arise out of and relate to those activities,
4 and assertion of personal jurisdiction over Defendant would be fair.

5 13. On information and belief, Defendant is subject to this Court's jurisdiction because this
6 action has been transferred to this District by the Judicial Panel on Multidistrict Litigation for
7 consolidated pretrial proceedings pursuant to 28 U.S.C. § 1407.

8
9 **PERSONALWEB BACKGROUND**

10 14. The Patents-in-Suit cover fundamental aspects of cloud computing, including the
11 identification of files or data and the efficient retrieval thereof in a manner which reduces bandwidth
12 transmission and storage requirements.

13 15. The ability to reliably identify and access specific data is essential to any computer
14 system or network. On a single computer or within a small network, the task is relatively easy: simply
15 name the file, identify it by that name and its stored location on the computer or within the network,
16 and access it by name and location. Early operating systems facilitated this approach with standardized
17 naming conventions, storage device identifiers, and folder structures.

18 16. Ronald Lachman and David Farber, the inventors of the Patents-in-Suit, recognized
19 that the conventional approach for naming, locating, and accessing data in computer networks could
20 not keep pace with ever-expanding, global data processing networks. New distributed storage systems
21 use files that are stored across different devices in dispersed geographic locations. These different
22 locations could use dissimilar conventions for identifying storage devices and data partitions.
23 Likewise, different users could give identical names to different files or parts of files—or unknowingly
24 give different names to identical files. No solution existed to ensure that identical file names referred
25 to the same data, and conversely, that different file names referred to different data. As a result,
26 expanding networks could not only become clogged with duplicate data, they also made locating and
27 controlling access to stored data more difficult.

28

1 17. Lachman and Farber developed a solution: replacing conventional naming and storing
2 conventions with system-wide “substantially unique,” content-based identifiers. Their approach
3 assigned substantially unique identifiers to “data items” of any type: “the contents of a file, a portion
4 of a file, a page in memory, an object in an object-oriented program, a digital message, a digital
5 scanned image, a part of a video or audio signal, or any other entity which can be represented by a
6 sequence of bits.” Applied system-wide, this invention would permit any data item to be stored,
7 located, managed, synchronized, and accessed using its content-based identifier.

8 18. To create a substantially unique, content-based identifier, Lachman and Farber turned
9 to cryptography. Cryptographic hash functions, including MD4, MD5, and SHA, had been used in
10 computer systems to verify the integrity of retrieved data—a so-called “checksum.” Lachman and
11 Farber recognized that these same hash functions could be devoted to a vital new purpose: if a
12 cryptographic hash function was applied to a sequence of bits (a “data item”), it would produce a
13 substantially unique result value, one that: (1) virtually guarantees a different result value if the data
14 item is changed; (2) is computationally difficult to reproduce with a different sequence of bits; and
15 (3) cannot be used to recreate the original sequence of bits.

16 19. These cryptographic hash functions would thus assign any sequence of bits, based on
17 content alone, with a substantially unique identifier. Lachman and Farber estimated that the odds of
18 these hash functions producing the same identifier for two different sequences of bits (i.e., the
19 “probability of collision”) would be about 1 in 2 to the 29th power. Lachman and Farber dubbed their
20 content-based identifier a “True Name.”

21 20. Using a True Name, Lachman and Farber conceived various data structures and
22 methods for managing data (each data item correlated with a single True Name) within a network—
23 no matter the complexity of the data or the network. These data structures provide a key-map
24 organization, allowing for a rapid identification of any particular data item anywhere in a network by
25 comparing a True Name for the data item against other True Names for data items already in the
26 network. In operation, managing data using True Names allows a user to determine the location of
27 any data in a network, determine whether access is authorized, and to selectively provide access to
28 specific content not possible using the conventional naming arts.

1 Hypertext Transfer Protocol (“HTTP”), an industry standard. The web server may respond to such an
2 HTTP request with a HTTP “response” that includes the requested web content and may include other
3 information or instructions.

4 26. A static webpage is delivered exactly as stored, as web content in the web server’s file
5 system or memory. In contrast, a dynamic webpage is generated by a web server application, usually
6 driven by server-side software, upon receipt of a request from a browser (user). For example, a picture
7 of a building might be delivered as static content (a picture) whereas the latest traffic conditions may
8 be delivered dynamically based on real time traffic information.

9 27. The speed of a browser retrieving webpage base files and incorporated asset files can
10 be increased by the browser storing previously retrieved webpage base files and asset files in a browser
11 “cache” on the computer running the browser. If a browser’s user later requests a previously retrieved
12 webpage base file or requests a webpage that includes an asset file previously used by the browser in
13 rendering the same or a different webpage (for example, by reloading a webpage or visiting the same
14 webpage again), the browser may use the cached webpage base file or asset file rather than having to
15 download the same file repeatedly over the Internet again.

16 28. Two computers communicating over the Internet usually are not directly connected to
17 each other but rather interact via chains of network appliances and other computers (*e.g.*, “switches”
18 and “intermediate” servers). Many intermediate servers have caches similar to and complementing
19 the browser cache that store webpage base files and assets that pass through that intermediate server.
20 If a browser or server requests a file from the intermediate server that is present in that intermediate
21 server’s cache, the intermediate server can use the content in its cache to respond to the request rather
22 than send the request upstream towards the web server from which the file initially originated (also
23 called the “origin server”).

