



US005941947A

United States Patent [19]

[11] Patent Number: **5,941,947**

Brown et al.

[45] Date of Patent: **Aug. 24, 1999**

- [54] **SYSTEM AND METHOD FOR CONTROLLING ACCESS TO DATA ENTITIES IN A COMPUTER NETWORK** 5,367,621 11/1994 Cohen et al. .
5,371,852 12/1994 Attanasio .
5,388,255 2/1995 Pydik et al. .
5,396,626 3/1995 Nguyen .

[75] Inventors: **Ross M. Brown, Bellvue; Richard G. Greenberg, Redmond, both of Wash.**

(List continued on next page.)

[73] Assignee: **Microsoft Corporation, Redmond, Wash.**

OTHER PUBLICATIONS

[21] Appl. No.: **08/516,573**

[22] Filed: **Aug. 18, 1995**

- [51] Int. Cl.⁶ **G06F 17/00**
- [52] U.S. Cl. **709/225**
- [58] Field of Search 395/200.55, 200.56, 395/200.47, 200.48, 200.49, 186, 187.01, 188.01; 380/23, 24, 25; 709/225

Operating System Concepts, Fourth Edition, Abraham Silberschatz and Peter B. Galvin, pp. 361-380, 431-457, ©1994.

Inside Windows NT, Helen Custer Foreword by David N. Cutler, The Object Manager and Object Security, Chapter Three, pp. 49-81. ©1993.

So . . . Just What is this First Class Thing Anyway? (visited Oct. 10, 1995) <<http://orion.edmonds.wednet.edu/ESD/FC/AboutFC.html>>.

Colton, Malcolm. "Replicated Data in a Distributed Environment." *IEEE* (1993).

[56] References Cited

(List continued on next page.)

U.S. PATENT DOCUMENTS

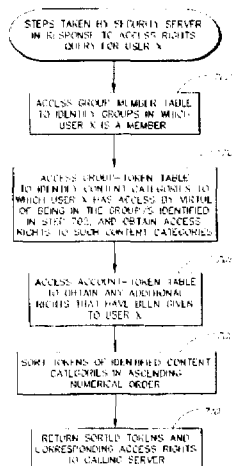
- 4,184,200 1/1980 Wagner et al. 395/188
- 4,280,176 7/1981 Tan 395/188
- 4,432,057 2/1984 Daniell et al. .
- 4,493,024 1/1985 Baxter, II et al. 395/188
- 4,799,153 1/1989 Hann et al. 380/25
- 4,799,156 1/1989 Shavit et al. .
- 4,800,488 1/1989 Agrawal et al. .
- 4,858,117 8/1989 Dichiaro et al. 395/188
- 4,899,136 2/1990 Beard et al. .
- 4,914,571 4/1990 Baratz et al. .
- 5,079,765 1/1992 Nakamura .
- 5,113,499 5/1992 Ankney et al. 395/325
- 5,140,689 8/1992 Kobayashi .
- 5,151,989 9/1992 Johnson et al. .
- 5,187,790 2/1993 Fast et al. .
- 5,247,676 9/1993 Ozur et al. .
- 5,257,369 10/1993 Skeen et al. .
- 5,265,250 11/1993 Andrade et al. .
- 5,291,597 3/1994 Shorter et al. .
- 5,307,490 4/1994 Davidson et al. .
- 5,321,841 6/1994 East et al. .
- 5,329,619 7/1994 Page et al. .
- 5,341,477 8/1994 Pitkin et al. .
- 5,347,632 9/1994 Filepp et al. .
- 5,355,497 10/1994 Cohen-Levy .

Primary Examiner—Ellis B. Ramirez
Attorney, Agent, or Firm—Leydig, Voit & Mayer, Ltd.

[57] ABSTRACT

Access rights of users of a computer network with respect to data entities are specified by a relational database stored on one or more security servers. Application servers on the network that provide user access to the data entities generate queries to the relational database in order to obtain access rights lists of specific users. An access rights cache on each application server caches the access rights lists of the users that are connected to the respective application server, so that user access rights to specific data entities can rapidly be determined. Each user-specific access rights list includes a series of category identifiers plus a series of access rights values. The category identifiers specify categories of data entities to which the user has access, and the access rights values specify privilege levels of the users with respect to the corresponding data entity categories. The privilege levels are converted into specific access capabilities by application programs running on the application servers.

