CALL CIRCUIT SELECTION MANAGEMENT METHOD AND SYSTEM

Abstract: Described are various embodiments of a call circuit selection management method and system. In one embodiment, a computer-automated method is provided for managing circuit selection in establishing a call initiated via a calling device to a called destination. The method comprises receiving indication of a call request initiated from the calling device identifying the call destination, said call request having associated therewith at least one preset call service parameter; identifying an available circuit for completing said call request; upon confirming that said available circuit satisfies said at least one preset call service parameter, causing placement of said call request via said available circuit; otherwise causing provision of a user-selectable option via said calling device to proceed with said call request via said available circuit despite said at least one preset call service parameter being unsatisfied; and upon said user-selectable option being selected, causing placement of said call request via said available circuit.


With international search report (Art. 21(a))
— 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))
CALL CIRCUIT SELECTION MANAGEMENT METHOD AND SYSTEM

FIELD OF THE DISCLOSURE

[0001] The present disclosure relates to telephony, and in particular, to a call circuit selection management method and system.

BACKGROUND

[0002] Standard telephony generally involves the establishment of a call between a calling device and a destination defined by a calling request initiated via the calling device. To complete the call, one or more particular circuits are selected that link the calling device to the destination. Depending on the destination (local vs. national vs. international), different calling rates may be applied, which may depend not only on the destination, but also the selected circuit to complete the call.

[0003] In the context of a calling card or other long distance service, one or more circuits may be available to complete a call, with each one potentially offering different calling rates, and offering different circuit reliability and call quality. Accordingly, such a long distance service provider may elect from available circuits to increase profit margins and/or to offer better rates to their customers. In the context of a calling card service, a lowest available rate is generally advertised for different destinations based on a lowest-rate circuit accessible or known to the service provider, irrespective of availability. Upon placing a call with such a service, a customer may expect the advertised lowest available rate, but in fact be charged a much higher rate depending on circuit availability and applicable circuit call rates at the time the call is made. This discrepancy can cause significant customer frustration, particularly as most calling cards will advertise a number of available call time minutes for each destination for a given payment amount irrespective of whether such call time minutes are likely to be realized given the relatively volatile availability of such lowest rate circuits.
This background information is provided to reveal information believed by the applicant to be of possible relevance. No admission is necessarily intended, nor should be construed, that any of the preceding information constitutes prior art.

SUMMARY

The following presents a simplified summary of the general inventive concept(s) described herein to provide a basic understanding of some aspects of the invention. This summary is not an extensive overview of the invention. It is not intended to restrict key or critical elements of the invention or to delineate the scope of the invention beyond that which is explicitly or implicitly described by the following description and claims.

A need exists for a call circuit selection management method and system that overcomes some of the drawbacks of known techniques, or at least, provides a useful alternative thereto. Some aspects of this disclosure provide examples of such systems and methods.

In accordance with one aspect, there is provided a computer-automated method for managing circuit selection in establishing a call initiated via a calling device to a call destination, the method comprising: receiving indication of a call request initiated from the calling device identifying the call destination, said call request having associated therewith at least one preset call service parameter; identifying an available circuit for completing said call request; upon confirming that said available circuit satisfies said at least one preset call service parameter, causing placement of said call request via said available circuit; otherwise causing provision of a user-selectable option via said calling device to proceed with said call request via said available circuit despite said at least one preset call service parameter being unsatisfied; and upon said user-selectable option being selected, causing placement of said call request via said available circuit.

In accordance with one embodiment, the preset call service parameter comprises a preset calling rate.
In accordance with one embodiment, the preset calling rate is specific to the call destination.

In accordance with one embodiment, the method further comprises relaying an automated message to said calling device in providing said user-selectable option so to indicate a current call service parameter available via said available circuit.

In accordance with one embodiment, the method is automatically executed by a processor of a network-enabled device operatively associated with a telephony network switch and/or gateway processing said call request.

In accordance with one embodiment, the switch and/or gateway comprises a VoIP switch and/or gateway.

In accordance with one embodiment, the identifying said available circuit comprises identifying multiple available circuits appropriate for relaying said call request and each having a respective call service parameter associated therewith; and determining which of said multiple available circuits best satisfies said preset call service parameter based on each said respective call service parameter to select it as said available circuit.