24 29. Responses to HTTP requests may include header elements (control elements) and a
25 body (the “object” that was requested). Under HTTP, web servers can include a “cache-control”
26 header with a response that includes a webpage or asset file. A “cache-control” header includes one
27 or more directives that instruct browsers and intermediate server caches (“intermediate caches”) as to
28 whether and for how long the file (object) included in the response may be cached or under what

1 circumstances and under what conditions the cached content may be used. HTTP also provides for
2 including other headers in responses that provide similar types of instructions to browsers and
3 intermediate caches. Collectively, these other headers and directives in a “cache-control” header are
4 referred to herein as “cache-control headers.”

5 30. Given that webpage content changes, sometimes rather quickly and regularly, a
6 problem that website owners face is effectively instructing a browser that is re-rendering a previously
7 cached webpage that one or more of its cached files for that webpage are no longer the correct and
8 authorized content (the content of those files has changed) and similarly reauthorizing the use of those
9 cached files whose content has not changed.

10 31. On one hand, website owners want to encourage the browsers that render their web
11 pages to use cached files thereby reducing the number of requests for these files that are being made
12 to their webpage servers. Therefore, they frequently will set cache-control headers that authorize the
13 browser to cache their webpage base files and asset files so the files are on hand when the browser
14 needs to render that webpage again. On the other hand, website owners want the browsers to use the
15 latest authorized files so that their users do not see the wrong content when viewing their webpage.

16 17 **DEFENDANT’S BACKGROUND**

18 32. On information and belief, Defendant has operated a website located at
19 **aptsandlofts.com**, and has done so since before expiration of the last to expire of the Patents-in-Suit,
20 which has operated to provide authorized webpage content to its users in the manner herein described.¹

21 33. On information and belief, Defendant’s web servers utilized a system of notifications
22 and authorizations to control the distribution of content, *e.g.*, what webpage content may be served
23 from web servers and intermediate caches and what cached webpage content a browser is re-authorized
24 to use to render Defendant’s webpage(s).

25 34. On information and belief, Defendant’s system and its associated method of providing
26 webpage content used “conditional” HTTP GET requests with If-None-Match headers and associated

27 _____
28 ¹ While the complaint is sometimes written in the present or present perfect tense, all specific
allegations are directed to the system’s operations and the method’s performance in the relevant time
period.

1 content-based ETag values for various webpage base files and asset files required to render various
2 webpages of the Defendant.

3 35. On information and belief, Defendant's system and its associated method of providing
4 webpage content also inserted fingerprints generated based on the content of asset files into the
5 filenames of asset files required to render various webpages of the Defendant.

6 36. On information and belief, Defendant's system and associated method used these
7 ETags and fingerprints to instruct both the intermediate cache servers and the endpoint caches at
8 browsers to verify whether they were still authorized to reuse the previously cached webpage base
9 files of Defendant and to instruct them to obtain newly authorized content in rendering Defendant's
10 webpage when that content had changed. In other words, whether the previously cached content was
11 still considered valid for use by the Defendant website operator.

12 37. On information and belief, Defendant thereby reduced the bandwidth and computation
13 required by its origin servers and any intermediate cache servers to field user requests to render
14 Defendant's webpages as those servers only need to serve files whose content has changed. On
15 information and belief, this has allowed for the efficient update of cached information only when such
16 content has changed, thereby reducing transaction overhead and bandwidth and allowing the
17 authorized content to be served from the nearest cache.

18 38. More particularly, on information and belief, each of Defendant's webpages included
19 a webpage base file (*e.g.*, a main or initial HTML file) and one or more asset files referenced in the
20 webpage base file (or referenced in other asset files that contained references to other asset files). On
21 information and belief, the references in the webpage base file to the asset files needed to render the
22 webpage were typically Uniform Resource Identifiers ("URIs"), which each typically included a
23 filename, the address of a host server from which the asset file could be retrieved, and a "path" to the
24 location of that asset file on that server.

25 39. On information and belief, Defendant's website used a web application framework to
26 develop and compile various webpages of the Defendant, including asset files that were used in
27 rendering the webpages, and to generate fingerprints of the contents of asset files. On information and
28 belief, the fingerprints of individual asset files that were part of the webpage's content were included

1 in the respective filenames of the individual asset files. On information and belief, the modified
2 filenames were then used as part of the URI used to access the individual asset files over the Internet.
3 On information and belief, when an asset file's content was changed, a new fingerprint was generated
4 and included in the filename, its URI thus being changed accordingly.

5 40. On information and belief, the asset file fingerprint was generated with a hash function
6 and used to identify content changes. Furthermore, on information and belief, asset file URIs (with
7 respective fingerprints) were included in webpage base files or other asset files contained references
8 to other asset files. On information and belief, static webpage base files, if any, were recompiled when
9 any URI of a referenced asset file was changed (due to the fingerprint of the referenced asset file
10 changing). Thus, a content change in an asset file for a given webpage would result in a change to its
11 fingerprint, its URI, and a subsequent change to the content of any static webpage base files
12 referencing that changed asset file for that webpage.

