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(72) Inventor; and
(71) Applicant : **RAVE, Elad** [IL/IL]; 13 Dov Freidman St., 5250407 Ramat Gan (IL).

(74) Agents: **BOROCHOV KORAKH & CO.** et al.; P.O.B. 58100, 6158002 Tel Aviv (IL).

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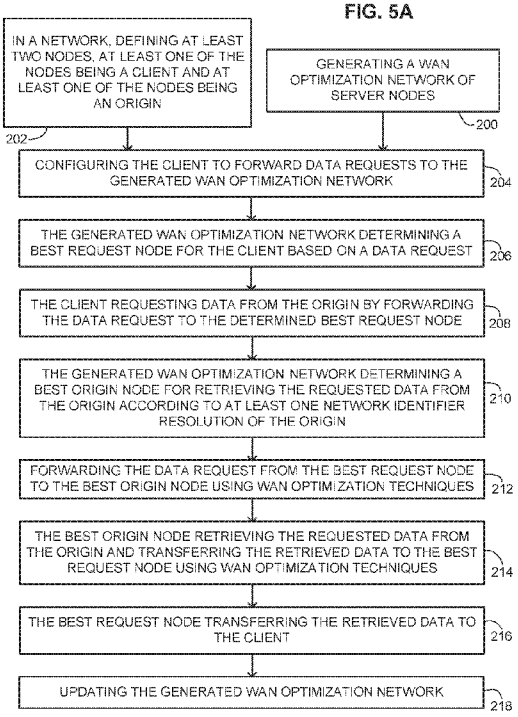
(54) **Title**: INCREASED DATA TRANSFER RATE METHOD AND SYSTEM FOR REGULAR INTERNET USER

FIG. 5A



(57) **Abstract**: Method for increasing data transfer rates for regular network users, including the procedures of generating a WAN optimization network (WANON), in a network, defining a client, for requesting data, and an origin, from which data is requested, the WANON determining a best requesting node for the client based on a data request, configuring the client to forward the data request to the WANON, the client requesting data by forwarding the data request to the requesting node, the WANON determining a best origin node for retrieving the requested data from the origin according to a network identifier resolution of the origin, the requesting node forwarding the data request to the origin node using WAN optimization, the origin node retrieving the requested data from the origin and transferring the retrieved data to the requesting node using W;AN optimization, the requesting node transferring the retrieved data to the client, and updating the WANON.

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AMENDED CLAIMS
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CLAIMS

1. Method for increasing a data transfer rate for a regular network user, comprising the procedures of:

generating a WAN optimization network of at least two server nodes;

in a network, defining at least two nodes, at least one of said nodes being a client, for requesting data, and at least another one of said nodes being an origin, from which said data is requested from;

said generated WAN optimization network determining a best requesting node for said client based on a data request, said best requesting node being selected from said at least two server nodes;

establishing a configuration to forward said data request of said client to said generated WAN optimization network;

said client requesting data from said origin by forwarding said data request to said determined best requesting node;

said generated WAN optimization network determining a best origin node, from said at least two server nodes, for retrieving said requested data from said origin according to at least one network identifier resolution of said origin, wherein said best origin node is one of said at least two server nodes which can most efficiently retrieve said requested data from said origin;

said best requesting node forwarding said data request to said best origin node using a first at least one WAN optimization technique;

said best origin node retrieving said requested data from said origin and transferring said retrieved data to said best requesting node using a second at least one WAN optimization technique;

said best requesting node transferring said retrieved data to said client; and

updating said WAN optimization network.

2. The method according to claim 1, wherein said network is selected from the list consisting of:

the Internet;

a WAN;

an intranet; and

a LAN.

3. The method according to claim 1, wherein said client is selected from the list consisting of:

a personal computer;

a workstation;

a smartphone; and

a device capable of accessing the Internet and performing data requests.

4. The method according to claim 1, wherein said origin is selected from the list consisting of:

a website;

a server;

a mail server;

a proxy server;

a cloud server; and

a cloud router.

5. The method according to claim 1, wherein said procedure of determining a best requesting node for said client is executed using at least one heuristic.