In accordance with one embodiment, the number of said multiple available circuits varies as a function of at least one of time of day, destination and current call volume.

In accordance with one embodiment, the call request is initiated using a calling card service, and wherein said preset call service parameter comprises a preset calling rate associated with said calling card service based on a predefined circuit accessible to said calling card service with limited availability.

In accordance with one embodiment, the limited availability comprises a maximum overall calling time allotted to said calling card service for a given destination accessible via said predefined circuit and allotted at a discounted rate permissive of said preset calling rate.
In accordance with one embodiment, the limited availability comprises at least one of a preset time, preset times, a given weekday, given weekdays, a given weekend day and given weekend days during which access to said predefined circuit is provided to said calling card service at a discounted rate permissive of said preset calling rate.

In accordance with one embodiment, each said respective call service parameter further comprises at least one of a circuit reliability and a circuit quality metric, wherein said user-selected option comprises option to proceed as a function of said at least one of said circuit reliability and said circuit quality metric.

In accordance with one embodiment, the method is automatically executed as part of or in concert with an automated lowest cost routing application operable to identify a lowest cost routing circuit available or satisfying a preset call quality and/or reliability metric to the call destination.

In accordance with another aspect, there is provided a call circuit selection management device for managing selection of a call circuit for establishment of a call initiated via a calling device to a call destination, the device comprising: a circuit network interface to receive indication of a call request initiated from the calling device identifying the call destination, wherein said call request has at least one preset call service parameter associated therewith; a processor operatively associated with said circuit network interface to execute instructions, responsive to said call request indication, to: identify an available circuit for completing said call request; determine whether said available circuit satisfies said preset call service parameter; upon confirming that said available circuit satisfies said at least one preset call service parameter, instruct placement of said call request via said available circuit; otherwise cause provision of a user-selectable option via the calling device to proceed with said call request via said available circuit despite said at least one preset call service parameter being unsatisfied; and upon said user-selectable option being selected, instruct placement of said call request via said available circuit.

In accordance with one embodiment, the preset call service parameter comprises a stored preset calling rate.
In accordance with one embodiment, the preset calling rate is specific to the call destination.

In accordance with one embodiment, the instructions further comprise instructions to cause relaying of an automated message to the calling device in providing said user-selectable option so to indicate a current call service parameter available via said available circuit.

In accordance with one embodiment, the device is operatively associated with a telephony network switch and/or gateway processing said call request.

In accordance with one embodiment, the switch and/or gateway comprises a VoIP switch and/or gateway.

In accordance with one embodiment, the instructions to identify said available circuit comprise instructions to identify multiple available circuits appropriate for relaying said call request and each having a respective call service parameter associated therewith; and instructions to determine which of said multiple available circuits best satisfies said preset call service parameter based on each said respective call service parameter to select it as said available circuit.

In accordance with one embodiment, the instructions are executable as part of or in concert with an automated lowest cost routing application operable to identify a lowest cost routing circuit available or satisfying a preset call quality and/or reliability metric to the call destination.

In accordance with another aspect there is provided a computer-readable medium having statements and instructions stored thereon for implementation by a processor to manage selection of a call circuit for establishment of a call initiated via a calling device to a call destination initiation by: receiving indication of a call request initiated from the calling device identifying the call destination, said call request having associated therewith at least one preset call service parameter; identifying an available circuit for completing said call request; upon confirming that said available circuit satisfies said at least one preset call service parameter, causing placement of said call
request via said available circuit; otherwise causing provision of a user-selectable option via said calling device to proceed with said call request via said available circuit despite said at least one preset call service parameter being unsatisfied; and upon said user-selectable option being selected, causing placement of said call request via said available circuit.

[0029] In accordance with one embodiment, the preset call service parameter comprises a stored preset calling rate.

[0030] In accordance with one embodiment, the preset calling rate is specific to the call destination.

[0031] In accordance with one embodiment, the instructions further comprise instructions to cause relaying of an automated message to the calling device in providing said user-selectable option so to indicate a current call service parameter available via said available circuit.

[0032] In accordance with one embodiment, the instructions to identify said available circuit comprise instructions to identify multiple available circuits appropriate for relaying said call request and each having a respective call service parameter associated therewith; and instructions to determine which of said multiple available circuits best satisfies said preset call service parameter based on each said respective call service parameter to select it as said available circuit.