13 41. On information and belief, a dynamic webpage base file generated for a webpage of
14 Defendant webpages in response to one request from a user could be the same as it was when it was
15 generated in response to a prior request from that or another user. However, on information and belief,
16 this would not be the case if any of the asset files referenced in the webpage base file had changed
17 between the time of the two requests and the URIs of the changed asset files included fingerprints as
18 described above.

19 42. On information and belief, when an asset file's content was changed, a new fingerprint
20 was generated and included in the filename, and its URI was thus changed accordingly, resulting in a
21 content change to any webpage base file or other asset file that referenced that URI. This, in turn,
22 caused a new and different ETag being generated for such webpage base file or other asset file that
23 referenced that URI.

24 43. On information and belief, for at least one of the asset files ("CBI ETag asset files"),
25 the asset file comprised a sequence of bits and an associated ETag value was generated by Defendant
26 by applying a hash function to the sequence of bits; wherein any two CBI ETag asset files comprising
27 identical sequences of bits had identical associated ETag values. Thus, on information and belief,
28 when a CBI ETag asset file's content was changed a new associated ETag value was generated by

1 Defendant. On information and belief, Defendant caused the origin server for each CBI ETag asset
2 file to serve such CBI ETag asset file with its associated Etag value in response to HTTP GET requests
3 for the CBI ETag asset file.

4 44. On information and belief, Defendant contracted with Amazon to use Amazon's S3
5 system to store and serve at least some of Defendant's CBI ETag files ("S3 asset files") on its behalf.
6 On information and belief, once Defendant's S3 asset files were compiled and are complete, Defendant
7 uploaded them to an Amazon S3 server as objects. On information and belief, such objects comprised
8 a sequence of bits and, upon upload, an associated ETag value was generated by the S3 system on
9 behalf of Defendant by applying a hash function to the sequence of bits, wherein any two S3 asset
10 files comprising identical sequences of bits had identical associated ETag values. On information and
11 belief, in this way, Defendant generated the associated ETag values for its CBI ETag asset files that
12 were S3 asset files. On information and belief, the S3 server for each S3 asset file served the S3 asset
13 file with the its associated ETag value to HTTP GET requests for the S3 asset file.

14 45. On information and belief, when Defendant created a webpage base file for a webpage,
15 whether dynamic or static, that webpage base file included a sequence of bits and an associated ETag
16 value was generated by Defendant by applying a hash function to the sequence of bits; wherein any
17 two webpage base files comprising identical sequences of bits had identical associated ETag values.
18 Thus, on information and belief, when a webpage base file's content was changed and a new associated
19 ETag value was generated by Defendant, it thereafter instructed the respective service by intermediate
20 cache servers or use by endpoint caches such as browser caches to no longer use the previous cached
21 webpage base file's content. Conversely, when the webpage base file content had not changed and
22 thus its ETag was unchanged, the cached asset files with fingerprints in their URIs referenced in the
23 webpage base file had not changed and were still valid to use.

24 46. On information and belief, when an intermediate cache server or a browser requested
25 a webpage from the Defendant for the first time, it sent an HTTP GET request with the webpage's
26 URI and Defendant's origin server or an upstream cache server responded by sending an HTTP 200
27 (OK) response message containing the webpage base file, along with its respective associated ETag.
28 On information and belief, a browser then sent individual HTTP GET requests, each with an asset

1 file's URI that was referenced in the webpage base file, and the asset files' origin servers or
2 intermediate cache servers responded by sending individual HTTP 200 responses containing the
3 requested asset files, along with, if available, their respective associated ETags. On information and
4 belief, upon receipt of the HTTP 200 responses, the intermediate cache server or browser cached the
5 webpage base file and asset files with their associated URI and associated ETag values and the browser
6 used them in rendering the requested web page of the Defendant. On information and belief, the origin
7 servers, intermediate cache servers, and browser caches were caused to maintain databases/tables
8 which mapped the URIs of webpage base files and asset files to their respective responses and, if
9 applicable, associated cache-control headers and ETags.

10 47. On information and belief, by responding to an HTTP GET request for a given webpage
11 by transmitting content of a webpage base file or asset file with an associated ETag, Defendant
12 instructed the browser cache and all intermediate cache servers, to use an HTTP conditional GET
13 request the next time that webpage base file or asset file is requested. More specifically, on information
14 and belief, the browser or intermediate cache is instructed to include the ETag in the HTTP conditional
15 GET request with an "If-None-Match" header to re-verify that they are still authorized to serve or use
16 that content or determine that they are no longer authorized to use that content and therefore must use
17 new content.

18 48. On information and belief, Defendant did this, for example, by causing cache-control
19 headers to be included in HTTP responses containing its webpage base file or asset files. On
20 information and belief, Defendant benefits from using the ETags to control the distribution of its
21 webpage content by communicating to a downstream cache and to a browser which of Defendant's
22 cached webpage base files it is reauthorized to serve/use and what newly authorized files it must first
23 obtain in serving/rendering Defendant's webpages.

