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NEW UTILITY PATENT APPLICATION TRANSMITTAL <i>(only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket Number	22726-05909
	First Named Inventor	Timothy Tuttle
	Title	Asynchronous Messaging Using a Node Specialization Architecture Dynamic Routing Network
	Express Mail Label No.	EL668937406US

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APPLICATION ELEMENTS	ACCOMPANYING APPLICATION PARTS
1. ☐ Fee Transmittal Form (in duplicate)	7. ☐ Assignment Papers (cover sheet & document(s))
2. ☒ Applicant claims small entity status. See 37 CFR 1.27	8. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
3. ☒ Specification <i>Total Pages</i> 54 <i>(preferred arrangement set forth below)</i> ☐ Descriptive Title of the Invention ☐ Cross Reference(s) to Related Case(s) ☐ Statement Regarding Fed sponsored R & D ☐ Background of the Invention ☐ Brief Summary of the Invention ☐ Brief Description of the Drawing(s) ☐ Detailed Description ☐ Claim or Claims ☐ Abstract of the Disclosure	9. ☐ Power of Attorney or Authorization of Agent
4. ☒ Drawing(s) (35 U.S.C. 113) <i>Total Sheets</i> 12	10. ☐ 37 CFR 3.73(b) Statement
5. Oath or Declaration	11. ☐ Preliminary Amendment
a. ☐ New Declaration <i>Total Pages</i> ☐ ☐ Executed (original or copy)	12. ☐ Information Disclosure Statement & PTO-1449 ☐ Copies of IDS Citation(s)
b. ☐ Copy from a prior application (37 CFR 1.63(d)) <i>(for continuation/divisional with Box 18 completed)</i>	13. ☒ Request and Certification under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent
i. ☐ 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).	14. ☒ Return Postcard
6. ☒ Application Data Sheet. See 37 CFR 1.76	15. ☐
	16. ☐
	17. ☐
ADDRESS TO: Box Patent Application U.S. Patent & Trademark Office P.O. Box 2327 Arlington, VA 22202	

18. If a **CONTINUING APPLICATION**, check appropriate box and supply the requisite information below and in a preliminary amendment or in an Application Data Sheet under 37 CFR 1.76:

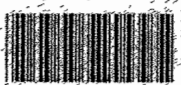
☐ Continuation ☐ Divisional ☒ Continuation-in-part (CIP) of prior application No: 10/017,182

Prior application information: Examiner: _____ Group/Art Unit: _____

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuing or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

19. CORRESPONDENCE ADDRESS

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REQUEST AND CERTIFICATION UNDER 35 U.S.C. 122(b)(2)(B)(i)		First Named Inventor	Timothy Tuttle
		Title	Asynchronous Messaging Using a Node Specialization Architecture in the Dynamic Routing Network
		Atty Docket Number	22726-05909

I hereby certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing. I hereby request that the attached application not be published under 35 U.S.C. 122(b).

March 21, 2002

Date



Signature

Rimma Budnitskaya, Reg. No. 48,237

Typed or printed name/Registration Number

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application **upon filing**.

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently files an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant **must** notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. **Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(iii)).**

Burden Hour Statement. This collection of information is required by 37 CFR 1.213(a). The information is used by the public to request that an application not be published under 35 U.S.C. 122(b) (and the PTO to process that request). Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This form is estimated to take 6 minutes to complete. This time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to

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APPLICATION INFORMATION

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This application is a:: CONTINUATION IN PART OF

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Filing Date:: 12-14-2001

Which is a:: NON PROV. OF PROVISIONAL

>> Application Two:: 60/256613
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**ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION
ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK**

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KARL E. RUMELHART

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. Application No. 10/017,182 filed December 14, 2001, which claims the benefit of U.S. Provisional Application No. 60/256,613, filed December 18, 2000, U.S. Provisional Application No. 60/276,847, filed March 16, 2001, U.S. Provisional Application No. 60/278,303, filed March 21, 2001, U.S. Provisional Application No. 60/279,608, filed March 28, 2001, and U.S. Provisional Application No. 60/280,627, filed March 29, 2001, all of which are hereby incorporated by reference herein.

BACKGROUND

FIELD OF THE INVENTION

[0002] This invention pertains in general to transferring information through digital networks and in particular to transferring information for remotely updating content at client devices through the digital networks.

BACKGROUND ART

[0003] The Internet is a digital network of computers. An individual computer on the Internet is typically identified by an internet protocol (IP) address. A computer on the

Internet sends a packet of information to another computer by routing the packet to a logical port at the destination computer's IP address. The destination computer interprets the packet according to one of several possible protocols determined by the port to which the packet was sent.

[0004] The World Wide Web (the "Web") is a collection of technology and content available on the Internet that allows the content to be routed from server computers to particular destination computers. The Web includes a large number of web pages residing on many different servers. Web pages contain one or more files, or references to one or more files, specifying instructions for presenting the web page and content, such as text, images, applets, video, and/or audio.

[0005] Web pages use a variety of definitional and programming languages to control how information is presented. The most fundamental of these is the Hypertext Markup Language (HTML). HTML uses a system of "tags" to specify how content should be displayed. Recent advances in HTML introduce "style sheets" which help separate content information from display information. HTML has also been modified and extended to provide new capabilities. For example, Extensible Markup Language (XML) adds semantic content to web pages. In addition, Dynamic HTML (DHTML) adds some dynamic content to web pages.

[0006] A web page may also include one or more programs for controlling how the web page is displayed. For example, JAVA[®] applets and JAVASCRIPT[®] scripts may be used to control the display of a web page. In addition, DHTML uses scripts to control the dynamic content. Thus, a web page designer can use applets and scripts to produce

animation effects or modify the display based on user interaction. For example, the designer can write a script that changes the color of a piece of text when a user clicks on a button.

[0007] Devices that display/execute web pages are often called “client devices” or simply “clients.” Client devices include personal computers, web-enabled set-top boxes and televisions, cellular telephones, personal digital assistants and other handheld devices, and special-purpose web-browsing appliances. Client devices typically employ a program called a “web browser” for interpreting the HTML or other display instructions in the web page and displaying the content accordingly. Most web browsers include special functionality, such as a Java Virtual Machine, for executing JAVA[®] applets and/or other applets or scripts embedded in the web pages.

[0008] A client device specifies a web page or other document on the web using a Uniform Resource Locator (URL). A URL has the form “service://server/path/file.” Here “service” refers to the protocol to be used, such as the file transfer protocol (FTP) or the hypertext transport protocol (HTTP). “Server” is the IP address of the server containing the page, and “path/file” specifies the particular web page on the server.

[0009] The Web suffers from a substantial limitation with respect to dynamically updating content in a web page at a client device. The Web’s only mode of operation is for a client device to first request a page from a server and then for the server to send the requested page to the client device. Once the server delivers the page to the client, it typically terminates its connection to the client, and does not retain any information about the client or the page that was sent. For this reason, servers are typically “stateless.” As

a result, client devices drive and control the flow of information around the Web. While client-side control is appropriate in some situations, it does not permit efficient updating of data at the client devices. For example, if a web page contains information that may change, such as the score of a baseball game or a stock quote, the server has no way to inform the client devices that are viewing the page of the change. Instead, the client devices must ask the server for the updated information. However, the client devices do not know when the information on the web page has changed, and thus do not know to ask for the update.

[0010] There are some simple web programming techniques that attempt to update content on client device-side web pages. One approach that web designers use is to rely on the client devices to periodically re-request web pages. This updating can be performed as the result of user action (such as pressing the “refresh” button) or can be automated to occur on a particular schedule (such as by using the HTML Meta Refresh tag to cause the client device to request the page every ‘X’ seconds). Although this technique provides client devices with more up-to-date information, it is very wasteful of resources. In particular, the web server must resend the page even if nothing has changed, and, even when something has changed, it must resend the entire web page rather than just the updated information, which may be only a very small part of the page. Further, attempting to reduce unnecessary requests by decreasing the request rate results in decreasing the currency of the data. This is an unalterable trade off in a client-driven approach.

[0011] The performance of automatic refreshing can be improved somewhat by putting information that may change in a separate frame from information that is less

likely to change, and only refreshing the separate frame. A few web designers even write custom JAVA applets to limit refreshing to individual components on a page, such as the score of a soccer game. A willingness to go to such effort illustrates the serious drain of resources caused by frequent refreshing. Nevertheless, even custom JAVA applets are not a meaningful attack on this problem. Custom applets require a large separate development effort for each item on each page that might need to be updated. More importantly, most custom applets still update content based upon client-driven requests, although it is possible to design an applet that accepts “pushed” messages. This solution is not scalable to provide updated information for large numbers of client devices and for large numbers of web pages.

[0012] Therefore, there is a need in the art for an efficient way to provide dynamic content to a web page at a client device.

DISCLOSURE OF THE INVENTION

[0013] The above need is met by a dynamic content routing network that routes messages containing data for updating properties of live objects to clients displaying web pages or other representations of data containing the live objects. The web server that initially provides the web pages to the clients does not need to track which clients are currently displaying the live objects. Instead, the information provider or a dynamic content provider (generically referred to as an "input source") that provided the live object simply sends an update message to the routing network. This routing utilizes bandwidth efficiently because the update messages are provided to the clients only when the live objects change.

[0014] The routing network is adapted to selectively send messages to the nodes in the network. In one embodiment, a hierarchy of registrations is used. Each gateway in the routing network maintains the mappings between the live objects and the nodes that have registered for the live objects. Each node in the routing network, in turn, maintains the mappings between the live objects and the clients that display them. An input source provides a message to a gateway in each cluster in the routing network. Each gateway forwards to each node only messages that reference the objects for which it has registered. Each node forwards to each client only messages that reference the objects for which it has registered. Adding node functionality to the gateway and client functionality to the node advantageously allows the routing network to decide which nodes should receive an update message. As a result, messages are sent to only nodes that have registered for the messages. Furthermore, each node receives all the messages that the clients connected to that node are interested in.

[0015] In another embodiment, all messages from an input source are assigned to one or more of N categories. Also, the nodes are assigned to one or more of M types, and mappings are created between message categories and node types. Each gateway keeps track of these mappings. When a gateway receives messages from input sources, the gateway identifies the categories of the messages and routes the messages to the nodes of the types to which the categories are mapped. To ensure that clients have access to the messages they need, clients are allowed to communicate with nodes of several types using client proxies connected between the clients and the nodes. There are at least two ways to implement the client proxy embodiment. The implementations differ primarily in where the client registration information is stored. In the first implementation, client registration information is stored at the nodes, and the client proxy merely passes messages among the clients and nodes. When a node directs a message to the client, the node passes the message to the client proxy along with a pointer to the client socket. When the client proxy receives the message, it simply pushes it to the client socket.

[0016] In the second implementation of the client proxy embodiment, the client proxy stores client registration information. In this embodiment, each node stores the object IDs registered by client proxies connected to the node. The client proxy registers with the nodes for all objects for which it needs to receive updates. The nodes receive the messages from the input sources, determine which client proxies have registered for the messages, and send the messages to the appropriate client proxies. The client proxies, in turn, transmit the messages to the clients that have registered for the messages.

[0017] The features and advantages described in this summary and the following detailed description are not all-inclusive, and particularly, many additional features and

advantages will be apparent to one of ordinary skill in the art in view of the drawings, specification, and claims hereof.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. 1 is a high-level block diagram illustrating an environment containing a dynamic content routing network;

[0019] FIG. 2 is an interaction diagram illustrating interactions among a server, information provider, dynamic content provider, client, and routing network to update a property of a live object on a web page;

[0020] FIG. 3 is a high-level diagram graphically indicating the many-to-many mapping performed by the routing network;

[0021] FIG. 4 illustrates two different web pages containing sports scores;

[0022] FIG. 5 is a block diagram illustrating an input source and the tools available to it for generating the update messages;

[0023] FIG. 6 is a flow chart illustrating the steps performed by an embodiment of an activation module;

[0024] FIG. 7 is a block diagram illustrating a lower-level view of the routing network according to an embodiment of the present invention;

[0025] FIG. 8 is a flow chart illustrating steps performed by a gateway and a node in a cluster to perform object-based routing of a message received from an input source in an embodiment using a hierarchy of registries;

[0026] FIG. 9 is a block diagram illustrating a high-level view of the routing network in an embodiment adapted to use message categories, node types, and client proxies;

[0027] FIG. 10 is a flow chart illustrating steps performed by a gateway, a node that stores client registration information, and a pass-through client proxy to perform object-based routing of a message received from an input source;

[0028] FIG. 11 is a block diagram illustrating a high-level view of the routing network for an embodiment in which the client proxy stores the client registration information; and

[0029] FIG. 12 is a block diagram illustrating a high-level view of the routing network for an embodiment in which the nodes adopt client proxy functionality.

[0030] The figures depict an embodiment of the present invention for purposes of illustration only. One skilled in the art will readily recognize from the following description that alternative embodiments of the structures and methods illustrated herein may be employed without departing from the principles of the invention described herein.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0031] FIG. 1 is a high-level block diagram illustrating an environment 100 containing a dynamic content routing network 110 (hereafter referred to as the “routing

network”). The environment 100 also contains a server 112 in communication with a client 114, an information provider 108, and a dynamic content provider 116. Although a typical environment 100 will have hundreds of servers 112 and information providers 108, thousands (or even millions) of clients 114, and multiple dynamic content providers 116, FIG. 1 illustrates only one of each of these entities in order to enhance the clarity of this description.

[0032] The server 112, client 114, information provider 108, dynamic content provider 116, and routing network 110 are preferably in communication via conventional communications links 117 such as those comprising the Internet. The communications links 117 include known wired communications media, such as dedicated or shared data, cable television or telephone lines, and/or known wireless communications media, such as communications over the cellular telephone network using protocols such as the global system for mobile communications (GSM), code division multiple access (CDMA), time division multiple access (TDMA), etc.

[0033] In one embodiment, the entities may each be in communication with one or more Internet Service Providers (ISPs) (not shown) that provide each entity with access to other computers on the Internet. In addition, the server 112, client 114, information provider 108, dynamic content provider 116, and routing network 110 are preferably each identified by at least one Internet Protocol (IP) address such as “66.35.209.224.” The IP address may also have one or more domain names associated with it, such as “bangnetworks.com.” Alternative embodiments of the present invention may use alternative addressing schemes and/or naming conventions instead of, or in addition to, those described herein. For example, embodiments wherein one or more of the clients

are cellular telephones or other portable devices may rely on different addressing schemes.

[0034] Preferably, the information provider 108 provides web pages or other representations of data to the server 112. The web pages contain one or more "live objects," which are designated to be real-time dynamically-updateable objects. Each live object is identified by an object identifier, or object ID. Preferably, the server 112 provides the web pages 118 to multiple clients 114. The clients 114 contact the routing network 110 and register for update messages for the object IDs on the web page. The routing network 110, in turn, preferably maintains a registry indicating which clients have registered for which object IDs.

[0035] The information provider 108 and/or dynamic content provider 116 send update messages to the routing network 110. These messages can be sent any time the information provider 108 or dynamic content provider 116 wants to update a property of a live object. Each update message preferably identifies a live object and contains data for updating a property of the identified live object. The routing network 110 accesses the registry and determines which clients have registered for the identified object. Then, the routing network 110 routes the update message to the appropriate clients. Upon receipt of an update message, the clients 114 update the specified property of the live object.

[0036] The routing network 110 provides an efficient one-to-many mapping of objects to clients (and by inference of information, a many-to-many mapping of information providers 108/dynamic content providers 116 to clients) through object-

based routing. Messages provided by the information provider 108 and/or dynamic content provider 116 to the routing network 110 are not routed to the clients 114 based entirely on a specified destination; more specifically, they are not routed based on the IP address of the client, as in conventional IP routing schemes. Instead, the messages are routed based on the live objects referenced by the message.

[0037] The mapping and object-based routing provided by the routing network 110 allow the information provider 108 and dynamic content provider 116 to update properties of live objects at a dynamically changing cross-section of clients in real-time, without requiring the information provider or dynamic content provider to track the clients or web pages being viewed by the clients. The clients 114, in turn, do not need to have any a priori knowledge of object IDs – they “discover” which IDs they should register when they receives the web pages 118 from the server 112.

[0038] Object-based routing also allows information providers 108 to dynamically update content on web pages without requiring the clients 114 to re-request the content, and without requiring the information providers 108 or servers 112 to maintain connections with the clients. In this manner, significantly more clients can receive updated content from a given information provider 108 than would be possible utilizing conventional client-side request-driven transmission control protocol/Internet Protocol (TCP/IP) connections between the clients and the server 112.

[0039] Turning now to the individual entities illustrated in Fig. 1, the server 112 is preferably a conventional computer system configured to act as a web server and serves

web pages 118 and other data representations to clients 114. The web pages 118 provided by the server 112 are associated with one or more information providers 108.

[0040] An information provider 108 is an entity providing one or more web pages 118, information contained in web pages, and/or other representations of data served by the server 112. The information provider 108 preferably has a conventional computer system coupled to the Internet. In one embodiment, the server 112 is directly controlled by the information provider 108 (e.g., the server is physically located at the information provider and/or is dedicated to serving only the information provider's web pages). In this embodiment, the server 112 and information provider 108 can be treated as the same entity. In an alternative embodiment, the server 112 serves web pages from multiple information providers.

[0041] As is known in the art, the web pages 118 and other content on the server 112 are specified by uniform resource locators (URLs) having the form "service://server/path/web page." Typically, web pages 118 are obtained via the hypertext transport protocol (HTTP) and thus an exemplary URL for retrieving the web page "b1.html" from the web server having the domain name "www.bangnetworks.com" is "http://www.bangnetworks.com/news/b1.html."

[0042] As used herein, a "web page" is a block of data available from the server 112. In the simplest case, a web page is a file written in the hypertext markup language (HTML). The web page may also contain or refer to one or more other blocks of data, such as other files, text, images, applets, video, and/or audio. In addition, the web page may contain instructions for presenting the web page and its content, such as HTML tags

and style sheets. The instructions may also be in the Extensible Markup Language (XML), which is related to HTML and adds semantic content to web pages or the Dynamic HTML (DHTML), which adds some dynamic content to web pages.

Additionally, the instructions may take the form of one or more programs such as JAVA[®] applets and JAVASCRIPT[®] and/or DHTML scripts.

[0043] As used herein, the phrase “web page” also refers to other representations of data served by the server 112 regardless of whether these data representations include characteristics of conventional web pages. These data representations include, for example, application programs and data intended for the web browser 120 or other application programs residing at the clients 114 or elsewhere, such as spreadsheet or textual (e.g., word processing) data, etc.

[0044] In a preferred embodiment, objects at the client, such as web pages and elements of web pages, can be designated as “live” by the information provider 108. Properties of a live object can be dynamically updated in real-time at the client 114 by the information provider 108 or another entity acting on behalf of the information provider. As used herein, an “object” is any datum or data at the client 114 that can be individually identified or accessed. Examples of objects include elements of web pages such as text characters and strings, images, frames, tables, audio, video, applets, scripts, HTML, XML, and other code forming the web page, variables and other information used by applets, scripts and/or code, URLs embedded in the web page, etc. Application and operating system constructs are also objects. For example, cells of spreadsheets, text in word processor documents, and title bars and messages displayed by the operating system or applications are objects. Preferably, multiple objects can be grouped together into a

single, logical object. Thus, an object can be defined at any desired or useful level of granularity.

[0045] Since content on a web page is conceptualized and organized by "object," the present invention essentially abstracts web pages and web page content, and other modules and/or functionality at the client 114, away from the HTML code or other conventional representation. This abstraction allows the information provider 108 to update a property of an object without concern for the location, display format, or other specifics of how the data is being represented at the client 114.

[0046] Live objects have associated "properties" which include any modifiable data related to the object or referenced with respect to the object. The information provider 108 typically, but not necessarily, provides initial settings for the properties of live objects provided to the client 114. The properties may or may not affect the visual representation of the object in the web page or other data representation. A property may affect an internal aspect of the object and, thus, a change to the property may not have any direct effect on a web page containing the object. For example, the property may affect whether particular aspects of the object are modifiable, how the object responds to user input or other stimuli, etc. Additionally, a property may also have a direct effect on how the object is displayed at the client 114. For example, the property may affect the content, color, typeface, size, formatting, or other attribute of text, images, or other data displayed by the object. Other properties may occupy parts of the spectrum between having no effect on the visible representation of the object and having a direct effect on the visible representation of the object. For example, a web page showing scores of football games may include a list of games and the current scores of the games as of the

time the server 112 serves the web page. The list of games, subset of games to be displayed, and the scores of the games can be designated as live objects (or properties of a single live object) and updated as necessary or desired.

[0047] A property can also preferably include instantiating an instance of the object or invoking functionality of the object. For example, a property of a browser window object may include functionality for instantiating another browser window. This function can be invoked as a logical change to a property of the object. The second browser window can be referenced through the original browser window (i.e., object) or designated as a new live object.

[0048] An information provider 108 or other entity preferably updates a live object at a client 114 via an update message. In general, an update message identifies the live object and, if necessary, the property of the live object, and contains data for updating the property. In one embodiment, the data may be the actual value for the property or executable code for causing the object's property to be updated. For example, the data may be a simple numerical or textual value, e.g., "4," to which the property should be set, and/or the data may be JAVASCRIPT[®] code or a call to a JAVASCRIPT[®] function at the client that effects the desired change to the property of the object.

[0049] The update message preferably implicitly or explicitly identifies a handler at the client 114 for use in updating the live object's property. In one embodiment, the client 114 utilizes a default handler when the message implicitly specifies the handler (e.g. when the message does not identify a specific handler). In one embodiment, if the update message specifies the actual value for the property, a default handler generates

JAVASCRIPT[®] code for changing the property to the specified value. If the data in the update message are JAVASCRIPT[®] code, the default handler does not perform any processing of the code. In either case, the default handlers preferably use LiveConnect to execute the JAVASCRIPT[®] code in a Java Virtual Machine (JVM) 122 at the client 114 and thereby update the property of the live object.

[0050] For certain objects and/or data types, the default handlers are not appropriate. In these cases, the message preferably explicitly identifies a handler for performing the update. For example, the message may explicitly specify a function to call on the data or the message may explicitly identify the environment in which the data should be executed. For example, the data in the update message may include code for execution by a software “plug-in” such as MACROMEDIA FLASH[®] and the message may explicitly identify FLASH as the handler.

[0051] The information provider 108 preferably designates an object as “live” by including a unique identifier for the object, the object ID, in the web page or other data representation provided to the client 114. In one embodiment, the information provider 108 encodes the object ID in an object’s corresponding HTML “ID” attribute using the following HTML expression:

ID = “elementIdentifier,”

where “elementIdentifier” is the object ID and is preferably a string. The string can encode any information desired by the information provider 108 or other entity establishing the object ID and in one embodiment is a simple textual and/or numeric identifier. In one embodiment, the information provider 108 begins the object ID with a

predefined token, such as “Bang\$,” in order to distinguish live objects from other objects that happen to have defined ID attributes. For example, an object can have the object ID “Bang\$elementIdentifier.”

[0052] In the preferred embodiment, each information provider 108 optionally encodes a unique information provider ID in its object IDs in order to prevent naming collisions between the object IDs of different information providers. In one embodiment, the information provider ID is a textual and/or numeric identifier. The information provider 108 may specify the information provider ID and the object ID as part of a hierarchical namespace. For example, in one embodiment objects are named as follows: “\$namespace1\$[namespace2\$...\$namespaceN\$]objectId,” where “\$namespace1” is the information provider ID and the “\$” operates as the name separator and defines additional optional levels of a namespace hierarchy. One embodiment of the system 100 supports typical directory services functionality. For example, two dollar sign characters appearing together, “\$\$,” refers to the top level of the namespace hierarchy.

[0053] Thus, the object ID for a live object is preferably formed from a combination of the predefined token, the information provider ID namespace, and a value assigned by the information provider 108. For example, the object ID for a live object representing the real time price of a stock having the symbol “BANG” might be: “Bang\$\$informationProviderID\$equities\$realtime\$bang.” In this example, “Bang\$” is the predefined token that signifies a live object, “\$informationProviderID” is the ID identifying the information provider, “\$equities\$realtime\$” defines levels of a namespace hierarchy, and “bang” identifies the specific object.

[0054] In some embodiments and situations, the object ID utilizes relative names. For example, an information provider 108 referring to its own object IDs is implicitly in its own namespace. Accordingly, the information provider 108 does not need to include the information Provider ID in the object IDs it utilizes internally. In one embodiment, the information provider ID is not explicitly encoded into the object ID. Instead, the information provider ID is encoded elsewhere in the web page in order to provide scope to the page's object IDs.

[0055] In one embodiment, the object ID identifies a point (i.e., a node in a tree) in a Document Object Model (DOM) representation of a web page or other document at the client 114. The DOM is a platform- and language-neutral interface that represents a document as a hierarchy of objects. The DOM also provides an interface that allows programs and scripts to dynamically access and update properties of the objects. Object properties can be inherited by descendent objects.

[0056] In this embodiment, the client 114 preferably executes an update message in the context of the specified point in the DOM representation. The update may specify a change to a property of the object at the identified point. The update also may specify a change to a parent or descendent of the object at the identified point. In each case, the update is executed relative to the specified point in the DOM representation. In one embodiment, points in the DOM representation specify how to update properties of live objects located at those points. Thus, the same update may be interpreted differently depending upon the identified live object's location in the DOM representation.

[0057] For example, assume there is an object in the DOM representation identified as "window.document.frame[3].ObjectID." Also assume that the object has an "innerText" property located at "window.document.frame[3].ObjectID.innerText" that specifies the text displayed by the object. An update message can change the text displayed by the object by specifying "ObjectID" and the new value for the innerText property.

[0058] An advantage of utilizing object IDs to specify objects is that the information provider 108 or other entity providing the update message can access and change properties of objects without knowing the object's actual location in the DOM representation. Indeed, the object may be in different locations in different DOM representations and/or in multiple locations in the same DOM representation. In any of these cases, the update message will change the specified properties of all of the objects having the given object ID.

[0059] Depending upon the particular embodiment of the environment 100, the information provider 108 and/or the dynamic content provider 116 provides update messages to the routing network 110. The dynamic content provider 116 is preferably a conventional computer system operated by an entity that provides real-time information, such as stock prices and/or sports scores. In one embodiment, the information provider 108 receives updated properties for the live objects from the dynamic content provider 116 or another source (or generates the updated properties internally). Then, the information provider 108 sends an update message specifying the object ID and the change to the object property to the routing network 110. In this embodiment, the dynamic content provider 116 may be absent from the environment 100.

[0060] In another embodiment, the dynamic content provider 116 provides the object IDs for live objects to one or more information providers 108 and the information providers 108 distribute the live objects to the clients 114. Then, the dynamic content provider 116 sends messages specifying the changes to the properties of the live objects to the routing network 110. For example, the dynamic content provider 116 distributes an object ID associated with the score of a particular baseball game to the information providers 108. Then, the dynamic content provider 116 sends a message specifying the object ID and an update to a property of the object that controls the displayed score of the particular baseball game to the routing network 110. These two embodiments are not mutually exclusive and, therefore, some updates may be provided to the routing network 110 by the information provider 108 while others are provided by the dynamic content provider 116.

[0061] The client 114 is a device that retrieves web pages 118 and/or other information from the server 112. In one embodiment, the client 114 is a conventional personal computer used by a person to access information on the Internet. In alternative embodiments, the client 114 is a different consumer electronic device having Internet connectivity, such as an Internet-enabled television, a cellular telephone, a personal digital assistant (PDA), a web browsing appliance, etc. The client 114 preferably, but not necessarily, has an associated display device.

[0062] The client 114 preferably executes a web browser 120, such as MICROSOFT INTERNET EXPLORER®, for retrieving web pages and displaying them on the display device. In embodiments where the client receives data representations from the server 112 other than conventional web pages, the web browser 120 does not necessarily share

similarities with conventional web browsers. Preferably, the web browser 120 contains a JVM 122 for executing JAVA[®] applets and/or scripts. The web browser 120 also preferably contains Dynamic HTML capabilities, such as support for JAVASCRIPT[®] (or another scripting language, such as VBScript) and the Document Object Model (DOM), and enables communications between JAVA[®] and the scripting languages. In one embodiment, the web browser 120 supports the LiveConnect standard for enabling communication between JAVA[®] applets and scripts written in the supported scripting languages. The web browser 120 can also be extended through software plug-ins such as MACROMEDIA FLASH[®], REAL NETWORKS REALPLAYER[®], and/or APPLE QUICKTIME[®]. In alternative embodiments, the functionality of the JVM 122 and/or other aspects of the web browser 120 are provided by one or more other functional units within the client 114. The term "module" is used herein to refer to software computer program code and/or any hardware or circuitry utilized to provide the functionality attributed to the module. The web browser 120 and JVM 122 are examples of modules in the client 114.

[0063] In some embodiments, the client 114 does not necessarily have a display device, web browser 120 and/or other components associated with a typical consumer device. The client 114, for example, may be a dedicated purpose device having certain aspects of web connectivity such as an embedded HTTP client in a web-enabled appliance or in a controller for an automobile, audio-visual equipment, or some other device.

[0064] A web page 118 provided from the server 112 to the client 114 preferably includes instructions for enabling the live objects on the web page. The instructions

cause the client 114 to automatically and transparently (i.e., without user interaction) contact the routing network 110 and download an activation module 124 for activating the live objects. In one embodiment, the instructions comprise a URL specifying the location of the activation module 124 at the routing network 110. In an alternative embodiment, the client 114 obtains the activation module 124 from the server 112 or another source.