[0033] Other aspects, features and/or advantages will become more apparent upon reading of the following non-restrictive description of specific embodiments thereof, given by way of example only with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE FIGURES

[0034] Several embodiments of the present disclosure will be provided, by way of examples only, with reference to the appended drawings, wherein:
[0035] Figure 1 is a high level diagram of a call connection management system and method in accordance with one embodiment; and

[0036] Figure 2 is a flow diagram of a call connection management method implemented in accordance with an illustrative implementation of the embodiment of Figure 1.

DETAILED DESCRIPTION

[0037] The embodiments described herein provide different illustrative examples of a call circuit selection management method and system. For instance, in some embodiments, a circuit selection method is automatically executed in an attempt to provide a calling party a lowest available routing cost to the call destination, for instance, in respecting an advertised lowest available calling rate to this destination. Where routing circuits to the call destination available at the time the call is placed do not satisfy this advertised rate, the disclosed methods may result in the provision of a user-selectable option to proceed with their call request via what circuits are currently available despite the current unavailability of the advertised rate, thus empowering the caller to decide whether to proceed with the call and be subject to higher-than-advertised rates. A similar technique may be applied in the context of call quality, where for example advertised high quality circuits are not currently available, but where a caller may nonetheless elect to proceed with a call over lower quality circuits.

[0038] With reference to Figure 1, and in accordance with one embodiment, a user-mediated call circuit management system, generally referred to using the numeral 100, will now be described. In the example of Figure 1, an automated circuit selection device 102 is provided in automatically managing, at least in part, call circuit selection within the context of a general voice over data network system, such as Voice over IP (VoIP) network system 100. In this particular embodiment, the circuit selection device 102 provides for the execution of an automated caller-mediated process for addressing call circuit selection, for instance, where various routing options may be available to complete a given call to a given destination, but possibly not in accordance with one or more preset call service parameters advertised or otherwise expected by the caller. In this example,
the monitoring device 102 interfaces with the VoIP network system 100 to participate in call circuit selection for an illustrative call made over an available communication network(s) 101 between a calling device 104 and a call destination 106.

[0039] In this high level example, a call request is directed to an originating gateway 108 by the calling device 104 over an originating communication network link 110 so to initiate a call setup sequence and ultimately relay a call to the call destination 106 via a communicatively accessible destination gateway 112 and destination network link 114. It will be appreciated that multiple destination gateways 112 may be available to the originating gateway 108 to complete the call, and that selection of such gateway, and associated destination service provider may be based on different parameters and criteria, such as network access costs and fees, compatibility, reliability, existing business relationships or incentives between interfacing parties, etc. Furthermore, certain favourable destination gateways 112 and/or links 114 may be available at certain times, on certain days, and/or to accommodate certain call volumes, but may otherwise become unavailable to a given originating service provider for various such or other reasons, and at times unpredictably so. Accordingly, while a local service provider may legitimately advertise or promote access to various call destinations via such favourable destination gateways and/or links, they may in fact have limited access thereto, predictably or not, and thus fall short on certain advertised call service parameters to such destinations, such as call connection or airtime rates, available airtime minutes for a preset cost or account balance, call quality and/or reliability, and the like.

[0040] The known complexities of call circuit selection criteria and implementations may invoke, in some embodiments, the execution of known or proprietary least-cost routing (LCR) processes and techniques. For instance, LCR is generally associated with the process of selecting the path of outbound communication traffic based on cost. A telecommunication carrier may, for example, employ a LCR team that periodically (monthly, weekly or even daily) chooses between routes from several or even hundreds of carriers for destinations across the world. This process can otherwise be automated by a device or software program known as a Least Cost Router, or the like. For example, a dedicated LCR application software can be operated to automatically load price schedules
and code tables, keep control of volume commitment and available capacity with selected local and/or foreign carriers, correctly compare dial codes, convert a carrier's name-based price schedule into a dial code-dependent termination cost schedule, put costs in order, incorporate quality considerations, produce costing and routing schedules in a format suitable for pricing analysts and engineering, generate automatic orders to network switches, and transfer data into a related billing system. LCR application platforms can vary from basic homegrown applications to commercial products offering integration with switch and billing systems, for example.