6. The method according to claim 5, wherein said at least one heuristic is executed by external software installed on said client.

7. The method according to claim 5, wherein said WAN optimization network further comprises a SOCKS file proxy and wherein said at least one heuristic is executed by said SOCKS file proxy.

8. The method according to claim 5, wherein said WAN optimization network further comprises a DNS server and wherein said at least one heuristic is executed by said DNS server.

9. The method according to claim 5, wherein said at least one heuristic is selected from the list consisting of:

a shortest path of one of said at least two server nodes to said client; and

one of said at least two server nodes having a quickest response time with said client.

10. The method according to claim 1, wherein said procedure of determining a best requesting node for said client is executed based on a performance of said at least two server nodes.

11. The method according to claim 1, wherein said procedure of determining a best requesting node for said client is executed based on a latency of said at least two server nodes.

12. The method according to claim 1, further comprising the procedure of periodically updating said determined best requesting node.

13. The method according to claim 12, wherein said procedure of periodically updating comprises a sub-procedure of determining if a shortest path server node in said WAN optimization network to said client is also a quickest server node in said WAN optimization network to respond to said client.

14. The method of according to claim 1, wherein said procedure of determining a best origin node for retrieving said requested data is executed using at least one heuristic.

15. The method according to claim 14, wherein said at least one heuristic is selected from the list consisting of:

a shortest path of one of said at least two server nodes to said origin; and

a shortest path of one of said at least two server nodes to a proxy server coupled with said origin having a local copy of said requested data.

16. The method according to claim 1, wherein said at least one network identifier resolution is selected from the list consisting of:

Internet protocol (IP) addressing;

domain name system (DNS) addressing;
media access control (MAC) addressing;
NetBIOS over TCP/IP addressing; and
entity identification (EID) addressing.

17. The method according to claim 1, wherein said first at least one WAN optimization technique and said second at least one WAN optimization technique are each selected from the list consisting of:
deduplication;
traffic shaping;
compression;
protocol spoofing;
latency optimization; and
caching.

18. The method according to claim 1, wherein said procedures of determining said best requesting node and said best origin node are executed recursively.

19. The method according to claim 1, wherein said procedures of forwarding said data request to said determined best requesting node and determining said best origin node are executed recursively.

20. The method according to claim 1, further comprising the procedure of said best requesting node pre-fetching said requested data from said origin.

21. The method according to claim 1, further comprising the procedure of said best origin node pre-fetching said requested data from said origin.

22. The method according to claim 1, further comprising the procedure of determining if pre-fetching said requested data by at least one of said best requesting node and said best origin node from said origin increases said data transfer rate.

23. The method according to claim 1, wherein each one of said at least two server nodes comprises a respective distributed data structure (DDS).

24. The method according to claim 23, wherein said respective DDS is selected from the list consisting of:

a distributed hash table;

a distributed graph;

a distributed linked list; and

a distributed array.

25. The method according to claim 23, wherein said respective DDS stores at least one item selected from the list consisting of:

a table of values from which said requested data can be reconstructed;

data necessary for executing at least one of said first at least one WAN optimization technique and said second at least one WAN optimization technique;

configuration information related to said WAN optimization network;

information relating to data handled by one of said at least two server nodes in said WAN optimization network; and

information regarding a topology of said at least two server nodes in said WAN optimization network.

26. The method according to claim 23, wherein said procedure of updating said WAN optimization network comprises updating said respective DDS for each one of said at least two server nodes.

27. The method according to claim 26, wherein said procedure of updating said respective DDS comprises at least one sub-procedure selected from the list consisting of:

storing information in said respective DDS related to data requests recently handled by each one of said at least two server nodes;

updating a topology of said WAN optimization network stored in said respective DDS;

caching data from said requested data in said respective DDS provided said requested data can be cached; and

updating said best requesting node and said best origin node stored in said respective DDS.

28. The method according to claim 1, further comprising the procedure of forming at least one cluster of server nodes in said WAN optimization network, said at least one cluster of server nodes being selected from said at least two server nodes.