[0065] The activation module 124 preferably contains JAVA[®] instructions for execution by the JVM 122. However, alternative embodiments of the module 124 may encode the instructions in the web page 118 and/or the activation module 124 using different languages and/or techniques. For example, the instructions and/or activation module 124 can be embedded in the web browser 120 or operating system, either as native code or as plug-ins. In these alternative embodiments, the web browser 120 does not have to download the activation module 124 from an external source.

[0066] The activation module 124 preferably registers object IDs from the web page 118 downloaded by the client 114 with the routing network 110 and updates the live objects in response to update messages received from the network. The routing network 110 records the registrations in the registry 125. The client's registrations preferably remain in effect as long as the client is displaying the associated web page 118, although other embodiments of the system 100 may use different criteria for determining when to terminate the client's registrations.

[0067] FIG. 2 is an interaction diagram illustrating interactions among the server 112, information provider 108/dynamic content provider 116 (generically referred to as an

“input source 210”), client 114, and the routing network 110 to update a property of a live object. Initially, the client 114 sends 212 a web page request to the server 112. In response, the server 112 provides 214 to the client 114 the web page containing or otherwise identifying the one or more live objects. Instructions encoded in the web page preferably cause the client 114 to transparently request 216 the activation module 124 from the routing network 110. In response, the routing network 110 sends 218 the activation module 124. The client 114 executes 220 the activation module 124, which identifies the object IDs of the live objects at the client and registers 222 the object IDs with the routing network 110. The routing network 110 updates 223 its registry to identify the object IDs for which the client 114 has registered.

[0068] At some point, the input source 210 sends 224 an update message to the routing network 110 in order to change a property of a live object at the client 114. In one embodiment, the message from the input source 210 to the routing network 110 contains only a single object ID and an update to a property of the identified object. In another embodiment, the message contains multiple object IDs and the corresponding property updates. In this latter embodiment, the message may have an associated “Batch ID” that identifies the message as having multiple object IDs and updates. Preferably, the information provider 108 can include a batch ID in a web page 118 in the same manner as including an object ID. Likewise, the client 114 can preferably register for a batch ID with the routing network 110 in the same manner as an object ID. In fact, the batch ID can be the same as the object ID so that the client 114 registers for both batch and non-batch messages by registering one ID. Alternatively, separate procedures can be

established for registering batch messages. The client 114 preferably processes the component messages of a batch as if each message were delivered separately.

[0069] The routing network 110, in turn, routes 226 the message to each client 114 that has registered for the specified object ID, preferably by utilizing standard Internet communications protocols, such as IP addresses, etc. The activation module 124 at the client 114 processes the message and updates 228 the property of the identified live object. If live objects having the same object ID appear in multiple locations at the client 114 (e.g., at multiple locations on a web page being displayed at the client), the activation module 124 preferably updates each of the live objects having the specified ID. As a result, the routing network 110 allows live objects at the client 114 to be dynamically updated. Preferably, this routing and updating happens quickly enough to be considered "real-time" for the purposes of the input source 210.

[0070] This update process, indicated within the dashed box 230 in FIG. 2, can repeat an indefinite number of times and is fully asynchronous as to the information provider 210 and client 114. For example, the input source 210 may send regular update messages to the routing network 110 as the score of a sporting event changes or a stock price fluctuates, but may stop sending update messages once the sporting event ends or stock market closes. When the client 114 ends the display of a web page containing the live object, or otherwise no longer desires to receive update messages, the client preferably closes 232 the connection with the routing network 110. The routing network 110, in turn, updates 234 the registry 125 to remove the client's object registrations. In another embodiment, the client 114 sends messages to the routing network 110 that selectively

register and/or de-register the client from one or more objects yet leaves the connection open in order to receive update messages pertaining to other objects.

[0071] FIG. 3 is a high-level diagram graphically indicating the many-to-many mapping performed by the routing network 110. Multiple input sources (labeled 210A-C) send update messages to the routing network 110. Each update message preferably specifies at least one object ID and an update to a property of the identified object. The routing network 110, in turn, selectively routes the update messages to the clients 114 that have registered for the given object ID from the given input source 210. In FIG. 3, assume for example that clients 312A and 312B have registered for a given object ID while the other clients have not registered for the object ID. Accordingly, the routing network 110 routes the update message to clients 312A and 312B, but does not route the message to clients 312C-312H.

[0072] FIG. 4 illustrates an example of the capabilities of the dynamic content routing network 110. FIG. 4 illustrates two different web pages 410, 412 containing sports scores. Although the web pages are formatted differently, each page contains the same scores for two professional football games and two professional baseball games. Web page 410 contains all four games under the heading "Local Sports Scores" while web page 412 contains the baseball games under the heading "Baseball Scores" and the football games under the heading "Football Scores."

[0073] There are various ways to internally represent the games and scores in the web pages using live objects. In one embodiment, a "game" object is defined having properties for the two teams involved in the game and the score associated with each

team. The game object is placed at a selected position in the web page and the properties of the object cause the information about the game to be displayed on the page. In another embodiment, "team" and "score" objects are defined, with the team object having a property defining the name of a team and the score object having a property defining a score. In this second embodiment, the team and score objects are placed at selected locations on the page so that the proper teams and scores are aligned when the page is rendered. In yet another embodiment, an object is defined having properties for the name of one team and a score associated with that team. Then, pairs of the objects are placed in the page in the proper alignment to indicate the games and scores. In another embodiment, an object is defined having properties specifying names of two teams and a separate object is defined having properties specifying two scores. In this last embodiment, the two objects are placed in the page so that the names of the teams align with the associated scores. Obviously, additional variations of these representations are possible.

[0074] Assume for the example of FIG. 4 that the names of teams in a game are specified by a "names" object having properties for the two team names and the scores in the game are specified by a "scores" object having properties for two scores. In web page 410, a names object 414 having properties set to identify the "SF 49ers" and the "STL Rams" is located directly under the "Local Sports Scores" heading. A scores object 416 having a property set to identify the score of the game as "42" to "7" is directly to the right of the names object 414. In web page 412, the properties of the second names object 418 identify the same game using slightly different terminology:

“SF” and “STL.” However, this names object 418 is aligned with the same scores object 416 as is utilized in web page 410.

[0075] Thus, the same scores object 416 is utilized in different positions in each web page 410, 412. In order to update the score of the San Francisco 49ers vs. St. Louis Rams football game on both web pages, the input source 210 simply sends an update message to the routing network 110 specifying the object ID for the scores object 416 and the update to the score property. The routing network 110 routes the update message to the appropriate clients 114, and the clients update the appropriate score regardless of the particular page layout.

[0076] The input source 210, i.e., the information provider 108 and/or dynamic content provider 116 can use a variety of tools to generate the update messages. FIG. 5 is a block diagram illustrating an input source 210 and the tools available to it for generating the update messages. Other tools can be utilized in addition to or instead of the ones described herein.

[0077] Preferably, the tools allow the input source 210 to access an application programming interface (API) provided by the routing network 110 for accepting messages. In one embodiment, the messages sent by the input source 210 are in the same format as utilized by the activation module 124 at the client 114. In an alternative embodiment, the messages provided to the routing network 110 are in a different format and the routing network translates the messages into the format utilized by the activation module 124.

[0078] In one embodiment, the input source 210 utilizes a data pump module 510 to access the API. The data pump module 510 reads an extensible markup language (XML) file containing one or more object IDs and the new values for the identified objects at regular intervals and automatically generates API calls that send messages representing changes to object properties to the routing network 110. In another embodiment, the data pump module 510 is event-driven and reads the XML file in response to a change in the file or some other occurrence.

[0079] In another embodiment, the input source 210 utilizes a director console module 512 to access the API. Preferably, the director console module 512 presents an administrator with a graphical interface displaying the contents of the web page 118. For example, the administrator may use the director console 512 to edit textual data, images, and/or any objects or properties of objects on the web page. After editing, the administrator uses a "send update" button or similar technique to cause the director console module 512 to send messages for the changed objects and properties to the routing network 110 via the API.

[0080] In another embodiment, the information provider 108 and dynamic content provider 116 work together as the input source 210 by using a content management system module 514 to access the API. Preferably, the content management system module 514 resides at the information provider 108 and receives object property updates from the dynamic content provider 116. The content management system module 514 preferably updates the properties of the live objects in the web page 118 stored at the server 112 and also sends messages for the changed properties to the routing network 110. In this manner, the web page 118 at the server 112 and the web page displayed at

the client 114 are updated almost simultaneously. In one embodiment, the dynamic content provider 116 sends the update messages to the routing network 110 instead of to the information provider 108. Embodiments of the system 100 can also utilize any combination of the content management techniques described herein.

[0081] For example, the tools described above can generate a message having the following code for updating the text displayed by a score object to "2":

```
LiveObject score = new LiveObject("Bang$homeScoreID");  
score.setProperty("innerText", "2");
```

This code sets the innerText property of the object having object ID "Bang\$homeScoreID" to "2." The tools use the API to pass this message to the routing network 110.

[0082] Turning now to the actions performed at the client 114, FIG. 6 is a flow chart illustrating the steps performed by an embodiment of the activation module 124. Those of skill in the art will recognize that different embodiments may perform the steps of FIG. 6 in different orders. The activation module 124 generally performs three functions: register object IDs with the routing network 110, handle messages received by the client 114 from the network in order to update the properties of live objects, and control communications between the client and the network.

[0083] In order to register object IDs, the activation module 124 preferably parses 610 the web page 118 received from the server 112 and identifies the object IDs of the live objects. In an alternative embodiment, the activation module 124 identifies only a subset of the object IDs, such as the IDs of only live objects that are currently being displayed by the web browser 120. Alternatively, a list of object IDs may be pre-encoded

in the web page in addition to the objects themselves, thereby enabling easy identification by the activation module 124. In yet another embodiment, a user of the client 114 selects the object IDs to register.

[0084] The activation module 124 preferably opens 612 a connection between the client 114 and the routing network 110. The activation module 124 can open 612 this connection before or after the activation module receives and/or parses the web page 118. In some cases, the client 114 is located behind a firewall that puts a restriction on the types of connection requests the client can make. A firewall might, for example, block all non-HTTP traffic. For this reason, the activation module 124 preferably wraps the connection request in an HTTP header in order to get the request to the routing network 110 through the firewall.

[0085] The activation module 124 uses the connection between the client 114 and routing network 110 to register 614 the object IDs by communicating to the routing network 116 a vector (e.g., a list or array) containing the identified object IDs. In order to accomplish this task through the firewall, the activation module 124 preferably puts the vector into a string, referred to as "object data," and then preferably creates an HTTP message to communicate the object data to the routing network 110. A schematic example is as follows:

```
POST / HTTP/1.1\r\n
Content-Length: <length of object data> \r\n
\r\n
<object data>
```

where <object data> is the object ID list. When the routing network 110 receives such an HTTP request, it extracts the object data and updates the registry 125 to indicate that the client 114 has registered for the identified objects.

[0086] If the web browser 120 loads 616 a new page, or otherwise terminates display of the objects on the initial page, the activation module 124 associated with the initial web page preferably terminates 618 the client's connection with the routing network 110. Those of skill in the art will recognize that this termination 618 can occur asynchronously with the other steps illustrated in FIG. 6. Thus, the location of steps 616 and 618 represents only one possible place in the sequence of steps where the termination may occur.

[0087] If the connection is not terminated, the activation module 124 preferably waits until it receives 618 a message from the routing network 110 specifying an object ID and an update to a property of the identified object. In one embodiment, this message is received as HTTP data. Upon receipt of the message, the activation module 124 preferably extracts 620 the object ID and update from the HTTP data. Then, the activation module 124 updates 622 the property of the identified object, or causes the object to be updated, as specified by the message.

[0088] The sequence of receiving messages 618, extracting data 620, and updating objects 622 is preferably repeated until a new page is loaded 616 or the connection with the routing network 110 is otherwise terminated. Although not shown in FIG. 6, in certain circumstances, such as when a user action with respect to the web page 118 activates a new live object, the activation module 124 may register new object IDs with

the routing network 110 without first downloading and parsing a new page. In one embodiment, if the newly-loaded page contains live objects, then the process of downloading the activation module 124 and updating the objects as described by FIG. 6 is repeated. In an alternative embodiment, the activation module 124 remains active at the client 114 and, therefore, the client does not re-download the activation module from the routing network 110. Instead, the already-present activation module 124 performs the live-enabling process on the new page.

[0089] FIG. 7 is a block diagram illustrating a lower-level view of the routing network 110 according to one embodiment of the present invention. FIG. 7 illustrates multiple input sources (labeled 710A-D) representative of sources providing messages to the routing network 110, such as an information provider 710A and a dynamic content provider 710B. FIG. 7 also illustrates multiple clients (labeled 712A-F) representative of the many clients in communication with the routing network 110 at any given instant.

[0090] Internally, the routing network 110 is preferably divided into one or more clusters 714. In FIG. 7, the routing network 110 has three clusters 714A, 714B, 714C, although the number of clusters can vary depending upon the processing needs of the network. An input-side global load balancer 716 preferably routes messages from the input sources 710 to the clusters 714. Similarly, a client-side global load balancer 718 preferably routes connection requests from the clients 712 to the clusters 714. The load balancers 716, 718 are designed to ensure that load is distributed among the clusters 714 according to a predetermined heuristic. For example, the load may be distributed evenly among the clusters 714 or a more powerful cluster may be distributed a majority of the load. In one embodiment, one load balancer performs the functions of the input-side 716

and client-side 718 load balancers and utilizes conventional Domain Name System- (DNS-) based load balancing.

[0091] Each cluster 714, of which cluster 714A is representative, preferably contains an input-side cluster load balancer 720A and a client-side cluster load balancer 722A. The cluster load balancers 720A, 722A function similarly to the corresponding global load balancers 716, 718 in that the input-side cluster load balancer 720A balances and routes incoming messages among one or more gateways 724A and the client-side cluster load balancer 722A balances and routes incoming connection requests among one or more nodes 726A and application servers 728A. The gateways 724A are connected to the nodes 726A. In one embodiment every gateway 724A is connected to every node 726A and in another embodiment certain gateways are connected to only certain nodes.

[0092] Preferably, the routing network 110 utilizes conventional single-processor computer systems executing the Linux operating system (OS). Preferably, each component of the routing network 110 is implemented by a separate, dedicated computer system in order to enable the separate optimization of the components. The input/output (I/O) functionality of the OS is preferably enhanced through the use of a non-blocking OS package such as NBIO available from the University of California, Berkeley, California. Based on the assumption that connections with the nodes 728 are long-lived, the OS is preferably configured to not allocate resources toward monitoring idle connections. Instead, the well-known /dev/poll patch is preferably applied to the OS in order to provide advanced socket polling capabilities.

[0093] Those skilled in the art will recognize that there are many ways to use the functionality of the routing network 110 to route update messages to clients 710. For example, in one embodiment, every message is distributed to every node 726. In another embodiment, the routing network 110 selectively sends messages to the nodes 726 in the routing network 110. Selectively sending messages to the nodes in the routing network presents at least the two difficulties. First, for a given message, a decision needs to be made as to which nodes should receive it. Second, a client must receive all messages in which it is interested. There are at least two approaches meeting these difficulties. The first approach uses a hierarchy of registries at the gateways and nodes to respectively keep track which messages to send to the nodes and clients. The second approach assigns messages to one or more categories, assigns nodes to one or more types, and maintains mappings between categories and types. This latter approach also uses client proxies to allow clients 712 to communicate with multiple nodes of different types.

[0094] FIG. 7 illustrates the embodiment using the hierarchy of registries. A node 726 registers with each gateway 724 in all of the clusters and indicates which messages it needs and the clients do the same with the nodes. Each gateway 724 preferably maintains a registry 734 containing the object IDs registered by the nodes 726 connected to the gateway 724. In one embodiment, the gateway registry 734 associates each object ID with a linked list containing one entry for each node 726 that has registered for that object ID. In another embodiment, the gateway registry 734 is a hash table containing the object ID registered by the nodes 726 connected to the gateway 724. A node 726 preferably maintains a node registry 732 containing the object IDs registered by clients 712 connected to the node. The gateways 724 in each cluster 714 receive the messages

from the input sources 710 and direct the messages to the appropriate node or nodes 726.

The nodes 726 preferably transmit messages received from the gateways 724 to the clients 712 that have registered in the object IDs identified by the messages.

[0095] In one embodiment, the node registry 732 associates each object ID with a linked list containing one entry for each client 712 that has registered for that object ID. In another embodiment, the node registry 732 is a hash table containing the object ID registered by the clients 712 connected to the nodes 726. Each entry in the linked list or hash table preferably contains a pointer to a socket representing the connection to the corresponding client 712. As is known in the art, the pointer to the socket, typically called a "file descriptor," represents an address to which the node can write in order to send the message to the corresponding client. Gateways 724 can also use file descriptors in this manner to store node addresses. Alternative embodiments of the present invention utilize other data structures in addition to, or instead of, the hash table and linked list, and/or may utilize different data within the data structures.

[0096] Preferably, the node 726 adds an entry to its registry 732 every time a client 712 registers an interest in an object and deletes the corresponding entry from the registry when the client 712 disconnects from the node or otherwise indicates that it is no longer interested in a particular object. If the node 726 determines that the client 712 registered for an object ID that was not previously registered on that node, the node preferably registers that object ID with the gateways 724 to which it is connected. Similarly, if the node 726 determines that the client 712 deregistered an object ID for which it was the last interested client, the node 726 deregisters that object ID with the gateways 724 to which

it is connected. The gateways 724 update their registries 734 in response to the communication from the node 726.

[0097] In alternative embodiments of the present invention, when the client 712 disconnects from the node 726 or otherwise indicates that it is no longer interested in a particular object, the node 726 waits for a period of time or until some event occurs before deregistering the object ID with the gateway 724. For example, the node 726 could wait until it receives a message associated with that object ID to do the deregistration. Alternatively, the wait time can be fixed, random, or based on the frequency of registrations for that object ID, or registrations for the same input source 710 as the object being deregistered. This latter approach keeps the object IDs from more frequently used input sources 710 registered for a longer period of time. This waiting advantageously reduces the number of registration changes required between nodes and gateways in cases where it is likely that another client will soon register for the same object ID.

[0098] Since a gateway 724 does not control the rate at which it receives messages from input sources 710, it is possible for the gateway to receive messages faster than it can process them (i.e., send the messages to the nodes). Therefore, each gateway 724 preferably maintains a queue 730 of messages that have been received but not yet processed in order to avoid losing messages. In one embodiment, the gateway 724 drops messages if the queue 730 becomes too long. In another embodiment, the gateway 724 utilizes priorities assigned to certain messages or input sources to determine which messages to drop.

[0099] The application server 728 within each node 714 preferably serves the activation module 124 to the clients 712 in response to client requests. In addition, the application server 728 serves any other modules that may be required or desired to support the environment 100. In an alternative embodiment of the routing network, a single application server 728 fulfills all of the client requests. This application server 728 may be within a certain cluster 714 or independent of the clusters. However, this single-application-server embodiment is less desirable because it lacks redundancy.

[0100] FIG. 8 is a flow chart illustrating steps performed by a gateway 724 and a node 726 in a cluster 714 to perform object-based routing of a message received from an input source 710 in the embodiment using a hierarchy of registries. Initially, the gateway 724 receives 810 the message from the input source 710. The gateway 724 extracts 820 the object ID from the message. The gateway 724 examines its registry 734 to determine the nodes 726 that have registered in the object ID. The gateway 724 transmits 840 the message to each of the registered nodes 726. Each node 726 that receives the message uses its registry 732 to determine 850 which clients 712 have registered for the message. Each node 726 then forwards 860 the message to the registered clients 712.

[0101] Adding node functionality to the gateway and client functionality to the node advantageously allows the routing network 110 to solve the difficulties identified above. For example, it allows the routing network 110 to decide which nodes should receive an updated message. As a result, messages are sent to only nodes that have registered for the message. Further, no matter which node a client connects to, that node will receive all messages that the client wants. One skilled in the art would understand that while the

present invention allows registration at both a gateway level and node level, registration could be extended to any number of levels.

[0102] In the second approach for meeting the difficulties described above, all messages in the routing network 110 are assigned to one or more of N categories, and all of the nodes are assigned to one or more of M types. Mappings are created that specify which categories of messages are forwarded to which types of nodes. The mappings allow control over the amount of traffic processed by the nodes.

[0103] FIG. 9 is a block diagram illustrating a high-level view of the routing network 110 of FIG. 7 in an embodiment adapted to use the approach having message categories and node types. Although FIG. 9 illustrates only two node types—nodes of type 1 726 and nodes of type 2 726—for purposes of simplicity, this embodiment of the network 110 can have any number of node types. FIG. 9 also illustrates a client proxy 740 for reasons described below. However, an embodiment of the present invention using message categories and node types does not necessarily utilize a client proxy 740.

[0104] There are many different possible mappings between message categories and node types. In the simple case, there is one-to-one mapping between message categories and node types. For example, if the message is of category 1, it is forwarded to the nodes of type 1. In more complicated mappings, messages of one category are mapped to nodes of multiple types. For example, messages of category 1 are mapped to nodes of types 1, 2, and 3, whereas messages of category 2 are mapped to nodes of types 2, 3 and 4. In short, any possible mapping of message categories to node types is possible and the

number of message categories, N, does not have to be the same as the number of node types, M.

[0105] There are multiple ways to assign the messages into categories. One way is to assign all messages from a given input source 710 into a certain category. Another way is to explicitly specify the category in the object ID for the message. Yet another way is to utilize a hashing function or lookup table to partition messages into categories based on object IDs or other values. For example, in one embodiment a hash function is applied to the object ID to generate an integer between 1 and N, and this integer is the message category.

[0106] Nodes are preferably assigned to types based on information stored in the gateways 724. In one embodiment, each gateway 724 holds a lookup table or other data structure that specifies the types to which each node is assigned. The lookup table also preferably stores the mappings between message categories and node types. When a gateway 724 receives a message from an input source, the gateway preferably determines the category of the message using one of the techniques described above. Then, the gateway 724 determines the node type (or types) to which the message category maps, and determines which nodes are of the given type. The gateway 724 routes the message to the appropriate nodes.

[0107] In one embodiment, the gateway 724 uses a combination of multiple techniques to determine the message categories, node types, and/or mappings. For example, a lookup table can be used to encode a priori knowledge about categories, types, and/or mappings and a hash table can be used to route messages for which there is

no a priori knowledge. Continuing this example, assume that certain messages are assigned to a given category based on a table lookup, while other messages are assigned to categories based on a hashing function. In this example, the gateway 724 looks up the object ID (or other information, such as an input source ID) of an arriving message in a lookup table to determine if it has a specified category. If the object ID is stored in the lookup table, the gateway 724 determines the mappings for the category and routes the messages to the nodes of the appropriate types. If the object ID is not stored in the lookup table, the gateway 724 utilizes a hash function on the object ID (or other information) to determine the message category.

[0108] Message categorization advantageously allows the routing network 110 to decide which nodes get which messages. However, message categorization does not ensure that clients 712 have access to the messages they need. Assume a client 712 connects to a node of type 1 and the client 712 wants to receive messages of category 3. If there is a simple one-to-one mapping of message categories to node types, nodes of type 1 will never receive messages of category 3, and neither will the client 712. To ensure that clients have access to the messages they need, the embodiment shown in FIG. 9 uses client proxies to allow clients 712 to communicate with multiple nodes of different types. As shown in FIG. 9, the clients 712 connect to a client proxy 740 instead of the nodes 726. Each client proxy 740 is connected to at least one node of each type. For example, as shown in FIG. 9, the client proxy 740 connects to a node of type 1 726 and a node of type 2 726.

[0109] There are at least two ways to implement the embodiment that uses client proxies to ensure that clients connect to multiple nodes of different types. The

implementations vary primarily in where the client registration information is stored. In the first variation, client registration information is stored at the nodes, and the client proxy is adapted to simply pass update messages and registration information among the clients and nodes. In the second variation, the client proxy 740 is responsible for keeping track of client registrations.

[0110] FIG. 9 illustrates the variation where the nodes store the client registration information, and the client proxy 740 is adapted to pass messages and registration information among the clients and nodes. When a client sends registration information to the client proxy 740, the client proxy passes it to the appropriate node or nodes. In one embodiment, the client proxy 740 sends client registration information to at least one node of every type, and the nodes ignore irrelevant registration information (e.g., registrations for messages of categories not handled by the node). In another embodiment, the client proxy 740 itself analyzes the registrations, and passes only registrations relevant for a given node type to a node of that type. In a third embodiment, the client contains functionality for determining which node types handle which registration requests, and the client tells the proxy 740 to which node types to pass the registration information.

[0111] The client proxy 740 preferably stores an identifier of its connection to each client 712, such as a pointer to the socket for the client connection, and sends this identifier to the nodes along with the registration information. Each node 726, in turn, maintains a registry 732 storing the relevant registration information it receives from the client proxy 740. Preferably, at most one node of each type will contain registration information for a given client for messages of a category mapped to the node type. In

addition, a node preferably does not store registration information for messages of categories not mapped to its node type.

[0112] The registry 732 for each node 726 preferably indicates the object IDs registered by the clients, the client proxy 740 to which the client is connected (e.g., a pointer to the socket at the node to which the client proxy is connected), and the identifier indicating the client's connection to the client proxy (e.g., the pointer to the socket at the client proxy to which the client is connected). When the node 726 receives an update message, it uses the registry to identify the clients to which it should forward the message, the client proxies to which the clients are connected, and the specific connections between the client proxies and the clients. The node routes the update message to the identified client proxies and includes the identifier (e.g., the pointer to the client socket) telling the client proxy where to send the update message. When the client proxy 740 receives the update message, it uses the identifier to send the message to the client or clients.

[0113] In one embodiment, the node registry 732 contains, for each object ID, a list with one entry for each client registered for that ID. Each entry contains a (name of client proxy, name of client) pair where each "name" is a socket identifier or some other information for identifying how to route the message to the named entity. In another embodiment, the registry 732 is adapted to more efficiently handle the case where multiple clients at a given client proxy are registered for the same object ID by placing a list of clients registered for the object ID in each entry. Thus, each entry in the list for a given object ID contains a (name of client proxy, list of names of clients on that proxy) pair. When a message having a particular object ID arrives at the node, the node walks

down the corresponding entries in the registry for that ID, pushing one copy of the message to each listed client proxy. Along with the message, the node includes the list of clients on that proxy (e.g., a list of pointers to sockets for the clients) who have registered for the object ID. When the client proxy receives the message and the list, it simply pushes a copy of the message to each client.

[0114] The approach using the pass-through client proxy 740 described above is advantageous because it reduces memory loads because the client proxy stores only minimal state, and each node has a restricted list of object IDs for which it is responsible. It also expedites message routing because the client proxy does very little processing to forward a message. Plus, this approach separates different potential stress points in the network into different components, allowing the network to be tuned to provide good performance. In particular, the nodes handle a large amount of data and store a large amount of state, but do not have to hold open a large number of connections. The client proxies do not store a large amount of data or state, but hold open a large number of connections to the clients. In different embodiments, the ratios of nodes to client proxies can be varied to match the network to its requirements.

[0115] In the second variation of client proxies, the client proxy 740 stores client registration information. FIG. 11 illustrates a high-level diagram of the routing network 110 in which the client proxy 740 stores the client registration information. In this embodiment, the node registry 732 stores the object IDs registered by client proxies 740 connected to the node. Each client proxy 740 preferably maintains a client proxy registry 736 containing the object IDs registered by clients 712 connected to the client proxy 740. The client proxy 740 registers with the nodes for all objects for which it needs to receive

updates. Thus, this variation is similar to the hierarchical registry embodiment described above.

[0116] An alternative to maintaining a separate client proxy as described above is to have the nodes themselves provide the client proxy functionality. In this alternative, clients connect to a node of a first type. When a client registers for messages of a category not handled by the node, the node passes the registration to a node of the appropriate type along with an identifier of the client connection. In this case, the node connected to the client adopts the functionality of the pass-through client proxy. The node can also adopt the functionality of the client proxy that stores client registration information, thereby creating a hierarchy of registrations among the nodes themselves.

[0117] FIG. 12 is a high-level block diagram of the routing network 110 of the embodiment in which the nodes themselves adopt client proxy functionality. There are at least two ways to implement this embodiment. In one implementation there is a preferred node type, such as node of type 3, that always serves as a client proxy. This node type may be designated to handle the most common categories of messages. As a result, the client proxy functionality would be utilized very rarely. As shown in FIG. 12, client 1 712 and client 2 712 are connected to the node of type 3 726, which in turn is connected to a node of type 1 726 and a node of type 2 726.

[0118] In another implementation, instead of having one preferred node type that always serves as a client proxy, each node type can serve as a node and as a client proxy. For example, when a client 712 connects to a node 726, it passes the node all of the object IDs the client wishes to register. For object IDs of message categories handled by

that node, the node stores the registrations in its registry. For object IDs of messages in other categories, the node acts as a client proxy and passes the registration requests to nodes of the appropriate types. This implementation can be made more efficient by providing functionality in the activation module for identifying the most common categories of messages sought by the client, and causing the client to connect to a node of a type that receives those categories of messages.

[0119] An alternative to connecting clients 712 to nodes 726 using a client proxy 740 is having a client 712 maintain multiple connections to the routing network 110. This can be accomplished, for example, by attaching message-categorization functionality to the activation module 124. The activation module 124 preferably determines which categories of messages it needs and to which nodes types it should connect. The activation module 124 then makes a connection to one node of each relevant type and registers the appropriate object IDs with the appropriate nodes.