[0041] With VoIP becoming a predominate carrier messaging system, routing becomes available from standalone products and hosted services. Standalone LCR systems in this context can integrate many powerful routing features such as jurisdictional routing, profit margin protected routing, standard LCR, and the like, as will be readily appreciated by the skilled artisan.

[0042] In any event, the circuit selection management systems and methods considered herein may be employed alone or in concert with the above or other such call routing techniques to deliver improved services while mitigating unnecessary operating losses. In the present example, an LCR application could, for instance, form part of, or be associated and/or interface with the caller-mediated circuit selection device 102 of Figure 1 so to operate in concert in the selection and caller-authorized routing of calls via selected circuits that may, in some circumstances, conflict with advertised or otherwise expected call parameters to the caller. In any event, and as will be discussed in greater detail below, selection of an appropriate communication network, or destination gateway 112 in this example, may at least in part be impacted by implementation of the caller-mediated device 102 of Figure 1.

[0043] The calling device 104 may consist of, but is not limited to, a traditional telephone communicating over a standard public switch telephone network (PSTN) link, a cellular telephone communicating over a local cellular communication network link, a VoIP phone or softphone communicating over an available data network link (e.g. Internet connection such as a dial-up, DSL, cable and/or optical fibre connection), and the
like. The call destination 106, much like calling device 104, may consist of different types of communication devices operating over an appropriate communication network link, or the like.

[0044] In this example, the device 102 is operatively associated with the originating gateway 108 so to actively partake in the routing of a call connection made via the originating gateway 108 between the calling device 104 and call destination 106. For the sake of illustration, the device 102 is shown as a separate device or hardware box interfacing with the communication network via the originating gateway 108. It will, however, be appreciated that the monitoring device 102 may also form part of the gateway 108, either as a fully or partially integrated or embedded hardware and/or software component, for example, to achieve a similar result. Alternatively, the device 102 may be interposed within the communication network to monitor communications relayed thereon and interface with a call service server 116 (introduced below) without requiring an active interface to the gateway 108, but rather probe the communication network without interference or disruption to existing or legacy equipment. In any event, the device 102 may be configured to monitor/track call setup signals, traffic, data and the like (commonly referred to herein as signals for simplicity) and automatically call upon an operator of the calling device 104 to participate in the validation of a call circuit selection ultimately resulting therefrom. For instance, and in accordance with one embodiment, the device 102 can interface with the communication network via originating gateway 108 to access an identified available circuit selection (i.e. selected via a distinct or integrated LCR application), retrieve one or more call service parameters (e.g. calling rate, circuit quality, etc.) associated with such selection and compare such applicable service parameters with preset call service parameters advertised or otherwise expected by the caller. Based on this automated comparison, the device 102 may cause implementation of an automated caller-mediated circuit selection authorization process, as appropriate or necessary, to validate applicable call service parameters to be applied for the call that may in fact diverge from those advertised or otherwise expected by the caller.

[0045] As illustrated in the embodiment of Figure 1, the device 102 may be operated
by a VoIP or other call service provider, such as a local, regional, national and/or international call service provider in order to provide greater assurance or control to their customers that billing metrics to be applied in respect of calls initiated via their services are appropriately applied, or at least more transparently applied through confirmed caller authorization. In this example, the call service provider is illustrated as operating a network-accessible call service server 116 or the like to manage and operate the originating gateway 108 in placing requested calls to multiple destinations around the globe and managing accounts associated with users making these calls, be they regular call service subscribers, pay-per-use subscribers, calling card users or the like.

[0046] In one particular example and with added reference to Figure 2, a circuit selection sequence, generally referred to using the numeral 200, is affected in whole or in part by an integrated circuit selection application executed to interface with an originating gateway, such as gateway 108 of Figure 1, to receive indication of a call request 202 initiated by a given calling device 104, and process selection of an appropriate or preferred circuit for completing the call request, for instance, via a selected destination gateway 112 and/or link 114 as may be available and/or appropriate given operational characteristics, preferences and/or limitations of the originating call service provider. As noted above, this process may be wholly or partly implemented by a distinct call circuit selection device 102 or platform operatively interfacing with the originating gateway 108 and/or network-accessible call service server 116, directly by the originating gateway 108, and/or by or as an integrated component or module of the call service server 116. Likewise, the various steps and processes involved in circuit selection may, again, be implemented wholly within the context of an integral circuit selection device or module, or distributed across two or more cooperating circuit selection platforms or modules, for instance, via cooperative implementation of an automated LCR application and a caller-mediated circuit selection approval application, as one example.