29. The method according to claim 28, further comprising the procedures of:

using network analytics to monitor data flow through said WAN optimization network; and

determining membership of each one of said at least two server nodes in said at least one cluster based on said monitored data flow.

30. The method according to claim 28, further comprising the procedure of determining membership of each one of said at least two server nodes in said at least one cluster using at least one decentralized management technique.

31. The method according to claim 28, wherein membership of a server node in said at least one cluster is stored in a distributed data structure (DDS) in said WAN optimization network.

32. The method according to claim 28, wherein said procedure of updating said WAN optimization network comprises updating which server nodes of said at least two server nodes are members of which said at least one cluster.

33. The method according to claim 1, further comprising the procedure of said best origin node retrieving said requested data from a proxy server coupled with said origin.

34. The method according to claim 1, further comprising the procedure of forming at least one cluster of said at least two nodes accessing said WAN optimization network.

35. The method according to claim 1, further comprising the procedure of said best requesting node retrieving said requested data from another one of said at least two server nodes in said WAN optimization network, if said requested data was cached on said another one of said at least two server nodes.

36. The method according to claim 1, further comprising the procedure of said WAN optimization network determining a difference between said data request from said origin by a first one of said at least two nodes and a previous data request from said origin by a second one of said at least two nodes.

37. The method according to claim 1, wherein said procedure of establishing a configuration comprises a device configuration.

38. The method according to claim 1, wherein said procedure of establishing a configuration comprises a non-device configuration.

39. The method according to claim 38, wherein said non-device configuration is selected from the list consisting of:

accessing a SOCKS file proxy;

using DNS; and

using a border gateway protocol (BGP).

40. Method for increasing a data transfer rate for a regular network user, comprising the procedures of:

generating a WAN optimization network of at least two server nodes;

in a network, defining at least two nodes, at least one of said nodes being a client, for requesting data, and at least another one of said nodes being an origin, from which said data is requested from;

said generated WAN optimization network determining a best requesting node for said client based on a data request, said best requesting node being selected from said at least two server nodes;

establishing a configuration to forward said data request of said client to said generated WAN optimization network;

said client requesting data from said origin by forwarding said data request to said determined best requesting node;

said generated WAN optimization network determining a best origin node, from said at least two server nodes, for retrieving said requested data from said origin according to at least one network identifier resolution of said origin, wherein said best origin node is one of said at least two server nodes which can most efficiently retrieve said requested data from said origin;

said best requesting node forwarding said data request to said best origin node using at least one WAN optimization technique;

said best origin node retrieving said requested data from said origin;

if said retrieved data is cache enabled and has not yet expired, then said best origin node determining if said retrieved data can be reconstructed from said generated WAN optimization network;

said best origin node forwarding a message to said generated WAN optimization network to reconstruct said retrieved data from at least one distributed data structure (DDS);

said best request node reconstructing said retrieved data from its own DDS and transferring said retrieved data to said client; and

updating said WAN optimization network.

41. The method according to claim 40, wherein said procedure of determining if said retrieved data can be reconstructed from said generated WAN optimization network comprises the sub-procedure of determining a difference between said data request of said client to said origin and a previous data request of another client to said origin.

42. The method according to claim 41, further comprising the procedure of said best requesting node reconstructing said retrieved data from its own DDS and from said determined difference.

43. WAN optimization system for use with a network, said network comprising at least two nodes, at least one of said nodes being a client, for requesting data, and at least another one of said nodes being an origin, from which said data is requested from, said WAN optimization system comprising:

at least two server nodes, coupled together so as to transfer data therebetween using at least one WAN optimization technique;

wherein said WAN optimization system determines a best requesting node and a best origin node, from said at least two server nodes, for said client based on a data request and on at least one network identifier resolution of said origin;

wherein said best origin node is one of said at least two server nodes which can most efficiently retrieve said data request from said origin;

wherein said client forwards said data request to said determined best requesting node which forwards said data request to said best origin node using said at least one WAN optimization technique;

wherein said best origin node retrieves said requested data from said origin and transfers it back to said best requesting node, using said at least one WAN optimization technique; and

wherein said best requesting node transfers said retrieved data to said client.