24 49. More particularly, on information and belief, when a browser again requested the
25 Defendant's webpage, the browser either used a cached copy, if allowed by the cache-control headers,
26 or retrieved a new copy of the webpage base file for Defendant's webpage. Similarly, on information
27 and belief, for asset files referenced in the new or cached webpage base file, the browser either used a
28

1 cached copy, if allowed by the cache-control headers, or retrieved a new copy of the asset files for
2 Defendant's webpage.

3 50. On information and belief, for a webpage base file or an asset file stored in the
4 browser's cache with an ETag, and based on the cache-control headers received in the original
5 response, the browser sent a conditional GET request with an If-None-Match header using the
6 associated ETag value and the URI for the webpage base file or asset file so as to be notified whether
7 the browser still had Defendant's authority to render the webpage with its locally cached webpage
8 base file or asset file. In other words, whether the cached content was still valid for use in rendering
9 Defendant's webpage.

10 51. On information and belief, under most circumstances, a responding intermediate cache
11 server having content cached for the URI in the conditional GET request and having an ETag for that
12 URI responded to the request by determining whether it had the same associated ETag value for that
13 URI. If it had no ETag value for that URI, on information and belief, the request was passed up to an
14 upstream intermediate cache server capable of responding or, if none, to the URI's origin server, which
15 responded to the request. On information and belief, if the intermediate cache server did not have
16 content cached for the URI in the conditional GET request, the request was similarly passed up to an
17 upstream intermediate cache server capable of responding or, if none, to the URI's origin server.

18 52. On information and belief, if the responding server had the webpage content for that
19 URI and there was a match between the ETag it received in the request with the ETag it currently had
20 associated for that URI, it sent back an HTTP 304 (Not Modified) response message; this message
21 notifying the browser that the same webpage content was present at the responding server and that the
22 browser was still authorized to use that previously cached webpage base file or asset file to render the
23 webpage. On information and belief, upon receipt of the HTTP 304 response, the browser accessed
24 the locally cached webpage base file or asset file in rendering the webpage.

25 53. On information and belief, if the webpage base file's or asset file's associated ETag
26 sent by the browser in the conditional GET If-None-Match request did not match the associated ETag
27 maintained at the responding server (or other intermediate cache servers further upstream or the origin
28 server) for that URI, the responding server sent back an HTTP 200 response along with the new

1 webpage base file or asset file and its new ETag value. The HTTP 200 response indicated to the
2 browser that it was not authorized to use (or serve, in the case of an intermediate cache server receiving
3 the HTTP 200 response) the previously cached webpage base file or asset file. In response to receiving
4 the HTTP 200 response, the browser (or intermediate cache server) was instructed to update its
5 respective cache with the new webpage base file or asset file and associated ETag. The browser
6 subsequently used the new webpage base file (and the asset file URIs contained therein) or asset file
7 to render the webpage.

8 54. Exhibit 1 to the complaint lists specific examples of files that were, on information and
9 belief, served by or on behalf of Defendant during the relevant time period. The examples in Exhibit
10 1 include: a webpage base file served with a content-based ETag for the webpage base file; an asset
11 file served by S3 with a content-based ETag generated by S3 for that asset file; and an asset file
12 referenced by a URI with a fingerprint of the asset file contained into the URI.

13 55. On information and belief, in this manner, Defendant used (1) ETag values and (2)
14 asset files referenced by URIs with fingerprints based on the asset files' content to control the behavior
15 of downstream intermediate cache servers and browser caches to assure that they only accessed and
16 used Defendant's latest authorized webpage content to serve or to render its webpages.

17 18 **FIRST CLAIM FOR RELIEF**

19 **INFRINGEMENT OF U.S. PATENT NO. 6,928,442**

20 56. PersonalWeb repeats and realleges paragraphs 1, as if the same were fully stated herein.

21 57. On August 9, 2005, United States Patent No. 6,928,442 (the "'442 patent") was duly
22 and legally issued for an invention entitled "Enforcement and Policing of Licensed Content Using
23 Content-Based Identifiers." PersonalWeb has an ownership interest in the '442 patent by assignment,
24 including the exclusive right to enforce the '442 patent within the PersonalWeb Patent Field, and
25 continues to hold that ownership interest in the '442 patent. A true and correct copy of the '442 patent
26 is attached as Exhibit 2.

27 58. Defendant has infringed at least claims 10 and 11 of the '442 patent by its manufacture,
28 use, sale, importation, and/or offer for sale of products or services, and/or controlling the distribution

1 of its webpage content in the manner described herein. Defendant's infringement is literal and/or
2 under the doctrine of equivalents and Defendant is liable for its infringement of the '442 patent
3 pursuant to 35 U.S.C. § 271.

4 59. For example, claim 10 covers "a method, in a system in which a plurality of files are
5 distributed across a plurality of computers." On information and belief, Defendant has used a system
6 of notifications and authorizations to distribute a plurality of files, *e.g.*, Defendant's files containing
7 content necessary to render its webpages, across a plurality of computers such as production servers,
8 origin servers, intermediate cache servers and endpoint caches used by browsers rendering
9 Defendant's webpages.