[0120] An alternative to using client proxies is to allow clients to register for only categories of messages handled by one type of node. For example, if each node type handles messages from only one input source, each client 712 can be required to register for messages from only one input source. This can be done, for example, by configuring the load balancer 718 to ensure that clients registering for messages from one input source connect to a node of the type that receives messages from that input source.

[0121] FIG. 10 is a flow chart illustrating steps performed by a gateway 724, a node 726 that stores client registration information, and a pass-through client proxy 740 to perform object-based routing of a message received from an input source 710. Initially,

the gateway 724 receives 1010 the message from an input source 710. The gateway 724 determines 1020 to which category the message belongs using one or more of the techniques described above. After the gateway 724 has determined to which category the message belongs, the gateway 724 identifies 1030 node types to which the message category is mapped and routes 1040 the message to the nodes of those types. Each node 726 that receives the message extracts 1050 the object ID from the message. Each node 726 examines its registry 732 to determine which clients have registered for the message, the client proxies to which the clients are connected, and the connections between the client proxies and the clients. Each node 726 then forwards 1060 the message to the identified client proxies 740 along with the identifiers for the client connections (e.g., the client socket or a list of client sockets). When a client proxy 740 receives the message from a node 726, it pushes 1070 the message to the identified client socket or sockets.

[0122] The above description is included to illustrate the operation of the preferred embodiments and is not meant to limit the scope of the invention. The scope of the invention is to be limited only by the following claims. From the above discussion, many variations will be apparent to one skilled in the relevant art that would yet be encompassed by the spirit and scope of the invention.

CLAIMS

1 1. A method for dynamically updating a property of a live object at remote
 2 clients, comprising:
 3 receiving a first message from a remote input source, the first message
 4 identifying the live object and containing data for updating a property
 5 of the live object;
 6 identifying nodes that have registered for updates to the live object, wherein
 7 the nodes are distributed on a network;
 8 routing the first message via the network to the registered nodes;
 9 identifying remote clients that have registered for updates to the live object,
 10 wherein the remote clients are distributed on the network; and
 11 routing a second message via the network from the nodes to the registered
 12 clients, the second message identifying the live object and containing
 13 the data for updating the property of the live object;
 14 wherein the registered clients are adapted to process the data to cause the
 15 update to the property of the live object.

1 2. The method of claim 1, wherein the live object is identified by an object
 2 ID.

1 3. The method of claim 1, further comprising:
 2 receiving a registration request from a node, the registration request
 3 identifying the live object with an object ID.

1 4. The method of claim 1, further comprising:
 2 receiving a registration request from a client, the registration request
 3 identifying the live object with an object ID.

1 5. The method of claim 1, further comprising:
2 receiving a request from a client for an activation module, the activation
3 module adapted to identify any live objects at the client; and
4 providing the activation module to the client.

1 6. The method of claim 1, further comprising:
2 receiving, by a node, a registration request registering for updates to
3 properties of live objects at the client.

1 7. The method of claim 1, further comprising:
2 processing the first message from a first format to a second format to produce
3 the second message.

1 8. The method of claim 1, wherein the first message and the second message
2 are identical.

1 9. A dynamic content routing network for enabling updating of a property of
2 a live object at a client coupled to the network, comprising:
3 a gateway for receiving a message from a remote input source, the message
4 identifying the live object and containing data for updating a property
5 of the live object, for maintaining a registry of nodes coupled to the
6 gateway that have registered to receive updates to properties of the live
7 object, and for routing the message to the registered nodes; and
8 a node in communication with the gateway, for receiving the message from
9 the gateway, for maintaining a registry of remote clients coupled to the
10 network that have registered to receive updates to properties of the live
11 object, and for routing the message to the registered clients.

1 10. The routing network of claim 9, wherein the node is further adapted to
2 receive a registration request from a client, the registration request identifying the live
3 object with an object ID, to update the node's registry in response to the registration

4 request, and to send a corresponding registration request to the gateway if the node is not
5 registered for the object ID.

1 11. The routing network of claim 9, wherein the node is further adapted to
2 receive a deregistration request from a client, the deregistration request identifying the
3 live object with an object ID, and to send a corresponding deregistration request to the
4 gateway if no other clients connected to the node are registered for the object ID.

1 12. The routing network of claim 9, wherein the registry maintained by the
2 node comprises:
3 a data structure identifying live objects for which clients have registered, and
4 an address of each registered client.

1 13. The routing network of claim 9, wherein the registry maintained by the
2 gateway comprises:
3 a data structure identifying live objects for which nodes have registered, and
4 an address of each registered node.

1 14. A dynamic content routing network for enabling updating properties of
2 live objects at a client coupled to the network, comprising:
3 a gateway for receiving messages from a remote input source, the messages
4 identifying the live objects and containing data for updating properties
5 of the live objects, for identifying categories of the messages, for
6 determining node types to which the message categories map, and for
7 routing the messages responsive to the mappings; and
8 a plurality of nodes, each node assigned to at least one node type, the nodes in
9 communication with the gateway and adapted to receive messages of
10 categories mapped to the nodes' types, the nodes for maintaining a
11 registry of clients coupled to the network that have registered to
12 receive updates to properties of the live objects, and for routing the
13 messages to the registered clients.

1 15. The routing network of claim 14, wherein a node includes client identifiers
2 with the messages routed to the clients, the network further comprising:
3 a client proxy in communication with a node of each type, for receiving the
4 messages routed by the nodes and the client identifiers and for using
5 the client identifiers to route the messages to the registered clients.

1 16. The routing network of claim 14, wherein the registry maintained by a
2 node comprises:
3 a data structure identifying clients that have registered for live objects, client
4 proxy identifiers identifying the client proxies to which the clients are
5 connected, and client identifiers identifying connections between the
6 client proxies and clients.

1 17. The routing network of claim 14, wherein the registry maintained by the
2 node comprises:
3 a data structure identifying clients that have registered for live objects, client
4 proxy identifiers identifying the client proxies to which the clients are
5 connected, and a list of client identifiers identifying connections
6 between the clients and client proxies.

1 18. The routing network of claim 15, wherein the client proxy is further
2 adapted to receive a registration request for update messages for a live object from a
3 client and to route the registration request to a node.

1 19. The routing network of claim 18, wherein the client proxy routes the
2 registration request to at least one node of each type.

1 20. The routing network of claim 18, wherein the client proxy routes the
2 registration request to a node of a type to which the update message category is mapped.

21. A dynamic content routing network for enabling updating properties of live objects at a client coupled to the network, comprising:

- a gateway for receiving messages from a remote input source, the messages identifying the live objects and containing data for updating properties of the live objects, for identifying categories of the messages, for determining node types to which the message categories map, and for routing the messages responsive to the mappings; and
- a plurality of nodes, each node assigned to at least one node type, the nodes in communication with the gateway and adapted to receive messages of categories mapped to the nodes' types, the nodes for determining a client proxy that is registered to receive updates to properties of the live object, and for routing the message to the registered client proxy.

22. The routing network of claim 21, wherein the registry maintained by the client proxy comprises:

- a data structure identifying live objects for which clients have registered, and
- an address of each registered client.

23. A method for dynamically updating properties of live objects at remote clients, the method comprising the steps:

- receiving a message from a remote input source, the message identifying a live object and containing data for updating a property of the live object;
- identifying a category of the message;
- identifying a mapping to a node type for the identified category of the message; and
- routing the message via the network to a node of the identified node type;

wherein the node is adapted to identify clients that have registered for updates to properties of the live object and to route the message to those clients, and wherein the clients are adapted to process the message to cause the update to the property of the live object.

1 24. The method of claim 23, wherein the step of identifying a category of the
2 message comprises the step of:
3 looking up the message in a lookup table.

1 25. The method of claim 23, wherein the step of identifying a category of the
2 message comprises the step of:
3 applying a hash function to an ID of the live object to generate the category.

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**ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION
ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK**

ABSTRACT OF THE DISCLOSURE

[0123] A network routes update messages containing updates to properties of live objects from input sources to clients having the objects. When the clients receive live objects, the clients identify the object IDs associated with the objects and register the object IDs with the routing network. The routing network is adapted to selectively send update messages to nodes in the network and the nodes forward the messages to the clients. One implementation uses a hierarchy of registries to indicate which nodes and clients receive which update messages. Another implementation assigns update messages to one or more of N categories and nodes to one or more of M types, and the gateways maintain mapping between categories and types. To ensure that clients receive all of the update messages for which they register, the clients connect to client proxies that in turn connect to at least one node of each type.



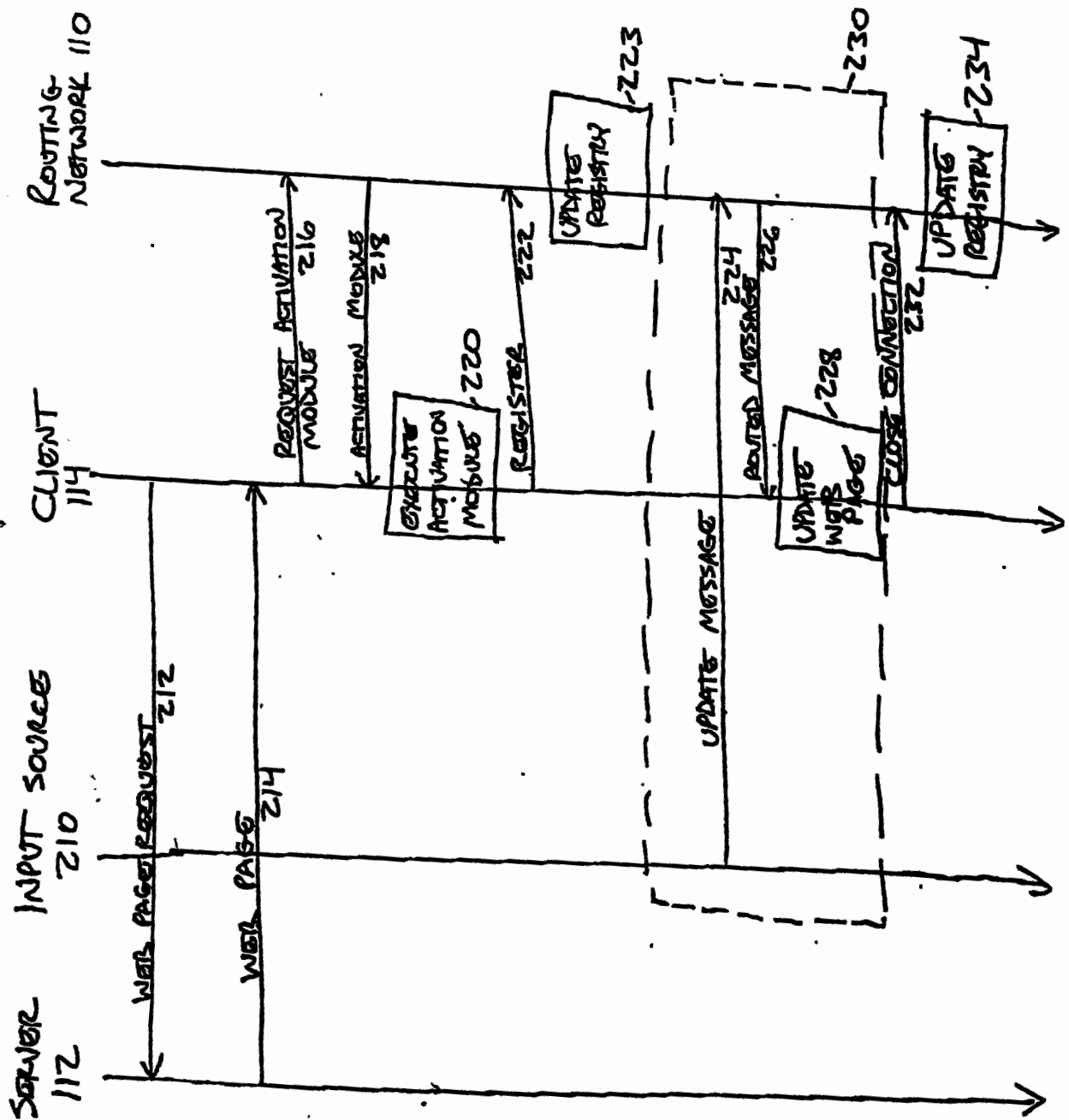


FIG. 2

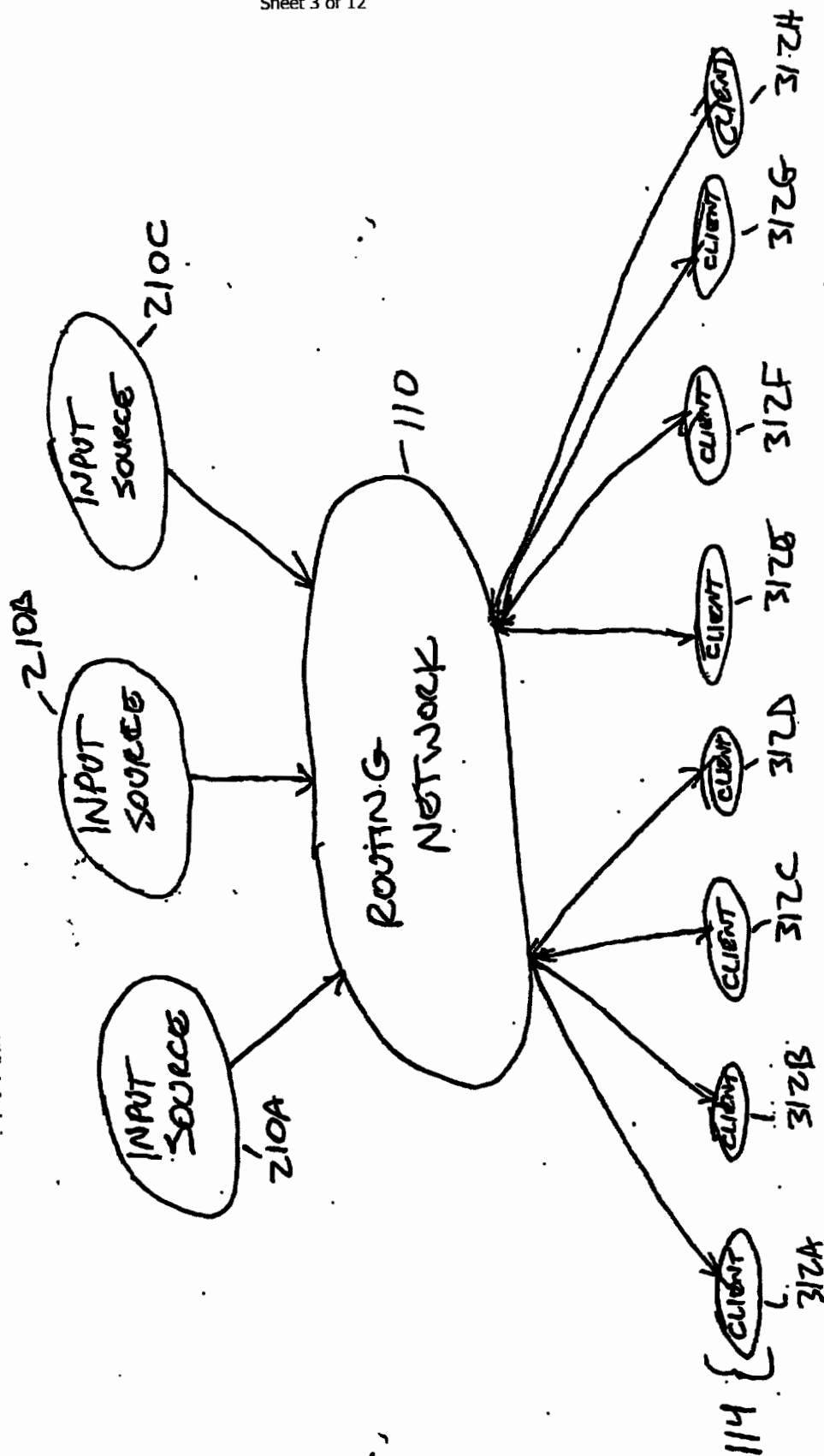
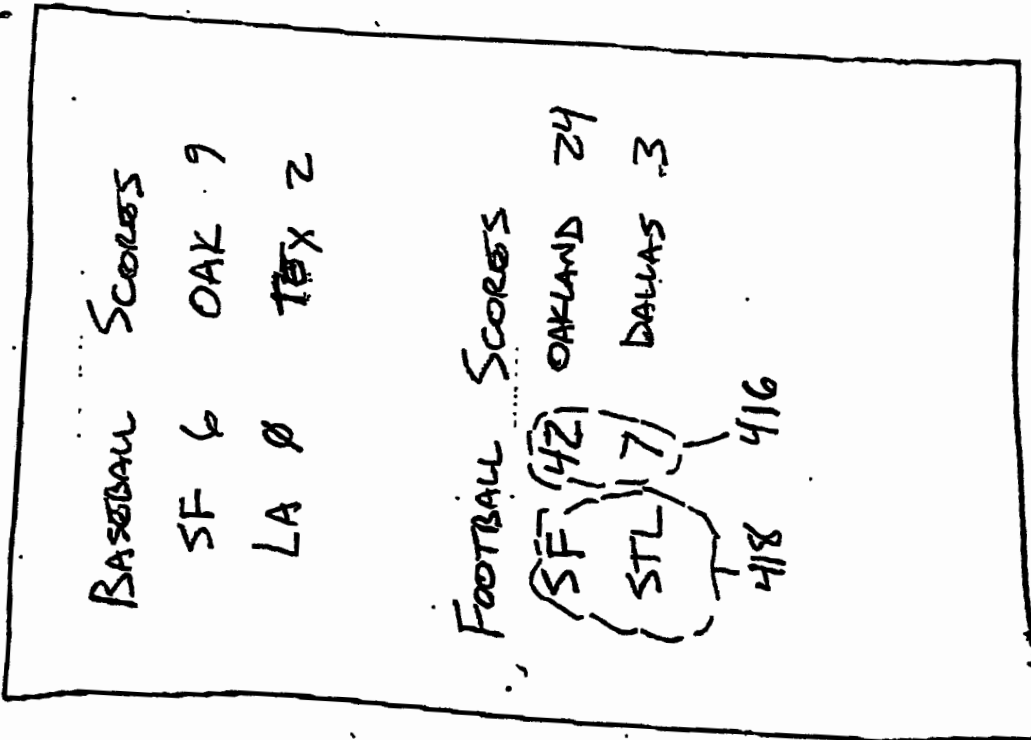
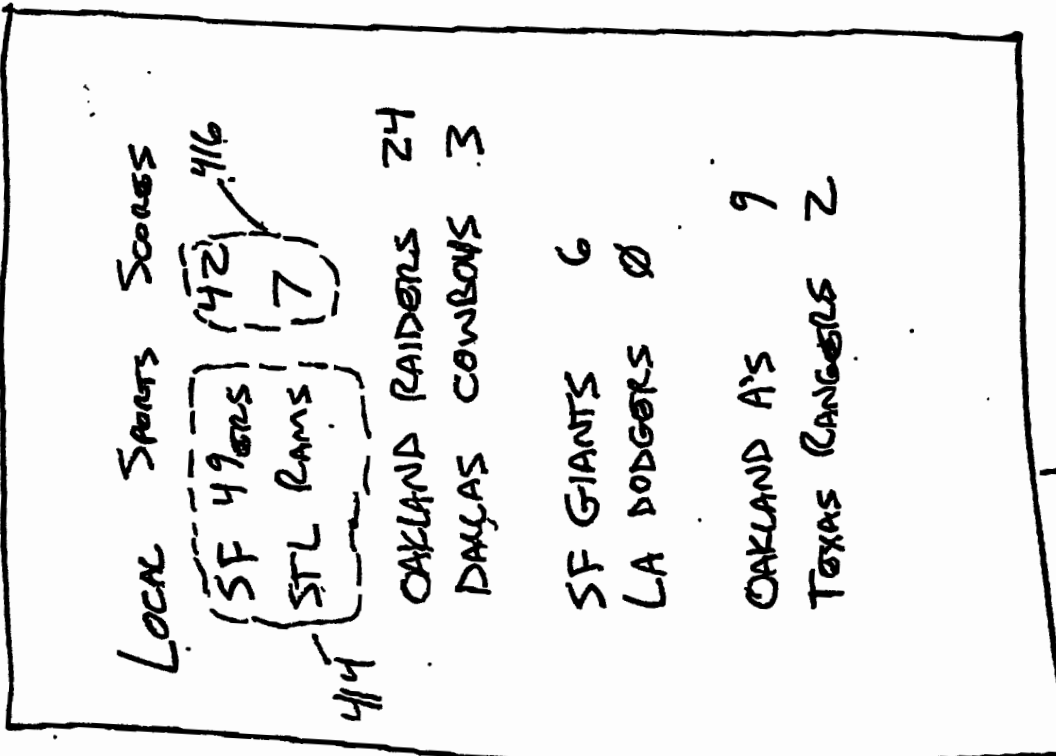


FIG. 3

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412



410

FIG. 4

FIG.

5

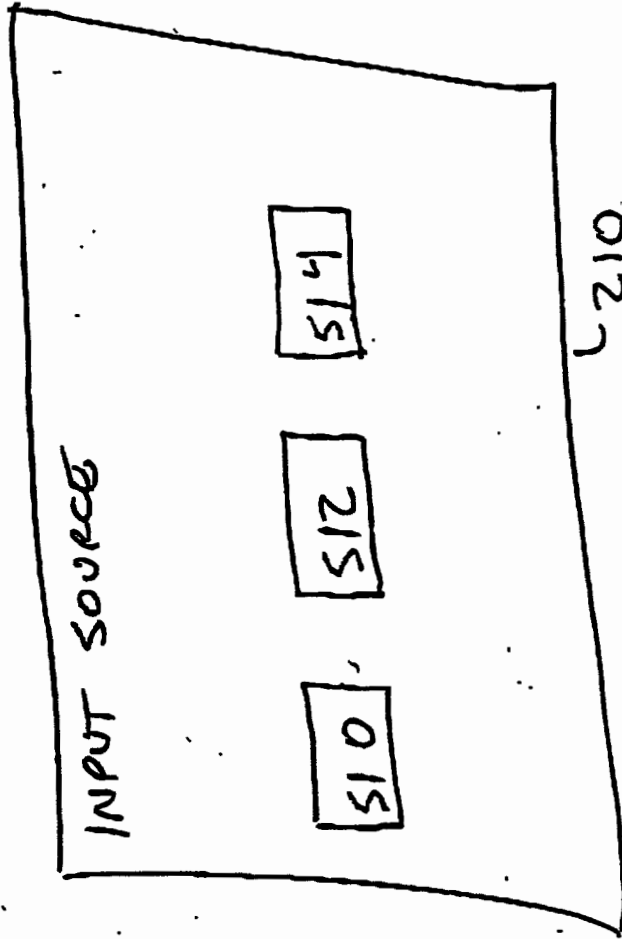
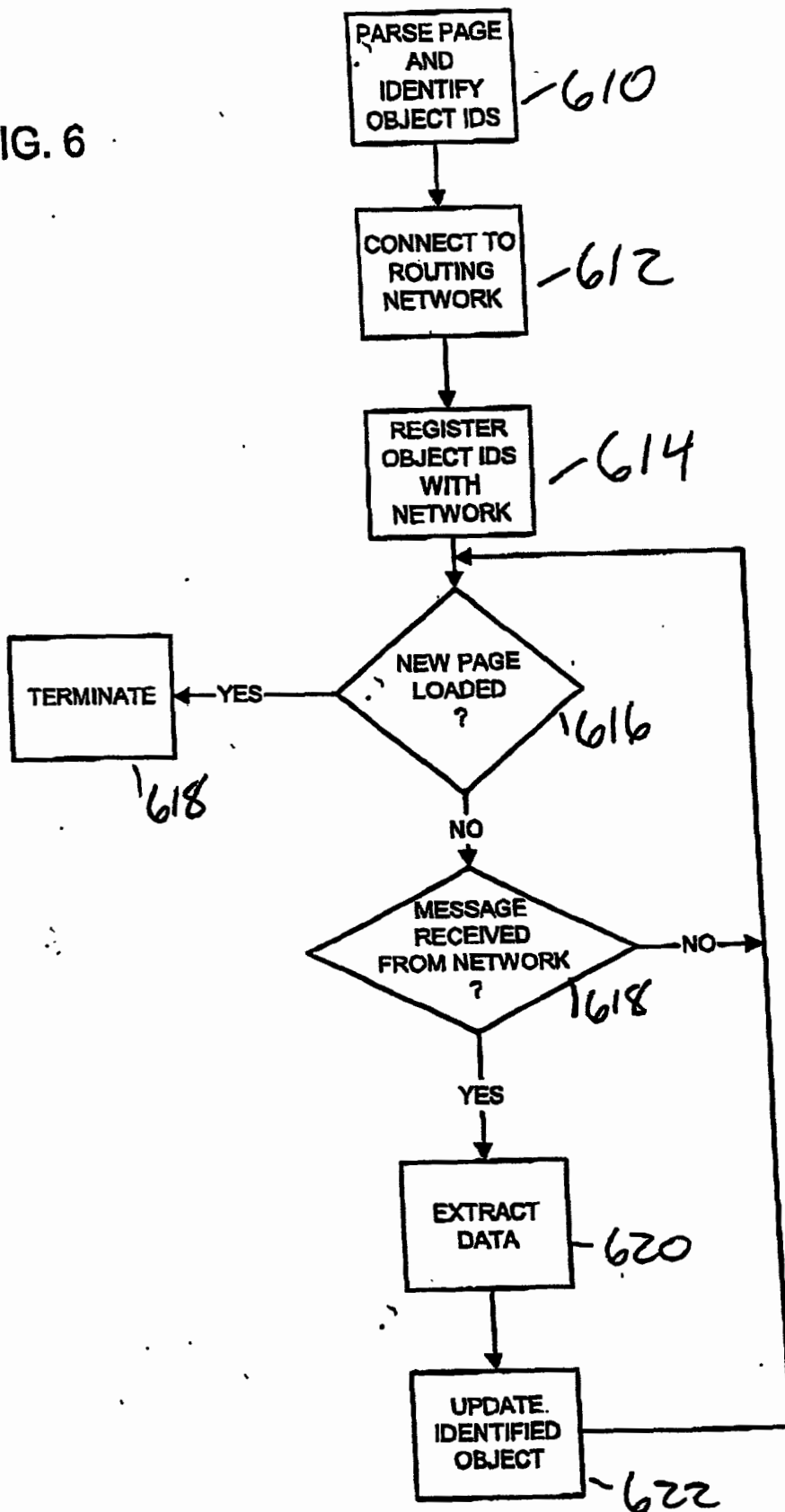