[0047] In any even, the circuit selection process will respond to the call request by first identifying (204) available circuits for completing the call request, and then selected one of these available circuits (206) based on one or more preset criteria, such as but not limited to reported circuit reliability, circuit quality, applicable connection and/or airtime
rates, and the like. In the context of an LCR-mediated circuit selection process, a lowest cost circuit available in completing the call request would generally be selected provided this lowest cost circuit meets certain minimum reliability and/or quality criteria.

[0048] Once an available circuit has been automatically selected, one or more service parameters associated with this selected circuit are compared (208) with one or more corresponding call service parameters advertised or otherwise expected by the caller (e.g. advertised rate, available minutes for pre-purchased calling/ mobile service card or remaining card balance, etc.). For instance, in the context of a calling card service, advertised or expected rates would generally correspond with a lowest cost circuit rate known to be at least occasionally available to the service provider. Accordingly, the call service provider would configure the caller-mediated circuit selection system to compare an call circuit rate available at that time with this lowest advertised rate.

[0049] In the event that the available call service parameter(s) do coincide with those expected by the caller, the call is executed via the selected circuit (210). However, where the call service parameter(s) do not coincide with those expected by the caller, the caller is probed by an automated message is relayed (212) to the caller requesting caller authorization to complete the call via the selected circuit despite the expected call service parameter(s) being unsatisfied by this selected circuit. Upon caller approval (214), the call is executed via the selected circuit (210), otherwise the call is terminated (216).

[0050] As will be appreciated by the skilled artisan, the caller may receive the automated message via various means depending on the type of device being operated to set the call. For example, the caller notification may come through as an automated voice recording identifying the actual rate applicable given the circuit selected and/or the number of minutes or airtime available to the user should the call continue based on a current caller account balance. The caller could then authorize pursuit of the call with the selected circuit via an appropriate voice command (e.g. captured and processed by a voice recognition software or the like), touch tone phone command (e.g. press "1" to continue, press "2" to try again, press "3" to disconnect), or again by staying on the line for a preset timer duration presumptively indicative of the caller's intention to continue
with the call on the selected circuit. Other examples may include the rendering of a text-based or graphically rendered message on text or graphic-enabled devices, and the capture of a caller selection via a corresponding text or graphically enabled selection function. These and other examples will be readily understood by the skilled artisan and are therefore intended to fall within the general scope and nature of the present disclosure.

[0051] While the present disclosure describes various exemplary embodiments, the disclosure is not so limited. To the contrary, the disclosure is intended to cover various modifications and equivalent arrangements included within the general scope of the present disclosure.
CLAIMS

What is claimed is:

1. A computer-automated method for managing circuit selection in establishing a call initiated via a calling device to a call destination, the method comprising:
   - receiving indication of a call request initiated from the calling device identifying the call destination, said call request having associated therewith at least one preset call service parameter;
   - identifying an available circuit for completing said call request;
   - upon confirming that said available circuit satisfies said at least one preset call service parameter, causing placement of said call request via said available circuit; otherwise
   - causing provision of a user-selectable option via said calling device to proceed with said call request via said available circuit despite said at least one preset call service parameter being unsatisfied; and
   - upon said user-selectable option being selected, causing placement of said call request via said available circuit.

2. The method of claim 1, wherein said preset call service parameter comprises a preset calling rate.

3. The method of claim 2, wherein said preset calling rate is specific to the call destination.

4. The method of any one of claims 1 to 3, further comprising relaying an automated message to said calling device in providing said user-selectable option so to indicate a current call service parameter available via said available circuit.
5. The method of any one of claims 1 to 4, wherein the method is automatically executed by a processor of a network-enabled device operatively associated with a telephony network switch and/or gateway processing said call request.

6. The method of claim 5, wherein said switch and/or gateway comprises a VoIP switch and/or gateway.

7. The method of any one of claims 1 to 6, wherein said identifying said available circuit comprises identifying multiple available circuits appropriate for relaying said call request and each having a respective call service parameter associated therewith; and determining which of said multiple available circuits best satisfies said preset call service parameter based on each said respective call service parameter to select it as said available circuit.