10 60. Claim 10 then recites the act of "obtaining a name for a data file, the name being based
11 at least in part on a given function of the data, wherein the data used by the function comprises the
12 contents of the particular file." As set forth above, on information and belief, Defendant generated or
13 otherwise obtained ETags for its webpage base file and asset files used to render its webpages using a
14 hash function, wherein the ETags were based on the contents of the particular files. Moreover,
15 Defendant caused the intermediate caches servers and endpoint caches to obtain the ETags in HTTP
16 200 responses sent from Defendant's origin servers. On information and belief, Defendant caused
17 intermediate cache servers and its origin servers to obtain ETags in conditional GET messages from
18 endpoint and intermediate caches, as described *supra*.

19 61. Claim 10 then recites the act of "determining, using at least the name, whether a copy
20 of the data file is present on at least one of said computers." On information and belief, as set forth
21 above, Defendant has caused its origin servers and the intermediate cache servers between an endpoint
22 cache and one of its origin servers to, in response to receiving a conditional GET request with an If-
23 None-Match header, determine whether it has a file present that matches the URI in the conditional
24 GET and to compare the ETag in the conditional GET to the ETag for that URI and determine whether
25 a copy of the content having that ETag is present.

26 62. Claim 10 then recites the act of "determining whether a copy of the data file that is
27 present on a at least one of said computers is an unauthorized copy or an unlicensed copy of the data
28 file." On information and belief, as set forth above, if there was a match, the origin or intermediate

1 cache server determined that the copy of the file present at the downstream intermediate cache server
2 and/or the endpoint cache was an authorized or licensed copy of the data file. Conversely, if there was
3 no match, it determined that the copy of the file present at the downstream intermediate cache server
4 and/or the endpoint cache was an unauthorized copy of the data file. Likewise, if the browser
5 determined that it had a file with a matching URI, the browser determined that it was still authorized
6 to use that file.

7 63. Defendant's acts of infringement caused damage to PersonalWeb and PersonalWeb is
8 entitled to recover from Defendant the damages sustained by PersonalWeb as a result of Defendant's
9 wrongful acts in an amount subject to proof at trial.

10 **SECOND CLAIM FOR RELIEF**

11 **INFRINGEMENT OF U.S. PATENT NO. 7,802,310**

12 64. PersonalWeb repeats and realleges paragraphs 1, as if the same were fully stated herein.

13 65. On September 21, 2010, United States Patent No. 7,802,310 (the "'310 patent") was
14 duly and legally issued for an invention entitled "Controlling Access to Data in a Data Processing
15 System." PersonalWeb has an ownership interest in the '310 patent by assignment, including the
16 exclusive right to enforce the '310 patent within the PersonalWeb Patent Field, and continues to hold
17 that ownership interest in the '310 patent. A true and correct copy of the '310 patent is attached as
18 Exhibit 3.

19 66. Defendant has infringed at least claims 20 and 69 of the '310 patent by its manufacture,
20 use, sale, importation, and/or offer for sale of products or services, and/or controlling the distribution
21 of its webpage content in the manner described herein. Defendant's infringement is literal and/or
22 under the doctrine of equivalents and Defendant is liable for its infringement of the '310 patent
23 pursuant to 35 U.S.C. § 271.

24 67. For example, claim 20 covers a "computer-implemented method operable in a system
25 which includes a plurality of computers." On information and belief, Defendant used the claimed
26 computer implemented method by using a system of notifications and authorizations to control the
27 distribution of data items, such as various webpage base file and asset files, necessary to render its
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1 webpages, across a plurality of computers such as production servers, origin servers, intermediate
2 cache servers, and endpoint caches.

3 68. Claim 20 then recites “controlling distribution of content from a first computer to at
4 least one other computer, in response to a request obtained by a first device in the system from a second
5 device in the system, the first device comprising hardware including at least one processor, the request
6 including at least a content-dependent name of a particular data item, the content-dependent name
7 being based at least in part on a function of at least some of the data comprising the particular data
8 item, wherein the function comprises a message digest function or a hash function, and wherein two
9 identical data items will have the same content-dependent name.” On information and belief, as set
10 forth above, Defendant has caused downstream intermediate cache servers and endpoint caches to
11 send conditional GET requests with If-None-Match headers containing ETags that are fielded by
12 upstream cache or origin servers. On information and belief, the ETags were content-dependent names
13 for a data item based on hashing the data item’s contents; and when the file’s content changed a new
14 content-dependent name was determined. On information and belief, in Defendant’s method, a first
15 computer, such as the intermediate cache server or origin server, received such conditional GET
16 requests from a second computer, such as a user browser or other intermediate cache server, regarding
17 data items, such as webpage or asset files, the requests including ETags associated with the respective
18 data items.