FIG. 6



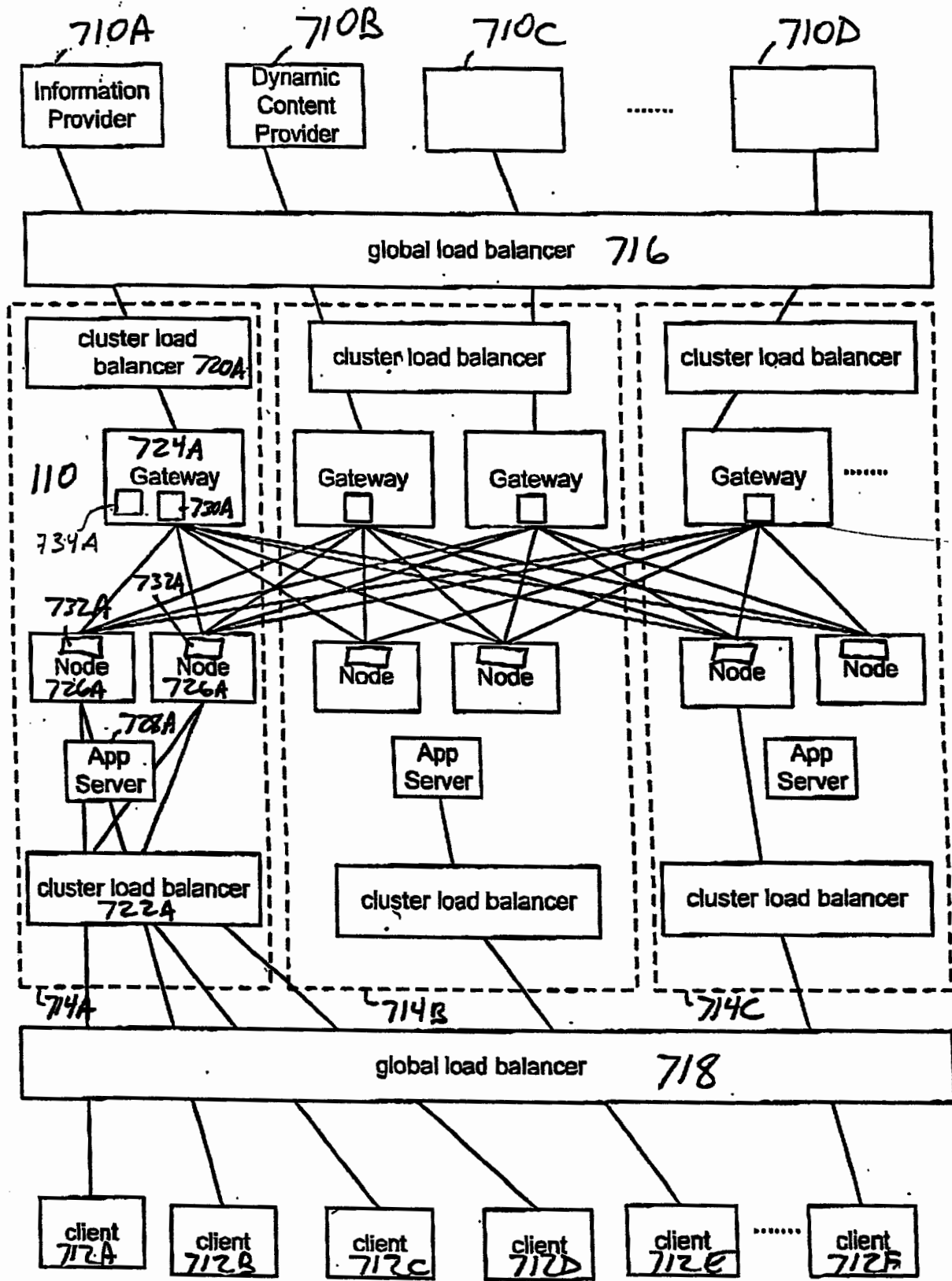


FIG. 7

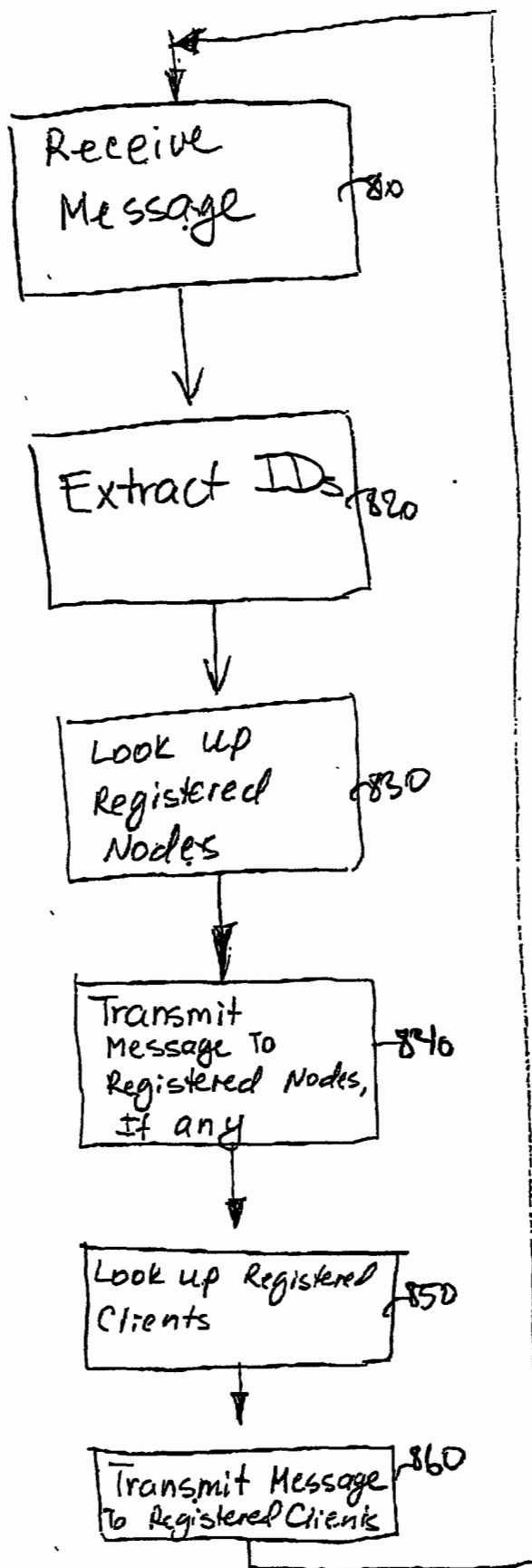
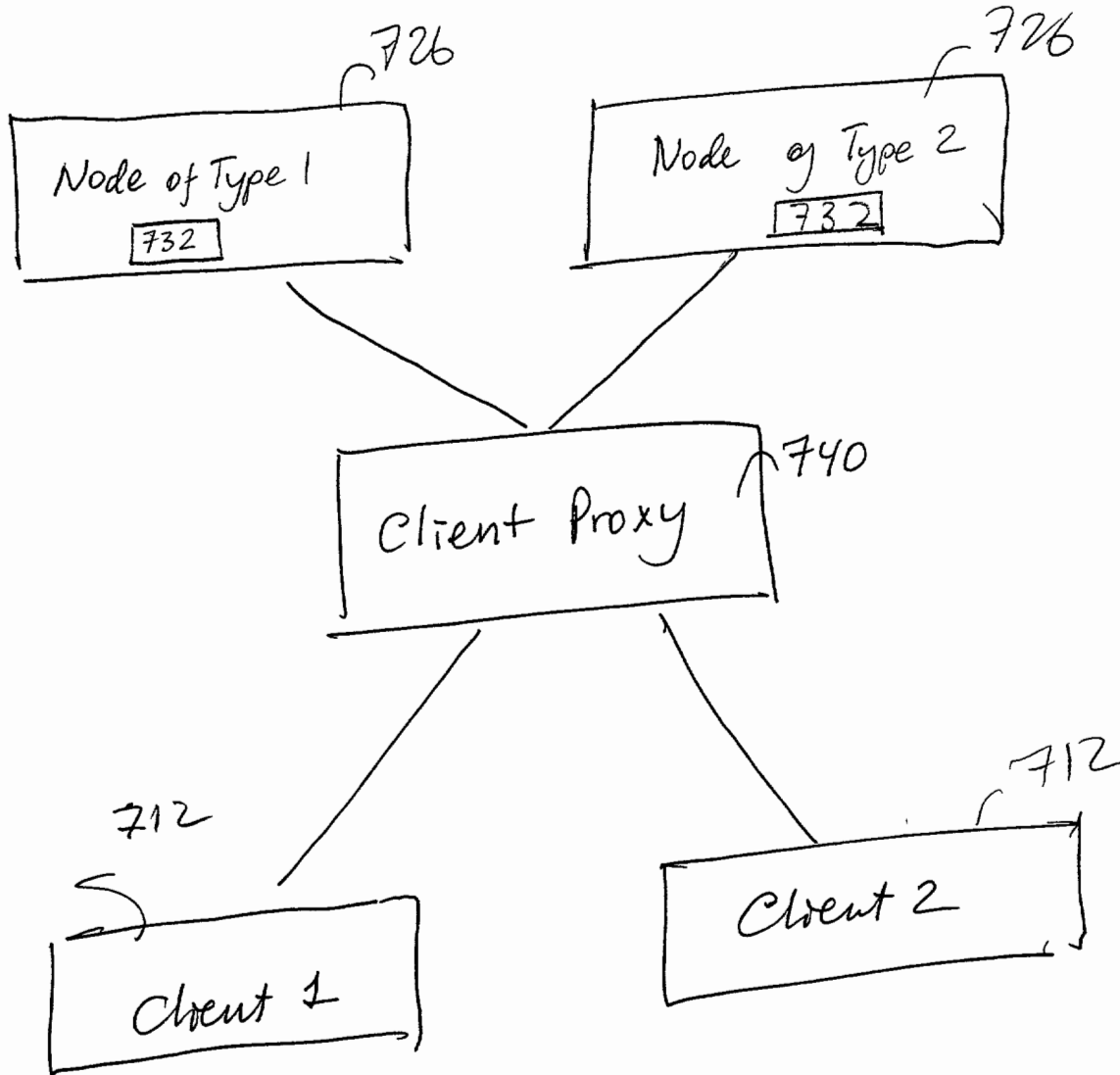


FIG. 8



110

Fig. 9

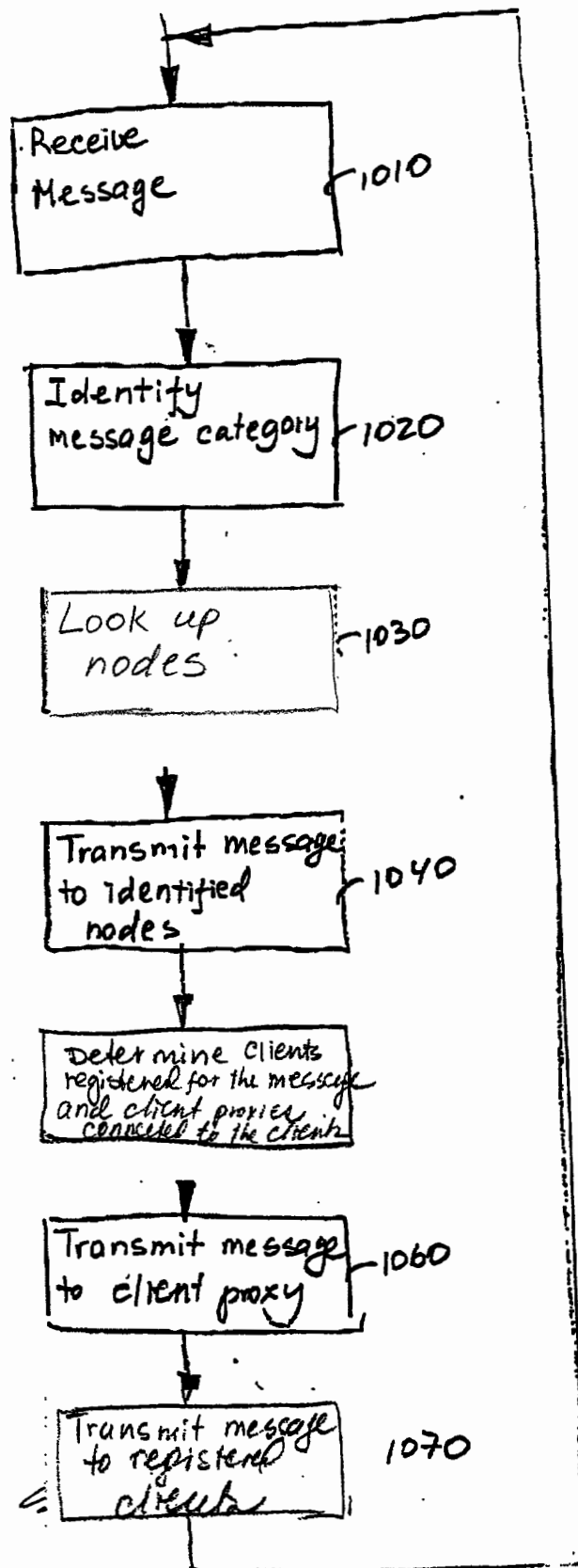
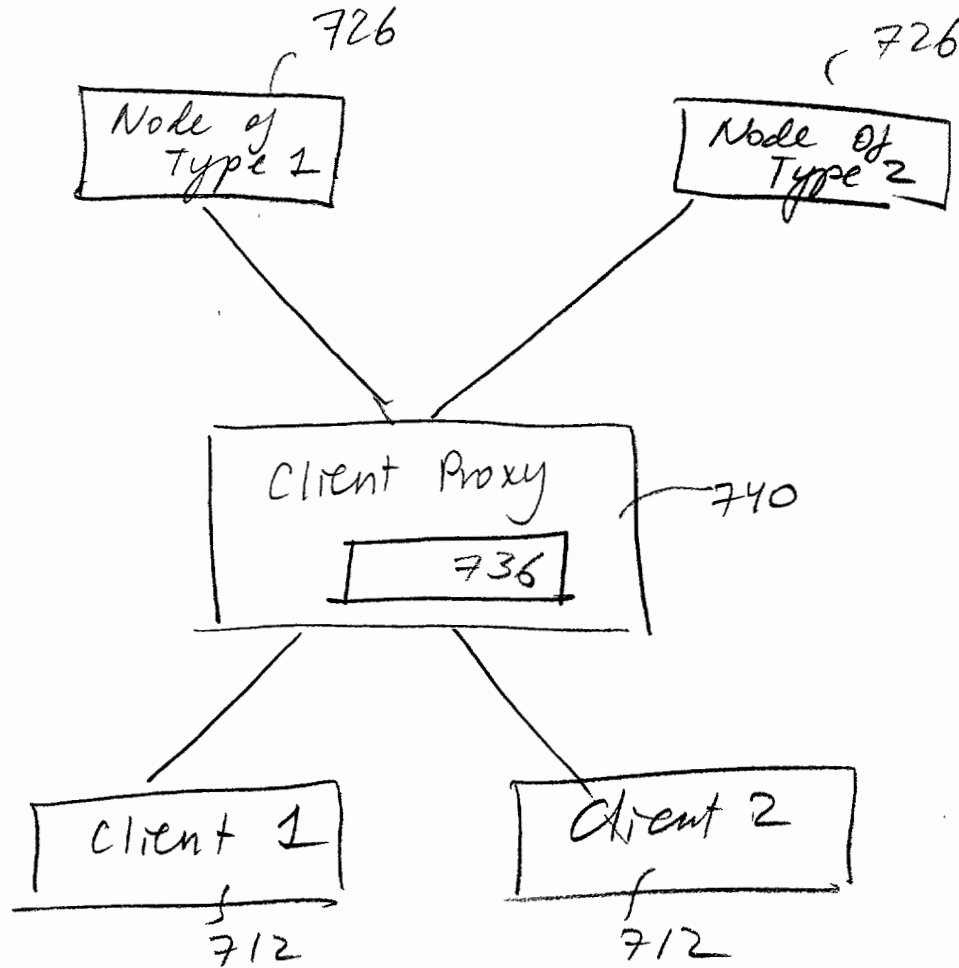


FIG. 10



110

Fig 11

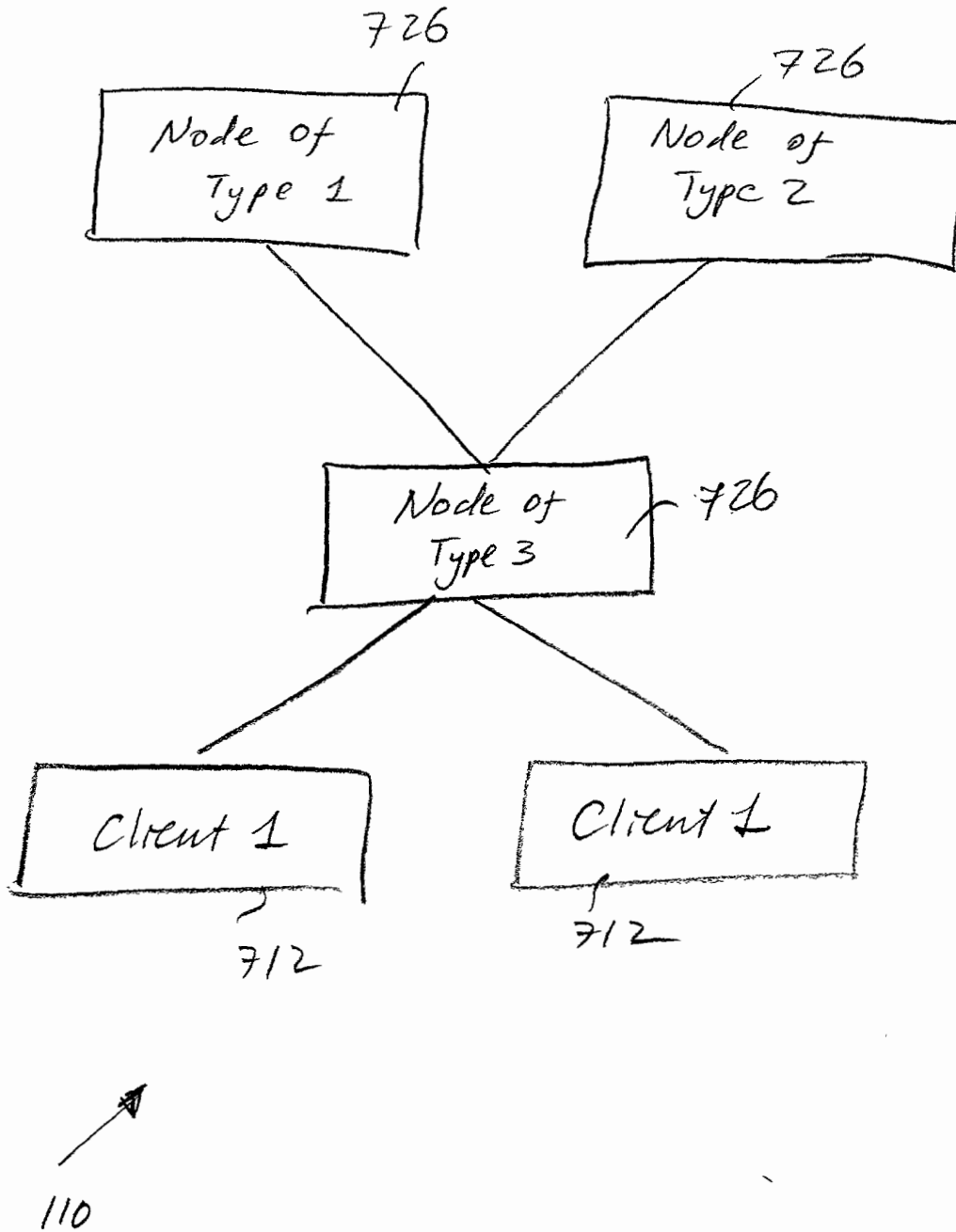


FIG. 12

PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2001

Application or Docket Number

10 605 618

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	25	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	25 minus 20 = *	5
INDEPENDENT CLAIMS	5 minus 3 = *	2
MULTIPLE DEPENDENT CLAIM PRESENT ☐		

SMALL ENTITY
TYPE ☒

OTHER THAN SMALL ENTITY

RATE	FEE
BASIC FEE	370.00
X\$ 9=	45
X42=	84
+140=	
TOTAL	

RATE	FEE
BASIC FEE	740.00
X\$18=	
X84=	
+280=	
TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total *	Minus **	=
	Independent *	Minus ***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐		

SMALL ENTITY

OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X84=	
+280=	
TOTAL ADDIT. FEE	

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total *	Minus **	=
	Independent *	Minus ***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐		

RATE	ADDITIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X84=	
+280=	
TOTAL ADDIT. FEE	

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total *	Minus **	=
	Independent *	Minus ***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐		

RATE	ADDITIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X84=	
+280=	
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.

CLAIMS ONLY							SERIAL NO. 1010568	FILING DATE					
							APPLICANT(S)						
CLAIMS													
	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT			*		*		*	
	IND.	DEP.	IND.	DEP.	IND.	DEP.		IND.	DEP.	IND.	DEP.	IND.	DEP.
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100													
TOTAL IND.													
TOTAL DEP.													
TOTAL CLAIMS													

* MAY BE USED FOR ADDITIONAL CLAIMS OR ADMENDMENTS

FORM PTO-2022 (1-98)

U.S. DEPARTMENT OF COMMERCE
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UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/105,018	03/21/2002	Timothy Tuttle	22726-05909

00758
FENWICK & WEST LLP
TWO PALO ALTO SQUARE
PALO ALTO, CA 94306

CONFIRMATION NO. 7060

FORMALITIES LETTER



OC000000007912536

Date Mailed: 04/19/2002

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 370 to complete the basic filing fee for a small entity.
- Total additional claim fee(s) for this application is \$129.
 - \$45 for 5 total claims over 20.
 - \$84 for 2 independent claims over 3 .
- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(l) of \$65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.
- The balance due by applicant is \$ 564.

*A copy of this notice **MUST** be returned with the reply.*

Customer Service Center

Initial Patent Examination Division (703) 308-1202

PART 3 - OFFICE COPY



ATTORNEY DOCKET NO. 22726-05909

PTO/SB/01A (10-00)

Approved for use through 10/31/2002. OMB 0651-0032
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.**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)**

As the below named inventor(s), I/we declare that:

This declaration is directed to:

- ☐ The attached application or
☒ Application No. 10/105,018, filed on March 21, 2002,
☐ as amended on _____ (if applicable);

I/we believe that I/we am/are the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought;

I/we have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment specifically referred to above;

I/we acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me/us to be material to patentability as defined in 37 CFR 1.56, including material information which became available between the filing date of the prior application and the National or PCT International filing date of the continuation-in-part application, if applicable; and

All statements made herein of my/our knowledge are true, all statements made herein 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 are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and may jeopardize the validity of the application or any patent issuing thereon.

FULL NAME OF INVENTOR(S)Inventor one: Timothy Tuttle Citizen of: United StatesSignature: [Signature] Date: 5/29/02Inventor two: Karl E. Rumelhart Citizen of: United StatesSignature: [Signature] Date: 5/29/02

Inventor three: _____ Citizen of: _____

Signature: _____ Date: _____

Inventor four: _____ Citizen of: _____

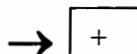
Signature: _____ Date: _____

☐ Additional inventors are being named on one additional form attached hereto.

Burden Hour Statement: This collection of information is required by 35 U.S.C. and 37 CFR 1.63. The information is used by the public to file (and the PTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This form is estimated to take 1 minute to complete. This time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Washington, DC 20231.



Please type a plus sign (+) inside this box →



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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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POWER OF ATTORNEY OR AUTHORIZATION OF AGENT	Application Number	10/105,018
	Filing Date	March 21, 2002
	First Named Inventor	Timothy Tuttle
	Title	ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK
	Group Art Unit	2151
	Examiner Name	UNASSIGNED
	Attorney Docket Number	22726-05909

I hereby appoint:



Practitioners at Customer Number

00758



Practitioner(s) named below:

Name	Registration Number
Robert R. Sachs	42,120
Brian M. Hoffman	39,713
Rimma Budnitskaya	48,237

as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

Please change the correspondence address for the above-identified application to:



The above-mentioned Customer Number.

I am the:



Applicant/Inventor

OR



Assignee of record of the entire interest. See 37 CFR 3.71.

Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

Name	Timothy Tuttle
Signature	
Date	5/29/02

I am the:



Applicant/Inventor

OR



Assignee of record of the entire interest. See 37 CFR 3.71.

Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

Name	Karl E. Rumelhart
Signature	
Date	5/29/02

I am the:



Applicant/Inventor

OR



Assignee of record of the entire interest. See 37 CFR 3.71.

Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

Name	
Signature	
Date	

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 one form is submitted.



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UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/105,018	03/21/2002	Timothy Tuttle	22726-05909

CONFIRMATION NO. 7060

FORMALITIES LETTER



OC00000007912536

00758
FENWICK & WEST LLP
TWO PALO ALTO SQUARE
PALO ALTO, CA 94306

Date Mailed: 04/19/2002

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 370 to complete the basic filing fee for a small entity.
- Total additional claim fee(s) for this application is \$129.
 - \$45 for 5 total claims over 20.
 - \$84 for 2 independent claims over 3 .
- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(l) of \$65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.
- **The balance due by applicant is \$ 564.**

*A copy of this notice **MUST** be returned with the reply.*

Customer Service Center
Initial Patent Examination Division (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE

03/26/2002 MBTZUNES 00000068 10105018
370.00 00 00 00
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84.00 00 00 00
65.00 00 00 00
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FC:203
FC:202
FC:205



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PTO/SB/21 (modified)

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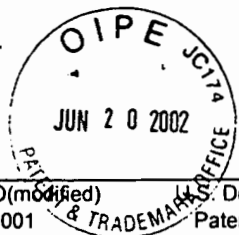
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

TRANSMITTAL FORM (to be used for all correspondence during pendency of filed application)	0001/PTO Rev. 10/95	U.S. Department of Commerce Patent and Trademark Office	Application Number	10/105,018
			Filing Date	March 21, 2002
			First Named Inventor	Timothy Tuttle
			Group Art Unit Number	2151
			Examiner Name	Unknown
Total Number of Pages in This Submission		11	Attorney Docket Number	22726-05909

ENCLOSURES (check all that apply)	
☒ Fee Transmittal Form (in duplicate) ☒ Check Enclosed ☒ Return Receipt Postcard ☒ Response to Notice to File Missing Parts ☒ Assignment & Assignment Recordation ☒ Declaration ☒ Power of Attorney ☐ Information Disclosure Statement & PTO-1449 ☐ Copies of IDS Cited References ☐ Request to Withdraw as Attorneys (in triplicate) ☐ Request for Correction of Recorded Assignment ☐ Amendment/Response: [] Page(s) ☐ After Final ☐ Status Request ☐ Revocation and Power of Attorney	☐ Issue Fee Transmittal ☐ Letter to Chief Draftsperson ☐ Formal Drawing(s): [12] Sheet(s) of Figures [1 - 12] ☐ Appeal Communication to Board of Appeals and Interferences ☐ Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) ☐ Certified Copy of Priority Document(s) ☐ After Allowance Communication to Group ☒ Copy of Formalities Letter ☐ Application Data Sheet ☐ ☐ ☐
REMARKS: *Excludes page count of the cited references	

SIGNATURE OF ATTORNEY OR AGENT			
Signature:			
Attorney/Reg. No.:	Rimma Budnitskaya, Registration No. 48,237	Dated:	6/14/02

CERTIFICATE OF MAILING			
I hereby certify that this correspondence, including the enclosures identified above, is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Box Missing Parts, Washington, D.C. 20231 on the date shown below. If the Express Mail Mailing Number is filled in below, then this correspondence is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service pursuant to 37 CFR 1.10.			
Signature:			
Typed or Printed Name:	Rimma Budnitskaya	Dated:	6/14/02
Express Mail Mailing Number (optional):			

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ORIGINAL FILEDPTO/SB/17 (10-01)(modified)
OMB 0651-0032

Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

0002/PTO(modified)
Rev. 10/2001 U.S. Department of Commerce
Patent and Trademark Office

FEE TRANSMITTAL

TOTAL AMOUNT OF PAYMENT

Subtotal (1) + Subtotal (2) + Subtotal (3) = (\$ 604)

Complete if Known

Application Number	10/105,018
Filing Date	March 21, 2002
First Named Inventor	Timothy Tuttle
Group Art Unit	2151
Examiner Name	Unknown
Attorney Docket Number	22726-05909

METHOD OF PAYMENT

FEE CALCULATION (continued)

1. The Commissioner is hereby authorized to:

- ☐ Charge the indicated fees to the below mentioned deposit account.
- ☒ Charge any additional fee required under 37 CFR 1.16 - 1.21 or credit any over payments to the below mentioned deposit account.†
- ☒ Applicant claims small entity status
See 37 CFR 1.27

Deposit Account Number: 19-2555

Deposit Account Name: FENWICK & WEST LLP

A Duplicate Copy of this authorization is attached

2. ☒ Payment Enclosed:☒ Check ☐ Credit Card ☐ Other

FEE CALCULATION (fees effective 10/01/2001)

1. FILING FEE

Large Entity Fee Code/Fee	Small Entity Fee Code/Fee	Fee Description	Fee Due
101/\$740	201/\$370	Utility Filing	370
106/\$330	206/\$165	Design Filing	
108/\$740	208/\$370	Reissue	
114/\$160	214/\$80	Provisional Filing	
SUBTOTAL (1)			(\$ 370)

2. CLAIMS

Large Entity Fee Code/Fee	Small Entity Fee Code/Fee	Fee Description
103/\$18	203/\$9	Claims in excess of 20
102/\$84	202/\$42	Independent claims in excess of 3
104/\$280	204/\$140	Multiple dependent claim
109/\$84	209/\$42	Reissue independent claims over original patent
110/\$18	210/\$9	Reissue claims in excess of 20 and over original patent

3. ADDITIONAL FEES

Large Entity Fee Code/Fee	Small Entity Fee Code/Fee	Fee Description	Fee Due
105/\$130	205/\$65	Surcharge - late filing fee or oath	65
127/\$50	227/\$25	Surcharge-late provisional filing fee or cover sheet	
147/\$2,520	147/\$2,520	For filing a request for reexamination	
115/\$110	215/\$55	Extension for response within first month†	
116/\$400	216/\$200	Extension for response within second month†	
117/\$920	217/\$460	Extension for response within third month†	
118/\$1,440	218/\$720	Extension for response within fourth month†	
128/\$1,960	228/\$980	Extension for response within fifth month†	
119/\$320	219/\$160	Notice of Appeal	
141/\$1,280	241/\$640	Petition to revive unintentionally abandoned application	
142/\$1,280	242/\$640	Utility Issue Fee (Or Reissue)	
143/\$460	243/\$230	Design Issue Fee	
122/\$130	122/\$130	Petitions to the Commissioner	
126/\$180	126/\$180	Submission of Information Disclosure Statement	
179/\$740	279/\$370	Request for Continued Examination (RCE)	
581/\$40	581/\$40	Recording each patent assignment per property (times number of properties)	40
146/\$740	246/\$370	Filing a submission after final rejection (37 CFR 1.129(a))	
149/\$740	249/\$370	For each additional invention to be examined (37 CFR 1.129(b))	
Other fee (specify):			
Other fee (specify):			
SUBTOTAL (3)			(\$ 105)

(Col. 1)		(Col. 2)		(Col. 3)		Fee	Fee Due
For	No. of Existing Claims		Highest No. Previously Paid For	Extra**			
TOTAL	25	minus*	20 or	5	x	9	45
INDEP	5	minus*	3 or	2	x	42	84
[] First presentation of multiple dependent claim							

* Subtract the greater number of Col. 2

** If the difference between Col. 1 and Col. 2 is less than zero, then enter "0" in Col. 3

SUBTOTAL (2) (\$ 129)

SUBMITTED BY

Typed or Printed Name Rimma Budnitskaya

Signature

Complete (if applicable)

Reg. Number 48,237

Date

6/14/02

22726/05909/SF/5077411.1

* Request for Extension of Time per 37 CFR 1.136 (a)(3) made hereby



PATENT

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IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

APPLICANTS: Timothy Tuttle & Karl E. Rumelhart
APPLICATION NO.: 10/105,018
FILING DATE: March 21, 2002
TITLE: Asynchronous Messaging Using a Node Specialization Architecture in the Dynamic Routing Network
EXAMINER: Unknown
GROUP ART UNIT: 2151
ATTY. DKT. NO.: 22726-05909

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Box Missing Parts, Commissioner For Patents, Washington, D.C. 20231, on the date shown below:

Dated: 6/14/02 By: Rimma Budnitskaya
Rimma Budnitskaya, Reg. No.: 48,237

BOX MISSING PARTS
COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

**RESPONSE TO NOTICE TO FILE MISSING
PARTS OF APPLICATION**

SIR:

Responsive to Notice to File Missing Parts dated April 19, 2002, received in the above-identified patent application,

☒ Enclosed are:

- ☒ a copy of the Notice to File Missing Parts;
- ☒ an original, signed Declaration;
- ☒ an original, signed Power of Attorney; and

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PATENT

☒ payment in the amount of \$ 604 for the filing fees, missing parts surcharge and assignment recordation.