8. The method of claim 7, wherein a number of said multiple available circuits varies as a function of at least one of time of day, destination and current call volume.

9. The method of any one of claims 1 to 8, wherein said call request is initiated using a calling card service, and wherein said preset call service parameter comprises a preset calling rate associated with said calling card service based on a predefined circuit accessible to said calling card service with limited availability.

10. The method of claim 9, wherein said limited availability comprises a maximum overall calling time allotted to said calling card service for a given destination accessible via said predefined circuit and allotted at a discounted rate permissive of said preset calling rate.

11. The method of claim 9, wherein said limited availability comprises at least one of a preset time, preset times, a given weekday, given weekdays, a given weekend day and given weekend days during which access to said predefined circuit is provided to said calling card service at a discounted rate permissive of said preset calling rate.
12. The method of claim 7, wherein each said respective call service parameter further comprises at least one of a circuit reliability and a circuit quality metric, wherein said user-selected option comprises option to proceed as a function of said at least one of said circuit reliability and said circuit quality metric.

13. The method of any one of claims 1 to 12, wherein the method is automatically executed as part of or in concert with an automated lowest cost routing application operable to identify a lowest cost routing circuit available or satisfying a preset call quality and/or reliability metric to the call destination.

14. A call circuit selection management device for managing selection of a call circuit for establishment of a call initiated via a calling device to a call destination, the device comprising:

   a circuit network interface to receive indication of a call request initiated from the calling device identifying the call destination, wherein said call request has at least one preset call service parameter associated therewith;

   a processor operatively associated with said circuit network interface to execute instructions, responsive to said call request indication, to:

       identify an available circuit for completing said call request;

       determine whether said available circuit satisfies said preset call service parameter;

       upon confirming that said available circuit satisfies said at least one preset call service parameter, instruct placement of said call request via said available circuit; otherwise

       cause provision of a user-selectable option via the calling device to proceed with said call request via said available circuit despite said at least one preset call service parameter being unsatisfied; and

       upon said user-selectable option being selected, instruct placement of said call request via said available circuit.
15. The device of claim 14, wherein said preset call service parameter comprises a stored preset calling rate.

16. The device of claim 15, wherein said preset calling rate is specific to the call destination.

17. The device of any one of claims 14 to 16, wherein said instructions further comprise instructions to cause relaying of an automated message to the calling device in providing said user-selectable option so to indicate a current call service parameter available via said available circuit.

18. The device of any one of claims 14 to 17, wherein the device is operatively associated with a telephony network switch and/or gateway processing said call request.

19. The device of claim 18, wherein said switch and/or gateway comprises a VoIP switch and/or gateway.

20. The device of any one of claims 14 to 19, wherein said instructions to identify said available circuit comprise instructions to identify multiple available circuits appropriate for relaying said call request and each having a respective call service parameter associated therewith; and instructions to determine which of said multiple available circuits best satisfies said preset call service parameter based on each said respective call service parameter to select it as said available circuit.

21. The device of any one of claims 14 to 20, wherein said instructions are executable as part of or in concert with an automated lowest cost routing application operable to identify a lowest cost routing circuit available or satisfying a preset call quality and/or reliability metric to the call destination.
22. A computer-readable medium having statements and instructions stored thereon for implementation by a processor to manage selection of a call circuit for establishment of a call initiated via a calling device to a call destination initiation by:

receiving indication of a call request initiated from the calling device identifying the call destination, said call request having associated therewith at least one preset call service parameter;

identifying an available circuit for completing said call request;

upon confirming that said available circuit satisfies said at least one preset call service parameter, causing placement of said call request via said available circuit; otherwise

causing provision of a user-selectable option via said calling device to proceed with said call request via said available circuit despite said at least one preset call service parameter being unsatisfied; and

upon said user-selectable option being selected, causing placement of said call request via said available circuit.

23. The computer-readable medium of claim 22, wherein said preset call service parameter comprises a stored preset calling rate.