19 69. Claim 20 then recites “based at least in part on said content-dependent name of said
20 particular data item, the first device (A) permitting the content to be provided to or accessed by the at
21 least one other computer if it is not determined that the content is unauthorized or unlicensed,
22 otherwise, (B) if it is determined that the content is unauthorized or unlicensed, not permitting the
23 content to be provided to or accessed by the at least one other computer.” On information and belief,
24 the first computer, such as an upstream intermediate cache server or origin server, maintained a
25 plurality of ETags associated with Defendant’s asset and webpage base files. On information and
26 belief, the ETag in a request and the ETag maintained by the first computer for the particular data item
27 sought by the request were compared to determine whether the associated content present at the
28 downstream computer was still authorized to be used/served or whether new authorized content must

1 be provided thereto. If it was determined that the data item corresponding to the received ETag was
2 still authorized to be used, the first computer sent back an HTTP 304 response authorizing the
3 downstream cache server or end-user cache to access the file content already present in order to serve
4 it or to use it to render the webpage. On information and belief, if it had been determined that the data
5 item corresponding to received E-tag was no longer authorized, the first computer sent back an HTTP
6 200 response which indicated to the downstream cache server or end-user cache that was not
7 authorized to access the old content and must access the new authorized file content contained in the
8 HTTP 200 response to serve it or to use it to render the webpage.

9 70. For a further example, claim 69 covers a “system operable in a network of computers,
10 the system comprising hardware including at least a processor, and software, in combination with said
11 hardware.” On information and belief, Defendant has controlled the distribution of its website content
12 across a system that included a network of computers, such as its production servers as well as origin
13 servers, intermediate cache servers, and endpoint caches, all comprising hardware including a
14 processor. On information and belief, Defendant has utilized software, in combination with such
15 hardware, such as a web development framework, software utilized in implementing the HTTP web
16 protocol, and software used on host servers that Defendant used to serve its content.

17 71. Claim 69 then recites the system “(a) to receive at a first computer, from a second
18 computer, a request regarding a data item, said request including at least a content-dependent name
19 for the data item, the content-dependent name being based at least in part on a function of the data in
20 the data item, wherein the data used by the function to determine the content-dependent name
21 comprises at least some of the contents of the data item, wherein the function that was used is a
22 message digest function or a hash function, and wherein two identical data items will have the same
23 content-dependent name.” On information and belief, as set forth above, Defendant has caused
24 downstream intermediate cache servers and endpoint caches to send conditional GET requests with
25 URIs including fingerprints that are fielded by upstream cache or origin servers. On information and
26 belief, the URIs including fingerprints were content-dependent names for a data item calculated by
27 hashing the file’s contents; and when the file’s content changed a new content-dependent name was
28 determined. On information and belief, in Defendant’s system, a first computer, such as the

1 intermediate cache server or origin server, received such conditional GET requests from a second
2 computer, such as a user browser, regarding data items, such as asset files, using content-dependent
3 names such as URIs including fingerprints associated with the data items.

4 72. Claim 69 then recites “(b) in response to said request: (i) to cause the content-dependent
5 name of the data item to be compared to a plurality of values; and (ii) to determine if access to the data
6 item is authorized or unauthorized based on whether or not the content-dependent name corresponds
7 to at least one of said plurality of values, and (iii) based on whether or not it is determined that access
8 to the data item is authorized or unauthorized, to allow the data item to be provided to or accessed by
9 the second computer if it is not determined that access to the data item is unauthorized.” On
10 information and belief, the first computer, such as an upstream intermediate cache server or origin
11 server, maintained a plurality of URI values associated with Defendant’s asset and webpage base files;
12 compared the URI value received in a conditional GET request from the second (downstream)
13 computer to that plurality of URI values; that comparison allowed the first computer to determine
14 whether the content-dependent name in the request corresponded to one of the plurality of stored URI
15 values and to determine whether access to the data item was still authorized or not. On information
16 and belief, in particular when there was a match, the first computer determined the associated content
17 present at the downstream computer was still authorized to be used/served or whether new authorized
18 content must be provided thereto. If it was determined that the data item corresponding to the received
19 URI including a fingerprint was still authorized to be used, the first computer has sent back an HTTP
20 304 response authorizing the downstream cache server or end-user cache to access the file content
21 already present in order to serve it or to use it to render the webpage.

22 73. Defendant’s acts of infringement have caused damage to PersonalWeb and
23 PersonalWeb is entitled to recover from Defendant the damages sustained by PersonalWeb as a result
24 of Defendant’s wrongful acts in an amount subject to proof at trial.

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THIRD CLAIM FOR RELIEF**INFRINGEMENT OF U.S. PATENT NO. 7,945,544**

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2
3 74. PersonalWeb repeats and realleges paragraphs 1–55, as if the same were fully stated
4 herein.

5 75. On May 17, 2011, United States Patent No. 7,945,544 (the “’544 patent”) was duly and
6 legally issued for an invention entitled “Similarity-Based Access Control of Data in a Data Processing
7 System.” PersonalWeb has an ownership interest in the ’544 patent by assignment, including the
8 exclusive right to enforce the ’544 patent within the PersonalWeb Patent Field, and continues to hold
9 that ownership interest in the ’544 patent. A true and correct copy of the ’544 patent is attached as
10 Exhibit 4.