☐ Other

☒ Applicant claims small entity status under 37 C.F.R. § 1.27.

Respectfully submitted,
TIMOTHY TUTTLE & KARL E. RUMELHART

Dated: _____

6/14/02

By: _____

Bud

Rimma Budnitskaya, Reg. No.: 48,237
Fenwick & West LLP
Two Palo Alto Square
Palo Alto, CA 94306
Tel.: (415) 875-2401
Fax.: (415) 281-1350

22726/05909/SF/5077371.1



PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: Timothy Tuttle *et al.*
APPLICATION NO.: 10/105,018
FILING DATE: March 21, 2002
TITLE: NODE SPECIALIZATION ARCHITECTURE
EXAMINER: UNASSIGNED
GROUP ART UNIT: 2151
ATTY. DKT. NO.: 22726-05909

RECEIVED

DEC 02 2002

Technology Center 2100

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Box Non-Fee Amendment, Commissioner For Patents, Washington, DC 20231, on the date shown below:

Dated: November 19, 2002

By:

Brian M. Hoffman, Reg. No. 39,713

BOX NON-FEE AMENDMENT
COMMISSIONER FOR PATENTS
WASHINGTON, DC 20231

INFORMATION DISCLOSURE STATEMENT

Under 37 CFR §§ 1.56 and 1.97-98

SIR:

Pursuant to the provisions of 37 CFR §§ 1.56 and 1.97-98, enclosed herewith is modified form PTO/SB/08A listing references for consideration by the Examiner. Enclosed is a copy of each listed reference that may be material to the examination of this application, and for which there may be a duty to disclose.

The filing of this Information Disclosure Statement shall not be construed as a representation regarding the completeness of the list of references, or that inclusion of a reference in this list is an admission that it is prior art or is pertinent to this application, or that a search has been made, or as an admission that the information listed is, or may be considered to be, material to patentability, or that no other material information exists, and shall not be construed as an admission against interest in any manner.

This Information Disclosure Statement is being filed:

- ☒ within three months of the filing date of the application, or date of entry into the national stage of an international application, or before the mailing date of a first office action on the merits, whichever event last occurred;

- ☐ before the mailing of a first official action after the filing of a request for continued examination (RCE) under 37 CFR § 1.114;
- ☐ after three months of the filing date of this national application or the date of entry of the national stage in an international application, or after the mailing date of the first official action on the merits, whichever event last occurred, but before the mailing date of the first to occur of either: (1) a final action under 37 CFR § 1.113; or (2) an action that otherwise closes prosecution in the application, and:
 - ☐ attached hereto is the fee set forth under 37 CFR § 1.17(p) for submission of this Information Disclosure Statement under 37 CFR § 1.97(c); OR
 - ☐ Applicant certifies pursuant to 37 CFR § 1.97(e) that:
 - ☐ each item of information contained in this Information Disclosure Statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Statement; OR
 - ☐ no item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application and, to the knowledge of the person signing this certification after making reasonable inquiry, no item of information contained in this Statement was known to any individual designated under 37 CFR § 1.56(c) more than three months prior to the filing of this Statement;
- ☐ before the payment of the issue fee but after the mailing date of the first to occur of either: (1) a final action under 37 CFR § 1.113; or (2) an action that otherwise closes prosecution in the application, and:
 - ☐ Applicant certifies pursuant to 37 CFR § 1.97(e) that:
 - ☐ each item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Statement; or
 - ☐ no item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application and, to the knowledge of the person signing this

certification after making reasonable inquiry, no item of information contained in this Statement was known to any individual designated under 37 CFR § 1.56(c) more than three months prior to the filing of this Statement; AND

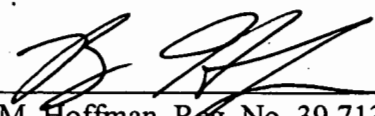
- ☐ attached hereto is the fee set forth under 37 CFR § 1.17(p) for submission of this Information Disclosure Statement under 37 CFR § 1.97(c); OR
- ☐ after the payment of the issue fee. Applicant request that the information contained in this Information Disclosure Statement be placed in the file according to 37 CFR § 1.97(i), although the information may not be considered by the USPTO.
- ☒ This application relies, under 35 U.S.C. § 120, on the earlier filing date of prior application No. 10/017,182, filed on December 14, 2001, and the references cited therein are hereby referenced, but are not required to be provided in this application under 37 CFR § 1.98(d). However, copies of the references are enclosed herewith for the examiner's convenience.
- ☐ Each item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart application, and the communication was not received by any individual designated in 37 CFR § 1.56(c) more than thirty days prior to the filing of this Information Disclosure Statement. 37 CFR § 1.704(d).
- ☒ Applicant submits that no fee is required for the consideration of this Information Disclosure Statement.

Consideration of the listed references and favorable action are solicited.

Respectfully submitted,

TIMOTHY TUTTLE *et al.*

Dated: November 19, 2002

By: 
Brian M. Hoffman, Reg. No. 39,713
Attorney for Applicants
Fenwick & West LLP
Two Palo Alto Square
Palo Alto, CA 94306
Tel.: (415) 875-2484
Fax: (415) 281-1350



PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1449A/PTO		Complete if Known			
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		Application No.	10/105,018		
		Filing Date	March 21, 2002		
		First Named Inventor	Timothy Tuttle <i>et al.</i>		
		Art Unit	2151		
		Examiner Name	UNASSIGNED		
Sheet	2	of	2	Attorney Docket Number	22726-05909

U.S. PATENT DOCUMENTS					RECEIVED DEC 02 2002 Technology Center 2100
Examiner Initials*	Cite No. ¹	Document No. Number - Kind Code ² (if known)	Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	
	A1	US-6029175	02-22-2000	Chow <i>et al.</i>	

OTHER REFERENCES - NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T ³
	C1	Franklin <i>et al.</i> , "Dissemination-Based Information Systems," IEEE Data Engineering Bulletin, Vol. 19, No. 3, September 1996, 9 pages.	
	C2	Nagami <i>et al.</i> , "Toshiba's Flow Attribute Notification Protocol (FANP) Specification," April 1997, RFC 2129, Internet RFC/STD/FYI/BCP Archives [online], [retrieved on 2002-05-16]. Retrieved from the Internet: <URL: http://www.landfield.com/rfcs/rfc2129.html >, 16 pages.	
	C3	Strom <i>et al.</i> , "Gryphon: An Information Flow Based Approach to Message Brokering," International Symposium on Software Reliability Engineering '98, 1998, 2 pages.	
	C4	Sturman <i>et al.</i> , "Reflection in the Gryphon Message Brokering System," Reflection Workshop of the 13 th ACM Conference on Object Oriented Program Systems, Languages and Applications (OOPSLA '98), 1998, 5 pages.	
	C5	International DOI Foundation, "Introduction to the Digital Object Identifier," [online]. April 1998 [retrieved on 2002-05-16]. Retrieved from the Internet: <URL: http://www.doi.org/introduction.html >, 4 pages.	
	C6	Aksoy <i>et al.</i> , "Research in Data Broadcast and Dissemination", Proc. 1st Int'l Conf. on Advanced Multimedia Content Processing, Osaka University, Osaka, Japan, November, 1998.	
	C7	Banavar <i>et al.</i> , "An Efficient Multicast Protocol for Content-Based Publish-Subscribe Systems," Proc. of the 19th International Conference on Distributed Computing Systems, 1999, 9 pages.	
	C8	Banavar <i>et al.</i> , "Information Flow Based Event Distribution Middleware," Proceedings of the 1999 ICDCS Workshop on Electronic Commerce and Web-Based Applications, 1999, 8 pages.	

Examiner Signature	Date Considered
-----------------------	--------------------

*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 next communication to applicant.

¹Applicant's unique citation designation number (optional). ²See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached.

22726/05909/SF/5087947.1

PETITIONERS - AMERICAN/SOUTHWEST, Exhibit 1016

Page 84 of 167

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Substitute for form 1449A/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT 		Application No.	10/105,018
		Filing Date	March 21, 2002
		First Named Inventor	Timothy Tuttle et al.
		Art Unit	2151
		Examiner Name	UNASSIGNED
		Attorney Docket Number	22726-05909
Sheet	2	2	

[illegible]

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Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

*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 next communication to applicant.

¹Applicant's unique citation designation number (optional). ²See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached.



2151 +

PTO/SB/21 (modified)
Approved for use through xx/xx/xx, OMB 0651-0031
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

TRANSMITTAL FORM <i>(to be used for all correspondence during pendency of filed application)</i>	U.S. Department of Commerce Patent and Trademark Office	Application Number	10/105,018	
		Filing Date	March 21, 2002	
		First Named Inventor	Timothy Tuttle et al.	
		Group Art Unit Number	2151	
		Examiner Name	UNASSIGNED	
Total Number of Pages in This Submission		7*	Attorney Docket Number	22726-05909

RECEIVED

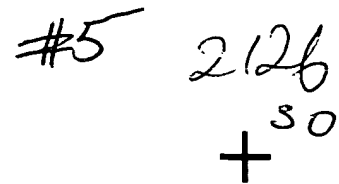
DEC 02 2002

ENCLOSURES (check all that apply)		Technology Center 2100
☐ Fee Transmittal Form (in duplicate) ☐ Check Enclosed	☐ Issue Fee Transmittal	
☒ Return Receipt Postcard	☐ Letter to Chief Draftsperson	
☐ Response to Notice to File Missing Parts	☐ Formal Drawing(s): [] Sheet(s) of Figure(s) []	
☐ Assignment & Recordation Cover Sheet	☐ Appeal Communication to Board of Appeals and Interferences	
☐ Declaration	☐ Appeal Communication to Group (Appeal Notice, Brief, Reply Brief)	
☐ Power of Attorney	☐ Certified Copy of Priority Document(s)	
☐ Application Data Sheet	☐ After Allowance Communication to Group	
☒ Information Disclosure Statement & PTO/SB/08A ☒ Copies of 19 IDS Cited References	☐	
☐ Request for Corrected Filing Receipt	☐	
☐ Request for Correction of Recorded Assignment	☐	
☐ Amendment/Response: [] Page(s) ☐ After Final	☐	
☐ Status Request	☐	
☐ Revocation and Substitute Power of Attorney	☐	

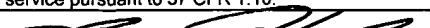
REMARKS: * references not included in page count

SIGNATURE OF ATTORNEY OR AGENT			
Signature:			
Attorney/Reg. No.:	Brian M. Hoffman, Reg. No. 39,713	Dated:	November 19, 2002

CERTIFICATE OF MAILING			
I hereby certify that this correspondence, including the enclosures identified above, is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Box Non-Fee Amendment, Commissioner for Patents, Washington, DC 20231 on the date shown below. If the Express Mail Mailing Number is filled in below, then this correspondence is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service pursuant to 37 CFR 1.19.			
Signature:			
Typed or Printed Name:	Brian M. Hoffman	Dated:	November 19, 2002
Express Mail Mailing Number (optional):			



ENCLOSURES (check all that apply)	
☐ Fee Transmittal Form (in duplicate) ☐ Check Enclosed ☒ Return Receipt Postcard ☐ Response to Notice to File Missing Parts ☐ Assignment & Recordation Cover Sheet ☐ Declaration ☐ Power of Attorney ☐ Application Data Sheet ☐ Information Disclosure Statement & PTO/SB/08A ☐ Copies of IDS Cited References ☐ Request for Corrected Filing Receipt ☐ Request for Correction of Recorded Assignment ☐ Amendment/Response: [] Page(s) ☐ After Final ☐ Status Request ☐ Revocation and Substitute Power of Attorney	☐ Issue Fee Transmittal ☐ Letter to Chief Draftsperson ☐ Formal Drawing(s): [] Sheet(s) of Figure(s) [] ☐ Appeal Communication to Board of Appeals and Interferences ☐ Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) ☐ Certified Copy of Priority Document(s) ☐ After Allowance Communication to Group ☒ Request for Withdrawal as Attorney or Agent ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____
REMARKS: RECEIVED JUN 07 20 Technology Center	

CERTIFICATE OF MAILING			
I hereby certify that this correspondence, including the enclosures identified above, is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below. If the Express Mail Mailing Number is filled in below, then this correspondence is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service pursuant to 37 CFR 1.10.			
Signature:			
Typed or Printed Name:		Brian M. Hoffman	Dated: May 28, 2004
Express Mail Mailing Number (optional):			

22726/05909/SF/5121902.1



**REQUEST FOR WITHDRAWAL
AS ATTORNEY OR AGENT**

Application Number	10/105,018
Issue Date	March 21, 2002
First Named Inventor	Timothy Tuttle <i>et al</i>
Group Art Unit	2126
Examiner Name	Meng Ai T An
Attorney Docket Number	22726-05909

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I hereby apply to withdraw as attorney or agent for the above identified patent. The client has been duly notified of this request for withdrawal and provided with all papers and property to which the client is entitled.

The reasons for this request are:

Pursuant to 37 CFR §§1.36 and 10.40, the practitioner's client knowingly and freely assents to, and has requested, termination of the employment.

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JUN 07 2004
Technology Center 2100

1. ☐ The correspondence address is NOT affected by this withdrawal.
2. ☒ Change the correspondence address and direct all future correspondence to:

Firm or Individual Name	Townsend Townsend & Crew				
Address	Two Embarcadero Center				
Address	8 th Floor				
City	San Francisco	State	CA	Zip	94111-3834
Country	United States				
Telephone	415-576-0200	Fax	415-576-0300		

- ☒ This request is made on behalf of myself and
☒ all the attorneys/agents of record,
☐ the attorneys/agents (with registration numbers) listed on the attached paper(s), or
☒ the attorneys/agents associated with Customer Number 00758
on whose behalf I have signed this request and on whose behalf I am authorized to sign. The request is enclosed in triplicate (including any attachments).

Name	Brian M. Hoffman
Signature	<i>[Signature]</i>
Date	May 28, 2004

NOTE: Withdrawal is effective when approved rather than when received.
Unless there are at least 30 days between approval of withdrawal and the expiration date of a time period for response or possible extension period, the request to withdraw is normally disapproved.

22726/05909/SF/5121894.1



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Paper No. 6

MAIL

JUN 3 0 2004

**DIRECTOR OFFICE
TECHNOLOGY CENTER 2100**

Fenwick & West LLP
Silicon Valley Center
801 California Street
Mountain View, CA 94041

In re Application of:
Timothy TUTTLE, et al.
Application No. 10/105,018
Filed: March 21, 2002
For: ASYNCHRONOUS MESSAGING USING
A NODE SPECIALIZATION
ARCHITECTURE IN THE DYNAMIC
ROUTING NETWORK

DECISION ON REQUEST TO
WITHDRAW AS ATTORNEY
OR AGENT

This is a decision on the Request to Withdraw from Representation filed June 1, 2004.

A grantable request to withdraw as attorney of record should indicate thereon the present mailing addresses of the attorney(s) who is/are withdrawing from the record and of the applicant. The request for withdrawal must be signed by every attorney seeking to withdraw or contain a clear indication that one attorney is signing on behalf of another/others. A request to withdraw will not be approved unless at least 30 (thirty) days would remain between the date of approval and the later of the expiration date of a time to file a response or the expiration date of the maximum time period which can be extended under 37 C.F.R. § 1.136(a). The effective date of withdrawal being the date of decision and not the date of request. See M.P.E.P. § 402.06. 37 C.F.R. § 1.36 further requires that the applicant or patent owner be notified of the withdrawal of the attorney or agent.

The request is **GRANTED**.

All future communications from the Office will be directed to the below-listed address until otherwise notified by applicant. This correspondence address is provided by the withdrawn attorney(s). Applicant is reminded of the obligation to promptly notify the Patent and Trademark Office (Office) of any change in correspondence address to ensure receipt of all communications from the Office.

Serial No.: 10/105,018
Decision on Petition

- 2 -



Vincent N. Trans
Special Program Examiner
Technology Center 2100
Computer Architecture, Software, and
Information Security
703-305-9750

cc: Townsend, Townsend & Crew
Two Embarcadero Center
8th Floor
San Francisco, CA 94111-3834

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JUL 15 2004

003/004

OFFICIAL

PTO/SB/82 (09-03)

REVOCATION OF POWER OF ATTORNEY WITH NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS	Application Number	10/105,018
	Filing Date	March 21, 2002
	First Named Inventor	Tuttle, Timothy
	Art Unit	2161
	Examiner Name	Unassigned
	Attorney Docket Number	022193-090611US

I hereby revoke all previous powers of attorney given in the above-identified application:

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint the practitioners associated with the Customer Number:

20350

☒ Please change the correspondence address for the above-identified application to:☒ The address associated with
Customer Number: 20350

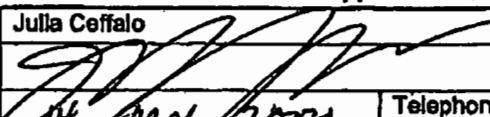
OR

☐ Firm or Individual Name					
Address					
Address					
City		State		ZIP	
Country					
Telephone		Fax			

I am the:

☐ Applicant/Inventor.☒ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)

SIGNATURE of Applicant or Assignee of Record

Name	Julia Ceffalo		
Signature			
Date	14 July 2004	Telephone	

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.

60260349 v1

PTO/S&P (03-03)

Attorney Docket No. 022193-090611US

STATEMENT UNDER 37 CFR 3.73(b)Applicant/Patent Owner: Timothy Tuttle et al.Application No./Patent No.: 10/105,018Filed/Issue Date: March 21, 2002Entitled: ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORKShaw Parsing LLCa Delaware corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ 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:

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

OR

- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as shown below:

1. From: Timothy Tuttle et al. To: Bang Networks, Inc.
The document was recorded in the United States Patent and Trademark Office at Reel 013025, Frame 0417, or for which a copy thereof is attached.
2. From: Bang Networks, Inc. To: Shaw Parsing LLC
The document was recorded in the United States Patent and Trademark Office at Reel 014780, Frame 0220, or for which a copy thereof is attached.
3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet.☐ 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 USPTO. See MPEP 302.8]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

14 July 2004
Date

Telephone number _____

Julia Cefalo
Typed or printed name

Signature _____

Authorized Person _____

Title _____

60260374 v1

PTO/SB/21 (04-04)

TRANSMITTAL FORM <i>(to be used for all correspondence after initial filing)</i>		Application Number	10/105,018
		Filing Date	March 21, 2002
		First Named Inventor	Tuttle, Timothy
		Art Unit	2151
		Examiner Name	Unassigned
Total Number of Pages in This Submission	3	Attorney Docket Number	022193-090611US

ENCLOSURES (Check all that apply)		
☐ Fee Transmittal Form ☐ Fee Attached ☐ Amendment/Reply ☐ After Final ☐ Affidavits/declaration(s) ☐ Extension of Time Request ☐ Express Abandonment Request ☐ Information Disclosure Statement ☐ Certified Copy of Priority Document(s) ☐ Response to Missing Parts/Incomplete Application ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53	☒ Revocation of Power of Attorney with New Power of Attorney and Change of Correspondence Address ☒ Statement Under 37 CFR 3.73(b) ☐ Petition ☐ Petition to Convert to a Provisional Application ☐ Power of Attorney, Revocation Change of Correspondence Address ☐ Terminal Disclaimer ☐ Request for Refund ☐ CD, Number of CD(s) _____	☐ After Allowance Communication to Technology Center (TC) ☐ Appeal Communication to Board of Appeals and Interferences ☐ Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) ☐ Proprietary Information ☐ Status Letter ☒ Other Enclosure(s) (please identify below): Facsimile Cover Sheet
Remarks		The Commissioner is authorized to charge any additional fees to Deposit Account 20-1430.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	Townsend and Townsend and Crew LLP Patrick R. Jewik Reg. No. 40,456
Signature	
Date	July 15, 2004

CERTIFICATE OF FACSIMILE TRANSMISSION	
I hereby certify that this correspondence is being facsimile transmitted to the Patent and Trademark Office, Fax No. (703) 872-9306 on July 15, 2004.	
Typed or printed name	Michael Nowak
Signature	
Date	July 15, 2004

60261995 v1

Atty Docket No. 022193-090611US

PTO FAX NO.: (703) 872-9306

ATTENTION: Examiner Unassigned

Group Art Unit 2151

TELEPHONE NO.: (703) 308-1202

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JUL 15 2004

OFFICIAL COMMUNICATION
FOR THE ATTENTION OF THE O.I.P.E.
CERTIFICATION OF FACSIMILE TRANSMISSION

OFFICIAL

I hereby certify that the following documents in re Application of Timothy Tuttle et al., Application No. 10/105,018, filed March 21, 2002 for ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK are being facsimile transmitted to the Patent and Trademark Office on the date shown below.

Document(s) Attached

1. Transmittal Form
2. Revocation of Power of Attorney with New Power of Attorney and Change of Correspondence Address
3. Statement Under 37 CFR 3.73(b)

Number of pages being transmitted, including this page: 4

Dated: July 15, 2004


Michael Nowak

**PLEASE CONFIRM RECEIPT OF THIS PAPER BY
RETURN FACSIMILE AT (415) 576-0300**

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, CA 94111-3834
Telephone: 415-576-0200
Fax: 415-576-0300

60262060 v1



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/105,018	03/21/2002	Timothy Tuttle	22726-05909

20350
 TOWNSEND AND TOWNSEND AND CREW, LLP
 TWO EMBARCADERO CENTER
 EIGHTH FLOOR
 SAN FRANCISCO, CA 94111-3834

CONFIRMATION NO. 7060



OC000000013468107

#8

Date Mailed: 08/06/2004

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/15/2004.

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.

JESSICA T GAYNOR
 2100 (703) 306-4141

OFFICE COPY



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/105,018	03/21/2002	Timothy Tuttle	22726-05909

00758
 FENWICK & WEST LLP
 SILICON VALLEY CENTER
 801 CALIFORNIA STREET
 MOUNTAIN VIEW, CA 94041

CONFIRMATION NO. 7060



OC000000013468090

Date Mailed: 08/06/2004

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/15/2004.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

JESSICA T GAYNOR
 2100 (703) 306-4141

OFFICE COPY



2157
30

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:

PATENT
Attorney Docket No.: 022193-090611US
Client Ref. No.: US 10/105018

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

On OCTOBER 1, 2004

TOWNSEND and TOWNSEND and CREW LLP

By: Katherine Farkas

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OCT 12 2004

Technology Center 2100

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

TUTTLE, Timothy et al.

Application No.: 10/105,018

Filed: March 21, 2002

For: Asynchronous Messaging Using
a Node Specialization Architecture in
the Dynamic Routing Network

Examiner: Unassigned

Art Unit: 2151

STATUS REQUEST

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The above-referenced application was filed as a patent application on March 21, 2002. A filing receipt (confirmation # 7060) was mailed July 16, 2002. To date, attorneys for applicants have not yet received an Office Action from the United States Patent Office.

Please note that a POA and Change of Correspondence Address were filed on July 15, 2004.

Please advise us on the status of this application.

Respectfully submitted,

A handwritten signature in dark ink, consisting of a large, stylized 'P' followed by a horizontal line and a small flourish.

Patrick R. Jewik
Reg No. 40,456

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: (415) 576-0200
Fax: (415) 576-0300

60322948 v1



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

20350 7590 07/05/2005

TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER

BAROT, BHARAT

ART UNIT

PAPER NUMBER

2155

DATE MAILED: 07/05/2005

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/105,018	03/21/2002	Timothy Tuttle	22726-05909	7060

TITLE OF INVENTION: ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$700	\$0	\$700	10/05/2005

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.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail**

**Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
(703) 746-4000**

or **Fax**

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.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

20350 7590 07/05/2005

**TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834**

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.
10/105,018	03/21/2002	Timothy Tuttle	22726-05909	7060

TITLE OF INVENTION: ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$700	\$0	\$700	10/05/2005

EXAMINER	ART UNIT	CLASS-SUBCLASS
BAROT, BHARAT	2155	709-203000

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 no longer claiming SMALL ENTITY status. See 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 _____

Typed or printed name _____

Registration No. _____

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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/105,018	03/21/2002	Timothy Tuttle	22726-05909	7060
20350	7590	07/05/2005	EXAMINER	
TOWNSEND AND TOWNSEND AND CREW, LLP TWO EMBARCADERO CENTER EIGHTH FLOOR SAN FRANCISCO, CA 94111-3834			BAROT, BHARAT	
			ART UNIT	PAPER NUMBER
			2155	

DATE MAILED: 07/05/2005

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 776 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 776 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 (571) 272-7702. 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.

Notice of Allowability

Application No.

10/105,018

Examiner

Bharat N. Barot

Applicant(s)

TUTTLE ET AL.

Art Unit

2155

-- 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 application filed on 03/21/2002.
2. ☒ The allowed claim(s) is/are 1-25.
3. ☐ The drawings filed on _____ 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) *Substitute*
2. ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 11/29/2002
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 _____

Bharat Barot
BHARAT BAROT
PRIMARY EXAMINER

(571)272-3979

Reasons For Allowance

1. The following is an Examiner's Statement of Reasons for Allowance:

Claims 1-25 are allowable over the prior art of record.

The examiner has found that the prior art of record does not teach or suggest or render obvious a method and a content routing network for dynamically updating a property of a live object at remote client. The major difference in the independent claims not found in the prior art of record that a gateway for receiving a message from a remote input source, the message identifying the live object and containing data for updating the property of the live object at remote clients that have registered for updates to the live object by based on the intermediate registered nodes which are distributed on a network at set forth in the specification and recited in the independent claims 1 and 9; and also based on a category of the message and the node types to which the message category map at set forth in the specification and recited in the independent claims 14, 21, and 23.

2. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bharat Barot whose telephone number is (571) 272-3979. The examiner can normally be reached on Monday-Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne, can be reached at (571) 272-4001.

Any inquiry of general nature or relating to the status of this application should be directed to the group receptionist whose telephone number is (703) 305-3900.

Patent Examiner Bharat Barot

Art Unit 2155

June 23, 2005


**BHARAT BAROT
PRIMARY EXAMINER**



PTO/SB/08A (10-01)
Approved for use through 10/31/2002. OMB 0651-0031
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Substitute for form 1449A/PTO		Complete if Known			
INFORMATION DISCLOSURE STATEMENT BY APPLICANT NOV 29 2002 PATENT & TRADEMARK OFFICE		Application No.	10/105,018		
		Filing Date	March 21, 2002		
		First Named Inventor	Timothy Tuttle <i>et al.</i>		
		Art Unit	2151-2155		
		Examiner Name	UNASSIGNED <i>Barot</i>		
Sheet	2	of	2	Attorney Docket Number	22726-05909

U.S. PATENT DOCUMENTS					RECEIVED DEC 02 2002 Technology Center 2100
Examiner Initials*	Cite No. ¹	Document No. Number - Kind Code ² (if known)	Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	
<i>BB</i>	A1	US-6029175	02-22-2000	Chow <i>et al.</i>	

OTHER REFERENCES - NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T ³
<i>BB</i>	C1	Franklin <i>et al.</i> , "Dissemination-Based Information Systems," IEEE Data Engineering Bulletin, Vol. 19, No. 3, September 1996, 9 pages.	
<i>BB</i>	C2	Nagami <i>et al.</i> , "Toshiba's Flow Attribute Notification Protocol (FANP) Specification," April 1997, RFC 2129, Internet RFC/STD/FYI/BCP Archives [online], [retrieved on 2002-05-16]. Retrieved from the Internet: <URL: http://www.landfield.com/rfcs/rfc2129.html >, 16 pages.	
<i>BB</i>	C3	Strom <i>et al.</i> , "Gryphon: An Information Flow Based Approach to Message Brokering," International Symposium on Software Reliability Engineering '98, 1998, 2 pages.	
<i>BB</i>	C4	Sturman <i>et al.</i> , "Reflection in the Gryphon Message Brokering System," Reflection Workshop of the 13 th ACM Conference on Object Oriented Program Systems, Languages and Applications (OOPSLA '98), 1998, 5 pages.	
<i>BB</i>	C5	International DOI Foundation, "Introduction to the Digital Object Identifier," [online]. April 1998 [retrieved on 2002-05-16]. Retrieved from the Internet: <URL: http://www.doi.org/introduction.html >, 4 pages.	
<i>BB</i>	C6	Aksoy <i>et al.</i> , "Research in Data Broadcast and Dissemination", Proc. 1st Int'l Conf. on Advanced Multimedia Content Processing, Osaka University, Osaka, Japan, November, 1998.	
<i>BB</i>	C7	Banavar <i>et al.</i> , "An Efficient Multicast Protocol for Content-Based Publish-Subscribe Systems," Proc. of the 19th International Conference on Distributed Computing Systems, 1999, 9 pages.	
<i>BB</i>	C8	Banavar <i>et al.</i> , "Information Flow Based Event Distribution Middleware," Proceedings of the 1999 ICDCS Workshop on Electronic Commerce and Web-Based Applications, 1999, 8 pages.	