66 Claims, 10 Drawing Sheets



U.S. PATENT DOCUMENTS

5,423,003 6/1995 Berteau .
 5,434,994 7/1995 Shaheen et al. .
 5,444,848 8/1995 Johnson et al. .
 5,455,932 10/1995 Major et al. .
 5,463,625 10/1995 Yasrebi .
 5,473,599 12/1995 Li et al. .
 5,475,819 12/1995 Miller et al. .
 5,481,720 1/1996 Loucks et al. .
 5,483,652 1/1996 Sudama et al. .
 5,490,270 2/1996 Devarakonda et al. .
 5,491,800 2/1996 Goldsmith et al. .
 5,491,817 2/1996 Gopal et al. .
 5,491,820 2/1996 Belove et al. .
 5,497,463 3/1996 Stein et al. .
 5,499,342 3/1996 Kurihara et al. .
 5,500,929 3/1996 Dickinson .
 5,513,314 4/1996 Kadasamy et al. .
 5,526,491 6/1996 Wei .
 5,530,852 6/1996 Meske et al. .
 5,544,313 8/1996 Shachanai et al. .
 5,544,327 8/1996 Dan et al. .
 5,548,724 8/1996 Akizawa et al. .
 5,548,726 8/1996 Pettus .
 5,551,508 9/1996 Pettus et al. .
 5,553,239 9/1996 Heath et al. .
 5,553,242 9/1996 Russell et al. .
 5,559,969 9/1996 Jennings .
 5,564,043 10/1996 Siefert .
 5,572,643 11/1996 Judson .
 5,581,753 12/1996 Terry et al. .
 5,592,611 1/1997 Midgely et al. .
 5,596,579 1/1997 Yasrebi .
 5,596,744 1/1997 Dao .
 5,608,865 3/1997 Midgely et al. .
 5,608,903 3/1997 Prasad et al. .
 5,617,568 4/1997 Ault et al. .
 5,617,570 4/1997 Russell et al. .
 5,619,632 4/1997 Lamping et al. .
 5,650,994 7/1997 Daley .
 5,666,519 9/1997 Hayden .
 5,675,723 10/1997 Ekrot et al. .
 5,675,796 10/1997 Hodges et al. .
 5,696,895 12/1997 Hemphill .
 5,774,668 6/1998 Choquire et al. .

OTHER PUBLICATIONS

Coulouris et al., "Distributed Transactions," Chapter 14 of *Distributed Systems Concepts and Design 2nd Ed.*, 409-421 (1994).
 Cox, John, "Sybase Server to Add Complexity User for Challenge with Data Replication," *Communication* No. 483 (1993).
 Eckerson, Wayne, "Users Give Green Light for Replication," *Network World* (Jul. 19, 1993).
 Edelstein, Herb, "The Challenge of Replication," *DBMS* vol. 8, No. 4, 68 (Apr. 1995).
 Edelstein, Herb, "Microsoft and Sybase are Adding their Unique Touches to SQI Servers," *Information Week*, No. 528, 62 (1995).
 Edelstein, Herb, "Replicating Data," *DBMS* vol. 6, No. 6, 59 (Jun. 1993).
 Gouhle, Michael, "RDBMS Server Choice Gets Tougher," *Network World*, 52 (May 23, 1994).
 Heylighen, Francis, "World-Wide Web: A Distributed Hypermedia Paradigm for Global Networking," *Proceedings of the SHARE Europe Spring Conference*, 355-368 (1994).
 International Telecommunications Union, *CCITT Blue Book vol. VIII Data Communication Networks Directory*, 3-18 (1989).
 King, Adrian, "The User Interface and the Shell," *Inside Windows 95*, Chapter 5 (1994).
 Pallatlo, John, "Sybase Lays Out Blue Print for Client/Server Networks," *PC Week*, vol. 9, No. 461, 6 (1992).
 PR Newswire Association, Inc., "America On-line Publicly Previews World Wide Web Browser," *Financial News Section* (May 9, 1995).
 Quereshi, "The Effect of Workload on the Performance and Availability of Voting Algorithms," *IEEE* (1995).
 Rexford, Jennifer, "Window Consistent Replication for Real-Time Applications," *IEEE* (1994).
 Richman, Dan, "Sybase to Enhance RDBMS," *Open System Today*, No. 111 (1992).
 Terry, Douglas, "Session Guarantees for Weekly Consistent Replicated Data," *IEEE* (1994).
 Wang, Yongdong, "Data Replication in a Distributed Heterogenous Database Environment," *IEEE* (1994).