11 76. Defendant has infringed at least claims 46, 48, 52, and 55 of the ’544 patent by its
12 manufacture, use, sale, importation, and/or offer for sale of products or services, and/or controlling the
13 distribution of its webpage content in the manner described herein. Defendant’s infringement is literal
14 and/or under the doctrine of equivalents and Defendant is liable for its infringement of the ’544 patent
15 pursuant to 35 U.S.C. § 271.

16 77. For example, claim 46 covers a claimed “computer-implemented method.” On
17 information and belief, Defendant uses the claimed computer implemented method by using a system
18 of notifications and authorizations to locate and control the distribution of data items, such as various
19 webpage base files and asset files, necessary to render its webpages.

20 78. Claim 46 then recites the act of “(A) for each particular file of a plurality of files:
21 (a2) determining a particular digital key for the particular file, wherein the particular file comprises a
22 first one or more parts.” On information and belief, each of Defendant’s webpages comprises one or
23 more asset files and has an associated webpage base file, the webpage base file containing the URIs
24 having fingerprints of a plurality of asset files comprising the webpage, and once the webpage base
25 files and asset files are compiled and complete, Defendant stores them on a host system. On
26 information and belief, the webpage base file’s associated ETag value is generated by applying a hash
27 algorithm to the webpage base file’s contents. On information and belief, whenever a new webpage
28

1 base file is generated or the webpage base file's content changes, Defendant caused an ETag to be
2 determined and associated to the webpage base file.

3 79. Claim 46 then recites "each part of said first one or more parts having a corresponding
4 part value, the part value of each specific part of said first one or more parts being based on a first
5 function of the contents of the specific part, wherein two identical parts will have the same part value
6 as determined by the first function, and wherein the particular digital key for the particular file is
7 determined using a second function of the one or more of part values of said first one or more parts."

8 On information and belief, prior to various asset files being stored on a host system, a fingerprint is
9 generated for each of these asset files by applying a hash function to the asset file's contents and the
10 fingerprints are inserted into the URIs for the respective asset files. On information and belief, the
11 webpage's ETag value is generated by applying a second hash function to the webpage base file's
12 contents, which include the URIs of one or more of the asset files which comprise the webpage's
13 contents. On information and belief, because the respective asset files' URIs include the fingerprints
14 of their content, the webpage's ETag value will change and a new associated ETag value is generated
15 to represent the webpage's content, when the content changes and two identical webpages having the
16 identical content represented by their webpage base file will have the same ETag value.

17 80. Claim 46 then recites the act of "(a2) adding the particular digital key of the particular
18 file to a database, the database including a mapping from digital keys of files to information about the
19 corresponding files." On information and belief, Defendant caused the origin server, intermediate
20 caches and endpoint caches to maintain databases/tables which mapped the ETag of each webpage's
21 webpage base file to its URI, and information about the corresponding webpage, such as, for example,
22 information from cache-control headers for the webpage.

23 81. Claim 46 then recites "(B) determining a search key based on search criteria, wherein
24 the search criteria comprise a second one or more parts, each of said second one or more parts of said
25 search criteria having a corresponding part value, the part value of each specific part of said second
26 one or more parts being based on the first function of the contents of the specific part, and wherein the
27 search key is determined using the second function of the one or more of part values of said second
28 one or more parts." On information and belief, when a downstream intermediate cache server or a

1 browser again requested a webpage of Defendant, Defendant caused it to send a conditional GET
2 request with an If-None-Match header with the webpage's associated ETag value. On information
3 and belief, the received ETag value was determined using the second hash function of the webpage's
4 webpage base file, which included URIs including fingerprints for one or more of the asset files which
5 comprised the webpage's contents.

6 82. Claim 46 then recites "(C) attempting to match the search key with a digital key in the
7 database." On information and belief, when the responding server received the webpage's ETag value
8 in a conditional GET request with an If-None-Match header, it compared the received ETag with the
9 ETag it has maintained in a database/table corresponding to the URI of the webpage's webpage base
10 file to determine if there is matching value for that webpage.

11 83. Claim 46 then recites "(D) if the search key matches a particular digital key in the
12 database, providing information about the file corresponding to the particular digital key." On
13 information and belief, if the responding server had a matching ETag value for the webpage's webpage
14 base file, the responding server sent an HTTP 304 response, which included information about the
15 corresponding webpage, such as, for example, information from cache-control headers for the
16 webpage.

17 84. Defendant's acts of infringement have caused damage to PersonalWeb and
18 PersonalWeb is entitled to recover from Defendant the damages sustained by PersonalWeb as a result
19 of Defendant's wrongful acts in an amount subject to proof at trial.

20
21 **FOURTH CLAIM FOR RELIEF**

22 **INFRINGEMENT OF U.S. PATENT NO. 8,099,420**

23 85. PersonalWeb repeats and realleges paragraphs 1–55, as if the same were fully stated
24 herein.

25 86. On January 17, 2012, United States Patent No. 8,099,420 (the "'420 patent") was duly
26 and legally issued for an invention entitled "Accessing Data in a Data Processing System."
27 PersonalWeb has an ownership interest in the '420 patent by assignment, including the exclusive right
28

1 to enforce the '420 patent within the PersonalWeb Patent Field, and continues to hold that ownership
2 interest in the '420 patent. A true and correct copy of the '420 patent is attached as Exhibit 5.

