11-15-00

#692918 v1 - m-6011-1c us transmittal cont. appln - Please type a plus sign (+) inside this box ⇒ [+]

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JC869 U.S. PTO 09/712712 11/14/00

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	M-6011-1C US
First Named Inventor or Application Identifier	Lange
Title	Network System Extensible By Users
Express Mail Label No.	EL 707 907 142 US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents

ADDRESS TO: Commissioner for Patents, Box Patent Application, Washington, D.C. 20231

1. ☒ Fee Transmittal Form - ***see page 2 of this form.*** (Submit an original, and a duplicate for fee processing)
2. Application:
   - ☒ Specification: (preferred arrangement set forth below)
     Descriptive title of the Invention,
     Cross References to Related Applications.
     Reference to Microfiche Appendix,
     Background of the Invention,
     Brief Summary of the Invention,
     Brief Description of the Drawings, and
     Detailed Description (all totaling 86 pages)
     Appendix(ces) ___, ___, & ___ (____pages)
   - ☒ Claim(s) 17 pages
   - ☒ Abstract of the Disclosure 1 page
3. ☒ Drawing(s) (35 USC 113) [Total Sheets 17]
4. Oath or Declaration ☐ unsigned [Total Pages 3]
   - a. ☐ Newly executed (original or copy)
   - b. ☒ Copy from prior application (37 CFR §1.63(d)) (for continuation/divisional with Box 17 completed)
   - c. ☐ DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
5. ☒ Incorporation By Reference (useable if Box 4b is checked)
   The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program Appendix consisting of ____ pages of microfiche containing ___ frames on each page in accompanying envelope.
7. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
   - a. ☐ Computer Readable Copy
   - b. ☐ Paper Copy (identical to computer copy)
   - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☒ Assignment Papers* (cover sheet & documents) 3 pages
9. ☒ 37 CFR §3.73(b) Statement* 3 pages
   ☒ Power of Attorney*
10. ☐ English Translation Document (if applicable)
11. ☐ Information Disclosure Statement (IDS) & ☐ PTO-1449 ☐ ___Copies of IDS Citations/References
12. ☒ Preliminary Amendment 12 pages
13. ☒ Return Receipt Postcard (MPEP 503) (should be specifically itemized)
14. Small Entity Status
    - ☐ Small Entity Statement Enclosed ___ pages
    - ☐ Statement filed in prior application; and status still proper and desired
    - ☐ Is no longer claimed.
15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☒ Other: Assignment was recorded on 10/23/98 on Reel 9557 at frame 0591.

***copy from prior application**

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information and a preliminary amendment:
    ☒ Continuation ☐ Divisional of prior application No. 09/178,366
    Filed on October 23, 1998, entitled: NETWORK SYSTEM EXTENSIBLE BY USERS
    PRIOR APPLICATION INFORMATION: *Examiner* Mehmet B. Geckil *Group Art Unit* 2756

18. CORRESPONDENCE ADDRESS

Customer Number or Bar Code Label or ☒ Correspondence address below

Name	**Philip W. Woo**			Reg. No. 39,880	
Attorneys for Applicant	**Skjerven Morrill MacPherson LLP**				
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19. Fee calculations.

CLAIMS (Number Filed)	(1) FOR	(2)		(3) NUMBER EXTRA		(4) RATE		(5) CALCULATIONS
65	TOTAL CLAIMS (37 CFR 1.16(c))	-20	=	45	x	$18	=	$810 00
5	INDEPENDENT CLAIMS (37 CFR 1.16(b))	-3	=	2	x	$80	=	$ 160.00
☐	MULTIPLE DEPENDENT CLAIMS (if applicable) (37 CFR 1.18(d))				+	$260.00	=	
						BASIC FEE (37 CFR 1.16(a))	=	$ 710.00
						Total of above Calculations	=	$ 810.00
							=	
						TOTAL	=	$ 1,680.00

20. FEES: The Commissioner is hereby authorized to credit overpayments or charge the following fees to Deposit Account No. **19-2386**:
   a. ☒ Fees required under 37 CFR 1.16. (U.S. Application Filing Fees)
   b. ☒ Fees required under 37 CFR 1.17. (Conditional Extension of Time Fees)
   c. ☐ Fees required under 37 CFR 1.18. (Patent Issue Fees)

21. ☐ Other: _____

NOTE: **The prior application's correspondence address will carry over to this UPA UNLESS a new correspondence address is provided below.**

22. NEW CORRESPONDENCE ADDRESS					
Customer Number or Bar Code Label				New correspondence address below	
NAME					
ADDRESS					
CITY		STATE		ZIP CODE	
COUNTRY		TELEPHONE		FAX	

23. SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED		
Skjerven Morrill MacPherson LLP 25 Metro Drive, Suite 700 San Jose, CA 95110 Tel. (408) 453-9200 Fax. (408) 453-7979		
Date:	November 14, 2000	
Name	Philip W. Woo	Reg. No. 39,880
Signature	Philip W. Woo	
Express Mail Label No.	EL 707 907 142 US	

692918 v1

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Danny Lange, Barbara Nelson, Jing Su, and James E. White		
Assignee:	General Magic		
Title:	NETWORK SYSTEM EXTENSIBLE BY USERS		
Serial No.:	Unassigned	Filed:	November 14, 2000
Examiner:	Unassigned	Group Art Unit:	Unassigned
Docket No.:	M-6011-1C US		

San Jose, California
November 14, 2000

BOX PATENT APPLICATION
COMMISSIONER FOR PATENTS
Washington, D.C. 20231

Express Mail Label No. EL 707 907 142 US

PRELIMINARY AMENDMENT

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION

Page 1, in the header: immediately following "M-6011 US" please insert —1C—.

Page 1, in the express mail label box: please cancel "EL 030 470 745 US" and substitute —EL 707 907 142 US—.

Page 1, before line 10, "TECHNICAL FIELD OF THE INVENTION", insert the following:

—CROSS REFERENCE TO RELATED APPLICATIONS

The present application is a continuation of Serial No. 09/178,366, filed October 23, 1998, entitled "Network System Extensible By Users" which application was allowed on July 3, 2000.—

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IN THE CLAIMS:

Please amend the claims as follows.

Please cancel claims 1-76.

Please add new claims 77-141 as follows:

—77. (New) A network system comprising:

a service;

an agent operable to use the service on behalf of a principal and to consume a service resource while using the service;

an agent server operable to mediate the use of the service by the agent; and

a service wrapper associated with the service, the service wrapper operable to monitor the consumption of the service resource by the agent.

78. (New) The network system of Claim 77 wherein the service wrapper is operable to terminate the agent in response to the monitoring.

79. (New) The network system of Claim 77 wherein the agent server is operable to charge the principal for the consumption of the service resource.

80. (New) The network system of Claim 77 further comprising a service permission associated with the service resource and the agent, the service permission specifying a predetermined amount of the service resource which the agent is allowed to consume.

81. (New) The network system of Claim 77 further comprising a service permission associated with the service resource and the principal, the service permission

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specifying a predetermined amount of the service resource which is allowed to be consumed on behalf of the principal.

82. (New) The network system of Claim 77 wherein the service resource comprises elapsed time for a telephone call.

83. (New) The network system of Claim 77 wherein the service resource comprises cost for a telephone call.

84. (New) The network system of Claim 77 wherein the service wrapper is operable to translate between a first instruction set and a second instruction set.

85. (New) The network system of Claim 77 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete an agent template from which the agent is created.

86. (New) The network system of Claim 77 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete the agent.

87. (New) The network system of Claim 86 wherein the user interface comprises a graphical user interface.

88. (New) The network system of Claim 87 wherein the graphical user interface comprises:

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a web server resident in the network system; and

a web browser resident in a user device.

89. (New) The network system of Claim 86 wherein the user interface comprises a voice user interface.

90. (New) The network system of Claim 89 wherein the voice user interface comprises a speech recognition application.

91. (New) The network system of Claim 89 wherein the voice user interface comprises a speech synthesis application.

92. (New) The network system of Claim 89 wherein the voice user interface comprises a speech playback device.

93. (New) The network system of Claim 77 wherein the service comprises a user interface service operable to provide a user interface by which the agent can interact with a user.

94. (New) The network system of Claim 93 wherein the user interface comprises a graphical user interface.

95. (New) The network system of Claim 94 wherein the graphical user interface comprises:

a web server resident in the network system; and

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Date Entered: 05/14/2008

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a web browser resident in a user device.

96. (New) The network system of Claim 93 wherein the user interface comprises a voice user interface.

97. (New) The network system of Claim 96 wherein the voice user interface comprises a speech recognition application.

98. (New) The network system of Claim 96 wherein the voice user interface comprises a speech synthesis application.

99. (New) The network system of Claim 96 wherein the voice user interface comprises a speech playback device.

100. (New) The network system of Claim 77 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.

101. (New) A network system comprising:

a user interface operable to allow a user to interact with the network system; and

an agent server coupled to the user interface, the agent server operable to manage the operation of a programmable functionality component of the network system, the agent server in conjunction with the user interface operable to create, modify, or delete an agent in response to interaction by the user, the agent operable to consume a service resource as the agent uses a service on behalf of the user.

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Docket No.: 21676-0010

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102. (New) The network system of Claim 101 wherein the user interface comprises a graphical user interface.

103. (New) The network system of Claim 102 wherein the graphical user interface comprises a web browser application.

104. (New) The network system of Claim 101 wherein the user interface comprises a voice user interface.

105. (New) The network system of Claim 104 wherein the voice user interface comprises a speech recognition application.

106. (New) The network system of Claim 104 wherein the voice user interface comprises a speech synthesis application.

107. (New) The network system of Claim 104 wherein the voice user interface comprises a speech playback device.

108. (New) The network system of Claim 101 wherein the user interface comprises an agent area for creating, modifying, or deleting the agent.

109. (New) The network system of Claim 101 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.

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110. (New) The network system of Claim 101 further comprising a service wrapper associated with the service, the service wrapper operable to cooperate with the agent server to mediate interaction between the service and the agent.

111. (New) The network system of Claim 110 wherein the service wrapper is operable to convert between a first computer language used by the agent and a second computer language used by the service.

112. (New) The network system of Claim 110 wherein the service wrapper is operable to monitor the amount of service resource consumed by the agent when the agent utilizes the service.

113. (New) A method comprising:

admitting a user to a network system wherein at least one agent is operable to consume a service resource while utilizing a service to perform a task for the user; and

allowing the user to create, modify, or delete the agent within the network system.

114. (New) The method of Claim 113 further comprising accepting an agent command from the user.

115. (New) The method of Claim 114 wherein the agent command is one of a create agent command, an edit agent command, and a delete agent command.

Docket: 25902.59

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116. (New) The method of Claim 113 further comprising suspending execution of the agent.

117. (New) The method of Claim 113 further comprising accepting a template command from the user.

118. (New) The method of Claim 117 further comprising allowing the user to create, modify, or delete an agent template within the network system.

119. (New) The method of Claim 113 further comprising admitting the user to an agent area of a user interface.

120. (New) A network system comprising:

an agent server operable to manage the operation of a programmable functionality component of the network system;

a service;

an agent operable to consume a service resource while utilizing the service; and

a service wrapper associated with the service, the service wrapper operable to cooperate with the agent server to mediate interaction between the service and the agent.

121. (New) The network system of Claim 120 wherein the service wrapper comprises a monitor, the monitor operable to monitor the amount of the service resource consumed by the agent when the agent utilizes the service.

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122. (New) The network system of Claim 120 wherein the service wrapper comprises a converter, the converter operable to convert between a first computer language used by the agent and a second computer language used by the service.

123. (New) The network system of Claim 122 wherein the converter comprises an agent server to service converter for converting from the first computer language to the second computer language.

124. (New) The network system of Claim 122 wherein the converter comprises a service to agent server converter for converting from the second computer language to the first computer language.

125. (New) The network system of Claim 120 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.

126. (New) The network system of Claim 120 further comprising a user interface operable to allow a user to interact with the network system in order to create the agent.

127. (New) The network system of Claim 126 wherein the user interface comprises a graphical user interface.

128. (New) The network system of Claim 127 wherein the graphical user interface comprises a web browser application.

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129. (New) The network system of Claim 127 wherein the user interface comprises a voice user interface.

130. (New) The network system of Claim 129 wherein the voice user interface comprises a speech recognition application.

131. (New) The network system of Claim 129 wherein the voice user interface comprises a speech synthesis application.

132. (New) The network system of Claim 129 wherein the voice user interface comprises a speech playback device.

133. (New) The network system of Claim 120 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising data and instructions executable within the agent server.

134. (New) The network system of Claim 120 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising a permission for the agent.

135. (New) A method comprising:

allowing an agent to consume a service resource while utilizing a service; and

mediating interaction between the service and the agent.

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Date Entered: 09/14/2004

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136. (New) The method of Claim 135 wherein mediating comprises monitoring the amount of a service resource consumed by the agent.

137. (New) The method of Claim 135 wherein mediating comprises:

identifying a service permission required in order for the agent to consume the service resource; and

determining whether the agent holds the required service permission.

138. (New) The method of Claim 135 wherein mediating comprises:

receiving an instruction which requires that the agent consume the service resource associated with the service when the agent utilizes the service;

identifying an amount of the service resource which would be consumed if the instruction is executed;

identifying an amount of the service resource allotted to the agent; and

determining whether the amount which is allotted is greater than or equal to the amount which would be consumed.

139. (New) The method of Claim 138 wherein mediating comprises:

executing the instruction if the amount which is allotted is greater than or equal to the amount which would be consumed; and

subtracting the amount which would be consumed from the amount which is allotted.

140. (New) The method of Claim 135 further comprising converting between a first computer language used by an agent and a second computer language used by the service.

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141. (New) The method of Claim 135 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.—

REMARKS

Claims 1-76 are canceled. Claims 77-141 are added. Amendments to the specification are to identify related applications. No new matter is added.

Applicants request claims 77-141 be allowed and passed to issue and invite the Examiner to telephone Applicants' attorney at 415-217-6000 if there are any questions.

I hereby certify that this correspondence is being deposited with the United States Postal Service under Express Mail, label EL 707 907 142 US, in an envelope addressed to: Box Patent Application, Commissioner for Patents, Washington, D.C. 20231, on November 14, 2000.

Nov. 14, 2000
Attorney for Applicant(s) Date of Signature

Respectfully submitted,

Philip W. Woo
Attorney for Applicants
Reg. No. 39,880

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EXPRESS MAIL LABEL NO:
EL 030 470 745 US

NETWORK SYSTEM

EXTENSIBLE BY USERS

Danny Lange
Barbara Nelson
Jing Su
James E. White

DOCKET: 2156.360

TECHNICAL FIELD OF THE INVENTION

The present invention relates generally to the field of computer software systems and, more particularly, to a network system extensible by users.

CROSS-REFERENCE TO MICROFICHE APPENDICES

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Docket No. 460038

CROSS-REFERENCE TO RELATED APPLICATIONS

This Application relates to the subject matter disclosed in the following United States Patent and co-pending United States Applications:

United States Patent No. 5,603,031 to White et al., entitled "System and Method For Distributed Computation Based Upon the Movement, Execution, and Interaction of Processes In a Network;"

United States Application Serial No. 08/609,699, filed March 1, 1996, entitled "Method and Apparatus For Telephonically Accessing and Navigating the Internet;"

United States Application Serial No. 08/798,675, filed February 10, 1997, entitled "System and Method For Distributed Computation Based Upon the Movement, Execution, and Interaction of Processes In a Network;" and

United States Application Serial No. 09/071,717, filed May 1, 1998, entitled "Voice User Interface With Personality."

The above patent and co-pending applications are assigned to the present Assignee and are incorporated herein by reference.

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BACKGROUND OF THE INVENTION

Advances in computer and telephony systems have led to the development of numerous technology-driven services, such as electronic mail (e-mail), voice mail, electronic organizers (for appointments and addresses), on-line databases (e.g., for periodicals and stock quotes), and the like. An increasing popularity for these technological services in recent years has spawned an entire industry devoted to the provision and integration of the same. For example, numerous companies now offer e-mail service over the interconnection of computers widely known as the Internet. Other companies offer systems for voice mail services in both private branch exchange (PBX) and public telephone environments. Entities which offer, supply, or otherwise provide services are referred to as "service providers." Entities which purchase, consume, or otherwise use services are referred to as "subscribers."

Many technological services are supported by one or more software applications. These software

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applications are often developed with a broad spectrum of subscribers in mind. As such, the respective technological services may address the generalized needs of many subscribers, but not the specialized needs of any one particular subscriber or group of subscribers.

With previous techniques, when a subscriber desires to alter, change, modify, or otherwise customize a service to suit his or her own specialized needs, that subscriber must contact the appropriate service provider. If the service provider deems that there is sufficient demand for such customization, the provider will initiate a modification of the supporting software application for the relevant service. Software programmers or developers must then modify the existing software application to address the specialized needs of the requesting subscriber(s), and afterwards, test the modified software to ensure that it is functioning properly. Many iterations of modification and testing may be performed before the finished, customized service is available to the subscriber.

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In light of the above, it is clear that previous techniques are problematic for numerous reasons. For example, a service provider is required to maintain or otherwise employ a staff of human software developers for making modifications to supporting software applications. This can be expensive. Furthermore, a substantial amount of time may be required to develop, modify, and test supporting software applications in response to the request of a particular subscriber or group of subscribers. This can lead to subscriber dissatisfaction, and ultimately, defection to another service provider.

SUMMARY OF THE INVENTION

The disadvantages and problems associated with previous techniques for providing technological services have been substantially reduced or eliminated using the present invention.

The present invention provides a network system extensible (e.g., programmable) by "end-users," and a method of operation for the same. In general, an end-user (or simply "user") is any individual, party, or

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entity which somehow interacts with the network system. A user can thus be an entity known to the network system (i.e., an entity having a log-in ID), such as, for example, a subscriber and or an individual affiliated with the service provider. A user can also be an arbitrary third-party which somehow interacts with the network system.

With the present invention, users may extend or customize the network system according to their own particular needs. To accomplish this, a network system is augmented with an agent system. Capabilities of the network system are programmatically exposed by means of one or more services, service resources, and service wrappers. Each service individually, or the network system as a whole, can be extended by adding agents (created by users). Furthermore, the consumption of computational and service resources are monitored within the network system, thus protecting the subscribers and the service provider from harm or misuse, whether intentional or inadvertent. Accordingly, the network system can admit agents programmed by users.

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In addition, the present invention contemplates that a third party may modify existing agents and create new agents in the case where subscribers lack the desire or sophistication to do so themselves. The third party can then make such customized agents commercially available to subscribers.

According to an embodiment of the present invention, a network system includes a service. An agent uses the service on behalf of a principal. An agent server mediates the use of the service by the agent.

According to another embodiment of the present invention, a network system includes a user interface which allows a user to interact with the network system. An agent server is coupled to the user interface. The agent server manages agent use of the network system. Furthermore, the agent server in conjunction with the user interface is operable to create or modify an agent in response to interaction by the user.

According to yet another embodiment of the present invention, a method includes the following: admitting

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a user to a network system wherein at least one agent is operable to utilize a service to perform a task for the user; and allowing the user to create or modify the agent within the network system.

According to still another embodiment of the present invention, a network system includes an agent server which manages agent use of the network system. An agent is operable to utilize a service within the network system. A service wrapper, associated with the service, cooperates with the agent server to mediate interaction between the service and the agent.

According to yet another embodiment of the present invention, a method includes the following: allowing an agent to utilize a service; and mediating interaction between the service and the agent.

A technical advantage of the present invention includes providing a network system (and a method of operation therefor) which is programmable by users (including subscribers) according to their own particular needs. From the standpoint of subscribers, this facilitates the process of adding or deleting new services or extending existing services and, from the

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standpoint of a service provider, this is beneficial in that human software developers and testers can be reduced or eliminated altogether with the automated system of the present invention.

Other aspects and advantages of the present invention will become apparent from the following descriptions and accompanying drawings.

Date Recue/Date Received 2020-12-22

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and for further features and advantages, reference is now made to the following description taken in conjunction with the accompanying drawings, in which:

Figure 1 illustrates a network system extensible by users, according to an embodiment of the present invention;

Figure 2 illustrates an exemplary computer-based system that can be used to implement the network system shown in Figure 1;

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Figure 3 illustrates details for a graphical user interface, according to an embodiment of the present invention;

Figure 4 illustrates details for a voice user interface, according to an embodiment of the present invention;

Figure 5 illustrates details for an agent server, according to an embodiment of the present invention;

Figure 6 illustrates details for a service wrapper, according to an embodiment of the present invention;

Figure 7 illustrates details for specific exemplary service wrappers, services, and service resources;

Figure 8 illustrates details for an exemplary agent object, according to an embodiment of the present invention;

Figure 9 is a flow diagram of an exemplary method for a user session, according to an embodiment of the present invention;

Figure 10 is a flow diagram of an exemplary method for executing a selection command for selecting an

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agent or an agent template, according to an embodiment of the present invention;

Figure 11 is a flow diagram of an exemplary method for executing an agent template command, according to an embodiment of the present invention;

Figure 12 is a flow diagram of an exemplary method for executing an agent command, according to an embodiment of the present invention;

Figure 13 is a block diagram detailing the controlled consumption of service and computational resources, according to an embodiment of the present invention;

Figure 14 is a flow diagram of an exemplary method for executing time slices for an agent population, according to an embodiment of the present invention;

Figure 15 is a flow diagram of an exemplary method for executing a time slice for an agent, according to an embodiment of the present invention;

Figure 16 is a flow diagram of an exemplary method for executing an event handler, according to an embodiment of the present invention; and

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Figure 17 is a flow diagram of an exemplary method for executing a service instruction, according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments of the present invention and their advantages are best understood by referring to Figures 1 through 17 of the drawings. Like numerals are used for like and corresponding parts of the various drawings.

Turning first to the nomenclature of the specification, the detailed description which follows is represented largely in terms of processes and symbolic representations of operations performed by conventional computer components, such as a central processing unit (CPU) or processor associated with a general purpose computer system, memory storage devices for the processor, and connected pixel-oriented display devices. These operations include the manipulation of data bits by the processor and the maintenance of these bits within data structures resident in one or more of the memory storage devices. Such data structures

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impose a physical organization upon the collection of data bits stored within computer memory and represent specific electrical or magnetic elements. These symbolic representations are the means used by those skilled in the art of computer programming and computer construction to most effectively convey teachings and discoveries to others skilled in the art.

For purposes of this discussion, a process, method, routine, or sub-routine is generally considered to be a sequence of computer-executed steps leading to a desired result. These steps generally require manipulations of physical quantities. Usually, although not necessarily, these quantities take the form of electrical, magnetic, or optical signals capable of being stored, transferred, combined, compared, or otherwise manipulated. It is conventional for those skilled in the art to refer to these signals as bits, values, elements, symbols, characters, text, terms, numbers, records, files, or the like. It should be kept in mind, however, that these and some other terms should be associated with appropriate physical quantities for computer operations, and that these

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terms are merely conventional labels applied to physical quantities that exist within and during operation of the computer.

It should also be understood that manipulations within the computer are often referred to in terms such as adding, comparing, moving, or the like, which are often associated with manual operations performed by a human operator. It must be understood that no involvement of the human operator may be necessary, or even desirable, in the present invention. The operations described herein are machine operations performed in conjunction with the human operator or user that interacts with the computer or computers.

In addition, it should be understood that the programs, processes, methods, and the like, described herein are but an exemplary implementation of the present invention and are not related, or limited, to any particular computer, apparatus, or computer language. Rather, various types of general purpose computing machines or devices may be used with programs constructed in accordance with the teachings described herein. Similarly, it may prove advantageous to

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construct a specialized apparatus to perform the method steps described herein by way of dedicated computer systems with hard-wired logic or programs stored in non-volatile memory, such as read-only memory (ROM).

Network System Overview

Referring now to the drawings, Figure 1 illustrates a network system 2 extensible by users, according to an embodiment of the present invention. To achieve this, network system 2 may incorporate an agent system comprising an agent server and one or more agents, as described below in more detail. An exemplary construction for an agent system is taught by United States Patent No. 5,603,031, issued to the Assignee of the present invention, the text of which is incorporated herein by reference.

It is contemplated that network system 2 may be maintained, managed, and/or operated by any provider of technological services, such as electronic mail (e-mail), voice mail, electronic organizer (for appointments and/or addresses), on-line data retrieval (for, e.g., periodicals and stock quotes), and the

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like. These services are offered and/or provided to one or more users who may be considered to be "subscribers." Each of the provider and the subscribers can be an individual, a business, a governmental department or agency, an academic institution, an organization, or the like, which provides or receives, respectively, any form of technological service.

The following primarily describes how network system 2 and its associated methods of operation can be used to provide information technology services over a telephony system. Furthermore, a model of a network system providing telephony services is discussed in detail in microfiche Appendix A, in accordance with one embodiment of the present invention. It should be understood, however, that the present invention is not so limited. That is, the teachings of the present invention generally encompass the provision of services by agents to one or more users in an environment which can be extended by the users, for example, by programming additional agents.

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Network system 2 includes a programmable functionality component 4 and a hard-wired functionality component 6. In general, programmable functionality component 4 and hard-wired functionality component 6 each functions to provide and/or support the provision of technological services. Hard-wired functionality component 6 is implemented substantially with a number of "hard-wired" elements, and thus, its functionality is modified or changed primarily by connecting or re-connecting the same or additional elements. Programmable functionality component 4 is implemented with an agent system and, as such, its functionality can be programmed (for example, by subscribers or third parties), as described below in more detail. Computer code for an exemplary agent system implementing a programmable functionality component 4 is provided in microfiche Appendix B, in accordance with an embodiment of the present invention.

Graphical User Interface

Network system 2 includes a graphical user interface (GUI) 12. Graphical user interface 12 may be

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implemented and/or supported by a web browser--i.e., a client application that resides on (or is downloaded to) an electronic user device, such as a desktop computer. Any of a variety of browsers are available, such as NETSCAPE NAVIGATOR, MICROSOFT INTERNET EXPLORER, and others. The web browser can be a forms-capable browser which is able to interpret Hyper Text Markup Language (HTML) code which provides forms including fill-in text boxes, option buttons, drop-down list boxes, radio buttons, and the like.

Graphical user interface 12 allows a user to interact with network system 2 via a communication line, which may be any type of communication link capable of supporting data transfer. For example, the communication line may include any combination of an Integrated Services Digital Network ("ISDN") communication line, a hard-wired line or a telephone line. This enables communication via the interconnection of computers popularly known as the "Internet," using any suitable protocol, such as, Transmission Control Protocol/Internet Protocol

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(TCP/IP), Internetwork Packet eXchange/Sequence Packet eXchange (IPX/SPX), or AppleTalk.

Graphical user interface 12--comprising a web browser and a web server--manages the connection between the user device and network system 2, supports the transfer of data therebetween, and interprets and displays the data. For example, graphical user interface 12 enables the downloading of one or more web pages (serving as graphical interfaces into network system 2) to the user device. The user device may include one or more suitable input devices, such as a keyboard, key pad, touch screen, input port, pointing device (e.g. mouse), and/or other device that can accept information, and one or more suitable output devices, such as a computer display, output port, speaker, or other device for conveying information including digital data, visual information, or audio information.

Graphical user interface 12 may comprise an agent area 14 which is dedicated to the activities of creating new agents and manipulating existing agents, as described herein. For example, in one embodiment, an "agent" icon is added to a screen menu; the

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interface screen which is accessed by "clicking" on the agent icon constitutes the agent area.

Voice User Interface

A voice user interface (VUI) 16 allows a user to interact with network system 2 via a telephone line, which can be an analog telephone line, a digital T1 line, a digital T3 line, or an OC3 telephony feed. In contrast to graphical user interface 12, voice user interface 16 does not require that a user have access to an electronic interface, such as a computer. Rather, voice user interface 16 interprets the vocalized expressions of a user so that the user may issue commands and other input into network system 2. Voice user interface 16 may also issue audible output in the form of speech that is understandable by a user. Such speech can be synthesized or previously recorded, as described below in more detail.

Voice user interface 16 may comprise speech recognition and speech synthesis software and/or hardware stored in or implemented as a suitable memory device and run on a suitable processor. Such speech

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recognition software allows network system 2 to recognize vocalized speech and may include grammar software that creates or selects a speech recognition grammar for determining which speech should be recognized. Commercially available speech recognition systems with recognition grammars are provided by ASR (Automatic Speech Recognition) technology vendors such as the following: Nuance Corporation of Menlo Park, CA; Dragon Systems of Newton, MA; IBM of Austin, TX; Kurzweil Applied Intelligence of Waltham, MA; Lernout Hauspie Speech Products of Burlington, MA; and PureSpeech, Inc. of Cambridge, MA. Recognition grammars are written specifying what sentences and phrases are to be recognized by the voice user interface 16. For example, a recognition grammar can be generated by a computer scientist or a computational linguist or a linguist. The speech synthesis software synthesizes human speech and may include speech markup software for determining the speech to be synthesized.

In addition to speech synthesis software and/or hardware, voice user interface 16 may include speech play-back capabilities for playing back previously

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recorded human speech. Exemplary play-back devices include a tape player, a laser disc player, etc. Here, an actual person (preferably an actor) recites various statements which may desirably be issued during an interactive session with a user of network system 2. The person's voice is recorded as the recitations are made. The recordings are separated into discrete messages, each message comprising one or more statements that would desirably be issued in a particular context (e.g., greeting, farewell, requesting instructions, receiving instructions, etc.). Afterwards, when a user interacts with network system 2, the recorded messages are played back to the user when the proper context arises. In one embodiment, such speech play-back capabilities can be used to implement a voice user interface with personality, as taught by United States Patent Application Serial No. 09/071,717, entitled "Voice User Interface With Personality," the text of which is incorporated herein by reference.

Voice user interface 16 may also comprise hardware and/or software supporting the interpretation and

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issuance of dual tone multiple frequency (DTMF) commands so that a user may alternatively interact with network system 2 using a telephone key pad.

Voice user interface 16 may comprise an agent area 18 which, like agent area 14 of graphical user interface 12, is dedicated to the activities of creating new agents and manipulating existing agents. In one embodiment, agent area 18 of voice user interface 16 can be implemented by translating the agent area 14 of graphical user interface 12 into voice.

Agent Server

Programmable functionality component 4 includes an agent server 20. Agent server 20 is in communication with graphical user interface 12 and voice user interface 16, and accordingly, may exchange (receive and transmit) information therewith. In general, agent server 20 controls, coordinates, and otherwise manages the overall operation of programmable functionality component 4. Among other things, agent server 20 may invoke, initiate, or execute various routines,

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processes, objects, and the like. For example, when a user wishes to interact with network system 2 via graphical user interface 12, agent server 20 may cause web pages to be downloaded to an electronic user device. As another example, agent server 20 may prompt voice user interface 16 to issue various statements at appropriate moments during an interactive session with a user via telephone. Additional functionality of agent server 20 includes, but is not limited to, executing agent objects, identifying computational and service permissions, and controlling the consumption of computational and service resources, as described below in more detail.

Agent server 20 is responsive to various commands which it may receive from a user, for example, via graphical user interface 12 or voice user interface 16. These commands can be of three types: agent commands, agent template commands, and selection commands for selecting agents and agent templates. Each of these types of commands is explained below in more detail. Agent server 20 executes these commands during its operation.

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Agents

A number of agents 22 are in communication with agent server 20. Each agent 22 is associated with a particular user (e.g., a subscriber or an individual affiliated with the service provider), which may be deemed to be the "principal" for the respective agent. Generally speaking, agents 22 can be considered to be personal software assistants with authority delegated by the respective principals. That is, each agent 22 may be implemented as a software application, program, or process which autonomously, and possibly continuously, runs on behalf of its principal. As such, an agent 22 may be viewed by its principal as an electronic extension thereof. A particular principal may employ a plurality of agents 22, each of which serves only that principal.

The software applications for implementing agents 22 may each comprise a text file or document in, for example, a format prescribed by eXtensible Markup Language (XML). XML is a subset of Standard Generalized Markup Language (SGML) and, like SGML, is a meta-language--i.e., a language for specifying markup

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languages. One such markup language is Agent Definition Format (ADF) developed by General Magic, Inc. Various specifications for ADF are discussed in detail in microfiche Appendix C, in accordance with an embodiment of the present invention. A markup language such as ADF uses tags to provide programming language constructs to text. These tags, which may comprise instructions enclosed in angled brackets, are inserted before and after the text affected. Agent server 20 can interpret the tags and text of an ADF document to cause a respective agent 22 to act. Exemplary code for a number of agents 22 is provided in microfiche Appendix D, in accordance with an embodiment of the present invention.

Agents 22 are task-based. That is, each agent 22 is responsible for performing a particular task or set of tasks on behalf of the respective principal. These tasks may include, for example, answering telephone calls, taking voice mail messages, placing telephone calls, notifying the user of recently received messages (voice mail and/or e-mail), delivering messages, setting up meetings/appointments, gathering

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information, negotiating deals, transacting electronic commerce, etc.

Agents 22 can be "standard" or "customized." A standard agent is one which may be written and/or set-up by the service provider. In general, standard agents perform tasks that many users (e.g., subscribers) each would desirably have performed on his or her behalf. Such tasks may include organizing meetings and delivering messages. A separate copy of a standard agent may be engaged or selected by each user who wishes to have the respective tasks performed. Thus, many standard agents, each performing the same sort of tasks but for different users, may exist in network system 2.

In contrast, a customized agent is one which is written and/or set up by a particular subscriber or group of subscribers to perform certain tasks which are unique to that subscriber or group. For example, a particular subscriber or group may work in the real estate industry and thus desire to have certain tasks related to real estate transactions performed for him/her or them. In this case, such subscriber or

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group of subscribers may customize or create one or more agents that address the specialized needs of the subscriber or group. Furthermore, a third party may customize or create agents for subscribers or groups which are unable, unwilling, or lack the sophistication to do so for themselves. Such agents customized by a third party can be made commercially available to subscribers and other users. Accordingly, network system 2 is extensible in the sense that subscribers and/or third parties may program customized agents 22 according to particular needs.

The customization of agents 22 can be accomplished using an electronic user device (e.g., desktop computer) communicating with network system 2 via graphical user interface 12. In one embodiment, the service provider may maintain a website which users can access for customizing agents 22.

While performing the respective tasks, agents 22 may use or consume various computational resources 21 (e.g., memory storage space, processing time, and the like). Furthermore, agents 22 may also use or consume various service resources (described below in more

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detail) during the performance of their respective tasks. The consumption of computational and service resources by various agents 22 can be monitored, and the respective principals charged for the same.

In one embodiment, each agent 22 is given permission to consume up to a pre-authorized amount of each computational resource and each service resource that the agent may use when performing its respective task(s). For each computational resource, the relevant permission constitutes a "computational permission." For each service resource, the relevant permission constitutes a "service permission." With respect to a particular agent 22, the computational and service permissions ensure that other agents 22 (acting on behalf of the same or other principals/users) have adequate computational and service resources, even in the case of a maliciously or incorrectly programmed customized agent.

Alternatively, a computational or a service permission may be associated with a particular principal and specifies a predetermined amount of a respective resource which is allowed to be consumed on

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behalf of that principal. That is, multiple agents 22 having the same principal may each use the same resource. By authorizing a predetermined amount of resource for the principal, the associated agents 22 are given a "pool" of that resource from which to draw.

In one embodiment, each agent 22 may direct its own movement (i.e., transportation) through a computer-based system (Figure 2) by executing an instruction which identifies a destination computer within the computer-based system and directs that the particular agent 22 be transported there. While executing within the destination computer, the agent may have access to information which is not available elsewhere in the computer-based system. The particular agent can access and use that information to determine another destination computer to which the agent should travel.

Agents 22 are created from agent templates. An agent template can be a "blueprint" for one or more agents 22. In object-oriented terminology, each agent 22 is an object and each template is an agent class from which agents 22 can be created by instantiating the class/template. In one embodiment, an agent

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template is essentially an agent object in its initial state. After the agent has been created, it may be executed. During execution, the agent object begins to receive events, handle these events, and so change its state.

In accordance with an embodiment of the present invention, network system 2 allows users (e.g., subscribers) to create, copy, modify, edit, or delete agents 22 and the associated templates as desired, thereby affording extensibility.

Services

A number of services 24 may each comprise one or more software applications providing various capabilities that are available to a principal. Each service 24 may be utilized by one or more agents 22 in order to perform their respective tasks. For example, one service 24 may support call processing, including a voice mail system. With this service 24, an agent 22 may place an outgoing telephone call for its principal, answer an incoming telephone call for the principal, and record a voice message from a caller. Another

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exemplary service 24 may support an electronic mail (e-mail) system. With an e-mail service, an agent 22 may collect, forward, and store e-mail messages addressed to the respective principal, generate e-mail messages for the principal, and notify the principal when new e-mail messages have been received. Yet another exemplary service 24 may support an electronic appointment book. With this service, an agent 22 can plan a schedule, check conflicts therewith, and organize various meetings, interviews, etc. for its respective principal. Still another exemplary service 24 can support an electronic address book which maintains information about one or more contacts with whom a principal may interact. The information maintained for each of these contacts may include the contact's name, title, employer, business address, home address, e-mail address, work phone number, home phone number, and the like. Still yet another service 24 can support on-line data retrieval for various information. With this service, an agent 22 can retrieve electronic copies of periodicals (e.g., newspapers, magazines, etc.) and the latest quotes for stocks, bonds, mutual

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funds, etc. In order to use a particular service 24, an agent 22 must first be authorized to do so. This authority may be given by the service provider and/or the respective principal.

In one embodiment, a plurality of services 24 may be used by a particular agent 22 which acts as a "virtual assistant" for its respective principal. This virtual assistant may, for example, answer an incoming telephone call, identify the caller, schedule a meeting between the caller and the principal, and generate an e-mail message notifying the principal of such meeting. Additional services 24 can be used (by this agent 22) by extending or customizing the agent, as described herein.

Service Resources

One or more service resources 25 can support each service 24. In one embodiment, at least a portion of service resources 25 can be integral to the respective services 24. In general, a service resource 25 is a resource which enables a service to be performed. For example, for a call processing service, service

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resources 25 may include a telephone, an answering machine, a telephone line, a local telephone provider service, a long-distance telephone provider service, etc. As another example, for an on-line data retrieval service, service resources 25 may include a telephony connection, a modem for on-line communication, an on-line database provider service, etc. As yet another example, for an e-mail service, service resources 25 may include an Internet connection and disk space for storing e-mail messages.

At least some of service resources 25 may comprise discrete units which are "consumed" during utilization of the respective resource by an agent 22. For example, a service resource 25 related to telephony services (e.g., voice mail and call placement) may comprise units of long-distance calling time which are consumed as an agent 22 places one or more calls utilizing such services 24. Likewise, a service resource 25 related to on-line data retrieval may comprise units of data-access time or inquiry which are consumed as an agent retrieves data (e.g., stock

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quotes, newspaper articles, etc.) utilizing the respective service 24.

Service Wrappers

A number of service wrappers 26 link services 24 and respective service resources 25 to agent server 20. In the depicted embodiment, a separate service wrapper 26 is provided for each service 24. Each service wrapper 26 can mediate the interaction between a service 24 (and its respective resources 25) and the remainder of programmable functionality component 4. In one embodiment, at least a portion of service wrappers 26 can be integral to the respective services 24 and/or service resources 25. Service wrappers 26, in conjunction with agent server 20, may act as "gatekeepers" to the respective services 24. That is, a service wrapper 26 grants access, to a respective service 24, only to agents 22 which have been authorized to utilize such service. For example, a voice message held by a service 24 supporting voice mail is accessible only by an agent 22 which has authority from the user for whom the message was left.

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Similarly, for a service 24 supporting call answering, the respective service wrapper 26 only allows agents 22 having authority from a particular user to answer telephone calls placed to a number associated with such a user.

Service wrappers 26 enable communication between services 24 and agent server 20, for example, by converting between a computer language (or instruction set) used within agent server 20 and the computer language (or instruction set) of the respective service 24. For this purpose, in one embodiment, each service wrapper 26 may be implemented, at least in part, with an application programming interface (API). An API allows access to the respective service 24, thereby pragmatically exposing the capabilities of the service 24 to one or more agents 22. That is, each service wrapper 26 lets any agent (having the proper authorization) use the respective service 24. A service wrapper 26 may also allow agent server 20 to replace one service 24 with another service 24 of the same type, but located on a different computer, without any interruption to principals. This operation of a

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service wrapper 26 is hidden or invisible to users, and thus, service wrappers 26 provide a point of abstraction between the respective service 24 and agent server 20.

Furthermore, at least some of service wrappers 26 may monitor the amount of service resources 25 expended or otherwise consumed by one or more authorized agents 22 when utilizing the respective service 24. For example, a service wrapper 26 may identify the respective service resource 25 to agent server 20, allow agent server 20 to impose a predetermined limit on each authorized agent's use of such service resource 25 (i.e., allocate a predetermined amount of service resource 25 for each agent), and debit/credit the amount consumed from the predetermined amount previously allocated for the agent 22. Thus, each service wrapper 26, in conjunction with agent server 20, controls an agent's consumption of service resources 25, thereby ensuring that an agent 22 does not use more than a predetermined amount of resource when performing its respective task or tasks. In this way, service wrappers 26 protect against the over-

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consumption, whether intentional or inadvertent, of the respective service resources 25. A service wrapper 26 thus serves to ensure that sufficient units of a service resource 25 are available for each agent 22 authorized to utilize the respective service 24. In addition, a service wrapper 26 may maintain a record of the amount of service resource 25 consumed by various agents 22 so that the appropriate users/principals can be billed accordingly.

Operational Overview

In operation, one or more agents 22 may be set up for each user who is a subscriber to the services offered by the operator/provider of network system 2. These agents 22 can be standard (i.e., set up by the service provider) or customized (i.e., set up by the respective user). Each agent for a particular user performs one or more tasks on behalf of that user. These tasks may include answering calls, taking voice mail messages, placing calls, notifying the user of recently received e-mail, setting up appointments, negotiating deals, transacting electronic commerce,

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etc. To perform these tasks, each agent 22 utilizes one or more services 24, during which it may consume various respective service resources 25. Access to each service 24 is granted by the respective service wrapper 26, which may also monitor the amount of each respective service resource 25 consumed to ensure that no particular agent 22 uses more than an amount authorized for that agent when performing its specific task(s). This protects both the authorizing user/subscriber and the service provider against undue consumption of service resources 25. Via a suitable interface (e.g., graphical user interface 12 or voice user interface 16), a user may direct, command, instruct, or otherwise communicate with each of his or her respective agents 22. At any time, a user can extend the services provided thereto by customizing existing agents 22, or alternatively, employing (and possibly customizing additional) agents 22.

In this manner, the present invention enables subscribers of a network service provided by network system 2 to create and employ personal agents 22

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utilizing services 24 in a manner that is safe and secure for the subscribers and the service provider.

Computer-Based System Implementation

Figure 2 is a simplified diagram of an exemplary computer-based system 30 that can be used to implement network system 2 shown in Figure 1. Referring to the embodiment shown in Figure 2, computer-based system 30 can include a communications hub 1000 and a firewall 1002 which support an interface between computer-based system 30 and the Internet. Collectively, communications hub 1000 and firewall 1002 provide communication, protection, and security between the remainder of computer-based system 30 and the Internet. Hub 1000 and firewall 1002 allow users to interact with computer-based system 30 using an electronic user device, which may support a graphical user interface 12 (Figure 1).

A switch 1004 enables communication with computer-based system 30 via a telephone instrument. Switch 1004 allows users to interact with computer-based system 30, for example, via a voice user interface 16

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(Figure 1). A call detail records data base 1005 is coupled to switch 1004. This data base 1005 stores information relating to calls received by or initiated out of computer-based system 30. For each call, such call-related information may specify calling party, called party, telephone number of outside party, date of call, time of call, duration of call, cost of call, and the like.

A plurality of fast Ethernet hubs 1006 are coupled to firewall 1002 and switch 1004. Fast Ethernet hubs 1006 support a local area network (LAN) for computer-based system 30 and enable the routing of information signals therein. These Ethernet hubs 1006 may implement the Fast Ethernet technique in which information is transferred at a rate of 100 Mbps.

One or more application server clusters 1008 are coupled to fast Ethernet hubs 1006. Each application server cluster 1008 may comprise a plurality of servers which provide processing capability to support various functions, such as, for example, speech recognition, speech synthesis, pronunciation generation, speech

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playback, etc. As such, application server clusters 1008 may support a voice user interface 16 (Figure 1).

A number of sub-systems 1010, 1012, 1014, 1016, 1018, 1020, 1022 are also coupled to fast Ethernet hubs 1006. Each of these sub-systems may comprise one or more servers, data storage devices, and other hardware components. The servers provide processing capability, and the data storage devices provide data storage capability.

At least a portion of the sub-systems in computer-based system 30 may support one or more services 24, and the respective service wrappers 26 and service resources 25 (Figure 1). For example, as shown in Figure 2, sub-systems 1010, 1012, 1014, 1016, and 1018 support an e-mail service, a voice mail service, a paging/facsimile service, an address book and calendar service, and a business news and stocks information service, respectively.

The remaining sub-systems support other operational aspects of computer-based system 30. In particular, as shown, sub-system 1020 maintains profiles for one or more subscribers to a network

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system 2. For each subscriber, a profile may include the name of the subscriber, the home address of the subscriber, the billing address of the subscriber, an e-mail address, a telephone number, a listing of all agents operating for the subscriber, the computational and service permissions granted to the subscriber's agents, and the like. Sub-system 1022 maintains various rules for the operation of network system 2. For example, such rules may govern how network system 2 processes incoming e-mail messages for particular subscribers (e.g., a subscriber may be paged upon the delivery of messages satisfying certain criteria).

Each of the servers within application server clusters 1008 and sub-systems 1010-1022 can be implemented using any of a number of server hardware configurations running a suitable server operating system, such as SUN SOLARIS, WINDOWS NT, OS/2 WARP, and NETWARE. Each data storage device within application server clusters 1008 and sub-systems 1010-1022 can be a mass storage subsystem of tapes or disk drives, which is electronically coupled to the respective servers. Information or data supporting each of graphical user

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interface 12, voice user interface 16, agent server 20, agents 22, services 24, service resources 25, and service wrappers 26 (shown in Figure 1) can be contained in the data storage devices. The servers may retrieve, process, and store this information into the data storage devices.

In one embodiment, as shown, application server clusters 1008 and sub-systems 1010-1022 are linked by the same LAN. In another embodiment, at least a portion of application server clusters 1008 and/or sub-systems 1010-1022 can be remote from the remainder and linked as a wide area network (WAN); consequently, computer-based system 30 may provide a distributed network.

Any one or a combination of interested parties (e.g., subscribers, third parties, or service providers) can use computer-based system 30 to collect, maintain, generate, or process the information supporting graphical user interface 12, voice user interface 16, agent server 20, computational resources 21, agents 22, services 24, service resources 25, and service wrappers 26. Any of the servers or other

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computers in application server clusters 1008 and sub-systems 1010-1022, either individually or in combination, can perform the functionality of agent server 20 shown in Figure 1. Furthermore, because these servers and other computers are linked together, each can directly access (e.g., store and retrieve) any of the information described above, if necessary.

In one embodiment, agents 22 may travel throughout the environment of computer-based system 30. That is, each agent 22 may move to the servers and other computers in application server clusters 1008 and sub-systems 1010-1022, and afterward, execute thereon. As an agent 22 moves and executes, it may perform its respective tasks on behalf of its principal.

The elements of computer-based system 30, and the functions provided thereby, constitute computational resources 21 which may be expended, consumed, or used during the operation of network system 2 (Figure 1). In one embodiment, the consumption of these computational resources 21 by different agents 22 is monitored so that no particular agent 22 utilizes more

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than a proportionate, predetermined, or allotted share thereof, as such agent executes.

Graphical User Interface (Details)

Figure 3 illustrates details for a graphical user interface 12, according to an embodiment of the present invention. As depicted, graphical user interface 12 comprises a web browser 64 and a web server 66 which are connected via a line 68 supporting Internet communication.

Web browser 64 is a client application that may reside on (or is downloaded to) a client device such as a desktop computer. Such desktop computer preferably has at least a "486" processor or an operational equivalent and runs a suitable desktop operating system, such as, for example, MS-DOS, MacINTOSH OS, WINDOWS NT, WINDOWS 95, OS/2, UNIX, XENIX, GEOS, or MAGIC CAP.

Web server 66 is a server application that resides on a service provider device, such as a server. Such server can be any of the servers in application server clusters 1008 or sub-systems 1010-1022 of computer-

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based system 30 shown in Figure 2. Web server 66 may support a number of web pages 70 which can be downloaded from web server 66 to web browser 64 as appropriate during operation. At least one of these web pages 70 may constitute an agent area 14 which is dedicated to the activities of creating new agents and manipulating existing agents.

Communication line 68 can be any link capable of supporting data transfer between a client device and a service provider device. For example, communication line 68 may include any combination of an Integrated Services Digital Network ("ISDN") communication line, a hard-wired line, or a telephone line. This enables communication via the Internet, using any suitable protocol, such as, Transmission Control Protocol/Internet Protocol (TCP/IP), Internetwork Packet eXchange/Sequence Packet eXchange (IPX/SPX), or AppleTalk.

Voice User Interface (Details)

Figure 4 illustrates details for a voice user interface 16, according to an embodiment of the present

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invention. As shown, voice user interface 16 comprises a telephone instrument 72 coupled to a telephone server 74 via a telephone line 76.

Telephone instrument 72 is a user (e.g., subscriber) device which may comprise a conventional telephone. Telephone instrument 72 may include a key pad for entering dual tone multiple frequency (DTMF) commands.

Telephone server 74 is a service provider device. Such device may comprise any of the servers in application server clusters 1008 or sub-systems 1010-1022 of computer-based system 30 shown in Figure 2. Telephone server 74 may support a number of grammars, prompts, and other speech functionalities 78 for enabling communication with a user. At least one of these speech functionalities 78 may constitute an agent area 18 which is dedicated to the activities of creating new agents and manipulating existing agents 22.

Telephone line 76 can be an analog telephone line, a digital T1 line, a digital T3 line, or an OC3 telephony feed.

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Agent Server (Details)

Figure 5 illustrates details for agent server 20, in accordance with a preferred embodiment. Agent server 20 generally functions to control, coordinate, and otherwise manage the overall operation of programmable functionality component 4. This includes the use of network system 2 by agents 22. As depicted, agent server 20 includes an engine 42, a scheduler 44, and one or more agent objects 46.

Scheduler 44 maintains an internal clock, which can keep track of real time or elapsed time. In one embodiment, scheduler 44 may be supported with a piezo-electric crystal or oscillating circuit implemented with transistors. Scheduler 44 generally functions to trigger the further execution of particular agents 22 by engine 42 upon the occurrence of certain events. Such events may include the lapse of a predetermined amount of time (e.g., 24 hours) or the occurrence of a specified time (e.g., 6:00 a.m.). Scheduler 44 may maintain a record or schedule with a separate entry for each triggering event. Scheduler 44 may also receive

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information from engine 42. This received information may be used to create new entries within scheduler 44.

Agent objects 46 each correspond to a particular agent 22 of network system 2 (Figure 1). Each agent object 46 can be an internal representation within agent server 20 for the corresponding agent 22. Agent objects 46 comprise software objects, each of which, in general, has (i) an internal state defined by a number of properties, (ii) an internal behavior defined by a number of methods, and (iii) an external behavior defined by a number of features.

More simply, each agent object 46 is an organization of data and instructions which are executable within agent server 20. In one embodiment, the data represents a "state" of the agent object and the instructions are grouped into tasks that are to be performed. The data may specify the corresponding agent 22, the services 24 which may be utilized by the agent, and the computational and service permissions which have been granted to the agent 22. The instructions may comprise one or more event handlers which direct the corresponding agent 22 upon the

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occurrence of predefined events. Each agent object 46 may also comprise a pending event queue which queues events to which the agent 22 should, but has not yet, responded.

Engine 42 is in communication with scheduler 44 and agent objects 46. In addition, engine 42 is in bi-directional communication with graphical user interface 12, voice user interface 16, and service wrappers 26. Engine 42 generally controls and/or manages the operation of agent server 20. Engine 42 may be implemented as a computer process, executing within a computer system, which invokes or manages other processes or routines, and executes instructions. For example, engine 42 can execute each agent object 46 which, in turn, may provide instructions to engine 42. Engine 42 may function to identify each of the computational permissions and service permissions specified within an agent object 46 and to control the consumption, by the corresponding agent 22, of the relevant computational resources 21 and service resources 25. Also, engine 42 may invoke routines in each of interfaces 12 and 16 and service wrappers 26.

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Furthermore, engine 42 may receive and be responsive to information from the same.

In one embodiment, scheduler 44 may be considered to "create" pending events to which engine 42 responds by executing an agent's handler for such event. This is described below in more detail.

In an exemplary operation for agent server 20, one agent object 46 may correspond to an agent 22 which is responsible for waking up its principal at a certain time each weekday morning. This time constitutes an event for which scheduler 44 may contain an entry. Each weekday, at the appointed time or shortly before, scheduler 44 invokes engine 42. In response engine 42 executes the particular agent object 46. When this agent object 46 is executed, the corresponding agent 22 (using the appropriate services 24) performs the task of waking up the principal, for example, by calling the principal over a telephone or, alternatively, generating an audible alarm on an electronic user device (e.g., a desktop computer).

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Service Wrapper (Details)

Figure 6 illustrates details for a service wrapper 26, in accordance with a preferred embodiment. A service wrapper 26 generally functions to mediate the interaction between a respective service 24 and the remainder of programmable functionality component 4. In one embodiment, service wrapper 26 is associated with, and supports, only a single service 24. As shown, service wrapper 26 comprises a converter 48 and a monitor 50.

Converter 48 generally functions to convert between a computer language (or instruction set) used within agent server 20 and a computer language (or instruction set) used within the respective service 24. In one embodiment, the computer language of agent server 20 can be a high-level language, whereas the computer language of service 24 may be a low-level language. An agent 22 may comprise instructions of the set used in agent server 20; a service 24 may comprise or issue instructions of the set used therein.

As depicted, converter 48 comprises an agent-server-to-service converter 52 and a service-to-agent-

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server converter 54. Agent-server-to-service converter 52 operates unidirectionally to convert from the language (e.g., a high-level language) used by agent server 20 to the language (e.g., a low-level language) used by the corresponding service 24. Service-to-agent-server converter 54 also operates unidirectionally, but in contrast to converter 52, converts from the language (e.g., low-level language) used by service 24 into the language (e.g., high-level language) used by agent server 20.

Monitor 50 is coupled by bi-directional lines to each of agent server 20 and the respective service 24. Monitor 50 generally functions to monitor the amount of respective service resources 25 expended, used, or otherwise consumed by one or more agents 22 which have been authorized to access the service 24. Monitor 50 identifies respective service resources 25 to agent server 20, allows agent server 20 to impose a predetermined limit on each authorized agent's use of the respective service resources 25, and informs agent server 20 of the amount consumed against the predetermined limit. The predetermined limit may be

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derived from a service permission for the respective agent 22.

Exemplary Service Wrappers, Services, and Service Resources (Details)

Figure 7 illustrates details for specific exemplary services, and their respective service wrappers and service resources. In particular, these services include a web server service 81, a web browser service 86, and a call processing service 91. Each of exemplary services 81, 86, and 91 constitutes a user interface service; that is, these services 81, 86, and 91 each provides a user interface by which an agent 22 can interact with a subscriber or third party. In Figure 7, the services and respective service resources have been combined because, with these examples, the services and resources are not logically distinct.

Web server service 81 provides a web server from network system 2 (Figure 1) and can be used, for example, to notify a user about recently received e-mail messages. Web server service 81 (and its respective service resources) resides in network system

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2 and includes one or more web pages 84. A web server service wrapper 80 controls access from the remainder of programmable functionality component 4 into web server service 81 and its associated service resources. A web browser 82 is connected to web server service 81 via an Internet line 83. Web browser 82 may reside in a client device. Web pages 84 can be downloaded from web server service 81 to web browser 82. Collectively, web server service 81, web pages 84, web browser 82, and Internet line 83 can implement a graphical user interface with which an agent 22 can interact with its principal or another party.

Web browser service 86 provides a web browser from network system 2 and can be used, for example, for on-line data access to stock quotes, news, etc. Web browser service 86 and its respective service resources are resident on network system 2. A web browser service wrapper 85 provides access from the remainder of programmable functionality component 4 into web browser service 86 and its service resources. A web server 87 is connected to web browser service 86 via an Internet line 88. Web server 87 resides in a website

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server device and may comprise one or more web pages 89 which can be downloaded to web browser service 86. Collectively, web browser service 86, web server 87, web pages 89, and Internet line 88 can implement a graphical user interface with which an agent 22 can interact with an arbitrary website on behalf of its principal.

Call processing service 91 provides call processing from network system 2 and can be used, for example, to take voice mail messages for one or more subscribers. Call processing service 91 and its respective service resources reside in network system 2. Call processing service 91 may include grammars, prompts, and other speech functionality 94. A call processing service wrapper 90 controls access from the remainder of programmable functionality component 4 to call processing service 91 and its service resources. A telephone instrument 92, which resides outside of network system 2, is connected to call processing service 91 via a telephone line 93. Collectively, call processing service 91, speech functionality 94, telephone instrument 92, and telephone line 93 can

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implement a voice user interface with which an agent 22 can interact with its principal or another party, for example, by placing a call to, or answering a call from, the principal or other party.

Agent Object (Details)

Figure 8 illustrates details for an agent object 46, in accordance with an exemplary embodiment. An agent object 46 generally represents (within agent server 20) a corresponding agent 22, which can be considered to be a personal software assistant to a particular principal. Agent object 46 can be a software object and may reside within agent server 20. As depicted, agent object 46 comprises a permissions component 56, an event handlers component 58, a datastore component 60 and a pending event queue component 62. In other embodiments, the event handlers component and the pending event queue component may be external to an agent object 46.

Permissions component 56 generally comprises data and instructions related to permissions that have been granted to the agent 22 represented by agent object 46.

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These permissions include computational permissions and service permissions. A computational permission can specify that a respective agent 22 is authorized to consume a particular computational resource 21 (e.g., memory storage space, processing time, elapsed time, and the like which may be provided by the elements and functions of computer-based system 30) when performing its particular task(s). Furthermore, in some instances, a computational permission can specify a pre-authorized amount of computational resource 21 which may be allowably consumed by the respective agent 22. A service permission can specify that the respective agent is authorized to consume a particular service resource 25 (e.g., long-distance time, on-line data access time) when the agent utilizes a respective service 24 (e.g., e-mail, phone mail, electronic appointment book, electronic contact book, etc.) in performing its task(s). In some instances, a service permission can specify a pre-authorized amount of service resource 25 which is allowably consumed by the respective agent 22.

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Event handlers component 58 includes data and instructions for directing agent server 20 and/or engine 42 upon the occurrence of various events which may arise during the operation of network system 2. In particular, an event handler comprises a routine for handling an event of a specified type. For example, these events can be the lapse of a previously specified amount of time or the delivery of an e-mail message.

In one embodiment, an event is identified by a uniform resource locator (URL) which expresses or provides an address for a web page. The URL specifies both the event's type and the agent 22 which is event's intended recipient. The URL may be chosen by agent server 20 and the particular agent 22 in combination. This allows a web server providing a graphical user interface to network system 10 to receive HyperText Transfer Protocol (HTTP) requests for the web page at the URL so that agent server 20 can relay the event to the particular agent 22. A standard web browser can send an event to an agent 22 by fetching the web page identified by the URL for the event. The web page returned to the browser is supplied by the agent's

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event handler and relayed by agent server 20. One of the instructions in an agent instruction set allows an agent 22 to send an event (for example, to another agent 22 as a means of inter-agent communication).

Datastore component 60 may contain various information related to agent object 46. This may include information specifying the corresponding agent 22, the principal or user for whom that agent 22 performs tasks, the tasks which the agent 22 may perform, etc. Datastore component 60 may also include information used by agent object 46 for guiding its interaction with various service wrappers 26. For example, datastore component 60 may contain the parameters of a request the agent intends to make of a particular service wrapper 26 or the wrapper's response to such a request.

Pending event queue component 62 comprises information for events to which the corresponding agent 22 should, but has not yet, responded. Pending event queue component 62 queues these events so that the agent 22 may respond, for example, using the event handlers specified in event handlers component 58.

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User Session

Figure 9 is a flow diagram of an exemplary method 100 for a user session, according to an embodiment of the present invention. During method 100, a user is interacting with network system 2.

Method 100 begins at step 102 where network system 2 admits a user at a user interface (UI), which can be either graphical user interface 12 or voice user interface 16. Essentially, at this step, a user logs on to network system 2.

At step 104, network system 2 admits the user to the agent area of the relevant user interface. For voice user interface 16, this is agent area 18. For graphical user interface 12, this is agent area 14. With graphical user interface 12, a user is admitted to the agent area when the user "clicks" on an agent icon which is displayed on a menu screen. In the agent area, the user can create new agents and manipulate existing agents. Specifically, the user can enter various commands, depending on his or her intentions.

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Each command can be one of three types: an agent command, a template command, or a selection command. Agent commands are directed to the running of agents. These agents include ones which are currently executing and which the user now would like to manipulate. Template commands are directed to the manipulation of agent templates. An agent template can be a "blueprint" for agents. In object-oriented terminology, each agent is an object and each template is an agent class from which agents can be created by instantiating the class/template. Selection commands select agents or templates. A selection command allows network system 2 to focus on a particular template or a particular agent in order to provide a context for any subsequent template command or agent command.

At step 106, network system 2 accepts a command which has been entered by the user via the user interface. The command is forwarded from the user interface to agent server 20.

If the command is a selection command, agent server 20 executes such command at step 108. If the command is a template command, agent server 20 executes

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the command at step 110. Otherwise, if the command is an agent command, agent server 20 executes the command at step 112. The executions of a selection command, a template command, and an agent command are described below in more detail.

At step 114, network system 2 prompts a user for more commands. If the user enters additional commands, method 100 returns to step 106 where the next command is accepted. Method 100 repeats steps 106-114 until no additional commands are entered.

At step 116, network system 2 excuses the user from the agent area of the user interface. At step 118, the user is excused from the user interface itself. That is, the user logs off network system 2. Afterwards, method 100 ends.

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Selection Command Execution

Figure 10 is a flow diagram of an exemplary method 200 for executing a selection command, according to an embodiment of the present invention. Method 200 is initiated within and performed by network system 2 when a user (e.g., subscriber) has entered a selection

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command. A selection command can be one of two types: a select agent command or a select template command.

A select agent command is one which selects a particular agent. Specifically, when a user enters the agent area, a list of executing agents may be visible. The user enters a select agent command to select a particular agent from the list in order to manipulate the same; afterwards, the user can enter an agent command to perform the manipulation.

Similarly, a select template command is one which selects a particular template. In particular, a list of agent templates may be provided from which a user may select. The user enters a select template command to select a particular template from the list; afterwards, the user can enter a template command to manipulate the template.

Method 200 begins at step 202 where agent server 20 determines whether the selection command is a select template command. If the selection command is a select template command, method 200 moves to step 204 where agent server 20 notes the particular template which has been selected. Afterwards, method 200 ends.

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Otherwise, if at step 202 it is determined that the selection command is not a select template command, then at step 206 agent server 20 determines whether the selection command is a select agent command. If the command is a select agent command, method 200 moves to step 208 where agent server 20 notes the agent which has been selected, after which method 200 ends.

Otherwise, if the selection command is not a select agent command, method 200 ends.

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Template Command Execution

Figure 11 is a flow diagram of an exemplary method 300 for executing a template command, according to an embodiment of the present invention. Method 300 is initiated within and performed by network system 2 when a user has entered a template command. In general, a template command is one which affects a particular template. A template command can be one of four types: a create template command, a copy template command, an edit template command, and a delete template command.