Examiner Signature	<i>Bhadrat Barot</i>	Date Considered	06/23/2005
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809.
Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹Applicant's unique citation designation number (optional). ²See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 18 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached.

22726/05909/SF/5087947.1

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Substitute for form 1449A/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		Application No.	10/105,018
		Filing Date	March 21, 2002
		First Named Inventor	Timothy Tuttle et al.
		Art Unit	2151-2155
		Examiner Name	UNASSIGNED - Barot
Sheet	2	Attorney Docket Number	22726-05909

OTHER REFERENCES - NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T ²
B/B	C9	Aguilera et al., "Matching Events in a Content-based Subscription System," Eighteenth ACM Symposium on Principles of Distributed Computing (PODC '99), Atlanta, GA, May 4-6, 1999, 9 pages.	
B/B	C10	Banavar et al., "A Case for Message Oriented Middleware," Distributed Computing, 13 th International Symposium, Bratislava, Slovak Republic, September 27-29, 1999, 18 pages.	
B/B	C11	Aguilera et al., "Efficient Atomic Broadcast Using Deterministic Merge," Symposium on Principles of Distributed Computing, 2000, 10 pages.	
B/B	C12	Opyrchal et al., "Exploiting IP Multicast in Content-Based Publish-Subscribe Systems," Proceedings of the IFIP/ACM International Conference on Distributed Systems Platforms (Middleware 2000), April 2000, 23 pages.	
B/B	C13	Caplin Systems Ltd., White Paper "Real Time Text Protocol (RTTP)," Version 1.1, September 2000, 11 pages.	
B/B	C14	Reuters, "Reuters Market Data Systems and the Trading Solutions Architecture," Version 1.0, January 12, 2001, 51 pages.	
B/B	C15	Ramamrithan et al., "Dissemination of Dynamic Data on the Internet," [online]. Powerpoint Presentation, Spring 2001, [retrieved on 2002-02-06], 5 pages. Retrieved from the Internet <URL: http://www.cs.umbc.edu/courses/graduate/CMSC691T/spring 2001/rlist/amit.ppt >.	
B/B	C16	ComputerLetter, Vol. 17, No. 23, July 16, 2001, pp. 1-8.	
B/B	C17	ComputerLetter, Vol. 17, No. 31, September 24, 2001, pp. 1-6.	
B/B	C18	ComputerLetter, Vol. 17, No. 35, November 5, 2001, pp. 1-6.	

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Examiner Signature	Bharat Barot	Date Considered	06/23/2005
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*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 next communication to applicant.

¹Applicant's unique citation designation number (optional). ²See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached.

22726/05909/SF/5087947.1

Notice of References Cited	Application/Control No. 10/105,018		Applicant(s)/Patent Under Reexamination TUTTLE ET AL.	
	Examiner Bharat N. Barot		Art Unit 2155	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,871,346 B1	03-2005	Kumbalimutt et al.	707/100
*	B	US-6,836,886 B2	12-2004	Tuerke et al.	707/10
*	C	US-6,658,652 B1	12-2003	Alexander et al.	707/206
*	D	US-6,446,257 B1	09-2002	Pradhan et al.	717/154
*	E	US-6,418,448 B1	07-2002	Sarkar, Shyam Sundar	709/203
*	F	US-6,363,421 B2	03-2002	Barker et al.	709/202
*	G	US-6,253,167 B1	06-2001	Matsuda et al.	709/203
*	H	US-6,233,600 B1	05-2001	Salas et al.	709/205
	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					
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*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.

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Final	Original		Final	Original		Final	Original		Final	Original		Final	Original		Final	Original		
	1		31			61			91			121			151			181
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Index of Claims



Application/Control No.

10/105,018

Examiner

Bharat N. Barot

Applicant(s)/Patent under Reexamination

TUTTLE ET AL.

Art Unit

2155

✓	Rejected
=	Allowed

-	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
I	Interference

A	Appeal
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Claim		Date				
Final	Original	6/23/05				
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Search Notes

Application/Control No.

10/105,018

Examiner

Bharat N. Barot

Applicant(s)/Patent under
Reexamination

TUTTLE ET AL.

Art Unit

2155

SEARCHED

Class	Subclass	Date	Examiner
709	202-205 217-219 227-229 238	6/23/2005	BB
709	242, 246		
717	153-154		
718	104-105		
719	315, 318		
719	328-332		
707	10, 100		

INTERFERENCE SEARCHED

Class	Subclass	Date	Examiner
709	203, 205	6/23/2005	BB
709	228, 238		
718	105		
707	10		

**SEARCH NOTES
(INCLUDING SEARCH STRATEGY)**

	DATE	EXMR
WEST Search	6/23/2005	BB
Consult SPE	6/23/2005	BB



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BIBDATASHEET

Bib Data Sheet

CONFIRMATION NO. 7060

SERIAL NUMBER 10/105,018	FILING DATE 03/21/2002 RULE	CLASS 709	GROUP ART UNIT 2155	ATTORNEY DOCKET NO. 22726-05909
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APPLICANTS

Timothy Tuttle, San Francisco, CA;

Karl E. Rumelhart, Palo Alto, CA;

** CONTINUING DATA *****

Yes BB

This application is a CIP of 10/017,182 12/14/2001
which claims benefit of 60/256,613 12/18/2000
and claims benefit of 60/276,847 03/16/2001
and claims benefit of 60/278,303 03/21/2001
and claims benefit of 60/279,608 03/28/2001
and claims benefit of 60/280,627 03/29/2001

** FOREIGN APPLICATIONS *****

IF REQUIRED, FOREIGN FILING LICENSE GRANTED

** 04/18/2002

** SMALL ENTITY **

Foreign Priority claimed ☐ yes ☒ no	STATE OR COUNTRY CA	SHEETS DRAWING 12	TOTAL CLAIMS 25	INDEPENDENT CLAIMS 5
35 USC 119 (a-d) conditions met ☐ yes ☒ no ☐ Met after Allowance				
Verified and Acknowledged Examiner's Signature <i>Brent Bent</i> Initials				

ADDRESS

20350
TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA
94111-3834

TITLE

Asynchronous messaging using a node specialization architecture in the dynamic routing network

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PETITIONERS - AMERICAN/SOUTHWEST, Exhibit 1016-

Page 111 of 167

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*DB=USPT; PLUR=YES; OP=ADJ*L18 L1.clm. 6 L18*DB=PGPB; PLUR=YES; OP=ADJ*L17 L14 same propert\$ 0 L17L16 L14 same web page 0 L16L15 L14 same client 4 L15L14 updat\$ with live object 16 L14L13 L1 0 L13*DB=USPT; PLUR=YES; OP=ADJ*L12 L1 same rout\$ 0 L12L11 L5 same rout\$ 1 L11L10 L9 same network 8 L10L9 L8 same live 23 L9L8 L7 same property 124 L8L7 updat\$ same client same object 1435 L7L6 L5 same client 9 L6L5 updat\$ same property same web page 33 L5L4 updat\$ same property same live object 1 L4L3 L2 same network 1 L3L2 L1 same (client or user) 11 L2L1 updat\$ with live object 27 L1

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JUL 06 2005

Atty Docket No. 022193-090611US

PTO FAX NO.: (703) 872-9306

ATTENTION: Examiner Unassigned

Group Art Unit 2151

**OFFICIAL COMMUNICATION
FOR THE PERSONAL ATTENTION OF
COMMISSIONER FOR PATENTS**

CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that the following documents in re Application of TUTTLE, Timothy et al., Application No. 10/105,018, filed March 21, 2002 for ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK are being facsimile transmitted to the Patent and Trademark Office on the date shown below.

Documents Attached

1. Transmittal Form (1 page)
2. Status Request (1 page)

Number of pages being transmitted, including this page: 3

Dated: July 6, 2005


Katherine Farkas

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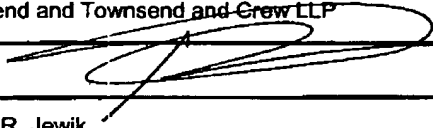
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Two Embarcadero Center, Eighth Floor
San Francisco, CA 94111-3834
Telephone: 415-576-0200
Fax: 415-576-0300
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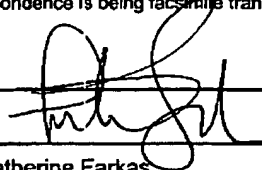
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PTO/SB/21 (09-04)

TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	10/105,018	
	Filing Date	March 21, 2002	
	First Named Inventor	Tuttle, Timothy	
	Art Unit	2151	
	Examiner Name	Unassigned	
Total Number of Pages in This Submission	3	Attorney Docket Number	022193-090611US

ENCLOSURES (Check all that apply)		
☐ Fee Transmittal Form ☐ Fee Attached ☐ Amendment/Reply ☐ After Final ☐ Affidavits/declaration(s) ☐ Extension of Time Request ☐ Express Abandonment Request ☐ Information Disclosure Statement ☐ Certified Copy of Priority Document(s) ☐ Reply to Missing Parts/ Incomplete Application ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53	☐ Drawing(s) ☐ Licensing-related Papers ☐ Petition ☐ Petition to Convert to a Provisional Application ☐ Power of Attorney, Revocation ☐ Change of Correspondence Address ☐ Terminal Disclaimer ☐ Request for Refund ☐ CD, Number of CD(s) _____ ☐ Landscape Table on CD	☐ After Allowance Communication to TC ☐ Appeal Communication to Board of Appeals and Interferences ☐ Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) ☐ Proprietary Information ☒ Status Letter ☐ Other Enclosure(s) (please identify below):
Remarks: The Commissioner is authorized to charge any additional fees to Deposit Account 20-1430.		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT			
Firm Name	Townsend and Townsend and Crew LLP		
Signature			
Printed name	Patrick R. Jewik		
Date	July 6, 2005	Reg. No.	40,456

CERTIFICATE OF TRANSMISSION/MAILING			
I hereby certify that this correspondence is being facsimile transmitted to the Patent and Trademark Office, Fax No. (703) 872-9308 on the date shown below.			
Signature			
Typed or printed name	Katherine Farkas	Date	July 6, 2005

60531292 v1

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CENTRAL FAX CENTER

JUL 06 2005

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(703) 872-9306

On 7/6/05

TOWNSEND and TOWNSEND and CREW LLP

By: Katherine Karkas

PATENT

Attorney Docket No.: 022193-090611US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Tuttle, Timothy

Application No.: 10/105,018

Filed: March 21, 2002

For: Asynchronous Messaging Using A
Node Specialization Architecture In The
Dynamic Routing Network

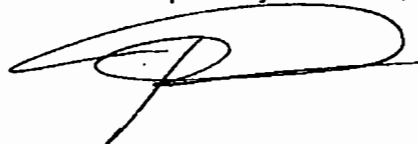
STATUS REQUEST

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

To date, Applicants have not received an Office Action on the merits.
Please advise us on the status of this application.

Respectfully submitted,



Patrick R. Jewik
Reg No. 40,456

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: (415) 576-0200
Fax: (415) 576-0300
60531278 v1

AUG 19 2005

Atty Docket No. 022193-090611US

PTO FAX NO.: 1-571-273-8300

ATTENTION: Examiner Bharat BAROTt

Group Art Unit 2155

OFFICIAL COMMUNICATION
FOR THE PERSONAL ATTENTION OF
EXAMINER Bharat Barot

CERTIFICATION OF FACSIMILE TRANSMISSION

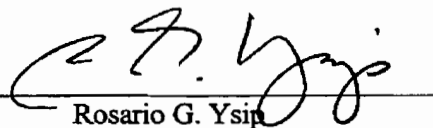
I hereby certify that the following document in re Application of TUTTLE, Timothy et al., Application No. 10/105,018, filed March 21, 2002 for ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK is being facsimile transmitted to the Patent and Trademark Office on the date shown below.

Documents Attached

1. Rescission of Previous Nonpublication Request, 1 page.

Number of pages being transmitted, including this page: -2-

Dated: August 19, 2005


Rosario G. Ysip

**PLEASE CONFIRM RECEIPT OF THIS PAPER BY
RETURN FACSIMILE AT (415) 576-0300**

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, CA 94111-3834
Telephone: 415-576-0200
Fax: 415-576-0300
0407

60567472 v1

AUG 19 2005

PTO/SB/36 (07-05)

**RESCISSION OF PREVIOUS NONPUBLICATION
REQUEST**

(35 U.S.C. 122(b)(2)(B)(iii))

AND, IF APPLICABLE,

NOTICE OF FOREIGN FILING

(35 U.S.C. 122(b)(2)(B)(iii))

Send completed form to:
Mall Stop PG Pub
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450
 FAX (571) 273-8300

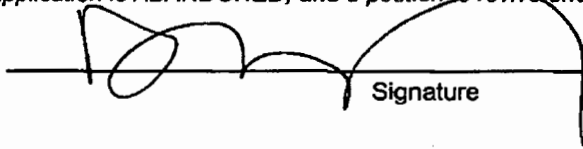
Application Number	10/105,018
Filing Date	03/21/2002
First Named Inventor	Timothy TUTTLE
Title	ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK
Atty Docket Number	022193-090611US
Art Unit	2155
Examiner	Bharat Barot

A request that the above-identified application not be published under 35 U.S.C. 122(b) (nonpublication request) was included with the above-identified application on filing pursuant to 35 U.S.C. 122(b)(2)(B)(i).

I hereby rescind the previous nonpublication request.

If a notice of foreign or international filing is or will be required by 35 U.S.C. 122(b)(2)(B)(iii) and 37 CFR 1.213(c), I hereby provide such notice. This notice is being provided no later than forty-five (45) days after the date of such foreign or international filing.

If a notice of subsequent foreign or international filing required by 35 U.S.C. 122(b)(2)(B)(iii) and 37 CFR 1.213(c) was not filed within forty-five (45) days after the date of filing of the foreign or international application, the application is ABANDONED, and a petition to revive under 37 CFR 1.137(b) is required. See 37 CFR 1.137(f).

 _____
 Signature

August 19, 2005

 Date

Brian N. Young

 Typed or printed name

48,602

 Registration Number, if applicable

415-576-0200

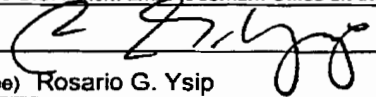
 Telephone Number

This request must be signed in compliance with 37 CFR 1.33(b).

If information or assistance is needed in completing this form, please contact the Pre-Grant Publication Division at (703) 605-4283 or by e-mail at PGPub@USPTO.gov.

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mall Stop PG Pub, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

Signature  _____
 Name (Print/Type) Rosario G. Ysip Date 8/19/05

60567401 v1



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
10/105,018	03/21/2002	Timothy Tuttle	22726-05909
CONFIRMATION NO. 7060			

20350

TOWNSEND AND TOWNSEND AND CREW, LLP
 TWO EMBARCADERO CENTER
 EIGHTH FLOOR
 SAN FRANCISCO, CA 94111-3834

Date Mailed: 08/24/2005

Communication Regarding Rescission Of Nonpublication Request and/or Notice of Foreign Filing

Applicant's rescission of the previously-filed nonpublication request and/or notice of foreign filing is acknowledged. The paper has been reflected in the Patent and Trademark Office's (USPTO's) computer records so that the earliest possible projected publication date can be assigned.

The projected publication date is 12/01/2005.

If applicant rescinded the nonpublication request before or on the date of "foreign filing,"¹ then no notice of foreign filing is required.

If applicant foreign filed the application after filing the above application and before filing the rescission, and the rescission did not also include a notice of foreign filing, then a notice of foreign filing (not merely a rescission) is required to be filed within 45 days of the date of foreign filing. See 35 U.S.C. § 122(b)(2)(B)(iii), and Clarification of the United States Patent and Trademark Office's Interpretation of the Provisions of 35 U.S.C. § 122(b)(2)(B)(ii)-(iv), 1272 Off. Gaz. Pat. Office 22 (July 1, 2003).

If a notice of foreign filing is required and is not filed within 45 days of the date of foreign filing, then the application becomes abandoned pursuant to 35 U.S.C. § 122(b)(2)(B)(iii). In this situation, applicant should either file a petition to revive or notify the Office that the application is abandoned. See 37 CFR 1.137(f). Any such petition to revive will be forwarded to the Office of Petitions for a decision. Note that the filing of the petition will not operate to stay any period of reply that may be running against the application.

Questions regarding petitions to revive should be directed to the Office of Petitions at (571) 272-3282. Questions regarding publications of patent applications should be directed to the patent application publication hotline at (703) 605-4283 or by e-mail pgpub@uspto.gov.

¹ Note, for purpose of this notice, that "foreign filing" means "filing an application directed to the same invention in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing".



PTO/SB/30 (04-05)

RCE
JFW

Request
for
Continued Examination (RCE)
Transmittal

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	10/105,018
Filing Date	March 21, 2002
First Named Inventor	Tuttle, Timothy
Art Unit	2155
Examiner Name	Bharat Barot
Attorney Docket Number	022193-090611US

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application. Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. **Submission required under 37 CFR 1.114** Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

- a. ☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.
- i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ii. ☐ Other _____
- b. ☒ Enclosed
- i. ☐ Amendment/Reply
- ii. ☐ Affidavit(s)/ Declaration(s)
- iii. ☒ Information Disclosure Statement (IDS)
- iv. ☐ Other _____

2. **Miscellaneous**

- a. ☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)
- b. ☐ Other _____

3. **Fees** The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

- a. ☒ The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Deposit Account No. 20-1430. I have enclosed a duplicate copy of this sheet.

- i. ☒ X RCE fee required under 37 CFR 1.17(e)
- ii. ☐ Extension of time fee (37 CFR 1.136 and 1.17)
- iii. ☐ Other _____

10/04/2005 WASFAW1 00000018 201430 10105018
01 FC:1801 790.00 DA

- b. ☐ Check in the amount of \$ _____ enclosed
- c. ☐ Payment by credit card (Form PTO-2038 enclosed)

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.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature		Date	9/29/05
Name (Print /Type)	Brian N. Young	Registration No.	48,602

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

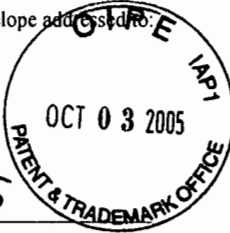
Signature		Date	Sept 30, 2005
Name (Print /Type)	Mark T. Davis		

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

On

Sept 30, 2005



PATENT
Attorney Docket No.: 022193-090611US
Client Reference No.: US 10/105018

TOWNSEND and TOWNSEND and CREW LLP

By:

A handwritten signature of Mark T. Davis in black ink.

Mark T. Davis

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

TUTTLE, Timothy et al.

Application No.: 10/105,018

Filed: March 21, 2002

For: ASYNCHRONOUS MESSAGING
USING A NODE SPECIALIZATION
ARCHITECTURE IN THE DYNAMIC
ROUTING NETWORK

Examiner: Bharat Barot

Art Unit: 2155

SUPPLEMENTAL INFORMATION
DISCLOSURE STATEMENT UNDER 37
CFR §1.97 and §1.98

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

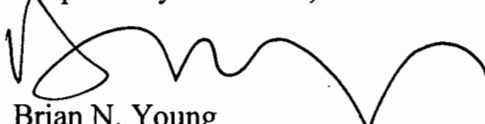
Sir:

The references cited on attached form PTO/SB/08A are being called to the attention of the Examiner. Copies of the references [in compliance with the requirements of 1287 OG 163] are not enclosed. It is respectfully requested that the cited references be expressly considered during the prosecution of this application, and the references be made of record therein and appear among the "references cited" on any patent to issue therefrom.

As provided for by 37 CFR 1.97(g) and (h), no inference should be made that the information and references cited are prior art merely because they are in this statement and no representation is being made that a search has been conducted or that this statement encompasses all the possible relevant information.

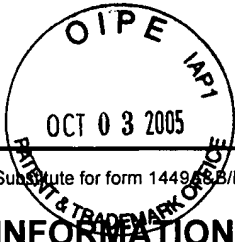
Applicant believes that no fee is required for submission of this statement. However, if a fee is required, the Commissioner is authorized to deduct such fee from the undersigned's Deposit Account No. 20-1430. Please deduct any additional fees from, or credit any overpayment to, the above-noted Deposit Account.

Respectfully submitted,



Brian N. Young
Reg. No. 48,602

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 415-576-0200
Fax: 415-576-0300
BNY:mtd
60576232 v1



Substitute for form 1449, PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet 1 of 1

Complete if Known

Application Number	10/105,018
Filing Date	March 21, 2002
First Named Inventor	Tuttle, Timothy
Art Unit	2155
Examiner Name	Bharat Barot
Attorney Docket Number	022193-090611US

U.S. PATENT DOCUMENTS+					
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where ¹ Relevant Passages or Relevant Figures Appear
		Number Kind Code ² (if known)			
	AA	US-5,706,516	01-1998	Chang et al.	
	AB	US-6,324,587	11-2001	Trenbeath et al.	
	AC	US-6,577,328 B2	06-2003	Matsuda et al.	
	AD	US-6,609,138	08-2003	Merriam	
	AE	US 10/017,182		Tuttle et al.	
	AF	US 10/213,269		Cano et al.	

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

*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 next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2001

Application or Docket Number

10 605 018

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	25	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	25 minus 20 = *	5
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

CLAIMS AS AMENDED - PART II

10-3-05

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	* 25	Minus ** 25	=
Independent	* 5	Minus *** 5	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus **	=
Independent	*	Minus ***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus **	=
Independent	*	Minus ***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐			

- * 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.

SMALL ENTITY TYPE ☒

OR OTHER THAN SMALL ENTITY

RATE	FEE
BASIC FEE	370.00
X\$ 9=	45
X42=	84
+140=	
TOTAL	

RATE	FEE
BASIC FEE	740.00
X\$18=	
X84=	
+280=	
TOTAL	

SMALL ENTITY TYPE ☐

OR OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X84=	
+280=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X84=	
+280=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X84=	
+280=	
TOTAL ADDIT. FEE	



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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NOTICE OF ALLOWANCE AND FEE(S) DUE

20350 7590 01/03/2006

TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER

BAROT, BHARAT

ART UNIT

PAPER NUMBER

2155

DATE MAILED: 01/03/2006

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/105,018	03/21/2002	Timothy Tuttle	22726-05909	7060

TITLE OF INVENTION: ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$700	\$300	\$1000	04/03/2006

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.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail

**Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571) 273-2885**

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.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

20350 7590 01/03/2006

**TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834**

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 (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/105,018	03/21/2002	Timothy Tuttle	22726-05909	7060

TITLE OF INVENTION: ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$700	\$300	\$1000	04/03/2006

EXAMINER	ART UNIT	CLASS-SUBCLASS
BAROT, BHARAT	2155	709-203000

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.

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 no longer claiming SMALL ENTITY status. See 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 _____

Typed or printed name _____

Registration No. _____

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 DEPARTMENT OF COMMERCE
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/105,018	03/21/2002	Timothy Tuttle	22726-05909	7060
20350	7590	01/03/2006		
TOWNSEND AND TOWNSEND AND CREW, LLP TWO EMBARCADERO CENTER EIGHTH FLOOR SAN FRANCISCO, CA 94111-3834			EXAMINER BAROT, BHARAT	
			ART UNIT	PAPER NUMBER
			2155	

DATE MAILED: 01/03/2006

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 776 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 776 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 (571) 272-7702. 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.

Notice of Allowability

Application No.

10/105,018

Applicant(s)

TUTTLE ET AL.

Examiner

Art Unit

Bharat N. Barot

2155

-- 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 RCE filed with IDS on 10/03/2005.
2. ☒ The allowed claim(s) is/are 1-25.
3. ☐ The drawings filed on _____ 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:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ 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 07/03/2005.
- (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)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 10/03/2005
- ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
- ☐ Examiner's Amendment/Comment
- ☐ Examiner's Statement of Reasons for Allowance
- ☐ Other _____

Bharat Barot

**BHARAT BAROT
PRIMARY EXAMINER**

(571)272-3979



INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Complete if Known			
		Application Number	10/105,018		
		Filing Date	March 21, 2002		
		First Named Inventor	Tuttle, Timothy		
		Art Unit	2155		
		Examiner Name	Bharat Barot		
Sheet	1	of	1	Attorney Docket Number	022193-090611US

U.S. PATENT DOCUMENTS+					
Examiner Initials*	Cite No.	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number Kind Code ² (if known)			
BB	AA	US-5,708,516	01-1998	Chang et al.	/
BB	AB	US-6,324,587	11-2001	Trenbeath et al.	
BB	AC	US-6,577,328 B2	06-2003	Matsuda et al.	
BB	AD	US-6,609,138	08-2003	Merriam	
BB	AE	US 10/017,182	—	Tuttle et al.	
BB	AF	US 10/213,269	—	Cano et al.	

Examiner Signature	Bharat Barot	Date Considered	12/05/2005 11/10/2005
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*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 next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Issue Classification 	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/105,018	TUTTLE ET AL.	
	Examiner	Art Unit	
	Bharat N. Barot	2155	

ISSUE CLASSIFICATION									
ORIGINAL					CROSS REFERENCE(S)				
CLASS		SUBCLASS			CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)			
709		203			709	205	228	238	
INTERNATIONAL CLASSIFICATION					718	105			
G	0	6	F	15/16	707	10			
				/					
				/					
				/					
				/					

(Assistant Examiner) (Date)		<i>Bharat Barot.</i> BHARAT BAROT PRIMARY EXAMINER 12/05/05 11/10/2005 (Date)	Total Claims Allowed: 25	
<i>Shen Gals</i> 12-29-05 (Legal Instruments Examiner) (Date)			O.G. Print Claim(s) 1 of 23	O.G. Print Fig. 7

☒ 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	Final	Original
	1		31		61		91		121		151		181		211
	2		32		62		92		122		152		182		212
	3		33		63		93		123		153		183		213
	4		34		64		94		124		154		184		214
	5		35		65		95		125		155		185		215
	6		36		66		96		126		156		186		216
	7		37		67		97		127		157		187		217
	8		38		68		98		128		158		188		218
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	10		40		70		100		130		160		190		220
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	25		55		85		115		145		175		205		235
	26		56		86		116		146		176		206		236
	27		57		87		117		147		177		207		237
	28		58		88		118		148		178		208		238
	29		59		89		119		149		179		209		239
	30		60		90		120		150		180		210		240

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail**

**Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
(571) 273-2885**

or **Fax**

(571) 273-2885

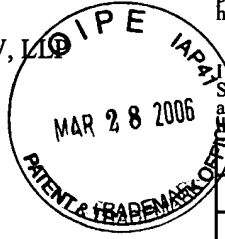
INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence 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.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

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.

20350 7590 01/03/2006

**TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834**



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 (571) 273-2885, on the date indicated below.

Rosario G. Ysip (Depositor's name)
[Signature] (Signature)
March 28, 2006 (Date)

03/31/2006 BABRAHA2 00000039 201430 10105018

01 FC:1501 1400.00 DA
02 FC:1504 300.00 DA

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/105,018	03/21/2002	Timothy Tuttle	22726-05909	7060

TITLE OF INVENTION: ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	~~\$700~~ \$1400	\$300	~~\$1000~~ \$1700	04/03/2006

EXAMINER	ART UNIT	CLASS-SUBCLASS
BAROT, BHARAT	2155	709-203000

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 **Townsend and Townsend**
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively, **and Crew, LLP**
(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.

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 **20-1430** (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 no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

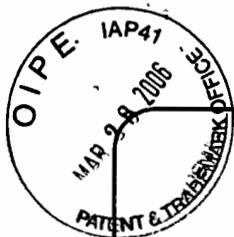
The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above. NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney 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 *[Signature]*
Typed or printed name **C. Bart Sullivan**

Date **March 28, 2006**
Registration No. **41,516**

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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PTO/SB/21 (09-04)

**TRANSMITTAL
FORM**

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

-18-

Application Number

10/105,018

Filing Date

March 21, 2002

First Named Inventor

Tuttle, Timothy

Art Unit

2155

Examiner Name

Bharat Barot

Attorney Docket Number

022193-090611US

ENCLOSURES (Check all that apply)

- | | | |
|---|---|---|
| ☐ Fee Transmittal Form | ☐ Drawing(s) | ☐ After Allowance Communication to TC |
| ☐ Fee Attached | ☐ Licensing-related Papers | ☐ Appeal Communication to Board of Appeals and Interferences |
| ☐ Amendment/Reply | ☐ Petition | ☐ Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) |
| ☐ After Final | ☐ Petition to Convert to a Provisional Application | ☐ Proprietary Information |
| ☐ Affidavits/declaration(s) | ☐ Power of Attorney, Revocation Change of Correspondence Address | ☐ Status Letter |
| ☐ Extension of Time Request | ☐ Terminal Disclaimer | ☒ Other Enclosure(s) (please identify below): |
| ☐ Express Abandonment Request | ☐ Request for Refund | Notification of Loss of Entitlement to Small Entity Status; |
| ☐ Information Disclosure Statement | ☐ CD, Number of CD(s) _____ | Issue Fee Transmittal; |
| | ☐ Landscape Table on CD | Letter to Draftsperson; |
| ☐ Certified Copy of Priority Document(s) | | Replacement Drawings of Figs. 1-12; and |
| ☐ Reply to Missing Parts/ Incomplete Application | | Return Postcard |
| ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53 | | |

Remarks

The Commissioner is authorized to charge any additional fees to Deposit Account 20-1430.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name

Townsend and Townsend and Crew LLP

Signature

Printed name

C. Bart Sullivan

Date

March 28, 2006

Reg. No.