3 87. Defendant has infringed claims 25, 26, 27, 29, 30, 32, 34–36, and 166 of the '420 patent
4 by its manufacture, use, sale, importation, and/or offer for sale of products or services, and/or
5 controlling the distribution of its webpage content in the manner recited herein. Defendant's
6 infringement is literal and/or under the doctrine of equivalents and Defendant is liable for its
7 infringement of the '420 patent pursuant to 35 U.S.C. § 271.

8 88. For example, claim 166 covers a “system comprising hardware, including at least a
9 processor, and software, in combination with said hardware.” On information and belief, Defendant
10 has controlled the distribution of its website content across a system that included hardware including
11 a processor, such as its production servers as well as origin servers, intermediate cache servers, and
12 endpoint caches; and software, in combination with such hardware, such as a web development
13 framework, software utilized in implementing the HTTP web protocol, and the software used on host
14 servers that Defendant used to serve its webpages.

15 89. Claim 166 then recites “(A) for a particular data item in a set of data items, said
16 particular data item comprising a corresponding particular sequence of bits.” On information and
17 belief, Defendant's system has controlled the distribution of webpage base files and asset files
18 necessary to render its webpages which represent particular data items, and each of these files comprise
19 a corresponding sequence of bits.

20 90. Claim 166 then recites that for the particular data item to “(a1) determine one or more
21 content-dependent digital identifiers for said particular data item, each said content-dependent digital
22 identifier being based at least in part on a given function of at least some of the bits in the particular
23 sequence of bits of the particular data item, wherein two identical data items will have the same digital
24 identifiers as determined using said given function.” On information and belief, Defendant's system
25 has applied hash functions to each of various Defendant's webpage base files to all of the bits of the
26 file's content to determine a fingerprint, an ETag, or both for the file's content; whereby two identical
27 data items have the same ETag values and the same fingerprint values. On information and belief,
28 fingerprints were included in files' URI and ETag values were associated with files' URIs.

1 91. Claim 166 then recites that for the particular data item “(a2) selectively permits the
 2 particular data item to be made available for access and to be provided to or accessed by or from at
 3 least some of the computers in a network of computers, wherein the data item is not to be made
 4 available for access or provided without authorization, as resolved based, at least in part, on whether
 5 or not at least one of said one or more content-dependent digital identifiers for said particular data item
 6 corresponds to an entry in one or more databases, each of said one or more databases comprising a
 7 plurality of identifiers, each of said identifiers in each said database corresponding to at least one data
 8 item of a plurality of data items, and each of said identifiers in each said database being based, at least
 9 in part, on at least some of the data in a corresponding data item.”

10 92. On information and belief, Defendant’s system has included one or more web servers
 11 with databases containing ETag values associated with the URIs for various of the webpage base files
 12 and asset files necessary to render its webpages; moreover, Defendant’s system has used a system of
 13 conditional GET requests with If-None-Match headers and HTTP 304 and HTTP 200 responses
 14 containing the ETags, as described more particularly *supra*, to ensure that downstream caches only
 15 access authorized file content to either serve that file content further downstream or to use it to render
 16 Defendant’s webpages. On information and belief, in particular, as more fully described *supra*, the
 17 system compared the ETag received in a given conditional GET request with the ETags contained in
 18 the database to selectively determine whether the requesting computer could access the file content it
 19 already had or must access newly received authorized content.

20 93. Defendant’s acts of infringement have caused damage to PersonalWeb and
 21 PersonalWeb is entitled to recover from Defendant the damages sustained by PersonalWeb as a result
 22 of Defendant’s wrongful acts in an amount subject to proof at trial.

23
 24 **PRAYER FOR RELIEF**

25 WHEREFORE, Plaintiff PersonalWeb requests entry of judgment in its favor and against
 26 Defendant as follows:

27 a) Declaration that Defendant has infringed U.S. Patent Nos. 6,928,442, 7,802,310,
 28 7,945,544, and 8,099,420 as described in this action;

1 b) Awarding the damages arising out of Defendant’s infringement of U.S. Patent Nos.
2 6,928,442, 7,802,310, 7,945,544, and 8,099,420, together with pre-judgment and post-judgment
3 interest, in an amount according to proof;

4 c) An award of attorneys’ fees pursuant to 35 U.S.C. § 285 or as otherwise permitted by
5 law; and

6 d) For costs incurred and such other and further relief as the Court may deem just and
7 proper.

8
9 Respectfully submitted,

10 Dated: October 4, 2018

STUBBS, ALDERTON & MARKILES, LLP

11
12 By: /s/ Stanley H. Thompson, Jr.

13 Michael A. Sherman
14 Jeffrey F. Gersh
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Dated: October 4, 2018

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DEMAND FOR JURY TRIAL

Pursuant to Fed. R. Civ. P. 38(b) and Local Rule 3–6, Plaintiff PersonalWeb Technologies, LLC hereby demands a trial by jury on all issues triable in this action.

Respectfully submitted,

Dated: October 4, 2018 STUBBS, ALDERTON & MARKILES, LLP

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