Method 300 begins at step 302 where agent server 20 determines whether the template command which has

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been entered is a create template command. A create template command is one which creates a new template. Each new template can be based on a generic blank template which can be modified as desired by a user.

Accordingly, if the template command is a create template command, then at step 304 agent server 20 stores a blank template into memory (a computational resource 21) where the template can be modified. In the context of a graphical user interface, an entry for the new template is added to the list of templates appearing on a screen. At step 306, agent server 20 selects the blank template as the current template, after which method 300 ends.

Referring again to step 302, if it is determined that the template command is not a create template command, than method 300 moves to step 308 where agent server 20 determines whether the command is a copy template command. A copy template command is one which copies an existing template. A user may enter this command when it is desirable to create a new template from a previously created template rather than the generic blank template.

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If it is determined that the command is a copy template command, then at step 310 agent server 20 loads the previously created template. "Loading" a template means that the template is stored into memory, such as random access memory (RAM). At step 312, agent server 20 creates and stores a copy of the template into persistent memory, such as a hard drive. At step 314, agent server 20 selects the copy of the template as the current template, after which method 300 ends.

Referring again to step 308, if it is determined that the template command is not a copy template command, then method 300 moves to step 316 where agent server 20 determines whether the command is an edit template command. An edit template command is one which edits an existing template. A user may enter this command when it is desirable to edit either a newly created or previously created template.

If it is determined that the command is an edit template command, agent server 20 loads the template at step 318 and allows changes to be made to the template at step 320. At step 322, the edited template is stored back into persistent memory and then is made the

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current (selected) template, after which method 300 ends.

Otherwise, if it is determined at step 316 that the template command is not an edit template command, then method 300 moves to step 324 where agent server 20 determines whether the command is a delete template command. A delete template command is one which deletes an existing template. A user may enter this command to remove from permanent memory any template which is obsolete, incorrect, or otherwise undesirable.

If it is determined that the command is a delete template command, agent server 20 deselects the current template at step 326. Deselection is performed because a deleted template cannot be subsequently selected. Next, at step 328, agent server 20 deletes the template from persistent memory. In the context of a graphical user interface, this step would also remove an icon for such template from the screen. Method 300 then ends.

Referring again to step 324, if it is determined that the command is not a delete template command, method 300 ends because the command was not any of the types of commands for a template.

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For each of steps 310, 318, and 326 above, if no template is currently selected, agent server 20 will generate an error message.

Method 300, as described, thus provides user extensibility for network system 2 by allowing a user to create, copy, edit, and delete agent templates as desired.

Agent Command Execution

Figure 12 is a flow diagram of an exemplary method 400 for executing an agent command, according to an embodiment of the present invention. Method 400 is initiated within and performed by network system 2 when a user has entered an agent command. Generally speaking, an agent command is one which affects a particular agent 22. Agent commands can be of three types: a create agent command, an edit agent command, and a delete agent command.

Method 400 begins at step 402 where agent server 20 determines whether the command is a create agent command. A create agent command is one which creates a new agent from an agent template. After an agent 22

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has been created, it is generally allowed to execute, thereby performing tasks for the user who created the agent.

If it is determined that the command is a create agent command, then at step 404 agent server 20 loads the respective agent template. If no template is currently selected, agent server 20 will generate an error message. Otherwise, at step 406, agent server 20 stores the newly created agent 22 and at step 408 selects that agent 22 as the current agent. Afterwards, method 400 ends.

With reference again to step 402, if it is determined that the command is not a create agent command, then at step 410 agent server 20 determines whether the command is an edit agent command. An edit agent command is one which allows the user to edit an executing or running agent. If no agent 22 is currently selected, however, agent server 20 generates an error message.

If it is determined that the command is an edit agent command, then agent server 20 loads the executing agent 22 at step 412. Agent server 20 suspends the

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execution of such agent 22 at step 414 and allows changes to be made to the agent by a user at step 416. At step 418, agent server 20 resumes the execution of the agent 22 and, at step 420, stores the edited agent. Afterwards, method 400 ends.

Referring again to step 410, if it is determined that the agent command is not an edit agent command, then at step 422 agent server 20 determines whether the command is a delete agent command. In general, a delete agent command is one which ends the execution of an agent 22 and removes it from persistent memory. If no agent 22 is currently selected, however, agent server 20 generates an error message.

If it is determined at step 422 that the command is a delete agent command, then at step 424 agent server 20 deselects the agent 22, because an agent cannot be selected once it has been deleted. At step 426, agent server 20 deletes the agent 22. Method 400 then ends.

Referring again to step 422, if it is determined that the command is not a delete agent command, method

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400 ends because the command was not any of the types of commands for an agent.

Consumption of Service and Computational Resources

Figure 13 is a block diagram detailing the controlled consumption of service resources 25 and computational resources 21 by an agent 22, according to an embodiment of the present invention.

As previously described, an agent 22 may consume various service resources 25 (e.g., long-distance calling time, on-line data access time, etc.) and computational resources 21 (e.g., memory space, processing time, etc.) in the performance of its tasks.

The amount of the resources consumed by a particular agent 22 is limited by permissions which are specified in permissions component 56 of an agent object 46 corresponding to the agent 22. More specifically, for a particular agent 22, permissions component 56 includes one set of service permissions 64 for each service 24 utilized by that agent. The service permissions 64 bound the service resources 25 expended on behalf of the agent 22 by that service 24.

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That is, each service permission 64 specifies whether the agent 22 is authorized to consume a particular service resource 25 and, in some instances, the amount of such service resource 25 that is allowably consumed by that agent 22.

Agent server 20 and service wrappers 26 cooperate in order to ensure that an agent 22 does not consume more than its allotted amount of any particular service resource 25 as specified by a respective service permission 64.

Permissions component 56 also includes a set of computational permissions 66 for the agent 22. These computational permissions 66 bound the computational resources 21 expended on the agent's behalf by agent server 20. In other words, each computational permission 66 specifies whether the agent 22 is authorized to consume a particular computational resource 21 and, in some instances, the amount of the computational resource 21 which is allowably consumed by that agent.

Agent server 20, together with service wrappers 26, monitors and ensures that the agent 22 does not

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consume more than its allotted amount of any computational resource 21 as specified by a respective computational permission 66.

Agent Population Execution

Figure 14 is a flow diagram of an exemplary method 500 for executing time slices for an agent population, according to an embodiment of the present invention. Method 500 is performed by agent server 20 in order to enable each agent 22 to make progress in performing its respective tasks.

In general, the processing capability of agent server 20 cannot be dedicated solely to any particular agent 22, but rather must be allocated among all executing agents. Processing time by agent server 20 is thus divided into time slices. The time slices can be of predetermined duration. During each time slice, the processing capability of agent server 20 is directed to a particular agent 22.

With reference to Figure 14, method 500 begins at step 502 where agent server 20 selects an agent 22, which is responsible for performing one or more tasks

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for a respective user. At step 504, agent server 20 executes a time slice for the selected agent 22. During this time slice, the processing capability of server 20 is directed to or used for the selected agent 22.

At step 506, agent server 20 determines whether there are any other agents 22 for which a time slice should be executed. If there are more agents, method 500 returns to step 502 where the next agent is selected. Agent server 20 repeats steps 502-506 until a time slice has been executed for each agent 22. Afterwards, method 500 ends.

Agent Execution

Figure 15 is a flow diagram of an exemplary method 600 for executing a time slice for an agent 22, according to an embodiment of the present invention. Method 600 is performed by agent server 20 for a particular agent 22.

Method 600 begins at step 602 where an agent object 46 corresponding to the particular agent 22 is loaded into agent server 20. This agent object 46

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comprises a permissions component 56, an event handlers component 58, a datastore component 60, and a pending event queue 62.

At step 604, agent server 20 determines whether execution of the agent 22 has been suspended (e.g., because the user is editing the agent). If execution has been suspended, it is unnecessary to provide any processing for the agent, and accordingly, method 600 ends.

Otherwise, if execution of the agent 22 has not been suspended, method 600 proceeds to step 605 where agent server 20 determines whether an event is currently being handled by agent 22. An event is something that triggers or causes an agent 22 to take action, or something to which agent 22 must respond. If it is determined that there is an event currently being handled, method 600 moves to step 612.

Alternatively, if it is determined at step 605 that there is not an event currently being handled, method 600 proceeds to step 606 where agent server 20 determines whether there is an event pending for the agent--i.e., an event for which handling has not yet

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begun. This can be accomplished by examining pending event queue component 62 of the corresponding agent object 46. If there is no event pending for agent 22, method 600 ends.

Otherwise, if it is determined that there is an event pending for agent 22, then at step 608 agent server 20 removes or dequeues the event from the pending event queue of the corresponding agent object 46.

At step 610, agent server 20 determines whether agent 22 has a handler for responding to the event. Generally, an event handler comprises a routine for responding to an event of a particular type. An event handler can be divided into a plurality of portions, each of which is separately executable during different time slices. Event handlers are specified in the event handlers component 58 of agent object 46. If it is determined that agent 22 does not have a handler for the relevant event, method 600 moves to step 614. Otherwise, if it is determined that agent 22 does have a handler for responding to the event, method 600 moves to 612.

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At step 612, agent server 20 executes a portion of the event handler for agent 22. Method 600 then proceeds to step 614.

At step 614, agent server 20 stores the agent 22, after which method 600 ends.

Event Handler Execution

Figure 16 is a flow diagram of an exemplary method 700 for executing an event handler, according to an embodiment of the present invention. Method 700 is performed by agent server 20 when an event handler is invoked in response to the occurrence of a particular event. The event handler routine may include a number of instructions which are directed to agent server 20 and/or one or more service wrappers 26.

Method 700 begins its step 702 where agent server 20 receives an instruction to execute in a patroller time slice. At step 704, agent server 20 determines whether the instruction is a service instruction. A service instruction is an instruction relating to and utilizing a particular service 24. Accordingly, a service instruction can only be executed via a

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respective service wrapper 26. All other instructions do not require the cooperation of a respective service wrapper 26, but rather, can be executed by agent server 20 itself.

If it is determined at step 704 that the instruction is a service instruction, method 700 proceeds to step 708 where agent server 20 asks the respective service wrapper 26 to execute the instruction for agent 22. Method 700 then moves to step 710.

Referring again to step 704, if it is determined that the instruction is not a service instruction, then agent server 20 itself executes the instruction at step 706. Method 700 then proceeds to step 710.

At step 710, agent server 20 determines whether there are any more instructions in the event handler. If so, method 700 returns to step 702 where agent server 20 fetches the next instruction. Agent server 20 repeats steps 702-710 until all instructions of the event handler to be executed as part of the current time slice have been executed, either by agent server 20 or respective service wrappers 26. Afterwards, method 700 ends.

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Service Instruction Execution

Figure 17 is a flow diagram of an exemplary method 800 for executing a service instruction, according to an embodiment of the present invention. Method 800 is performed by a service wrapper 26 when agent server 20 asks the service wrapper to execute a service instruction relating to the respective service 24.

Method 800 begins at step 802 where service wrapper 26 identifies the service permissions required by the service instruction. In other words, the execution of the service instruction may cause particular service resources 25 (e.g., long-distance calling time, on-line data access time, or memory storage space) to be consumed. Thus, an assessment is made as to the service permissions needed in order to carry out the service instruction.

At step 804, service wrapper 26 asks agent server 20 for the permissions held by the agent 22 for which the instruction is being executed. The permissions held by an agent 22 are not necessarily the same as the permissions which are required in order to execute an

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instruction. For example, agent 22 may have permissions only for long-distance calling time and memory storage space, but execution of the instruction requires permission for on-line data access time.

Thus, at step 806, service wrapper 26 determines whether the permissions held by agent 22 include the permissions required in order to execute the instruction. If it is determined that the permissions held do not include the permissions required, service wrapper 26 executes an error routine at step 808, after which method 800 ends.

Otherwise, if it is determined at step 806 that the permissions held do include the permissions required, method 800 precedes to step 810 where, for each service permission, service wrapper 26 identifies the amount of a service resource 25 which is allotted to agent 22 and the amount of that service resource 25 which must be consumed in order to execute the instruction. As with the permissions, the amount of a service resource 25 allotted to an agent 22 is not necessarily the same as the amount of that service resource 25 which is required to execute the

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instruction. For example, an agent 22 may have permission to utilize up to a predefined amount of memory storage space to store a voice mail message, but the actual amount required for a particular message is greater than the predefined amount.

At step 812, service wrapper 26 determines whether the amount allotted to agent 22 is at least as great as the amount required to execute the instruction. If it is determined that the amount allotted is not at least as great as the amount required, service wrapper 26 executes an error routine at step 814, after which method 800 ends.

Referring again to step 812, if it is determined that the amount of the service resource 25 allotted to agent 22 is at least as great as the amount which is required to execute the instruction, then method 800 moves to step 816 where service wrapper 26 asks the respective service 24 to execute the instruction, thereby enabling agent 22 to perform one or more tasks for its user/principal.

At step 818, service wrapper 26 identifies the amount of each service resource 25 actually consumed or

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instruction. For example, an agent 22 may have permission to utilize up to a predefined amount of memory storage space to store a voice mail message, but the actual amount required for a particular message is greater than the predefined amount.

At step 812, service wrapper 26 determines whether the amount allotted to agent 22 is at least as great as the amount required to execute the instruction. If it is determined that the amount allotted is not at least as great as the amount required, service wrapper 26 executes an error routine at step 814, after which method 800 ends.

Referring again to step 812, if it is determined that the amount of the service resource 25 allotted to agent 22 is at least as great as the amount which is required to execute the instruction, then method 800 moves to step 816 where service wrapper 26 asks the respective service 24 to execute the instruction, thereby enabling agent 22 to perform one or more tasks for its user/principal.

At step 818, service wrapper 26 identifies the amount of each service resource 25 actually consumed or

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used to execute the instruction. At step 820, for each service resource 25, service wrapper 26 asks agent server 20 to decrement the amount allotted to agent 22 by the amount actually used. Method 800 then ends.

In method 800 described above, it is assumed that service wrapper 26 can determine in advance what amount of service resource 25 will be consumed in the execution of an instruction. This, however, is not always the case. For example, while a predefined maximum amount of memory space may be set aside to store any given voice mail message, the amount of storage space actually consumed depends on how long the caller speaks. Other service resources 25 can be consumed on an on-going basis even after an instruction has executed. For example, if a long-distance call is made on behalf of a subscriber, connect time for a long-distance service continues until the call has been completed. In both cases, service wrapper 26 actively monitors service resource consumption and halts further consumption whenever the amount held by an agent 22 is exhausted.

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Accordingly, the present invention provides a system and method which allow subscribers or third parties to create and customize personalized agents 22 which utilize services 24 (e.g., e-mail, voice mail, electronic address book, electronic contact book, etc.) in order to perform respective tasks for the subscribers. Thus, the present invention affords user extensibility of the services 24.

Furthermore, the present invention monitors and controls the consumption of service resources 25 and computational resources 21 by agents 22 during execution. Thus, the present invention protects the subscribers and a service provider from misuse or overuse, whether intentional or inadvertent, of such resources.

While particular embodiments of the present invention and their advantages have been shown and described, it should be understood that various changes, substitutions, and alterations can be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

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WHAT IS CLAIMED IS:

1. A network system comprising:

a service;

an agent operable to use the service on behalf of a principal; and

an agent server operable to mediate the use of the service by the agent.

2. The network system of Claim 1 further comprising a computational resource which can be consumed by the agent.

3. The network system of Claim 2 wherein the agent server is operable to monitor the consumption of the computational resource by the agent.

4. The network system of Claim 3 wherein the agent server is operable to charge the principal for the consumption of the computational resource.

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5. The network system of Claim 3 wherein the agent server is operable to terminate the agent in response to the monitoring.

6. The network system of Claim 2 further comprising a computational permission associated with the computational resource and the agent, the computational permission specifying a predetermined amount of the computational resource which the agent is allowed to consume.

7. The network system of Claim 2 further comprising a computational permission associated with the computational resource and the principal, the computational permission specifying a predetermined amount of the computational resource which is allowed to be consumed on behalf of the principal.

8. The network system of Claim 2 wherein the computational resource can be processing time for the agent or elapsed time for the agent.

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9. The network system of Claim 1 further comprising a service resource associated with the service and which can be consumed by the agent when the agent uses the service.

10. The network system of Claim 9 further comprising a service wrapper associated with the service, the service wrapper operable to monitor the consumption of the service resource by the agent.

11. The network system of Claim 10 wherein the service wrapper is operable to terminate the agent in response to the monitoring.

12. The network system of Claim 9 wherein the agent server is operable to charge the principal for the consumption of the service resource.

13. The network system of Claim 9 further comprising a service permission associated with the service resource and the agent, the service permission specifying a predetermined amount of the service resource which the agent is allowed to consume.

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14. The network system of Claim 9 further comprising a service permission associated with the service resource and the principal, the service permission specifying a predetermined amount of the service resource which is allowed to be consumed on behalf of the principal.

15. The network system of Claim 9 wherein the service resource comprises elapsed time for a telephone call.

16. The network system of Claim 9 wherein the service resource comprises cost for a telephone call.

17. The network system of Claim 1 further comprising a service wrapper associated with the service, the service wrapper operable to translate between a first instruction set and a second instruction set.

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18. The network system of Claim 1 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete an agent template from which the agent is created.

19. The network system of Claim 1 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete the agent.

20. The network system of Claim 19 wherein the user interface comprises a graphical user interface.

21. The network system of Claim 20 wherein the graphical user interface comprises:

a web server resident in the network system; and

a web browser resident in a user device.

22. The network system of Claim 19 wherein the user interface comprises a voice user interface.

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23. The network system of Claim 22 wherein the voice user interface comprises a speech recognition application.

24. The network system of Claim 22 wherein the voice user interface comprises a speech synthesis application.

25. The network system of Claim 22 wherein the voice user interface comprises a speech playback device.

26. The network system of Claim 1 wherein the service comprises a user interface service operable to provide a user interface by which the agent can interact with a user.

27. The network system of Claim 26 wherein the user interface comprises a graphical user interface.

28. The network system of Claim 27 wherein the graphical user interface comprises:

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a web server resident in the network system; and

a web browser resident in a user device.

29. The network system of Claim 27 wherein the user interface comprises a voice user interface.

30. The network system of Claim 29 wherein the voice user interface comprises a speech recognition application.

31. The network system of Claim 29 wherein the voice user interface comprises a speech synthesis application.

32. The network system of Claim 29 wherein the voice user interface comprises a speech playback device.

33. A network system comprising:

a user interface operable to allow a user to interact with the network system; and

an agent server coupled to the user interface, the agent server operable to manage the operation of a

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programmable functionality component of the network system, the agent server in conjunction with the user interface operable to create, modify, or delete an agent in response to interaction by the user.

34. The network system of Claim 33 wherein the user interface comprises a graphical user interface.

35. The network system of Claim 34 wherein the graphical user interface comprises a web browser application.

36. The network system of Claim 33 wherein the user interface comprises a voice user interface.

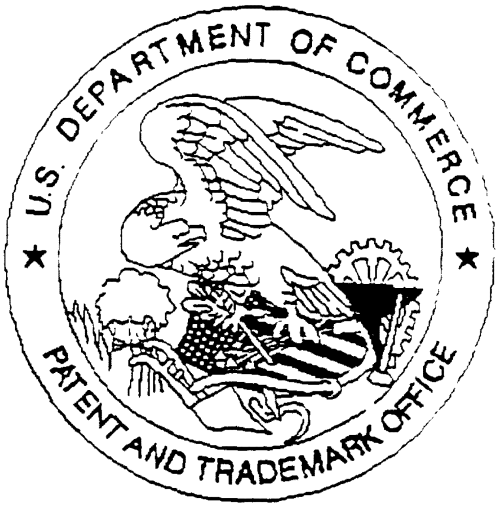
37. The network system of Claim 36 wherein the voice user interface comprises a speech recognition application.

38. The network system of Claim 36 wherein the voice user interface comprises a speech synthesis application.

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SCANNED, # 22

Application deficiencies were found during scanning:

■ Page(s) 95 of specification were not present for scanning. (Document title)

☐ Page(s)_____ of _____ were not present for scanning. (Document title)

☐ Scanned copy is best available.

43. The network system of Claim 41 further comprising a service resource associated with the service, the service resource being consumed when the agent utilizes the service.

44. The network system of Claim 43 wherein the service wrapper is operable to monitor the amount of service resource consumed by the agent when the agent utilizes the service.

45. A method comprising:

admitting a user to a network system wherein at least one agent is operable to utilize a service to perform a task for the user; and

allowing the user to create, modify, or delete the agent within the network system.

46. The method of Claim 45 further comprising accepting an agent command from the user.

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47. The method of Claim 46 wherein the agent command is one of a create agent command, an edit agent command, and a delete agent command.

48. The method of Claim 45 further comprising suspending execution of the agent.

49. The method of Claim 45 further comprising accepting a template command from the user.

50. The method of Claim 49 further comprising allowing the user to create, modify, or delete an agent template within the network system.

51. The method of Claim 45 further comprising admitting the user to an agent area of a user interface.

52. A network system comprising:

an agent server operable to manage the operation of a programmable functionality component of the network system;

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a service;

an agent operable to utilize the service; and

a service wrapper associated with the service, the service wrapper operable to cooperate with the agent server to mediate interaction between the service and the agent.

53. The network system of Claim 52 further comprising a service resource associated with the service, the service resource being consumed when the agent utilizes the service.

54. The network system of Claim 53 wherein the service wrapper comprises a monitor, the monitor operable to monitor the amount of the service resource consumed by the agent when the agent utilizes the service.

55. The network system of Claim 52 wherein the service wrapper comprises a converter, the converter operable to convert between a first computer language

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used by the agent and a second computer language used by the service.

56. The network system of Claim 55 wherein the converter comprises an agent server to service converter for converting from the first computer language to the second computer language.

57. The network system of Claim 55 wherein the converter comprises a service to agent server converter for converting from the second computer language to the first computer language.

58. The network system of Claim 52 further comprising a user interface operable to allow a user to interact with the network system in order to create the agent.

59. The network system of Claim 58 wherein the user interface comprises a graphical user interface.

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60. The network system of Claim 59 wherein the graphical user interface comprises a web browser application.

61. The network system of Claim 58 wherein the user interface comprises a voice user interface.

62. The network system of Claim 61 wherein the voice user interface comprises a speech recognition application.

63. The network system of Claim 61 wherein the voice user interface comprises a speech synthesis application.

64. The network system of Claim 61 wherein the voice user interface comprises a speech playback device.

65. The network system of Claim 52 further comprising a computational resource which can be consumed by the agent.

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66. The network system of Claim 65 wherein the agent server is operable to monitor the amount of the computational resource consumed by the agent.

67. The network system of Claim 52 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising data and instructions executable within the agent server.

68. The network system of Claim 52 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising a permission for the agent.

69. A method comprising:

allowing an agent to utilize a service; and

mediating interaction between the service and the agent.

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70. The method of Claim 69 wherein allowing comprises allowing the agent to consume a service resource associated with the service.

71. The method of Claim 69 wherein mediating comprises monitoring the amount of a service resource consumed by the agent.

72. The method of Claim 69 wherein mediating comprises:

identifying a service permission required in order for the agent to consume a service resource associated with the service; and

determining whether the agent holds the required service permission.

73. The method of Claim 69 wherein mediating comprises:

receiving an instruction which requires that the agent consume a service resource associated with the service when the agent utilizes the service;

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identifying an amount of the service resource which would be consumed if the instruction is executed;

identifying an amount of the service resource allotted to the agent; and

determining whether the amount which is allotted is greater than or equal to the amount which would be consumed.

74. The method of Claim 73 wherein mediating comprises:

executing the instruction if the amount which is allotted is greater than or equal to the amount which would be consumed; and

subtracting the amount which would be consumed from the amount which is allotted.

75. The method of Claim 69 further comprising converting between a first computer language used by an agent and a second computer language used by the service.

76. The method of Claim 69 further comprising:

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allowing an agent to consume a computational resource; and

monitoring the amount of the computational resource consumed by the agent.

5

Docket No. 2006P26605

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NETWORK SYSTEM

EXTENSIBLE BY USERS

Danny Lange
Barbara Nelson
Jing Su
James E. White

09624359.960796

ABSTRACT OF THE DISCLOSURE

In one aspect, a network system includes a user interface which allows a user to interact with the network system. An agent server is coupled to the user interface. The agent server manages the operation of the network system. Furthermore, the agent server in conjunction with the user interface is operable to create or modify an agent in response to interaction by the user. In another aspect, a network system includes an agent server which manages the operation of the network system. An agent is operable to utilize a service within the network system. A service wrapper, associated with the service, cooperates with the agent server to mediate interaction between the service and the agent.

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DATABRICKS EX1002 Page 119

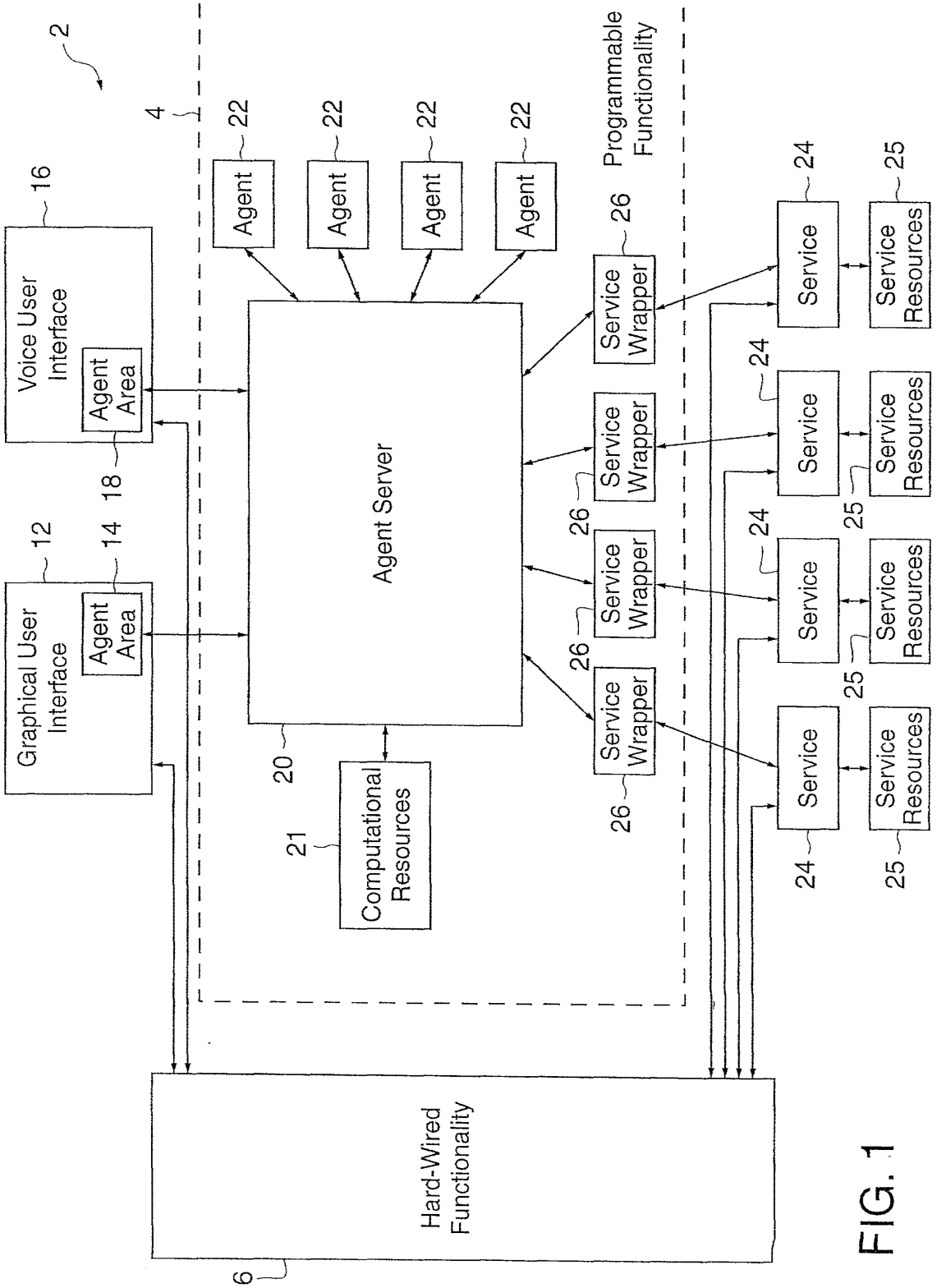

2
4
Programmable Functionality
Agent
22
Agent Server
Voice User Interface
Agent Area
16
18
Graphical User Interface
12
14
Computational Resources
21
20
Service Wrapper
26
Service
24
Service Resources
25
Hard-Wired Functionality
6

FIG. 1

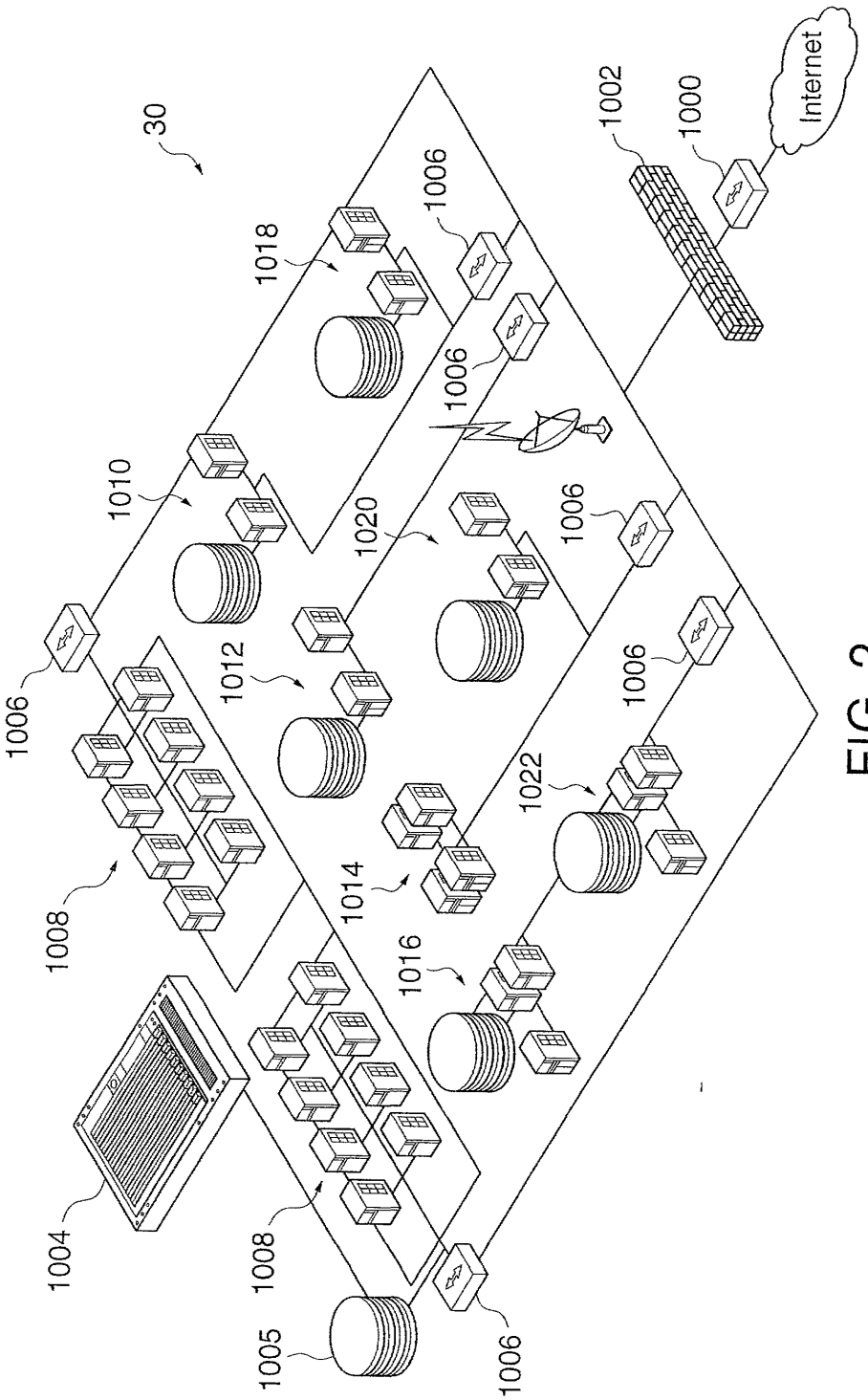

30
1018
1006
1002
1000
Internet
1010
1020
1012
1022
1014
1016
1008
1004
1005

FIG. 2

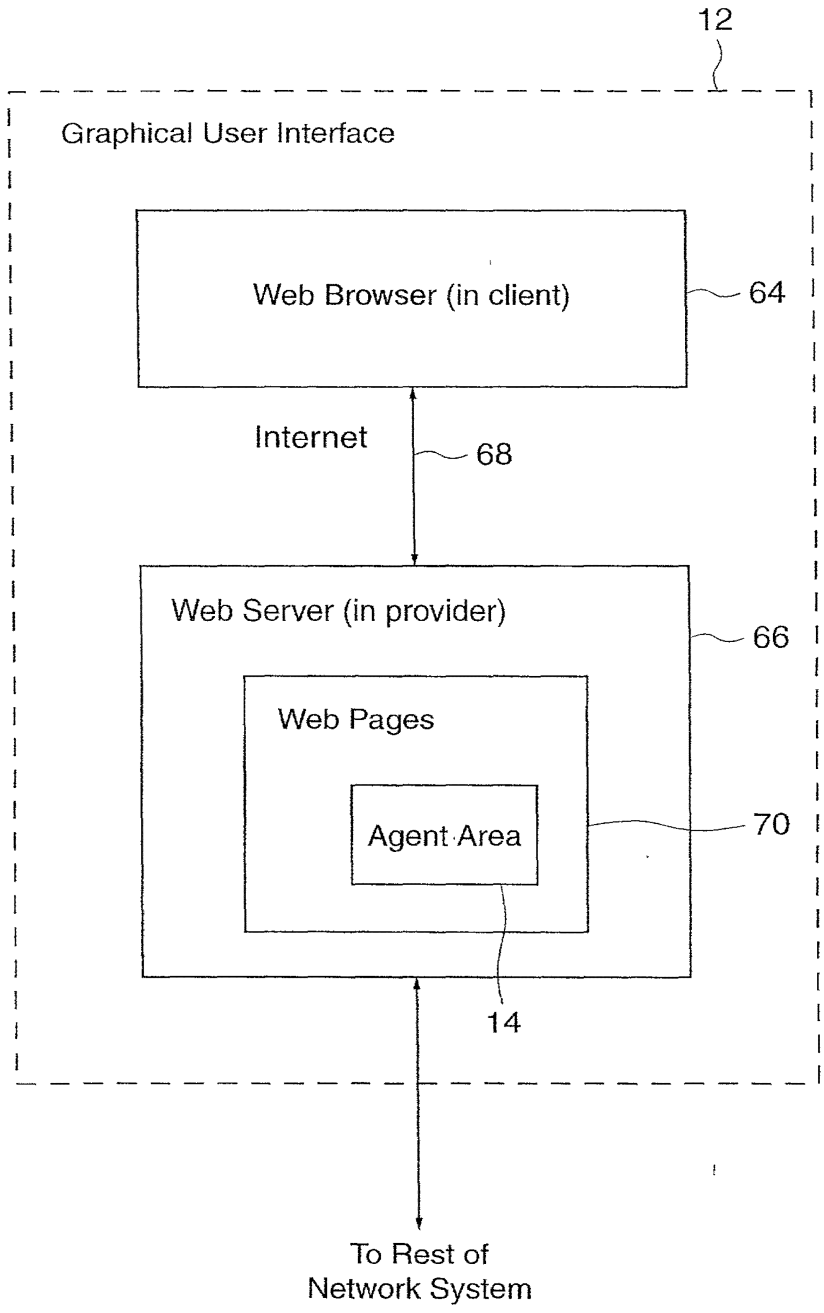


FIG. 3

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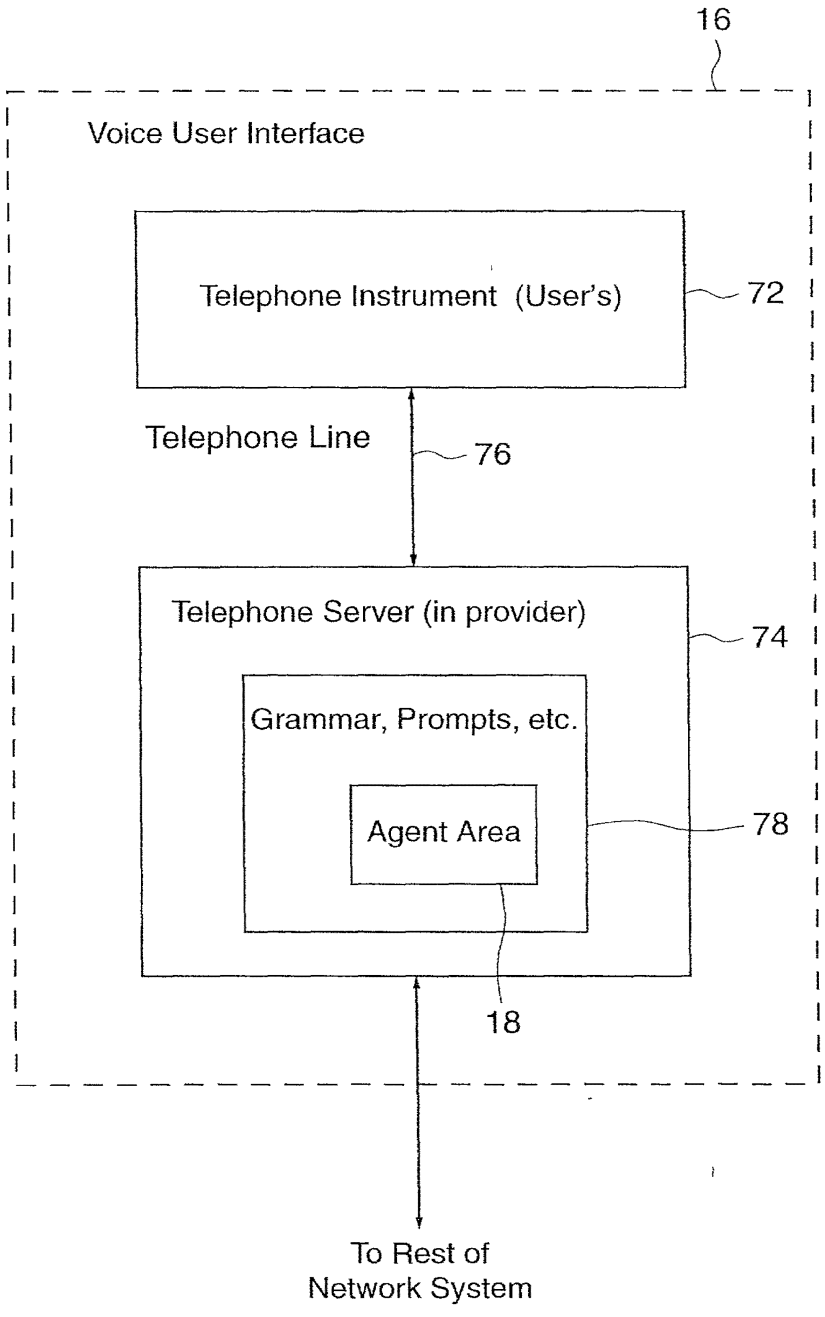

16
Voice User Interface
Telephone Instrument (User's)
72
Telephone Line
76
Telephone Server (in provider)
74
Grammar, Prompts, etc.
Agent Area
78
18
To Rest of
Network System

FIG. 4

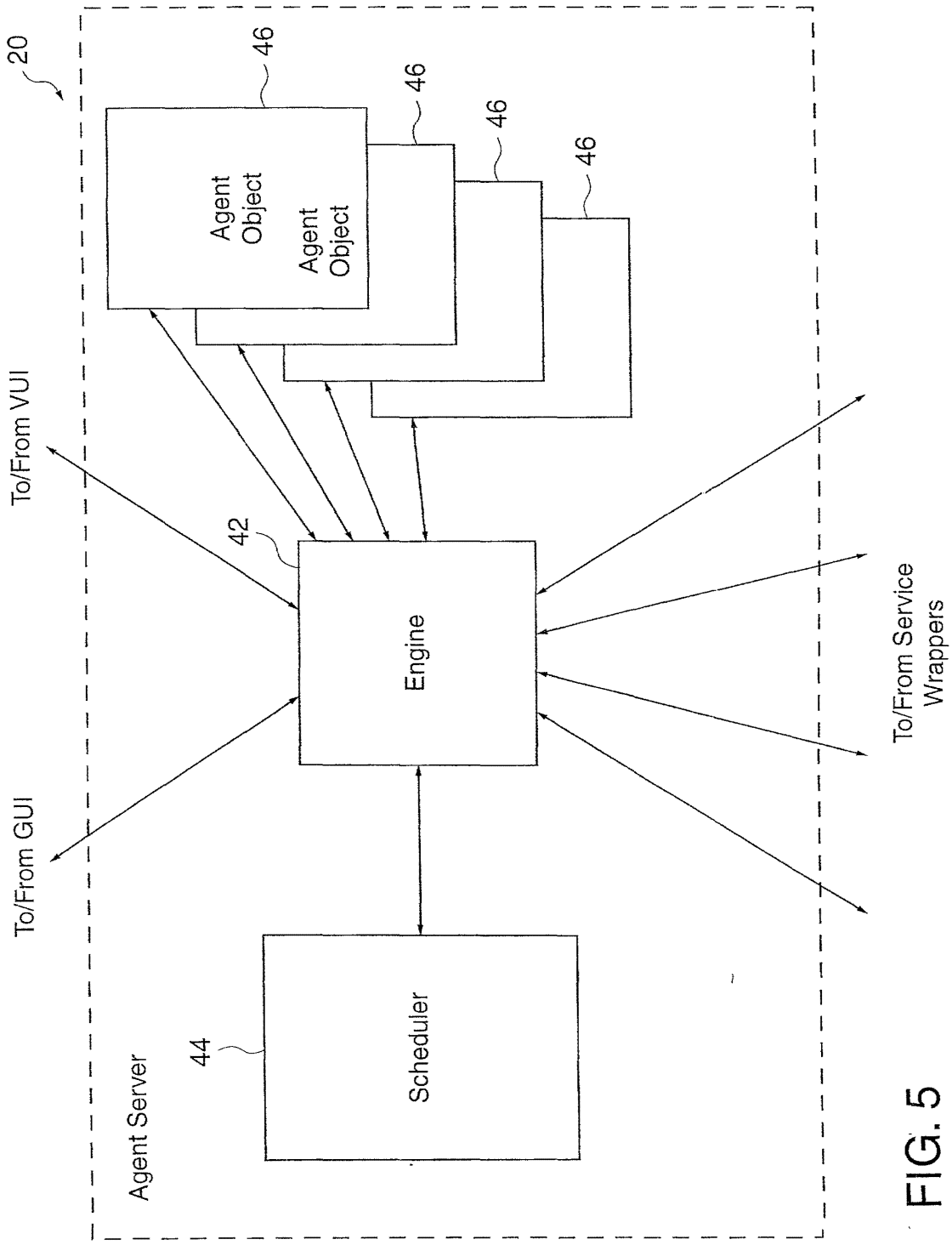

20
46
46
46
46
Agent Object
Agent Object
To/From VUI
42
Engine
To/From GUI
To/From Service Wrappers
44
Scheduler
Agent Server

FIG. 5

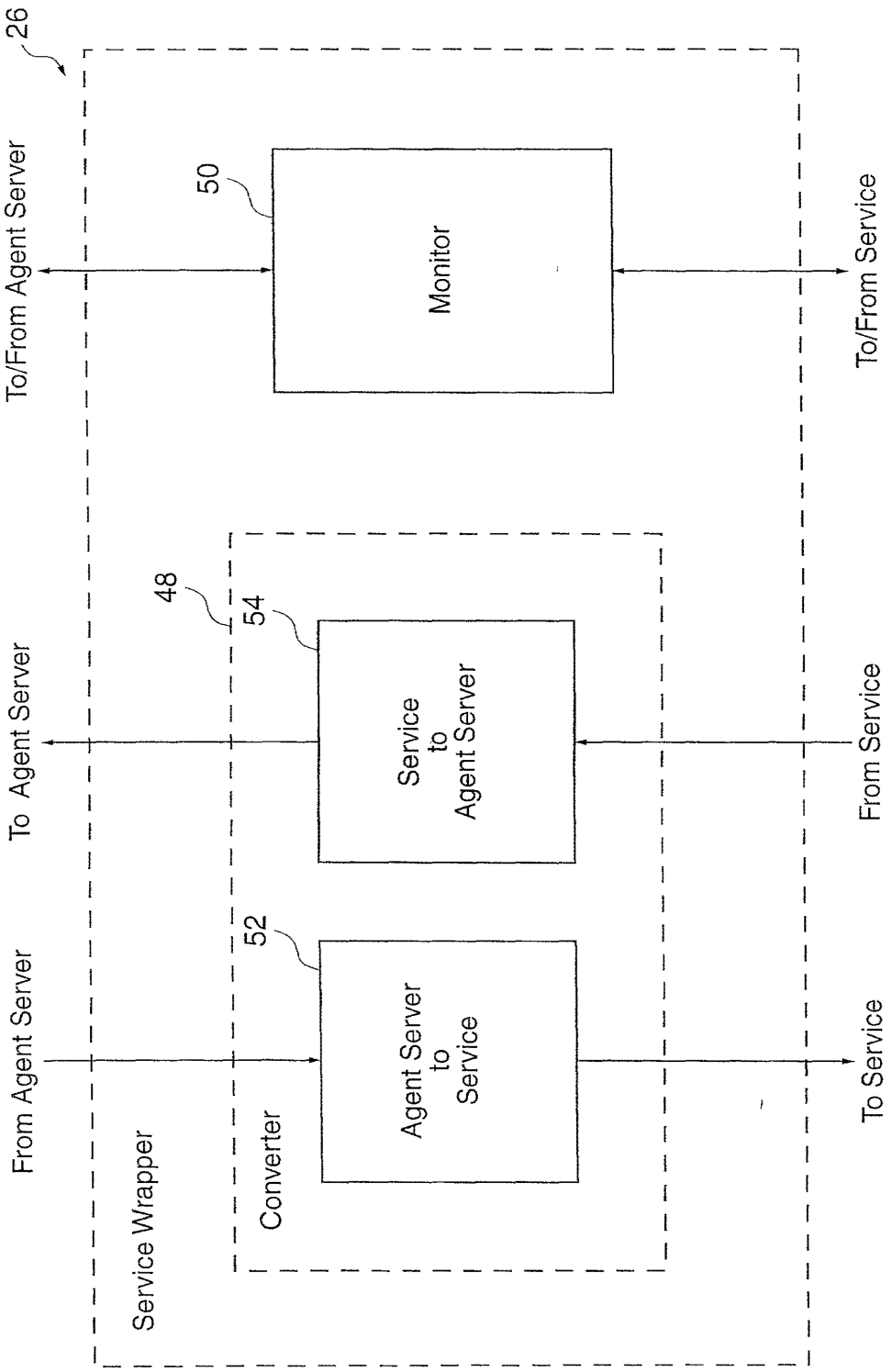

26
To/From Agent Server
50
Monitor
To/From Service
48
54
To Agent Server
Service to Agent Server
From Service
52
From Agent Server
Agent Server to Service
To Service
Converter
Service Wrapper

FIG. 6

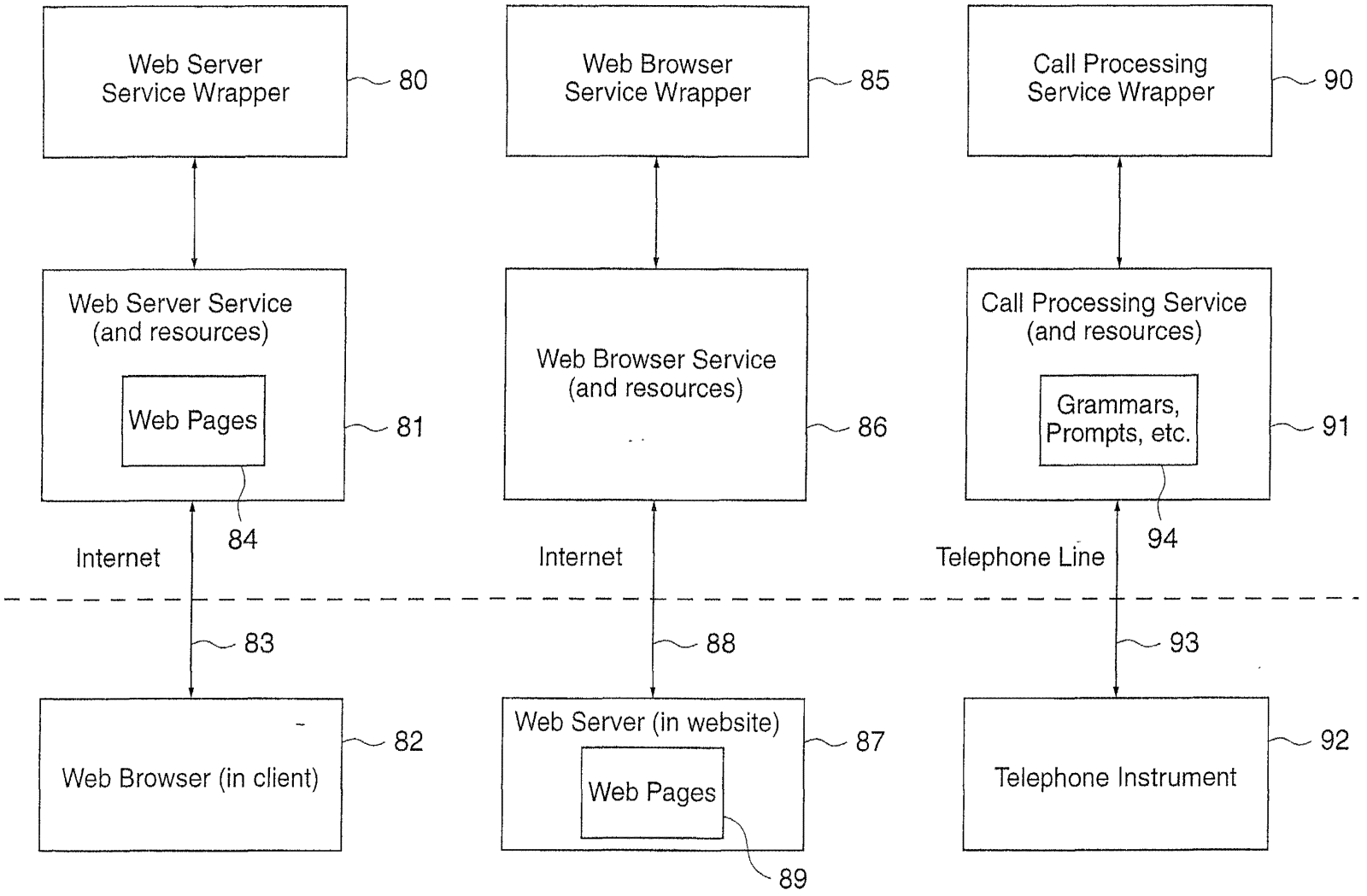


FIG. 7

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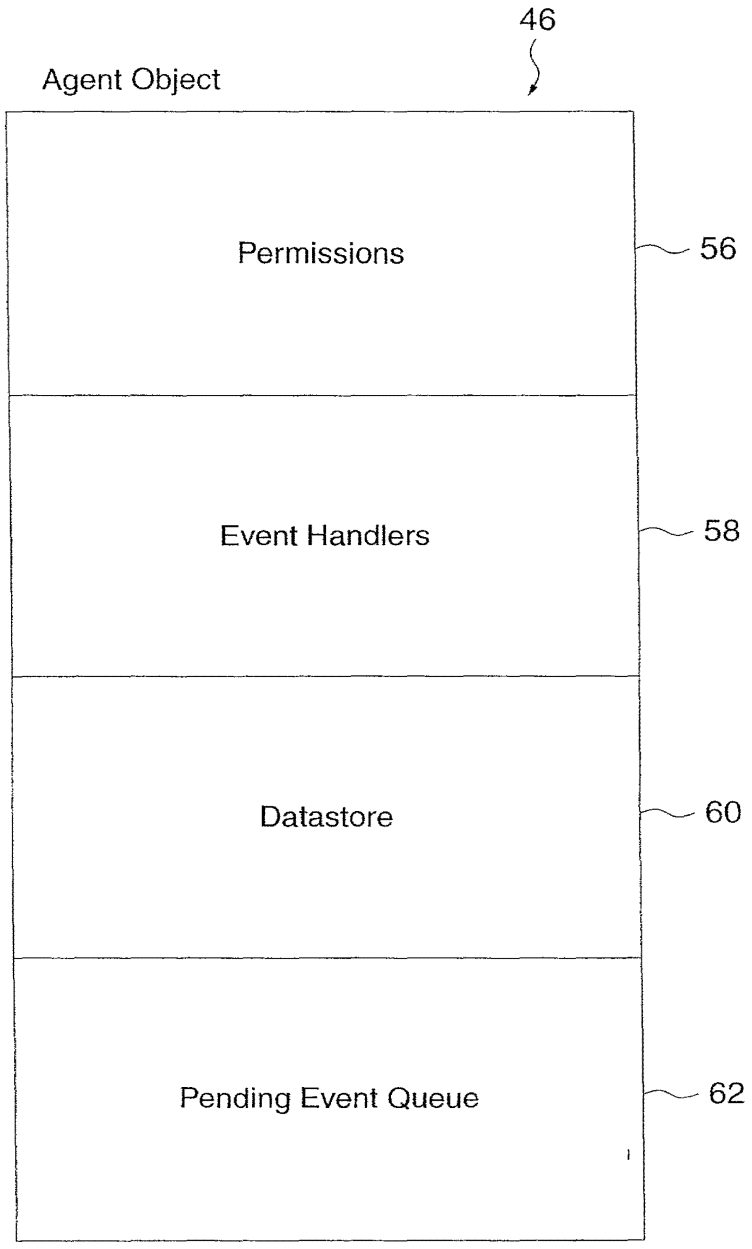


FIG. 8

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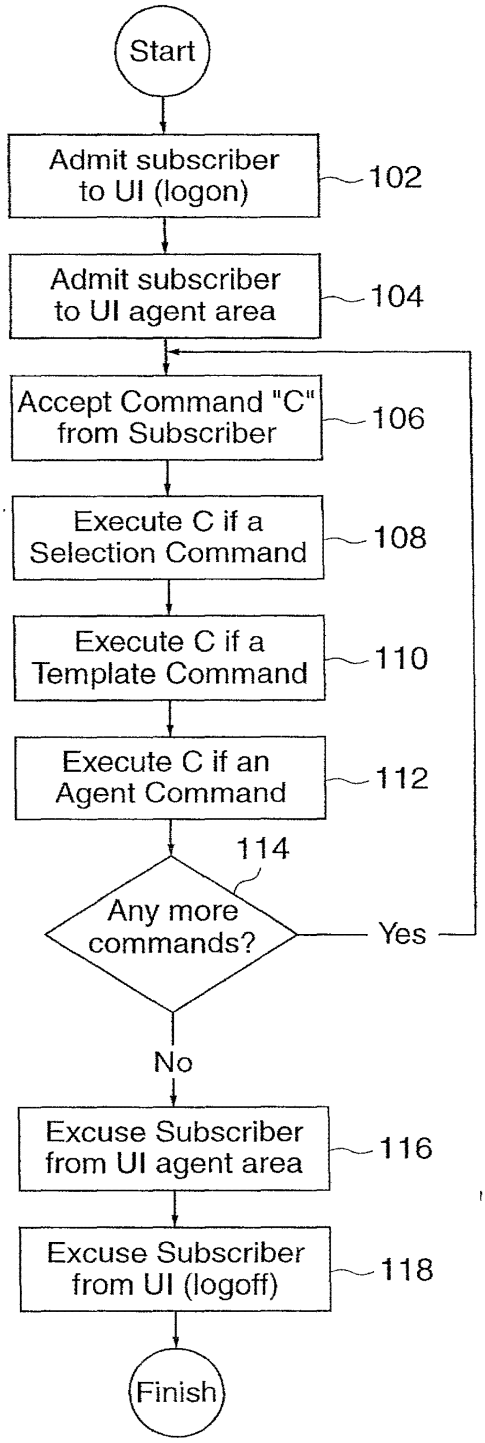


FIG. 9

Docket: 37257/260

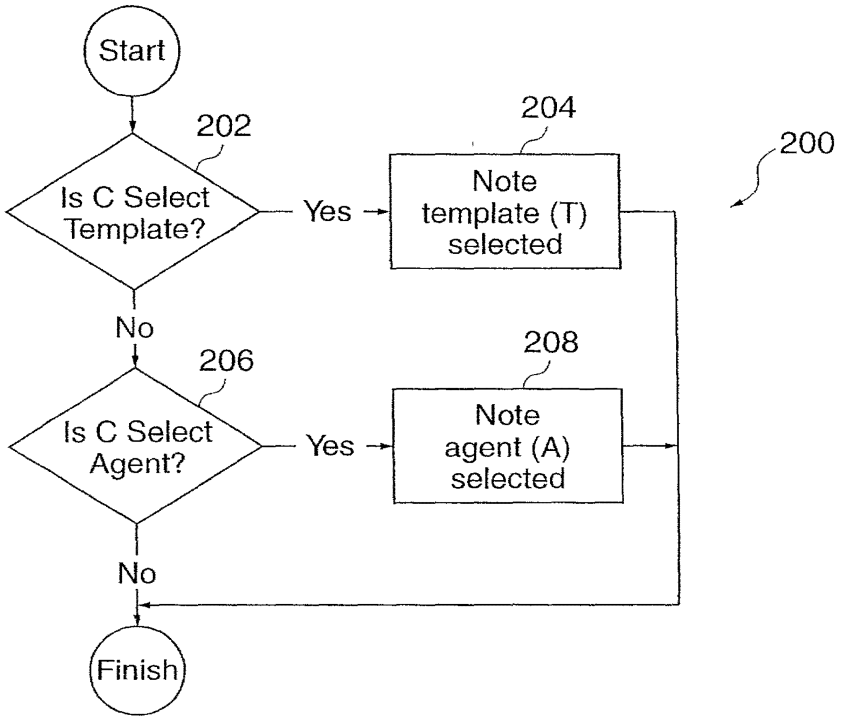


FIG. 10

Docket: 25-2525

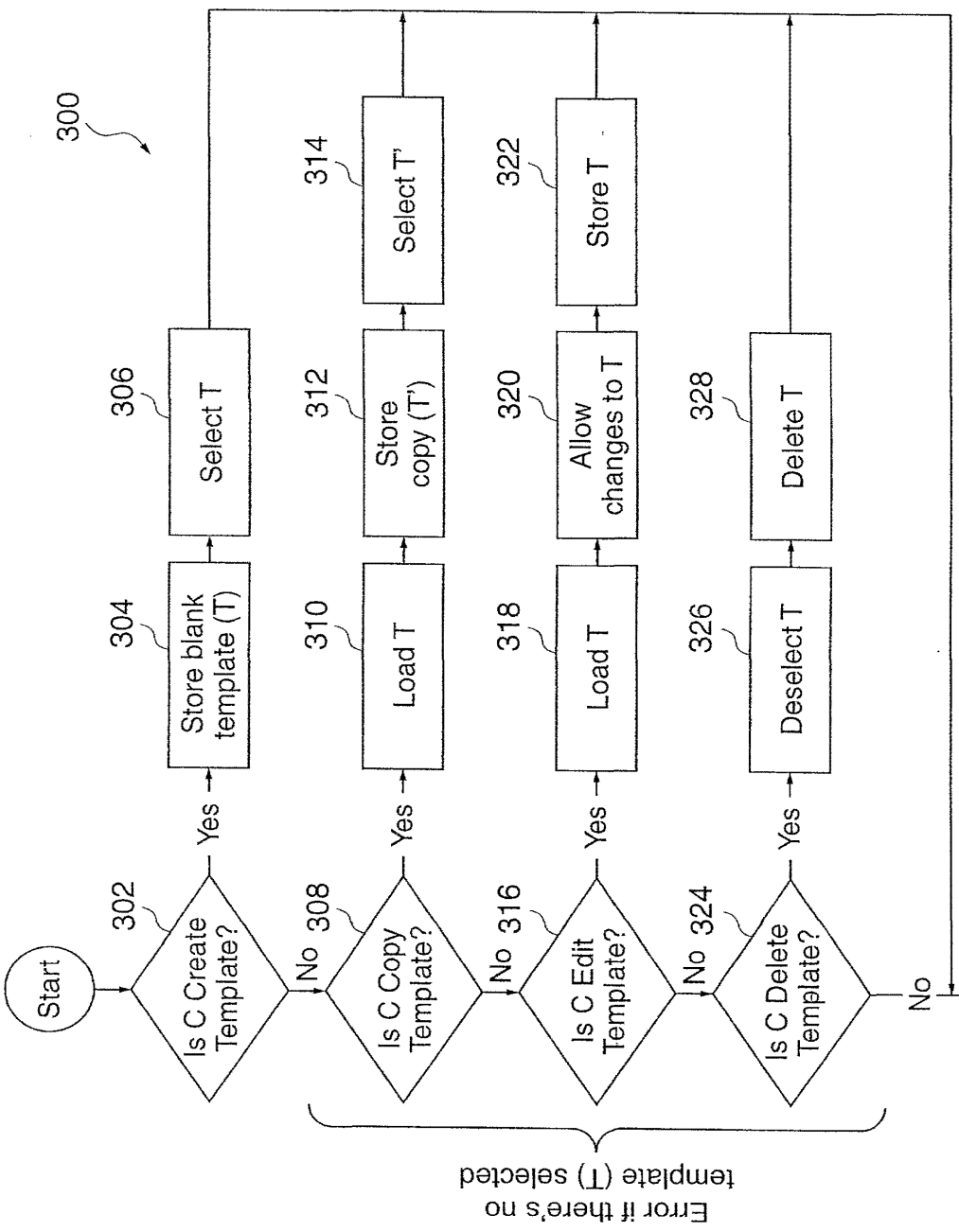

300
Start
302
Is C Create Template?
Yes
304
Store blank template (T)
306
Select T
No
308
Is C Copy Template?
Yes
310
Load T
312
Store copy (T')
314
Select T'
No
316
Is C Edit Template?
Yes
318
Load T
320
Allow changes to T
322
Store T
No
324
Is C Delete Template?
Yes
326
Deselect T
328
Delete T
No
Finish
Error if there's no template (T) selected

