(51) International Patent Classification:
H04L 12/721 (2013.01)  H04L 12/803 (2013.01)

(21) International Application Number:
PCT/US2015/039767

(22) International Filing Date:
9 July 2015 (09.07.2015)

(25) Filing Language:
English

(26) Publication Language:
English

(30) Priority Data:
62/049,466  12 September 2014 (12.09.2014)  US
14/792,070  6 July 2015 (06.07.2015)  US

(71) Applicant: ORACLE INTERNATIONAL CORPORATION [US/US]; 500 Oracle Parkway, M/S 5op7, Redwood Shores, California 94065 (US).

(72) Inventors: ZAHID, Feroz; P.O. Box 134, N-1325 Lysaker (NO). GRAN, Ernst Gunnar; 500 Oracle Parkway, M/S 5op7, Redwood Shores, California 94065 (US). BOGDANSKI, Bartosz; Hoff Terrasse 15 H0203, N-0275 Oslo (NO). JOHNSEN, Bjorn Dag; Vilberggrenda 9, N-0687 Oslo (NO).


(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIP (BW, GH, [Continued on next page])

(54) Title: SYSTEM AND METHOD FOR SUPPORTING EFFICIENT LOAD-BALANCING IN A HIGH PERFORMANCE COMPUTING (HPC) ENVIRONMENT

(57) Abstract: Methods and systems for supporting efficient load balancing among a plurality of switches and a plurality of end nodes arranged in a tree topology in a network environment. The methods and systems can sort the plurality of end nodes, wherein the plurality of end nodes are sorted in a decreasing order of a receive weight. The method and system may further route, in the decreasing order of receive weights, the plurality of end nodes, wherein the routing comprises selecting at least one down-going port and at least one up-going port. Further, the method and system can increase an accumulated downward weight on each selected down-going port by the receive weight of the routed end node, and increase an accumulated upward weight on each selected up-going port by the receive weight of the routed end node.

FIGURE 9
before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report: 3 March 2016

— with international search report (Art. 21(3))
## A. CLASSIFICATION OF SUBJECT MATTER

**INV.** H04L12/721 H04L12/803

**ADD.**

According to International Patent Classification (IPC) and both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04L

Documentation searched other than minimum documentation, to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
</table>

[X] Further documents are listed in the continuation of Box C.  
[X] See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation of other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "Z" document member of the same patent family

Date of the actual completion of the international search 21 October 2015

Date of mailing of the international search report 07/01/2016

Name and mailing address of the ISA

European Patent Office, P.B. 5018 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040
Fax: (+31-70) 340-3016

Authorized officer Perier, Samuel
<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patent document cited in search report</td>
<td>Publication date</td>
<td>Patent family member(s)</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>----------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>US 2013121154 AI</td>
<td>16-05-2013</td>
<td>CN 103907321 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 2781062 AI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 2015503274 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US 2013121154 AI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WO 2013074697 AI</td>
</tr>
<tr>
<td>US 2013121149 AI</td>
<td>16-05-2013</td>
<td>NONE</td>
</tr>
<tr>
<td>WO 2014003534 AI</td>
<td>03-01-2014</td>
<td>CN 104335530 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 112012006604 T5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US 2014192677 AI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WO 2014003534 AI</td>
</tr>
</tbody>
</table>