

CLAIMS

1. A computer-implemented method, operable on a device (700) in a content delivery network (100), wherein said content delivery network delivers content on behalf of at least one content provider (102), and wherein the content associated with said at least one content provider comprises at least one property, said device implementing a content delivery service (106), the method comprising, by said service on said device:

(A) maintaining property invalidation information (208) on said content delivery service, said property invalidation information comprising, for each property handled by said content delivery service, a list of one or more group invalidation commands, each of said one or more group invalidation commands specifying a group of zero or more resources;

(B) in response to receipt by said content delivery service of at least one new group invalidation command (214) for a particular property, attempting to add said new group invalidation command to said property invalidation information by:

(B)(1) if a size of said list of one or more group invalidation commands for said particular property does not exceed a particular threshold, then inserting said new group invalidation command into said list; otherwise,

(B)(2) if a size of said list of one or more group invalidation commands for said particular property exceeds a particular threshold, then (i) determining a plurality of merge candidates, where each of the plurality of merge candidates comprise two or more group invalidation commands which have a prefix in common between the two or more group invalidation commands, (ii) selecting a merge candidate from the plurality of merge candidates based on said merge candidate having the smallest performance impact on valid resources amongst the plurality of merge candidates, (iii) merging the two or more group invalidation commands of the selected merge candidate to form a merged invalidation command, (iv) inserting said merged invalidation command into said list, and (v) removing one or more group invalidation commands used in said merging from said list.

2. The method of claim 1 further comprising:

(C) maintaining, on said content delivery service, a per property common prefix list for group invalidation commands in each list, and wherein said merging uses said per property common prefix list to determine which group invalidation commands to merge.

3. The method of claim 2 wherein said per property common prefix list is sorted from smallest impact to largest impact, based on one or more impact assumptions.

4. The method of claim 2 wherein, when the at least one new group invalidation command for said particular property is received, the at least one new group invalidation command is checked against the list of one or more group invalidation commands for said particular property, and if a common prefix is found, then the common prefix is selectively added to said per property common prefix list.

5. The method of any of claims 1 to 4, wherein the one or more group invalidation commands comprise constraint patterns.

6. The method of claim 5 wherein the constraint patterns comprise glob patterns.

7. The method of any of claims 1 to 6 further comprising:

(D) in response to a request received at said content delivery service for a particular resource, if a copy of said particular resource is in a cache (206) of said content delivery service, then:

(D)(1) determining, using said property invalidation information on said content delivery service, whether said particular resource is valid, and

(D)(2) based on said determining in (D)(1), when it is determined that said particular resource is not valid, obtaining a valid version of said particular resource and basing a response to said request on said valid version of said particular resource.

8. The method of any of claims 1 to 7 wherein said list of one or more group invalidation commands comprises a data structure that maintains the prefix list in a sorted order.

9. The method of claim 8 wherein the data structure that maintains the prefix list sorted from smallest impact to largest impact.

10. The method of any of claims 1 to 9 wherein each invalidation command in said list of one or more group invalidation commands comprises a constraint and a minimum origin version (MOV) value, and wherein said list of one or more group invalidation commands is a MOV-ordered list.

11. The method of claim 10 wherein said merging of two or more group invalidation commands in (B)(2)(i), comprises determining an MOV value for the merged invalidation command based on MOV values of the two or more group invalidation commands being merged.

12. The method of claim 11 wherein the MOV value for the merged invalidation command is set to a maximum of the MOV values of the two or more group invalidation commands being merged.

13. The method of claim 10 wherein the constraint of the merged invalidation command was already in the list prior the merging, wherein in particular the constraint of the merged invalidation command was the constraint of one of the two or more group invalidation commands being merged in (B)(2)(i).

14. An article of manufacture comprising a computer-readable medium having program instructions stored thereon, the program instructions, operable on a computer system (700) in a content delivery network (100), wherein said content delivery network delivers content on behalf of at least one content provider (102), and wherein the content associated with said at least one content provider comprises at least one property, said computer system implementing a content delivery service (106), wherein execution of the program instructions by one or more processors (704) of said computer system causes the one or more processors to carry out the acts of:

(A) maintaining property invalidation information (208) on said content delivery service, said property invalidation information comprising, for each property handled by said content delivery service, a list of one or more group invalidation commands, each of said one or more group invalidation commands specifying a group of zero or more resources;

(B) in response to receipt by said content delivery service of at least one new group invalidation command (214) for a particular property, attempting to add said new group invalidation command to said property invalidation information by:

(B)(1) if a size of said list of one or more group invalidation commands for said particular property does not exceed a particular threshold, then inserting said new group invalidation command into said list; otherwise,

(B)(2) if a size of said list of one or more group invalidation commands for said particular property exceeds the particular threshold, then (i) determining a plurality of merge candidates, where each of the plurality of merge candidates comprise two or more group invalidation commands which have a prefix in common between the two or more group invalidation commands, (ii) selecting a merge candidate from the plurality of merge candidates based on said merge candidate having the smallest performance impact on valid resources amongst the plurality of merge candidates (iii) merging the two or more group invalidation commands of the selected merge candidate to form a merged invalidation command, (iv) inserting said merged invalidation command into said list, and (v) removing one or more group invalidation commands used in said merging from said list.

15. A device (700) in a content delivery network (100), wherein said content delivery network delivers content on behalf of at least one content provider (102), and wherein the content associated with said at least one content provider comprises at least one property, said device implementing a content delivery service (106), the device:

(A) maintaining property invalidation information (208) on said content delivery service, said property invalidation information comprising, for each property handled by said content delivery service, a list of one or more group invalidation commands, each of said one or more group invalidation commands specifying a group of zero or more resources;

(B) in response to receipt by said content delivery service of at least one new group invalidation command (214) for a particular property, attempting to add said new group invalidation command to said property invalidation information by:

(B)(1) if a size of said list of one or more group invalidation commands for said particular property does not exceed a particular threshold, then inserting said new group invalidation command into said list; otherwise,

(B)(2) if a size of said list of one or more group invalidation commands for said particular property exceeds the particular threshold, then (i) determining a plurality of merge candidates, where each of the plurality of merge candidates comprise two or more group invalidation commands which have a prefix in common between the two or more group invalidation commands, (ii) selecting a merge candidate from the plurality of merge candidates based on said merge candidate having the smallest performance impact on valid resources amongst the plurality of merge candidates (iii) merging the two or more group invalidation commands of the selected merge candidate to form a merged invalidation command, (iv) inserting said merged invalidation command into said list, and (iv) removing one or more group invalidation commands used in said merging from said list.