FIG. 11

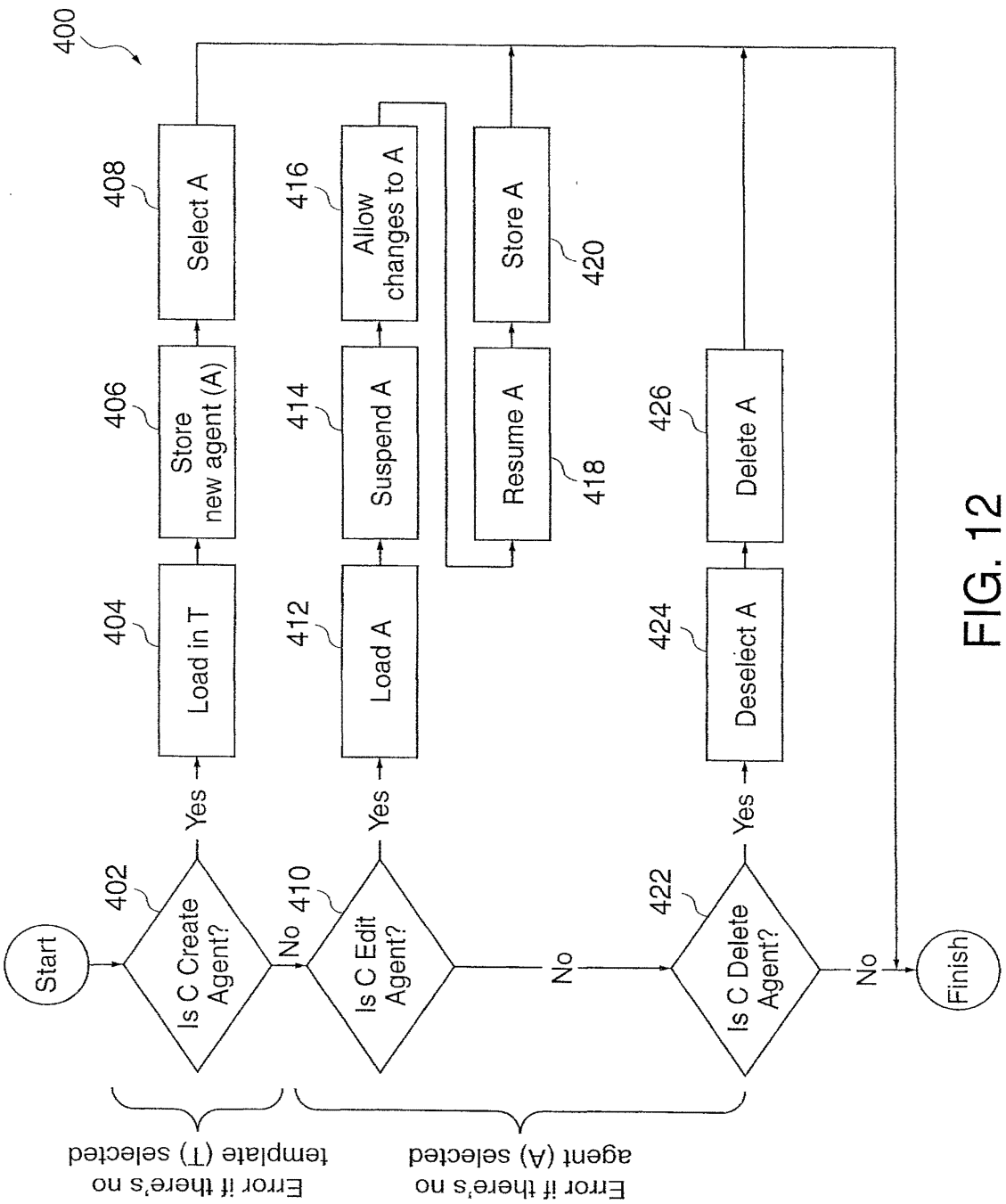

400
Start
Is C Create Agent?
402
Yes
No
Load in T
404
Store new agent (A)
406
Select A
408
Is C Edit Agent?
410
Yes
No
Load A
412
Suspend A
414
Allow changes to A
416
Is C Delete Agent?
422
Yes
No
Deselect A
424
Delete A
426
Resume A
418
Store A
420
Finish
Error if there's no template (T) selected
Error if there's no agent (A) selected

FIG. 12

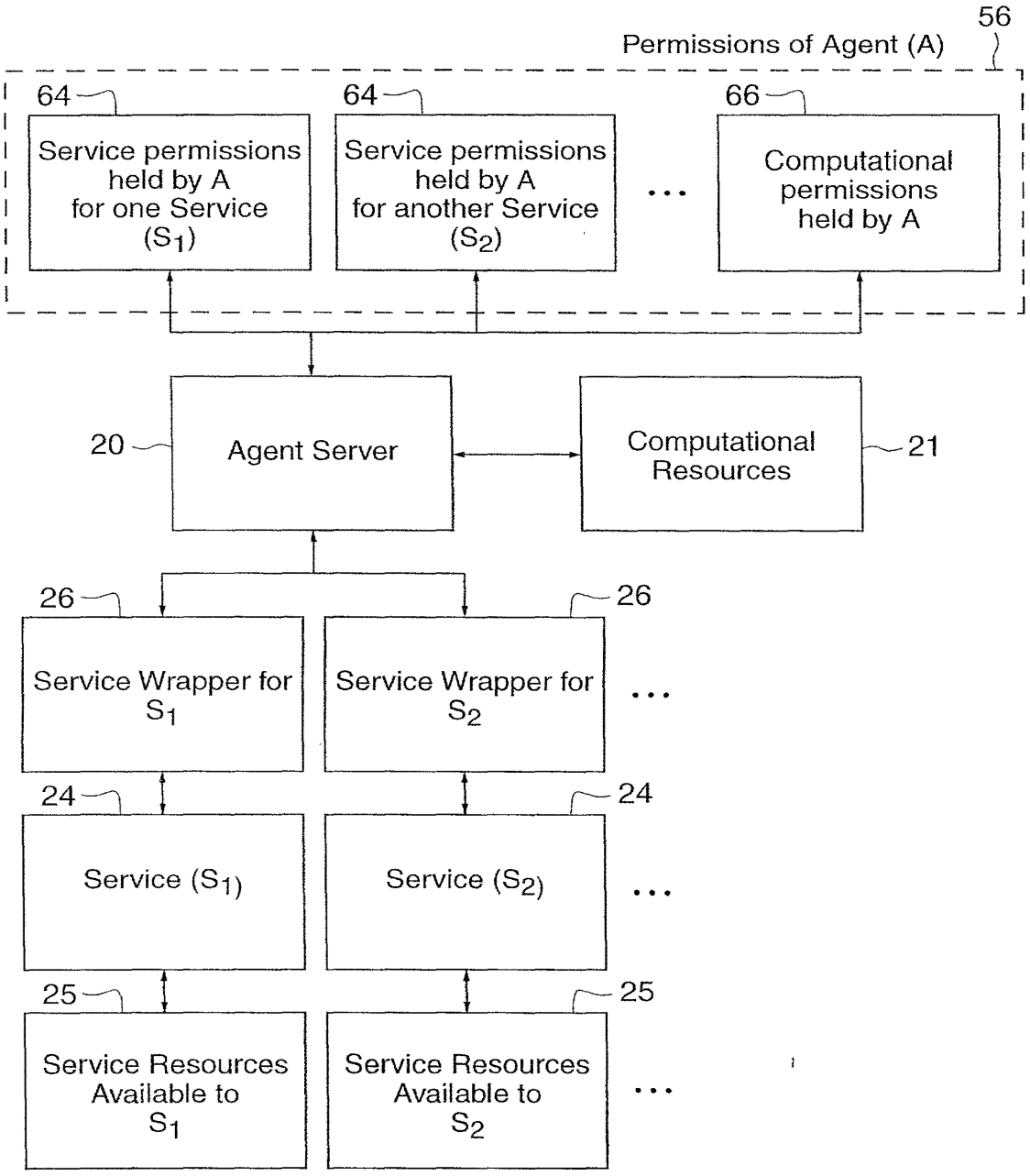


FIG. 13

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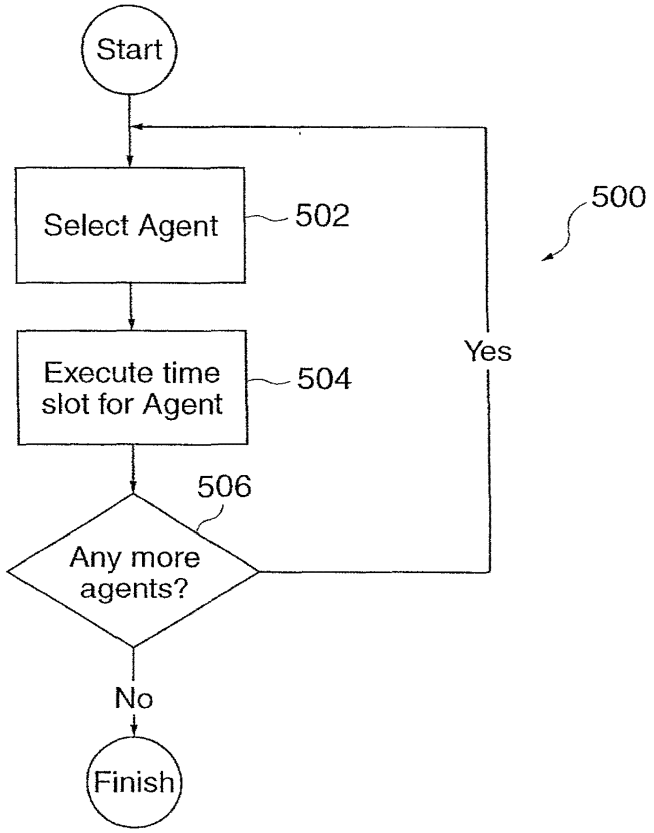


FIG. 14

Patent Application Publication Dec. 21, 2006

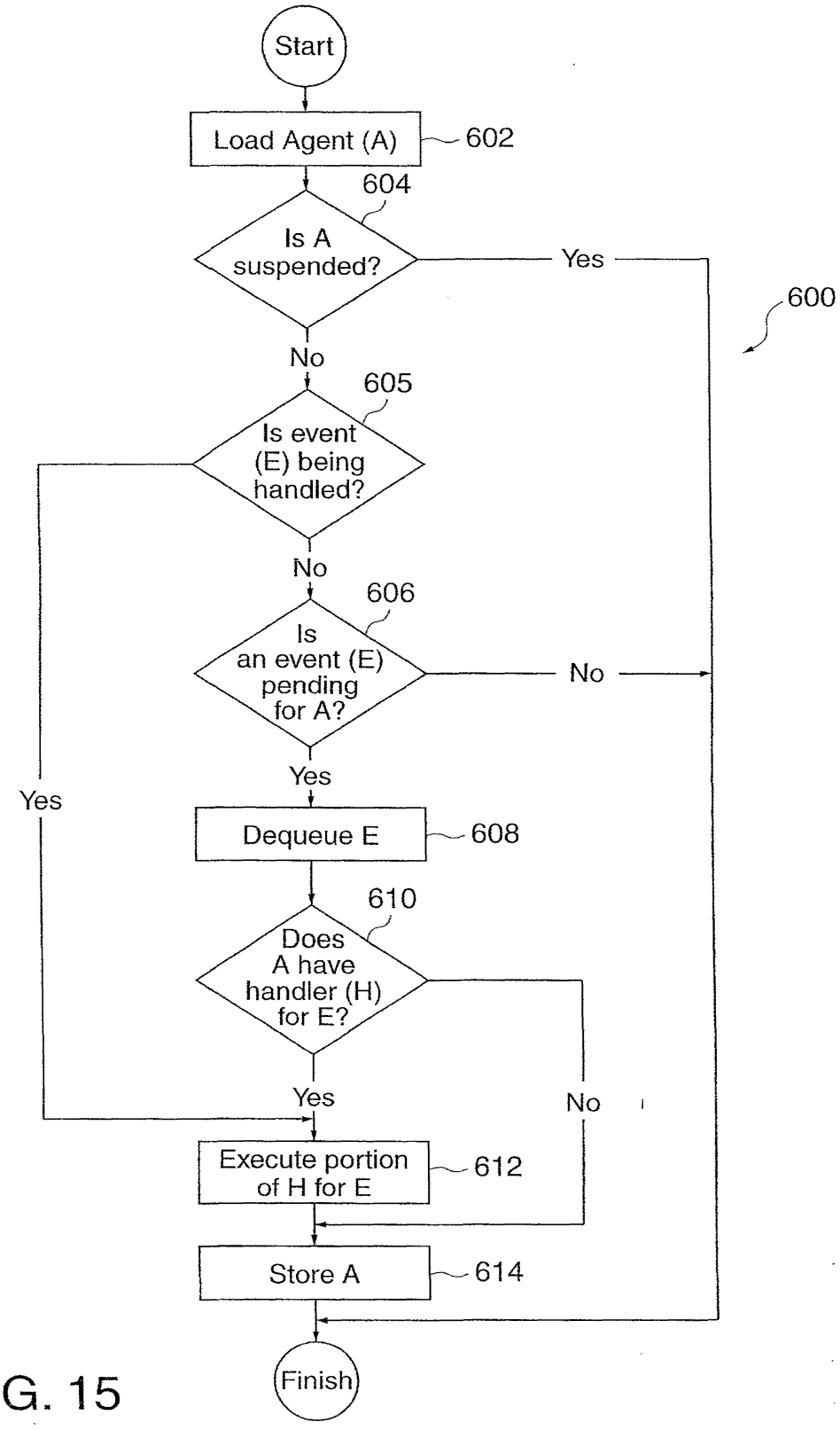


FIG. 15

09/24/2004, EAST Version: 1.4.1

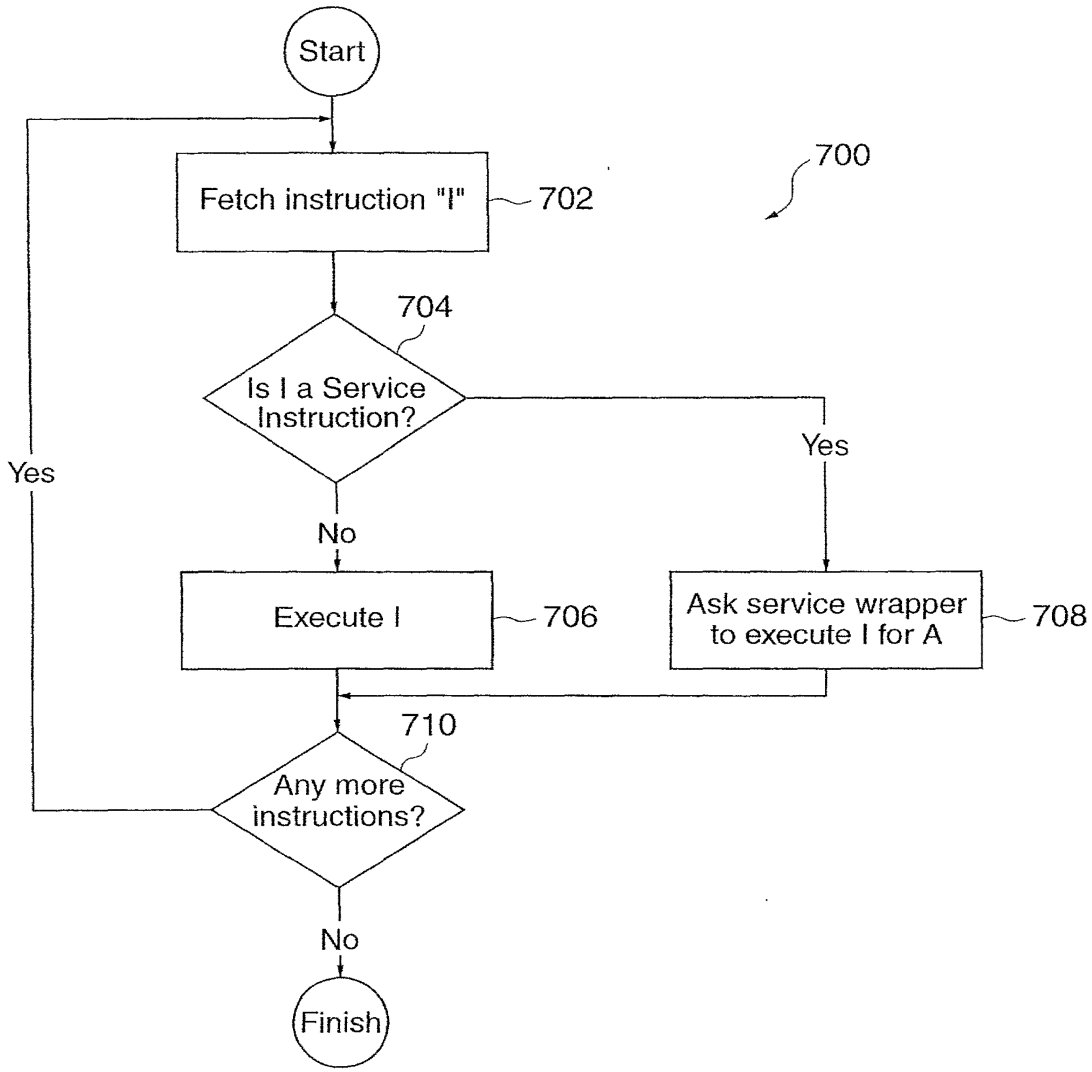

Start
Fetch instruction "I"
702
700
704
Is I a Service Instruction?
Yes
No
Yes
Execute I
706
Ask service wrapper to execute I for A
708
710
Any more instructions?
Yes
No
Finish

FIG. 16

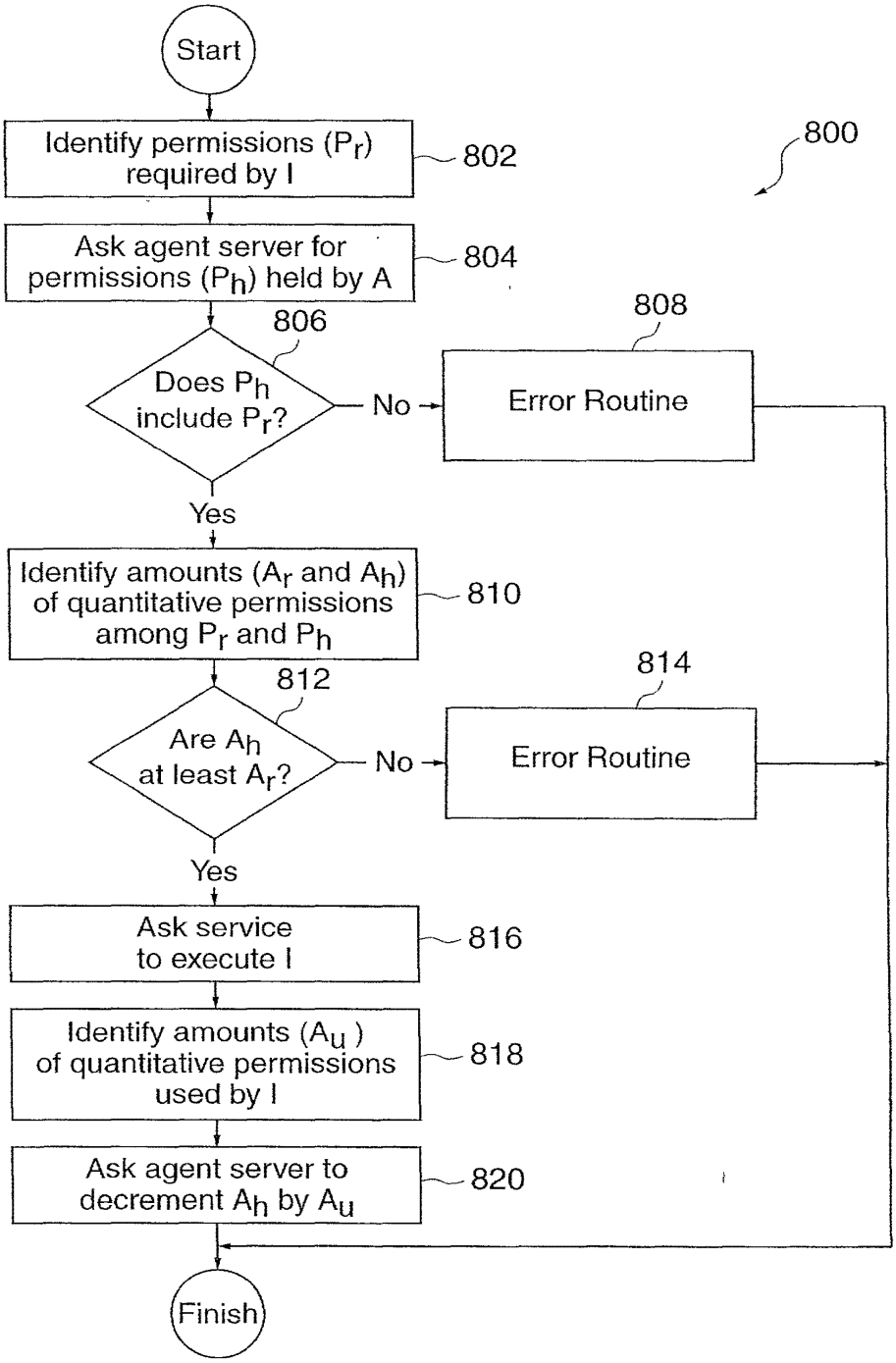


FIG. 17

Date Recue/Received date 2025-07-25

COPY

.orney Docket No.: M-6011 US

DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below adjacent to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of subject matter (process, machine, manufacture, or composition of matter, or an improvement thereof) which is claimed and for which a patent is sought by way of the application entitled **"Network System Extensible By Users"**

which (check) ☒ is attached hereto.
☐ and is amended by the Preliminary Amendment attached hereto.
☐ was filed on _____ as Application Serial No. _____
☐ and was amended on ___ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
Number	Country	Day/Month/Year Filed	Yes	No
N/A			☐	☐

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

Provisional Application Number	Filing Date
N/A	

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information, which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56, which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

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DATABRICKS EX1002 Page 137

Application Serial No.	Filing Date	Status (patented, pending, abandoned)
N/A		

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith:

Alan H. MacPherson (24,423); Thomas S. MacDonald (17,774); Kenneth E. Leeds (30,566); Brian D. Ogonowsky (31,988); David W. Heid (25,875); Norman R. Klivans (33,003); Edward C. Kwok (33,938); David E. Steuber (25,557); Michael Shenker (34,250); Stephen A. Terrile (32,946); Peter H. Kang (40,350); Ronald J. Meetin (29,089); Ken John Koestner (33,004); Omkar K. Suryadevara (36,320); David T. Millers (37,396); Kent B. Chambers (38,839); Serge J. Hodgson (40,017); Michael P. Adams (34,763); Bernard Berman (37,279); Michael J. Halbert (40,633); Gary J. Edwards (41,008); William B. Tiffany (41,347); James E. Parsons (34,691); Daniel P. Stewart (41,332); Philip W. Woo (39,880); John T. Winburn (26,822); Tom Chen (42,406); Fabio E. Marino (43,339); William W. Holloway (26,182); Elaine H. Lo (41,158); Don C. Lawrence (31,975); Marc R. Ascolese (42,268); Carmen C. Cook (42,433); David G. Dolezal (41,711); Adrian J. Lee (42,785); Michael P. Noonan (42,038); Roberta P. Saxon (43,087); Bernice Chen (42,403); Mary Jo Bertani (42,321); and Dale R. Cook (42,434).

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I declare that all statements made herein of my own knowledge are true, all statements made herein on information and belief are believed to be true, and all statements made herein are made with the knowledge that whoever, in any matter within the jurisdiction of the Patent and Trademark Office, knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or device a material fact, or makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be subject to the penalties including fine or imprisonment or both as set forth under 18 U.S.C. 1001, and that violations of this paragraph may jeopardize the validity of the application or this document, or the validity or enforceability of any patent, trademark registration, or certificate resulting therefrom.

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DATABRICKS EX1002 Page 138

Full name of first inventor: Danny Lange

Inventor's Signature: _____ Date: 10-22-98

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Full name of second inventor: Barbara Nelson

Inventor's Signature: Barbara Nelson Date: 10/22/98

Residence: San Mateo, California

Post Office Address: 2825 Juniper Street Citizenship: Ireland
San Mateo, California 94403

Full name of third inventor: Jing Su

Inventor's Signature: _____ Date: 10/22/98

Residence: Cupertino, California

Post Office Address: 20094 Wheaton Drive Citizenship: China
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Full name of fourth inventor: James E. White

Inventor's Signature: James E White Date: 10/22/98

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DOCKET ALARM

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11-15-00

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JC869 U.S. PTO 09/712712 11/14/00

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	M-6011-1C US
First Named Inventor or Application Identifier	Lange
Title	Network System Extensible By Users
Express Mail Label No.	EL 707 907 142 US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents

ADDRESS TO: Commissioner for Patents, Box Patent Application, Washington, D.C. 20231

1. ☒ Fee Transmittal Form - ***see page 2 of this form.*** (Submit an original, and a duplicate for fee processing)
2. Application:
   - ☒ Specification: (preferred arrangement set forth below)
     Descriptive title of the Invention,
     Cross References to Related Applications.
     Reference to Microfiche Appendix,
     Background of the Invention,
     Brief Summary of the Invention,
     Brief Description of the Drawings, and
     Detailed Description (all totaling 86 pages)
     Appendix(ces) ___, ___, & ___ (____pages)
   - ☒ Claim(s) 17 pages
   - ☒ Abstract of the Disclosure 1 page
3. ☒ Drawing(s) (35 USC 113) [Total Sheets 17]
4. Oath or Declaration ☐ unsigned [Total Pages 3]
   - a. ☐ Newly executed (original or copy)
   - b. ☒ Copy from prior application (37 CFR §1.63(d)) (for continuation/divisional with Box 17 completed)
   - c. ☐ DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
5. ☒ Incorporation By Reference (useable if Box 4b is checked)
   The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program Appendix consisting of ____ pages of microfiche containing ___ frames on each page in accompanying envelope.
7. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
   - a. ☐ Computer Readable Copy
   - b. ☐ Paper Copy (identical to computer copy)
   - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☒ Assignment Papers* (cover sheet & documents) 3 pages
9. ☒ 37 CFR §3.73(b) Statement* 3 pages
   ☒ Power of Attorney*
10. ☐ English Translation Document (if applicable)
11. ☐ Information Disclosure Statement (IDS) & ☐ PTO-1449 ☐ ___Copies of IDS Citations/References
12. ☒ Preliminary Amendment 12 pages
13. ☒ Return Receipt Postcard (MPEP 503) (should be specifically itemized)
14. Small Entity Status
    - ☐ Small Entity Statement Enclosed ___ pages
    - ☐ Statement filed in prior application; and status still proper and desired
    - ☐ Is no longer claimed.
15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☒ Other: Assignment was recorded on 10/23/98 on Reel 9557 at frame 0591.

***copy from prior application**

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information and a preliminary amendment:
    ☒ Continuation ☐ Divisional of prior application No. 09/178,366
    Filed on October 23, 1998, entitled: NETWORK SYSTEM EXTENSIBLE BY USERS
    PRIOR APPLICATION INFORMATION: *Examiner* Mehmet B. Geckil *Group Art Unit* 2756

18. CORRESPONDENCE ADDRESS

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Attorneys for Applicant	**Skjerven Morrill MacPherson LLP**				
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Country:	United States	Telephone	(408) 453-9200	Fax	(408) 453-7979

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19. Fee calculations.

CLAIMS (Number Filed)	(1) FOR	(2)		(3) NUMBER EXTRA		(4) RATE		(5) CALCULATIONS
65	TOTAL CLAIMS (37 CFR 1.16(c))	-20	=	45	x	$18	=	$810 00
5	INDEPENDENT CLAIMS (37 CFR 1.16(b))	-3	=	2	x	$80	=	$ 160.00
☐	MULTIPLE DEPENDENT CLAIMS (if applicable) (37 CFR 1.18(d))				+	$260.00	=	
						BASIC FEE (37 CFR 1.16(a))	=	$ 710.00
						Total of above Calculations	=	$ 810.00
							=	
						TOTAL	=	$ 1,680.00

20. FEES: The Commissioner is hereby authorized to credit overpayments or charge the following fees to Deposit Account No. **19-2386**:
   a. ☒ Fees required under 37 CFR 1.16. (U.S. Application Filing Fees)
   b. ☒ Fees required under 37 CFR 1.17. (Conditional Extension of Time Fees)
   c. ☐ Fees required under 37 CFR 1.18. (Patent Issue Fees)

21. ☐ Other: _____

NOTE: **The prior application's correspondence address will carry over to this UPA UNLESS a new correspondence address is provided below.**

22. NEW CORRESPONDENCE ADDRESS					
Customer Number or Bar Code Label				New correspondence address below	
NAME					
ADDRESS					
CITY		STATE		ZIP CODE	
COUNTRY		TELEPHONE		FAX	

23. SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED		
Skjerven Morrill MacPherson LLP 25 Metro Drive, Suite 700 San Jose, CA 95110 Tel. (408) 453-9200 Fax. (408) 453-7979		
Date:	November 14, 2000	
Name	Philip W. Woo	Reg. No. 39,880
Signature	Philip W. Woo	
Express Mail Label No.	EL 707 907 142 US	

692918 v1

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Danny Lange, Barbara Nelson, Jing Su, and James E. White		
Assignee:	General Magic		
Title:	NETWORK SYSTEM EXTENSIBLE BY USERS		
Serial No.:	Unassigned	Filed:	November 14, 2000
Examiner:	Unassigned	Group Art Unit:	Unassigned
Docket No.:	M-6011-1C US		

San Jose, California
November 14, 2000

BOX PATENT APPLICATION
COMMISSIONER FOR PATENTS
Washington, D.C. 20231

Date Deposited

PRELIMINARY AMENDMENT

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION

Page 1, in the header: immediately following "M-6011 US" please insert —1C—.

Page 1, in the express mail label box: please cancel "EL 030 470 745 US" and substitute —EL 707 907 142 US—.

Page 1, before line 10, "TECHNICAL FIELD OF THE INVENTION", insert the following:

—CROSS REFERENCE TO RELATED APPLICATIONS

The present application is a continuation of Serial No. 09/178,366, filed October 23, 1998, entitled "Network System Extensible By Users" which application was allowed on July 3, 2000.—

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IN THE CLAIMS:

Please amend the claims as follows.

Please cancel claims 1-76.

Please add new claims 77-141 as follows:

—77. (New) A network system comprising:

a service;

an agent operable to use the service on behalf of a principal and to consume a service resource while using the service;

an agent server operable to mediate the use of the service by the agent; and

a service wrapper associated with the service, the service wrapper operable to monitor the consumption of the service resource by the agent.

78. (New) The network system of Claim 77 wherein the service wrapper is operable to terminate the agent in response to the monitoring.

79. (New) The network system of Claim 77 wherein the agent server is operable to charge the principal for the consumption of the service resource.

80. (New) The network system of Claim 77 further comprising a service permission associated with the service resource and the agent, the service permission specifying a predetermined amount of the service resource which the agent is allowed to consume.

81. (New) The network system of Claim 77 further comprising a service permission associated with the service resource and the principal, the service permission

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specifying a predetermined amount of the service resource which is allowed to be consumed on behalf of the principal.

82. (New) The network system of Claim 77 wherein the service resource comprises elapsed time for a telephone call.

83. (New) The network system of Claim 77 wherein the service resource comprises cost for a telephone call.

84. (New) The network system of Claim 77 wherein the service wrapper is operable to translate between a first instruction set and a second instruction set.

85. (New) The network system of Claim 77 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete an agent template from which the agent is created.

86. (New) The network system of Claim 77 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete the agent.

87. (New) The network system of Claim 86 wherein the user interface comprises a graphical user interface.

88. (New) The network system of Claim 87 wherein the graphical user interface comprises:

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a web server resident in the network system; and

a web browser resident in a user device.

89. (New) The network system of Claim 86 wherein the user interface comprises a voice user interface.

90. (New) The network system of Claim 89 wherein the voice user interface comprises a speech recognition application.

91. (New) The network system of Claim 89 wherein the voice user interface comprises a speech synthesis application.

92. (New) The network system of Claim 89 wherein the voice user interface comprises a speech playback device.

93. (New) The network system of Claim 77 wherein the service comprises a user interface service operable to provide a user interface by which the agent can interact with a user.

94. (New) The network system of Claim 93 wherein the user interface comprises a graphical user interface.

95. (New) The network system of Claim 94 wherein the graphical user interface comprises:

a web server resident in the network system; and

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a web browser resident in a user device.

96. (New) The network system of Claim 93 wherein the user interface comprises a voice user interface.

97. (New) The network system of Claim 96 wherein the voice user interface comprises a speech recognition application.

98. (New) The network system of Claim 96 wherein the voice user interface comprises a speech synthesis application.

99. (New) The network system of Claim 96 wherein the voice user interface comprises a speech playback device.

100. (New) The network system of Claim 77 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.

101. (New) A network system comprising:

a user interface operable to allow a user to interact with the network system; and

an agent server coupled to the user interface, the agent server operable to manage the operation of a programmable functionality component of the network system, the agent server in conjunction with the user interface operable to create, modify, or delete an agent in response to interaction by the user, the agent operable to consume a service resource as the agent uses a service on behalf of the user.

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Docket No.: 21676-0010

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102. (New) The network system of Claim 101 wherein the user interface comprises a graphical user interface.

103. (New) The network system of Claim 102 wherein the graphical user interface comprises a web browser application.

104. (New) The network system of Claim 101 wherein the user interface comprises a voice user interface.

105. (New) The network system of Claim 104 wherein the voice user interface comprises a speech recognition application.

106. (New) The network system of Claim 104 wherein the voice user interface comprises a speech synthesis application.

107. (New) The network system of Claim 104 wherein the voice user interface comprises a speech playback device.

108. (New) The network system of Claim 101 wherein the user interface comprises an agent area for creating, modifying, or deleting the agent.

109. (New) The network system of Claim 101 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.

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110. (New) The network system of Claim 101 further comprising a service wrapper associated with the service, the service wrapper operable to cooperate with the agent server to mediate interaction between the service and the agent.

111. (New) The network system of Claim 110 wherein the service wrapper is operable to convert between a first computer language used by the agent and a second computer language used by the service.

112. (New) The network system of Claim 110 wherein the service wrapper is operable to monitor the amount of service resource consumed by the agent when the agent utilizes the service.

113. (New) A method comprising:

admitting a user to a network system wherein at least one agent is operable to consume a service resource while utilizing a service to perform a task for the user; and

allowing the user to create, modify, or delete the agent within the network system.

114. (New) The method of Claim 113 further comprising accepting an agent command from the user.

115. (New) The method of Claim 114 wherein the agent command is one of a create agent command, an edit agent command, and a delete agent command.

Docket: 25902.9

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116. (New) The method of Claim 113 further comprising suspending execution of the agent.

117. (New) The method of Claim 113 further comprising accepting a template command from the user.

118. (New) The method of Claim 117 further comprising allowing the user to create, modify, or delete an agent template within the network system.

119. (New) The method of Claim 113 further comprising admitting the user to an agent area of a user interface.

120. (New) A network system comprising:

an agent server operable to manage the operation of a programmable functionality component of the network system;

a service;

an agent operable to consume a service resource while utilizing the service; and

a service wrapper associated with the service, the service wrapper operable to cooperate with the agent server to mediate interaction between the service and the agent.

121. (New) The network system of Claim 120 wherein the service wrapper comprises a monitor, the monitor operable to monitor the amount of the service resource consumed by the agent when the agent utilizes the service.

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122. (New) The network system of Claim 120 wherein the service wrapper comprises a converter, the converter operable to convert between a first computer language used by the agent and a second computer language used by the service.

123. (New) The network system of Claim 122 wherein the converter comprises an agent server to service converter for converting from the first computer language to the second computer language.

124. (New) The network system of Claim 122 wherein the converter comprises a service to agent server converter for converting from the second computer language to the first computer language.

125. (New) The network system of Claim 120 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.

126. (New) The network system of Claim 120 further comprising a user interface operable to allow a user to interact with the network system in order to create the agent.

127. (New) The network system of Claim 126 wherein the user interface comprises a graphical user interface.

128. (New) The network system of Claim 127 wherein the graphical user interface comprises a web browser application.

Docket No. 20459-004600

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129. (New) The network system of Claim 127 wherein the user interface comprises a voice user interface.

130. (New) The network system of Claim 129 wherein the voice user interface comprises a speech recognition application.

131. (New) The network system of Claim 129 wherein the voice user interface comprises a speech synthesis application.

132. (New) The network system of Claim 129 wherein the voice user interface comprises a speech playback device.

133. (New) The network system of Claim 120 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising data and instructions executable within the agent server.

134. (New) The network system of Claim 120 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising a permission for the agent.

135. (New) A method comprising:

allowing an agent to consume a service resource while utilizing a service; and

mediating interaction between the service and the agent.

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136. (New) The method of Claim 135 wherein mediating comprises monitoring the amount of a service resource consumed by the agent.

137. (New) The method of Claim 135 wherein mediating comprises:

identifying a service permission required in order for the agent to consume the service resource; and

determining whether the agent holds the required service permission.

138. (New) The method of Claim 135 wherein mediating comprises:

receiving an instruction which requires that the agent consume the service resource associated with the service when the agent utilizes the service;

identifying an amount of the service resource which would be consumed if the instruction is executed;

identifying an amount of the service resource allotted to the agent; and

determining whether the amount which is allotted is greater than or equal to the amount which would be consumed.

139. (New) The method of Claim 138 wherein mediating comprises:

executing the instruction if the amount which is allotted is greater than or equal to the amount which would be consumed; and

subtracting the amount which would be consumed from the amount which is allotted.

140. (New) The method of Claim 135 further comprising converting between a first computer language used by an agent and a second computer language used by the service.

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141. (New) The method of Claim 135 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.—

REMARKS

Claims 1-76 are canceled. Claims 77-141 are added. Amendments to the specification are to identify related applications. No new matter is added.

Applicants request claims 77-141 be allowed and passed to issue and invite the Examiner to telephone Applicants' attorney at 415-217-6000 if there are any questions.

I hereby certify that this correspondence is being deposited with the United States Postal Service under Express Mail, label EL 707 907 142 US, in an envelope addressed to: Box Patent Application, Commissioner for Patents, Washington, D.C. 20231, on November 14, 2000.

Nov. 14, 2000
Attorney for Applicant(s) Date of Signature

Respectfully submitted,

Philip W. Woo
Attorney for Applicants
Reg. No. 39,880

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DATABRICKS EX1002 Page 153

EXPRESS MAIL LABEL NO:
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NETWORK SYSTEM

EXTENSIBLE BY USERS

Danny Lange
Barbara Nelson
Jing Su
James E. White

DOCKET: 2156.2020

TECHNICAL FIELD OF THE INVENTION

The present invention relates generally to the field of computer software systems and, more particularly, to a network system extensible by users.

CROSS-REFERENCE TO MICROFICHE APPENDICES

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docket pro 30

CROSS-REFERENCE TO RELATED APPLICATIONS

This Application relates to the subject matter disclosed in the following United States Patent and co-pending United States Applications:

United States Patent No. 5,603,031 to White et al., entitled "System and Method For Distributed Computation Based Upon the Movement, Execution, and Interaction of Processes In a Network;"

United States Application Serial No. 08/609,699, filed March 1, 1996, entitled "Method and Apparatus For Telephonically Accessing and Navigating the Internet;"

United States Application Serial No. 08/798,675, filed February 10, 1997, entitled "System and Method For Distributed Computation Based Upon the Movement, Execution, and Interaction of Processes In a Network;" and

United States Application Serial No. 09/071,717, filed May 1, 1998, entitled "Voice User Interface With Personality."

The above patent and co-pending applications are assigned to the present Assignee and are incorporated herein by reference.

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BACKGROUND OF THE INVENTION

Advances in computer and telephony systems have led to the development of numerous technology-driven services, such as electronic mail (e-mail), voice mail, electronic organizers (for appointments and addresses), on-line databases (e.g., for periodicals and stock quotes), and the like. An increasing popularity for these technological services in recent years has spawned an entire industry devoted to the provision and integration of the same. For example, numerous companies now offer e-mail service over the interconnection of computers widely known as the Internet. Other companies offer systems for voice mail services in both private branch exchange (PBX) and public telephone environments. Entities which offer, supply, or otherwise provide services are referred to as "service providers." Entities which purchase, consume, or otherwise use services are referred to as "subscribers."

Many technological services are supported by one or more software applications. These software

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applications are often developed with a broad spectrum of subscribers in mind. As such, the respective technological services may address the generalized needs of many subscribers, but not the specialized needs of any one particular subscriber or group of subscribers.

With previous techniques, when a subscriber desires to alter, change, modify, or otherwise customize a service to suit his or her own specialized needs, that subscriber must contact the appropriate service provider. If the service provider deems that there is sufficient demand for such customization, the provider will initiate a modification of the supporting software application for the relevant service. Software programmers or developers must then modify the existing software application to address the specialized needs of the requesting subscriber(s), and afterwards, test the modified software to ensure that it is functioning properly. Many iterations of modification and testing may be performed before the finished, customized service is available to the subscriber.

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In light of the above, it is clear that previous techniques are problematic for numerous reasons. For example, a service provider is required to maintain or otherwise employ a staff of human software developers for making modifications to supporting software applications. This can be expensive. Furthermore, a substantial amount of time may be required to develop, modify, and test supporting software applications in response to the request of a particular subscriber or group of subscribers. This can lead to subscriber dissatisfaction, and ultimately, defection to another service provider.

SUMMARY OF THE INVENTION

The disadvantages and problems associated with previous techniques for providing technological services have been substantially reduced or eliminated using the present invention.

The present invention provides a network system extensible (e.g., programmable) by "end-users," and a method of operation for the same. In general, an end-user (or simply "user") is any individual, party, or

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entity which somehow interacts with the network system. A user can thus be an entity known to the network system (i.e., an entity having a log-in ID), such as, for example, a subscriber and or an individual affiliated with the service provider. A user can also be an arbitrary third-party which somehow interacts with the network system.

With the present invention, users may extend or customize the network system according to their own particular needs. To accomplish this, a network system is augmented with an agent system. Capabilities of the network system are programmatically exposed by means of one or more services, service resources, and service wrappers. Each service individually, or the network system as a whole, can be extended by adding agents (created by users). Furthermore, the consumption of computational and service resources are monitored within the network system, thus protecting the subscribers and the service provider from harm or misuse, whether intentional or inadvertent. Accordingly, the network system can admit agents programmed by users.

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In addition, the present invention contemplates that a third party may modify existing agents and create new agents in the case where subscribers lack the desire or sophistication to do so themselves. The third party can then make such customized agents commercially available to subscribers.

According to an embodiment of the present invention, a network system includes a service. An agent uses the service on behalf of a principal. An agent server mediates the use of the service by the agent.

According to another embodiment of the present invention, a network system includes a user interface which allows a user to interact with the network system. An agent server is coupled to the user interface. The agent server manages agent use of the network system. Furthermore, the agent server in conjunction with the user interface is operable to create or modify an agent in response to interaction by the user.

According to yet another embodiment of the present invention, a method includes the following: admitting

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a user to a network system wherein at least one agent is operable to utilize a service to perform a task for the user; and allowing the user to create or modify the agent within the network system.

According to still another embodiment of the present invention, a network system includes an agent server which manages agent use of the network system. An agent is operable to utilize a service within the network system. A service wrapper, associated with the service, cooperates with the agent server to mediate interaction between the service and the agent.

According to yet another embodiment of the present invention, a method includes the following: allowing an agent to utilize a service; and mediating interaction between the service and the agent.

A technical advantage of the present invention includes providing a network system (and a method of operation therefor) which is programmable by users (including subscribers) according to their own particular needs. From the standpoint of subscribers, this facilitates the process of adding or deleting new services or extending existing services and, from the

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standpoint of a service provider, this is beneficial in that human software developers and testers can be reduced or eliminated altogether with the automated system of the present invention.

Other aspects and advantages of the present invention will become apparent from the following descriptions and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and for further features and advantages, reference is now made to the following description taken in conjunction with the accompanying drawings, in which:

Figure 1 illustrates a network system extensible by users, according to an embodiment of the present invention;

Figure 2 illustrates an exemplary computer-based system that can be used to implement the network system shown in Figure 1;

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Figure 3 illustrates details for a graphical user interface, according to an embodiment of the present invention;

Figure 4 illustrates details for a voice user interface, according to an embodiment of the present invention;

Figure 5 illustrates details for an agent server, according to an embodiment of the present invention;

Figure 6 illustrates details for a service wrapper, according to an embodiment of the present invention;

Figure 7 illustrates details for specific exemplary service wrappers, services, and service resources;

Figure 8 illustrates details for an exemplary agent object, according to an embodiment of the present invention;

Figure 9 is a flow diagram of an exemplary method for a user session, according to an embodiment of the present invention;

Figure 10 is a flow diagram of an exemplary method for executing a selection command for selecting an

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agent or an agent template, according to an embodiment of the present invention;

Figure 11 is a flow diagram of an exemplary method for executing an agent template command, according to an embodiment of the present invention;

Figure 12 is a flow diagram of an exemplary method for executing an agent command, according to an embodiment of the present invention;

Figure 13 is a block diagram detailing the controlled consumption of service and computational resources, according to an embodiment of the present invention;

Figure 14 is a flow diagram of an exemplary method for executing time slices for an agent population, according to an embodiment of the present invention;

Figure 15 is a flow diagram of an exemplary method for executing a time slice for an agent, according to an embodiment of the present invention;

Figure 16 is a flow diagram of an exemplary method for executing an event handler, according to an embodiment of the present invention; and

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Figure 17 is a flow diagram of an exemplary method for executing a service instruction, according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments of the present invention and their advantages are best understood by referring to Figures 1 through 17 of the drawings. Like numerals are used for like and corresponding parts of the various drawings.

Turning first to the nomenclature of the specification, the detailed description which follows is represented largely in terms of processes and symbolic representations of operations performed by conventional computer components, such as a central processing unit (CPU) or processor associated with a general purpose computer system, memory storage devices for the processor, and connected pixel-oriented display devices. These operations include the manipulation of data bits by the processor and the maintenance of these bits within data structures resident in one or more of the memory storage devices. Such data structures

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impose a physical organization upon the collection of data bits stored within computer memory and represent specific electrical or magnetic elements. These symbolic representations are the means used by those skilled in the art of computer programming and computer construction to most effectively convey teachings and discoveries to others skilled in the art.

For purposes of this discussion, a process, method, routine, or sub-routine is generally considered to be a sequence of computer-executed steps leading to a desired result. These steps generally require manipulations of physical quantities. Usually, although not necessarily, these quantities take the form of electrical, magnetic, or optical signals capable of being stored, transferred, combined, compared, or otherwise manipulated. It is conventional for those skilled in the art to refer to these signals as bits, values, elements, symbols, characters, text, terms, numbers, records, files, or the like. It should be kept in mind, however, that these and some other terms should be associated with appropriate physical quantities for computer operations, and that these

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terms are merely conventional labels applied to physical quantities that exist within and during operation of the computer.

It should also be understood that manipulations within the computer are often referred to in terms such as adding, comparing, moving, or the like, which are often associated with manual operations performed by a human operator. It must be understood that no involvement of the human operator may be necessary, or even desirable, in the present invention. The operations described herein are machine operations performed in conjunction with the human operator or user that interacts with the computer or computers.

In addition, it should be understood that the programs, processes, methods, and the like, described herein are but an exemplary implementation of the present invention and are not related, or limited, to any particular computer, apparatus, or computer language. Rather, various types of general purpose computing machines or devices may be used with programs constructed in accordance with the teachings described herein. Similarly, it may prove advantageous to

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construct a specialized apparatus to perform the method steps described herein by way of dedicated computer systems with hard-wired logic or programs stored in non-volatile memory, such as read-only memory (ROM).

Network System Overview

Referring now to the drawings, Figure 1 illustrates a network system 2 extensible by users, according to an embodiment of the present invention. To achieve this, network system 2 may incorporate an agent system comprising an agent server and one or more agents, as described below in more detail. An exemplary construction for an agent system is taught by United States Patent No. 5,603,031, issued to the Assignee of the present invention, the text of which is incorporated herein by reference.

It is contemplated that network system 2 may be maintained, managed, and/or operated by any provider of technological services, such as electronic mail (e-mail), voice mail, electronic organizer (for appointments and/or addresses), on-line data retrieval (for, e.g., periodicals and stock quotes), and the

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like. These services are offered and/or provided to one or more users who may be considered to be "subscribers." Each of the provider and the subscribers can be an individual, a business, a governmental department or agency, an academic institution, an organization, or the like, which provides or receives, respectively, any form of technological service.

The following primarily describes how network system 2 and its associated methods of operation can be used to provide information technology services over a telephony system. Furthermore, a model of a network system providing telephony services is discussed in detail in microfiche Appendix A, in accordance with one embodiment of the present invention. It should be understood, however, that the present invention is not so limited. That is, the teachings of the present invention generally encompass the provision of services by agents to one or more users in an environment which can be extended by the users, for example, by programming additional agents.

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Network system 2 includes a programmable functionality component 4 and a hard-wired functionality component 6. In general, programmable functionality component 4 and hard-wired functionality component 6 each functions to provide and/or support the provision of technological services. Hard-wired functionality component 6 is implemented substantially with a number of "hard-wired" elements, and thus, its functionality is modified or changed primarily by connecting or re-connecting the same or additional elements. Programmable functionality component 4 is implemented with an agent system and, as such, its functionality can be programmed (for example, by subscribers or third parties), as described below in more detail. Computer code for an exemplary agent system implementing a programmable functionality component 4 is provided in microfiche Appendix B, in accordance with an embodiment of the present invention.

Graphical User Interface

Network system 2 includes a graphical user interface (GUI) 12. Graphical user interface 12 may be

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implemented and/or supported by a web browser--i.e., a client application that resides on (or is downloaded to) an electronic user device, such as a desktop computer. Any of a variety of browsers are available, such as NETSCAPE NAVIGATOR, MICROSOFT INTERNET EXPLORER, and others. The web browser can be a forms-capable browser which is able to interpret Hyper Text Markup Language (HTML) code which provides forms including fill-in text boxes, option buttons, drop-down list boxes, radio buttons, and the like.

Graphical user interface 12 allows a user to interact with network system 2 via a communication line, which may be any type of communication link capable of supporting data transfer. For example, the communication line may include any combination of an Integrated Services Digital Network ("ISDN") communication line, a hard-wired line or a telephone line. This enables communication via the interconnection of computers popularly known as the "Internet," using any suitable protocol, such as, Transmission Control Protocol/Internet Protocol

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(TCP/IP), Internetwork Packet eXchange/Sequence Packet eXchange (IPX/SPX), or AppleTalk.

Graphical user interface 12--comprising a web browser and a web server--manages the connection between the user device and network system 2, supports the transfer of data therebetween, and interprets and displays the data. For example, graphical user interface 12 enables the downloading of one or more web pages (serving as graphical interfaces into network system 2) to the user device. The user device may include one or more suitable input devices, such as a keyboard, key pad, touch screen, input port, pointing device (e.g. mouse), and/or other device that can accept information, and one or more suitable output devices, such as a computer display, output port, speaker, or other device for conveying information including digital data, visual information, or audio information.

Graphical user interface 12 may comprise an agent area 14 which is dedicated to the activities of creating new agents and manipulating existing agents, as described herein. For example, in one embodiment, an "agent" icon is added to a screen menu; the

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interface screen which is accessed by "clicking" on the agent icon constitutes the agent area.

Voice User Interface

A voice user interface (VUI) 16 allows a user to interact with network system 2 via a telephone line, which can be an analog telephone line, a digital T1 line, a digital T3 line, or an OC3 telephony feed. In contrast to graphical user interface 12, voice user interface 16 does not require that a user have access to an electronic interface, such as a computer. Rather, voice user interface 16 interprets the vocalized expressions of a user so that the user may issue commands and other input into network system 2. Voice user interface 16 may also issue audible output in the form of speech that is understandable by a user. Such speech can be synthesized or previously recorded, as described below in more detail.

Voice user interface 16 may comprise speech recognition and speech synthesis software and/or hardware stored in or implemented as a suitable memory device and run on a suitable processor. Such speech

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recognition software allows network system 2 to recognize vocalized speech and may include grammar software that creates or selects a speech recognition grammar for determining which speech should be recognized. Commercially available speech recognition systems with recognition grammars are provided by ASR (Automatic Speech Recognition) technology vendors such as the following: Nuance Corporation of Menlo Park, CA; Dragon Systems of Newton, MA; IBM of Austin, TX; Kurzweil Applied Intelligence of Waltham, MA; Lernout Hauspie Speech Products of Burlington, MA; and PureSpeech, Inc. of Cambridge, MA. Recognition grammars are written specifying what sentences and phrases are to be recognized by the voice user interface 16. For example, a recognition grammar can be generated by a computer scientist or a computational linguist or a linguist. The speech synthesis software synthesizes human speech and may include speech markup software for determining the speech to be synthesized.

In addition to speech synthesis software and/or hardware, voice user interface 16 may include speech play-back capabilities for playing back previously

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recorded human speech. Exemplary play-back devices include a tape player, a laser disc player, etc. Here, an actual person (preferably an actor) recites various statements which may desirably be issued during an interactive session with a user of network system 2. The person's voice is recorded as the recitations are made. The recordings are separated into discrete messages, each message comprising one or more statements that would desirably be issued in a particular context (e.g., greeting, farewell, requesting instructions, receiving instructions, etc.). Afterwards, when a user interacts with network system 2, the recorded messages are played back to the user when the proper context arises. In one embodiment, such speech play-back capabilities can be used to implement a voice user interface with personality, as taught by United States Patent Application Serial No. 09/071,717, entitled "Voice User Interface With Personality," the text of which is incorporated herein by reference.

Voice user interface 16 may also comprise hardware and/or software supporting the interpretation and

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issuance of dual tone multiple frequency (DTMF) commands so that a user may alternatively interact with network system 2 using a telephone key pad.

Voice user interface 16 may comprise an agent area 18 which, like agent area 14 of graphical user interface 12, is dedicated to the activities of creating new agents and manipulating existing agents. In one embodiment, agent area 18 of voice user interface 16 can be implemented by translating the agent area 14 of graphical user interface 12 into voice.

Agent Server

Programmable functionality component 4 includes an agent server 20. Agent server 20 is in communication with graphical user interface 12 and voice user interface 16, and accordingly, may exchange (receive and transmit) information therewith. In general, agent server 20 controls, coordinates, and otherwise manages the overall operation of programmable functionality component 4. Among other things, agent server 20 may invoke, initiate, or execute various routines,

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processes, objects, and the like. For example, when a user wishes to interact with network system 2 via graphical user interface 12, agent server 20 may cause web pages to be downloaded to an electronic user device. As another example, agent server 20 may prompt voice user interface 16 to issue various statements at appropriate moments during an interactive session with a user via telephone. Additional functionality of agent server 20 includes, but is not limited to, executing agent objects, identifying computational and service permissions, and controlling the consumption of computational and service resources, as described below in more detail.

Agent server 20 is responsive to various commands which it may receive from a user, for example, via graphical user interface 12 or voice user interface 16. These commands can be of three types: agent commands, agent template commands, and selection commands for selecting agents and agent templates. Each of these types of commands is explained below in more detail. Agent server 20 executes these commands during its operation.

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Agents

A number of agents 22 are in communication with agent server 20. Each agent 22 is associated with a particular user (e.g., a subscriber or an individual affiliated with the service provider), which may be deemed to be the "principal" for the respective agent. Generally speaking, agents 22 can be considered to be personal software assistants with authority delegated by the respective principals. That is, each agent 22 may be implemented as a software application, program, or process which autonomously, and possibly continuously, runs on behalf of its principal. As such, an agent 22 may be viewed by its principal as an electronic extension thereof. A particular principal may employ a plurality of agents 22, each of which serves only that principal.

The software applications for implementing agents 22 may each comprise a text file or document in, for example, a format prescribed by eXtensible Markup Language (XML). XML is a subset of Standard Generalized Markup Language (SGML) and, like SGML, is a meta-language--i.e., a language for specifying markup

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languages. One such markup language is Agent Definition Format (ADF) developed by General Magic, Inc. Various specifications for ADF are discussed in detail in microfiche Appendix C, in accordance with an embodiment of the present invention. A markup language such as ADF uses tags to provide programming language constructs to text. These tags, which may comprise instructions enclosed in angled brackets, are inserted before and after the text affected. Agent server 20 can interpret the tags and text of an ADF document to cause a respective agent 22 to act. Exemplary code for a number of agents 22 is provided in microfiche Appendix D, in accordance with an embodiment of the present invention.

Agents 22 are task-based. That is, each agent 22 is responsible for performing a particular task or set of tasks on behalf of the respective principal. These tasks may include, for example, answering telephone calls, taking voice mail messages, placing telephone calls, notifying the user of recently received messages (voice mail and/or e-mail), delivering messages, setting up meetings/appointments, gathering

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information, negotiating deals, transacting electronic commerce, etc.

Agents 22 can be "standard" or "customized." A standard agent is one which may be written and/or set-up by the service provider. In general, standard agents perform tasks that many users (e.g., subscribers) each would desirably have performed on his or her behalf. Such tasks may include organizing meetings and delivering messages. A separate copy of a standard agent may be engaged or selected by each user who wishes to have the respective tasks performed. Thus, many standard agents, each performing the same sort of tasks but for different users, may exist in network system 2.

In contrast, a customized agent is one which is written and/or set up by a particular subscriber or group of subscribers to perform certain tasks which are unique to that subscriber or group. For example, a particular subscriber or group may work in the real estate industry and thus desire to have certain tasks related to real estate transactions performed for him/her or them. In this case, such subscriber or

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group of subscribers may customize or create one or more agents that address the specialized needs of the subscriber or group. Furthermore, a third party may customize or create agents for subscribers or groups which are unable, unwilling, or lack the sophistication to do so for themselves. Such agents customized by a third party can be made commercially available to subscribers and other users. Accordingly, network system 2 is extensible in the sense that subscribers and/or third parties may program customized agents 22 according to particular needs.

The customization of agents 22 can be accomplished using an electronic user device (e.g., desktop computer) communicating with network system 2 via graphical user interface 12. In one embodiment, the service provider may maintain a website which users can access for customizing agents 22.

While performing the respective tasks, agents 22 may use or consume various computational resources 21 (e.g., memory storage space, processing time, and the like). Furthermore, agents 22 may also use or consume various service resources (described below in more

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detail) during the performance of their respective tasks. The consumption of computational and service resources by various agents 22 can be monitored, and the respective principals charged for the same.

In one embodiment, each agent 22 is given permission to consume up to a pre-authorized amount of each computational resource and each service resource that the agent may use when performing its respective task(s). For each computational resource, the relevant permission constitutes a "computational permission." For each service resource, the relevant permission constitutes a "service permission." With respect to a particular agent 22, the computational and service permissions ensure that other agents 22 (acting on behalf of the same or other principals/users) have adequate computational and service resources, even in the case of a maliciously or incorrectly programmed customized agent.

Alternatively, a computational or a service permission may be associated with a particular principal and specifies a predetermined amount of a respective resource which is allowed to be consumed on

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behalf of that principal. That is, multiple agents 22 having the same principal may each use the same resource. By authorizing a predetermined amount of resource for the principal, the associated agents 22 are given a "pool" of that resource from which to draw.

In one embodiment, each agent 22 may direct its own movement (i.e., transportation) through a computer-based system (Figure 2) by executing an instruction which identifies a destination computer within the computer-based system and directs that the particular agent 22 be transported there. While executing within the destination computer, the agent may have access to information which is not available elsewhere in the computer-based system. The particular agent can access and use that information to determine another destination computer to which the agent should travel.

Agents 22 are created from agent templates. An agent template can be a "blueprint" for one or more agents 22. In object-oriented terminology, each agent 22 is an object and each template is an agent class from which agents 22 can be created by instantiating the class/template. In one embodiment, an agent

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template is essentially an agent object in its initial state. After the agent has been created, it may be executed. During execution, the agent object begins to receive events, handle these events, and so change its state.

In accordance with an embodiment of the present invention, network system 2 allows users (e.g., subscribers) to create, copy, modify, edit, or delete agents 22 and the associated templates as desired, thereby affording extensibility.

Services

A number of services 24 may each comprise one or more software applications providing various capabilities that are available to a principal. Each service 24 may be utilized by one or more agents 22 in order to perform their respective tasks. For example, one service 24 may support call processing, including a voice mail system. With this service 24, an agent 22 may place an outgoing telephone call for its principal, answer an incoming telephone call for the principal, and record a voice message from a caller. Another

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exemplary service 24 may support an electronic mail (e-mail) system. With an e-mail service, an agent 22 may collect, forward, and store e-mail messages addressed to the respective principal, generate e-mail messages for the principal, and notify the principal when new e-mail messages have been received. Yet another exemplary service 24 may support an electronic appointment book. With this service, an agent 22 can plan a schedule, check conflicts therewith, and organize various meetings, interviews, etc. for its respective principal. Still another exemplary service 24 can support an electronic address book which maintains information about one or more contacts with whom a principal may interact. The information maintained for each of these contacts may include the contact's name, title, employer, business address, home address, e-mail address, work phone number, home phone number, and the like. Still yet another service 24 can support on-line data retrieval for various information. With this service, an agent 22 can retrieve electronic copies of periodicals (e.g., newspapers, magazines, etc.) and the latest quotes for stocks, bonds, mutual

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funds, etc. In order to use a particular service 24, an agent 22 must first be authorized to do so. This authority may be given by the service provider and/or the respective principal.

In one embodiment, a plurality of services 24 may be used by a particular agent 22 which acts as a "virtual assistant" for its respective principal. This virtual assistant may, for example, answer an incoming telephone call, identify the caller, schedule a meeting between the caller and the principal, and generate an e-mail message notifying the principal of such meeting. Additional services 24 can be used (by this agent 22) by extending or customizing the agent, as described herein.

Service Resources

One or more service resources 25 can support each service 24. In one embodiment, at least a portion of service resources 25 can be integral to the respective services 24. In general, a service resource 25 is a resource which enables a service to be performed. For example, for a call processing service, service

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resources 25 may include a telephone, an answering machine, a telephone line, a local telephone provider service, a long-distance telephone provider service, etc. As another example, for an on-line data retrieval service, service resources 25 may include a telephony connection, a modem for on-line communication, an on-line database provider service, etc. As yet another example, for an e-mail service, service resources 25 may include an Internet connection and disk space for storing e-mail messages.

At least some of service resources 25 may comprise discrete units which are "consumed" during utilization of the respective resource by an agent 22. For example, a service resource 25 related to telephony services (e.g., voice mail and call placement) may comprise units of long-distance calling time which are consumed as an agent 22 places one or more calls utilizing such services 24. Likewise, a service resource 25 related to on-line data retrieval may comprise units of data-access time or inquiry which are consumed as an agent retrieves data (e.g., stock

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quotes, newspaper articles, etc.) utilizing the respective service 24.

Service Wrappers

A number of service wrappers 26 link services 24 and respective service resources 25 to agent server 20. In the depicted embodiment, a separate service wrapper 26 is provided for each service 24. Each service wrapper 26 can mediate the interaction between a service 24 (and its respective resources 25) and the remainder of programmable functionality component 4. In one embodiment, at least a portion of service wrappers 26 can be integral to the respective services 24 and/or service resources 25. Service wrappers 26, in conjunction with agent server 20, may act as "gatekeepers" to the respective services 24. That is, a service wrapper 26 grants access, to a respective service 24, only to agents 22 which have been authorized to utilize such service. For example, a voice message held by a service 24 supporting voice mail is accessible only by an agent 22 which has authority from the user for whom the message was left.

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Similarly, for a service 24 supporting call answering, the respective service wrapper 26 only allows agents 22 having authority from a particular user to answer telephone calls placed to a number associated with such a user.

Service wrappers 26 enable communication between services 24 and agent server 20, for example, by converting between a computer language (or instruction set) used within agent server 20 and the computer language (or instruction set) of the respective service 24. For this purpose, in one embodiment, each service wrapper 26 may be implemented, at least in part, with an application programming interface (API). An API allows access to the respective service 24, thereby pragmatically exposing the capabilities of the service 24 to one or more agents 22. That is, each service wrapper 26 lets any agent (having the proper authorization) use the respective service 24. A service wrapper 26 may also allow agent server 20 to replace one service 24 with another service 24 of the same type, but located on a different computer, without any interruption to principals. This operation of a

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service wrapper 26 is hidden or invisible to users, and thus, service wrappers 26 provide a point of abstraction between the respective service 24 and agent server 20.