41,516

CERTIFICATE OF TRANSMISSION/MAILING

Express Mail Label: EV 566973748 US

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Signature

Typed or printed name

Rosario G. Ysip

Date

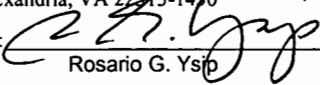
March 28, 2006



"Express Mail" Label No. EV 566973748 US
Date of Deposit March 28, 2006

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Alexandria, VA 22313-1450

By: 
Rosario G. Ysop

PATENT
Docket No.: 022193-090611US
Client Ref. No.: US 10/105018

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

TUTTLE, Timothy et al.

Application No.: 10/105,018

Filed: March 21, 2002

For: ASYNCHRONOUS MESSAGING
USING A NODE SPECIALIZATION
ARCHITECTURE IN THE DYNAMIC
ROUTING NETWORK

Examiner: Bharat Barot

Art Unit: 2155

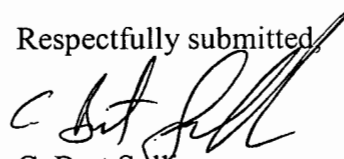
NOTIFICATION OF
LOSS OF ENTITLEMENT TO
SMALL ENTITY STATUS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to 37 C.F.R. 1.27(g)(2), notification is hereby given that small entity status is no longer appropriate in connection with the above-identified application. Please note that the owner of the above referenced patent now qualifies as LARGE entity.

Respectfully submitted,



C. Bart Sullivan
Reg. No. 41,516

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: (415) 576-0200
Fax: (415) 576-0300
CBS:rgy
60735133 v1

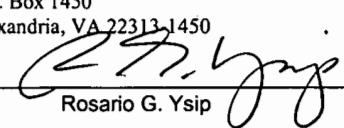


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Date of Deposit March 28, 2006

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P.O. Box 1450
Alexandria, VA 22313-1450

By: 

Rosario G. Ysip

PATENT

Attorney Docket No.: 022193-090611US

Client Ref. No.: US10/105018

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

TUTTLE, Timothy et al.

Application No.: 10/105,018

Filed: March 21, 2002

For: ASYNCHRONOUS MESSAGING
USING A NODE SPECIALIZATION
ARCHITECTURE IN THE DYNAMIC
ROUTING NETWORK

Examiner: Bharat Barot

Art Unit: 2155

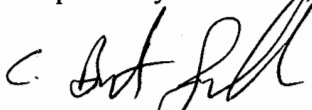
LETTER TO OFFICIAL DRAFTSPERSON

Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants submits twelve (12) sheets of formal drawings to be made of record in the above-identified case.

Respectfully submitted,



C. Bart Sullivan
Reg. No. 41,516

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
(415) 576-0200
Fax (415) 576-0300
CBS/rgy
Attachments
60735153 v1

PETITIONERS - AMERICAN/SOUTHWEST, Exhibit 1016

Page 133 of 167

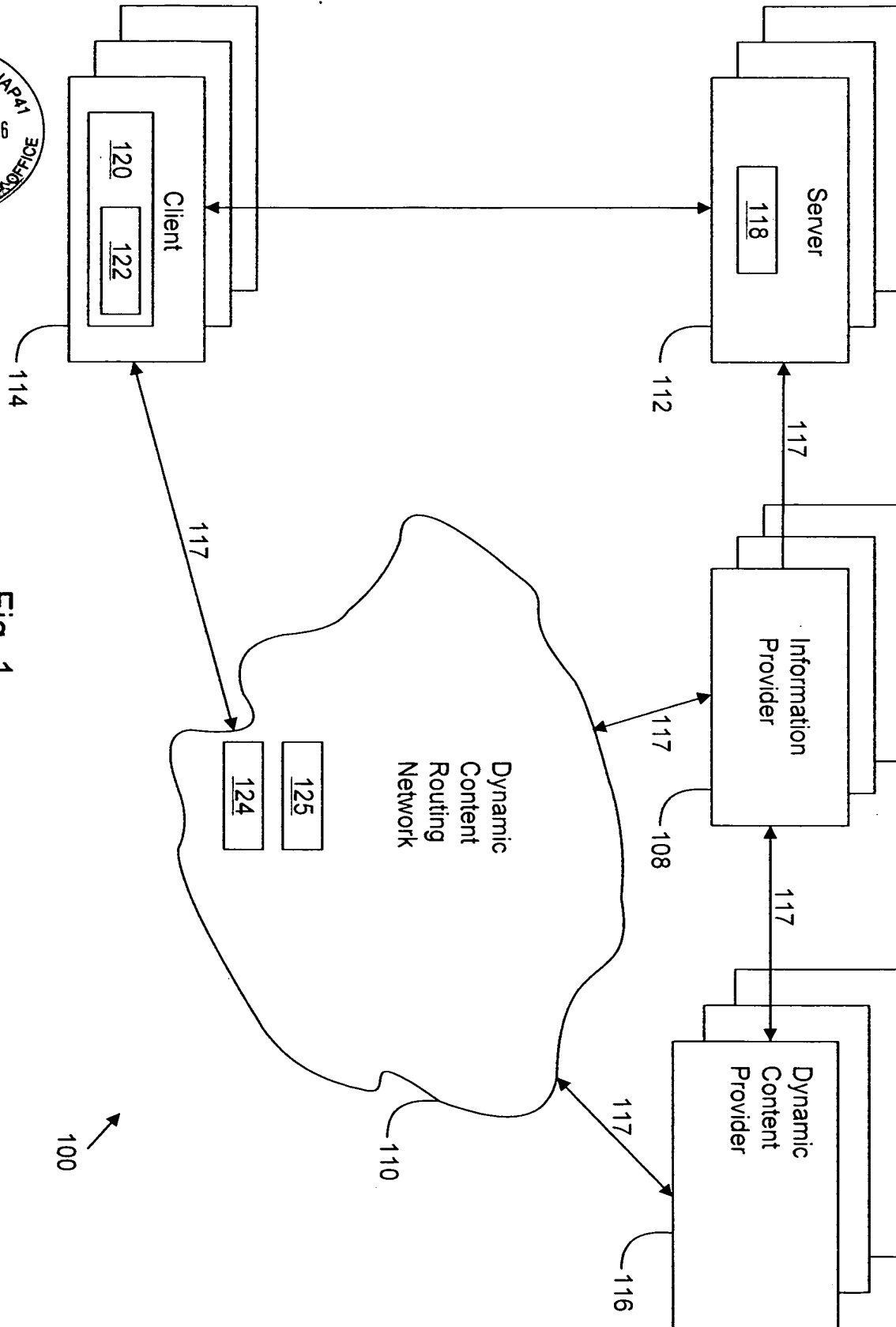
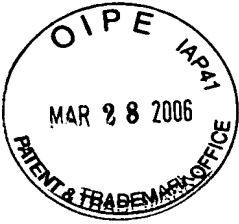
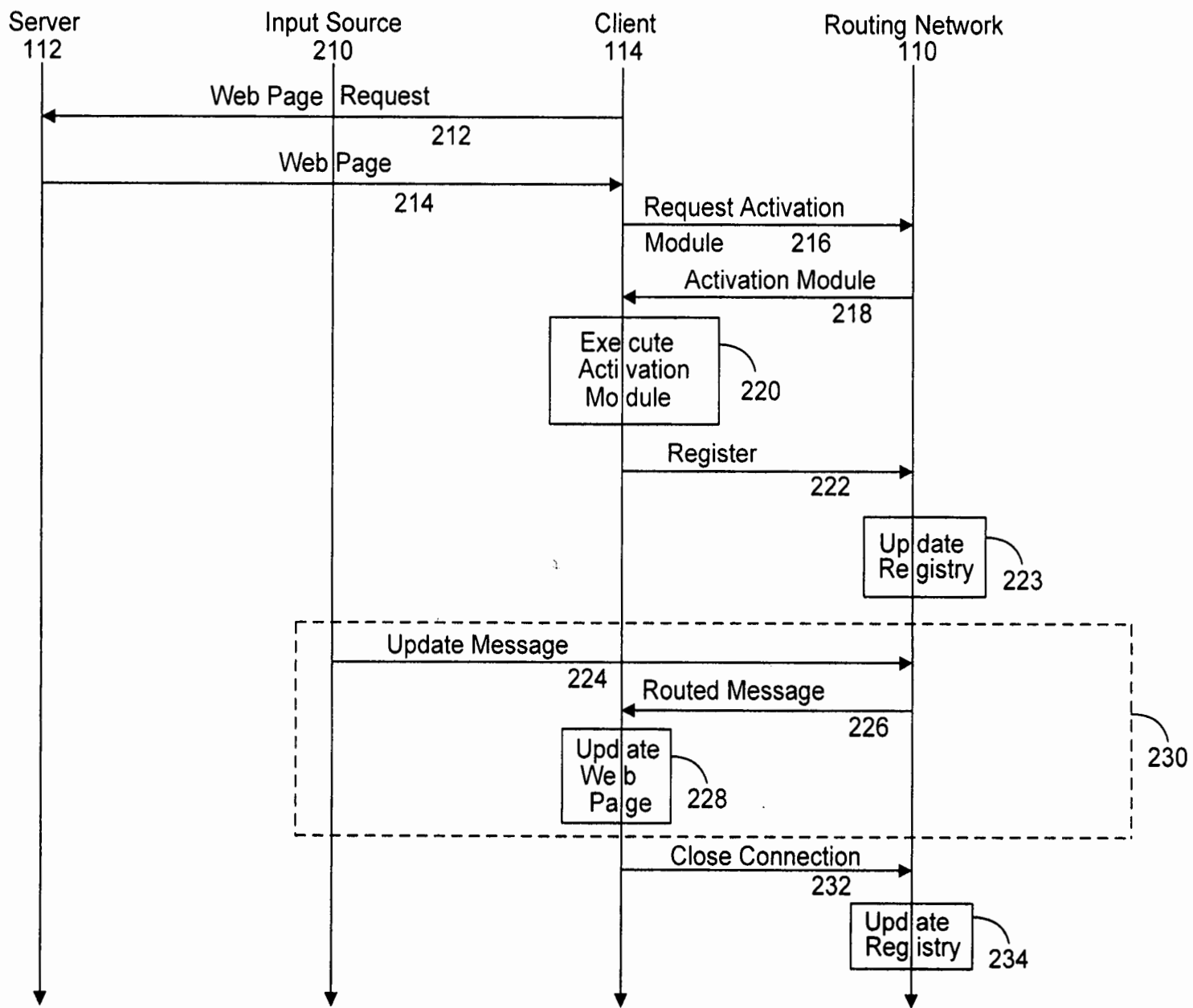


Fig. 1

Fig. 2



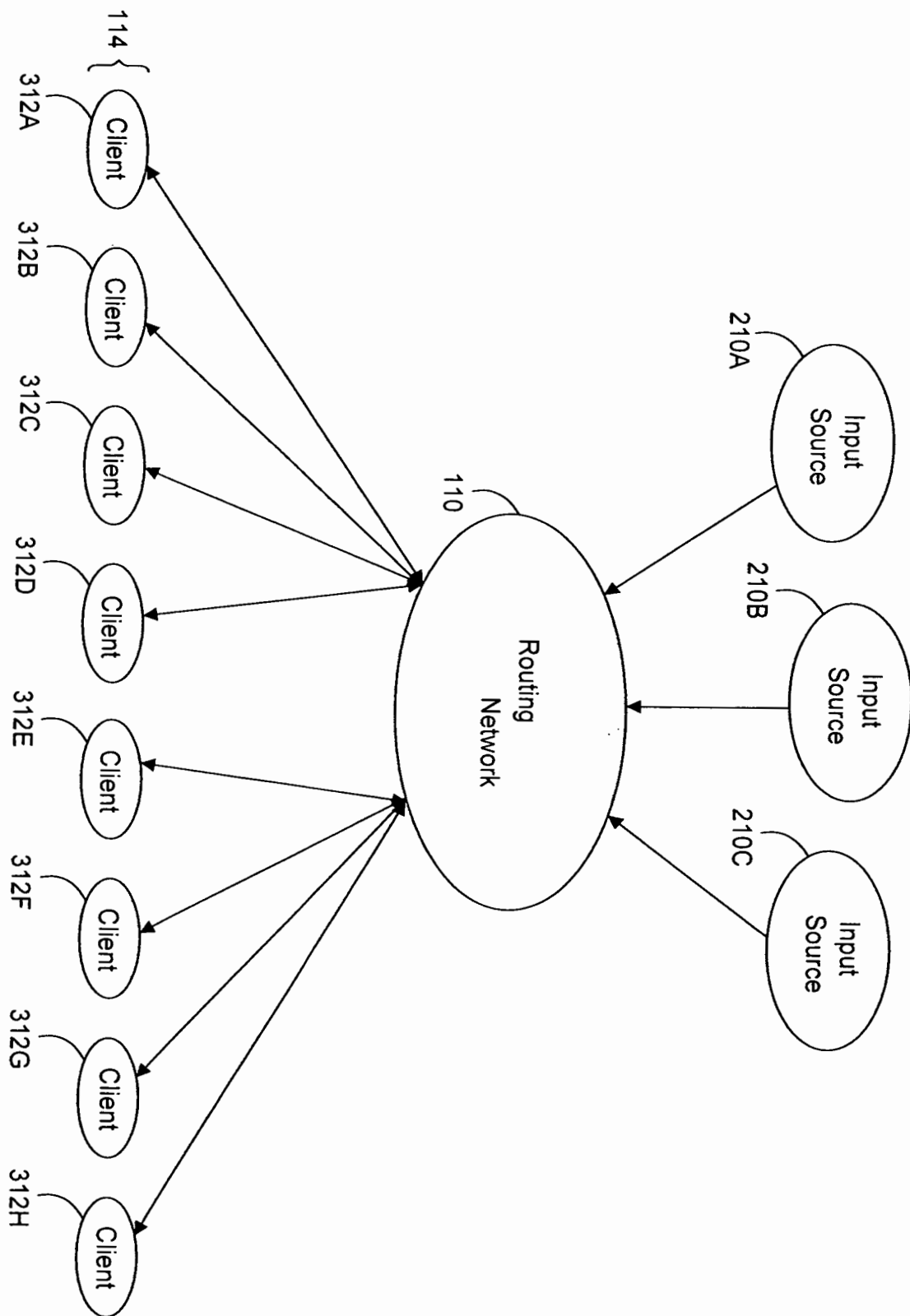


Fig. 3

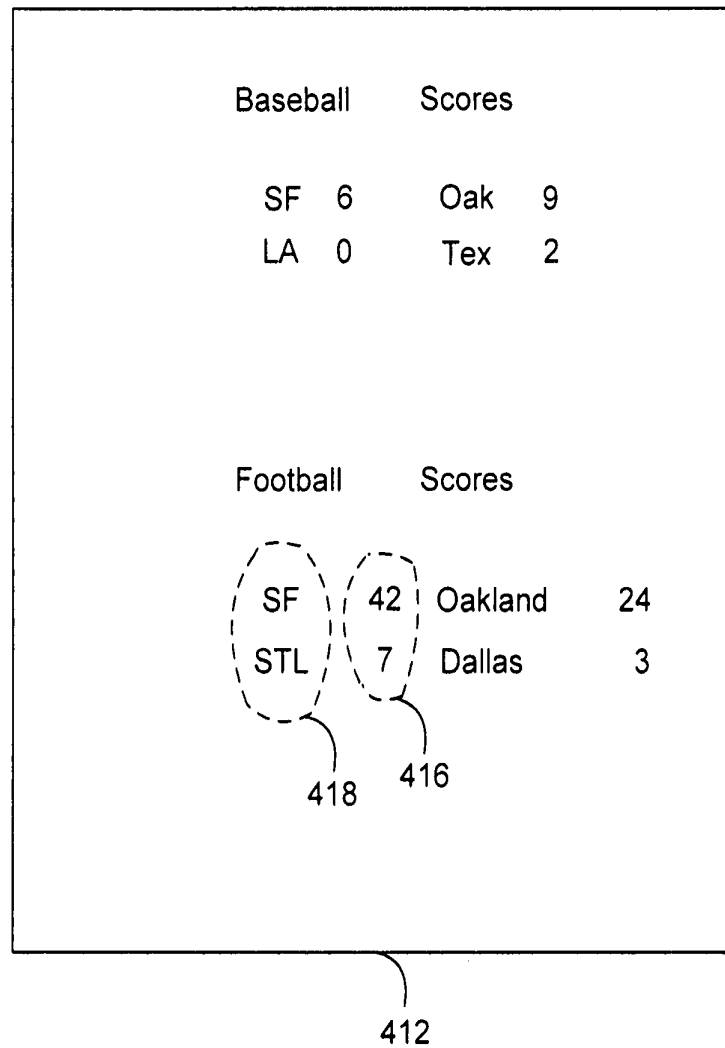
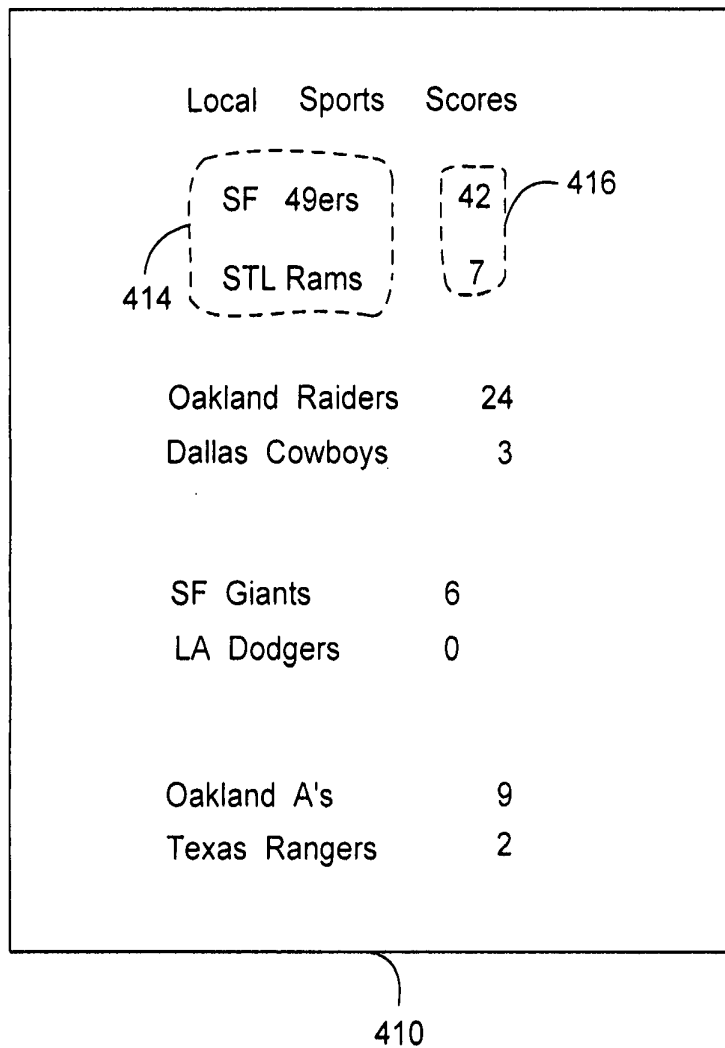