24. The computer-readable medium of claim 23, wherein said preset calling rate is specific to the call destination.

25. The computer-readable medium of any one of claims 22 to 24, wherein said instructions further comprise instructions to cause relaying of an automated message to the calling device in providing said user-selectable option so to indicate a current call service parameter available via said available circuit.

26. The computer-readable medium of any one of claims 22 to 25, wherein said instructions to identify said available circuit comprise instructions to identify multiple available circuits appropriate for relaying said call request and each having a respective call service parameter associated therewith; and instructions to determine which of said
multiple available circuits best satisfies said preset call service parameter based on each said respective call service parameter to select it as said available circuit.
FIGURE 2

1. RECEIVE CALL REQUEST
2. IDENTIFY AVAILABLE CIRCUITS
3. SELECT AVAILABLE CIRCUIT BASED ON PRESET CRITERIA
4. COMPARE CALL SERVICE PARAMETERS
5. AS ADVERTISED? NO → 212 PROBE CALLER FOR APPROVAL OF AVAILABLE CALL SERVICE PARAMETERS → 216 TERMINATE CALL
   YES → 210 EXECUTE CALL VIA SELECTED CIRCUIT → 214 APPROVED? NO → 216 TERMINATE CALL
   YES
INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2016/051019

A. CLASSIFICATION OF SUBJECT MATTER
   IPC: H04L 12/12 (2006.01), H04L 12/14 (2006.01), H04L 12/50 (2006.01), H04L 12/66 (2006.01)

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
   IPC: all

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

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
   Canadian patent database, Questel Orbit and Google

Some search terms used: least cost routing, managing circuit selection, call, route, authorization, call setup, calling card, rate, rule based call

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>
<tbody>
<tr>
<td>Y</td>
<td>WO 01/63820 (Bulawa et al.) 30 August 2001 (30-08-2001) Abstract; pages 5-8; figure 1</td>
<td>1-26</td>
</tr>
<tr>
<td>Y</td>
<td>US 5473630 (Penzias et al.) 05 December 1995 (05-12-1995) Figure 5, item 514; column 6, lines 44-67</td>
<td>1-26</td>
</tr>
</tbody>
</table>

Γ Further documents are listed in the continuation of Box C. 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 or 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
   "&" document member of the same patent family

Date of the actual completion of the international search
01 December 2016 (01-12-2016)

Date of mailing of the international search report
28 December 2016 (28-12-2016)

Name and mailing address of the ISA/CA
Canadian Intellectual Property Office
Place du Portage 1, Cl 14 - 1st Floor, Box PCT
50 Victoria Street
Gatineau, Quebec K1A 0C9
Facsimile No.: 819-953-2476

Authorized officer
C. Wong (819) 639-8353

Form PCT/ISA/210 (second sheet) (January 2015)
<table>
<thead>
<tr>
<th>Patent Document</th>
<th>Publication Date</th>
<th>Patent Family Member(s)</th>
<th>Publication Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AU4867501 A</td>
<td>03 September 2001 (03-09-2001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HK1 030724A2</td>
<td>04 May 2001 (04-05-2001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BR9400058A</td>
<td>09 August 1994 (09-08-1994)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA21 1359SA1</td>
<td>20 July 1994 (20-07-1994)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA2205308C</td>
<td>28 December 1999 (28-12-1999)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CN109921A</td>
<td>22 February 1995 (22-02-1995)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE69428728D1</td>
<td>29 November 2001 (29-11-2001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE69428728T2</td>
<td>01 August 2002 (01-08-2002)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP0608066B1</td>
<td>24 October 2001 (24-10-2001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP1 093285A2</td>
<td>18 April 2001 (18-04-2001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP1 093285A3</td>
<td>02 October 2002 (02-10-2002)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HU9400122D0</td>
<td>30 May 1994 (30-05-1994)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HUT66134A</td>
<td>28 September 1994 (28-09-1994)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HU21 3822B</td>
<td>28 October 1997 (28-10-1997)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JPH09116635A</td>
<td>02 May 1997 (02-05-1997)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JPH06244957A</td>
<td>02 September 1994 (02-09-1994)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RU21 13769C1</td>
<td>20 June 1998 (20-06-1998)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW284946B</td>
<td>01 September 1996 (01-09-1996)</td>
</tr>
</tbody>
</table>

Form PCT/ISA/210 (patent family annex) (January 2015)