Furthermore, at least some of service wrappers 26 may monitor the amount of service resources 25 expended or otherwise consumed by one or more authorized agents 22 when utilizing the respective service 24. For example, a service wrapper 26 may identify the respective service resource 25 to agent server 20, allow agent server 20 to impose a predetermined limit on each authorized agent's use of such service resource 25 (i.e., allocate a predetermined amount of service resource 25 for each agent), and debit/credit the amount consumed from the predetermined amount previously allocated for the agent 22. Thus, each service wrapper 26, in conjunction with agent server 20, controls an agent's consumption of service resources 25, thereby ensuring that an agent 22 does not use more than a predetermined amount of resource when performing its respective task or tasks. In this way, service wrappers 26 protect against the over-

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consumption, whether intentional or inadvertent, of the respective service resources 25. A service wrapper 26 thus serves to ensure that sufficient units of a service resource 25 are available for each agent 22 authorized to utilize the respective service 24. In addition, a service wrapper 26 may maintain a record of the amount of service resource 25 consumed by various agents 22 so that the appropriate users/principals can be billed accordingly.

Operational Overview

In operation, one or more agents 22 may be set up for each user who is a subscriber to the services offered by the operator/provider of network system 2. These agents 22 can be standard (i.e., set up by the service provider) or customized (i.e., set up by the respective user). Each agent for a particular user performs one or more tasks on behalf of that user. These tasks may include answering calls, taking voice mail messages, placing calls, notifying the user of recently received e-mail, setting up appointments, negotiating deals, transacting electronic commerce,

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etc. To perform these tasks, each agent 22 utilizes one or more services 24, during which it may consume various respective service resources 25. Access to each service 24 is granted by the respective service wrapper 26, which may also monitor the amount of each respective service resource 25 consumed to ensure that no particular agent 22 uses more than an amount authorized for that agent when performing its specific task(s). This protects both the authorizing user/subscriber and the service provider against undue consumption of service resources 25. Via a suitable interface (e.g., graphical user interface 12 or voice user interface 16), a user may direct, command, instruct, or otherwise communicate with each of his or her respective agents 22. At any time, a user can extend the services provided thereto by customizing existing agents 22, or alternatively, employing (and possibly customizing additional) agents 22.

In this manner, the present invention enables subscribers of a network service provided by network system 2 to create and employ personal agents 22

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utilizing services 24 in a manner that is safe and secure for the subscribers and the service provider.

Computer-Based System Implementation

Figure 2 is a simplified diagram of an exemplary computer-based system 30 that can be used to implement network system 2 shown in Figure 1. Referring to the embodiment shown in Figure 2, computer-based system 30 can include a communications hub 1000 and a firewall 1002 which support an interface between computer-based system 30 and the Internet. Collectively, communications hub 1000 and firewall 1002 provide communication, protection, and security between the remainder of computer-based system 30 and the Internet. Hub 1000 and firewall 1002 allow users to interact with computer-based system 30 using an electronic user device, which may support a graphical user interface 12 (Figure 1).

A switch 1004 enables communication with computer-based system 30 via a telephone instrument. Switch 1004 allows users to interact with computer-based system 30, for example, via a voice user interface 16

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(Figure 1). A call detail records data base 1005 is coupled to switch 1004. This data base 1005 stores information relating to calls received by or initiated out of computer-based system 30. For each call, such call-related information may specify calling party, called party, telephone number of outside party, date of call, time of call, duration of call, cost of call, and the like.

A plurality of fast Ethernet hubs 1006 are coupled to firewall 1002 and switch 1004. Fast Ethernet hubs 1006 support a local area network (LAN) for computer-based system 30 and enable the routing of information signals therein. These Ethernet hubs 1006 may implement the Fast Ethernet technique in which information is transferred at a rate of 100 Mbps.

One or more application server clusters 1008 are coupled to fast Ethernet hubs 1006. Each application server cluster 1008 may comprise a plurality of servers which provide processing capability to support various functions, such as, for example, speech recognition, speech synthesis, pronunciation generation, speech

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playback, etc. As such, application server clusters 1008 may support a voice user interface 16 (Figure 1).

A number of sub-systems 1010, 1012, 1014, 1016, 1018, 1020, 1022 are also coupled to fast Ethernet hubs 1006. Each of these sub-systems may comprise one or more servers, data storage devices, and other hardware components. The servers provide processing capability, and the data storage devices provide data storage capability.

At least a portion of the sub-systems in computer-based system 30 may support one or more services 24, and the respective service wrappers 26 and service resources 25 (Figure 1). For example, as shown in Figure 2, sub-systems 1010, 1012, 1014, 1016, and 1018 support an e-mail service, a voice mail service, a paging/facsimile service, an address book and calendar service, and a business news and stocks information service, respectively.

The remaining sub-systems support other operational aspects of computer-based system 30. In particular, as shown, sub-system 1020 maintains profiles for one or more subscribers to a network

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system 2. For each subscriber, a profile may include the name of the subscriber, the home address of the subscriber, the billing address of the subscriber, an e-mail address, a telephone number, a listing of all agents operating for the subscriber, the computational and service permissions granted to the subscriber's agents, and the like. Sub-system 1022 maintains various rules for the operation of network system 2. For example, such rules may govern how network system 2 processes incoming e-mail messages for particular subscribers (e.g., a subscriber may be paged upon the delivery of messages satisfying certain criteria).

Each of the servers within application server clusters 1008 and sub-systems 1010-1022 can be implemented using any of a number of server hardware configurations running a suitable server operating system, such as SUN SOLARIS, WINDOWS NT, OS/2 WARP, and NETWARE. Each data storage device within application server clusters 1008 and sub-systems 1010-1022 can be a mass storage subsystem of tapes or disk drives, which is electronically coupled to the respective servers. Information or data supporting each of graphical user

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interface 12, voice user interface 16, agent server 20, agents 22, services 24, service resources 25, and service wrappers 26 (shown in Figure 1) can be contained in the data storage devices. The servers may retrieve, process, and store this information into the data storage devices.

In one embodiment, as shown, application server clusters 1008 and sub-systems 1010-1022 are linked by the same LAN. In another embodiment, at least a portion of application server clusters 1008 and/or sub-systems 1010-1022 can be remote from the remainder and linked as a wide area network (WAN); consequently, computer-based system 30 may provide a distributed network.

Any one or a combination of interested parties (e.g., subscribers, third parties, or service providers) can use computer-based system 30 to collect, maintain, generate, or process the information supporting graphical user interface 12, voice user interface 16, agent server 20, computational resources 21, agents 22, services 24, service resources 25, and service wrappers 26. Any of the servers or other

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computers in application server clusters 1008 and sub-systems 1010-1022, either individually or in combination, can perform the functionality of agent server 20 shown in Figure 1. Furthermore, because these servers and other computers are linked together, each can directly access (e.g., store and retrieve) any of the information described above, if necessary.

In one embodiment, agents 22 may travel throughout the environment of computer-based system 30. That is, each agent 22 may move to the servers and other computers in application server clusters 1008 and sub-systems 1010-1022, and afterward, execute thereon. As an agent 22 moves and executes, it may perform its respective tasks on behalf of its principal.

The elements of computer-based system 30, and the functions provided thereby, constitute computational resources 21 which may be expended, consumed, or used during the operation of network system 2 (Figure 1). In one embodiment, the consumption of these computational resources 21 by different agents 22 is monitored so that no particular agent 22 utilizes more

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than a proportionate, predetermined, or allotted share thereof, as such agent executes.

Graphical User Interface (Details)

Figure 3 illustrates details for a graphical user interface 12, according to an embodiment of the present invention. As depicted, graphical user interface 12 comprises a web browser 64 and a web server 66 which are connected via a line 68 supporting Internet communication.

Web browser 64 is a client application that may reside on (or is downloaded to) a client device such as a desktop computer. Such desktop computer preferably has at least a "486" processor or an operational equivalent and runs a suitable desktop operating system, such as, for example, MS-DOS, MacINTOSH OS, WINDOWS NT, WINDOWS 95, OS/2, UNIX, XENIX, GEOS, or MAGIC CAP.

Web server 66 is a server application that resides on a service provider device, such as a server. Such server can be any of the servers in application server clusters 1008 or sub-systems 1010-1022 of computer-

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based system 30 shown in Figure 2. Web server 66 may support a number of web pages 70 which can be downloaded from web server 66 to web browser 64 as appropriate during operation. At least one of these web pages 70 may constitute an agent area 14 which is dedicated to the activities of creating new agents and manipulating existing agents.

Communication line 68 can be any link capable of supporting data transfer between a client device and a service provider device. For example, communication line 68 may include any combination of an Integrated Services Digital Network ("ISDN") communication line, a hard-wired line, or a telephone line. This enables communication via the Internet, using any suitable protocol, such as, Transmission Control Protocol/Internet Protocol (TCP/IP), Internetwork Packet eXchange/Sequence Packet eXchange (IPX/SPX), or AppleTalk.

Voice User Interface (Details)

Figure 4 illustrates details for a voice user interface 16, according to an embodiment of the present

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invention. As shown, voice user interface 16 comprises a telephone instrument 72 coupled to a telephone server 74 via a telephone line 76.

Telephone instrument 72 is a user (e.g., subscriber) device which may comprise a conventional telephone. Telephone instrument 72 may include a key pad for entering dual tone multiple frequency (DTMF) commands.

Telephone server 74 is a service provider device. Such device may comprise any of the servers in application server clusters 1008 or sub-systems 1010-1022 of computer-based system 30 shown in Figure 2. Telephone server 74 may support a number of grammars, prompts, and other speech functionalities 78 for enabling communication with a user. At least one of these speech functionalities 78 may constitute an agent area 18 which is dedicated to the activities of creating new agents and manipulating existing agents 22.

Telephone line 76 can be an analog telephone line, a digital T1 line, a digital T3 line, or an OC3 telephony feed.

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DOCKET ALARM

Agent Server (Details)

Figure 5 illustrates details for agent server 20, in accordance with a preferred embodiment. Agent server 20 generally functions to control, coordinate, and otherwise manage the overall operation of programmable functionality component 4. This includes the use of network system 2 by agents 22. As depicted, agent server 20 includes an engine 42, a scheduler 44, and one or more agent objects 46.

Scheduler 44 maintains an internal clock, which can keep track of real time or elapsed time. In one embodiment, scheduler 44 may be supported with a piezo-electric crystal or oscillating circuit implemented with transistors. Scheduler 44 generally functions to trigger the further execution of particular agents 22 by engine 42 upon the occurrence of certain events. Such events may include the lapse of a predetermined amount of time (e.g., 24 hours) or the occurrence of a specified time (e.g., 6:00 a.m.). Scheduler 44 may maintain a record or schedule with a separate entry for each triggering event. Scheduler 44 may also receive

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information from engine 42. This received information may be used to create new entries within scheduler 44.

Agent objects 46 each correspond to a particular agent 22 of network system 2 (Figure 1). Each agent object 46 can be an internal representation within agent server 20 for the corresponding agent 22. Agent objects 46 comprise software objects, each of which, in general, has (i) an internal state defined by a number of properties, (ii) an internal behavior defined by a number of methods, and (iii) an external behavior defined by a number of features.

More simply, each agent object 46 is an organization of data and instructions which are executable within agent server 20. In one embodiment, the data represents a "state" of the agent object and the instructions are grouped into tasks that are to be performed. The data may specify the corresponding agent 22, the services 24 which may be utilized by the agent, and the computational and service permissions which have been granted to the agent 22. The instructions may comprise one or more event handlers which direct the corresponding agent 22 upon the

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occurrence of predefined events. Each agent object 46 may also comprise a pending event queue which queues events to which the agent 22 should, but has not yet, responded.

Engine 42 is in communication with scheduler 44 and agent objects 46. In addition, engine 42 is in bi-directional communication with graphical user interface 12, voice user interface 16, and service wrappers 26. Engine 42 generally controls and/or manages the operation of agent server 20. Engine 42 may be implemented as a computer process, executing within a computer system, which invokes or manages other processes or routines, and executes instructions. For example, engine 42 can execute each agent object 46 which, in turn, may provide instructions to engine 42. Engine 42 may function to identify each of the computational permissions and service permissions specified within an agent object 46 and to control the consumption, by the corresponding agent 22, of the relevant computational resources 21 and service resources 25. Also, engine 42 may invoke routines in each of interfaces 12 and 16 and service wrappers 26.

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Furthermore, engine 42 may receive and be responsive to information from the same.

In one embodiment, scheduler 44 may be considered to "create" pending events to which engine 42 responds by executing an agent's handler for such event. This is described below in more detail.

In an exemplary operation for agent server 20, one agent object 46 may correspond to an agent 22 which is responsible for waking up its principal at a certain time each weekday morning. This time constitutes an event for which scheduler 44 may contain an entry. Each weekday, at the appointed time or shortly before, scheduler 44 invokes engine 42. In response engine 42 executes the particular agent object 46. When this agent object 46 is executed, the corresponding agent 22 (using the appropriate services 24) performs the task of waking up the principal, for example, by calling the principal over a telephone or, alternatively, generating an audible alarm on an electronic user device (e.g., a desktop computer).

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Service Wrapper (Details)

Figure 6 illustrates details for a service wrapper 26, in accordance with a preferred embodiment. A service wrapper 26 generally functions to mediate the interaction between a respective service 24 and the remainder of programmable functionality component 4. In one embodiment, service wrapper 26 is associated with, and supports, only a single service 24. As shown, service wrapper 26 comprises a converter 48 and a monitor 50.

Converter 48 generally functions to convert between a computer language (or instruction set) used within agent server 20 and a computer language (or instruction set) used within the respective service 24. In one embodiment, the computer language of agent server 20 can be a high-level language, whereas the computer language of service 24 may be a low-level language. An agent 22 may comprise instructions of the set used in agent server 20; a service 24 may comprise or issue instructions of the set used therein.

As depicted, converter 48 comprises an agent-server-to-service converter 52 and a service-to-agent-

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server converter 54. Agent-server-to-service converter 52 operates unidirectionally to convert from the language (e.g., a high-level language) used by agent server 20 to the language (e.g., a low-level language) used by the corresponding service 24. Service-to-agent-server converter 54 also operates unidirectionally, but in contrast to converter 52, converts from the language (e.g., low-level language) used by service 24 into the language (e.g., high-level language) used by agent server 20.

Monitor 50 is coupled by bi-directional lines to each of agent server 20 and the respective service 24. Monitor 50 generally functions to monitor the amount of respective service resources 25 expended, used, or otherwise consumed by one or more agents 22 which have been authorized to access the service 24. Monitor 50 identifies respective service resources 25 to agent server 20, allows agent server 20 to impose a predetermined limit on each authorized agent's use of the respective service resources 25, and informs agent server 20 of the amount consumed against the predetermined limit. The predetermined limit may be

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derived from a service permission for the respective agent 22.

Exemplary Service Wrappers, Services, and Service Resources (Details)

Figure 7 illustrates details for specific exemplary services, and their respective service wrappers and service resources. In particular, these services include a web server service 81, a web browser service 86, and a call processing service 91. Each of exemplary services 81, 86, and 91 constitutes a user interface service; that is, these services 81, 86, and 91 each provides a user interface by which an agent 22 can interact with a subscriber or third party. In Figure 7, the services and respective service resources have been combined because, with these examples, the services and resources are not logically distinct.

Web server service 81 provides a web server from network system 2 (Figure 1) and can be used, for example, to notify a user about recently received e-mail messages. Web server service 81 (and its respective service resources) resides in network system

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2 and includes one or more web pages 84. A web server service wrapper 80 controls access from the remainder of programmable functionality component 4 into web server service 81 and its associated service resources. A web browser 82 is connected to web server service 81 via an Internet line 83. Web browser 82 may reside in a client device. Web pages 84 can be downloaded from web server service 81 to web browser 82. Collectively, web server service 81, web pages 84, web browser 82, and Internet line 83 can implement a graphical user interface with which an agent 22 can interact with its principal or another party.

Web browser service 86 provides a web browser from network system 2 and can be used, for example, for on-line data access to stock quotes, news, etc. Web browser service 86 and its respective service resources are resident on network system 2. A web browser service wrapper 85 provides access from the remainder of programmable functionality component 4 into web browser service 86 and its service resources. A web server 87 is connected to web browser service 86 via an Internet line 88. Web server 87 resides in a website

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server device and may comprise one or more web pages 89 which can be downloaded to web browser service 86. Collectively, web browser service 86, web server 87, web pages 89, and Internet line 88 can implement a graphical user interface with which an agent 22 can interact with an arbitrary website on behalf of its principal.

Call processing service 91 provides call processing from network system 2 and can be used, for example, to take voice mail messages for one or more subscribers. Call processing service 91 and its respective service resources reside in network system 2. Call processing service 91 may include grammars, prompts, and other speech functionality 94. A call processing service wrapper 90 controls access from the remainder of programmable functionality component 4 to call processing service 91 and its service resources. A telephone instrument 92, which resides outside of network system 2, is connected to call processing service 91 via a telephone line 93. Collectively, call processing service 91, speech functionality 94, telephone instrument 92, and telephone line 93 can

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implement a voice user interface with which an agent 22 can interact with its principal or another party, for example, by placing a call to, or answering a call from, the principal or other party.

Agent Object (Details)

Figure 8 illustrates details for an agent object 46, in accordance with an exemplary embodiment. An agent object 46 generally represents (within agent server 20) a corresponding agent 22, which can be considered to be a personal software assistant to a particular principal. Agent object 46 can be a software object and may reside within agent server 20. As depicted, agent object 46 comprises a permissions component 56, an event handlers component 58, a datastore component 60 and a pending event queue component 62. In other embodiments, the event handlers component and the pending event queue component may be external to an agent object 46.

Permissions component 56 generally comprises data and instructions related to permissions that have been granted to the agent 22 represented by agent object 46.

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These permissions include computational permissions and service permissions. A computational permission can specify that a respective agent 22 is authorized to consume a particular computational resource 21 (e.g., memory storage space, processing time, elapsed time, and the like which may be provided by the elements and functions of computer-based system 30) when performing its particular task(s). Furthermore, in some instances, a computational permission can specify a pre-authorized amount of computational resource 21 which may be allowably consumed by the respective agent 22. A service permission can specify that the respective agent is authorized to consume a particular service resource 25 (e.g., long-distance time, on-line data access time) when the agent utilizes a respective service 24 (e.g., e-mail, phone mail, electronic appointment book, electronic contact book, etc.) in performing its task(s). In some instances, a service permission can specify a pre-authorized amount of service resource 25 which is allowably consumed by the respective agent 22.

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Event handlers component 58 includes data and instructions for directing agent server 20 and/or engine 42 upon the occurrence of various events which may arise during the operation of network system 2. In particular, an event handler comprises a routine for handling an event of a specified type. For example, these events can be the lapse of a previously specified amount of time or the delivery of an e-mail message.

In one embodiment, an event is identified by a uniform resource locator (URL) which expresses or provides an address for a web page. The URL specifies both the event's type and the agent 22 which is event's intended recipient. The URL may be chosen by agent server 20 and the particular agent 22 in combination. This allows a web server providing a graphical user interface to network system 10 to receive HyperText Transfer Protocol (HTTP) requests for the web page at the URL so that agent server 20 can relay the event to the particular agent 22. A standard web browser can send an event to an agent 22 by fetching the web page identified by the URL for the event. The web page returned to the browser is supplied by the agent's

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event handler and relayed by agent server 20. One of the instructions in an agent instruction set allows an agent 22 to send an event (for example, to another agent 22 as a means of inter-agent communication).

Datastore component 60 may contain various information related to agent object 46. This may include information specifying the corresponding agent 22, the principal or user for whom that agent 22 performs tasks, the tasks which the agent 22 may perform, etc. Datastore component 60 may also include information used by agent object 46 for guiding its interaction with various service wrappers 26. For example, datastore component 60 may contain the parameters of a request the agent intends to make of a particular service wrapper 26 or the wrapper's response to such a request.

Pending event queue component 62 comprises information for events to which the corresponding agent 22 should, but has not yet, responded. Pending event queue component 62 queues these events so that the agent 22 may respond, for example, using the event handlers specified in event handlers component 58.

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User Session

Figure 9 is a flow diagram of an exemplary method 100 for a user session, according to an embodiment of the present invention. During method 100, a user is interacting with network system 2.

Method 100 begins at step 102 where network system 2 admits a user at a user interface (UI), which can be either graphical user interface 12 or voice user interface 16. Essentially, at this step, a user logs on to network system 2.

At step 104, network system 2 admits the user to the agent area of the relevant user interface. For voice user interface 16, this is agent area 18. For graphical user interface 12, this is agent area 14. With graphical user interface 12, a user is admitted to the agent area when the user "clicks" on an agent icon which is displayed on a menu screen. In the agent area, the user can create new agents and manipulate existing agents. Specifically, the user can enter various commands, depending on his or her intentions.

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Each command can be one of three types: an agent command, a template command, or a selection command. Agent commands are directed to the running of agents. These agents include ones which are currently executing and which the user now would like to manipulate. Template commands are directed to the manipulation of agent templates. An agent template can be a "blueprint" for agents. In object-oriented terminology, each agent is an object and each template is an agent class from which agents can be created by instantiating the class/template. Selection commands select agents or templates. A selection command allows network system 2 to focus on a particular template or a particular agent in order to provide a context for any subsequent template command or agent command.

At step 106, network system 2 accepts a command which has been entered by the user via the user interface. The command is forwarded from the user interface to agent server 20.

If the command is a selection command, agent server 20 executes such command at step 108. If the command is a template command, agent server 20 executes

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the command at step 110. Otherwise, if the command is an agent command, agent server 20 executes the command at step 112. The executions of a selection command, a template command, and an agent command are described below in more detail.

At step 114, network system 2 prompts a user for more commands. If the user enters additional commands, method 100 returns to step 106 where the next command is accepted. Method 100 repeats steps 106-114 until no additional commands are entered.

At step 116, network system 2 excuses the user from the agent area of the user interface. At step 118, the user is excused from the user interface itself. That is, the user logs off network system 2. Afterwards, method 100 ends.

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Selection Command Execution

Figure 10 is a flow diagram of an exemplary method 200 for executing a selection command, according to an embodiment of the present invention. Method 200 is initiated within and performed by network system 2 when a user (e.g., subscriber) has entered a selection

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command. A selection command can be one of two types: a select agent command or a select template command.

A select agent command is one which selects a particular agent. Specifically, when a user enters the agent area, a list of executing agents may be visible. The user enters a select agent command to select a particular agent from the list in order to manipulate the same; afterwards, the user can enter an agent command to perform the manipulation.

Similarly, a select template command is one which selects a particular template. In particular, a list of agent templates may be provided from which a user may select. The user enters a select template command to select a particular template from the list; afterwards, the user can enter a template command to manipulate the template.

Method 200 begins at step 202 where agent server 20 determines whether the selection command is a select template command. If the selection command is a select template command, method 200 moves to step 204 where agent server 20 notes the particular template which has been selected. Afterwards, method 200 ends.

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Otherwise, if at step 202 it is determined that the selection command is not a select template command, then at step 206 agent server 20 determines whether the selection command is a select agent command. If the command is a select agent command, method 200 moves to step 208 where agent server 20 notes the agent which has been selected, after which method 200 ends.

Otherwise, if the selection command is not a select agent command, method 200 ends.

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Template Command Execution

Figure 11 is a flow diagram of an exemplary method 300 for executing a template command, according to an embodiment of the present invention. Method 300 is initiated within and performed by network system 2 when a user has entered a template command. In general, a template command is one which affects a particular template. A template command can be one of four types: a create template command, a copy template command, an edit template command, and a delete template command.

Method 300 begins at step 302 where agent server 20 determines whether the template command which has

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been entered is a create template command. A create template command is one which creates a new template. Each new template can be based on a generic blank template which can be modified as desired by a user.

Accordingly, if the template command is a create template command, then at step 304 agent server 20 stores a blank template into memory (a computational resource 21) where the template can be modified. In the context of a graphical user interface, an entry for the new template is added to the list of templates appearing on a screen. At step 306, agent server 20 selects the blank template as the current template, after which method 300 ends.

Referring again to step 302, if it is determined that the template command is not a create template command, than method 300 moves to step 308 where agent server 20 determines whether the command is a copy template command. A copy template command is one which copies an existing template. A user may enter this command when it is desirable to create a new template from a previously created template rather than the generic blank template.

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If it is determined that the command is a copy template command, then at step 310 agent server 20 loads the previously created template. "Loading" a template means that the template is stored into memory, such as random access memory (RAM). At step 312, agent server 20 creates and stores a copy of the template into persistent memory, such as a hard drive. At step 314, agent server 20 selects the copy of the template as the current template, after which method 300 ends.

Referring again to step 308, if it is determined that the template command is not a copy template command, then method 300 moves to step 316 where agent server 20 determines whether the command is an edit template command. An edit template command is one which edits an existing template. A user may enter this command when it is desirable to edit either a newly created or previously created template.

If it is determined that the command is an edit template command, agent server 20 loads the template at step 318 and allows changes to be made to the template at step 320. At step 322, the edited template is stored back into persistent memory and then is made the

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current (selected) template, after which method 300 ends.

Otherwise, if it is determined at step 316 that the template command is not an edit template command, then method 300 moves to step 324 where agent server 20 determines whether the command is a delete template command. A delete template command is one which deletes an existing template. A user may enter this command to remove from permanent memory any template which is obsolete, incorrect, or otherwise undesirable.

If it is determined that the command is a delete template command, agent server 20 deselects the current template at step 326. Deselection is performed because a deleted template cannot be subsequently selected. Next, at step 328, agent server 20 deletes the template from persistent memory. In the context of a graphical user interface, this step would also remove an icon for such template from the screen. Method 300 then ends.

Referring again to step 324, if it is determined that the command is not a delete template command, method 300 ends because the command was not any of the types of commands for a template.

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For each of steps 310, 318, and 326 above, if no template is currently selected, agent server 20 will generate an error message.

Method 300, as described, thus provides user extensibility for network system 2 by allowing a user to create, copy, edit, and delete agent templates as desired.

Agent Command Execution

Figure 12 is a flow diagram of an exemplary method 400 for executing an agent command, according to an embodiment of the present invention. Method 400 is initiated within and performed by network system 2 when a user has entered an agent command. Generally speaking, an agent command is one which affects a particular agent 22. Agent commands can be of three types: a create agent command, an edit agent command, and a delete agent command.

Method 400 begins at step 402 where agent server 20 determines whether the command is a create agent command. A create agent command is one which creates a new agent from an agent template. After an agent 22

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has been created, it is generally allowed to execute, thereby performing tasks for the user who created the agent.

If it is determined that the command is a create agent command, then at step 404 agent server 20 loads the respective agent template. If no template is currently selected, agent server 20 will generate an error message. Otherwise, at step 406, agent server 20 stores the newly created agent 22 and at step 408 selects that agent 22 as the current agent. Afterwards, method 400 ends.

With reference again to step 402, if it is determined that the command is not a create agent command, then at step 410 agent server 20 determines whether the command is an edit agent command. An edit agent command is one which allows the user to edit an executing or running agent. If no agent 22 is currently selected, however, agent server 20 generates an error message.

If it is determined that the command is an edit agent command, then agent server 20 loads the executing agent 22 at step 412. Agent server 20 suspends the

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execution of such agent 22 at step 414 and allows changes to be made to the agent by a user at step 416. At step 418, agent server 20 resumes the execution of the agent 22 and, at step 420, stores the edited agent. Afterwards, method 400 ends.

Referring again to step 410, if it is determined that the agent command is not an edit agent command, then at step 422 agent server 20 determines whether the command is a delete agent command. In general, a delete agent command is one which ends the execution of an agent 22 and removes it from persistent memory. If no agent 22 is currently selected, however, agent server 20 generates an error message.

If it is determined at step 422 that the command is a delete agent command, then at step 424 agent server 20 deselects the agent 22, because an agent cannot be selected once it has been deleted. At step 426, agent server 20 deletes the agent 22. Method 400 then ends.

Referring again to step 422, if it is determined that the command is not a delete agent command, method

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400 ends because the command was not any of the types of commands for an agent.

Consumption of Service and Computational Resources

Figure 13 is a block diagram detailing the controlled consumption of service resources 25 and computational resources 21 by an agent 22, according to an embodiment of the present invention.

As previously described, an agent 22 may consume various service resources 25 (e.g., long-distance calling time, on-line data access time, etc.) and computational resources 21 (e.g., memory space, processing time, etc.) in the performance of its tasks.

The amount of the resources consumed by a particular agent 22 is limited by permissions which are specified in permissions component 56 of an agent object 46 corresponding to the agent 22. More specifically, for a particular agent 22, permissions component 56 includes one set of service permissions 64 for each service 24 utilized by that agent. The service permissions 64 bound the service resources 25 expended on behalf of the agent 22 by that service 24.

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That is, each service permission 64 specifies whether the agent 22 is authorized to consume a particular service resource 25 and, in some instances, the amount of such service resource 25 that is allowably consumed by that agent 22.

Agent server 20 and service wrappers 26 cooperate in order to ensure that an agent 22 does not consume more than its allotted amount of any particular service resource 25 as specified by a respective service permission 64.

Permissions component 56 also includes a set of computational permissions 66 for the agent 22. These computational permissions 66 bound the computational resources 21 expended on the agent's behalf by agent server 20. In other words, each computational permission 66 specifies whether the agent 22 is authorized to consume a particular computational resource 21 and, in some instances, the amount of the computational resource 21 which is allowably consumed by that agent.

Agent server 20, together with service wrappers 26, monitors and ensures that the agent 22 does not

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consume more than its allotted amount of any computational resource 21 as specified by a respective computational permission 66.

Agent Population Execution

Figure 14 is a flow diagram of an exemplary method 500 for executing time slices for an agent population, according to an embodiment of the present invention. Method 500 is performed by agent server 20 in order to enable each agent 22 to make progress in performing its respective tasks.

In general, the processing capability of agent server 20 cannot be dedicated solely to any particular agent 22, but rather must be allocated among all executing agents. Processing time by agent server 20 is thus divided into time slices. The time slices can be of predetermined duration. During each time slice, the processing capability of agent server 20 is directed to a particular agent 22.

With reference to Figure 14, method 500 begins at step 502 where agent server 20 selects an agent 22, which is responsible for performing one or more tasks

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for a respective user. At step 504, agent server 20 executes a time slice for the selected agent 22. During this time slice, the processing capability of server 20 is directed to or used for the selected agent 22.

At step 506, agent server 20 determines whether there are any other agents 22 for which a time slice should be executed. If there are more agents, method 500 returns to step 502 where the next agent is selected. Agent server 20 repeats steps 502-506 until a time slice has been executed for each agent 22. Afterwards, method 500 ends.

Agent Execution

Figure 15 is a flow diagram of an exemplary method 600 for executing a time slice for an agent 22, according to an embodiment of the present invention. Method 600 is performed by agent server 20 for a particular agent 22.

Method 600 begins at step 602 where an agent object 46 corresponding to the particular agent 22 is loaded into agent server 20. This agent object 46

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comprises a permissions component 56, an event handlers component 58, a datastore component 60, and a pending event queue 62.

At step 604, agent server 20 determines whether execution of the agent 22 has been suspended (e.g., because the user is editing the agent). If execution has been suspended, it is unnecessary to provide any processing for the agent, and accordingly, method 600 ends.

Otherwise, if execution of the agent 22 has not been suspended, method 600 proceeds to step 605 where agent server 20 determines whether an event is currently being handled by agent 22. An event is something that triggers or causes an agent 22 to take action, or something to which agent 22 must respond. If it is determined that there is an event currently being handled, method 600 moves to step 612.

Alternatively, if it is determined at step 605 that there is not an event currently being handled, method 600 proceeds to step 606 where agent server 20 determines whether there is an event pending for the agent--i.e., an event for which handling has not yet

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begun. This can be accomplished by examining pending event queue component 62 of the corresponding agent object 46. If there is no event pending for agent 22, method 600 ends.

Otherwise, if it is determined that there is an event pending for agent 22, then at step 608 agent server 20 removes or dequeues the event from the pending event queue of the corresponding agent object 46.

At step 610, agent server 20 determines whether agent 22 has a handler for responding to the event. Generally, an event handler comprises a routine for responding to an event of a particular type. An event handler can be divided into a plurality of portions, each of which is separately executable during different time slices. Event handlers are specified in the event handlers component 58 of agent object 46. If it is determined that agent 22 does not have a handler for the relevant event, method 600 moves to step 614. Otherwise, if it is determined that agent 22 does have a handler for responding to the event, method 600 moves to 612.

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At step 612, agent server 20 executes a portion of the event handler for agent 22. Method 600 then proceeds to step 614.

At step 614, agent server 20 stores the agent 22, after which method 600 ends.

Event Handler Execution

Figure 16 is a flow diagram of an exemplary method 700 for executing an event handler, according to an embodiment of the present invention. Method 700 is performed by agent server 20 when an event handler is invoked in response to the occurrence of a particular event. The event handler routine may include a number of instructions which are directed to agent server 20 and/or one or more service wrappers 26.

Method 700 begins its step 702 where agent server 20 receives an instruction to execute in a patroller time slice. At step 704, agent server 20 determines whether the instruction is a service instruction. A service instruction is an instruction relating to and utilizing a particular service 24. Accordingly, a service instruction can only be executed via a

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respective service wrapper 26. All other instructions do not require the cooperation of a respective service wrapper 26, but rather, can be executed by agent server 20 itself.

If it is determined at step 704 that the instruction is a service instruction, method 700 proceeds to step 708 where agent server 20 asks the respective service wrapper 26 to execute the instruction for agent 22. Method 700 then moves to step 710.

Referring again to step 704, if it is determined that the instruction is not a service instruction, then agent server 20 itself executes the instruction at step 706. Method 700 then proceeds to step 710.

At step 710, agent server 20 determines whether there are any more instructions in the event handler. If so, method 700 returns to step 702 where agent server 20 fetches the next instruction. Agent server 20 repeats steps 702-710 until all instructions of the event handler to be executed as part of the current time slice have been executed, either by agent server 20 or respective service wrappers 26. Afterwards, method 700 ends.

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Service Instruction Execution

Figure 17 is a flow diagram of an exemplary method 800 for executing a service instruction, according to an embodiment of the present invention. Method 800 is performed by a service wrapper 26 when agent server 20 asks the service wrapper to execute a service instruction relating to the respective service 24.

Method 800 begins at step 802 where service wrapper 26 identifies the service permissions required by the service instruction. In other words, the execution of the service instruction may cause particular service resources 25 (e.g., long-distance calling time, on-line data access time, or memory storage space) to be consumed. Thus, an assessment is made as to the service permissions needed in order to carry out the service instruction.

At step 804, service wrapper 26 asks agent server 20 for the permissions held by the agent 22 for which the instruction is being executed. The permissions held by an agent 22 are not necessarily the same as the permissions which are required in order to execute an

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instruction. For example, agent 22 may have permissions only for long-distance calling time and memory storage space, but execution of the instruction requires permission for on-line data access time.

Thus, at step 806, service wrapper 26 determines whether the permissions held by agent 22 include the permissions required in order to execute the instruction. If it is determined that the permissions held do not include the permissions required, service wrapper 26 executes an error routine at step 808, after which method 800 ends.

Otherwise, if it is determined at step 806 that the permissions held do include the permissions required, method 800 precedes to step 810 where, for each service permission, service wrapper 26 identifies the amount of a service resource 25 which is allotted to agent 22 and the amount of that service resource 25 which must be consumed in order to execute the instruction. As with the permissions, the amount of a service resource 25 allotted to an agent 22 is not necessarily the same as the amount of that service resource 25 which is required to execute the

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instruction. For example, an agent 22 may have permission to utilize up to a predefined amount of memory storage space to store a voice mail message, but the actual amount required for a particular message is greater than the predefined amount.

At step 812, service wrapper 26 determines whether the amount allotted to agent 22 is at least as great as the amount required to execute the instruction. If it is determined that the amount allotted is not at least as great as the amount required, service wrapper 26 executes an error routine at step 814, after which method 800 ends.

Referring again to step 812, if it is determined that the amount of the service resource 25 allotted to agent 22 is at least as great as the amount which is required to execute the instruction, then method 800 moves to step 816 where service wrapper 26 asks the respective service 24 to execute the instruction, thereby enabling agent 22 to perform one or more tasks for its user/principal.

At step 818, service wrapper 26 identifies the amount of each service resource 25 actually consumed or

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instruction. For example, an agent 22 may have permission to utilize up to a predefined amount of memory storage space to store a voice mail message, but the actual amount required for a particular message is greater than the predefined amount.

At step 812, service wrapper 26 determines whether the amount allotted to agent 22 is at least as great as the amount required to execute the instruction. If it is determined that the amount allotted is not at least as great as the amount required, service wrapper 26 executes an error routine at step 814, after which method 800 ends.

Referring again to step 812, if it is determined that the amount of the service resource 25 allotted to agent 22 is at least as great as the amount which is required to execute the instruction, then method 800 moves to step 816 where service wrapper 26 asks the respective service 24 to execute the instruction, thereby enabling agent 22 to perform one or more tasks for its user/principal.

At step 818, service wrapper 26 identifies the amount of each service resource 25 actually consumed or

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used to execute the instruction. At step 820, for each service resource 25, service wrapper 26 asks agent server 20 to decrement the amount allotted to agent 22 by the amount actually used. Method 800 then ends.

In method 800 described above, it is assumed that service wrapper 26 can determine in advance what amount of service resource 25 will be consumed in the execution of an instruction. This, however, is not always the case. For example, while a predefined maximum amount of memory space may be set aside to store any given voice mail message, the amount of storage space actually consumed depends on how long the caller speaks. Other service resources 25 can be consumed on an on-going basis even after an instruction has executed. For example, if a long-distance call is made on behalf of a subscriber, connect time for a long-distance service continues until the call has been completed. In both cases, service wrapper 26 actively monitors service resource consumption and halts further consumption whenever the amount held by an agent 22 is exhausted.

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Accordingly, the present invention provides a system and method which allow subscribers or third parties to create and customize personalized agents 22 which utilize services 24 (e.g., e-mail, voice mail, electronic address book, electronic contact book, etc.) in order to perform respective tasks for the subscribers. Thus, the present invention affords user extensibility of the services 24.

Furthermore, the present invention monitors and controls the consumption of service resources 25 and computational resources 21 by agents 22 during execution. Thus, the present invention protects the subscribers and a service provider from misuse or overuse, whether intentional or inadvertent, of such resources.

While particular embodiments of the present invention and their advantages have been shown and described, it should be understood that various changes, substitutions, and alterations can be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

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WHAT IS CLAIMED IS:

1. A network system comprising:

a service;

an agent operable to use the service on behalf of a principal; and

an agent server operable to mediate the use of the service by the agent.

2. The network system of Claim 1 further comprising a computational resource which can be consumed by the agent.

3. The network system of Claim 2 wherein the agent server is operable to monitor the consumption of the computational resource by the agent.

4. The network system of Claim 3 wherein the agent server is operable to charge the principal for the consumption of the computational resource.

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5. The network system of Claim 3 wherein the agent server is operable to terminate the agent in response to the monitoring.

6. The network system of Claim 2 further comprising a computational permission associated with the computational resource and the agent, the computational permission specifying a predetermined amount of the computational resource which the agent is allowed to consume.

7. The network system of Claim 2 further comprising a computational permission associated with the computational resource and the principal, the computational permission specifying a predetermined amount of the computational resource which is allowed to be consumed on behalf of the principal.

8. The network system of Claim 2 wherein the computational resource can be processing time for the agent or elapsed time for the agent.

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9. The network system of Claim 1 further comprising a service resource associated with the service and which can be consumed by the agent when the agent uses the service.

10. The network system of Claim 9 further comprising a service wrapper associated with the service, the service wrapper operable to monitor the consumption of the service resource by the agent.

11. The network system of Claim 10 wherein the service wrapper is operable to terminate the agent in response to the monitoring.

12. The network system of Claim 9 wherein the agent server is operable to charge the principal for the consumption of the service resource.

13. The network system of Claim 9 further comprising a service permission associated with the service resource and the agent, the service permission specifying a predetermined amount of the service resource which the agent is allowed to consume.

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14. The network system of Claim 9 further comprising a service permission associated with the service resource and the principal, the service permission specifying a predetermined amount of the service resource which is allowed to be consumed on behalf of the principal.

15. The network system of Claim 9 wherein the service resource comprises elapsed time for a telephone call.

16. The network system of Claim 9 wherein the service resource comprises cost for a telephone call.

17. The network system of Claim 1 further comprising a service wrapper associated with the service, the service wrapper operable to translate between a first instruction set and a second instruction set.

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18. The network system of Claim 1 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete an agent template from which the agent is created.

19. The network system of Claim 1 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete the agent.

20. The network system of Claim 19 wherein the user interface comprises a graphical user interface.

21. The network system of Claim 20 wherein the graphical user interface comprises:

a web server resident in the network system; and

a web browser resident in a user device.

22. The network system of Claim 19 wherein the user interface comprises a voice user interface.

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23. The network system of Claim 22 wherein the voice user interface comprises a speech recognition application.

24. The network system of Claim 22 wherein the voice user interface comprises a speech synthesis application.

25. The network system of Claim 22 wherein the voice user interface comprises a speech playback device.

26. The network system of Claim 1 wherein the service comprises a user interface service operable to provide a user interface by which the agent can interact with a user.

27. The network system of Claim 26 wherein the user interface comprises a graphical user interface.

28. The network system of Claim 27 wherein the graphical user interface comprises:

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a web server resident in the network system; and

a web browser resident in a user device.

29. The network system of Claim 27 wherein the user interface comprises a voice user interface.

30. The network system of Claim 29 wherein the voice user interface comprises a speech recognition application.

31. The network system of Claim 29 wherein the voice user interface comprises a speech synthesis application.

32. The network system of Claim 29 wherein the voice user interface comprises a speech playback device.

33. A network system comprising:

a user interface operable to allow a user to interact with the network system; and

an agent server coupled to the user interface, the agent server operable to manage the operation of a

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programmable functionality component of the network system, the agent server in conjunction with the user interface operable to create, modify, or delete an agent in response to interaction by the user.

34. The network system of Claim 33 wherein the user interface comprises a graphical user interface.

35. The network system of Claim 34 wherein the graphical user interface comprises a web browser application.

36. The network system of Claim 33 wherein the user interface comprises a voice user interface.

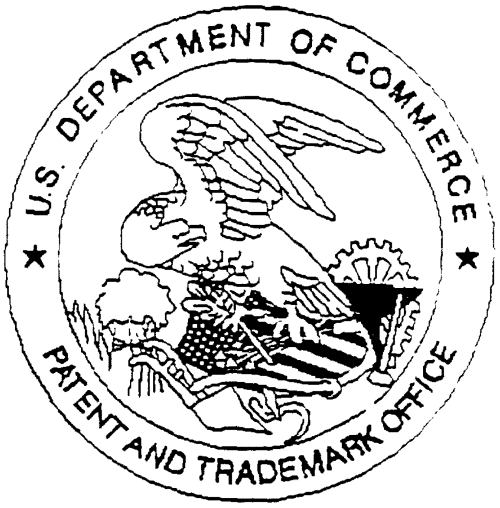
37. The network system of Claim 36 wherein the voice user interface comprises a speech recognition application.

38. The network system of Claim 36 wherein the voice user interface comprises a speech synthesis application.

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United States Patent & Trademark Office

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SCANNED, # 22

Application deficiencies were found during scanning:

■ Page(s) 95 of specification were not present for scanning. (Document title)

☐ Page(s)_____ of _____ were not present for scanning. (Document title)

☐ Scanned copy is best available.

43. The network system of Claim 41 further comprising a service resource associated with the service, the service resource being consumed when the agent utilizes the service.

44. The network system of Claim 43 wherein the service wrapper is operable to monitor the amount of service resource consumed by the agent when the agent utilizes the service.

45. A method comprising:

admitting a user to a network system wherein at least one agent is operable to utilize a service to perform a task for the user; and

allowing the user to create, modify, or delete the agent within the network system.

46. The method of Claim 45 further comprising accepting an agent command from the user.

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47. The method of Claim 46 wherein the agent command is one of a create agent command, an edit agent command, and a delete agent command.

48. The method of Claim 45 further comprising suspending execution of the agent.

49. The method of Claim 45 further comprising accepting a template command from the user.

50. The method of Claim 49 further comprising allowing the user to create, modify, or delete an agent template within the network system.

51. The method of Claim 45 further comprising admitting the user to an agent area of a user interface.

52. A network system comprising:

an agent server operable to manage the operation of a programmable functionality component of the network system;

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a service;

an agent operable to utilize the service; and

a service wrapper associated with the service, the service wrapper operable to cooperate with the agent server to mediate interaction between the service and the agent.

53. The network system of Claim 52 further comprising a service resource associated with the service, the service resource being consumed when the agent utilizes the service.

54. The network system of Claim 53 wherein the service wrapper comprises a monitor, the monitor operable to monitor the amount of the service resource consumed by the agent when the agent utilizes the service.

55. The network system of Claim 52 wherein the service wrapper comprises a converter, the converter operable to convert between a first computer language

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used by the agent and a second computer language used by the service.

56. The network system of Claim 55 wherein the converter comprises an agent server to service converter for converting from the first computer language to the second computer language.

57. The network system of Claim 55 wherein the converter comprises a service to agent server converter for converting from the second computer language to the first computer language.

58. The network system of Claim 52 further comprising a user interface operable to allow a user to interact with the network system in order to create the agent.

59. The network system of Claim 58 wherein the user interface comprises a graphical user interface.

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60. The network system of Claim 59 wherein the graphical user interface comprises a web browser application.

61. The network system of Claim 58 wherein the user interface comprises a voice user interface.

62. The network system of Claim 61 wherein the voice user interface comprises a speech recognition application.

63. The network system of Claim 61 wherein the voice user interface comprises a speech synthesis application.

64. The network system of Claim 61 wherein the voice user interface comprises a speech playback device.

65. The network system of Claim 52 further comprising a computational resource which can be consumed by the agent.

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66. The network system of Claim 65 wherein the agent server is operable to monitor the amount of the computational resource consumed by the agent.

67. The network system of Claim 52 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising data and instructions executable within the agent server.

68. The network system of Claim 52 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising a permission for the agent.

69. A method comprising:

allowing an agent to utilize a service; and

mediating interaction between the service and the agent.

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70. The method of Claim 69 wherein allowing comprises allowing the agent to consume a service resource associated with the service.

71. The method of Claim 69 wherein mediating comprises monitoring the amount of a service resource consumed by the agent.

72. The method of Claim 69 wherein mediating comprises:

identifying a service permission required in order for the agent to consume a service resource associated with the service; and

determining whether the agent holds the required service permission.

73. The method of Claim 69 wherein mediating comprises:

receiving an instruction which requires that the agent consume a service resource associated with the service when the agent utilizes the service;

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identifying an amount of the service resource which would be consumed if the instruction is executed;

identifying an amount of the service resource allotted to the agent; and

determining whether the amount which is allotted is greater than or equal to the amount which would be consumed.

74. The method of Claim 73 wherein mediating comprises:

executing the instruction if the amount which is allotted is greater than or equal to the amount which would be consumed; and

subtracting the amount which would be consumed from the amount which is allotted.

75. The method of Claim 69 further comprising converting between a first computer language used by an agent and a second computer language used by the service.

76. The method of Claim 69 further comprising:

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allowing an agent to consume a computational resource; and

monitoring the amount of the computational resource consumed by the agent.

5

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NETWORK SYSTEM

EXTENSIBLE BY USERS

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Barbara Nelson
Jing Su
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09624734 082596

ABSTRACT OF THE DISCLOSURE

In one aspect, a network system includes a user interface which allows a user to interact with the network system. An agent server is coupled to the user interface. The agent server manages the operation of the network system. Furthermore, the agent server in conjunction with the user interface is operable to create or modify an agent in response to interaction by the user. In another aspect, a network system includes an agent server which manages the operation of the network system. An agent is operable to utilize a service within the network system. A service wrapper, associated with the service, cooperates with the agent server to mediate interaction between the service and the agent.

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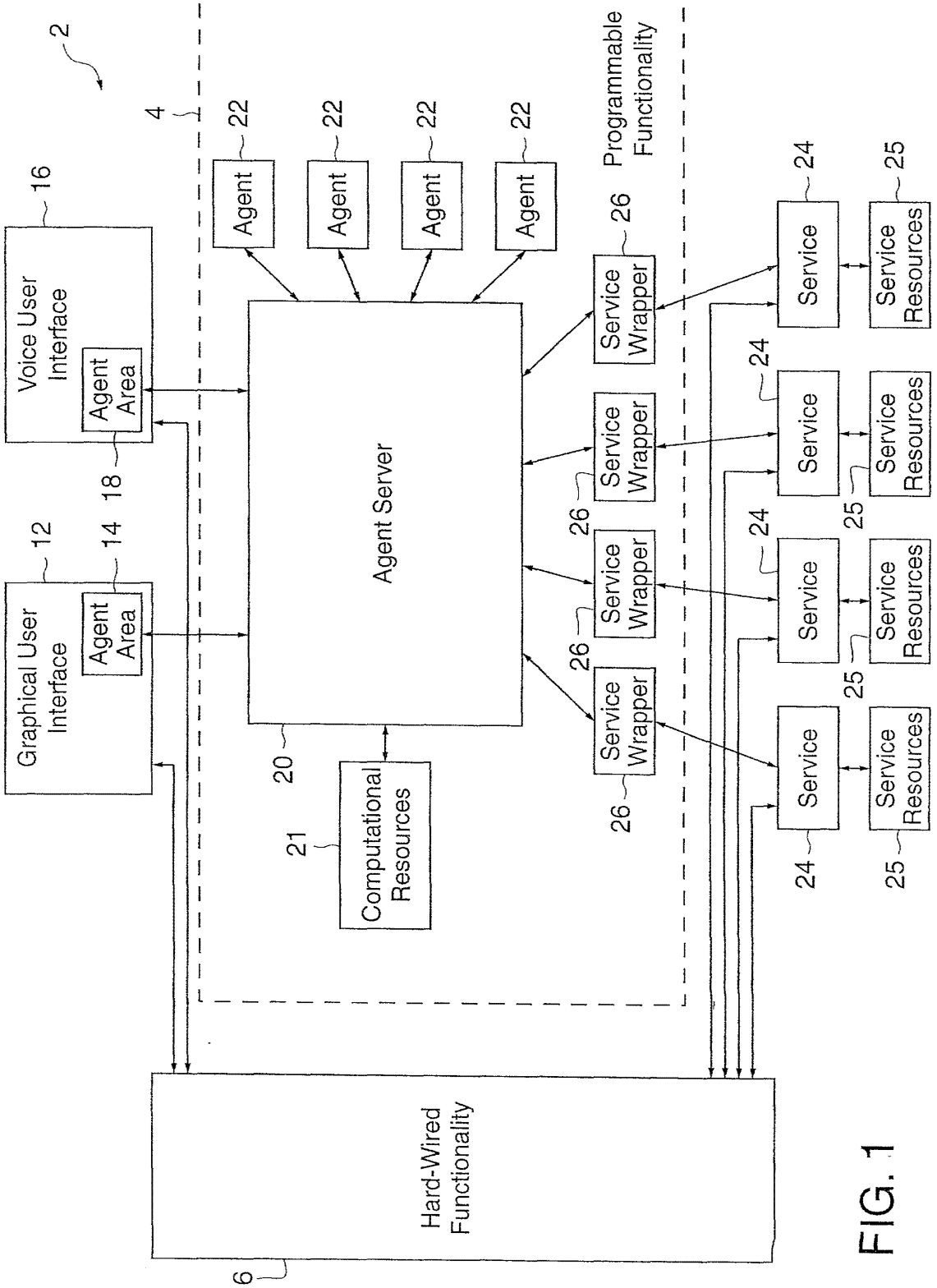

2
4
Programmable Functionality
Agent
22
Agent Server
Voice User Interface
Agent Area
16
18
Graphical User Interface
12
14
Computational Resources
21
20
Service Wrapper
26
Service
24
Service Resources
25
Hard-Wired Functionality
6

FIG. 1

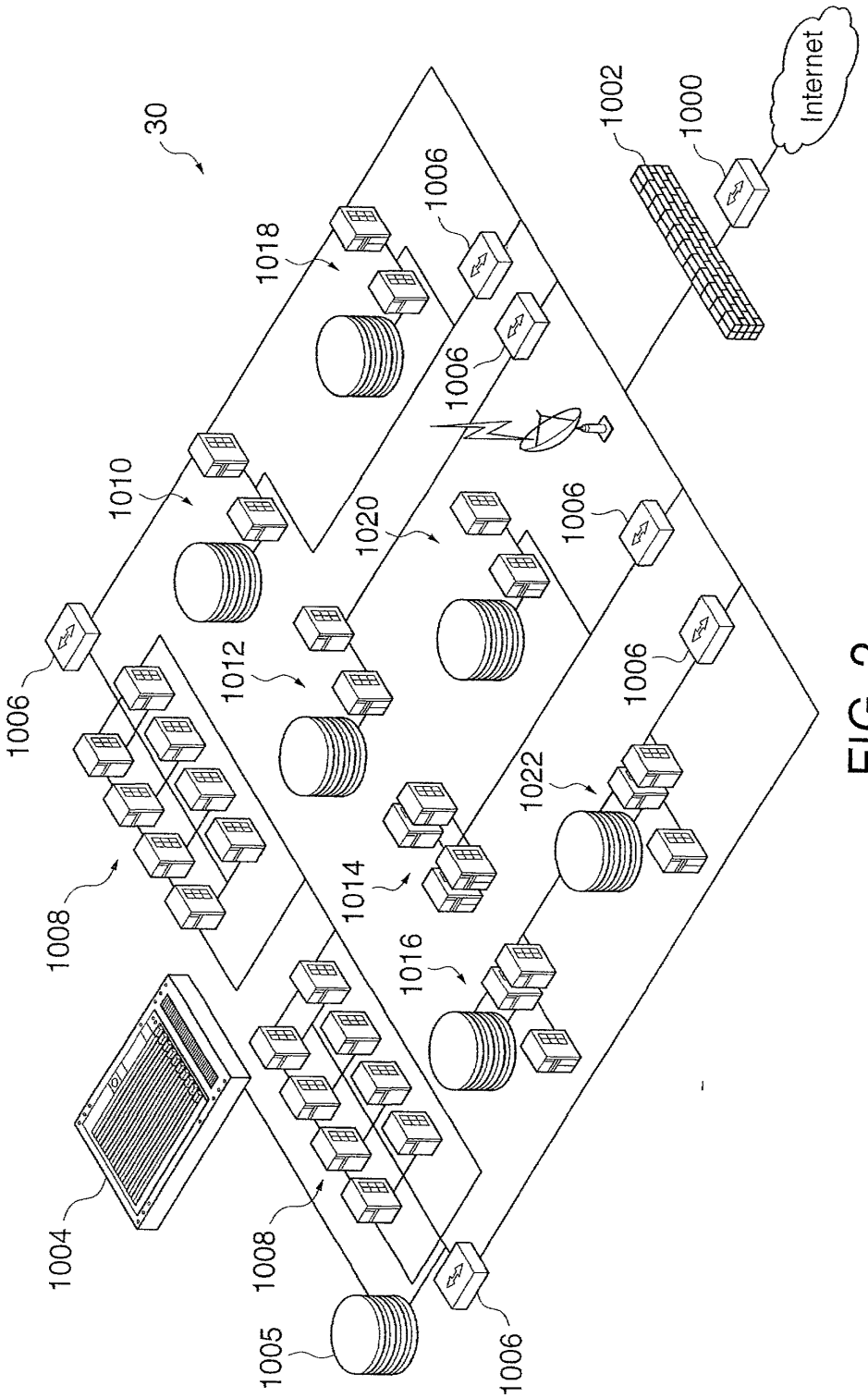

30
1018
1006
1002
1000
Internet
1010
1020
1006
1012
1006
1006
1022
1008
1014
1016
1004
1008
1005
1006

FIG. 2

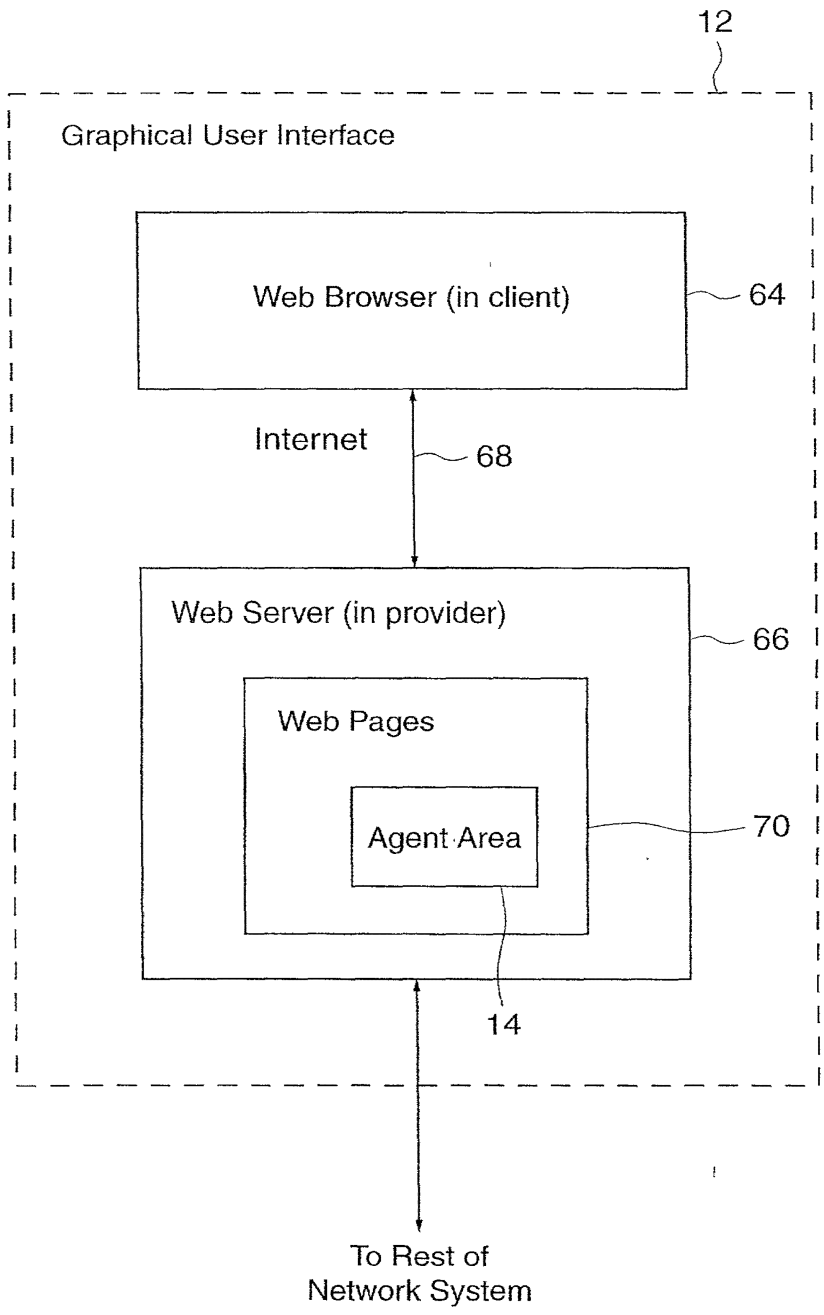


FIG. 3

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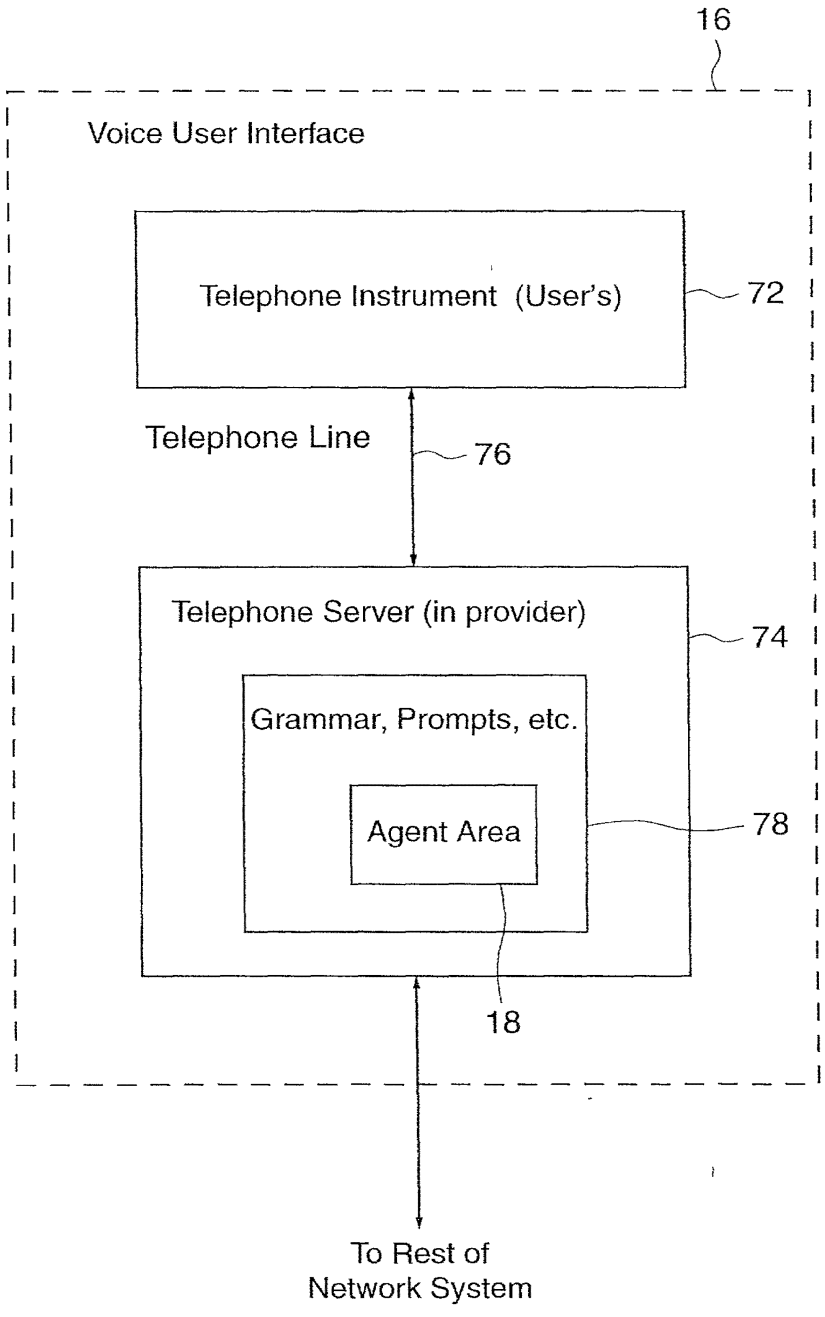