Fig. 4

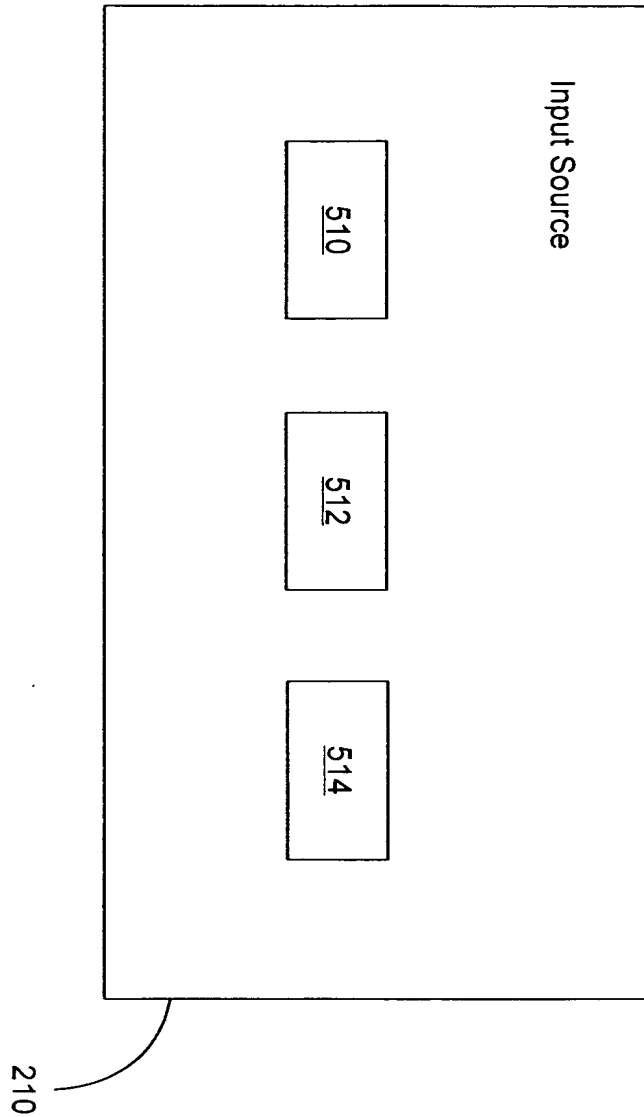


Fig. 5

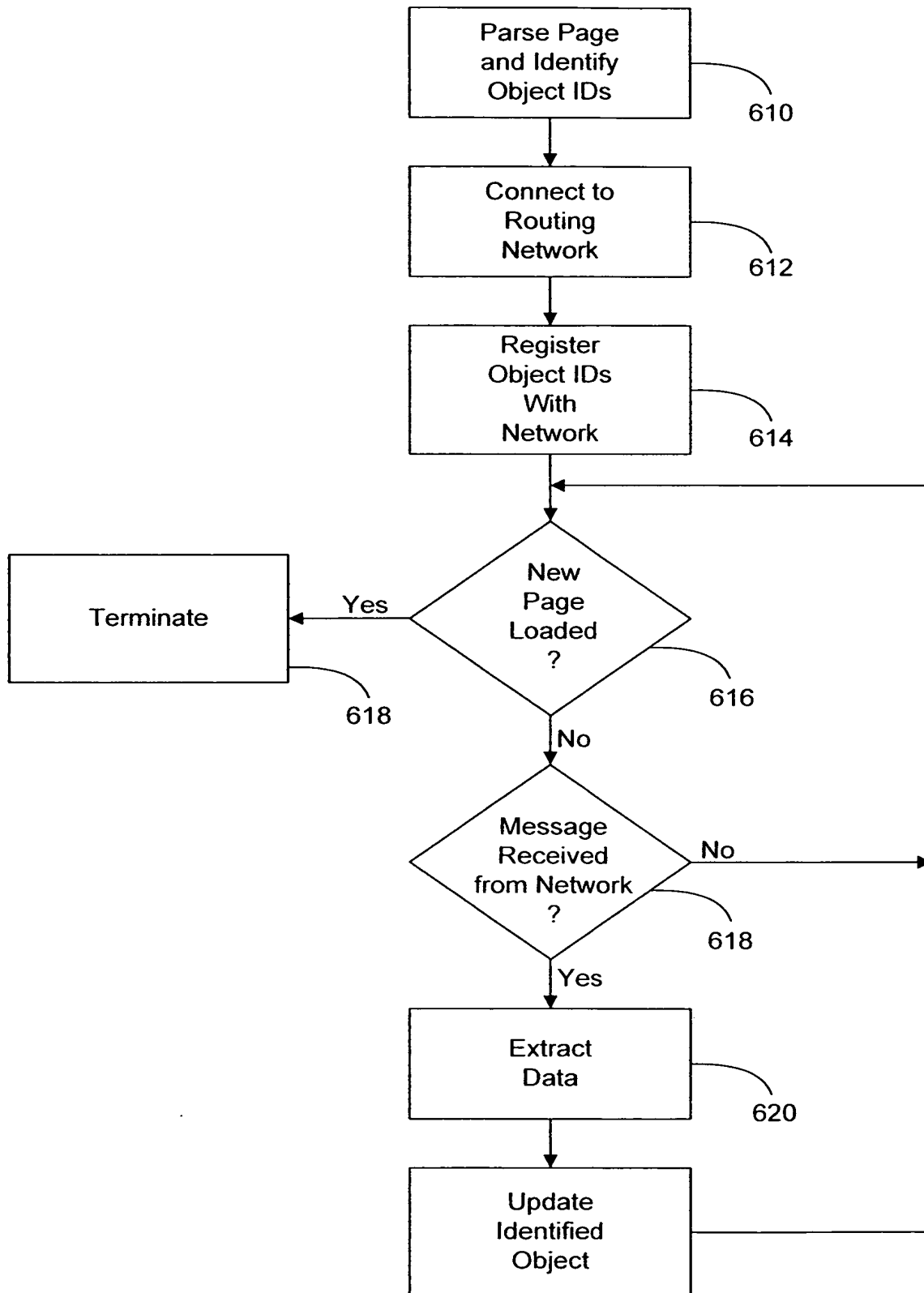


Fig. 6

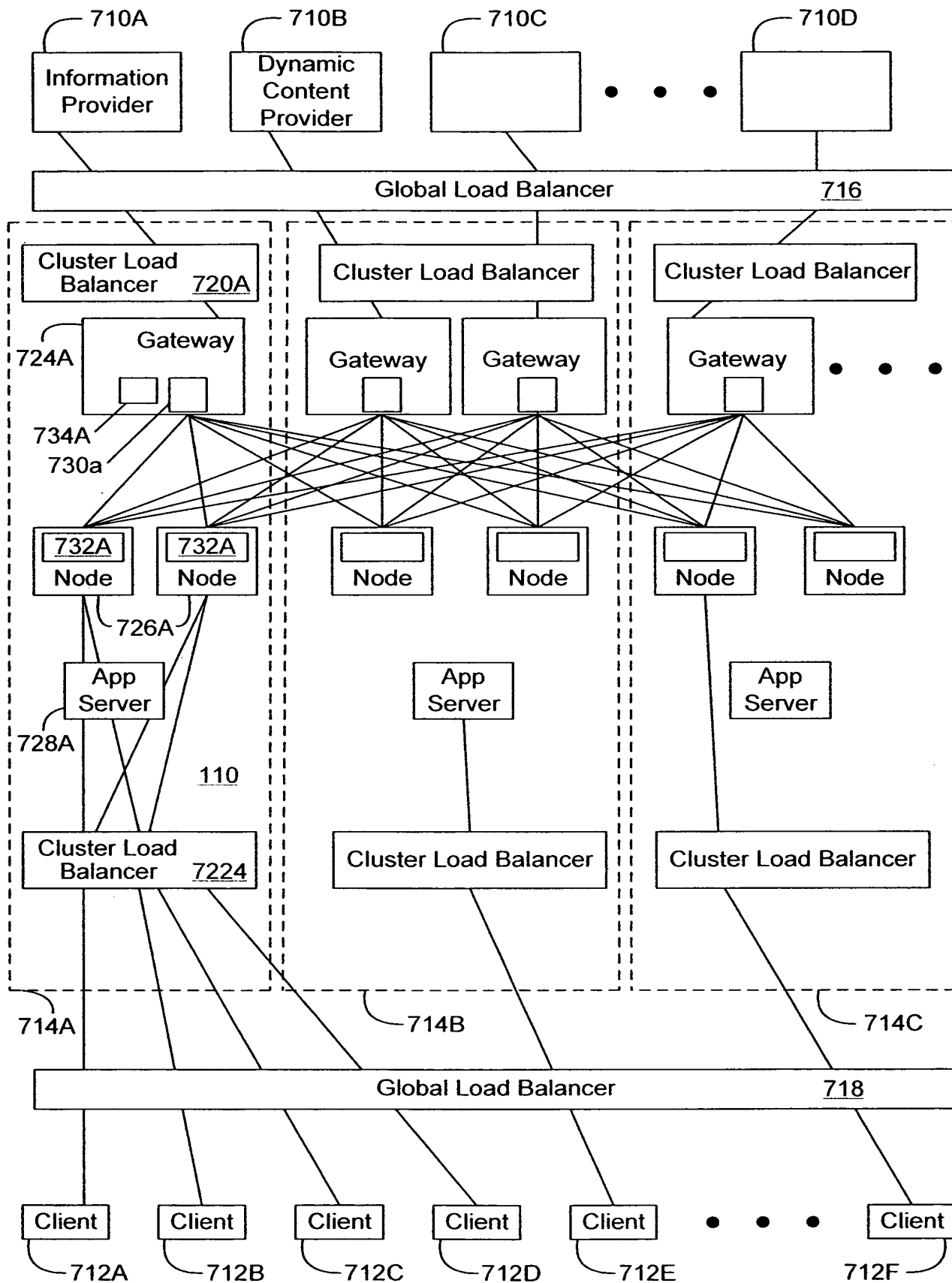


Fig. 7

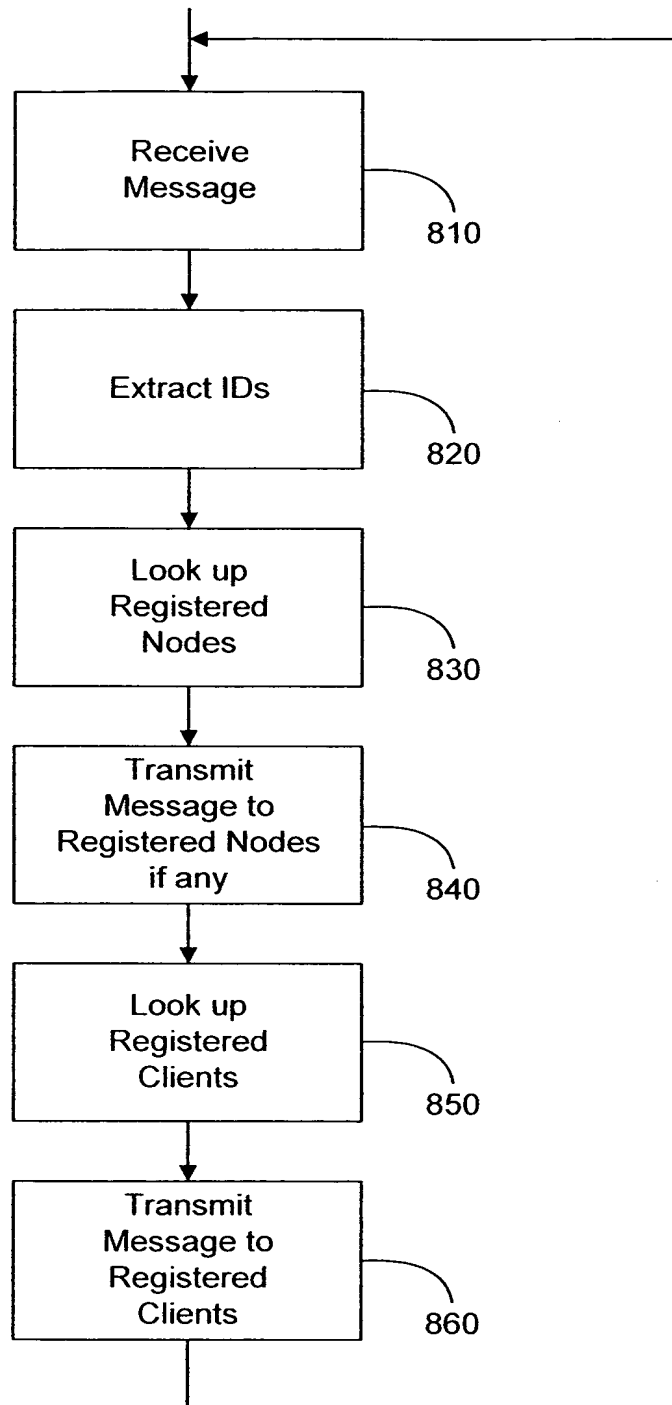


Fig. 8

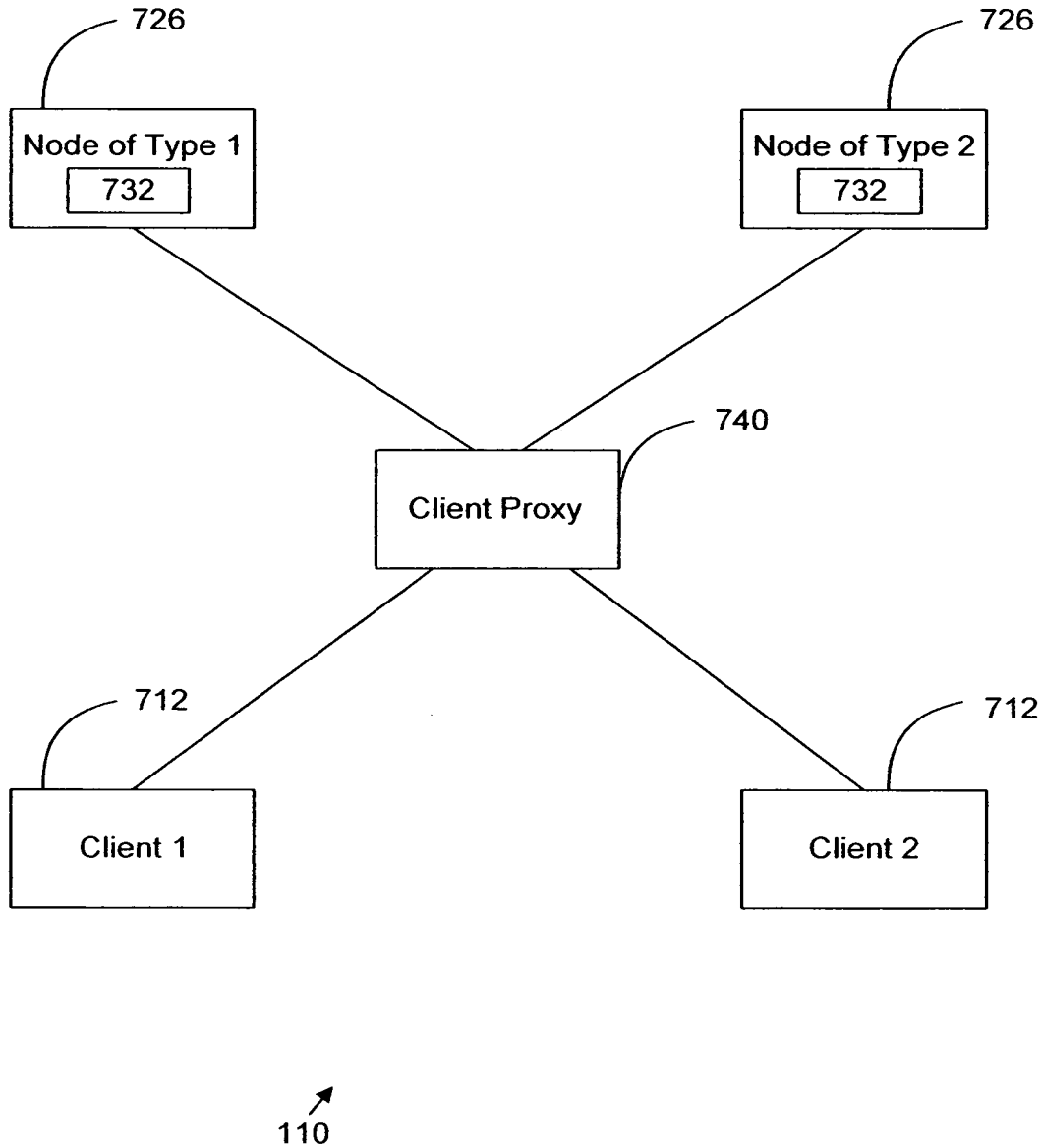


Fig. 9

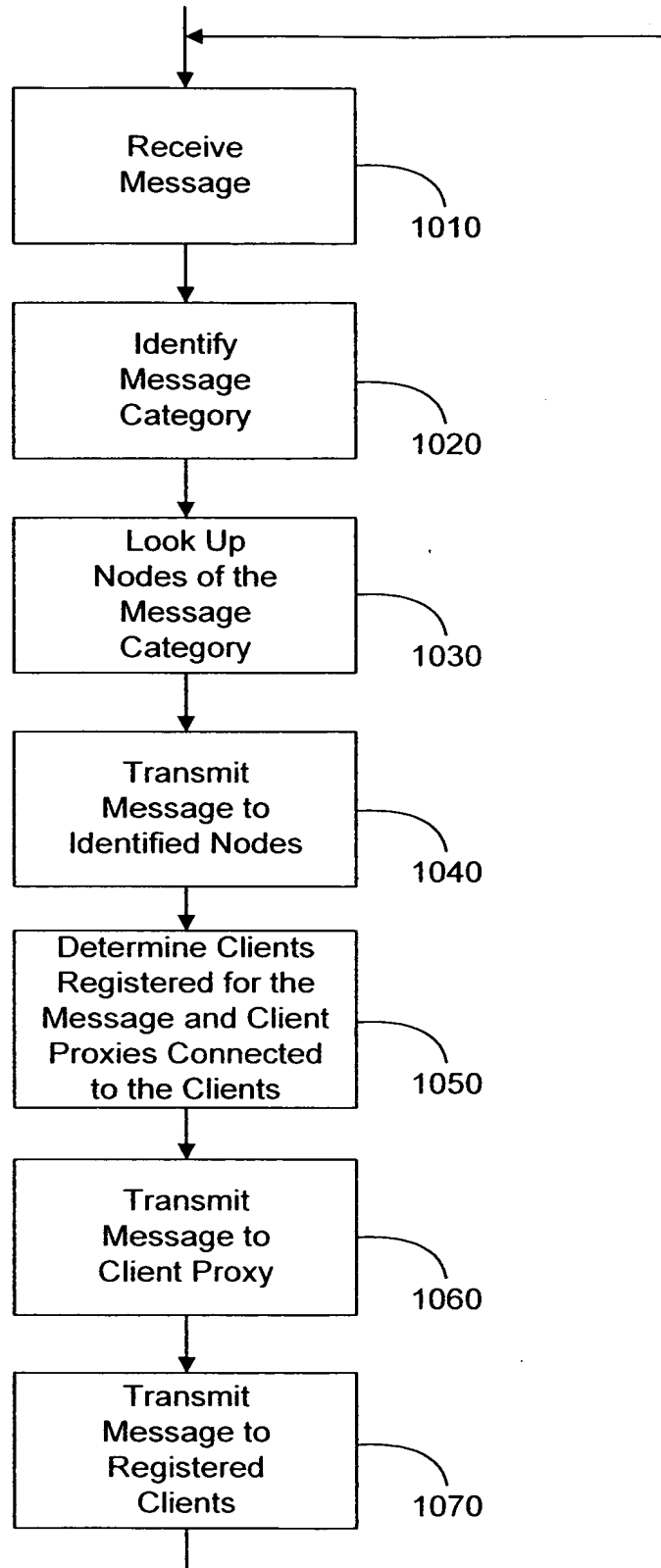


Fig. 10

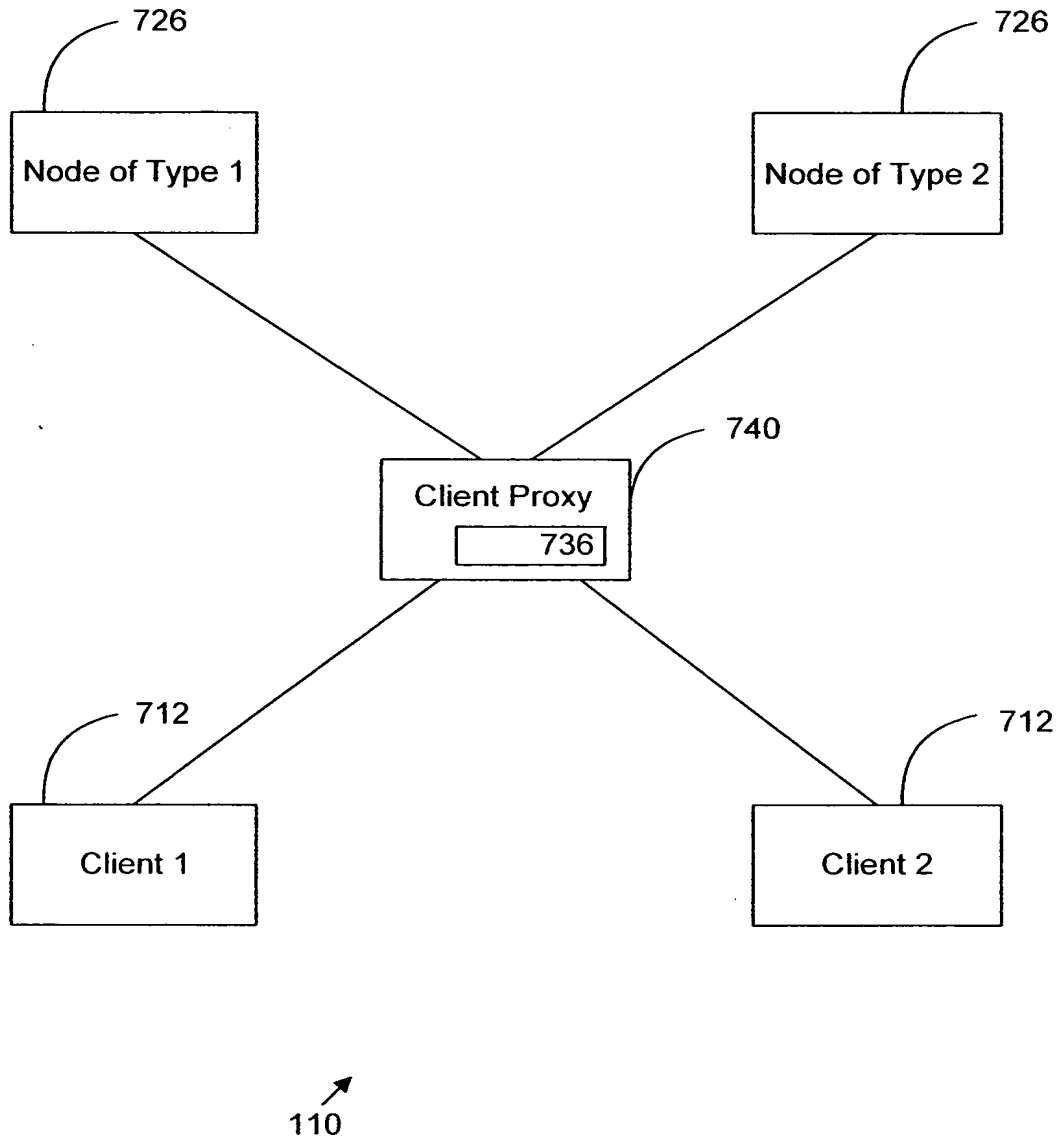


Fig. 11

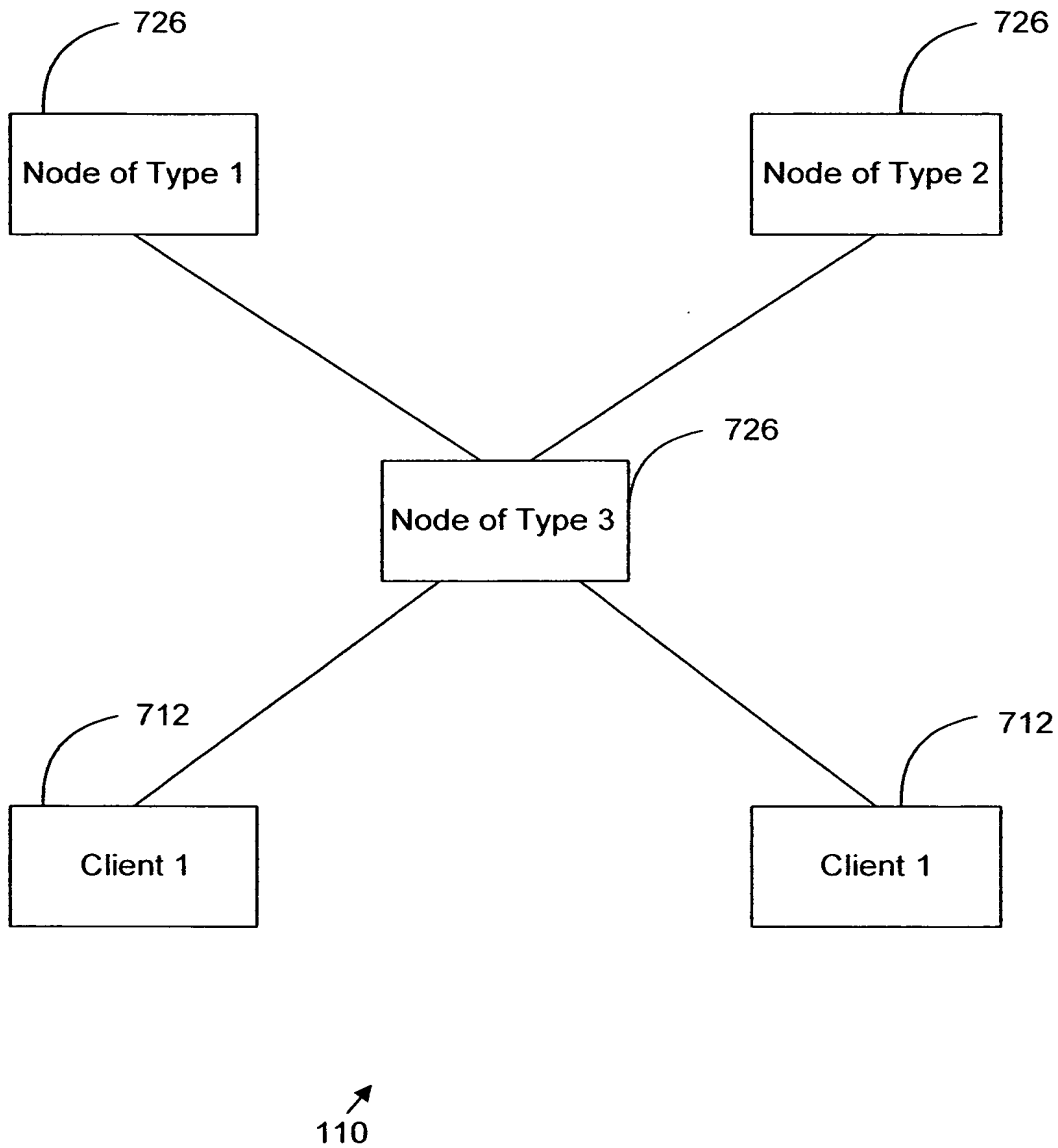


Fig. 12

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☒

Practitioners associated with the Customer Number:

26111

OR

☐

Practitioner(s) named below (If more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☒

The address associated with Customer Number:

26111

OR

☐

Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

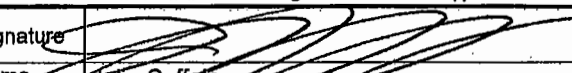
Assignee Name and Address:

Shaw Parsing LLC
2215-B Renaissance Drive, Suite 5
Las Vegas, NV 89119

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	24 MAY 2007
Name	Julia Ceffalo	Telephone	
Title	Authorized Person for Shaw Parsing LLC		

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.

STATEMENT UNDER 37 CFR 3.73(b)

2222.7750006

Applicant/Patent Owner: Timothy Tuttle et al.Application No./Patent No.: 7,051,070 Filed/Issue Date: May 23, 2006Entitled: ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION
ARCHITECTURE IN THE DYNAMIC ROUTING NETWORKShaw Parsing LLC, a Limited Liability Company
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ 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:

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

OR

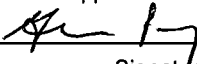
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Timothy Tuttle et al. To: Bang Networks, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 013025, Frame 0417, or for which a copy thereof is attached.
2. From: Bang Networks, Inc. To: Shaw Parsing LLC
The document was recorded in the United States Patent and Trademark Office at
Reel 014790, Frame 0220, or for which a copy thereof is attached.
3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet.☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.


SignatureGlenn J. Perry, Registration No. 28,458

Printed or Typed Name

Authorized Person

Title

6-7-2007
Date202.371.2600

Telephone Number

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 1.11 and 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.

Electronic Acknowledgement Receipt

EFS ID:	1852647
Application Number:	10105018
International Application Number:	
Confirmation Number:	7060
Title of Invention:	ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK
First Named Inventor/Applicant Name:	Timothy Tuttle
Customer Number:	20350
Filer:	Glenn J. Perry/Nihad Heto
Filer Authorized By:	Glenn J. Perry
Attorney Docket Number:	22726-05909
Receipt Date:	08-JUN-2007
Filing Date:	21-MAR-2002
Time Stamp:	11:23:13
Application Type:	Utility

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)
1		22227750006poaandstatem entunder373b.pdf	102251	yes	2

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Power of Attorney	1	1
	Assignee showing of ownership per 37 CFR 3.73(b).	2	2
Warnings:			
Information:			
Total Files Size (in bytes):		102251	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/105,018	03/21/2002	Timothy Tuttle	22726-05909

26111
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

CONFIRMATION NO. 7060



Date Mailed: 06/19/2007

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/08/2007.

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.

Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199
OFFICE COPY



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/105,018	03/21/2002	Timothy Tuttle	22726-05909

20350
 TOWNSEND AND TOWNSEND AND CREW, LLP
 TWO EMBARCADERO CENTER
 EIGHTH FLOOR
 SAN FRANCISCO, CA 94111-3834

CONFIRMATION NO. 7060



OC000000024423065

Date Mailed: 06/19/2007

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/08/2007.

- 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).

Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199
 OFFICE COPY

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent of:

TUTTLE *et al.*

Patent No.: 7,051,070

Issued: May 23, 2006

For: **ASYNCHRONOUS MESSAGING
USING A NODE SPECIALIZATION
ARCHITECTURE IN THE DYNAMIC
ROUTING NETWORK**

Confirmation No.: 7060

Art Unit: 2155

Examiner: BAROT, BHARAT

Atty. Docket: 2222.7750006

**Notification of Loss of Entitlement to Small Entity Status
Under 37 C.F.R. § 1.27(g)(2) When Maintenance Fee is Due**

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

The above-captioned patent is no longer entitled to small entity status. This notification is being filed prior to paying, or at the time of paying, the maintenance fee that is first due after the date on which status as a small entity is no longer appropriate.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.



Glenn J. Perry
Attorney for Patentees
Registration No. 28,458

Date: Nov. 13, 2007

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

Electronic Acknowledgement Receipt

EFS ID:	2462344
Application Number:	10105018
International Application Number:	
Confirmation Number:	7060
Title of Invention:	ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK
First Named Inventor/Applicant Name:	Timothy Tuttle
Customer Number:	26111
Filer:	Glenn J. Perry/Sewit Haile
Filer Authorized By:	Glenn J. Perry
Attorney Docket Number:	2222.7750006
Receipt Date:	14-NOV-2007
Filing Date:	21-MAR-2002
Time Stamp:	10:53:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	22227750006LESES.pdf	24647 b06b411809c2f8b2b34d8d6215a29f45f48653d8	no	1

Warnings:

Information:

PETITIONERS - AMERICAN/SOUTHWEST, Exhibit 1016

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Bang
IP Group 0046

TO PROSECUTE APPLICATIONS BEFORE THE USPTO

of attorney given in the application identified in the attached statement under

I hereby appoint:

☒ Practitioners associated with the Customer Number:

86636

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☒ The address associated with Customer Number:

86636

OR

☐ Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

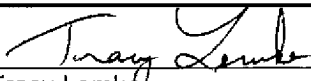
Assignee Name and Address:

Zarbana Digital Fund LLC
2711 CENTERVILLE ROAD
SUITE 400
WILMINGTON, DELAWARE, 19808

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

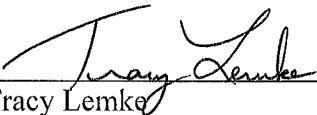
Signature		Date	3/30/17
Name	Tracy Lemke	Telephone	
Title	Authorized Person for Zarbana Digital Fund LLC		

This collection of information is required by 37 CFR 1.31, 1.32 and 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 1.11 and 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.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

DECLARATION REGARDING AUTHORITY TO SIGN
ON BEHALF OF A LEGAL ENTITY
37 C.F.R. 3.73(b)(2)(i)

I, Tracy Lemke (whose title is supplied below), hereby declare that I am authorized to sign documents on behalf of Zarbaña Digital Fund LLC



Tracy Lemke

Authorized Person for Zarbaña Digital Fund LLC

3/30/16

Date

Electronic Acknowledgement Receipt

EFS ID:	29138791
Application Number:	10105018
International Application Number:	
Confirmation Number:	7060
Title of Invention:	ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK
First Named Inventor/Applicant Name:	Timothy Tuttle
Customer Number:	26111
Filer:	Carl Irwin Brundidge/Nora Colston
Filer Authorized By:	Carl Irwin Brundidge
Attorney Docket Number:	2222.7750006
Receipt Date:	08-MAY-2017
Filing Date:	21-MAR-2002
Time Stamp:	11:58:08
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	3976-2_373.pdf	430230	no	2
			92461ebec46cdd0e61a2e6f32c674532de66004a		

Warnings:

PETITIONERS - AMERICAN/SOUTHWEST, Exhibit 1016

Information:					
2	Power of Attorney	Bang_PoA.pdf	57066	no	2
			8031626eed6d146f8b48bc6af921caaca9aaeab0		
Warnings:					
Information:					
Total Files Size (in bytes):				487296	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

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.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: ZARBAÑA DIGITAL FUND LLC

Application No./Patent No.: 7,051,070 Filed/Issue Date: 05-23-2006

Titled: ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK

ZARBAÑA DIGITAL FUND LLC, a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: TUTTLE, TIMOTHY, et al To: BANG NETWORKS, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 013025, Frame 0417, or for which a copy thereof is attached.

2. From: BANG NETWORKS, INC. To: SHAW PARSING LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 014790, Frame 0220, or for which a copy thereof is attached.

3. From: SHAW PARSING LLC To: ZARBAÑA DIGITAL FUND LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 037219, Frame 0324, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

- ☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/David S. Lee/

May 8, 2017

Signature

Date

David S. Lee

Patent Attorney for Applicant

Printed or Typed Name

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 1.11 and 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.**

PETITIONERS - AMERICAN/SOUTHWEST, Exhibit 1016

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Page 159 of 167

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



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UNITED STATES DEPARTMENT OF COMMERCE
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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/105,018	03/21/2002	Timothy Tuttle	

86636
BRUNDIDGE & STANGER, P.C.
2318 MILL ROAD, SUITE 1020
ALEXANDRIA, VA 22314

CONFIRMATION NO. 7060
POA ACCEPTANCE LETTER



Date Mailed: 05/12/2017

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/08/2017.

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.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/jtfitzhugh sr/



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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/105,018	03/21/2002	Timothy Tuttle	2222.7750006

26111
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

CONFIRMATION NO. 7060
POWER OF ATTORNEY NOTICE



OC000000091342521

Date Mailed: 05/12/2017

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/08/2017.

- 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).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/jtfitzhugh sr/



UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
10/105,018

RECEIPT DATE / TIME
10/04/2024 04:42:21 PM Z ET

ATTORNEY DOCKET #
-

Title of Invention

ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORK

Application Information

APPLICATION TYPE Utility - Nonprovisional Application
under 35 USC 111(a)

PATENT # 7051070

CONFIRMATION # 7060

FILED BY Margaret Ferello

PATENT CENTER # 67436167

FILING DATE 03/21/2002

CUSTOMER # 86636

FIRST NAMED
INVENTOR Timothy Tuttle

CORRESPONDENCE
ADDRESS -

AUTHORIZED BY Brandon Theiss

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
IVIPR- RE90019662_Power_to_Pro secute_pc.pdf	1	Power of Attorney	536 KB
Warning: The PDF file has been signed with a digital signature and the legal effect of the document will be based on the contents of the file not the digital signature.			
7051070_Statement_3_73c_ pc.pdf	2	Assignee showing of ownership per 37 CFR 3.73	410 KB

Digest

DOCUMENT MESSAGE DIGEST(SHA-512)

IVIPR- RE90019662_Power_to_Prose cute_pc.pdf	8723B76C96B3D70A6D7D1E2568404DB76BD4E9AB3284779E9 C21BB4931C1FA888F2865DB1F1935D8B0D3230809DBC30A2F A56E3E83FF37A0F2AFEAO0C91ED7286
7051070_Statement_3_73c_pc. pdf	CEFE9CA701C38FC417CED652B4F0565E9F66A4893B0B1DF0 5DF015EE85FDE5E6F16C55F5EB3C9939E3C9B9FB7CE38193 0323913603B492ED2C99275D07D3E122

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no person is required to respond to a collection of information unless it displays a valid OMB control number

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒

Practitioners associated with Customer Number:

03624

OR

☐

Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number

Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒

The address associated with Customer Number:

03624

OR

☐

Firm or individual name

Volpe Koenig

Address

City

State

Zip

Country

Telephone

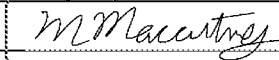
Email

Assignee name and address: INTELLECTUAL VENTURES I LLC
251 Little Falls Drive
Wilmington, DE 19808

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

Signature		Date	10/1/2024 9:10 PM EDT
Name	Michelle Macartney	Telephone	
Title Assistant Company Secretary			

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0035. Public burden for this form is estimated to average 18 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.** If filing this completed form by mail, 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.

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.

STATEMENT UNDER 37 CFR 3.73(c)First Named Inventor/Patent Owner: INTELLECTUAL VENTURES I LLCApplication No./Patent No.: 7,051,070 Filed/Issue Date: May 23, 2006Titled: ASYNCHRONOUS MESSAGING USING A NODE SPECIALIZATION ARCHITECTURE IN THE DYNAMIC ROUTING NETWORKINTELLECTUAL VENTURES I LLC, a corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached*.
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Timothy Tuttle and Karl E. Rumelhart To: Bang Networks, Inc.The document was recorded in the United States Patent and Trademark Office at
Reel 013025, Frame 0417, or for which a copy thereof is attached*.2. From: Bang Networks, Inc. To: Shaw Parsing LLCThe document was recorded in the United States Patent and Trademark Office at
Reel 014790, Frame 0220, or for which a copy thereof is attached*.

[Page 1 of 2]

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0031. Public burden for this form is estimated to average 12 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

PETITIONERS - AMERICAN/SOUTHWEST, Exhibit 1016

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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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.

STATEMENT UNDER 37 CFR 3.73(c)3. From: Shaw Parsing LLC To: Zarbana Digital Fund LLCThe document was recorded in the United States Patent and Trademark Office at
Reel 037219, Frame 0324, or for which a copy thereof is attached*.4. From: Zarbana Digital Fund LLC To: Intellectual Ventures I LLCThe document was recorded in the United States Patent and Trademark Office at
Reel 065469, Frame 0496, or for which a copy thereof is attached*.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached*.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached*.☐ Additional documents in the chain of title are listed on a supplemental sheet(s).☒ *As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Brandon R. TheissOctober 4, 2024

Signature

Date

/Brandon R. Theiss/70,507

Printed or Typed Name

Title or Registration Number

[Page 2 of 2]