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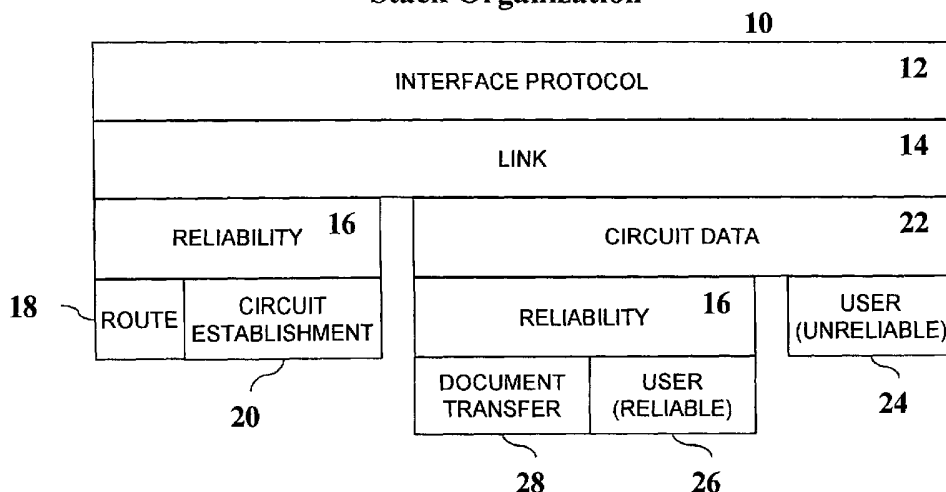
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- Published:**
- with international search report
 - before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR SECURE COMMUNICATIONS AND RESOURCE SHARING BETWEEN ANONYMOUS NON-TRUSTING PARTIES WITH NO CENTRAL ADMINISTRATION

Stack Organization



(57) Abstract: A unifying network model with a structure and architecture configured to address security, interoperability, mobility, and resource management, including priority and quality of services is provided. The network of the network model is structured as a hierarchical mesh network, with dynamically generated routing tables (18). The configuration of the network model optimizes routing and distributes communication load. Every device on the network is capable of being both an endpoint and a forwarder of communications. The network model may include underlying networks that are represented with one of two models, the link model or the star model. The nodes are organized in a hierarchical relationship structure to optimizes throughput. The model may include a cryptographic method of dynamically assigning local network addresses.



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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/01458

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04L 9/00

US CL : 713/167

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 713/167

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,784,560 A (KINGDON et al) 21 July 1998 (21.07.1998) Col. 3, lines 22-40	1



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/01458

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

1. Claim 1, drawn to a method of securely sharing resources between non-trusting parties.
2. Claim 2, drawn to a method of organizing multiple nodes on a network.
3. Claim 3, drawn to a system for controlling resource allocation.
4. Claim 4, drawn to a method of network communication.
5. Claim 5, drawn to a system for maintaining quality of service.
6. Claim 6, drawn to a system for allowing source broadcast.
7. Claim 7, drawn to a method of authenticating client requests.
8. Claim 8, drawn to a method of distributing public and private keys.
9. Claim 9, drawn to a process of utilizing cryptographic primitives.
10. Claim 10, drawn to a process of choosing communication routes.
11. Claim 11, drawn to a method of establishing a link between nodes.
12. Claim 12, drawn to a method of authenticating two nodes.
13. Claim 13, drawn to a method of identity inheritance.
14. Claim 14, drawn to a method of quantifying resource availability.
15. Claim 15, drawn to a process of providing permission based networking.
16. Claim 16, drawn to a method of assigning ownership to network resources.
17. Claim 17, drawn to a method of verifying permissions.
18. Claim 18, drawn to a method of subdividing a network.
19. Claim 19, drawn to a method of enforcing resource allocation levels.
20. Claim 20, drawn to a method of broadcasting communication between two nodes.
21. Claims 21, 22, drawn to a technique for preventing circular routes in decentralized dynamic routing networks.
22. Claim 23, drawn to a method of dynamically assigning local network addresses.
23. Claim 24, drawn to a method of protecting the communication of documents.
24. Claim 25, drawn to a process of informing each node of a network of the current resource availability.
25. Claim 26, drawn to a method of allowing administrative control of elections.

The inventions listed as Groups 1-25 do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Group 1 has the special technical feature of communication with an expected quality of service. Group 2 has the special technical feature of optimizing communication throughput. Group 3 has the special technical feature of controlling resource allocation through hierarchical rights enforcement. Group 4 has the special technical feature of exchanging signed documents. Group 5 has the special technical feature of communication path rerouting and recombination. Group 6 has the special technical feature of independently rebroadcast in multiple different time frame groupings. Group 7 has the special technical feature of securely processing portions of authentication requests. Group 8 has the special technical feature of giving each entity control over key redistribution. Group 9 has the special technical feature of controlling dynamic routing at the protocol level. Group 10 has the special technical feature of routing communication based on hierarchical relationships. Group 11 has the special technical feature of performing a computation upon requests. Group 12 has the special technical feature of authenticating network nodes so that the identities of the nodes are not externally visible. Group 13 has the special technical feature of self-authenticating. Group 14 has the special technical feature of optimizing routing and distributing communication load. Group 15 has the special technical feature of providing network-policy control via cryptographically signed documents. Group 16 has the special technical feature of subdividing

INTERNATIONAL SEARCH REPORT

International application No.

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resources for use and delegation. Group 17 has the special technical feature of verifying aggregated inheritance of permissions. Group 18 has the special technical feature of optimizing clustering through simulated annealing. Group 19 has the special technical feature of enabling backwards compatibility with existing network protocols. Group 20 has the special technical feature of redistributing the communication between nodes based on hierarchical relationship. Group 21 has the special technical feature of choosing routes based on the current network utilization. Group 22 has the special technical feature of dynamically assigning local network addresses. Group 23 has the special technical feature of limiting the rate at which document communication can occur. Group 24 has the special technical feature of informing the network of current resource availability using full and partial hierarchical flooding techniques. Group 25 has the special technical feature of allowing administrative control of elections.