FIG. 4

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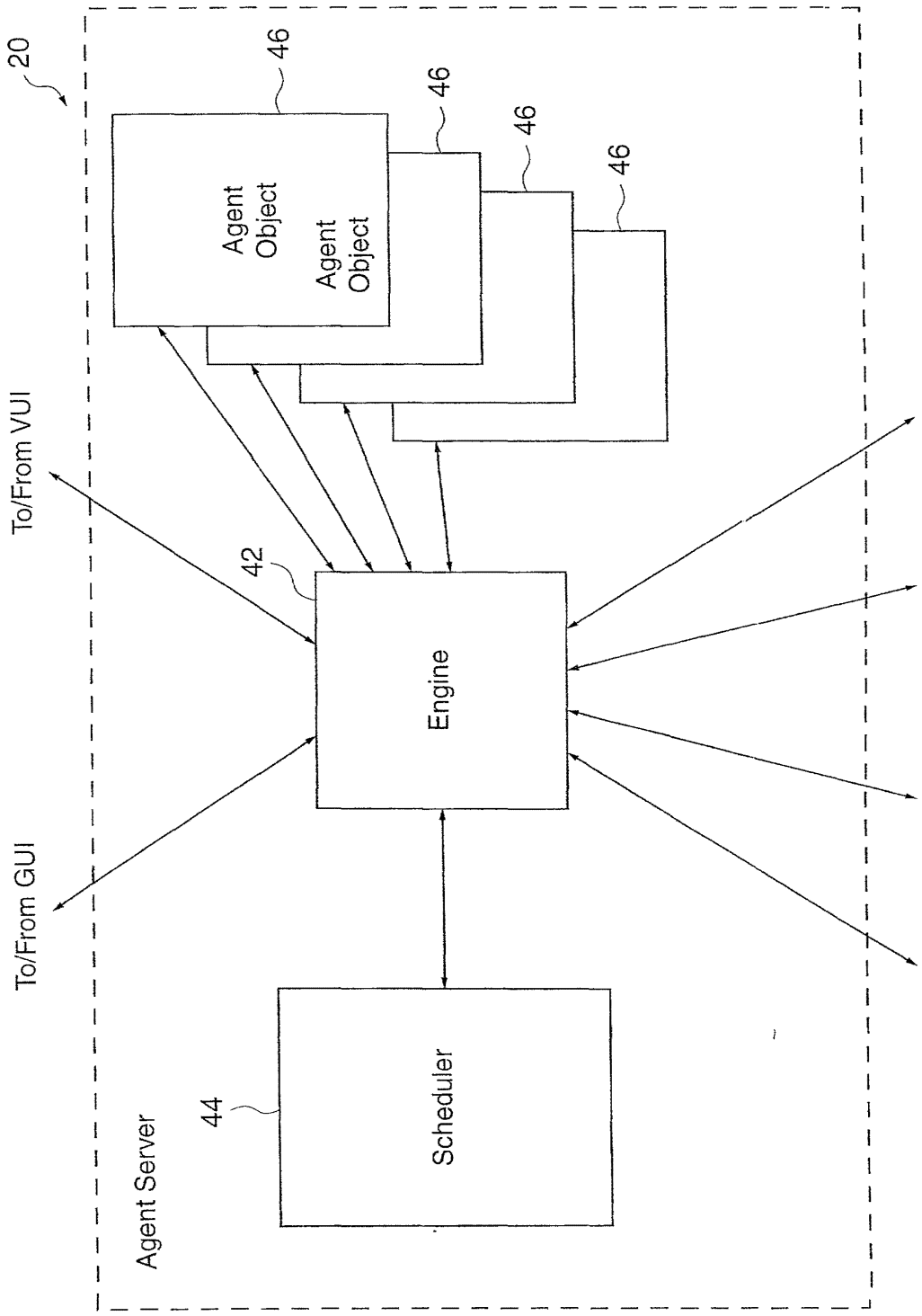

20
46
46
46
46
Agent Object
Agent Object
To/From VUI
42
Engine
To/From GUI
To/From Service Wrappers
44
Scheduler
Agent Server

FIG. 5

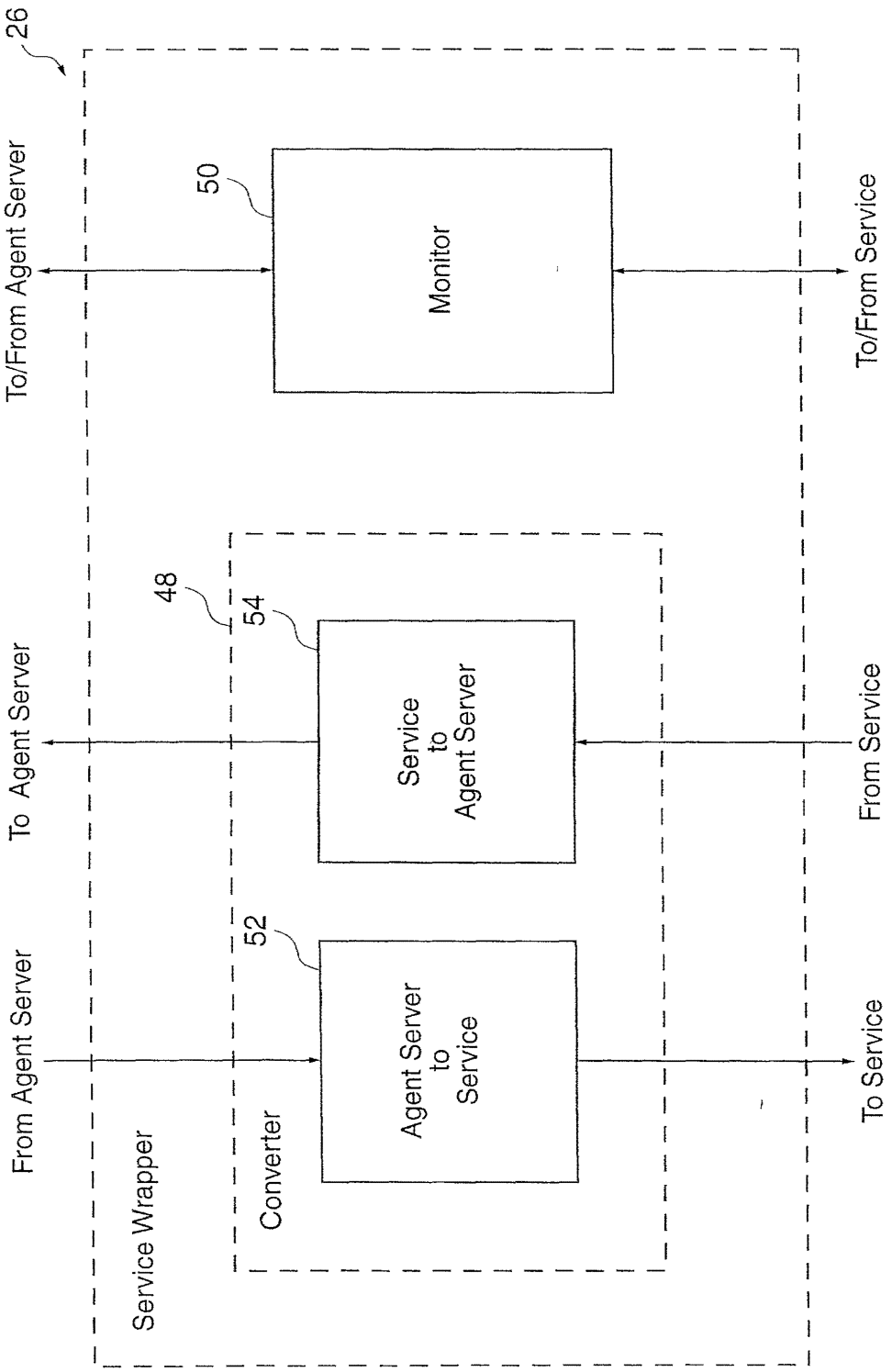

26
To/From Agent Server
50
Monitor
To/From Service
48
54
To Agent Server
Service
to
Agent Server
From Service
52
From Agent Server
Agent Server
to
Service
To Service
Converter
Service Wrapper

FIG. 6

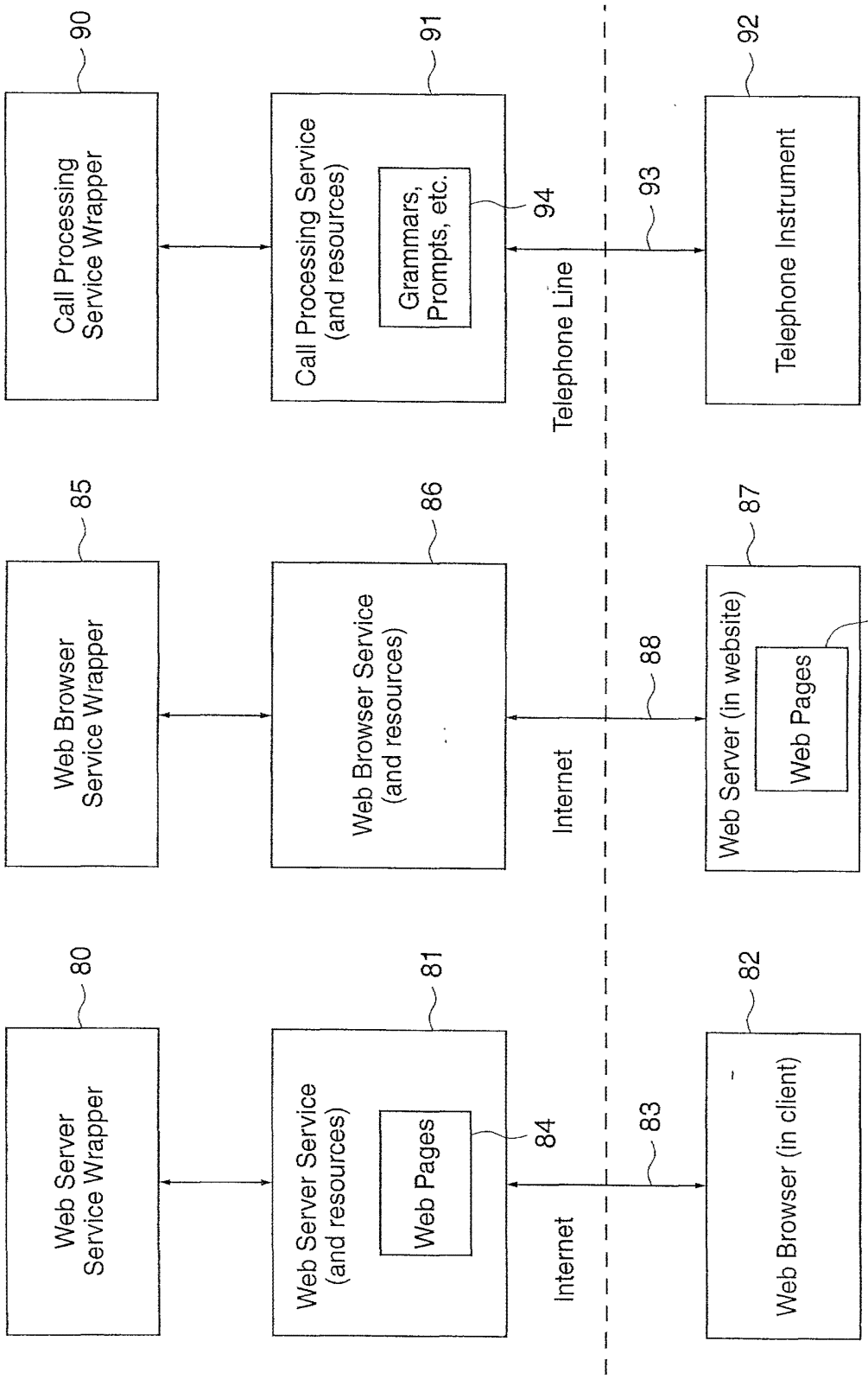

90
Call Processing Service Wrapper
91
Call Processing Service (and resources)
Grammars, Prompts, etc.
94
93
Telephone Line
92
Telephone Instrument
85
Web Browser Service Wrapper
86
Web Browser Service (and resources)
88
Internet
87
Web Server (in website)
Web Pages
89
80
Web Server Service Wrapper
81
Web Server Service (and resources)
Web Pages
84
83
Internet
82
Web Browser (in client)

FIG. 7

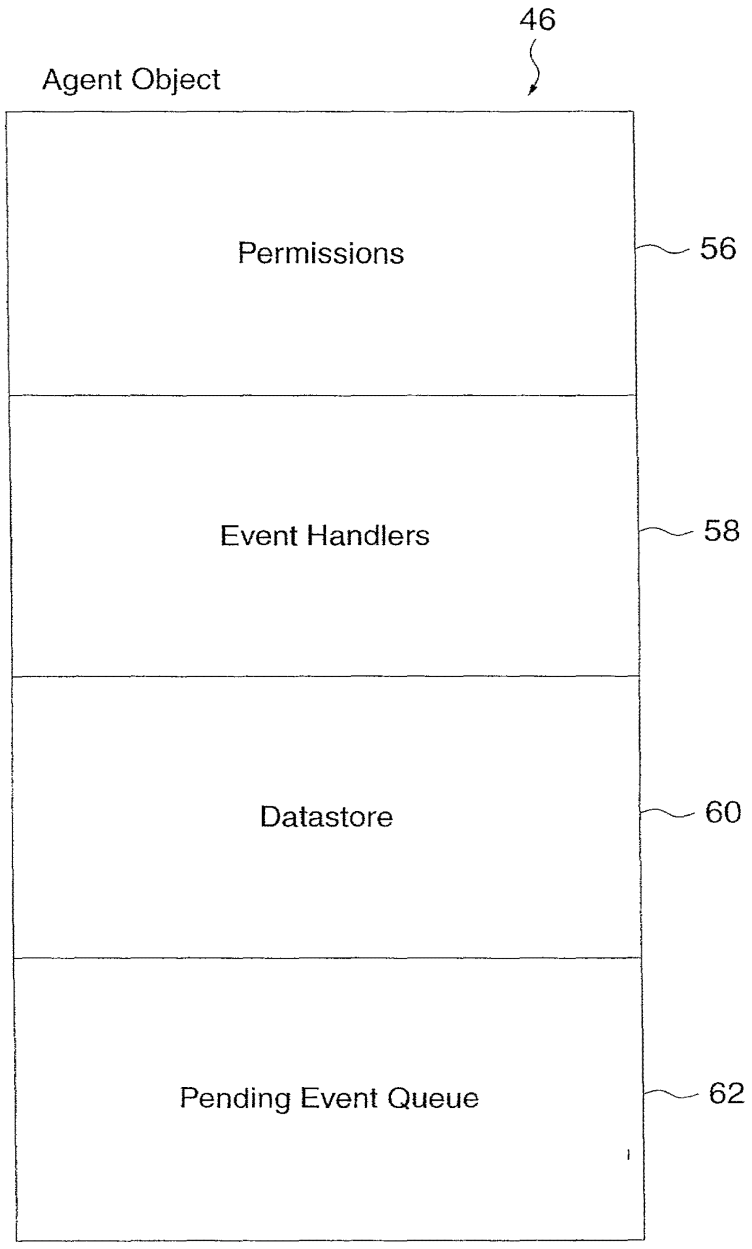


FIG. 8

09/12/2025 11:15:50

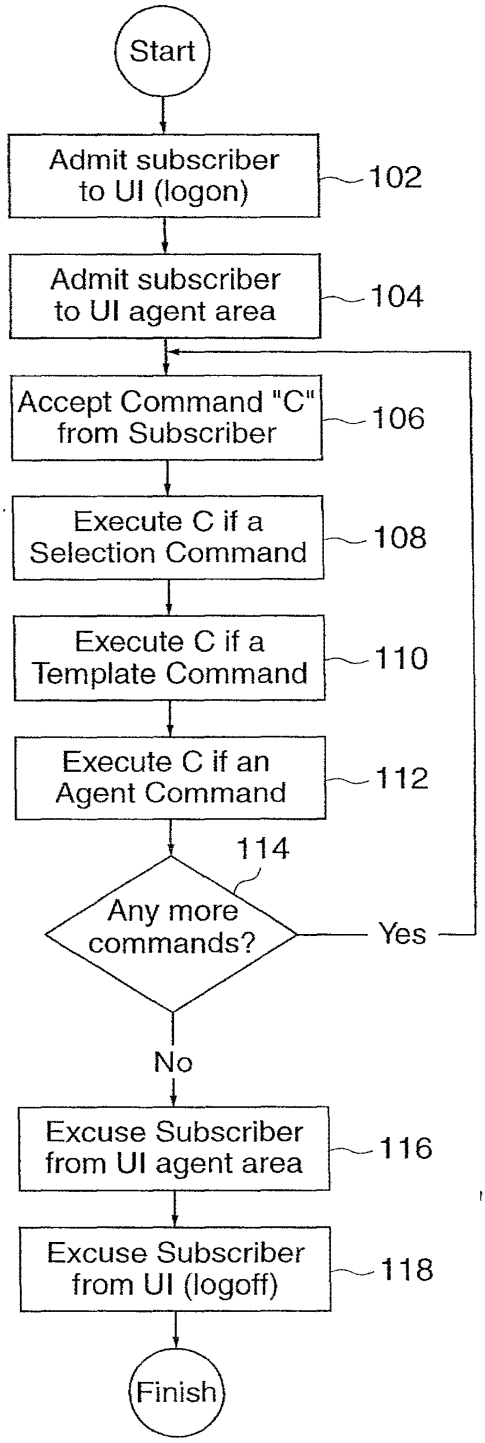


FIG. 9

Docket: 37250

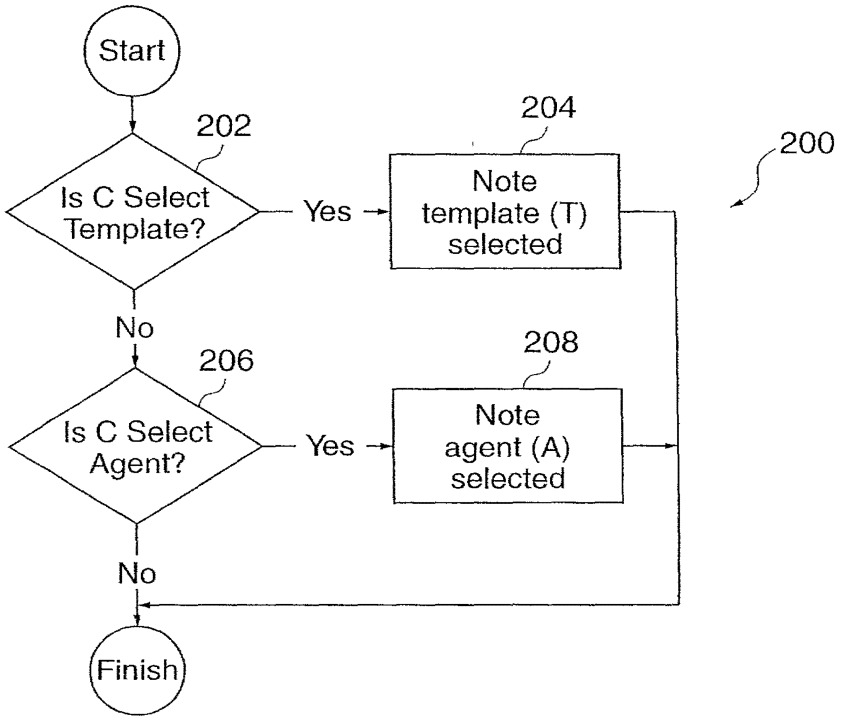


FIG. 10

DOCKET: 25-2525

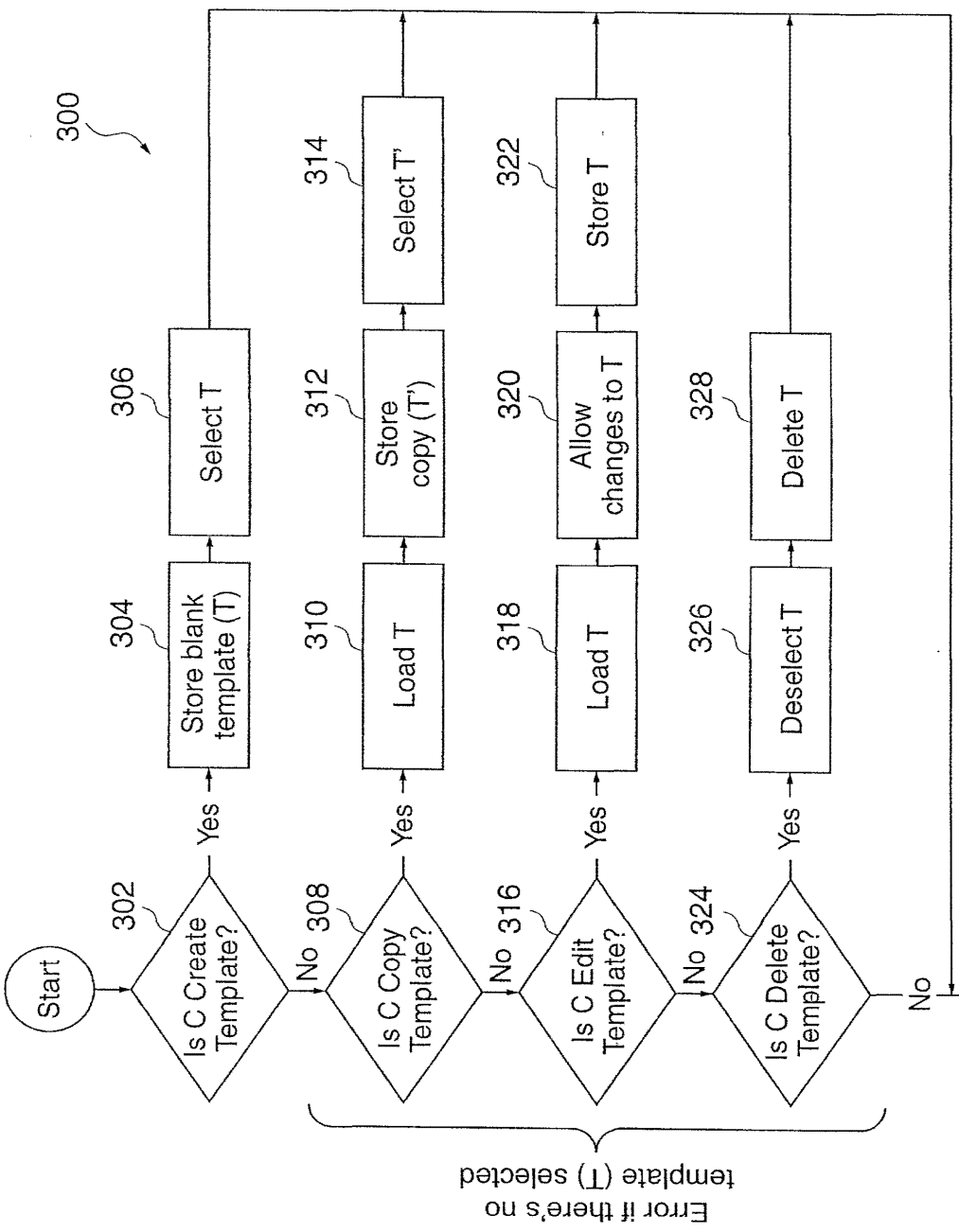

300
Start
302
Is C Create Template?
Yes
304
Store blank template (T)
306
Select T
No
308
Is C Copy Template?
Yes
310
Load T
312
Store copy (T')
314
Select T'
No
316
Is C Edit Template?
Yes
318
Load T
320
Allow changes to T
322
Store T
No
324
Is C Delete Template?
Yes
326
Deselect T
328
Delete T
No
Finish
Error if there's no template (T) selected

FIG. 11

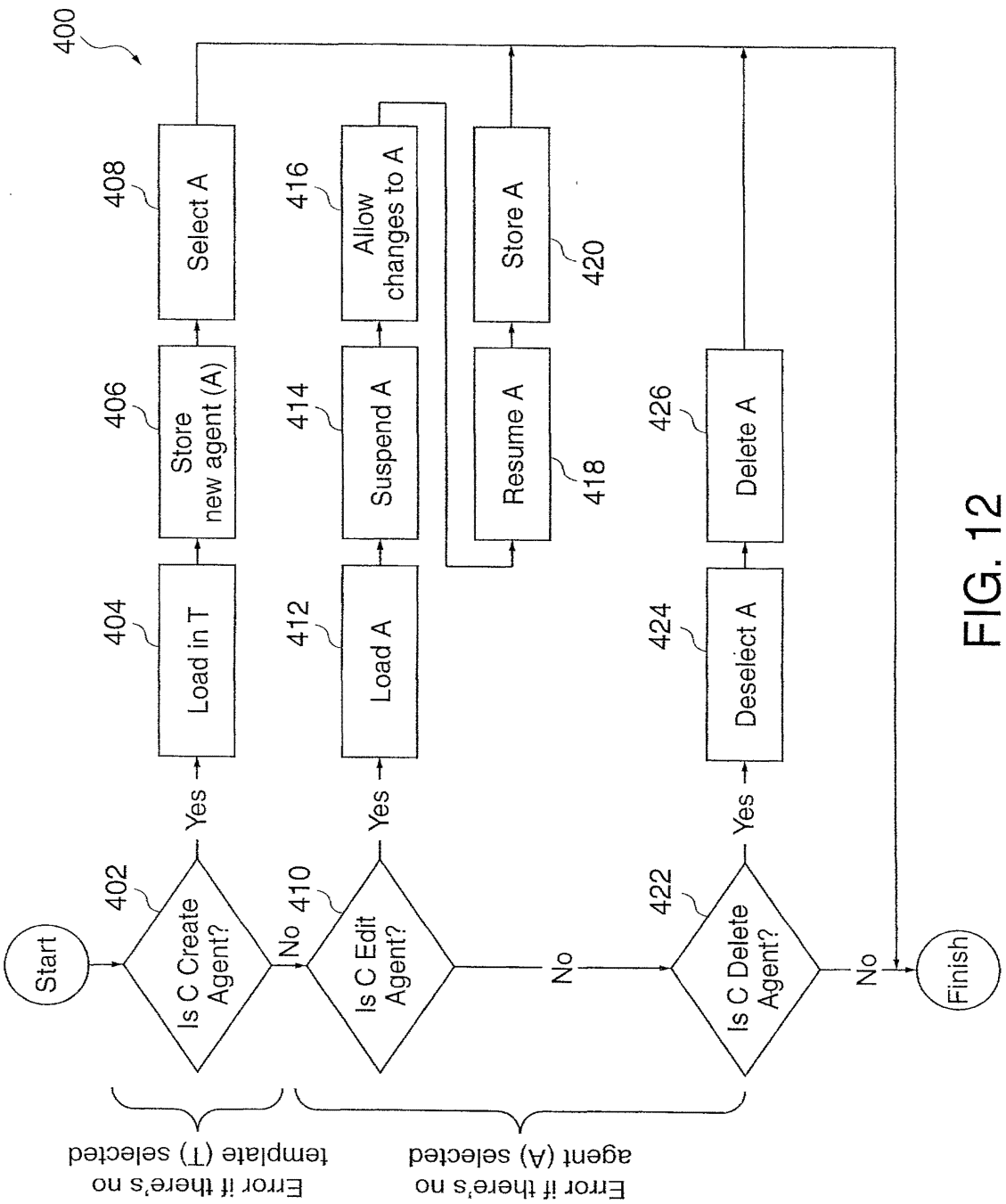

400
Start
Is C Create Agent?
402
Yes
No
Load in T
404
Store new agent (A)
406
Select A
408
Is C Edit Agent?
410
Yes
No
Load A
412
Suspend A
414
Allow changes to A
416
Is C Delete Agent?
422
Yes
No
Deselect A
424
Delete A
426
Resume A
418
Store A
420
Finish
Error if there's no template (T) selected
Error if there's no agent (A) selected

FIG. 12

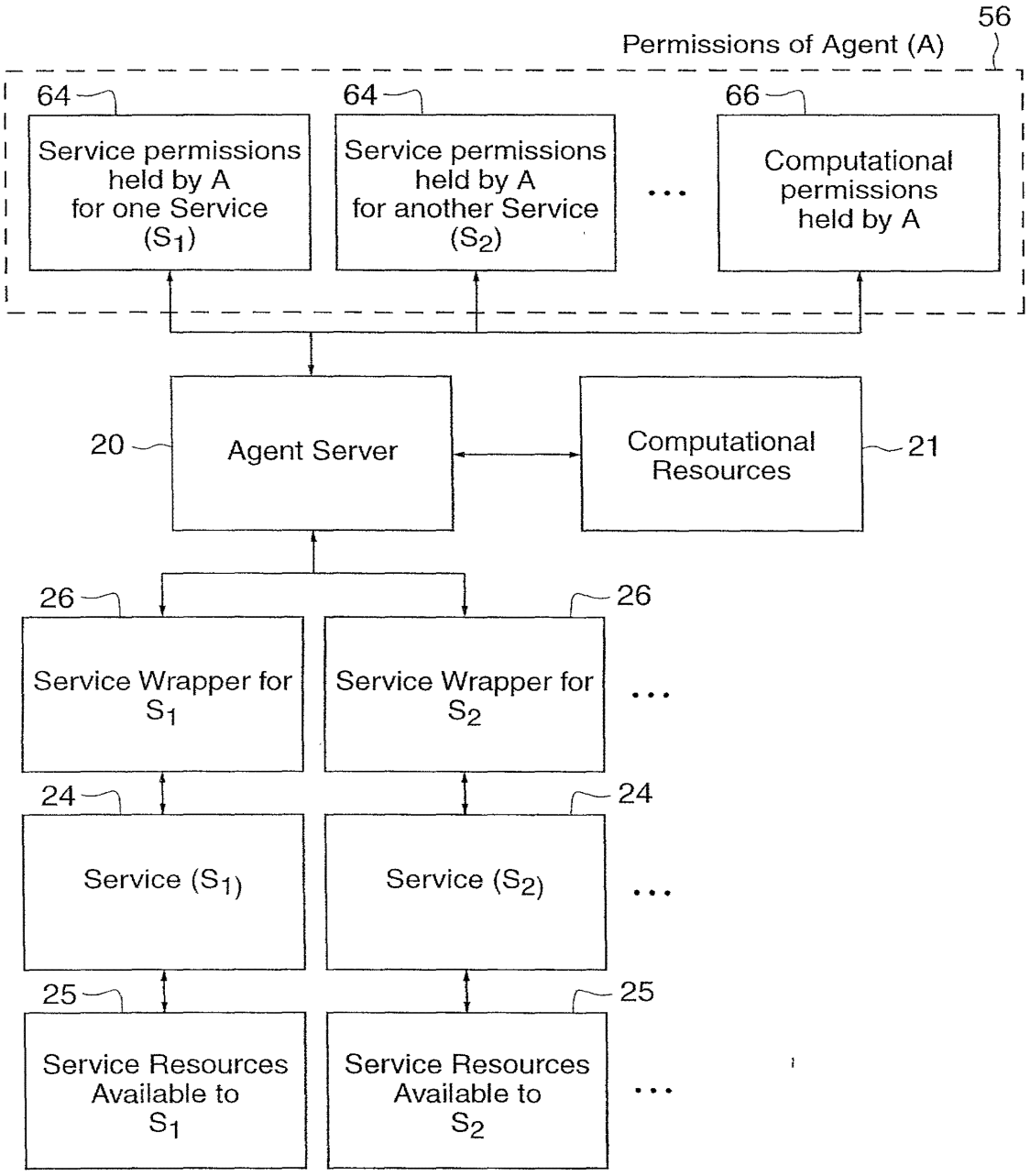


FIG. 13

Date: 11/25/2025

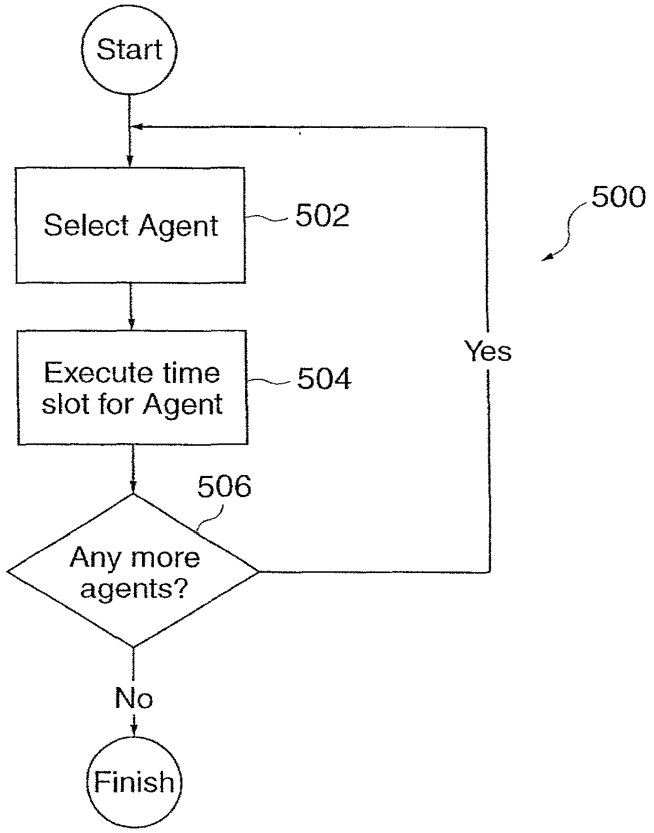


FIG. 14

Docket No. 2012P15950US

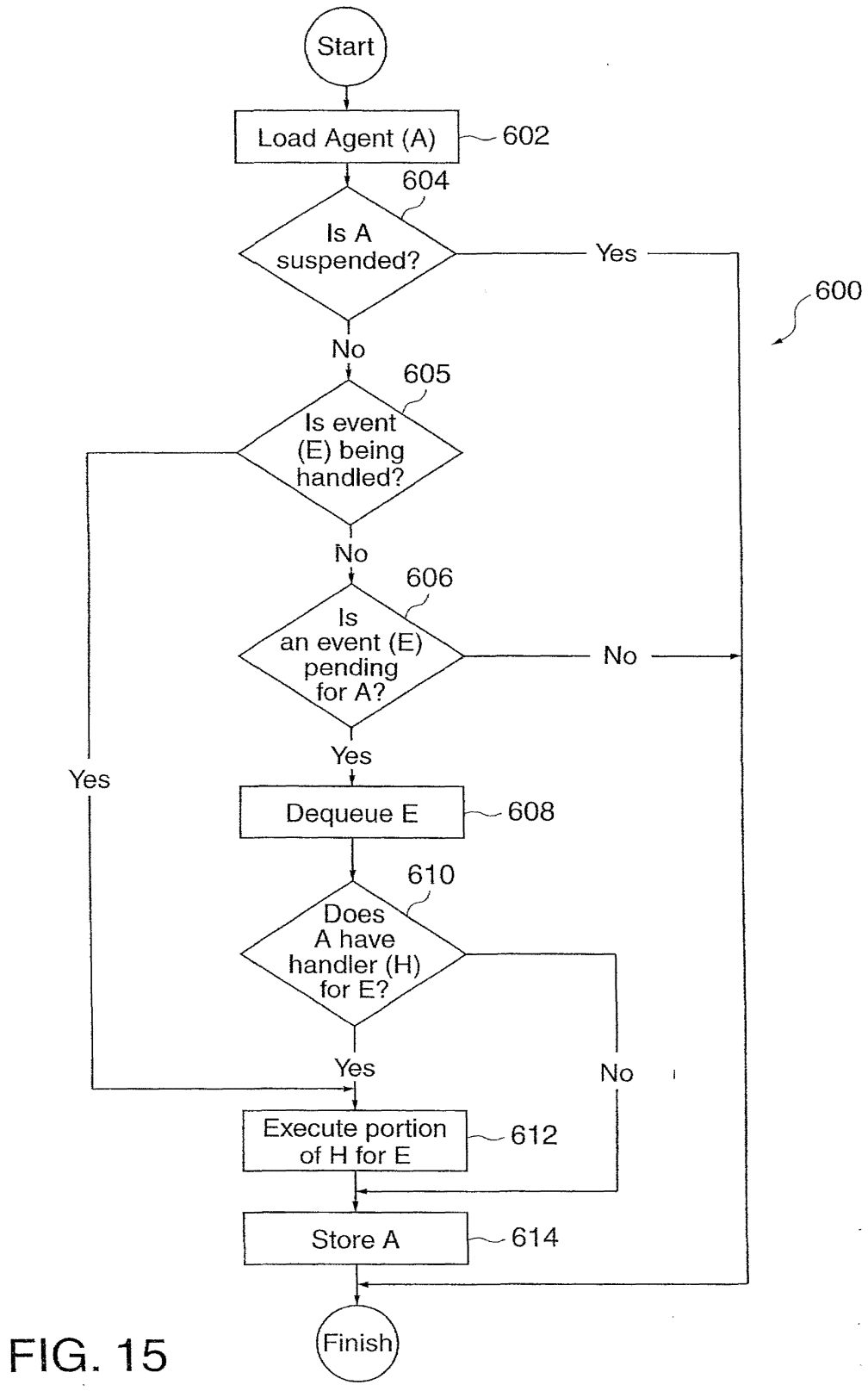


FIG. 15

09/25/2025 08:24:13 EDT

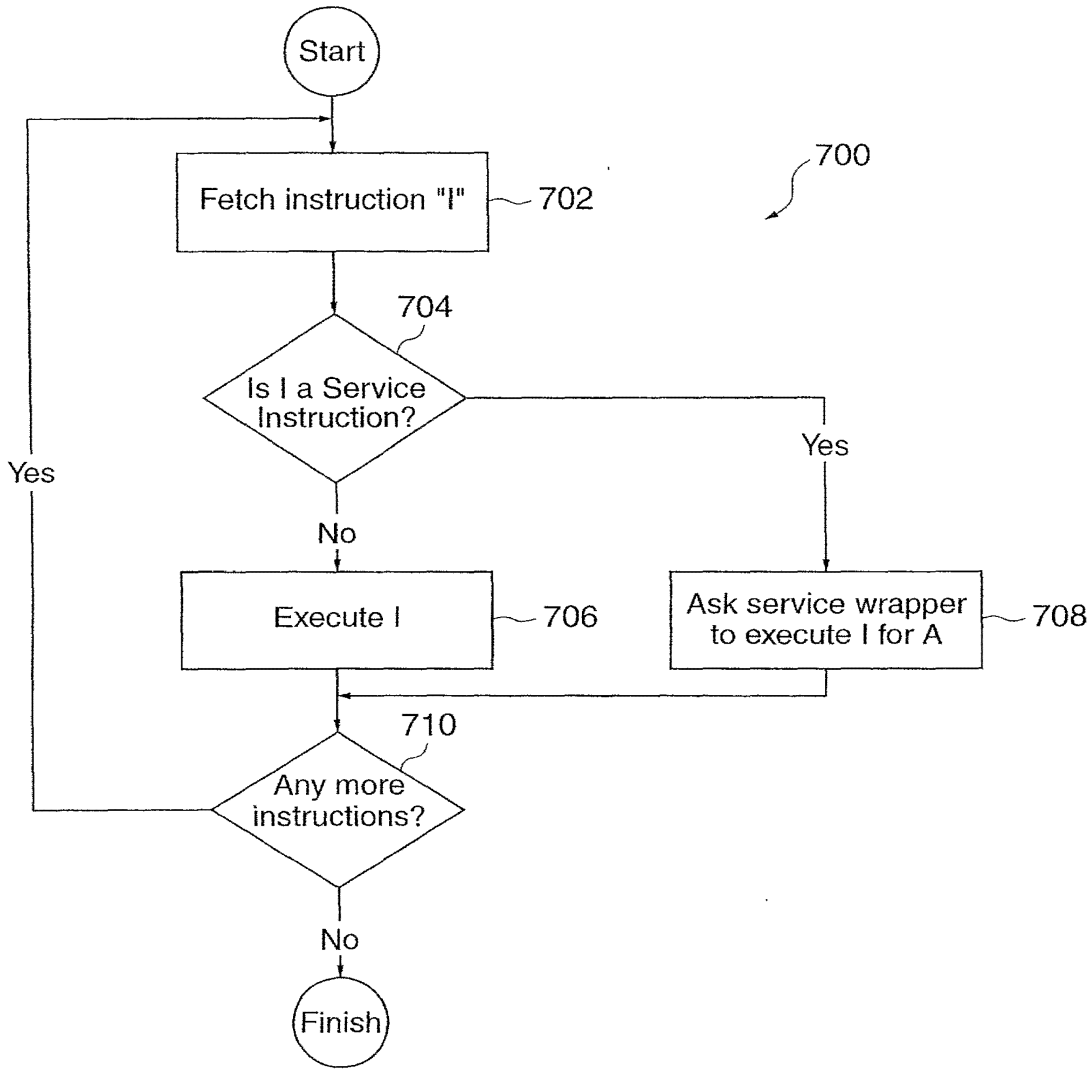

Start
Fetch instruction "I"
702
700
704
Is I a Service Instruction?
Yes
No
Yes
Execute I
706
Ask service wrapper to execute I for A
708
710
Any more instructions?
Yes
No
Finish

FIG. 16

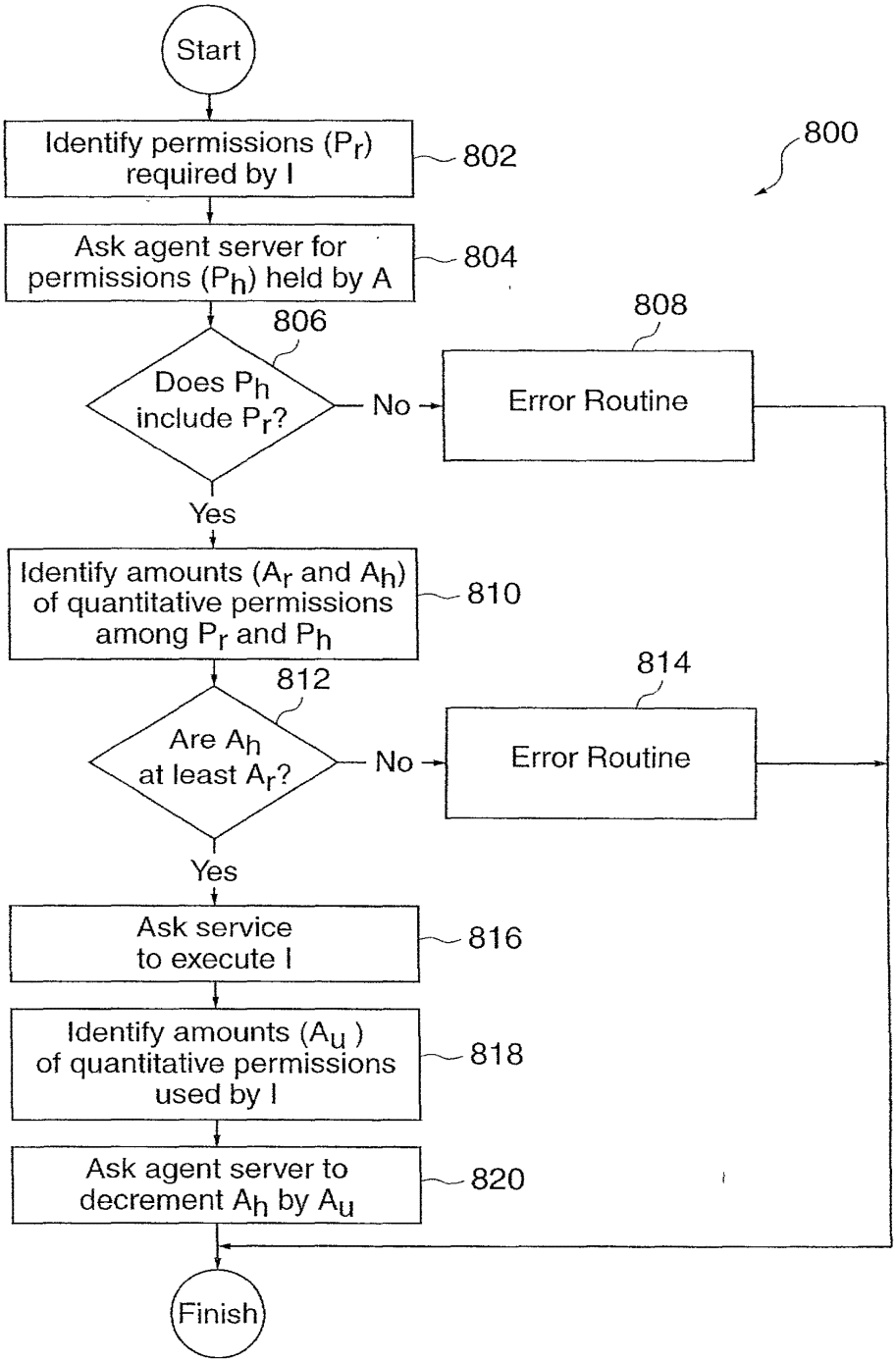


FIG. 17

Date Recue/Received date 2025-04-16

COPY

.orney Docket No.: M-6011 US

DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below adjacent to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of subject matter (process, machine, manufacture, or composition of matter, or an improvement thereof) which is claimed and for which a patent is sought by way of the application entitled **"Network System Extensible By Users"**

which (check) ☒ is attached hereto.
☐ and is amended by the Preliminary Amendment attached hereto.
☐ was filed on _____ as Application Serial No. _____
☐ and was amended on ___ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
Number	Country	Day/Month/Year Filed	Yes	No
N/A			☐	☐

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

Provisional Application Number	Filing Date
N/A	

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information, which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56, which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

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DATABRICKS EX1002 Page 276

Application Serial No.	Filing Date	Status (patented, pending, abandoned)
N/A		

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith:

Alan H. MacPherson (24,423); Thomas S. MacDonald (17,774); Kenneth E. Leeds (30,566); Brian D. Ogonowsky (31,988); David W. Heid (25,875); Norman R. Klivans (33,003); Edward C. Kwok (33,938); David E. Steuber (25,557); Michael Shenker (34,250); Stephen A. Terrile (32,946); Peter H. Kang (40,350); Ronald J. Meetin (29,089); Ken John Koestner (33,004); Omkar K. Suryadevara (36,320); David T. Millers (37,396); Kent B. Chambers (38,839); Serge J. Hodgson (40,017); Michael P. Adams (34,763); Bernard Berman (37,279); Michael J. Halbert (40,633); Gary J. Edwards (41,008); William B. Tiffany (41,347); James E. Parsons (34,691); Daniel P. Stewart (41,332); Philip W. Woo (39,880); John T. Winburn (26,822); Tom Chen (42,406); Fabio E. Marino (43,339); William W. Holloway (26,182); Elaine H. Lo (41,158); Don C. Lawrence (31,975); Marc R. Ascolese (42,268); Carmen C. Cook (42,433); David G. Dolezal (41,711); Adrian J. Lee (42,785); Michael P. Noonan (42,038); Roberta P. Saxon (43,087); Bernice Chen (42,403); Mary Jo Bertani (42,321); and Dale R. Cook (42,434).

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25 Metro Drive, Suite 700
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Telephone: 408-453-9200
Facsimile: 408-453-7979

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IPR2025-00714
DATABRICKS EX1002 Page 277

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Inventor's Signature: _____ Date: 10-22-98

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Full name of second inventor: Barbara Nelson

Inventor's Signature: Barbara Nelson Date: 10/22/98

Residence: San Mateo, California

Post Office Address: 2825 Juniper Street Citizenship: Ireland
San Mateo, California 94403

Full name of third inventor: Jing Su

Inventor's Signature: _____ Date: 10/22/98

Residence: Cupertino, California

Post Office Address: 20094 Wheaton Drive Citizenship: China
Cupertino, California 95014

Full name of fourth inventor: James E. White

Inventor's Signature: James E White Date: 10/22/98

Residence: San Carlos, California

Post Office Address: 112 Wycombe Avenue Citizenship: U.S.A.
San Carlos, California 94070

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DATABRICKS EX1002 Page 278

JC669 U.S. PTO
09/712712
11/14/00

Class	Subclass

ISSUE CLASSIFICATION

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PATENT NUMBER

U.S. UTILITY Patent Application

O.I.P.E.	PATENT DATE
SCANNED MH BK Q.A. A.G.	

APPLICATION NO.	CONT/PRIOR	CLASS	SUBCLASS	ART UNIT	EXAMINER
09/712712	D	709	202	2152	

APPLICANTS
Danny Lange
Barbara Nelson
Jing Su
James White

TITLE
Network system extensible by users

PTO-2040
12/99

ISSUING CLASSIFICATION

ORIGINAL		CROSS REFERENCE(S)	
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)
INTERNATIONAL CLASSIFICATION			
			☐ Continued on Issue Slip Inside File Jacket

☒ TERMINAL DISCLAIMER	DRAWINGS			CLAIMS ALLOWED	
	Sheets Drwg.	Figs. Drwg.	Print Fig.	Total Claims	Print Claim for O.G.
☐ The term of this patent subsequent to _____ (date) has been disclaimed.		(Assistant Examiner)	(Date)	NOTICE OF ALLOWANCE MAILED	
☒ The term of this patent shall not extend beyond the expiration date of U.S Patent. No. 6,163,794		(Primary Examiner)	(Date)	ISSUE FEE: Amount Due / Date Paid	
☐ The terminal ____months of this patent have been disclaimed.		(Legal Instruments Examiner)	(Date)	ISSUE BATCH NUMBER	

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Class	Sub.	Date	Exmr.
709	202	12/15/03	M.G
"	203	"	"
"	226	"	"
379	88+	"	"

INTERFERENCE SEARCHED

Class	Sub.	Date	Exmr.

SEARCH NOTES
(INCLUDING SEARCH STRATEGY)

	Date	Exmr.
West d base search hist - Report attached	12/15/03	M.G

(RIGHT OUTSIDE)

ISSUE SLIP STAPLE AREA (for additional cross references)

POSITION	INITIALS	ID NO.	DATE
FEE DETERMINATION			
O.I.P.E. CLASSIFIER			
FORMALITY REVIEW	AA, AA	71629	2-1-01
RESPONSE FORMALITY REVIEW			

INDEX OF CLAIMS

✔ ..... Rejected
= ..... Allowed
— (Through numeral)... Canceled
÷ ..... Restricted
N ..... Non-elected
I ..... Interference
A ..... Appeal
O ..... Objected

Claim	Date	Claim	Date	Claim	Date
Final / Original		Final / Original	12/19/53	Final / Original	12/19/01
1		51		101	
2		52		102	
3		53		103	
4		54		104	
5		55		105	
6		56		106	
7		57		107	
8		58		108	
9		59		109	
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26		76		126	
27		77 ✓		127	
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29		79		129	
30		80		130	
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32		82		132	
33		83		133	
34		84		134	
35		85		135	
36		86		136	
37		87		137	
38		88		138	
39		89		139	
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47		97		147	
48		98		148	
49		99		149	
50		100 ✓		150	

If more than 150 claims or 10 actions staple additional sheet here

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11-15-00

#692918 v1 - m-6011-1c us transmittal cont. appln - Please type a plus sign (+) inside this box ⇒ +

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JC921 U.S. PTO 11/14/00

JC869 U.S. PTO 09/712712 11/14/00

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	M-6011-1C US
First Named Inventor or Application Identifier	Lange
Title	Network System Extensible By Users
Express Mail Label No.	EL 707 907 142 US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

1. ☒ Fee Transmittal Form - ***see page 2 of this form.***
(Submit an original, and a duplicate for fee processing)
2. Application:
☒ Specification: (preferred arrangement set forth below)
Descriptive title of the Invention,
Cross References to Related Applications,
Reference to Microfiche Appendix,
Background of the Invention,
Brief Summary of the Invention,
Brief Description of the Drawings, and
Detailed Description (all totaling 86 pages)
Appendix(ces) ___, ___, & ___ (____pages)
☒ Claim(s) 17 pages
☒ Abstract of the Disclosure 1 page
3. ☒ Drawing(s) (35 USC 113) [Total Sheets 17]
4. Oath or Declaration ☐ unsigned [Total Pages 3]
a. ☐ Newly executed (original or copy)
b. ☒ Copy from prior application (37 CFR §1.63(d))
(for continuation/divisional with Box 17 completed)
c. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
5. ☒ Incorporation By Reference (useable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program Appendix
consisting of ____ pages of microfiche containing ___ frames on each page in accompanying envelope.
7. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
a. ☐ Computer Readable Copy
b. ☐ Paper Copy (identical to computer copy)
c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☒ Assignment Papers* (cover sheet & documents) 3 pages
9. ☒ 37 CFR §3.73(b) Statement* 3 pages
☒ Power of Attorney*
10. ☐ English Translation Document (if applicable)
11. ☐ Information Disclosure Statement (IDS) & ☐ PTO-1449 ☐ ___Copies of IDS Citations/References
12. ☒ Preliminary Amendment 12 pages
13. ☒ Return Receipt Postcard (MPEP 503)
(should be specifically itemized)
14. Small Entity Status
☐ Small Entity Statement Enclosed ___ pages
☐ Statement filed in prior application; and status still proper and desired
☐ Is no longer claimed.
15. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16. ☒ Other: Assignment was recorded on 10/23/98 on Reel 9557 at frame 0591.

***copy from prior application**

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information and a preliminary amendment:
☒ Continuation ☐ Divisional of prior application No. 09/178,366
Filed on October 23, 1998, entitled: NETWORK SYSTEM EXTENSIBLE BY USERS
PRIOR APPLICATION INFORMATION: *Examiner* Mehmet B. Geckil *Group Art Unit* 2756

18. CORRESPONDENCE ADDRESS

Customer Number or Bar Code Label or ☒ Correspondence address below

Name	**Philip W. Woo**			Reg. No. 39,880	
Attorneys for Applicant	**Skjerven Morrill MacPherson LLP**				
Address	25 Metro Drive, Suite 700				
City	San Jose	State	CA	Zip Code	95110
Country:	United States	Telephone	(408) 453-9200	Fax	(408) 453-7979

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19. Fee calculations.

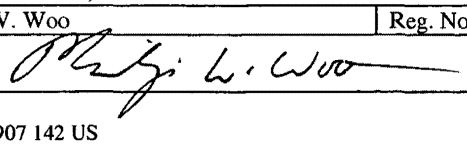
CLAIMS (Number Filed)	(1) FOR	(2)		(3) NUMBER EXTRA		(4) RATE		(5) CALCULATIONS
65	TOTAL CLAIMS (37 CFR 1.16(c))	-20	=	45	x	$18	=	$810.00
5	INDEPENDENT CLAIMS (37 CFR 1.16(b))	-3	=	2	x	$80	=	$ 160.00
☐	MULTIPLE DEPENDENT CLAIMS (if applicable) (37 CFR 1.18(d))				+	$260.00	=	
				BASIC FEE (37 CFR 1.16(a))			=	$ 710.00
				Total of above Calculations			=	$ 810.00
							=	
						TOTAL	=	$ 1,680.00

20. FEES: The Commissioner is hereby authorized to credit overpayments or charge the following fees to Deposit Account No. **19-2386**:
   a. ☒ Fees required under 37 CFR 1.16. (U.S. Application Filing Fees)
   b. ☒ Fees required under 37 CFR 1.17. (Conditional Extension of Time Fees)
   c. ☐ Fees required under 37 CFR 1.18. (Patent Issue Fees)

21. ☐ Other: _____

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22. NEW CORRESPONDENCE ADDRESS					
Customer Number or Bar Code Label				New correspondence address below	
NAME					
ADDRESS					
CITY		STATE		ZIP CODE	
COUNTRY		TELEPHONE		FAX	

23. SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED		
Skjerven Morrill MacPherson LLP 25 Metro Drive, Suite 700 San Jose, CA 95110 Tel. (408) 453-9200 Fax. (408) 453-7979		
Date:	November 14, 2000	
Name	Philip W. Woo	Reg. No. 39,880
Signature		
Express Mail Label No.	EL 707 907 142 US	

692918 v1

IPR2025-00714
DATABRICKS EX1002 Page 283

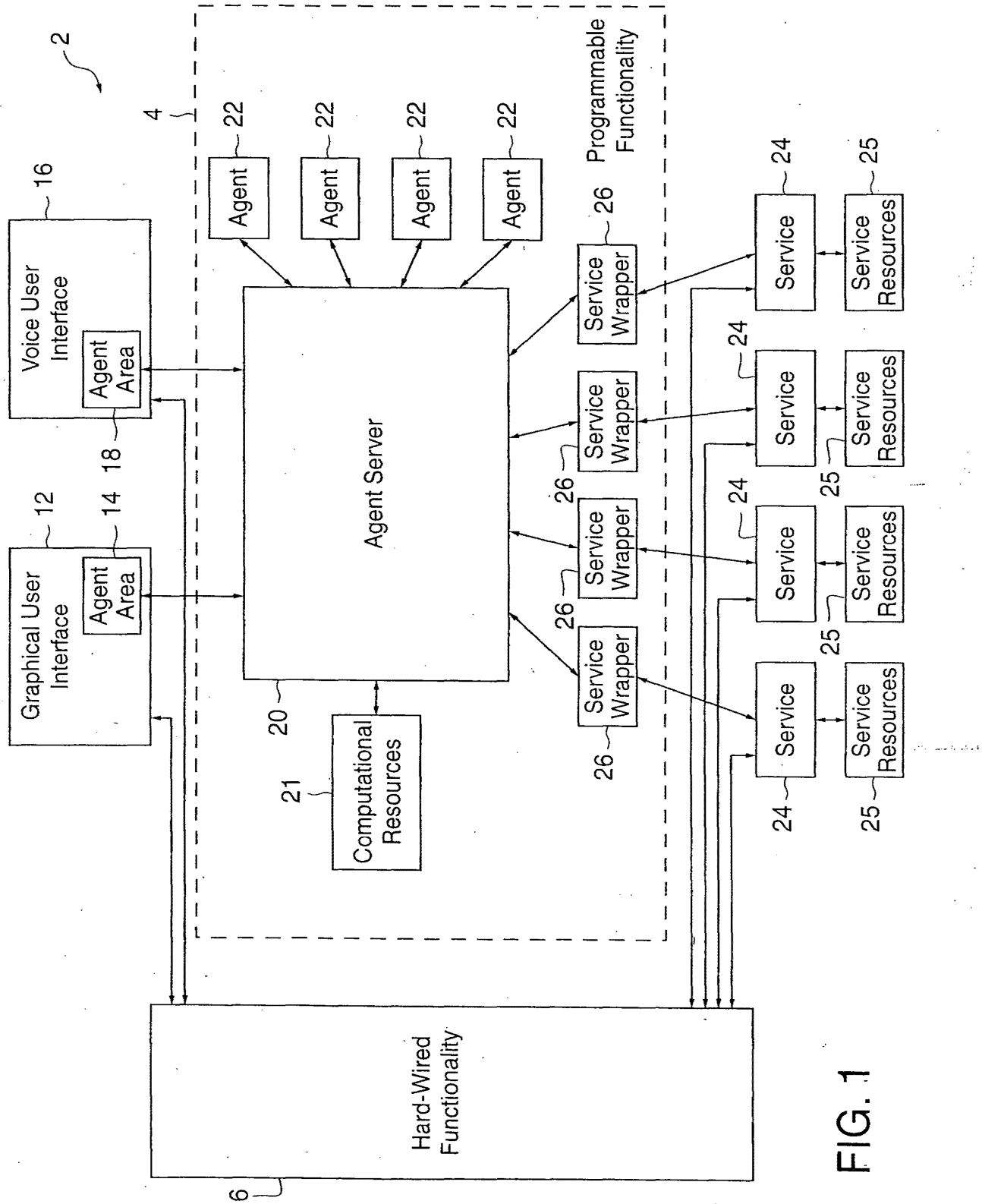


FIG. 1

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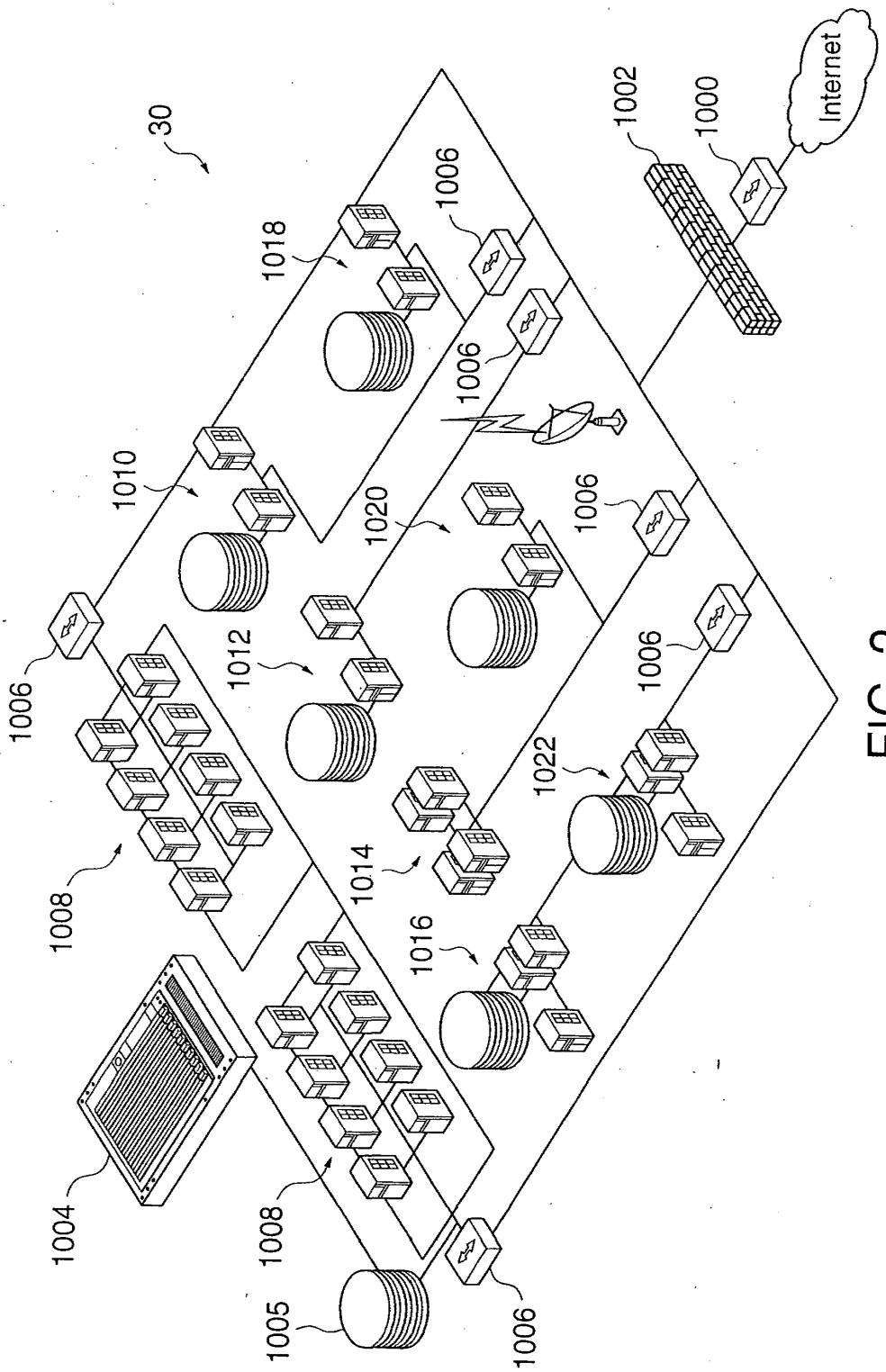


FIG. 2

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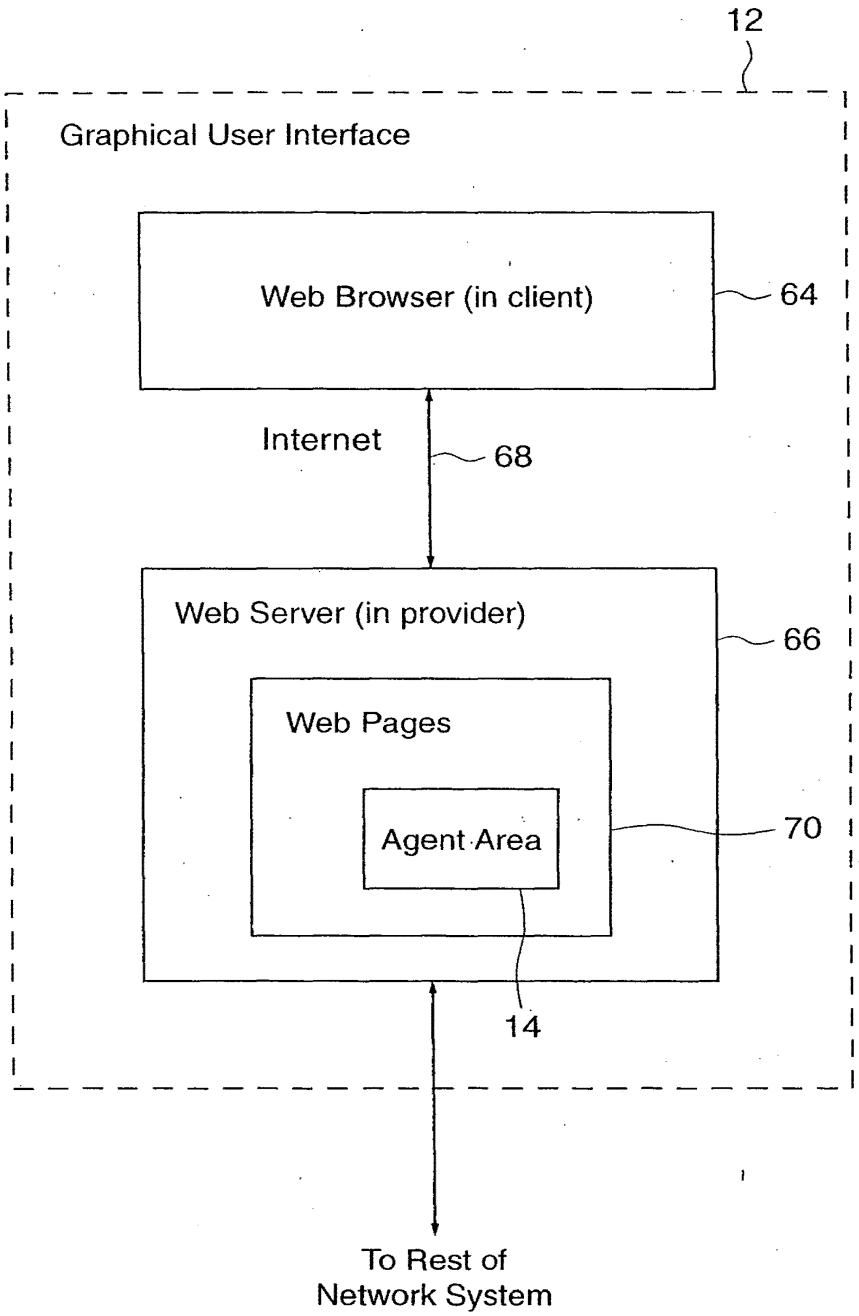


FIG. 3

SUBSTITUTE SHEET (RULE 26)

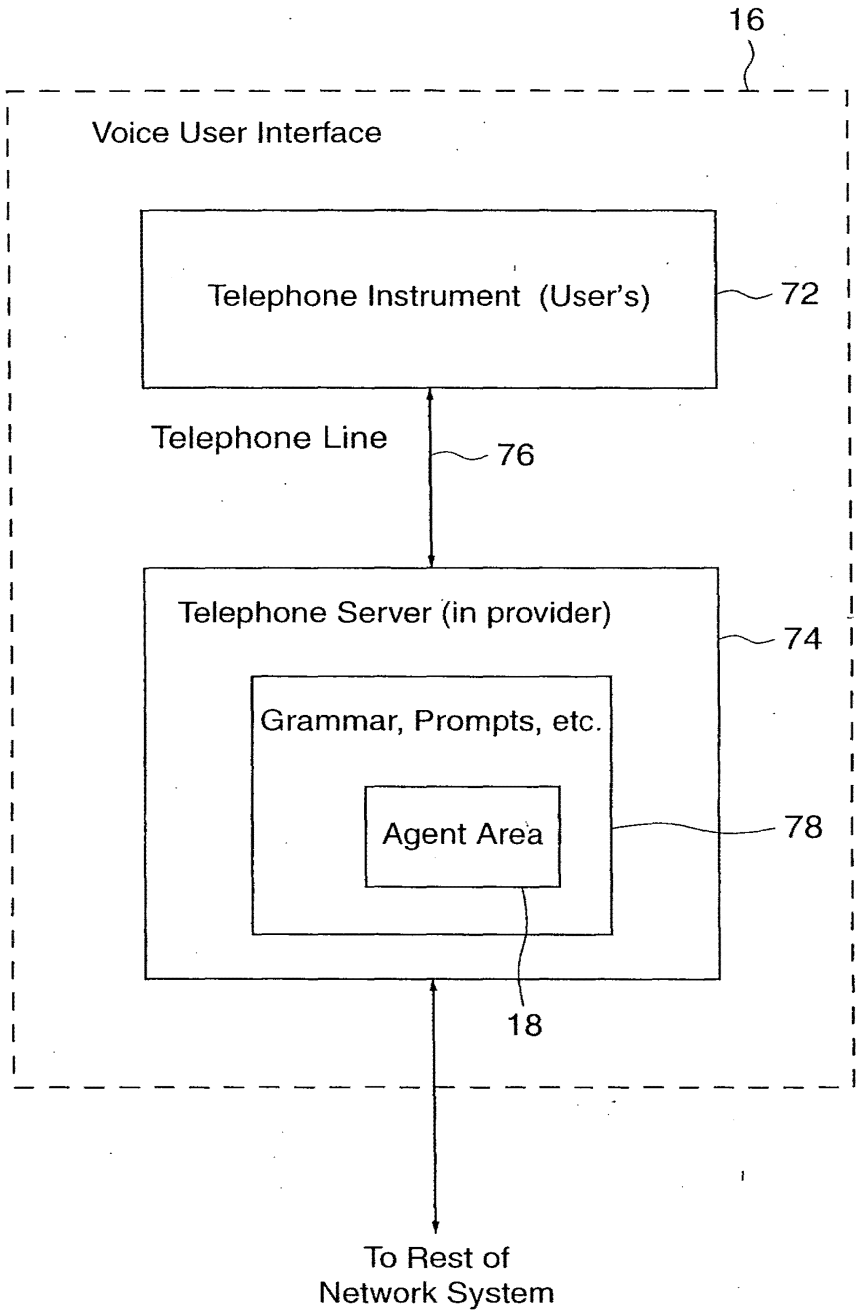


FIG. 4

09674122v1 09674122v1 09674122v1 09674122v1

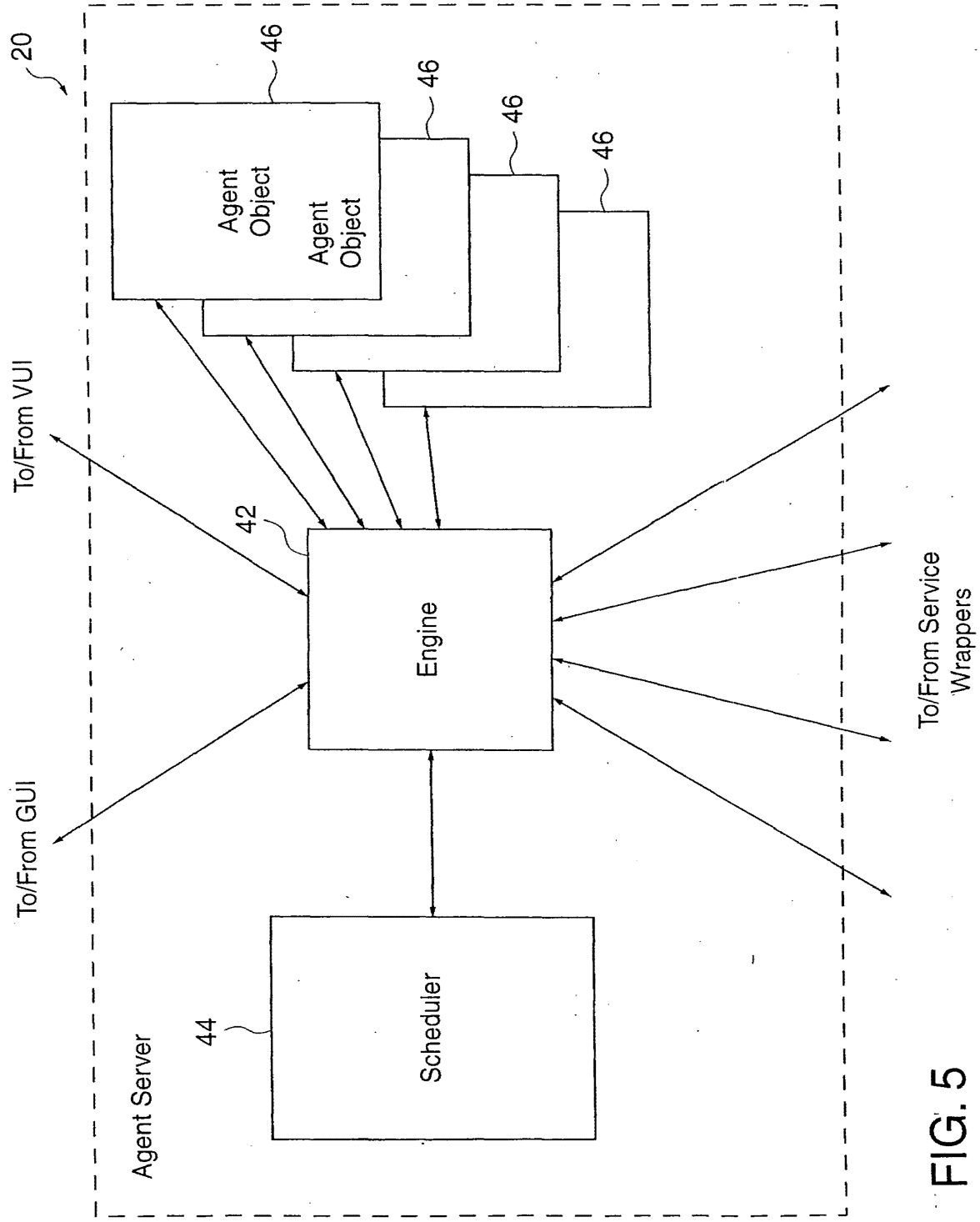

20
46
46
46
46
Agent Object
Agent Object
42
Engine
To/From VUI
To/From GUI
To/From Service Wrappers
44
Scheduler
Agent Server

FIG. 5

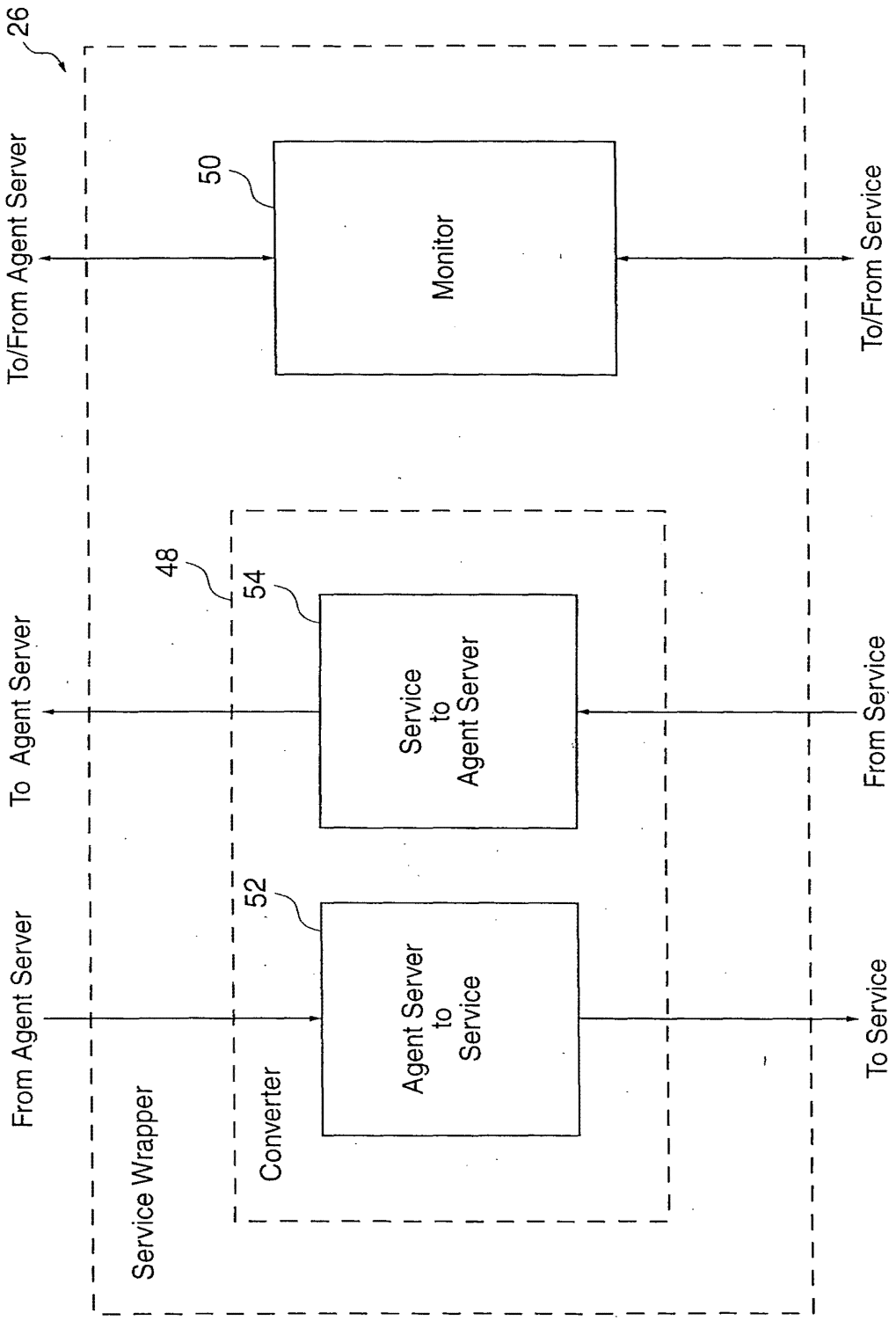


FIG. 6

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Call Processing Service Wrapper
90
Call Processing Service (and resources)
91
Grammars, Prompts, etc.
94
Telephone Line
93
Telephone Instrument
92
Web Browser Service Wrapper
85
Web Browser Service (and resources)
86
Internet
88
Web Server (in website)
87
Web Pages
89
Web Server Service Wrapper
80
Web Server Service (and resources)
81
Web Pages
84
Internet
83
Web Browser (in client)
82

FIG. 7

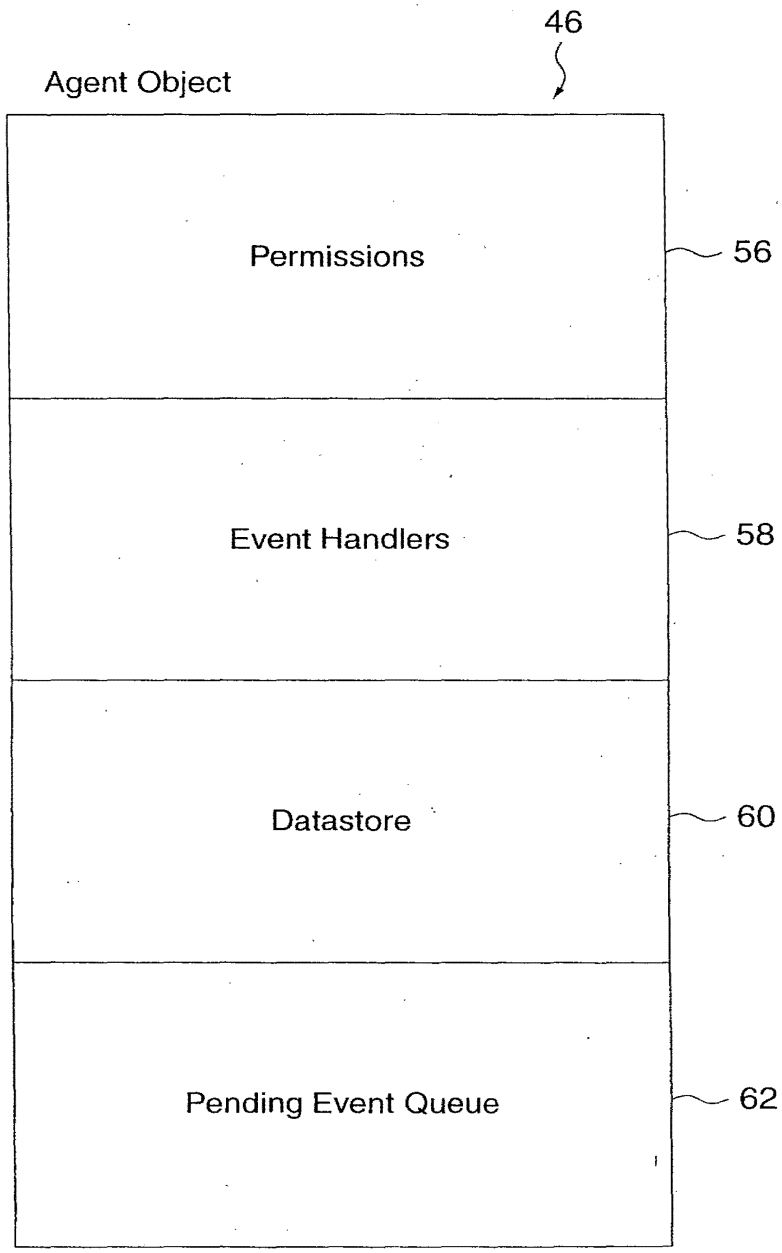


FIG. 8

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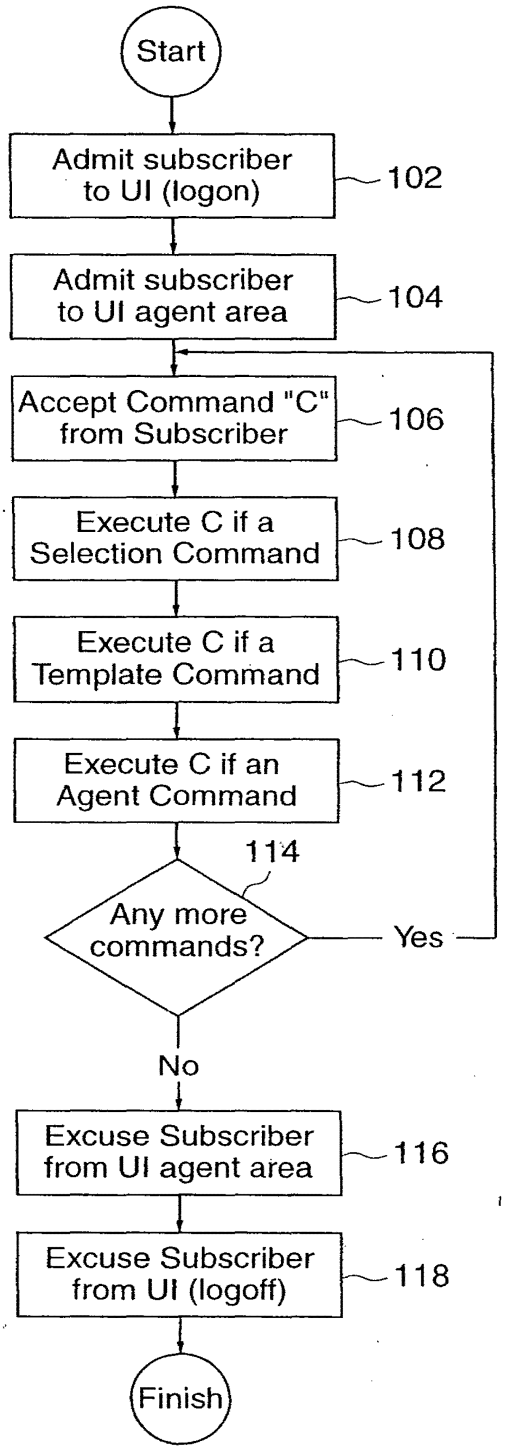

Start
Admit subscriber to UI (logon)
102
100
Admit subscriber to UI agent area
104
Accept Command "C" from Subscriber
106
Execute C if a Selection Command
108
Execute C if a Template Command
110
Execute C if an Agent Command
112
114
Any more commands?
Yes
No
Excuse Subscriber from UI agent area
116
Excuse Subscriber from UI (logoff)
118
Finish

FIG. 9

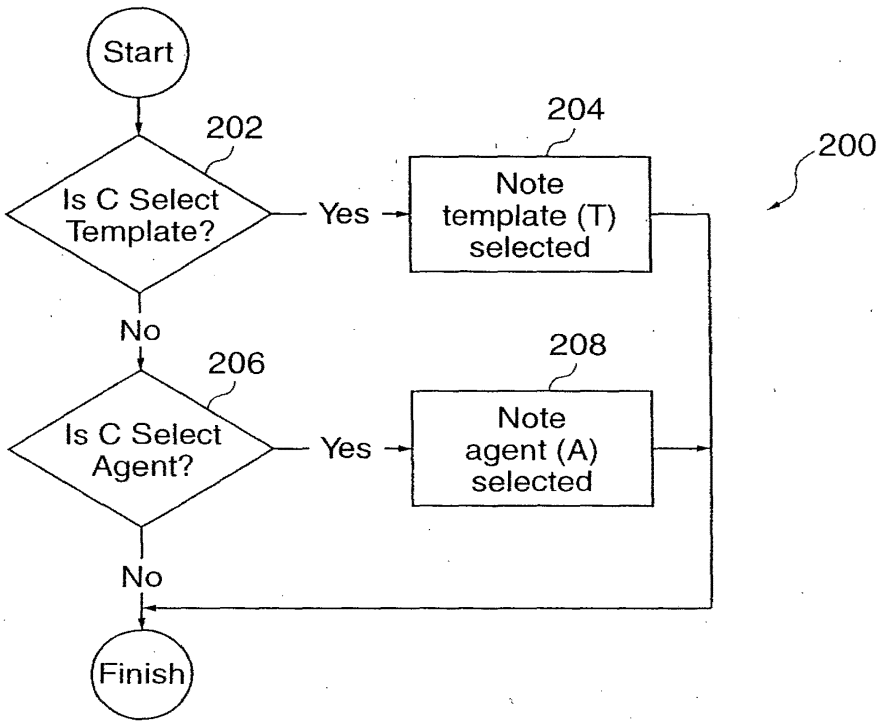


FIG. 10

09/25/2003, EAST Version: 1.03.0002

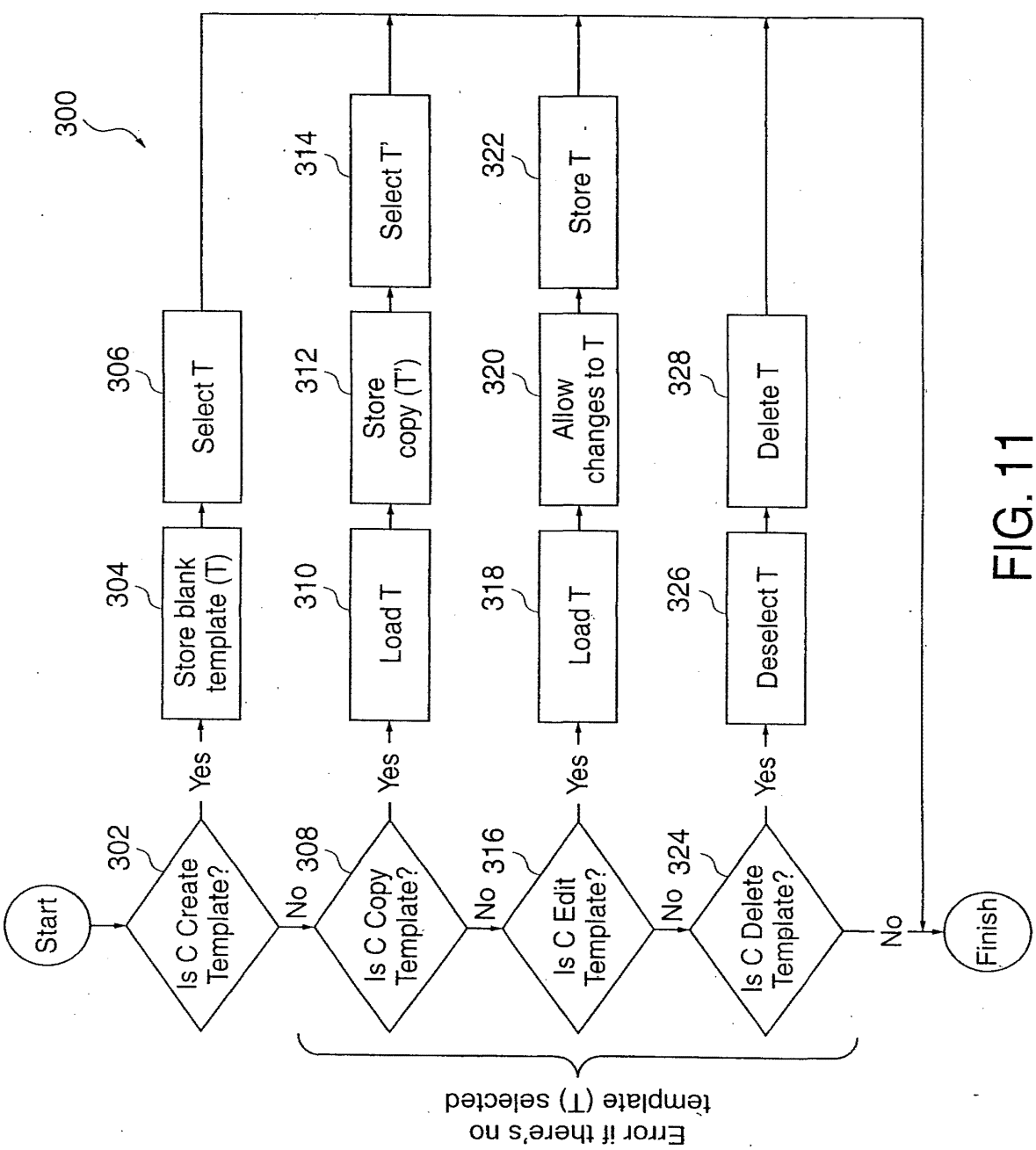


FIG. 11

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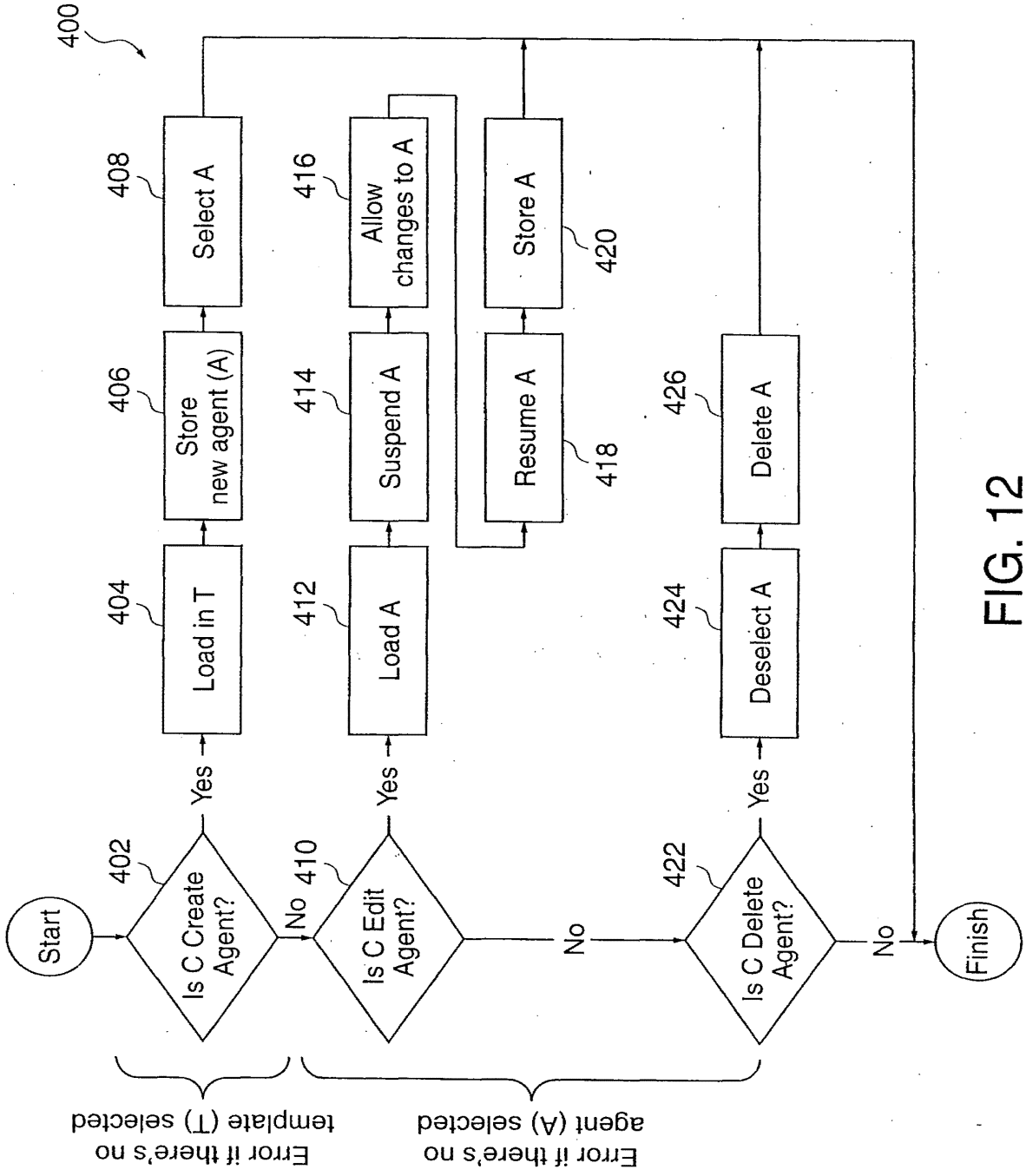

400
Start
Is C Create Agent?
402
Yes
No
Load in T
404
Store new agent (A)
406
Select A
408
Is C Edit Agent?
410
Yes
No
Load A
412
Suspend A
414
Allow changes to A
416
Resume A
418
Store A
420
Is C Delete Agent?
422
Yes
No
Deselect A
424
Delete A
426
Finish
Error if there's no template (T) selected
Error if there's no agent (A) selected

FIG. 12

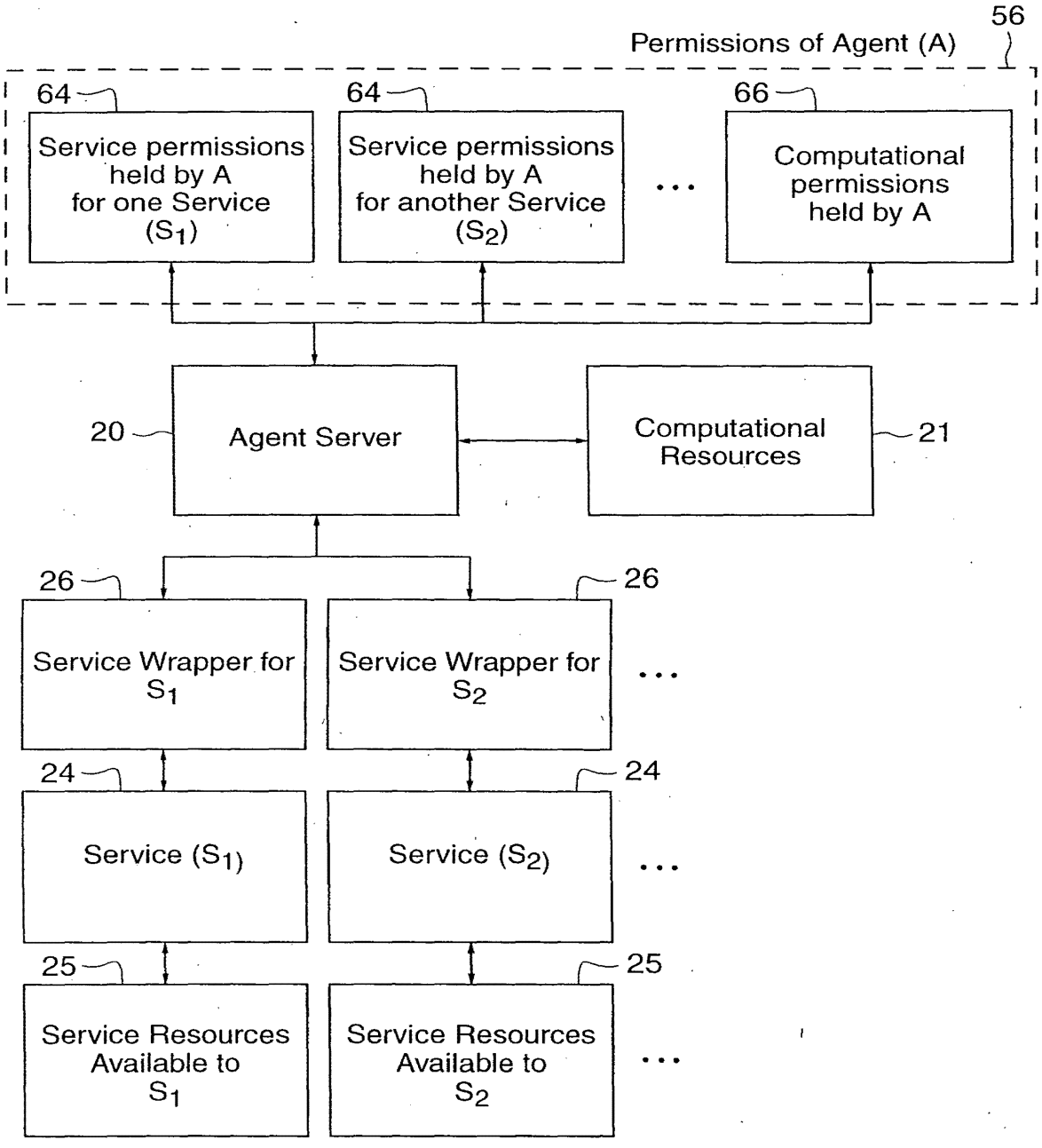

56
Permissions of Agent (A)
64
Service permissions held by A for one Service (S_1)
64
Service permissions held by A for another Service (S_2)
66
Computational permissions held by A
20
Agent Server
Computational Resources
21
26
Service Wrapper for S_1
26
Service Wrapper for S_2
24
Service (S_1)
24
Service (S_2)
25
Service Resources Available to S_1
25
Service Resources Available to S_2

FIG. 13

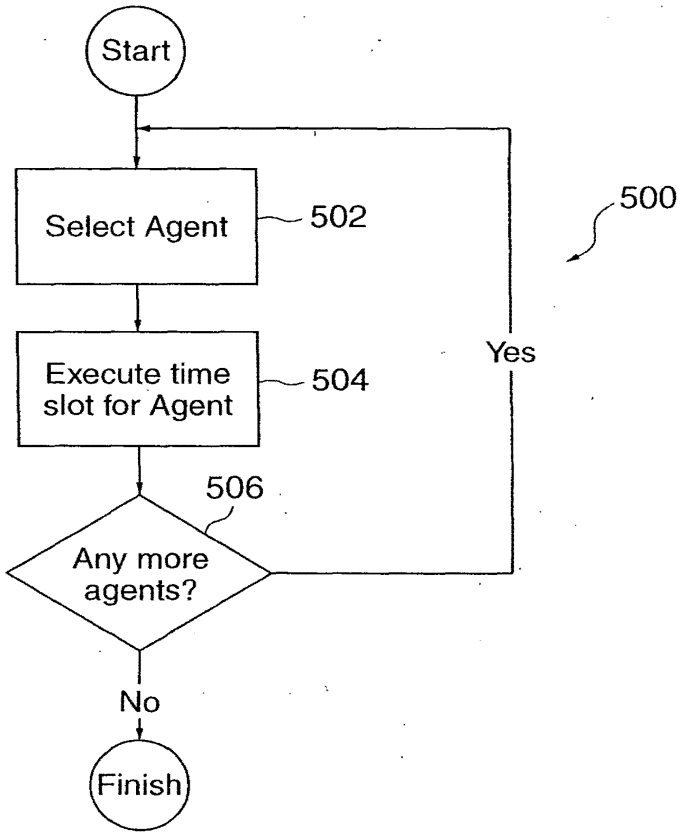


FIG. 14

09/14/2004 15:27 [ID]

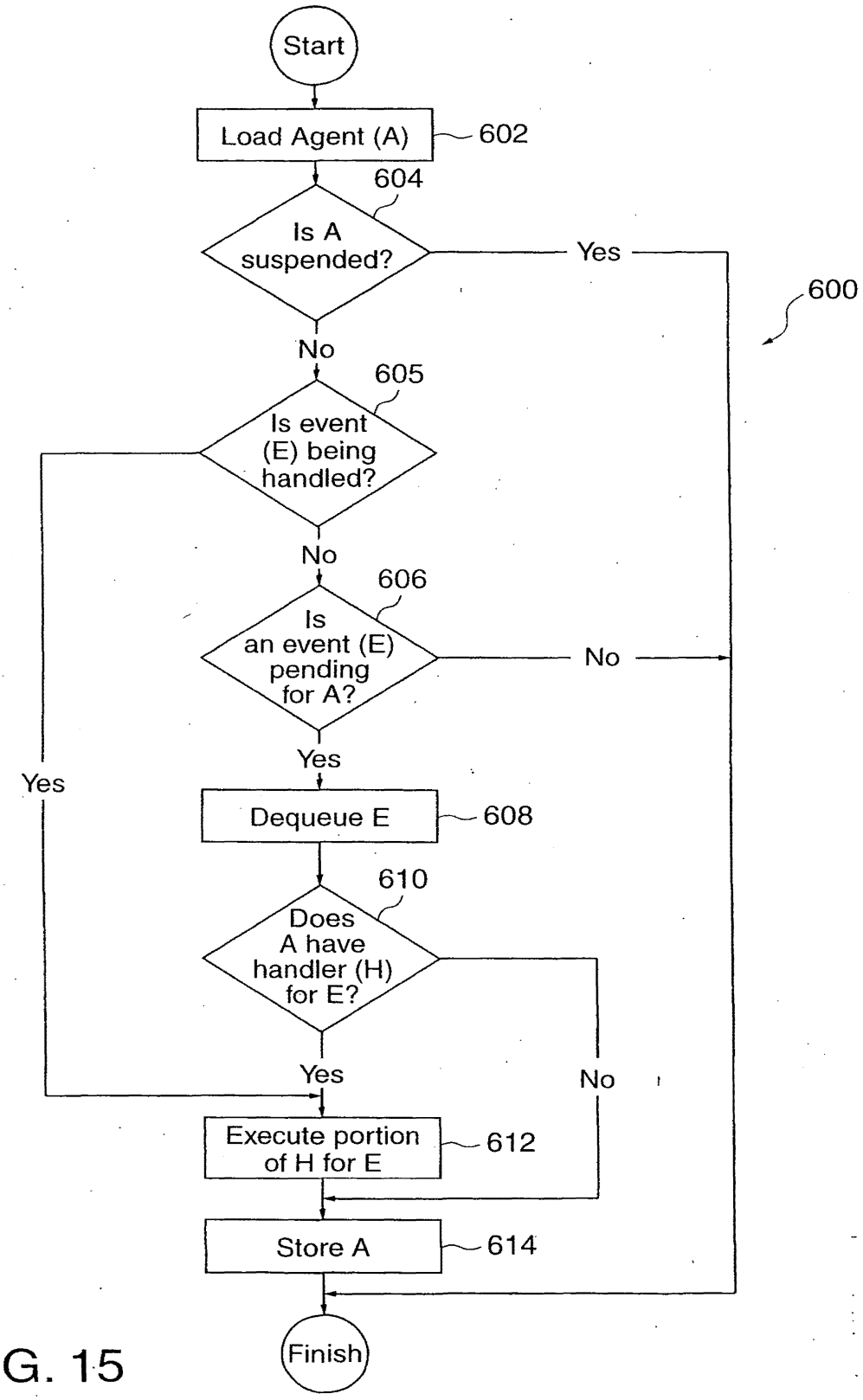


FIG. 15

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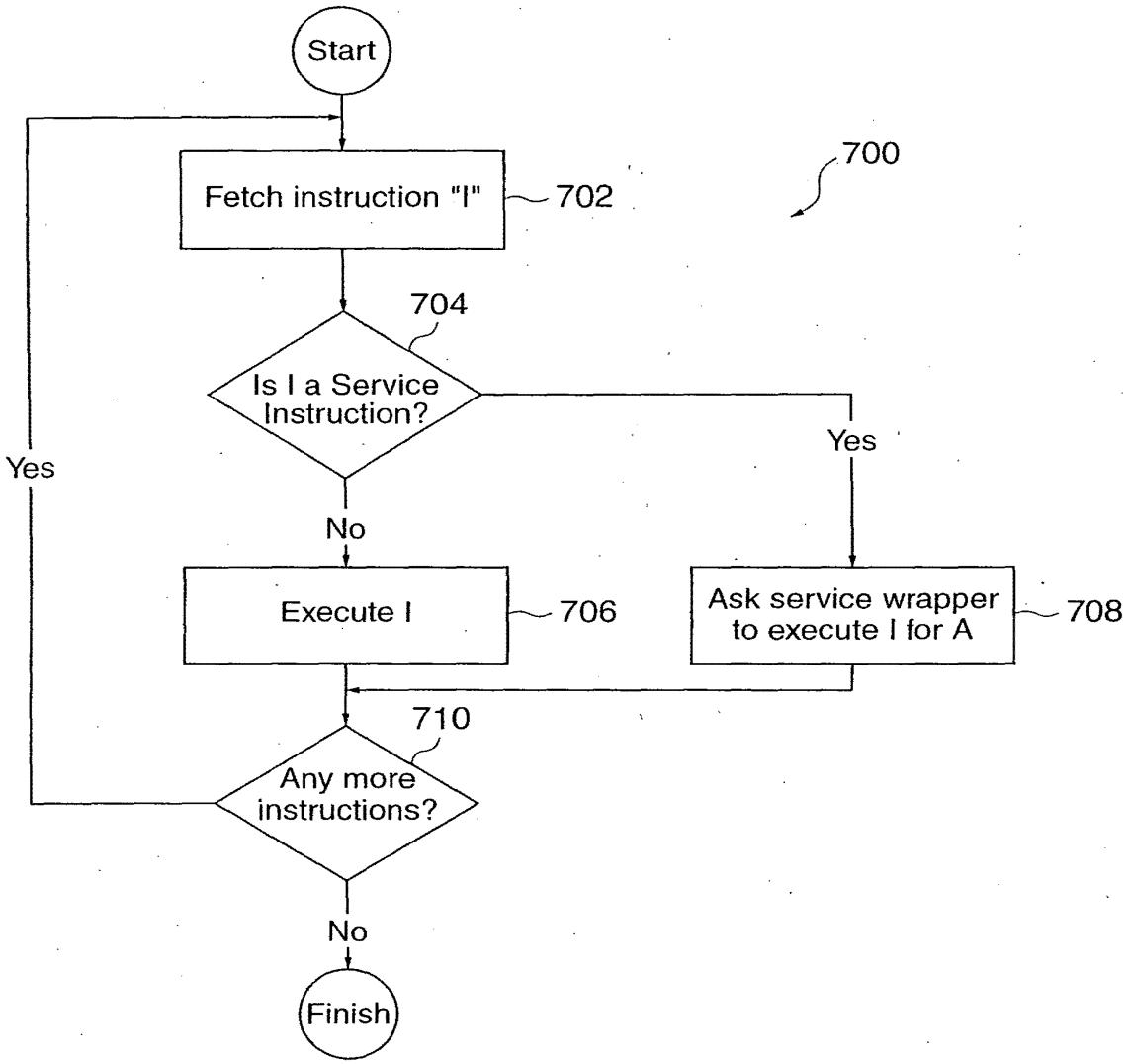


FIG. 16

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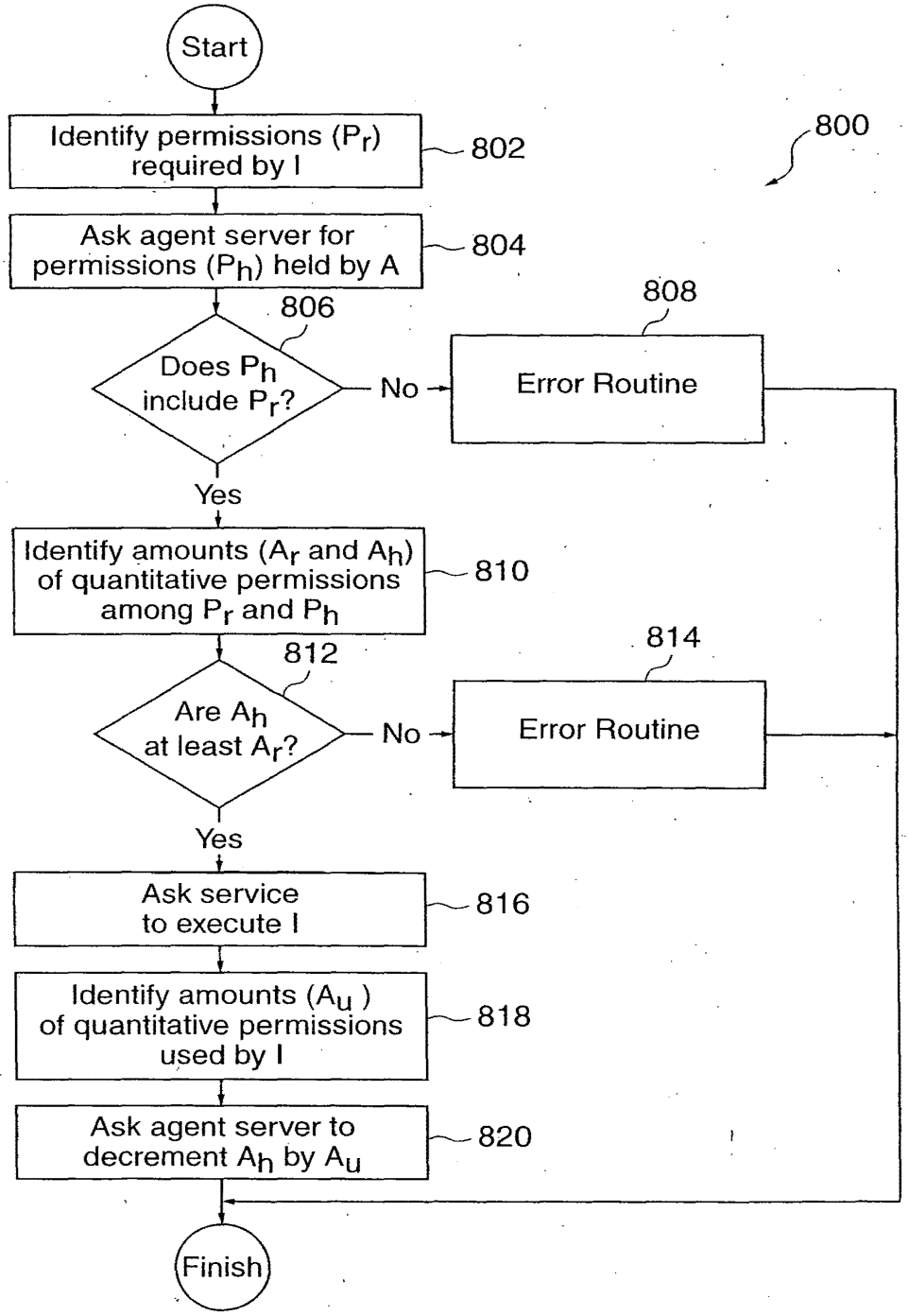


FIG. 17

09674125v1 - 21/05/2025

EXPRESS MAIL LABEL NO:
EL 707907 142US
EL 030 [redacted] 45 US
09/712,712

NETWORK SYSTEM EXTENSIBLE BY USERS

Danny Lange
Barbara Nelson
Jing Su
James E. White

Insal
DOCKET ALARM

TECHNICAL FIELD OF THE INVENTION

The present invention relates generally to the field of computer software systems and, more particularly, to a network system extensible by users.

CROSS-REFERENCE TO MICROFICHE APPENDICES

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Date: 12/22/98

CROSS-REFERENCE TO RELATED APPLICATIONS

This Application relates to the subject matter disclosed in the following United States Patent and co-pending United States Applications:

United States Patent No. 5,603,031 to White et al., entitled "System and Method For Distributed Computation Based Upon the Movement, Execution, and Interaction of Processes In a Network;"

United States Application Serial No. 08/609,699, filed March 1, 1996, entitled "Method and Apparatus For Telephonically Accessing and Navigating the Internet;"

United States Application Serial No. 08/798,675, filed February 10, 1997, entitled "System and Method For Distributed Computation Based Upon the Movement, Execution, and Interaction of Processes In a Network;" and

United States Application Serial No. 09/071,717, filed May 1, 1998, entitled "Voice User Interface With Personality."

The above patent and co-pending applications are assigned to the present Assignee and are incorporated herein by reference.

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0074114-021260

BACKGROUND OF THE INVENTION

Advances in computer and telephony systems have led to the development of numerous technology-driven services, such as electronic mail (e-mail), voice mail, electronic organizers (for appointments and addresses), on-line databases (e.g., for periodicals and stock quotes), and the like. An increasing popularity for these technological services in recent years has spawned an entire industry devoted to the provision and integration of the same. For example, numerous companies now offer e-mail service over the interconnection of computers widely known as the Internet. Other companies offer systems for voice mail services in both private branch exchange (PBX) and public telephone environments. Entities which offer, supply, or otherwise provide services are referred to as "service providers." Entities which purchase, consume, or otherwise use services are referred to as "subscribers."

Many technological services are supported by one or more software applications. These software

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applications are oft
of subscribers in mind.
technological services may ad
needs of many subscribers, but not
needs of any one particular subscriber
subscribers.

a broad spectrum
espective
eralized
lized
of

With previous techniques, when a subscriber desires to alter, change, modify, or otherwise customize a service to suit his or her own specialized needs, that subscriber must contact the appropriate service provider. If the service provider deems that there is sufficient demand for such customization, the provider will initiate a modification of the supporting software application for the relevant service. Software programmers or developers must then modify the existing software application to address the specialized needs of the requesting subscriber(s), and afterwards, test the modified software to ensure that it is functioning properly. Many iterations of modification and testing may be performed before the finished, customized service is available to the subscriber.

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In light of the above, it is clear that previous techniques are problematic for numerous reasons. For example, a service provider is required to maintain or otherwise employ a staff of human software developers for making modifications to supporting software applications. This can be expensive. Furthermore, a substantial amount of time may be required to develop, modify, and test supporting software applications in response to the request of a particular subscriber or group of subscribers. This can lead to subscriber dissatisfaction, and ultimately, defection to another service provider.

SUMMARY OF THE INVENTION

The disadvantages and problems associated with previous techniques for providing technological services have been substantially reduced or eliminated using the present invention.

The present invention provides a network system extensible (e.g., programmable) by "end-users," and a method of operation for the same. In general, an end-user (or simply "user") is any individual, party, or

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entity which somehow interacts with the network system. A user can thus be an entity known to the network system (i.e., an entity having a log-in ID), such as, for example, a subscriber and or an individual affiliated with the service provider. A user can also be an arbitrary third-party which somehow interacts with the network system.

With the present invention, users may extend or customize the network system according to their own particular needs. To accomplish this, a network system is augmented with an agent system. Capabilities of the network system are programmatically exposed by means of one or more services, service resources, and service wrappers. Each service individually, or the network system as a whole, can be extended by adding agents (created by users). Furthermore, the consumption of computational and service resources are monitored within the network system, thus protecting the subscribers and the service provider from harm or misuse, whether intentional or inadvertent. Accordingly, the network system can admit agents programmed by users.

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In addition, the present invention contemplates that a third party may modify existing agents and create new agents in the case where subscribers lack the desire or sophistication to do so themselves. The third party can then make such customized agents commercially available to subscribers.

According to an embodiment of the present invention, a network system includes a service. An agent uses the service on behalf of a principal. An agent server mediates the use of the service by the agent.

According to another embodiment of the present invention, a network system includes a user interface which allows a user to interact with the network system. An agent server is coupled to the user interface. The agent server manages agent use of the network system. Furthermore, the agent server in conjunction with the user interface is operable to create or modify an agent in response to interaction by the user.

According to yet another embodiment of the present invention, a method includes the following: admitting

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a user to a network system wherein at least one agent is operable to utilize a service to perform a task for the user; and allowing the user to create or modify the agent within the network system.

According to still another embodiment of the present invention, a network system includes an agent server which manages agent use of the network system. An agent is operable to utilize a service within the network system. A service wrapper, associated with the service, cooperates with the agent server to mediate interaction between the service and the agent.

According to yet another embodiment of the present invention, a method includes the following: allowing an agent to utilize a service; and mediating interaction between the service and the agent.

A technical advantage of the present invention includes providing a network system (and a method of operation therefor) which is programmable by users (including subscribers) according to their own particular needs. From the standpoint of subscribers, this facilitates the process of adding or deleting new services or extending existing services and, from the

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standpoint of a service provider, this is beneficial in that human software developers and testers can be reduced or eliminated altogether with the automated system of the present invention.

Other aspects and advantages of the present invention will become apparent from the following descriptions and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and for further features and advantages, reference is now made to the following description taken in conjunction with the accompanying drawings, in which:

Figure 1 illustrates a network system extensible by users, according to an embodiment of the present invention;

Figure 2 illustrates an exemplary computer-based system that can be used to implement the network system shown in Figure 1;

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Figure 3 illustrates details for a graphical user interface, according to an embodiment of the present invention;

Figure 4 illustrates details for a voice user interface, according to an embodiment of the present invention;

Figure 5 illustrates details for an agent server, according to an embodiment of the present invention;

Figure 6 illustrates details for a service wrapper, according to an embodiment of the present invention;

Figure 7 illustrates details for specific exemplary service wrappers, services, and service resources;

Figure 8 illustrates details for an exemplary agent object, according to an embodiment of the present invention;

Figure 9 is a flow diagram of an exemplary method for a user session, according to an embodiment of the present invention;

Figure 10 is a flow diagram of an exemplary method for executing a selection command for selecting an

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agent or an agent template, according to an embodiment of the present invention;

Figure 11 is a flow diagram of an exemplary method for executing an agent template command, according to an embodiment of the present invention;

Figure 12 is a flow diagram of an exemplary method for executing an agent command, according to an embodiment of the present invention;

Figure 13 is a block diagram detailing the controlled consumption of service and computational resources, according to an embodiment of the present invention;

Figure 14 is a flow diagram of an exemplary method for executing time slices for an agent population, according to an embodiment of the present invention;

Figure 15 is a flow diagram of an exemplary method for executing a time slice for an agent, according to an embodiment of the present invention;

Figure 16 is a flow diagram of an exemplary method for executing an event handler, according to an embodiment of the present invention; and

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Figure 17 is a flow diagram of an exemplary method for executing a service instruction, according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments of the present invention and their advantages are best understood by referring to Figures 1 through 17 of the drawings. Like numerals are used for like and corresponding parts of the various drawings.

Turning first to the nomenclature of the specification, the detailed description which follows is represented largely in terms of processes and symbolic representations of operations performed by conventional computer components, such as a central processing unit (CPU) or processor associated with a general purpose computer system, memory storage devices for the processor, and connected pixel-oriented display devices. These operations include the manipulation of data bits by the processor and the maintenance of these bits within data structures resident in one or more of the memory storage devices. Such data structures

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impose a physical organization upon the collection of data bits stored within computer memory and represent specific electrical or magnetic elements. These symbolic representations are the means used by those skilled in the art of computer programming and computer construction to most effectively convey teachings and discoveries to others skilled in the art.

For purposes of this discussion, a process, method, routine, or sub-routine is generally considered to be a sequence of computer-executed steps leading to a desired result. These steps generally require manipulations of physical quantities. Usually, although not necessarily, these quantities take the form of electrical, magnetic, or optical signals capable of being stored, transferred, combined, compared, or otherwise manipulated. It is conventional for those skilled in the art to refer to these signals as bits, values, elements, symbols, characters, text, terms, numbers, records, files, or the like. It should be kept in mind, however, that these and some other terms should be associated with appropriate physical quantities for computer operations, and that these

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terms are merely conventional labels applied to physical quantities that exist within and during operation of the computer.

It should also be understood that manipulations within the computer are often referred to in terms such as adding, comparing, moving, or the like, which are often associated with manual operations performed by a human operator. It must be understood that no involvement of the human operator may be necessary, or even desirable, in the present invention. The operations described herein are machine operations performed in conjunction with the human operator or user that interacts with the computer or computers.

In addition, it should be understood that the programs, processes, methods, and the like, described herein are but an exemplary implementation of the present invention and are not related, or limited, to any particular computer, apparatus, or computer language. Rather, various types of general purpose computing machines or devices may be used with programs constructed in accordance with the teachings described herein. Similarly, it may prove advantageous to

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construct a specialized apparatus to perform the method steps described herein by way of dedicated computer systems with hard-wired logic or programs stored in non-volatile memory, such as read-only memory (ROM).

Network System Overview

Referring now to the drawings, Figure 1 illustrates a network system 2 extensible by users, according to an embodiment of the present invention. To achieve this, network system 2 may incorporate an agent system comprising an agent server and one or more agents, as described below in more detail. An exemplary construction for an agent system is taught by United States Patent No. 5,603,031, issued to the Assignee of the present invention, the text of which is incorporated herein by reference.

It is contemplated that network system 2 may be maintained, managed, and/or operated by any provider of technological services, such as electronic mail (e-mail), voice mail, electronic organizer (for appointments and/or addresses), on-line data retrieval (for, e.g., periodicals and stock quotes), and the

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like. These services are offered and/or provided to one or more users who may be considered to be "subscribers." Each of the provider and the subscribers can be an individual, a business, a governmental department or agency, an academic institution, an organization, or the like, which provides or receives, respectively, any form of technological service.

The following primarily describes how network system 2 and its associated methods of operation can be used to provide information technology services over a telephony system. Furthermore, a model of a network system providing telephony services is discussed in detail in microfiche Appendix A, in accordance with one embodiment of the present invention. It should be understood, however, that the present invention is not so limited. That is, the teachings of the present invention generally encompass the provision of services by agents to one or more users in an environment which can be extended by the users, for example, by programming additional agents.

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Network system 2 includes a programmable functionality component 4 and a hard-wired functionality component 6. In general, programmable functionality component 4 and hard-wired functionality component 6 each functions to provide and/or support the provision of technological services. Hard-wired functionality component 6 is implemented substantially with a number of "hard-wired" elements, and thus, its functionality is modified or changed primarily by connecting or re-connecting the same or additional elements. Programmable functionality component 4 is implemented with an agent system and, as such, its functionality can be programmed (for example, by subscribers or third parties), as described below in more detail. Computer code for an exemplary agent system implementing a programmable functionality component 4 is provided in microfiche Appendix B, in accordance with an embodiment of the present invention.

Graphical User Interface

Network system 2 includes a graphical user interface (GUI) 12. Graphical user interface 12 may be

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implemented and/or supported by a web browser--i.e., a client application that resides on (or is downloaded to) an electronic user device, such as a desktop computer. Any of a variety of browsers are available, such as NETSCAPE NAVIGATOR, MICROSOFT INTERNET EXPLORER, and others. The web browser can be a forms-capable browser which is able to interpret Hyper Text Markup Language (HTML) code which provides forms including fill-in text boxes, option buttons, drop-down list boxes, radio buttons, and the like.

Graphical user interface 12 allows a user to interact with network system 2 via a communication line, which may be any type of communication link capable of supporting data transfer. For example, the communication line may include any combination of an Integrated Services Digital Network ("ISDN") communication line, a hard-wired line or a telephone line. This enables communication via the interconnection of computers popularly known as the "Internet," using any suitable protocol, such as, Transmission Control Protocol/Internet Protocol

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(TCP/IP), Internetwork Packet eXchange/Sequence Packet eXchange (IPX/SPX), or AppleTalk.

Graphical user interface 12--comprising a web browser and a web server--manages the connection between the user device and network system 2, supports the transfer of data therebetween, and interprets and displays the data. For example, graphical user interface 12 enables the downloading of one or more web pages (serving as graphical interfaces into network system 2) to the user device. The user device may include one or more suitable input devices, such as a keyboard, key pad, touch screen, input port, pointing device (e.g. mouse), and/or other device that can accept information, and one or more suitable output devices, such as a computer display, output port, speaker, or other device for conveying information including digital data, visual information, or audio information.

Graphical user interface 12 may comprise an agent area 14 which is dedicated to the activities of creating new agents and manipulating existing agents, as described herein. For example, in one embodiment, an "agent" icon is added to a screen menu; the

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interface screen which is accessed by "clicking" on the agent icon constitutes the agent area.

Voice User Interface

A voice user interface (VUI) 16 allows a user to interact with network system 2 via a telephone line, which can be an analog telephone line, a digital T1 line, a digital T3 line, or an OC3 telephony feed. In contrast to graphical user interface 12, voice user interface 16 does not require that a user have access to an electronic interface, such as a computer. Rather, voice user interface 16 interprets the vocalized expressions of a user so that the user may issue commands and other input into network system 2. Voice user interface 16 may also issue audible output in the form of speech that is understandable by a user. Such speech can be synthesized or previously recorded, as described below in more detail.

Voice user interface 16 may comprise speech recognition and speech synthesis software and/or hardware stored in or implemented as a suitable memory device and run on a suitable processor. Such speech

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recognition software allows network system 2 to recognize vocalized speech and may include grammar software that creates or selects a speech recognition grammar for determining which speech should be recognized. Commercially available speech recognition systems with recognition grammars are provided by ASR (Automatic Speech Recognition) technology vendors such as the following: Nuance Corporation of Menlo Park, CA; Dragon Systems of Newton, MA; IBM of Austin, TX; Kurzweil Applied Intelligence of Waltham, MA; Lernout Hauspie Speech Products of Burlington, MA; and PureSpeech, Inc. of Cambridge, MA. Recognition grammars are written specifying what sentences and phrases are to be recognized by the voice user interface 16. For example, a recognition grammar can be generated by a computer scientist or a computational linguist or a linguist. The speech synthesis software synthesizes human speech and may include speech markup software for determining the speech to be synthesized.

In addition to speech synthesis software and/or hardware, voice user interface 16 may include speech play-back capabilities for playing back previously

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recorded human speech. Exemplary play-back devices include a tape player, a laser disc player, etc. Here, an actual person (preferably an actor) recites various statements which may desirably be issued during an interactive session with a user of network system 2. The person's voice is recorded as the recitations are made. The recordings are separated into discrete messages, each message comprising one or more statements that would desirably be issued in a particular context (e.g., greeting, farewell, requesting instructions, receiving instructions, etc.). Afterwards, when a user interacts with network system 2, the recorded messages are played back to the user when the proper context arises. In one embodiment, such speech play-back capabilities can be used to implement a voice user interface with personality, as taught by United States Patent Application Serial No. 09/071,717, entitled "Voice User Interface With Personality," the text of which is incorporated herein by reference.

Voice user interface 16 may also comprise hardware and/or software supporting the interpretation and

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issuance of dual tone multiple frequency (DTMF) commands so that a user may alternatively interact with network system 2 using a telephone key pad.

Voice user interface 16 may comprise an agent area 18 which, like agent area 14 of graphical user interface 12, is dedicated to the activities of creating new agents and manipulating existing agents. In one embodiment, agent area 18 of voice user interface 16 can be implemented by translating the agent area 14 of graphical user interface 12 into voice.

Agent Server

Programmable functionality component 4 includes an agent server 20. Agent server 20 is in communication with graphical user interface 12 and voice user interface 16, and accordingly, may exchange (receive and transmit) information therewith. In general, agent server 20 controls, coordinates, and otherwise manages the overall operation of programmable functionality component 4. Among other things, agent server 20 may invoke, initiate, or execute various routines,

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processes, objects, and the like. For example, when a user wishes to interact with network system 2 via graphical user interface 12, agent server 20 may cause web pages to be downloaded to an electronic user device. As another example, agent server 20 may prompt voice user interface 16 to issue various statements at appropriate moments during an interactive session with a user via telephone. Additional functionality of agent server 20 includes, but is not limited to, executing agent objects, identifying computational and service permissions, and controlling the consumption of computational and service resources, as described below in more detail.

Agent server 20 is responsive to various commands which it may receive from a user, for example, via graphical user interface 12 or voice user interface 16. These commands can be of three types: agent commands, agent template commands, and selection commands for selecting agents and agent templates. Each of these types of commands is explained below in more detail. Agent server 20 executes these commands during its operation.

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Agents

A number of agents 22 are in communication with agent server 20. Each agent 22 is associated with a particular user (e.g., a subscriber or an individual affiliated with the service provider), which may be deemed to be the "principal" for the respective agent. Generally speaking, agents 22 can be considered to be personal software assistants with authority delegated by the respective principals. That is, each agent 22 may be implemented as a software application, program, or process which autonomously, and possibly continuously, runs on behalf of its principal. As such, an agent 22 may be viewed by its principal as an electronic extension thereof. A particular principal may employ a plurality of agents 22, each of which serves only that principal.

The software applications for implementing agents 22 may each comprise a text file or document in, for example, a format prescribed by eXtensible Markup Language (XML). XML is a subset of Standard Generalized Markup Language (SGML) and, like SGML, is a meta-language--i.e., a language for specifying markup

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languages. One such markup language is Agent Definition Format (ADF) developed by General Magic, Inc. Various specifications for ADF are discussed in detail in microfiche Appendix C, in accordance with an embodiment of the present invention. A markup language such as ADF uses tags to provide programming language constructs to text. These tags, which may comprise instructions enclosed in angled brackets, are inserted before and after the text affected. Agent server 20 can interpret the tags and text of an ADF document to cause a respective agent 22 to act. Exemplary code for a number of agents 22 is provided in microfiche Appendix D, in accordance with an embodiment of the present invention.

Agents 22 are task-based. That is, each agent 22 is responsible for performing a particular task or set of tasks on behalf of the respective principal. These tasks may include, for example, answering telephone calls, taking voice mail messages, placing telephone calls, notifying the user of recently received messages (voice mail and/or e-mail), delivering messages, setting up meetings/appointments, gathering

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information, negotiating deals, transacting electronic commerce, etc.

Agents 22 can be "standard" or "customized." A standard agent is one which may be written and/or set-up by the service provider. In general, standard agents perform tasks that many users (e.g., subscribers) each would desirably have performed on his or her behalf. Such tasks may include organizing meetings and delivering messages. A separate copy of a standard agent may be engaged or selected by each user who wishes to have the respective tasks performed. Thus, many standard agents, each performing the same sort of tasks but for different users, may exist in network system 2.

In contrast, a customized agent is one which is written and/or set up by a particular subscriber or group of subscribers to perform certain tasks which are unique to that subscriber or group. For example, a particular subscriber or group may work in the real estate industry and thus desire to have certain tasks related to real estate transactions performed for him/her or them. In this case, such subscriber or

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group of subscribers may customize or create one or more agents that address the specialized needs of the subscriber or group. Furthermore, a third party may customize or create agents for subscribers or groups which are unable, unwilling, or lack the sophistication to do so for themselves. Such agents customized by a third party can be made commercially available to subscribers and other users. Accordingly, network system 2 is extensible in the sense that subscribers and/or third parties may program customized agents 22 according to particular needs.

The customization of agents 22 can be accomplished using an electronic user device (e.g., desktop computer) communicating with network system 2 via graphical user interface 12. In one embodiment, the service provider may maintain a website which users can access for customizing agents 22.

While performing the respective tasks, agents 22 may use or consume various computational resources 21 (e.g., memory storage space, processing time, and the like). Furthermore, agents 22 may also use or consume various service resources (described below in more

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detail) during the performance of their respective tasks. The consumption of computational and service resources by various agents 22 can be monitored, and the respective principals charged for the same.

In one embodiment, each agent 22 is given permission to consume up to a pre-authorized amount of each computational resource and each service resource that the agent may use when performing its respective task(s). For each computational resource, the relevant permission constitutes a "computational permission." For each service resource, the relevant permission constitutes a "service permission." With respect to a particular agent 22, the computational and service permissions ensure that other agents 22 (acting on behalf of the same or other principals/users) have adequate computational and service resources, even in the case of a maliciously or incorrectly programmed customized agent.

Alternatively, a computational or a service permission may be associated with a particular principal and specifies a predetermined amount of a respective resource which is allowed to be consumed on

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behalf of that principal. That is, multiple agents 22 having the same principal may each use the same resource. By authorizing a predetermined amount of resource for the principal, the associated agents 22 are given a "pool" of that resource from which to draw.

In one embodiment, each agent 22 may direct its own movement (i.e., transportation) through a computer-based system (Figure 2) by executing an instruction which identifies a destination computer within the computer-based system and directs that the particular agent 22 be transported there. While executing within the destination computer, the agent may have access to information which is not available elsewhere in the computer-based system. The particular agent can access and use that information to determine another destination computer to which the agent should travel.

Agents 22 are created from agent templates. An agent template can be a "blueprint" for one or more agents 22. In object-oriented terminology, each agent 22 is an object and each template is an agent class from which agents 22 can be created by instantiating the class/template. In one embodiment, an agent

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template is essentially an agent object in its initial state. After the agent has been created, it may be executed. During execution, the agent object begins to receive events, handle these events, and so change its state.

In accordance with an embodiment of the present invention, network system 2 allows users (e.g., subscribers) to create, copy, modify, edit, or delete agents 22 and the associated templates as desired, thereby affording extensibility.

Services

A number of services 24 may each comprise one or more software applications providing various capabilities that are available to a principal. Each service 24 may be utilized by one or more agents 22 in order to perform their respective tasks. For example, one service 24 may support call processing, including a voice mail system. With this service 24, an agent 22 may place an outgoing telephone call for its principal, answer an incoming telephone call for the principal, and record a voice message from a caller. Another

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exemplary service 24 may support an electronic mail (e-mail) system. With an e-mail service, an agent 22 may collect, forward, and store e-mail messages addressed to the respective principal, generate e-mail messages for the principal, and notify the principal when new e-mail messages have been received. Yet another exemplary service 24 may support an electronic appointment book. With this service, an agent 22 can plan a schedule, check conflicts therewith, and organize various meetings, interviews, etc. for its respective principal. Still another exemplary service 24 can support an electronic address book which maintains information about one or more contacts with whom a principal may interact. The information maintained for each of these contacts may include the contact's name, title, employer, business address, home address, e-mail address, work phone number, home phone number, and the like. Still yet another service 24 can support on-line data retrieval for various information. With this service, an agent 22 can retrieve electronic copies of periodicals (e.g., newspapers, magazines, etc.) and the latest quotes for stocks, bonds, mutual

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funds, etc. In order to use a particular service 24, an agent 22 must first be authorized to do so. This authority may be given by the service provider and/or the respective principal.

In one embodiment, a plurality of services 24 may be used by a particular agent 22 which acts as a "virtual assistant" for its respective principal. This virtual assistant may, for example, answer an incoming telephone call, identify the caller, schedule a meeting between the caller and the principal, and generate an e-mail message notifying the principal of such meeting. Additional services 24 can be used (by this agent 22) by extending or customizing the agent, as described herein.

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Service Resources

One or more service resources 25 can support each service 24. In one embodiment, at least a portion of service resources 25 can be integral to the respective services 24. In general, a service resource 25 is a resource which enables a service to be performed. For example, for a call processing service, service

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resources 25 may include a telephone, an answering machine, a telephone line, a local telephone provider service, a long-distance telephone provider service, etc. As another example, for an on-line data retrieval service, service resources 25 may include a telephony connection, a modem for on-line communication, an on-line database provider service, etc. As yet another example, for an e-mail service, service resources 25 may include an Internet connection and disk space for storing e-mail messages.

At least some of service resources 25 may comprise discrete units which are "consumed" during utilization of the respective resource by an agent 22. For example, a service resource 25 related to telephony services (e.g., voice mail and call placement) may comprise units of long-distance calling time which are consumed as an agent 22 places one or more calls utilizing such services 24. Likewise, a service resource 25 related to on-line data retrieval may comprise units of data-access time or inquiry which are consumed as an agent retrieves data (e.g., stock

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quotes, newspaper articles, etc.) utilizing the respective service 24.

Service Wrappers

A number of service wrappers 26 link services 24 and respective service resources 25 to agent server 20. In the depicted embodiment, a separate service wrapper 26 is provided for each service 24. Each service wrapper 26 can mediate the interaction between a service 24 (and its respective resources 25) and the remainder of programmable functionality component 4. In one embodiment, at least a portion of service wrappers 26 can be integral to the respective services 24 and/or service resources 25. Service wrappers 26, in conjunction with agent server 20, may act as "gatekeepers" to the respective services 24. That is, a service wrapper 26 grants access, to a respective service 24, only to agents 22 which have been authorized to utilize such service. For example, a voice message held by a service 24 supporting voice mail is accessible only by an agent 22 which has authority from the user for whom the message was left.

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Similarly, for a service 24 supporting call answering, the respective service wrapper 26 only allows agents 22 having authority from a particular user to answer telephone calls placed to a number associated with such a user.

Service wrappers 26 enable communication between services 24 and agent server 20, for example, by converting between a computer language (or instruction set) used within agent server 20 and the computer language (or instruction set) of the respective service 24. For this purpose, in one embodiment, each service wrapper 26 may be implemented, at least in part, with an application programming interface (API). An API allows access to the respective service 24, thereby pragmatically exposing the capabilities of the service 24 to one or more agents 22. That is, each service wrapper 26 lets any agent (having the proper authorization) use the respective service 24. A service wrapper 26 may also allow agent server 20 to replace one service 24 with another service 24 of the same type, but located on a different computer, without any interruption to principals. This operation of a

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service wrapper 26 is hidden or invisible to users, and thus, service wrappers 26 provide a point of abstraction between the respective service 24 and agent server 20.

Furthermore, at least some of service wrappers 26 may monitor the amount of service resources 25 expended or otherwise consumed by one or more authorized agents 22 when utilizing the respective service 24. For example, a service wrapper 26 may identify the respective service resource 25 to agent server 20, allow agent server 20 to impose a predetermined limit on each authorized agent's use of such service resource 25 (i.e., allocate a predetermined amount of service resource 25 for each agent), and debit/credit the amount consumed from the predetermined amount previously allocated for the agent 22. Thus, each service wrapper 26, in conjunction with agent server 20, controls an agent's consumption of service resources 25, thereby ensuring that an agent 22 does not use more than a predetermined amount of resource when performing its respective task or tasks. In this way, service wrappers 26 protect against the over-

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consumption, whether intentional or inadvertent, of the respective service resources 25. A service wrapper 26 thus serves to ensure that sufficient units of a service resource 25 are available for each agent 22 authorized to utilize the respective service 24. In addition, a service wrapper 26 may maintain a record of the amount of service resource 25 consumed by various agents 22 so that the appropriate users/principals can be billed accordingly.

Operational Overview

In operation, one or more agents 22 may be set up for each user who is a subscriber to the services offered by the operator/provider of network system 2. These agents 22 can be standard (i.e., set up by the service provider) or customized (i.e., set up by the respective user). Each agent for a particular user performs one or more tasks on behalf of that user. These tasks may include answering calls, taking voice mail messages, placing calls, notifying the user of recently received e-mail, setting up appointments, negotiating deals, transacting electronic commerce,

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etc. To perform these tasks, each agent 22 utilizes one or more services 24, during which it may consume various respective service resources 25. Access to each service 24 is granted by the respective service wrapper 26, which may also monitor the amount of each respective service resource 25 consumed to ensure that no particular agent 22 uses more than an amount authorized for that agent when performing its specific task(s). This protects both the authorizing user/subscriber and the service provider against undue consumption of service resources 25. Via a suitable interface (e.g., graphical user interface 12 or voice user interface 16), a user may direct, command, instruct, or otherwise communicate with each of his or her respective agents 22. At any time, a user can extend the services provided thereto by customizing existing agents 22, or alternatively, employing (and possibly customizing additional) agents 22.

In this manner, the present invention enables subscribers of a network service provided by network system 2 to create and employ personal agents 22

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utilizing services 24 in a manner that is safe and secure for the subscribers and the service provider.

Computer-Based System Implementation

Figure 2 is a simplified diagram of an exemplary computer-based system 30 that can be used to implement network system 2 shown in Figure 1. Referring to the embodiment shown in Figure 2, computer-based system 30 can include a communications hub 1000 and a firewall 1002 which support an interface between computer-based system 30 and the Internet. Collectively, communications hub 1000 and firewall 1002 provide communication, protection, and security between the remainder of computer-based system 30 and the Internet. Hub 1000 and firewall 1002 allow users to interact with computer-based system 30 using an electronic user device, which may support a graphical user interface 12 (Figure 1).

A switch 1004 enables communication with computer-based system 30 via a telephone instrument. Switch 1004 allows users to interact with computer-based system 30, for example, via a voice user interface 16

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(Figure 1). A call detail records data base 1005 is coupled to switch 1004. This data base 1005 stores information relating to calls received by or initiated out of computer-based system 30. For each call, such call-related information may specify calling party, called party, telephone number of outside party, date of call, time of call, duration of call, cost of call, and the like.

A plurality of fast Ethernet hubs 1006 are coupled to firewall 1002 and switch 1004. Fast Ethernet hubs 1006 support a local area network (LAN) for computer-based system 30 and enable the routing of information signals therein. These Ethernet hubs 1006 may implement the Fast Ethernet technique in which information is transferred at a rate of 100 Mbps.

One or more application server clusters 1008 are coupled to fast Ethernet hubs 1006. Each application server cluster 1008 may comprise a plurality of servers which provide processing capability to support various functions, such as, for example, speech recognition, speech synthesis, pronunciation generation, speech

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playback, etc. As such, application server clusters 1008 may support a voice user interface 16 (Figure 1).

A number of sub-systems 1010, 1012, 1014, 1016, 1018, 1020, 1022 are also coupled to fast Ethernet hubs 1006. Each of these sub-systems may comprise one or more servers, data storage devices, and other hardware components. The servers provide processing capability, and the data storage devices provide data storage capability.

At least a portion of the sub-systems in computer-based system 30 may support one or more services 24, and the respective service wrappers 26 and service resources 25 (Figure 1). For example, as shown in Figure 2, sub-systems 1010, 1012, 1014, 1016, and 1018 support an e-mail service, a voice mail service, a paging/facsimile service, an address book and calendar service, and a business news and stocks information service, respectively.

The remaining sub-systems support other operational aspects of computer-based system 30. In particular, as shown, sub-system 1020 maintains profiles for one or more subscribers to a network

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system 2. For each subscriber, a profile may include the name of the subscriber, the home address of the subscriber, the billing address of the subscriber, an e-mail address, a telephone number, a listing of all agents operating for the subscriber, the computational and service permissions granted to the subscriber's agents, and the like. Sub-system 1022 maintains various rules for the operation of network system 2. For example, such rules may govern how network system 2 processes incoming e-mail messages for particular subscribers (e.g., a subscriber may be paged upon the delivery of messages satisfying certain criteria).

Each of the servers within application server clusters 1008 and sub-systems 1010-1022 can be implemented using any of a number of server hardware configurations running a suitable server operating system, such as SUN SOLARIS, WINDOWS NT, OS/2 WARP, and NETWARE. Each data storage device within application server clusters 1008 and sub-systems 1010-1022 can be a mass storage subsystem of tapes or disk drives, which is electronically coupled to the respective servers. Information or data supporting each of graphical user

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interface 12, voice user interface 16, agent server 20, agents 22, services 24, service resources 25, and service wrappers 26 (shown in Figure 1) can be contained in the data storage devices. The servers may retrieve, process, and store this information into the data storage devices.

In one embodiment, as shown, application server clusters 1008 and sub-systems 1010-1022 are linked by the same LAN. In another embodiment, at least a portion of application server clusters 1008 and/or sub-systems 1010-1022 can be remote from the remainder and linked as a wide area network (WAN); consequently, computer-based system 30 may provide a distributed network.

Any one or a combination of interested parties (e.g., subscribers, third parties, or service providers) can use computer-based system 30 to collect, maintain, generate, or process the information supporting graphical user interface 12, voice user interface 16, agent server 20, computational resources 21, agents 22, services 24, service resources 25, and service wrappers 26. Any of the servers or other

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computers in application server clusters 1008 and sub-systems 1010-1022, either individually or in combination, can perform the functionality of agent server 20 shown in Figure 1. Furthermore, because these servers and other computers are linked together, each can directly access (e.g., store and retrieve) any of the information described above, if necessary.

In one embodiment, agents 22 may travel throughout the environment of computer-based system 30. That is, each agent 22 may move to the servers and other computers in application server clusters 1008 and sub-systems 1010-1022, and afterward, execute thereon. As an agent 22 moves and executes, it may perform its respective tasks on behalf of its principal.

The elements of computer-based system 30, and the functions provided thereby, constitute computational resources 21 which may be expended, consumed, or used during the operation of network system 2 (Figure 1). In one embodiment, the consumption of these computational resources 21 by different agents 22 is monitored so that no particular agent 22 utilizes more

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than a proportionate, predetermined, or allotted share thereof, as such agent executes.

Graphical User Interface (Details)

Figure 3 illustrates details for a graphical user interface 12, according to an embodiment of the present invention. As depicted, graphical user interface 12 comprises a web browser 64 and a web server 66 which are connected via a line 68 supporting Internet communication.

Web browser 64 is a client application that may reside on (or is downloaded to) a client device such as a desktop computer. Such desktop computer preferably has at least a "486" processor or an operational equivalent and runs a suitable desktop operating system, such as, for example, MS-DOS, MacINTOSH OS, WINDOWS NT, WINDOWS 95, OS/2, UNIX, XENIX, GEOS, or MAGIC CAP.

Web server 66 is a server application that resides on a service provider device, such as a server. Such server can be any of the servers in application server clusters 1008 or sub-systems 1010-1022 of computer-

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based system 30 shown in Figure 2. Web server 66 may support a number of web pages 70 which can be downloaded from web server 66 to web browser 64 as appropriate during operation. At least one of these web pages 70 may constitute an agent area 14 which is dedicated to the activities of creating new agents and manipulating existing agents.

Communication line 68 can be any link capable of supporting data transfer between a client device and a service provider device. For example, communication line 68 may include any combination of an Integrated Services Digital Network ("ISDN") communication line, a hard-wired line, or a telephone line. This enables communication via the Internet, using any suitable protocol, such as, Transmission Control Protocol/Internet Protocol (TCP/IP), Internetwork Packet eXchange/Sequence Packet eXchange (IPX/SPX), or AppleTalk.

Voice User Interface (Details)

Figure 4 illustrates details for a voice user interface 16, according to an embodiment of the present

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invention. As shown, voice user interface 16 comprises a telephone instrument 72 coupled to a telephone server 74 via a telephone line 76.

Telephone instrument 72 is a user (e.g., subscriber) device which may comprise a conventional telephone. Telephone instrument 72 may include a key pad for entering dual tone multiple frequency (DTMF) commands.

Telephone server 74 is a service provider device. Such device may comprise any of the servers in application server clusters 1008 or sub-systems 1010-1022 of computer-based system 30 shown in Figure 2. Telephone server 74 may support a number of grammars, prompts, and other speech functionalities 78 for enabling communication with a user. At least one of these speech functionalities 78 may constitute an agent area 18 which is dedicated to the activities of creating new agents and manipulating existing agents 22.

Telephone line 76 can be an analog telephone line, a digital T1 line, a digital T3 line, or an OC3 telephony feed.

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Agent Server (Details)

Figure 5 illustrates details for agent server 20, in accordance with a preferred embodiment. Agent server 20 generally functions to control, coordinate, and otherwise manage the overall operation of programmable functionality component 4. This includes the use of network system 2 by agents 22. As depicted, agent server 20 includes an engine 42, a scheduler 44, and one or more agent objects 46.

Scheduler 44 maintains an internal clock, which can keep track of real time or elapsed time. In one embodiment, scheduler 44 may be supported with a piezo-electric crystal or oscillating circuit implemented with transistors. Scheduler 44 generally functions to trigger the further execution of particular agents 22 by engine 42 upon the occurrence of certain events. Such events may include the lapse of a predetermined amount of time (e.g., 24 hours) or the occurrence of a specified time (e.g., 6:00 a.m.). Scheduler 44 may maintain a record or schedule with a separate entry for each triggering event. Scheduler 44 may also receive

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information from engine 42. This received information may be used to create new entries within scheduler 44.

Agent objects 46 each correspond to a particular agent 22 of network system 2 (Figure 1). Each agent object 46 can be an internal representation within agent server 20 for the corresponding agent 22. Agent objects 46 comprise software objects, each of which, in general, has (i) an internal state defined by a number of properties, (ii) an internal behavior defined by a number of methods, and (iii) an external behavior defined by a number of features.

More simply, each agent object 46 is an organization of data and instructions which are executable within agent server 20. In one embodiment, the data represents a "state" of the agent object and the instructions are grouped into tasks that are to be performed. The data may specify the corresponding agent 22, the services 24 which may be utilized by the agent, and the computational and service permissions which have been granted to the agent 22. The instructions may comprise one or more event handlers which direct the corresponding agent 22 upon the

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occurrence of predefined events. Each agent object 46 may also comprise a pending event queue which queues events to which the agent 22 should, but has not yet, responded.

Engine 42 is in communication with scheduler 44 and agent objects 46. In addition, engine 42 is in bi-directional communication with graphical user interface 12, voice user interface 16, and service wrappers 26. Engine 42 generally controls and/or manages the operation of agent server 20. Engine 42 may be implemented as a computer process, executing within a computer system, which invokes or manages other processes or routines, and executes instructions. For example, engine 42 can execute each agent object 46 which, in turn, may provide instructions to engine 42. Engine 42 may function to identify each of the computational permissions and service permissions specified within an agent object 46 and to control the consumption, by the corresponding agent 22, of the relevant computational resources 21 and service resources 25. Also, engine 42 may invoke routines in each of interfaces 12 and 16 and service wrappers 26.

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Furthermore, engine 42 may receive and be responsive to information from the same.

In one embodiment, scheduler 44 may be considered to "create" pending events to which engine 42 responds by executing an agent's handler for such event. This is described below in more detail.

In an exemplary operation for agent server 20, one agent object 46 may correspond to an agent 22 which is responsible for waking up its principal at a certain time each weekday morning. This time constitutes an event for which scheduler 44 may contain an entry. Each weekday, at the appointed time or shortly before, scheduler 44 invokes engine 42. In response engine 42 executes the particular agent object 46. When this agent object 46 is executed, the corresponding agent 22 (using the appropriate services 24) performs the task of waking up the principal, for example, by calling the principal over a telephone or, alternatively, generating an audible alarm on an electronic user device (e.g., a desktop computer).

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Service Wrapper (Details)

Figure 6 illustrates details for a service wrapper 26, in accordance with a preferred embodiment. A service wrapper 26 generally functions to mediate the interaction between a respective service 24 and the remainder of programmable functionality component 4. In one embodiment, service wrapper 26 is associated with, and supports, only a single service 24. As shown, service wrapper 26 comprises a converter 48 and a monitor 50.

Converter 48 generally functions to convert between a computer language (or instruction set) used within agent server 20 and a computer language (or instruction set) used within the respective service 24. In one embodiment, the computer language of agent server 20 can be a high-level language, whereas the computer language of service 24 may be a low-level language. An agent 22 may comprise instructions of the set used in agent server 20; a service 24 may comprise or issue instructions of the set used therein.

As depicted, converter 48 comprises an agent-server-to-service converter 52 and a service-to-agent-

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server converter 54. Agent-server-to-service converter 52 operates unidirectionally to convert from the language (e.g., a high-level language) used by agent server 20 to the language (e.g., a low-level language) used by the corresponding service 24. Service-to-agent-server converter 54 also operates unidirectionally, but in contrast to converter 52, converts from the language (e.g., low-level language) used by service 24 into the language (e.g., high-level language) used by agent server 20.

Monitor 50 is coupled by bi-directional lines to each of agent server 20 and the respective service 24. Monitor 50 generally functions to monitor the amount of respective service resources 25 expended, used, or otherwise consumed by one or more agents 22 which have been authorized to access the service 24. Monitor 50 identifies respective service resources 25 to agent server 20, allows agent server 20 to impose a predetermined limit on each authorized agent's use of the respective service resources 25, and informs agent server 20 of the amount consumed against the predetermined limit. The predetermined limit may be

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derived from a service permission for the respective agent 22.

Exemplary Service Wrappers, Services, and Service Resources (Details)

Figure 7 illustrates details for specific exemplary services, and their respective service wrappers and service resources. In particular, these services include a web server service 81, a web browser service 86, and a call processing service 91. Each of exemplary services 81, 86, and 91 constitutes a user interface service; that is, these services 81, 86, and 91 each provides a user interface by which an agent 22 can interact with a subscriber or third party. In Figure 7, the services and respective service resources have been combined because, with these examples, the services and resources are not logically distinct.

Web server service 81 provides a web server from network system 2 (Figure 1) and can be used, for example, to notify a user about recently received e-mail messages. Web server service 81 (and its respective service resources) resides in network system

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2 and includes one or more web pages 84. A web server service wrapper 80 controls access from the remainder of programmable functionality component 4 into web server service 81 and its associated service resources. A web browser 82 is connected to web server service 81 via an Internet line 83. Web browser 82 may reside in a client device. Web pages 84 can be downloaded from web server service 81 to web browser 82. Collectively, web server service 81, web pages 84, web browser 82, and Internet line 83 can implement a graphical user interface with which an agent 22 can interact with its principal or another party.

Web browser service 86 provides a web browser from network system 2 and can be used, for example, for on-line data access to stock quotes, news, etc. Web browser service 86 and its respective service resources are resident on network system 2. A web browser service wrapper 85 provides access from the remainder of programmable functionality component 4 into web browser service 86 and its service resources. A web server 87 is connected to web browser service 86 via an Internet line 88. Web server 87 resides in a website

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server device and may comprise one or more web pages 89 which can be downloaded to web browser service 86. Collectively, web browser service 86, web server 87, web pages 89, and Internet line 88 can implement a graphical user interface with which an agent 22 can interact with an arbitrary website on behalf of its principal.

Call processing service 91 provides call processing from network system 2 and can be used, for example, to take voice mail messages for one or more subscribers. Call processing service 91 and its respective service resources reside in network system 2. Call processing service 91 may include grammars, prompts, and other speech functionality 94. A call processing service wrapper 90 controls access from the remainder of programmable functionality component 4 to call processing service 91 and its service resources. A telephone instrument 92, which resides outside of network system 2, is connected to call processing service 91 via a telephone line 93. Collectively, call processing service 91, speech functionality 94, telephone instrument 92, and telephone line 93 can

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implement a voice user interface with which an agent 22 can interact with its principal or another party, for example, by placing a call to, or answering a call from, the principal or other party.

Agent Object (Details)

Figure 8 illustrates details for an agent object 46, in accordance with an exemplary embodiment. An agent object 46 generally represents (within agent server 20) a corresponding agent 22, which can be considered to be a personal software assistant to a particular principal. Agent object 46 can be a software object and may reside within agent server 20. As depicted, agent object 46 comprises a permissions component 56, an event handlers component 58, a datastore component 60 and a pending event queue component 62. In other embodiments, the event handlers component and the pending event queue component may be external to an agent object 46.

Permissions component 56 generally comprises data and instructions related to permissions that have been granted to the agent 22 represented by agent object 46.

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These permissions include computational permissions and service permissions. A computational permission can specify that a respective agent 22 is authorized to consume a particular computational resource 21 (e.g., memory storage space, processing time, elapsed time, and the like which may be provided by the elements and functions of computer-based system 30) when performing its particular task(s). Furthermore, in some instances, a computational permission can specify a pre-authorized amount of computational resource 21 which may be allowably consumed by the respective agent 22. A service permission can specify that the respective agent is authorized to consume a particular service resource 25 (e.g., long-distance time, on-line data access time) when the agent utilizes a respective service 24 (e.g., e-mail, phone mail, electronic appointment book, electronic contact book, etc.) in performing its task(s). In some instances, a service permission can specify a pre-authorized amount of service resource 25 which is allowably consumed by the respective agent 22.

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Event handlers component 58 includes data and instructions for directing agent server 20 and/or engine 42 upon the occurrence of various events which may arise during the operation of network system 2. In particular, an event handler comprises a routine for handling an event of a specified type. For example, these events can be the lapse of a previously specified amount of time or the delivery of an e-mail message.

In one embodiment, an event is identified by a uniform resource locator (URL) which expresses or provides an address for a web page. The URL specifies both the event's type and the agent 22 which is event's intended recipient. The URL may be chosen by agent server 20 and the particular agent 22 in combination. This allows a web server providing a graphical user interface to network system 10 to receive HyperText Transfer Protocol (HTTP) requests for the web page at the URL so that agent server 20 can relay the event to the particular agent 22. A standard web browser can send an event to an agent 22 by fetching the web page identified by the URL for the event. The web page returned to the browser is supplied by the agent's

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event handler and relayed by agent server 20. One of the instructions in an agent instruction set allows an agent 22 to send an event (for example, to another agent 22 as a means of inter-agent communication).

Datastore component 60 may contain various information related to agent object 46. This may include information specifying the corresponding agent 22, the principal or user for whom that agent 22 performs tasks, the tasks which the agent 22 may perform, etc. Datastore component 60 may also include information used by agent object 46 for guiding its interaction with various service wrappers 26. For example, datastore component 60 may contain the parameters of a request the agent intends to make of a particular service wrapper 26 or the wrapper's response to such a request.

Pending event queue component 62 comprises information for events to which the corresponding agent 22 should, but has not yet, responded. Pending event queue component 62 queues these events so that the agent 22 may respond, for example, using the event handlers specified in event handlers component 58.

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User Session

Figure 9 is a flow diagram of an exemplary method 100 for a user session, according to an embodiment of the present invention. During method 100, a user is interacting with network system 2.

Method 100 begins at step 102 where network system 2 admits a user at a user interface (UI), which can be either graphical user interface 12 or voice user interface 16. Essentially, at this step, a user logs on to network system 2.

At step 104, network system 2 admits the user to the agent area of the relevant user interface. For voice user interface 16, this is agent area 18. For graphical user interface 12, this is agent area 14. With graphical user interface 12, a user is admitted to the agent area when the user "clicks" on an agent icon which is displayed on a menu screen. In the agent area, the user can create new agents and manipulate existing agents. Specifically, the user can enter various commands, depending on his or her intentions.

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Each command can be one of three types: an agent command, a template command, or a selection command. Agent commands are directed to the running of agents. These agents include ones which are currently executing and which the user now would like to manipulate. Template commands are directed to the manipulation of agent templates. An agent template can be a "blueprint" for agents. In object-oriented terminology, each agent is an object and each template is an agent class from which agents can be created by instantiating the class/template. Selection commands select agents or templates. A selection command allows network system 2 to focus on a particular template or a particular agent in order to provide a context for any subsequent template command or agent command.

At step 106, network system 2 accepts a command which has been entered by the user via the user interface. The command is forwarded from the user interface to agent server 20.

If the command is a selection command, agent server 20 executes such command at step 108. If the command is a template command, agent server 20 executes

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the command at step 110. Otherwise, if the command is an agent command, agent server 20 executes the command at step 112. The executions of a selection command, a template command, and an agent command are described below in more detail.

At step 114, network system 2 prompts a user for more commands. If the user enters additional commands, method 100 returns to step 106 where the next command is accepted. Method 100 repeats steps 106-114 until no additional commands are entered.

At step 116, network system 2 excuses the user from the agent area of the user interface. At step 118, the user is excused from the user interface itself. That is, the user logs off network system 2. Afterwards, method 100 ends.

Selection Command Execution

Figure 10 is a flow diagram of an exemplary method 200 for executing a selection command, according to an embodiment of the present invention. Method 200 is initiated within and performed by network system 2 when a user (e.g., subscriber) has entered a selection

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command. A selection command can be one of two types: a select agent command or a select template command.

A select agent command is one which selects a particular agent. Specifically, when a user enters the agent area, a list of executing agents may be visible. The user enters a select agent command to select a particular agent from the list in order to manipulate the same; afterwards, the user can enter an agent command to perform the manipulation.

Similarly, a select template command is one which selects a particular template. In particular, a list of agent templates may be provided from which a user may select. The user enters a select template command to select a particular template from the list; afterwards, the user can enter a template command to manipulate the template.

Method 200 begins at step 202 where agent server 20 determines whether the selection command is a select template command. If the selection command is a select template command, method 200 moves to step 204 where agent server 20 notes the particular template which has been selected. Afterwards, method 200 ends.

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Otherwise, if at step 202 it is determined that the selection command is not a select template command, then at step 206 agent server 20 determines whether the selection command is a select agent command. If the command is a select agent command, method 200 moves to step 208 where agent server 20 notes the agent which has been selected, after which method 200 ends.

Otherwise, if the selection command is not a select agent command, method 200 ends.

Template Command Execution

Figure 11 is a flow diagram of an exemplary method 300 for executing a template command, according to an embodiment of the present invention. Method 300 is initiated within and performed by network system 2 when a user has entered a template command. In general, a template command is one which affects a particular template. A template command can be one of four types: a create template command, a copy template command, an edit template command, and a delete template command.

Method 300 begins at step 302 where agent server 20 determines whether the template command which has

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been entered is a create template command. A create template command is one which creates a new template. Each new template can be based on a generic blank template which can be modified as desired by a user.

Accordingly, if the template command is a create template command, then at step 304 agent server 20 stores a blank template into memory (a computational resource 21) where the template can be modified. In the context of a graphical user interface, an entry for the new template is added to the list of templates appearing on a screen. At step 306, agent server 20 selects the blank template as the current template, after which method 300 ends.

Referring again to step 302, if it is determined that the template command is not a create template command, than method 300 moves to step 308 where agent server 20 determines whether the command is a copy template command. A copy template command is one which copies an existing template. A user may enter this command when it is desirable to create a new template from a previously created template rather than the generic blank template.

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If it is determined that the command is a copy template command, then at step 310 agent server 20 loads the previously created template. "Loading" a template means that the template is stored into memory, such as random access memory (RAM). At step 312, agent server 20 creates and stores a copy of the template into persistent memory, such as a hard drive. At step 314, agent server 20 selects the copy of the template as the current template, after which method 300 ends.

Referring again to step 308, if it is determined that the template command is not a copy template command, then method 300 moves to step 316 where agent server 20 determines whether the command is an edit template command. An edit template command is one which edits an existing template. A user may enter this command when it is desirable to edit either a newly created or previously created template.

If it is determined that the command is an edit template command, agent server 20 loads the template at step 318 and allows changes to be made to the template at step 320. At step 322, the edited template is stored back into persistent memory and then is made the

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current (selected) template, after which method 300 ends.

Otherwise, if it is determined at step 316 that the template command is not an edit template command, then method 300 moves to step 324 where agent server 20 determines whether the command is a delete template command. A delete template command is one which deletes an existing template. A user may enter this command to remove from permanent memory any template which is obsolete, incorrect, or otherwise undesirable.

If it is determined that the command is a delete template command, agent server 20 deselects the current template at step 326. Deselection is performed because a deleted template cannot be subsequently selected. Next, at step 328, agent server 20 deletes the template from persistent memory. In the context of a graphical user interface, this step would also remove an icon for such template from the screen. Method 300 then ends.

Referring again to step 324, if it is determined that the command is not a delete template command, method 300 ends because the command was not any of the types of commands for a template.

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For each of steps 310, 318, and 326 above, if no template is currently selected, agent server 20 will generate an error message.

Method 300, as described, thus provides user extensibility for network system 2 by allowing a user to create, copy, edit, and delete agent templates as desired.

Agent Command Execution

Figure 12 is a flow diagram of an exemplary method 400 for executing an agent command, according to an embodiment of the present invention. Method 400 is initiated within and performed by network system 2 when a user has entered an agent command. Generally speaking, an agent command is one which affects a particular agent 22. Agent commands can be of three types: a create agent command, an edit agent command, and a delete agent command.

Method 400 begins at step 402 where agent server 20 determines whether the command is a create agent command. A create agent command is one which creates a new agent from an agent template. After an agent 22

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has been created, it is generally allowed to execute, thereby performing tasks for the user who created the agent.

If it is determined that the command is a create agent command, then at step 404 agent server 20 loads the respective agent template. If no template is currently selected, agent server 20 will generate an error message. Otherwise, at step 406, agent server 20 stores the newly created agent 22 and at step 408 selects that agent 22 as the current agent. Afterwards, method 400 ends.

With reference again to step 402, if it is determined that the command is not a create agent command, then at step 410 agent server 20 determines whether the command is an edit agent command. An edit agent command is one which allows the user to edit an executing or running agent. If no agent 22 is currently selected, however, agent server 20 generates an error message.

If it is determined that the command is an edit agent command, then agent server 20 loads the executing agent 22 at step 412. Agent server 20 suspends the

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execution of such agent 22 at step 414 and allows changes to be made to the agent by a user at step 416. At step 418, agent server 20 resumes the execution of the agent 22 and, at step 420, stores the edited agent. Afterwards, method 400 ends.

Referring again to step 410, if it is determined that the agent command is not an edit agent command, then at step 422 agent server 20 determines whether the command is a delete agent command. In general, a delete agent command is one which ends the execution of an agent 22 and removes it from persistent memory. If no agent 22 is currently selected, however, agent server 20 generates an error message.

If it is determined at step 422 that the command is a delete agent command, then at step 424 agent server 20 deselects the agent 22, because an agent cannot be selected once it has been deleted. At step 426, agent server 20 deletes the agent 22. Method 400 then ends.

Referring again to step 422, if it is determined that the command is not a delete agent command, method

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400 ends because the command was not any of the types of commands for an agent.

Consumption of Service and Computational Resources

Figure 13 is a block diagram detailing the controlled consumption of service resources 25 and computational resources 21 by an agent 22, according to an embodiment of the present invention.

As previously described, an agent 22 may consume various service resources 25 (e.g., long-distance calling time, on-line data access time, etc.) and computational resources 21 (e.g., memory space, processing time, etc.) in the performance of its tasks.

The amount of the resources consumed by a particular agent 22 is limited by permissions which are specified in permissions component 56 of an agent object 46 corresponding to the agent 22. More specifically, for a particular agent 22, permissions component 56 includes one set of service permissions 64 for each service 24 utilized by that agent. The service permissions 64 bound the service resources 25 expended on behalf of the agent 22 by that service 24.

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That is, each service permission 64 specifies whether the agent 22 is authorized to consume a particular service resource 25 and, in some instances, the amount of such service resource 25 that is allowably consumed by that agent 22.

Agent server 20 and service wrappers 26 cooperate in order to ensure that an agent 22 does not consume more than its allotted amount of any particular service resource 25 as specified by a respective service permission 64.

Permissions component 56 also includes a set of computational permissions 66 for the agent 22. These computational permissions 66 bound the computational resources 21 expended on the agent's behalf by agent server 20. In other words, each computational permission 66 specifies whether the agent 22 is authorized to consume a particular computational resource 21 and, in some instances, the amount of the computational resource 21 which is allowably consumed by that agent.

Agent server 20, together with service wrappers 26, monitors and ensures that the agent 22 does not

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consume more than its allotted amount of any computational resource 21 as specified by a respective computational permission 66.

Agent Population Execution

Figure 14 is a flow diagram of an exemplary method 500 for executing time slices for an agent population, according to an embodiment of the present invention. Method 500 is performed by agent server 20 in order to enable each agent 22 to make progress in performing its respective tasks.

In general, the processing capability of agent server 20 cannot be dedicated solely to any particular agent 22, but rather must be allocated among all executing agents. Processing time by agent server 20 is thus divided into time slices. The time slices can be of predetermined duration. During each time slice, the processing capability of agent server 20 is directed to a particular agent 22.

With reference to Figure 14, method 500 begins at step 502 where agent server 20 selects an agent 22, which is responsible for performing one or more tasks

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for a respective user. At step 504, agent server 20 executes a time slice for the selected agent 22. During this time slice, the processing capability of server 20 is directed to or used for the selected agent 22.

At step 506, agent server 20 determines whether there are any other agents 22 for which a time slice should be executed. If there are more agents, method 500 returns to step 502 where the next agent is selected. Agent server 20 repeats steps 502-506 until a time slice has been executed for each agent 22. Afterwards, method 500 ends.

Agent Execution

Figure 15 is a flow diagram of an exemplary method 600 for executing a time slice for an agent 22, according to an embodiment of the present invention. Method 600 is performed by agent server 20 for a particular agent 22.

Method 600 begins at step 602 where an agent object 46 corresponding to the particular agent 22 is loaded into agent server 20. This agent object 46

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comprises a permissions component 56, an event handlers component 58, a datastore component 60, and a pending event queue 62.

At step 604, agent server 20 determines whether execution of the agent 22 has been suspended (e.g., because the user is editing the agent). If execution has been suspended, it is unnecessary to provide any processing for the agent, and accordingly, method 600 ends.

Otherwise, if execution of the agent 22 has not been suspended, method 600 proceeds to step 605 where agent server 20 determines whether an event is currently being handled by agent 22. An event is something that triggers or causes an agent 22 to take action, or something to which agent 22 must respond. If it is determined that there is an event currently being handled, method 600 moves to step 612.

Alternatively, if it is determined at step 605 that there is not an event currently being handled, method 600 proceeds to step 606 where agent server 20 determines whether there is an event pending for the agent--i.e., an event for which handling has not yet

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begun. This can be accomplished by examining pending event queue component 62 of the corresponding agent object 46. If there is no event pending for agent 22, method 600 ends.

Otherwise, if it is determined that there is an event pending for agent 22, then at step 608 agent server 20 removes or dequeues the event from the pending event queue of the corresponding agent object 46.

At step 610, agent server 20 determines whether agent 22 has a handler for responding to the event. Generally, an event handler comprises a routine for responding to an event of a particular type. An event handler can be divided into a plurality of portions, each of which is separately executable during different time slices. Event handlers are specified in the event handlers component 58 of agent object 46. If it is determined that agent 22 does not have a handler for the relevant event, method 600 moves to step 614. Otherwise, if it is determined that agent 22 does have a handler for responding to the event, method 600 moves to 612.

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At step 612, agent server 20 executes a portion of the event handler for agent 22. Method 600 then proceeds to step 614.

At step 614, agent server 20 stores the agent 22, after which method 600 ends.

Event Handler Execution

Figure 16 is a flow diagram of an exemplary method 700 for executing an event handler, according to an embodiment of the present invention. Method 700 is performed by agent server 20 when an event handler is invoked in response to the occurrence of a particular event. The event handler routine may include a number of instructions which are directed to agent server 20 and/or one or more service wrappers 26.

Method 700 begins its step 702 where agent server 20 receives an instruction to execute in a patroller time slice. At step 704, agent server 20 determines whether the instruction is a service instruction. A service instruction is an instruction relating to and utilizing a particular service 24. Accordingly, a service instruction can only be executed via a

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respective service wrapper 26. All other instructions do not require the cooperation of a respective service wrapper 26, but rather, can be executed by agent server 20 itself.

If it is determined at step 704 that the instruction is a service instruction, method 700 proceeds to step 708 where agent server 20 asks the respective service wrapper 26 to execute the instruction for agent 22. Method 700 then moves to step 710.

Referring again to step 704, if it is determined that the instruction is not a service instruction, then agent server 20 itself executes the instruction at step 706. Method 700 then proceeds to step 710.

At step 710, agent server 20 determines whether there are any more instructions in the event handler. If so, method 700 returns to step 702 where agent server 20 fetches the next instruction. Agent server 20 repeats steps 702-710 until all instructions of the event handler to be executed as part of the current time slice have been executed, either by agent server 20 or respective service wrappers 26. Afterwards, method 700 ends.

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Service Instruction Execution

Figure 17 is a flow diagram of an exemplary method 800 for executing a service instruction, according to an embodiment of the present invention. Method 800 is performed by a service wrapper 26 when agent server 20 asks the service wrapper to execute a service instruction relating to the respective service 24.

Method 800 begins at step 802 where service wrapper 26 identifies the service permissions required by the service instruction. In other words, the execution of the service instruction may cause particular service resources 25 (e.g., long-distance calling time, on-line data access time, or memory storage space) to be consumed. Thus, an assessment is made as to the service permissions needed in order to carry out the service instruction.

At step 804, service wrapper 26 asks agent server 20 for the permissions held by the agent 22 for which the instruction is being executed. The permissions held by an agent 22 are not necessarily the same as the permissions which are required in order to execute an

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instruction. For example, agent 22 may have permissions only for long-distance calling time and memory storage space, but execution of the instruction requires permission for on-line data access time.

Thus, at step 806, service wrapper 26 determines whether the permissions held by agent 22 include the permissions required in order to execute the instruction. If it is determined that the permissions held do not include the permissions required, service wrapper 26 executes an error routine at step 808, after which method 800 ends.

Otherwise, if it is determined at step 806 that the permissions held do include the permissions required, method 800 precedes to step 810 where, for each service permission, service wrapper 26 identifies the amount of a service resource 25 which is allotted to agent 22 and the amount of that service resource 25 which must be consumed in order to execute the instruction. As with the permissions, the amount of a service resource 25 allotted to an agent 22 is not necessarily the same as the amount of that service resource 25 which is required to execute the

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instruction. For example, an agent 22 may have permission to utilize up to a predefined amount of memory storage space to store a voice mail message, but the actual amount required for a particular message is greater than the predefined amount.

At step 812, service wrapper 26 determines whether the amount allotted to agent 22 is at least as great as the amount required to execute the instruction. If it is determined that the amount allotted is not at least as great as the amount required, service wrapper 26 executes an error routine at step 814, after which method 800 ends.

Referring again to step 812, if it is determined that the amount of the service resource 25 allotted to agent 22 is at least as great as the amount which is required to execute the instruction, then method 800 moves to step 816 where service wrapper 26 asks the respective service 24 to execute the instruction, thereby enabling agent 22 to perform one or more tasks for its user/principal.

At step 818, service wrapper 26 identifies the amount of each service resource 25 actually consumed or

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used to execute the instruction. At step 820, for each service resource 25, service wrapper 26 asks agent server 20 to decrement the amount allotted to agent 22 by the amount actually used. Method 800 then ends.

In method 800 described above, it is assumed that service wrapper 26 can determine in advance what amount of service resource 25 will be consumed in the execution of an instruction. This, however, is not always the case. For example, while a predefined maximum amount of memory space may be set aside to store any given voice mail message, the amount of storage space actually consumed depends on how long the caller speaks. Other service resources 25 can be consumed on an on-going basis even after an instruction has executed. For example, if a long-distance call is made on behalf of a subscriber, connect time for a long-distance service continues until the call has been completed. In both cases, service wrapper 26 actively monitors service resource consumption and halts further consumption whenever the amount held by an agent 22 is exhausted.

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Accordingly, the present invention provides a system and method which allow subscribers or third parties to create and customize personalized agents 22 which utilize services 24 (e.g., e-mail, voice mail, electronic address book, electronic contact book, etc.) in order to perform respective tasks for the subscribers. Thus, the present invention affords user extensibility of the services 24.

Furthermore, the present invention monitors and controls the consumption of service resources 25 and computational resources 21 by agents 22 during execution. Thus, the present invention protects the subscribers and a service provider from misuse or overuse, whether intentional or inadvertent, of such resources.

While particular embodiments of the present invention and their advantages have been shown and described, it should be understood that various changes, substitutions, and alterations can be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

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WHAT IS CLAIMED IS:

1. A network system comprising:

a service;

an agent operable to use the service on behalf of a principal; and

an agent server operable to mediate the use of the service by the agent.

2. The network system of Claim 1 further comprising a computational resource which can be consumed by the agent.

3. The network system of Claim 2 wherein the agent server is operable to monitor the consumption of the computational resource by the agent.

4. The network system of Claim 3 wherein the agent server is operable to charge the principal for the consumption of the computational resource.

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5. The network system of Claim 3 wherein the agent server is operable to terminate the agent in response to the monitoring.

6. The network system of Claim 2 further comprising a computational permission associated with the computational resource and the agent, the computational permission specifying a predetermined amount of the computational resource which the agent is allowed to consume.

7. The network system of Claim 2 further comprising a computational permission associated with the computational resource and the principal, the computational permission specifying a predetermined amount of the computational resource which is allowed to be consumed on behalf of the principal.

8. The network system of Claim 2 wherein the computational resource can be processing time for the agent or elapsed time for the agent.

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9. The network system of Claim 1 further comprising a service resource associated with the service and which can be consumed by the agent when the agent uses the service.

10. The network system of Claim 9 further comprising a service wrapper associated with the service, the service wrapper operable to monitor the consumption of the service resource by the agent.

11. The network system of Claim 10 wherein the service wrapper is operable to terminate the agent in response to the monitoring.

12. The network system of Claim 9 wherein the agent server is operable to charge the principal for the consumption of the service resource.

13. The network system of Claim 9 further comprising a service permission associated with the service resource and the agent, the service permission specifying a predetermined amount of the service resource which the agent is allowed to consume.

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14. The network system of Claim 9 further comprising a service permission associated with the service resource and the principal, the service permission specifying a predetermined amount of the service resource which is allowed to be consumed on behalf of the principal.

15. The network system of Claim 9 wherein the service resource comprises elapsed time for a telephone call.

16. The network system of Claim 9 wherein the service resource comprises cost for a telephone call.

17. The network system of Claim 1 further comprising a service wrapper associated with the service, the service wrapper operable to translate between a first instruction set and a second instruction set.

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18. The network system of Claim 1 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete an agent template from which the agent is created.

19. The network system of Claim 1 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete the agent.

20. The network system of Claim 19 wherein the user interface comprises a graphical user interface.

21. The network system of Claim 20 wherein the graphical user interface comprises:

a web server resident in the network system; and

a web browser resident in a user device.

22. The network system of Claim 19 wherein the user interface comprises a voice user interface.

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23. The network system of Claim 22 wherein the voice user interface comprises a speech recognition application.

24. The network system of Claim 22 wherein the voice user interface comprises a speech synthesis application.

25. The network system of Claim 22 wherein the voice user interface comprises a speech playback device.

26. The network system of Claim 1 wherein the service comprises a user interface service operable to provide a user interface by which the agent can interact with a user.

27. The network system of Claim 26 wherein the user interface comprises a graphical user interface.

28. The network system of Claim 27 wherein the graphical user interface comprises:

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a web server resident in the network system; and

a web browser resident in a user device.

29. The network system of Claim 27 wherein the user interface comprises a voice user interface.

30. The network system of Claim 29 wherein the voice user interface comprises a speech recognition application.

31. The network system of Claim 29 wherein the voice user interface comprises a speech synthesis application.

32. The network system of Claim 29 wherein the voice user interface comprises a speech playback device.

33. A network system comprising:

a user interface operable to allow a user to interact with the network system; and

an agent server coupled to the user interface, the agent server operable to manage the operation of a

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programmable functionality component of the network system, the agent server in conjunction with the user interface operable to create, modify, or delete an agent in response to interaction by the user.

34. The network system of Claim 33 wherein the user interface comprises a graphical user interface.

35. The network system of Claim 34 wherein the graphical user interface comprises a web browser application.

36. The network system of Claim 33 wherein the user interface comprises a voice user interface.

37. The network system of Claim 36 wherein the voice user interface comprises a speech recognition application.

38. The network system of Claim 36 wherein the voice user interface comprises a speech synthesis application.

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43. The network system of Claim 41 further comprising a service resource associated with the service, the service resource being consumed when the agent utilizes the service.

44. The network system of Claim 43 wherein the service wrapper is operable to monitor the amount of service resource consumed by the agent when the agent utilizes the service.

45. A method comprising:

admitting a user to a network system wherein at least one agent is operable to utilize a service to perform a task for the user; and

allowing the user to create, modify, or delete the agent within the network system.

46. The method of Claim 45 further comprising accepting an agent command from the user.

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47. The method of Claim 46 wherein the agent command is one of a create agent command, an edit agent command, and a delete agent command.

48. The method of Claim 45 further comprising suspending execution of the agent.

49. The method of Claim 45 further comprising accepting a template command from the user.

50. The method of Claim 49 further comprising allowing the user to create, modify, or delete an agent template within the network system.

51. The method of Claim 45 further comprising admitting the user to an agent area of a user interface.

52. A network system comprising:

an agent server operable to manage the operation of a programmable functionality component of the network system;

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a service;

an agent operable to utilize the service; and

a service wrapper associated with the service, the service wrapper operable to cooperate with the agent server to mediate interaction between the service and the agent.

53. The network system of Claim 52 further comprising a service resource associated with the service, the service resource being consumed when the agent utilizes the service.

54. The network system of Claim 53 wherein the service wrapper comprises a monitor, the monitor operable to monitor the amount of the service resource consumed by the agent when the agent utilizes the service.

55. The network system of Claim 52 wherein the service wrapper comprises a converter, the converter operable to convert between a first computer language

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used by the agent and a second computer language used by the service.

56. The network system of Claim 55 wherein the converter comprises an agent server to service converter for converting from the first computer language to the second computer language.

57. The network system of Claim 55 wherein the converter comprises a service to agent server converter for converting from the second computer language to the first computer language.

58. The network system of Claim 52 further comprising a user interface operable to allow a user to interact with the network system in order to create the agent.

59. The network system of Claim 58 wherein the user interface comprises a graphical user interface.

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60. The network system of Claim 59 wherein the graphical user interface comprises a web browser application.

61. The network system of Claim 58 wherein the user interface comprises a voice user interface.

62. The network system of Claim 61 wherein the voice user interface comprises a speech recognition application.

63. The network system of Claim 61 wherein the voice user interface comprises a speech synthesis application.

64. The network system of Claim 61 wherein the voice user interface comprises a speech playback device.

65. The network system of Claim 52 further comprising a computational resource which can be consumed by the agent.

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66. The network system of Claim 65 wherein the agent server is operable to monitor the amount of the computational resource consumed by the agent.

67. The network system of Claim 52 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising data and instructions executable within the agent server.

68. The network system of Claim 52 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising a permission for the agent.

69. A method comprising:

allowing an agent to utilize a service; and

mediating interaction between the service and the agent.

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70. The method of Claim 69 wherein allowing comprises allowing the agent to consume a service resource associated with the service.

71. The method of Claim 69 wherein mediating comprises monitoring the amount of a service resource consumed by the agent.

72. The method of Claim 69 wherein mediating comprises:

identifying a service permission required in order for the agent to consume a service resource associated with the service; and

determining whether the agent holds the required service permission.

73. The method of Claim 69 wherein mediating comprises:

receiving an instruction which requires that the agent consume a service resource associated with the service when the agent utilizes the service;

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identifying an amount of the service resource which would be consumed if the instruction is executed;

identifying an amount of the service resource allotted to the agent; and

determining whether the amount which is allotted is greater than or equal to the amount which would be consumed.

74. The method of Claim 73 wherein mediating comprises:

executing the instruction if the amount which is allotted is greater than or equal to the amount which would be consumed; and

subtracting the amount which would be consumed from the amount which is allotted.

75. The method of Claim 69 further comprising converting between a first computer language used by an agent and a second computer language used by the service.

76. The method of Claim 69 further comprising:

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allowing an agent to consume a computational resource; and

monitoring the amount of the computational resource consumed by the agent.

add a 2

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DATABRICKS EX1002 Page 402

09/712712

NETWORK SYSTEM

EXTENSIBLE BY USERS

Danny Lange
Barbara Nelson
Jing Su
James E. White

09/712712 112000

ABSTRACT OF THE DISCLOSURE

In one aspect, a network system includes a user interface which allows a user to interact with the network system. An agent server is coupled to the user interface. The agent server manages the operation of the network system. Furthermore, the agent server in conjunction with the user interface is operable to create or modify an agent in response to interaction by the user. In another aspect, a network system includes an agent server which manages the operation of the network system. An agent is operable to utilize a service within the network system. A service wrapper, associated with the service, cooperates with the agent server to mediate interaction between the service and the agent.

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DATABRICKS EX1002 Page 403

COPY

Attorney Docket No.: M-6011 US

DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below adjacent to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of subject matter (process, machine, manufacture, or composition of matter, or an improvement thereof) which is claimed and for which a patent is sought by way of the application entitled **"Network System Extensible By Users"**

which (check) ☒ is attached hereto.
☐ and is amended by the Preliminary Amendment attached hereto.
☐ was filed on _____ as Application Serial No. _____
☐ and was amended on ___ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
Number	Country	Day/Month/Year Filed	Yes	No
N/A			☐	☐

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

Provisional Application Number	Filing Date
N/A	

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information, which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56, which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

IPR2025-00714
DATABRICKS EX1002 Page 404

Application Serial No.	Filing Date	Status (patented, pending, abandoned)
N/A		

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith:

Alan H. MacPherson (24,423); Thomas S. MacDonald (17,774); Kenneth E. Leeds (30,566); Brian D. Ogonowsky (31,988); David W. Heid (25,875); Norman R. Klivans (33,003); Edward C. Kwok (33,938); David E. Steuber (25,557); Michael Shenker (34,250); Stephen A. Terrile (32,946); Peter H. Kang (40,350); Ronald J. Meetin (29,089); Ken John Koestner (33,004); Omkar K. Suryadevara (36,320); David T. Millers (37,396); Kent B. Chambers (38,839); Serge J. Hodgson (40,017); Michael P. Adams (34,763); Bernard Berman (37,279); Michael J. Halbert (40,633); Gary J. Edwards (41,008); William B. Tiffany (41,347); James E. Parsons (34,691); Daniel P. Stewart (41,332); Philip W. Woo (39,880); John T. Winburn (26,822); Tom Chen (42,406); Fabio E. Marino (43,339); William W. Holloway (26,182); Elaine H. Lo (41,158); Don C. Lawrence (31,975); Marc R. Ascolese (42,268); Carmen C. Cook (42,433); David G. Dolezal (41,711); Adrian J. Lee (42,785); Michael P. Noonan (42,038); Roberta P. Saxon (43,087); Bernice Chen (42,403); Mary Jo Bertani (42,321); and Dale R. Cook (42,434).

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25 Metro Drive, Suite 700
San Jose, California 95110-1349

Telephone: 408-453-9200
Facsimile: 408-453-7979

I declare that all statements made herein of my own knowledge are true, all statements made herein on information and belief are believed to be true, and all statements made herein are made with the knowledge that whoever, in any matter within the jurisdiction of the Patent and Trademark Office, knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or device a material fact, or makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be subject to the penalties including fine or imprisonment or both as set forth under 18 U.S.C. 1001, and that violations of this paragraph may jeopardize the validity of the application or this document, or the validity or enforceability of any patent, trademark registration, or certificate resulting therefrom.

Dec 14 2004 15:50

IPR2025-00714
DATABRICKS EX1002 Page 405

Atty. Docket No.: M-6011 US

Full name of first inventor: Danny Lange

Inventor's Signature: _____ Date: 10-22-98

Residence: Cupertino, California

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Cupertino, California 95014

Full name of second inventor: Barbara Nelson

Inventor's Signature: Barbara Nelson Date: 10/22/98

Residence: San Mateo, California

Post Office Address: 2825 Juniper Street Citizenship: Ireland
San Mateo, California 94403

Full name of third inventor: Jing Su

Inventor's Signature: _____ Date: 10/22/98

Residence: Cupertino, California

Post Office Address: 20094 Wheaton Drive Citizenship: China
Cupertino, California 95014

Full name of fourth inventor: James E. White

Inventor's Signature: _____ Date: 10/22/98

Residence: San Carlos, California

Post Office Address: 112 Wycombe Avenue Citizenship: U.S.A.
San Carlos, California 94070

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IPR2025-00714
DATABRICKS EX1002 Page 406

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JC869 U.S. PTO
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11/14/00

M. 6011

UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
ASSISTANT SECRETARY AND COMMISSIONER
OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

100870647A

FEBRUARY 23, 1999 SKJERVEN, MORRILL, MAC PHERSON FRANKLIN & FRIEL PTAS

SKJERVEN, MORRILL, MACPHERSON ET AL
EDWARD C. KWOK
25 METRO DRIVE
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SAN JOSE, CA 95110

UNITED STATES PATENT AND TRADEMARK OFFICE
NOTICE OF RECORDATION OF ASSIGNMENT DOCUMENT

THE ENCLOSED DOCUMENT HAS BEEN RECORDED BY THE ASSIGNMENT DIVISION OF THE U.S. PATENT AND TRADEMARK OFFICE. A COMPLETE MICROFILM COPY IS AVAILABLE AT THE ASSIGNMENT SEARCH ROOM ON THE REEL AND FRAME NUMBER REFERENCED BELOW.

PLEASE REVIEW ALL INFORMATION CONTAINED ON THIS NOTICE. THE INFORMATION CONTAINED ON THIS RECORDATION NOTICE REFLECTS THE DATA PRESENT IN THE PATENT AND TRADEMARK ASSIGNMENT SYSTEM. IF YOU SHOULD FIND ANY ERRORS OR HAVE QUESTIONS CONCERNING THIS NOTICE, YOU MAY CONTACT THE EMPLOYEE WHOSE NAME APPEARS ON THIS NOTICE AT 703-308-9723. PLEASE SEND REQUEST FOR CORRECTION TO: U.S. PATENT AND TRADEMARK OFFICE, ASSIGNMENT DIVISION, BOX ASSIGNMENTS, CG-4, 1213 JEFFERSON DAVIS HWY, SUITE 320, WASHINGTON, D.C. 20231.

RECORDATION DATE: 10/23/1998
REEL/FRAME: 9557/0591
NUMBER OF PAGES: 4

BRIEF: ASSIGNMENT OF ASSIGNOR'S INTEREST (SEE DOCUMENT FOR DETAILS).

ASSIGNOR:
LANGE, DANNY
DOC DATE: 10/22/1998

ASSIGNOR:
NELSON, BARBARA
DOC DATE: 10/22/1998

ASSIGNOR:
SU, JING
DOC DATE: 10/22/1998

ASSIGNOR:
WHITE, JAMES E.
DOC DATE: 10/22/1998

ASSIGNEE:
GENERAL MAGIC
420 N. MARY AVENUE
SUNNYVALE, CALIFORNIA 94086

SERIAL NUMBER: 09178366
PATENT NUMBER:
FILING DATE: 10/23/1998
ISSUE DATE:

ECK/SAT/PWW

Mailing on 10/23/00
Fax Filing on 10/23/99
Box Return on 3/3/99
3/2/99
IDS on 1/23/99

MARY BENTON, EXAMINER
ASSIGNMENT DIVISION
OFFICE OF PUBLIC RECORDS

JC869 U.S. PTO 09/712712 11/14/00

10/23/98

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To the Honorable Commissioner of Pa ...ached original documents or copy thereof.

1. Name of conveying party(ies):

Danny Lange, Barbara Nelson, Jing Su, and James E. White

Additional name(s) of conveying party(ies) attached? ☐ Yes ☒ No

2. Name and address of receiving party(ies):

Name: **General Magic**

Internal Address:

Street Address: 420 N. Mary Avenue

City Sunnyvale State California ZIP 94086

Additional name(s) & address(es) attached? ☐ Yes ☒ No

09/178366 10/23/98

3. Nature of Conveyance:

☒ Assignment ☐ Merger

☐ Security Agreement ☐ Change of Name

☐ Other

Execution Date: October 22, 1998

4. Application number(s) or patent number(s): 09/178,366

If this document is being filed together with a new application, the execution date of the application is: October 22, 1998

A. Patent Application No.(s) - **Not Yet Assigned**

Title: **"Network System Extensible By Users"**

B. Patent No.(s)

Additional numbers attached? ☐ Yes ☒ No

5. Name and address of party to whom correspondence concerning document should be mailed:

Name: Edward C. Kwok

Internal Address: SKJERVEN, MORRILL, MacPHERSON, FRANKLIN & FRIEL LLP

Street Address: 25 METRO DRIVE, SUITE 700

City SAN JOSE State CA ZIP 95110

6. Total number of applications and patents involved: One (1)

7. Total fee (37 CFR 3.41): $40.00

☒ Authorized to be charged to Deposit Account 19-2386

☒ Charge Deposit Account 19-2386 for any additional fees required for this conveyance and credit deposit account 19-2386 any amounts overpaid

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8. Statement and signature.

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Philip W. Woo 39,880
Name of Person Signing

Philip W. Woo
Signature

10/23/98
Date

Total number of pages comprising cover sheet: 4

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Express Mail Label No.: EL 030 470 745 US
464619 v1

PATENT APPLICATION SERIAL NO. 09/712712

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

11/27/2000 FFANAEIA 00000050 192386 09712712

01 FC:101 710.00 CH
02 FC:102 160.00 CH
03 FC:103 810.00 CH

PTO-1556
(5/87)

*U.S. GPO: 1999-459-082/19144

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2000

Application or Docket Number: 09/718778

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS		
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	65 minus 20=	* 45
INDEPENDENT CLAIMS	5 minus 3 =	* 2
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	355.00	OR	BASIC FEE	710.00
X$ 9=		OR	X$18=	810
X40=		OR	X80=	160
+135=		OR	+270=	
TOTAL		OR	TOTAL	1,680

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 58	Minus	** 65	=
Independent	* 4	Minus	*** 5	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
***If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

IPR2025-00714
DATABRICKS EX1002 Page 411

CLAIMS ONLY

SERIAL NO. 09/712,778 | FILING DATE

APPLICANT(S)

CLAIMS

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT	
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TOTAL CLAIMS						

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TOTAL IND.	1					
TOTAL DEP.	23					
TOTAL CLAIMS	24					

* MAY BE USED FOR ADDITIONAL CLAIMS OR ADMENDMENTS

FORM PTO-2022 (1-98)

U.S.DEPARTMENT OF COMMERCE
Patent and Trademark Office

*U.S. GPO: 1998-443-593/89152

CLAIMS ONLY

SERIAL NO. 09/712,712 | FILING DATE

APPLICANT(S)

CLAIMS

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
101	1					
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TOTAL CLAIMS	41					

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TOTAL IND.		↓		↓		↓
TOTAL DEP.						
TOTAL CLAIMS						

* MAY BE USED FOR ADDITIONAL CLAIMS OR ADMENDMENTS

FORM PTO-2022 (1-98)

U.S.DEPARTMENT OF COMMERCE
Patent and Trademark Office

*U.S. GPO: 1998-443-593/89152

#A 2a
S. 3and
2/14/01

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Danny Lange, Barbara Nelson, Jing Su, and James E. White		
Assignee:	General Magic		
Title:	NETWORK SYSTEM EXTENSIBLE BY USERS		
Serial No.:	Unassigned	Filed:	November 14, 2000
Examiner:	Unassigned	Group Art Unit:	Unassigned
Docket No.:	M-6011-1C US		

San Jose, California
November 14, 2000

BOX PATENT APPLICATION
COMMISSIONER FOR PATENTS
Washington, D.C. 20231

Express Mail Label No. EL 707 907 142 US

PRELIMINARY AMENDMENT

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION

Page 1, in the header: immediately following "M-6011 US" please insert —1C—.

Page 1, in the express mail label box: please cancel "EL 030 470 745 US" and substitute —EL 707 907 142 US—.

Page 1, before line 10, "TECHNICAL FIELD OF THE INVENTION", insert the following:

—CROSS REFERENCE TO RELATED APPLICATIONS

The present application is a continuation of Serial No. 09/178,366, filed October 23, 1998, entitled "Network System Extensible By Users" which application was allowed on July 3, 2000.—

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IPR2025-00714
DATABRICKS EX1002 Page 414

IN THE CLAIMS:

Please amend the claims as follows.

Please cancel claims 1-76.

Please add new claims 77-141 as follows:

—77. (New) A network system comprising:

a service;

an agent operable to use the service on behalf of a principal and to consume a service resource while using the service;

an agent server operable to mediate the use of the service by the agent; and

a service wrapper associated with the service, the service wrapper operable to monitor the consumption of the service resource by the agent.

78. (New) The network system of Claim 77 wherein the service wrapper is operable to terminate the agent in response to the monitoring.

79. (New) The network system of Claim 77 wherein the agent server is operable to charge the principal for the consumption of the service resource.

80. (New) The network system of Claim 77 further comprising a service permission associated with the service resource and the agent, the service permission specifying a predetermined amount of the service resource which the agent is allowed to consume.

81. (New) The network system of Claim 77 further comprising a service permission associated with the service resource and the principal, the service permission

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Date Entered: 12/14/05

IPR2025-00714
DATABRICKS EX1002 Page 415

specifying a predetermined amount of the service resource which is allowed to be consumed on behalf of the principal.

82. (New) The network system of Claim 77 wherein the service resource comprises elapsed time for a telephone call.

83. (New) The network system of Claim 77 wherein the service resource comprises cost for a telephone call.

84. (New) The network system of Claim 77 wherein the service wrapper is operable to translate between a first instruction set and a second instruction set.

85. (New) The network system of Claim 77 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete an agent template from which the agent is created.

86. (New) The network system of Claim 77 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete the agent.

87. (New) The network system of Claim 86 wherein the user interface comprises a graphical user interface.

88. (New) The network system of Claim 87 wherein the graphical user interface comprises:

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DATABRICKS EX1002 Page 416

a web server resident in the network system; and

a web browser resident in a user device.

89. (New) The network system of Claim 86 wherein the user interface comprises a voice user interface.

90. (New) The network system of Claim 89 wherein the voice user interface comprises a speech recognition application.

91. (New) The network system of Claim 89 wherein the voice user interface comprises a speech synthesis application.

92. (New) The network system of Claim 89 wherein the voice user interface comprises a speech playback device.

93. (New) The network system of Claim 77 wherein the service comprises a user interface service operable to provide a user interface by which the agent can interact with a user.

94. (New) The network system of Claim 93 wherein the user interface comprises a graphical user interface.

95. (New) The network system of Claim 94 wherein the graphical user interface comprises:

a web server resident in the network system; and

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DATABRICKS EX1002 Page 417

a web browser resident in a user device.

96. (New) The network system of Claim 93 wherein the user interface comprises a voice user interface.

97. (New) The network system of Claim 96 wherein the voice user interface comprises a speech recognition application.

98. (New) The network system of Claim 96 wherein the voice user interface comprises a speech synthesis application.

99. (New) The network system of Claim 96 wherein the voice user interface comprises a speech playback device.

100. (New) The network system of Claim 77 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.

101. (New) A network system comprising:

a user interface operable to allow a user to interact with the network system; and

an agent server coupled to the user interface, the agent server operable to manage the operation of a programmable functionality component of the network system, the agent server in conjunction with the user interface operable to create, modify, or delete an agent in response to interaction by the user, the agent operable to consume a service resource as the agent uses a service on behalf of the user.

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102. (New) The network system of Claim 101 wherein the user interface comprises a graphical user interface.

103. (New) The network system of Claim 102 wherein the graphical user interface comprises a web browser application.

104. (New) The network system of Claim 101 wherein the user interface comprises a voice user interface.

105. (New) The network system of Claim 104 wherein the voice user interface comprises a speech recognition application.

106. (New) The network system of Claim 104 wherein the voice user interface comprises a speech synthesis application.

107. (New) The network system of Claim 104 wherein the voice user interface comprises a speech playback device.

108. (New) The network system of Claim 101 wherein the user interface comprises an agent area for creating, modifying, or deleting the agent.

109. (New) The network system of Claim 101 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.

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IPR2025-00714
DATABRICKS EX1002 Page 419

110. (New) The network system of Claim 101 further comprising a service wrapper associated with the service, the service wrapper operable to cooperate with the agent server to mediate interaction between the service and the agent.

111. (New) The network system of Claim 110 wherein the service wrapper is operable to convert between a first computer language used by the agent and a second computer language used by the service.

112. (New) The network system of Claim 110 wherein the service wrapper is operable to monitor the amount of service resource consumed by the agent when the agent utilizes the service.

113. (New) A method comprising:

admitting a user to a network system wherein at least one agent is operable to consume a service resource while utilizing a service to perform a task for the user; and

allowing the user to create, modify, or delete the agent within the network system.

114. (New) The method of Claim 113 further comprising accepting an agent command from the user.

115. (New) The method of Claim 114 wherein the agent command is one of a create agent command, an edit agent command, and a delete agent command.

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DATABRICKS EX1002 Page 420

116. (New) The method of Claim 113 further comprising suspending execution of the agent.

117. (New) The method of Claim 113 further comprising accepting a template command from the user.

118. (New) The method of Claim 117 further comprising allowing the user to create, modify, or delete an agent template within the network system.

119. (New) The method of Claim 113 further comprising admitting the user to an agent area of a user interface.

120. (New) A network system comprising:

an agent server operable to manage the operation of a programmable functionality component of the network system;

a service;

an agent operable to consume a service resource while utilizing the service; and

a service wrapper associated with the service, the service wrapper operable to cooperate with the agent server to mediate interaction between the service and the agent.

121. (New) The network system of Claim 120 wherein the service wrapper comprises a monitor, the monitor operable to monitor the amount of the service resource consumed by the agent when the agent utilizes the service.

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DATABRICKS EX1002 Page 421

122. (New) The network system of Claim 120 wherein the service wrapper comprises a converter, the converter operable to convert between a first computer language used by the agent and a second computer language used by the service.

123. (New) The network system of Claim 122 wherein the converter comprises an agent server to service converter for converting from the first computer language to the second computer language.

124. (New) The network system of Claim 122 wherein the converter comprises a service to agent server converter for converting from the second computer language to the first computer language.

125. (New) The network system of Claim 120 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.

126. (New) The network system of Claim 120 further comprising a user interface operable to allow a user to interact with the network system in order to create the agent.

127. (New) The network system of Claim 126 wherein the user interface comprises a graphical user interface.

128. (New) The network system of Claim 127 wherein the graphical user interface comprises a web browser application.

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DATABRICKS EX1002 Page 422

129. (New) The network system of Claim 127 wherein the user interface comprises a voice user interface.

130. (New) The network system of Claim 129 wherein the voice user interface comprises a speech recognition application.

131. (New) The network system of Claim 129 wherein the voice user interface comprises a speech synthesis application.

132. (New) The network system of Claim 129 wherein the voice user interface comprises a speech playback device.

133. (New) The network system of Claim 120 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising data and instructions executable within the agent server.

134. (New) The network system of Claim 120 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising a permission for the agent.

135. (New) A method comprising:

allowing an agent to consume a service resource while utilizing a service; and

mediating interaction between the service and the agent.

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136. (New) The method of Claim 135 wherein mediating comprises monitoring the amount of a service resource consumed by the agent.

137. (New) The method of Claim 135 wherein mediating comprises:

identifying a service permission required in order for the agent to consume the service resource; and

determining whether the agent holds the required service permission.

138. (New) The method of Claim 135 wherein mediating comprises:

receiving an instruction which requires that the agent consume the service resource associated with the service when the agent utilizes the service;

identifying an amount of the service resource which would be consumed if the instruction is executed;

identifying an amount of the service resource allotted to the agent; and

determining whether the amount which is allotted is greater than or equal to the amount which would be consumed.

139. (New) The method of Claim 138 wherein mediating comprises:

executing the instruction if the amount which is allotted is greater than or equal to the amount which would be consumed; and

subtracting the amount which would be consumed from the amount which is allotted.

140. (New) The method of Claim 135 further comprising converting between a first computer language used by an agent and a second computer language used by the service.

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141. (New) The method of Claim 135 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.—

REMARKS

Claims 1-76 are canceled. Claims 77-141 are added. Amendments to the specification are to identify related applications. No new matter is added.

Applicants request claims 77-141 be allowed and passed to issue and invite the Examiner to telephone Applicants' attorney at 415-217-6000 if there are any questions.

I hereby certify that this correspondence is being deposited with the United States Postal Service under Express Mail, label EL 707 907 142 US, in an envelope addressed to: Box Patent Application, Commissioner for Patents, Washington, D.C. 20231, on November 14, 2000.

Nov. 14, 2000
Attorney for Applicant(s) Date of Signature

Respectfully submitted,

Philip W. Woo
Attorney for Applicants
Reg. No. 39,880

DOCKET NO. 21427-000

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OIPE JC53 JAN 16 2001 PATENT & TRADEMARK OFFICE

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Danny Lange; Barbara Nelson; Jing Su; James E. White		
Assignee:	General Magic, Inc.		
Title:	NETWORK SYSTEM EXTENSIBLE BY USERS		
Serial No.:	09/712,712	Filed:	November 14, 2000
Examiner:	Unknown	Group Art Unit:	Unassigned
Docket No.:	M-6011-1C US		

San Jose, California
January 9, 2001

ASSISTANT COMMISSIONER FOR PATENTS
Washington, D. C. 20231

INFORMATION DISCLOSURE STATEMENT

Dear Sir:

Pursuant to 37 C.F.R. § 1.56, § 1.97 and § 1.98, the documents listed on the accompanying PTO Form-1449 are called to the attention of the Examiner for the above patent application. The documents cited herewith were previously cited in a related Application Serial No. 09/178,366 therefore, no copies of these documents are enclosed.

Citation of these documents shall not be construed as:

1. an admission that the documents are necessarily prior art with respect to the instant invention;

2. a representation that a search has been made, other than as described above; or

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IPR2025-00714
DATABRICKS EX1002 Page 426

3. an admission that the information cited herein is, or is considered to be, material to patentability as defined in § 1.56(b).

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on **January 9, 2001**.

Attorney for Applicants — Date of Signature: 1/9/01

Respectfully submitted,

Philip W. Woo
Attorney for Applicants
Reg. No. 39,880



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DATABRICKS EX1002 Page 427

#4

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Application of

Serial No.: 09/712,712

Filed: November 14, 2000

Title: Network system extensible by users.

Received
DEC 0 3 2002
Technology Center 2100

POWER TO INSPECT

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

The undersigned attorney of record in the above identified patent application hereby grants to TERRY KANNOFSKY / KATHY KANNOFSKY / AMBER CLICK and JAMES KANNOFSKY, all of TK ASSOCIATES INC., the power to inspect and copy the above mentioned application and file.

Respectfully submitted,

Philip W. Woo, Esquire

Date: 11/20/02

Reg. # 39,880

WEST Search History

DATE: Monday, December 15, 2003

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT; THES=ASSIGNEE; PLUR=YES; OP=ADJ			
L18	L16 and wrapper	5	L18
L17	L16 and service resource	1	L17
L16	L15 and service	21	L16
L15	L14 and l13	23	L15
L14	agent server	322	L14
L13	agent object	514	L13
L12	L11 and resource$1	5	L12
L11	L10 and agent	6	L11
L10	L9 and service and l4	18	L10
L9	((379/$)!.CCLS.)	43453	L9
L8	L7 and l4	3	L8
L7	((379/88$)!.CCLS.)	2548	L7
L6	(((709/203)!.CCLS.))	1927	L6
L5	(((709/226)!.CCLS.))	717	L5
L4	((709/202)!.CCLS.)	618	L4
L3	L2 same service resources	15	L3
L2	L1 near50 resource	224	L2
L1	agent near50 service	4111	L1

END OF SEARCH HISTORY

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/712,712	11/14/2000	Danny Lange	M-6011-1C-US	4612

7590 12/29/2003

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25 Metro Drive
Suite 700
San Jose, CA 95110

EXAMINER	
GECKIL, MEHMET B	

ART UNIT	PAPER NUMBER
2142	5

DATE MAILED: 12/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

IPR2025-00714
DATABRICKS EX1002 Page 430

Office Action Summary	Application No.	Applicant(s)	
	09/712,712	LANGE ET AL.	
	Examiner	Art Unit	
	Mehmet B. Geckil	2142	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *77-141* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *77-141* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

IPR2025-00714
DATABRICKS EX1002 Page 431

1. Claims 77-141 are presented for examination.

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 77-134 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-56 of U.S. Patent No. 6,163,794. Although the conflicting claims are not identical, they are not patentably distinct from each other because the difference in scope is not substantial enough therefore it would have been obvious for one of ordinary skill in the networking art to bridge what was taught before and what is disclosed in the present application.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 135-141 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dilip et al.

6. Dilip et al (6,657,990) taught the invention substantially as claimed including a system which provided network based interaction for allowing an agent application to consume a service resource while utilizing a service; and for mediating interaction between the service and the agent application (see col 5, line 32 et seq, and col 6, line 51 et seq.)

7. It would have been obvious to one of ordinary skill in the network and agent based systems that the claimed invention differed from the teachings of Dilip et al only by a degree, e.g., the agent application versus the claimed agent. But this is no more then a difference in a degree because agent application serves to the agent thus is a proxy for the agent. Other claimed elements are all obvious variations of the well known features of agent and proxy art. Applicant should note that Dilip et al teaches using a software based telephony service just as the applicant's telephone service as well as electronic mail (90,114), fax (92,116), and video (94,118) which are all in digital form.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehmet Geckil whose telephone number is (703) 305-9676. The examiner can normally be reached on Monday through Friday from 6:30 A.M. to 3:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Jack Harvey, can be reached on (703) 305-9705. The fax phone numbers for the organization where this application or proceeding is assigned are listed hereinbelow.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3800/4700. Customer service number is (703) 306-5631.

Any response to this action should be mailed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

(703) 872-9306

Hand-delivered responses should be brought to Crystal Park II, 2021 Crystal Drive, Arlington. VA., Fourth Floor (Receptionist).

12/19/03

MEHMET B. GECKIL
PRIMARY EXAMINER

Notice of References Cited	Application/Control No. 09/712,712	Applicant(s)/Patent Under Reexamination LANGE ET AL.	
	Examiner Mehmet B. Geckil	Art Unit 2142	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-6,657,990	12-2003	Dilip et al.	370/352
	B	US-6,457,063	09-2002	Chintalapati et al.	709/317
	C	US-6,363,411	03-2002	Dugan et al.	709/202
	D	US-6,285,977	09-2001	Miyazaki, Kazuya	703/26
	E	US-6,163,794	12-2000	Lange et al.	709/202
	F	US-5,825,759	10-1998	Liu, George	370/331
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Jonathan Dale, "A Mobile Agent Architecture to Support Distributed Resource Information Management", University of Southampton, Department of Electronics and Computer Science, 79 pages, 23 june 1998.
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Department of Commerce, Patent and Trademark Office	Atty Docket No.	Serial No.
	M-6011-1C US	09/712,712
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Applicants: Danny Lange, Barbara Nelson,	
(Use several sheets if necessary)	Jing Su and James E. White	
	Filing Date	Group 2142
	November 14, 2000	

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U.S. Patent Documents

*Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
MG	AA*	6,067,568	5/23/00	Li et al.	709	223	
	AB*	6,016,520	1/18/00	Facq et al.	710	33	
	AC*	5,983,267	11/9/99	Shklar et al.	709	217	
	AD*	5,983,190	11/9/99	Trower II, et al.	704	276	
	AE*	5,974,441	10/26/99	Rogers et al.	709	200	
	AF*	5,963,949	10/5/99	Gupta et al.	707	100	
	AG*	5,913,214	6/15/99	Madnick et al.	707	10	
	AH*	5,826,258	10/20/98	Gupta et al.	707	4	
	AI*	5,655,081	8/5/97	Bonnell et al.	709	202	
	AJ*	6,016,393	1/18/00	White et al.	395	683	
	AK*	5,953,392	9/14/99	Rhie et al.	379	8813	
MG	AL*	5,603,031	2/11/97	White et al.	395	683	

Foreign Patent Documents

		Document	Date	Country	Class	Subclass	Translation Yes	Translation No
	AM							
	AN							
	AO							
	AP							

OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)

MG	AQ*	JP Morgenthal, "XML Agents," NC.Focus website (www.ncfocus.com), 1998, Pages 1-4.
MG	AR*	D. Tsichritzis, et al., " KNOs: Knowledge Acquisition, Dissemination, and Manipulation Objects," ACM Transactions on Office Information Systems, Vol. 5, No. 1, January 1987, pages 96-112.
MG	AS*	C. Daniel Wolfson, et al., "Intelligent Routers," The 9th International Conference on Distributed Computing Systems, IEEE Computer Society Press, 1989, pages 371-376.

Examiner Mehdi Jazayeri	Date Considered 12/17/03

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with your communication to applicant.

PTO Form 1449 712117 v1

*A copy of this reference is not being furnished as it was cited in related Application Serial No. 09/178,366.

OIPE JC67
APR 26 2004
PATENT & TRADEMARK OFFICE

Sterne Kessler Goldstein Fox
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April 28, 2004

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Commissioner for Patents
P.O. Box 1450
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Art Unit 2142

RECEIVED
MAY 0 3 2004
Technology Center 2100

Re: U.S. Utility Patent Application
Appl. No. 09/712,712; Filed: November 14, 2000
For: **Network System Extensible by Users**
Inventors: Lange *et al.*
Our Ref: 2222.0300001

Sir:

Transmitted herewith for appropriate action are the following documents:

1. PTO-2038 Credit Card Payment Form for $220.00 to cover:
$110.00 Extension of Time Fee;
$110.00 Terminal Disclaimer Fee;

2. Fee Transmittal Form (PTO/SB/17);

3. Petition for Extension of Time Under 37 C.F.R. § 1.136(a)(1);

4. Amendment and Reply Under 37 C.F.R. § 1.111;

5. Revocation of Prior Power of Attorney and Appointment of New Attorneys of Record;

6. Terminal Disclaimer to Obviate a Double Patenting Rejection Over a Prior Patent;

7. Statement Under 37 C.F.R. § 3.73(b) accompanied by a copy of each assignment in the chain of title (Lange *et al.* to General Magic Inc.; General Magic Inc. to Intellectual Ventures Patent Holding I, L.L.C.; and Intellectual Ventures Patent Holding I, L.L.C. to Ben Franklin Patent Holding L.L.C.;

8. Change of Correspondence Address;

IPR2025-00714
DATABRICKS EX1002 Page 437

9. Request for Change of Attorney Docket Number; and

10. One (1) return postcard.

It is respectfully requested that the attached postcard be stamped with the date of filing of these documents, and that it be returned to our courier. In the event that extensions of time are necessary to prevent abandonment of this patent application, then such extensions of time are hereby petitioned.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

Thomas C. Fiala
Attorney for Applicants
Registration No. 43,610

TCF/LAG/lam
Enclosures

257943.1

IPR2025-00714
DATABRICKS EX1002 Page 438

OIPE JC67 APR 28 2004 PATENT & TRADEMARK OFFICE

PTO/SB/17 (10-03)
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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 220.00

Complete if Known	
Application Number	09/712,712
Filing Date	November 14, 2000
First Named Inventor	Danny Lange
Examiner Name	Geckil, Mehmet B.
Art Unit	2142
Attorney Docket No.	2222.0300001

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METHOD OF PAYMENT *(check all that apply)*

☐ Check ☒ Credit card ☐ Money Order ☒ Other** ☐ None

☐ **Charge any deficiencies or credit any overpayments in Deposit Account: *the fees to Deposit Acct. No. 19-0036.*

Deposit Account Number: 19-0036

Deposit Account Name: Sterne Kessler, Goldstein & Fox P.L.L.C.

The Director is authorized to: *(check all that apply)*

☐ Charge fee(s) indicated below ☐ Credit any overpayments

☐ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($) 0.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims		Fee from below	Fee Paid
Total Claims		- 20 **=		X =
Independent Claims		- 3 **=		X =
Multiple Dependent				=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0.00

***or number previously paid, if greater; For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	110.00
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) Terminal Disclaimer Fee 110.00

*Reduced by Basic Filing Fee Paid **SUBTOTAL (3)** ($) 220.00

SUBMITTED BY				(Complete *(if applicable)*)	
Name (Print/Type)	Thomas C. Fiala	*Registration No. (Attorney/Agent)*	43,610	*Telephone*	(202) 371-2600
Signature				*Date*	4/28/04

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This collection of information is required by 37 CFR 1.17 and 1.27. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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5/14/04

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No.: 4612
Lange *et al.*	Art Unit: 2142
Appl. No.: 09/712,712	Examiner: Geckil, Mehmet B.
Filed: November 14, 2000	Atty. Docket: 2222.0300001
For: **Network System Extensible by Users**	

Amendment and Reply Under 37 C.F.R. § 1.111

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In reply to the Office Action dated December 29, 2003, (PTO Prosecution File Wrapper Paper No. 5), Applicants submit the following Amendment and Remarks. This Amendment is provided in the following format:

(A) Each section begins on a separate sheet;

(B) Starting on a separate sheet, amendments to the specification by presenting replacement paragraphs marked up to show changes made;

(C) Starting on a separate sheet, a complete listing of all of the claims:

- in ascending order;
- with status identifiers; and
- with markings in the currently amended claims;

(D) Starting on a separate sheet, the Remarks.

It is not believed that extensions of time or fees for net addition of claims are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned

under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to our Deposit Account No. 19-0036.

Amendments to the Claims

1-76. (canceled)

77. (previously presented) A network system comprising:

a service;

an agent operable to use the service on behalf of a principal and to consume a service resource while using the service;

an agent server operable to mediate the use of the service by the agent; and

a service wrapper associated with the service, the service wrapper operable to monitor the consumption of the service resource by the agent.

78. (previously presented) The network system of Claim 77 wherein the service wrapper is operable to terminate the agent in response to the monitoring.

79. (previously presented) The network system of Claim 77 wherein the agent server is operable to charge the principal for the consumption of the service resource.

80. (previously presented) The network system of Claim 77 further comprising a service permission associated with the service resource and the agent, the service permission specifying a predetermined amount of the service resource which the agent is allowed to consume.

81. (previously presented) The network system of Claim 77 further comprising a service permission associated with the service resource and the principal, the service permission specifying a predetermined amount of the service resource which is allowed to be consumed on behalf of the principal.

82. (previously presented) The network system of Claim 77 wherein the service resource comprises elapsed time for a telephone call.

83. (previously presented) The network system of Claim 77 wherein the service resource comprises cost for a telephone call.

84. (previously presented) The network system of Claim 77 wherein the service wrapper is operable to translate between a first instruction set and a second instruction set.

85. (previously presented) The network system of Claim 77 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete an agent template from which the agent is created.

86. (previously presented) The network system of Claim 77 further comprising a user interface coupled to the agent server, the user interface operable to allow a user to create, modify, or delete the agent.

87. (previously presented) The network system of Claim 86 wherein the user interface comprises a graphical user interface.

88. (previously presented) The network system of Claim 87 wherein the graphical user interface comprises:

a web server resident in the network system; and

a web browser resident in a user device.

89. (previously presented) The network system of Claim 86 wherein the user interface comprises a voice user interface.

90. (previously presented) The network system of Claim 89 wherein the voice user interface comprises a speech recognition application.

91. (previously presented) The network system of Claim 89 wherein the voice user interface comprises a speech synthesis application.

92. (previously presented) The network system of Claim 89 wherein the voice user interface comprises a speech playback device.

93. (previously presented) The network system of Claim 77 wherein the service comprises a user interface service operable to provide a user interface by which the agent can interact with a user.

94. (previously presented) The network system of Claim 93 wherein the user interface comprises a graphical user interface.

95. (previously presented) The network system of Claim 94 wherein the graphical user interface comprises:

a web server resident in the network system; and

a web browser resident in a user device.

96. (previously presented) The network system of Claim 93 wherein the user interface comprises a voice user interface.

97. (previously presented) The network system of Claim 96 wherein the voice user interface comprises a speech recognition application.

98. (previously presented) The network system of Claim 96 wherein the voice user interface comprises a speech synthesis application.

99. (previously presented) The network system of Claim 96 wherein the voice user interface comprises a speech playback device.

100. (previously presented) The network system of Claim 77 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.

101. (previously presented) A network system comprising:

a user interface operable to allow a user to interact with the network system; and

an agent server coupled to the user interface, the agent server operable to manage the operation of a programmable functionality component of the network system, the agent server in conjunction with the user interface operable to create, modify, or delete an agent in response to interaction by the user, the agent operable to consume a service resource as the agent uses a service on behalf of the user.

102. (previously presented) The network system of Claim 101 wherein the user interface comprises a graphical user interface.

103. (previously presented) The network system of Claim 102 wherein the graphical user interface comprises a web browser application.

104. (previously presented) The network system of Claim 101 wherein the user interface comprises a voice user interface.

105. (previously presented) The network system of Claim 104 wherein the voice user interface comprises a speech recognition application.

106. (previously presented) The network system of Claim 104 wherein the voice user interface comprises a speech synthesis application.

107. (previously presented) The network system of Claim 104 wherein the voice user interface comprises a speech playback device.

108. (previously presented) The network system of Claim 101 wherein the user interface comprises an agent area for creating, modifying, or deleting the agent.

109. (previously presented) The network system of Claim 101 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.

110. (previously presented) The network system of Claim 101 further comprising a service wrapper associated with the service, the service wrapper operable to cooperate with the agent server to mediate interaction between the service and the agent.

111. (previously presented) The network system of Claim 110 wherein the service wrapper is operable to convert between a first computer language used by the agent and a second computer language used by the service.

112. (previously presented) The network system of Claim 110 wherein the service wrapper is operable to monitor the amount of service resource consumed by the agent when the agent utilizes the service.

113. (previously presented) A method comprising:

admitting a user to a network system wherein at least one agent is operable to consume a service resource while utilizing a service to perform a task for the user; and

allowing the user to create, modify, or delete the agent within the network system.

114. (previously presented) The method of Claim 113 further comprising accepting an agent command from the user.

115. (previously presented) The method of Claim 114 wherein the agent command is one of a create agent command, an edit agent command, and a delete agent command.

116. (previously presented) The method of Claim 113 further comprising suspending execution of the agent.

117. (previously presented) The method of Claim 113 further comprising accepting a template command from the user.

118. (previously presented) The method of Claim 117 further comprising allowing the user to create, modify, or delete an agent template within the network system.

119. (previously presented) The method of Claim 113 further comprising admitting the user to an agent area of a user interface.

120. (previously presented) A network system comprising:

an agent server operable to manage the operation of a programmable functionality component of the network system;

a service;

an agent operable to consume a service resource while utilizing the service; and

a service wrapper associated with the service, the service wrapper operable to cooperate with the agent server to mediate interaction between the service and the agent.

121. (previously presented) The network system of Claim 120 wherein the service wrapper comprises a monitor, the monitor operable to monitor the amount of the service resource consumed by the agent when the agent utilizes the service.

122. (previously presented) The network system of Claim 120 wherein the service wrapper comprises a converter, the converter operable to convert between a first computer language used by the agent and a second computer language used by the service.

123. (previously presented) The network system of Claim 122 wherein the converter comprises an agent server to service converter for converting from the first computer language to the second computer language.

124 (previously presented) The network system of Claim 122 wherein the converter comprises a service to agent server converter for converting from the second computer language to the first computer language.

125. (previously presented) The network system of Claim 120 wherein the service supports at least one of voice mail, electronic mail, electronic appointment book, electronic address book, and on-line data retrieval.

126. (previously presented) The network system of Claim 120 further comprising a user interface operable to allow a user to interact with the network system in order to create the agent.

127. (previously presented) The network system of Claim 126 wherein the user interface comprises a graphical user interface.

128. (previously presented) The network system of Claim 127 wherein the graphical user interface comprises a web browser application.

129. (previously presented) The network system of Claim 127 wherein the user interface comprises a voice user interface.

130. (previously presented) The network system of Claim 129 wherein the voice user interface comprises a speech recognition application.

131. (previously presented) The network system of Claim 129 wherein the voice user interface comprises a speech synthesis application.

132. (previously presented) The network system of Claim 129 wherein the voice user interface comprises a speech playback device.

133. (previously presented) The network system of Claim 120 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising data and instructions executable within the agent server.

134. (previously presented) The network system of Claim 120 further comprising an agent object associated with the agent and resident in the agent server, the agent object comprising a permission for the agent.

135-141. (canceled)

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 77-134 are pending in the application, with 77, 101, 113, and 120 being the independent claims. Claims 135-141 are sought to be cancelled without prejudice to or disclaimer of the subject matter therein. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Obviousness-Type Double Patenting Rejections

In the Office Action, claims 77-134 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-56 of U.S. Patent No. 6,163,794.

Applicants are submitting a Terminal Disclaimer concurrently herewith to overcome the double patenting rejection. Thus, Applicants respectively request that the Examiner reconsider and withdraw the rejection.

Rejections under 35 U.S.C. § 103

Claims 135-141 were rejected under 35 U.S.C. §103(a) as being unpatentable over Dilip, *et al,* U.S. Patent 6,657,990. In order to expedite allowance of this case, Applicants have cancelled each of these claims without prejudice to or disclaimer of the

subject matter therein, thereby rendering these rejections moot. Applicants hereby expressly reserve the right to present the cancelled subject matter in a continuation application.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

Thomas C. Fiala
Attorney for Applicants
Registration No. 43,610

Date: April 28, 2004

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

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Application

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P.O. Box 1450
Alexandria, VA 22313-1450.

Application Number	09/712,712
Filing Date	November 14, 2000
First Named Inventor	Lange et al.
Art Unit	2142
Examiner Name	Geckil, Mehmet B.
Attorney Docket Number	2222.0300001

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I am the:

[ ] Applicant/Inventor

[ ] Assignee of record of the entire interest.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

[X] Attorney or Agent of record. Registration Number 37,575.

[ ] Registered practitioner named in the application transmittal letter in an application without an executed oath or declaration. See 37 CFR 1.33(a)(1). Registration Number_____.

Typed or Printed Name	Michael V. Messinger		
Signature			
Date	April 28, 2004	Telephone	(202) 371-2600

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

[ ] *Total of _____forms are submitted.

This collection of information is required by 37 CFR 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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#6
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No.: 4612
Lange *et al.*	Art Unit: 2142
Appl. No.: 09/712,712	Examiner: Geckil, Mehmet B.
Filed: November 14, 2000	Atty. Docket: 2222.0300001
For: **Network System Extensible by Users**	

Revocation of Prior Power of Attorney and Appointment of New Attorneys of Record

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Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

The undersigned, having express authority to represent Ben Franklin Patent Holding L.L.C., the assignee of the entire right, title, and interest in the above-captioned application, by assignment filed at the U.S. Patent and Trademark Office on April 21, 2004 (copy enclosed), hereby revokes all powers of attorney heretofore given in the above-captioned application and appoints as his attorneys the attorneys associated with Customer Number 28393, those attorneys currently being: Robert Greene Sterne, Esq., Registration No. 28,912; Edward J. Kessler, Esq., Registration No. 25,688; Jorge A. Goldstein, Esq., Registration No. 29,021; David K.S. Cornwell, Esq., Registration No. 31,944; Robert W. Esmond, Esq., Registration No. 32,893; Tracy-Gene G. Durkin, Esq., Registration No. 32,831; Michele A. Cimbala, Esq., Registration No. 33,851; Michael B. Ray, Esq., Registration No. 33,997; Robert E. Sokohl, Esq., Registration No. 36,013; Eric K. Steffe, Esq., Registration No. 36,688; Michael Q. Lee, Esq., Registration No. 35,239; Steven R. Ludwig, Esq., Registration No. 36,203; John M. Covert, Esq., Registration No. 38,759; Linda E. Alcorn, Esq., Registration No. 39,588; Lawrence B. Bugaisky, Esq., Registration No. 35,086; Donald J. Featherstone, Esq., Registration No.

33,876; Robert C. Millonig, Esq., Registration No. 34,395; Michael V. Messinger, Esq., Registration No. 37,575; Judith U. Kim, Esq., Registration No. 40,679; Timothy J. Shea, Jr., Esq., Registration No. 41,306; Patrick E. Garrett, Esq., Registration No. 39,987; with full power of substitution, association, and revocation, to prosecute said application and to transact all business in the United States Patent and Trademark Office connected therewith.

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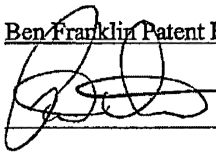
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STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 New York Avenue, N.W.
Washington, D.C. 20005-3934.

Direct telephone calls to (202) 371-2600.

FOR: Ben Franklin Patent Holding L.L.C.

SIGNATURE: 

BY: PETER DETKIN

TITLE: MANAGING-DIRECTOR

DATE: 26 APRIL 2004

252194.1

OIPE JC67 APR 26 2004 PATENT & TRADEMARK OFFICE

PTO/SB/96 (08-03)
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2222.0300001

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Lange et al.

Application No./Patent No.: 09/712,712 Filed/Issue Date: November 14, 2000

Entitled: Network System Extensible By Users

Ben Franklin Patent Holding L.L.C., a corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. [X] the assignee of the entire right, title, and interest; or

2. [ ] an assignee of less than the entire right, title and interest.
The extent (by percentage) of its ownership interest is _____ % in the patent application patent identified above by virtue of either:

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OR

B. [X] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as shown below:

1. From: Lange et al. To: General Magic, Inc.
The document was recorded in the Patent and Trademark Office at
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2. From: General Magic, Inc. To: Intellectual Ventures Patent Holding I, L.L.C.
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3. From: Intellectual Ventures Patent Holding I, L.L.C. To: Ben Franklin Patent Holding L.L.C.
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[ ] Additional documents in the chain of title are listed on a supplemental sheet.

[X] Copies of assignments or other documents in the chain of title are attached.
[NOTE: A separate copy (*i.e.*, the original assignment document or a true copy of the original document) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded in the records of the PTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

26APRIL2004
Date

PETER DETKIN
Typed or printed name

Telephone number

Signature

MANAGING DIRECTOR
Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you are required to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Attorney Docket No.: M-6011 US

ASSIGNMENT

For good and valuable consideration, receipt of which is hereby acknowledged, we

Danny Lange	of	Cupertino, California
Barbara Nelson	of	San Mateo, California
Jing Su	of	Cupertino, California
James E. White	of	San Carlos, California

hereby sell, assign and transfer to General Magic, a Delaware corporation, having a place of business at 420 N. Mary Avenue, Sunnyvale, California, 94086, its successors and assigns, the entire right, title and interest throughout the world in our invention in

"Network System Extensible By Users"

for which we have executed a United States patent application on or about the date of this assignment, and all patent applications and patents of every country for said invention, including divisions, reissues, continuations and extensions thereof, and all rights of priority resulting from the filing of said applications; we authorize the above-named assignee to apply for patents of foreign countries for said invention, and to claim all rights of priority without further authorization from us; we agree to execute all papers useful in connection with said United States and foreign applications, and generally to do everything possible to aid said assignee, their successors, assigns and nominees, at their request and expense, in obtaining and enforcing patents for said invention in all countries; and we request the Commissioner of Patents and Trademarks to issue all patents granted for said invention to the above-named assignee, its successors and assigns.

Executed this 22 day of October, 1998

(Danny Lange)

State of California)
) ss.
County of Santa Clara)

On Oct. 22, 1998 before me, Martha E. Peralez (Notary) personally appeared Danny Lange proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

MGC1 Martha E. Peralez Comm. #1145838 NOTARY PUBLIC CALIFORNIA SANTA CLARA COUNTY Comm Exp July 5, 2001 MGC1

WITNESS my hand and official seal.

Martha E. Peralez
SIGNATURE OF NOTARY

IPR2025-00714
DATABRICKS EX1002 Page 455

Executed this 22 day of October, 1998.

Barbara Nelson
(Barbara Nelson)

State of California)
) ss.
County of Santa Clara)

On Oct. 22. 1998 before me, Martha E. Peralez (Notary) personally appeared Barbara Nelson proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that she executed the same in her authorized capacity, and that by her signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

Martha E. Peralez
SIGNATURE OF NOTARY

MGC1 Martha E. Peralez Comm. #1145838 NOTARY PUBLIC CALIFORNIA SANTA CLARA COUNTY Comm Exp July 5, 2001 MGC1

Executed this 22 day of October, 1998

Jing Su
(Jing Su)

State of California)
) ss.
County of Santa Clara)

On Oct 22 1998 before me, Martha E. Peralez (Notary) personally appeared Jing Su proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

Martha E. Peralez
SIGNATURE OF NOTARY

MGC1 Martha E. Peralez Comm. #1145838 NOTARY PUBLIC CALIFORNIA SANTA CLARA COUNTY Comm Exp July 5, 2001 MGC1

IPR2025-00714
DATABRICKS EX1002 Page 456

Executed this 22 day of October, 1998

James E White
(James E. White)

State of California)
) ss.
County of Santa Clara)

On Oct. 22. 1998 before me, Martha E. Peralez (Notary) personally appeared James E. White or proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

MGC1 Martha E. Peralez Comm. #1145838 NOTARY PUBLIC CALIFORNIA SANTA CLARA COUNTY Comm Exp July 5, 2001 MGC1

WITNESS my hand and official seal.

Martha E. Peralez
SIGNATURE OF NOTARY

IPR2025-00714
DATABRICKS EX1002 Page 457

EXECUTION COPY

ASSET PURCHASE AGREEMENT

This Asset Purchase Agreement (the "Agreement") is made and entered into as of April 22, 2003, by and between General Magic, Inc., a Delaware corporation and a debtor and a debtor in possession ("Seller"), and Intellectual Ventures Patent Holding I, L.L.C., a Delaware limited liability company ("Purchaser").

RECITALS

A. Seller was a leading provider of voice infrastructure software products (the "Business").

B. On December 11, 2002, a voluntary bankruptcy case was filed by Seller under Chapter 11 of the United States Bankruptcy Code, 11 U.S.C. § 101, et seq. (the "**Bankruptcy Code**"), assigned Case No. 02-57022 (the "**Chapter 11 Case**"). Seller's bankruptcy case is pending in the United States Bankruptcy Court for the Northern District of California (the "**Bankruptcy Court**").

C. Seller wishes to sell to Purchaser, and Purchaser wishes to purchase from Seller, certain assets relating to the Business, upon the terms and subject to the conditions of this Agreement, and subject to the entry of an order of the Bankruptcy Court authorizing the transactions contemplated hereby.

AGREEMENT

NOW, THEREFORE, in consideration of the above recitals, which are incorporated in this Agreement by reference, and the mutual representations, warranties and agreements contained herein, the parties hereto, intending to be legally bound, agree as follows:

ARTICLE I
PURCHASE AND SALE OF ACQUIRED ASSETS

SECTION 1.1. Purchase and Sale.

(a) Upon the terms and subject to the conditions of this Agreement, Seller hereby agrees to sell, assign, transfer, convey and deliver to Purchaser, effective as of the Closing, and Purchaser hereby agrees to purchase, effective as of the Closing, all of Seller's right, title and interest in, to and under the Acquired Assets (defined in Section 1.2(a), below) free and clear of all liens, claims and interests, security interests, security agreements, tax liens, judgments, encumbrances, mortgages, rights, charges, liabilities, obligations, restrictions and, except as otherwise provided herein or in Schedule 3.1(c), any licenses or other rights of third parties (implied or express) (collectively, "**Encumbrances**"), such transfers to be effected pursuant to the Bill of Sale and Assignment and Assumption Agreement referred to in Section 2.2 and the Sale Order (defined in Section 1.3(b)).

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DATABRICKS EX1002 Page 458

(b) For purposes of this Agreement, "**Intellectual Property**" shall mean, in each case, in any jurisdiction in the world: trade secrets; patents, patent licenses, and patent applications and any counterparts, reissues, divisions, extensions, continuations and continuations in part related to, and any other patents claiming priority from the foregoing; copyrights; copyright applications; trademarks; trade names; service marks; discoveries; inventions; know-how; protocols; formulae; processes; procedures; drawings; plans; designs; features; data; research; inventions; innovations; operating instructions; computer software; any computer software source code (both human readable and machine readable forms); object code compiled from the source code and any relevant comments, specifications and documentation.

SECTION 1.2. Acquired Assets and Excluded Assets.

(a) The term "**Acquired Assets**" means the Intellectual Property owned, held or licensed by Seller and listed on Schedule 1.2(a) (including any license or other agreements being assigned to and assumed by Purchaser, collectively "**Assumed Contracts**"), but excluding any asset that is an Excluded Asset. The transfer of the Acquired Assets shall take place pursuant to the transfer agreements described in Section 2.2(a). Purchaser reserves the right, up to the time of Closing, to withdraw one or more of the Assumed Contracts from this Agreement.

(b) Purchaser hereby assumes, effective as of the Closing, and agrees to pay, perform and discharge when due, those obligations and liabilities arising in connection with the Acquired Assets following the Closing; *provided, however*, that in no event shall Purchaser assume (i) any obligations or liabilities arising or accruing prior to the Closing (including any obligations or liabilities arising from or relating to any breach of any provision of any of the Assumed Contracts, or from any event, circumstance or condition occurring or existing on or prior to the Closing that, with notice or lapse of time, would constitute or result in a breach of any of the Assumed Contracts, or which are not ascertainable in nature and amount solely by reference to the express written terms of the Assumed Contracts) or (ii) any obligations or liabilities not expressly assumed hereunder (including all obligations and liabilities relating to the Excluded Assets).

(c) Notwithstanding anything to the contrary herein, the Acquired Assets shall not include the following "**Excluded Assets**":

(i) All rights of Seller under this Agreement and the agreements, instruments and certificates delivered in connection with this Agreement.

(ii) Avoidance actions under the Bankruptcy Code and the proceeds thereof.

SECTION 1.3. Purchase Price.

(a) The purchase price for the Acquired Assets (the "**Purchase Price**") shall be US|

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DATABRICKS EX1002 Page 459

IN WITNESS WHEREOF, Seller and Purchaser have caused this Agreement to be signed by their respective officers thereunto duly authorized, all as of the date first written above.

INTELLECTUAL VENTURES PATENT HOLDING I, L.L.C., a Delaware limited liability company
By: Intellectual Ventures Management, L.L.C., its sole manager

By:_____
Name: Gregory Gorder
Title: Managing Director

GENERAL MAGIC, INC., a Delaware corporation

By: Mary E. Doyle
Name: Mary E. Doyle
Title: Responsible Individual

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DATABRICKS EX1002 Page 460

Schedule 1.2 (a) – Acquired Assets

For the avoidance of doubt, the Acquired Assets also include any counterparts, reissues, divisions, extensions; continuations and continuations in part related to, and any other patents claiming priority from, any of the patents listed below in any jurisdiction worldwide.

1. System and Method for Distributed Computation based Upon the Movement, Execution and Interaction of Processes in a Network – US Patent Nos. 5,603,031 (including related foreign filings pending in Canada (#2143672), Hong Kong (#98116124.8) and Japan (7-509799)), 6,016,393

2. Objective Code Structure and Method for Translation of Architecture Independent Program Implementations – US Patent No. 6,021,275.

3. Network System Extensible by Users – US Patent No. 6,163,794

4. Mobile Device Patents

   a) Graphical user interface for modifying object characteristics using coupon objects – U.S. Patent No. *5,611,031*
   b) Graphical user interface for navigating between levels displaying hallway and room metaphors – U.S. Patent Nos. *5,689,669, 5,896,133*
   c) Shadow mechanism having master blocks for a modifiable object oriented system – U.S. Patent Nos. *5,692,187, 5,819,306*
   d) Method for transmitting information over an intelligent low power serial bus – U.S. Patent No. *5,675,811*
   e) Bus interface circuit for an intelligent low power serial bus – U.S. Patent No. *5,787,298*
   f) Method for transmitting bus commands and data over two wires of a serial bus – U.S. Patent No. *5,793,993*
   g) Support structures for an intelligent low power serial bus – U.S. Patent No. *5,812,796*
   h) Method for configuring an intelligent low power serial bus – U.S. Patent No. *5,938,742*

5. Mobile Device Software – Magic Cap (Communicating Application Platform) Software (Versions 1.0, 1.5, 3.0 and 3.1)

6. Mobile Device Hardware Reference Designs

7. Technology License Agreement between Seller and Toshiba Corporation dated November 25, 1993, as amended.

8. PCT (#US94/07397)and EPO (#94305058.3) applications

IPR2025-00714
DATABRICKS EX1002 Page 461

State of Delaware
Secretary of State
Division of Corporations
Delivered 11:23 AM 11/24/2003
FILED 10:41 AM 11/24/2003
SRV 030759952 - 3669814 FILE

CERTIFICATE OF AMENDMENT

OF

INTELLECTUAL VENTURES PATENT HOLDING I, L.L.C.

The undersigned, being duly authorized to execute and file this Certificate of Amendment, does hereby certify as follows:

1. The name of the limited liability company is Intellectual Ventures Patent Holding I, L.L.C.

2. Paragraph 1 of the Certificate of Formation is amended in its entirety to read as follow:

"1. *Name.* The name of the limited liability company is Ben Franklin Patent Holding LLC."

IN WITNESS WHEREOF, the undersigned has duly executed this Certificate of Amendment on the 18th day of November, 2003.

Acquisition Management LLC, Manager

By: _____
Gregory Gorder, Managing Director

[3803310021S.DOC] 11/19/2003

IPR2025-00714
DATABRICKS EX1002 Page 462

OIPE JC67 APR 28 2004 PATENT & TRADEMARK OFFICE

#8
8 3rd
5/14/04

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No.: 4612
LANGE *et al.*	Art Unit: 2142
Appl. No.: 09/712,712	Examiner: Geckil, Mehmet B.
Filed: November 14, 2000	Atty. Docket: 2222.0300001
For: **Network System Extensible by Users**	

Request for Change of Attorney Docket Number

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Technology Center 2100

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants respectfully request that the attorney docket number for the above-captioned application be changed from ***"M-6011-1C US"*** to ***- - 2222.0300001 - -***. Kindly use this attorney docket number in any future correspondence addressed to the undersigned.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

Thomas C. Fiala
Attorney for Applicants
Registration No. 43,610

Date: April 28, 2004

1100 New York Avenue, N.W.
Washington, D.C. 20005
(202) 371-2600

258048.1

OIPE JC67 APR 28 2004 PATENT & TRADEMARK OFFICE

#9
5/14/04

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No.: 4612
Lange *et al.*	Art Unit: 2142
Appl. No.: 09/712,712	Examiner: Geckil, Mehmet B.
Filed: November 14, 2000	Atty. Docket: 2222.0300001
For: **Network System Extensible by Users**	

Petition for Extension of Time Under 37 C.F.R. § 1.136(a)(1)

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Commissioner for Patents
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Alexandria, VA 22313-1450

Sir:

It is hereby requested that the period for replying to the outstanding Office Action be extended one months from March 29, 2004 to April 29, 2004 by the filing of this Petition and fee payment.

The petition fee (37 C.F.R. § 1.17(a)) is believed to be $110.00 for a one (1) month extension for a large entity. Fee payment is provided in our accompanying PTO-2038 Credit Card Payment Form. However, if extensions of time under 37 C.F.R. § 1.136 other than those provided herewith are required to prevent abandonment of the present patent application, then such extensions of time are hereby petitioned.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

04/29/2004 ZJUHAR1 00000060 09712712
01 FC:1251 110.00 OP

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

Thomas C. Fiala
Attorney for Applicants
Registration No. 43,610

Date: April 28, 2004

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

257935.1

IPR2025-00714
DATABRICKS EX1002 Page 464

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#11/TD M.E. Cosca S-1484

PTO/SB/26 (08-03)
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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A PRIOR PATENT

Docket Number (Optional) 2222.0300001

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In re Application of: Lange et al.
Application No.: 09/712,712
Filed: November 14, 2000
For: Network System Extensible By Users

The owner*, Ben Franklin Patent Holding L.L.C. of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. 154 and 173, as presently shortened by any terminal disclaimer, of prior Patent No. 6,163,794. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of the prior patent, as presently shortened by any terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ For submissions on behalf of an organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the organization.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

2. ☒ The undersigned is an attorney or agent of record.



Signature — April 28, 2004 — Date

Michael V. Messinger
Typed or printed name

(202) 772-8667
Telephone Number

☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner). Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

04/29/2004 ZJUHAR1 00000060 09712712

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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/712,712	11/14/2000	Danny Lange	2222.0300001

CONFIRMATION NO. 4612

26111
STERNE, KESSLER, GOLDSTEIN & FOX PLLC
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

OC000000012674142
OC000000012674142

Date Mailed: 05/14/2004

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/26/2004.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

SUSAN K FORD
2100 (703) 308-9045

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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/712,712	11/14/2000	Danny Lange	M-6011-1C-US

CONFIRMATION NO. 4612

OC000000012674065

OC000000012674065

Philip W Woo
Skjerven Morrill MacPherson LLP
25 Metro Drive
Suite 700
San Jose, CA 95110

Date Mailed: 05/14/2004

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/26/2004.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Susan K. Ford

SUSAN K FORD
2100 (703) 308-9045

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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/712,712	11/14/2000	Danny Lange	M-6011-1C-US

CONFIRMATION NO. 4612

OC000000012674065
OC000000012674065

Philip W Woo
Skjerven Morrill MacPherson LLP
25 Metro Drive
Suite 700
San Jose, CA 95110

Date Mailed: 05/14/2004

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/26/2004.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

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Susan K. Ford

SUSAN K FORD
2100 (703) 308-9045

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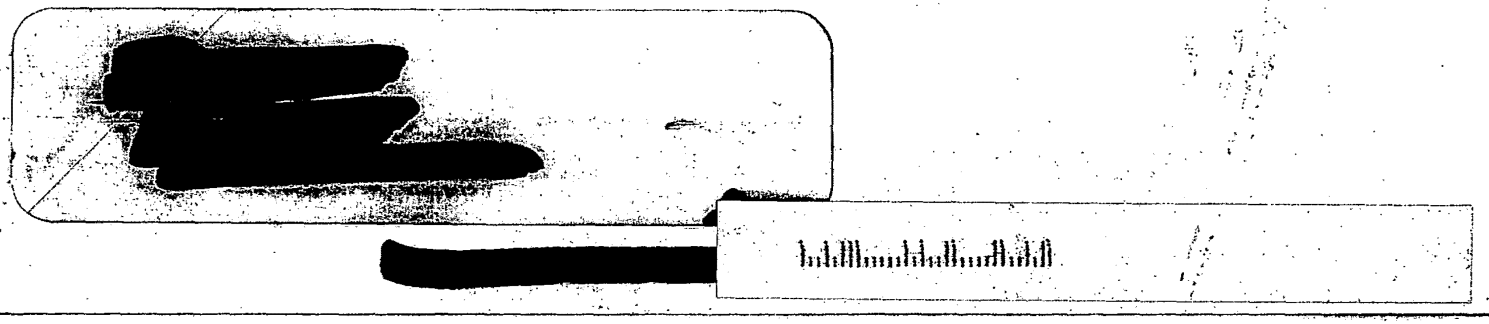
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☐	L18	L16 and wrapper	6
☐	L17	L16 and service resource	1
☐	L16	L15 and service	24
☐	L15	L14 and L13	26
☐	L14	agent server	383
☐	L13	agent object	551
☐	L12	L11 and resource$1	9
☐	L11	L10 and agent	10
☐	L10	L9 and service and L4	24
☐	L9	((379/$)!.CCLS.)	44718
☐	L8	L7 and L4	3
☐	L7	((379/88$)!.CCLS.)	2787
☐	L6	(((709/203)!.CCLS.))	2232
☐	L5	(((709/226)!.CCLS.))	855
☐	L4	((709/202)!.CCLS.)	690
☐	L3	L2 same service resources	17
☐	L2	L1 near50 resource	273
☐	L1	agent near50 service	4569

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NOTICE OF ALLOWANCE AND FEE(S) DUE

26111 7590 07/15/2004

STERNE, KESSLER, GOLDSTEIN & FOX PLLC
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER	
GECKIL, MEHMET B	
ART UNIT	PAPER NUMBER
2142	

DATE MAILED: 07/15/2004

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/712,712	11/14/2000	Danny Lange	2222.0300001	4612

TITLE OF INVENTION: NETWORK SYSTEM EXTENSIBLE BY USERS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1330	$0	$1330	10/15/2004

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 07/04) Approved for use through 04/30/2007.

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IPR2025-00714
DATABRICKS EX1002 Page 471

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Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
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Alexandria, Virginia 22313-1450
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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26111 7590 07/15/2004

STERNE, KESSLER, GOLDSTEIN & FOX PLLC
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (703) 746-4000, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/712,712	11/14/2000	Danny Lange	2222.0300001	4612

TITLE OF INVENTION: NETWORK SYSTEM EXTENSIBLE BY USERS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1330	$0	$1330	10/15/2004

EXAMINER	ART UNIT	CLASS-SUBCLASS
GECKIL, MEHMET B	2142	709-202000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent); ❑ individual ❑ corporation or other private group entity ❑ government

4a. The following fee(s) are enclosed:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s):

❑ A check in the amount of the fee(s) is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is not claiming SMALL ENTITY status. See, e.g., 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

(Authorized Signature) (Date)

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/712,712	11/14/2000	Danny Lange	2222.0300001	4612

26111 7590 07/15/2004

STERNE, KESSLER, GOLDSTEIN & FOX PLLC
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER	
GECKIL, MEHMET B	

ART UNIT	PAPER NUMBER
2142	

DATE MAILED: 07/15/2004

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 684 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 684 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (703) 305-1383. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

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Notice of Allowability	Application No.	Applicant(s)	
	09/712,712	LANGE ET AL.	
	Examiner	Art Unit	
	Mehmet B. Geckil	2142	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *4/28/04*.

2. ☒ The allowed claim(s) is/are *77-134*.

3. ☒ The drawings filed on *11/14/00* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

MEHMET B. GECKIL
PRIMARY EXAMINER

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Issue Classification	Application No.	Applicant(s)	
	09/712,712	LANGE ET AL.	
	Examiner	Art Unit	
	Mehmet B. Geckil	2142	

ISSUE CLASSIFICATION

ORIGINAL		CROSS REFERENCE(S)								
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)							
709	202	709	203	226						
INTERNATIONAL CLASSIFICATION										
G 0 6 F	15/16									
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(Assistant Examiner) (Date)	MEHMET B. GECKIL PRIMARY EXAMINER M.G.	Total Claims Allowed: 58
(Legal Instruments Examiner) (Date)	(Primary Examiner) (Date)	O.G. Print Claim(s): 1 / O.G. Print Fig.: 1

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		31		61	15	91	45	121		151		181
	2		32		62	16	92	46	122		152		182
	3		33		63	17	93	47	123		153		183
	4		34		64	18	94	48	124		154		184
	5		35		65	19	95	49	125		155		185
	6		36		66	20	96	50	126		156		186
	7		37		67	21	97	51	127		157		187
	8		38		68	22	98	52	128		158		188
	9		39		69	23	99	53	129		159		189
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	26		56	10	86	40	116		146		176		206
	27		57	11	87	41	117		147		177		207
	28		58	12	88	42	118		148		178		208
	29		59	13	89	43	119		149		179		209
	30		60	14	90	44	120		150		180		210

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Index of Claims

Application No.	Applicant(s)	
09/712,712	LANGE ET AL.	
Examiner	**Art Unit**	
Mehmet B. Geckil	2142	

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
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Claim		Date								
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Claim		Date								
Final	Original	7/13/04								
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Application Number	Application No.	Applicant(s)	
	09/712,712	LANGE ET AL.	

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Search Notes

Application No.	Applicant(s)	
09/712,712	LANGE ET AL.	
Examiner	**Art Unit**	
Mehmet B. Geckil	2142	

SEARCHED			
Class	Subclass	Date	Examiner
709	202	7/13/2004	M.G.
709	226	7/13/2004	M.G.
709	203	7/13/2004	M.G.
379	88+	7/13/2004	M.G.

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
709	**202**	**7/13/2004**	**M.G.**
709	203	7/13/2004	M.G.
709	226	7/13/2004	M.G.

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Wesr dBase searched. report attached.	7/13/2004	M.G.

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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
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1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

10/19/2004 WABDELR3 00000064 09712712

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	ART UNIT	CLASS-SUBCLASS
GECKIL, MEHMET B	2142	709-202000

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2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
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1 Sterne, Kessler, Goldstein & Fox P.L.L.C.
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Ben Franklin Patent Holding L.L.C.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Los Altos, CA

Please check the appropriate assignee category or categories (will not be printed on the patent); ☐ individual ☒ corporation or other private group entity ☐ government

4a. The following fee(s) are enclosed:
- ☒ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies __ _____

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- ☒ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), or credit any overpayment, to Deposit Account Number 19-0036 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
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- ☐ b. Applicant is not claiming SMALL ENTITY status. See, e.g., 37 CFR 1.27(g)(2).

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(Authorized Signature) _____ (Date) 10/14/04
Thomas C. Fiala, Reg. No. 43,610

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DATABRICKS EX1002 Page 479

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*Admitted only in Maryland
+ Admitted only in Virginia
•Practice Limited to Federal Agencies

OIPE JC06
OCT 14 2004
PATENT & TRADEMARK OFFICE

October 14, 2004

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Mail Stop Issue Fee

Re: Allowed U.S. Utility Patent Application
Appl. No. 09/712,712; Filed: November 14, 2000
For: **Network System Extensible by Users**
Inventors: Lange *et al.*
Our Ref: 2222.0300001

Sir:

In response to the Notice of Allowance and Issue Fee Due dated July 15, 2004, the following documents are forwarded for appropriate action by the U.S. Patent and Trademark Office:

1. PTO-2038 Credit Card Payment Form for $1,370.00 to cover: $1,370.00 Issue Fee;
2. Issue Fee Transmittal (Form PTOL-85B);
3. Fee Transmittal Form (PTO/SB/17); and
4. One (1) return postcard.

It is respectfully requested that the attached postcard be stamped with the date of filing of these documents, and that it be returned to our courier.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036. If extensions of time under 37 C.F.R. § 1.136 other than those otherwise provided for herewith are required to prevent

IPR2025-00714
DATABRICKS EX1002 Page 480

abandonment of the present patent application, then such extensions of time are hereby petitioned, and any fees therefor are hereby authorized to be charged to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

Thomas C. Fiala
Attorney for Applicants
Registration No. 43,610

TCF/LAG/lam
Enclosures

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DATABRICKS EX1002 Page 481

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PTO/SB/17 (10-03)
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

FEE TRANSMITTAL for FY 2005

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 1,370.00

Complete if Known	
Application Number	09/712,712
Filing Date	November 14, 2000
First Named Inventor	Danny Lange
Examiner Name	Geckil, Mehmet B.
Art Unit	2142
Attorney Docket No.	2222.0300001

METHOD OF PAYMENT *(check all that apply)*

☐ Check ☒ Credit card ☐ Money Order ☒ Other** ☐ None

**Charge any deficiencies or credit any overpayments in ☐ Deposit Account: the fees to Deposit Acct. No. 19-0036.

Deposit Account Number: 19-0036

Deposit Account Name: Sterne, Kessler, Goldstein & Fox P.L.L.C.

The Director is authorized to: *(check all that apply)*

☐ Charge fee(s) indicated below ☐ Credit any overpayments

☐ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	790	2001	395	Utility filing fee	
1002	350	2002	175	Design filing fee	
1003	550	2003	275	Plant filing fee	
1004	790	2004	395	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($) 0.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

			Extra Claims	Fee from below	Fee Paid
Total Claims		- 20 **=		X	=
Independent Claims		- 3 **=		X	=
Multiple Dependent					=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	88	2201	44	Independent claims in excess of 3
1203	300	2203	150	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0.00

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	430	2252	215	Extension for reply within second month	
1253	980	2253	490	Extension for reply within third month	
1254	1,530	2254	765	Extension for reply within fourth month	
1255	2,080	2255	1,040	Extension for reply within fifth month	
1401	340	2401	170	Notice of Appeal	
1402	340	2402	170	Filing a brief in support of an appeal	
1403	300	2403	150	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,370	2453	685	Petition to revive - unintentional	
1501	1,370	2501	685	Utility issue fee (or reissue)	1,370.00
1502	490	2502	245	Design issue fee	
1503	660	2503	330	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	790	2809	395	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR 1.129(b))	
1801	790	2801	395	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) 10 copies of patent @ $3.00 each

*Reduced by Basic Filing Fee Paid SUBTOTAL (3) ($) 1,370.00

SUBMITTED BY				(Complete *(if applicable)*)	
Name *(Print/Type)*	Thomas C. Fiala	Registration No. *(Attorney/Agent)*	43,610	Telephone	(202) 371-2600
Signature				Date	October 14, 2004

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.17 and 1.27. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.