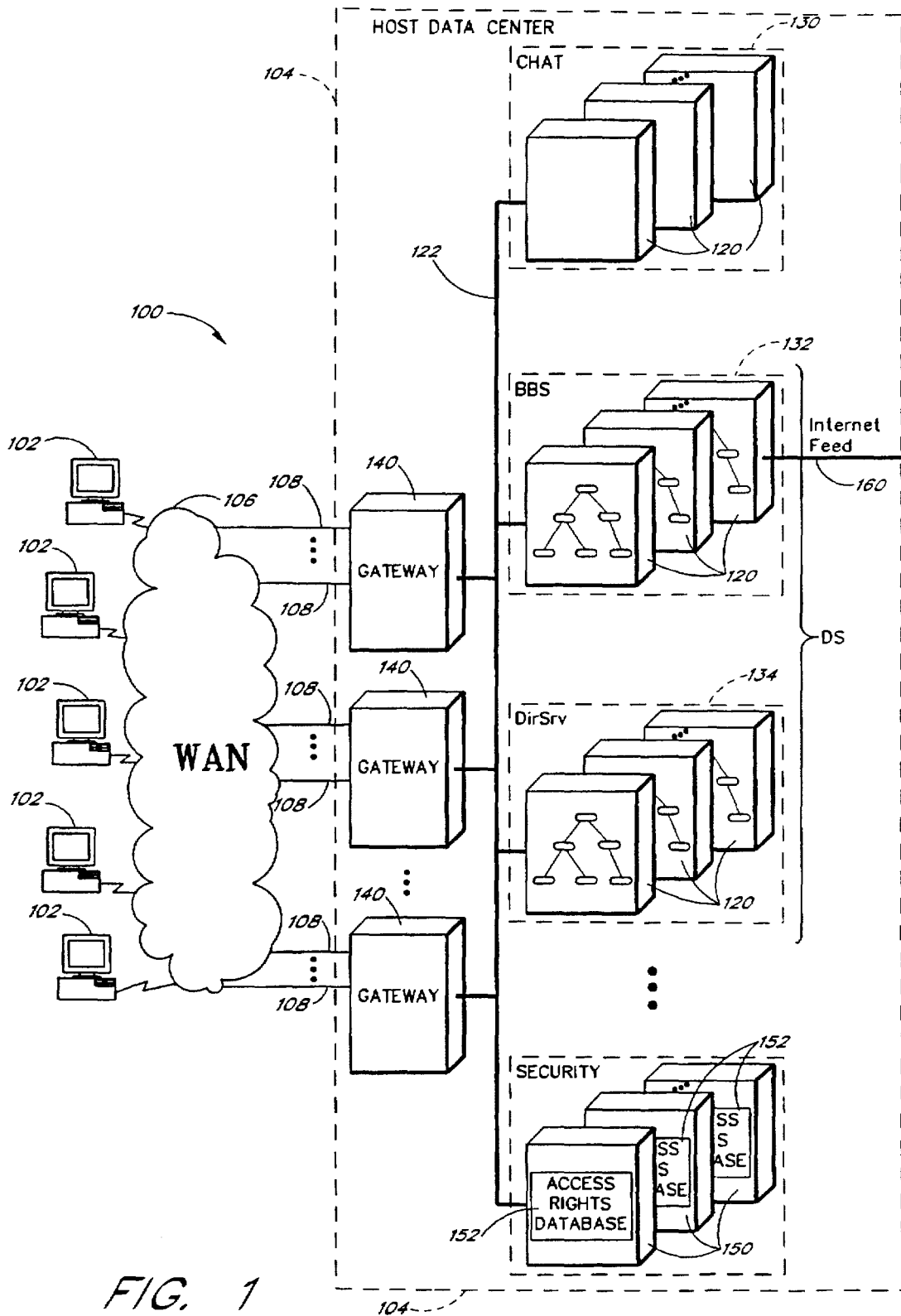


FIG. 1

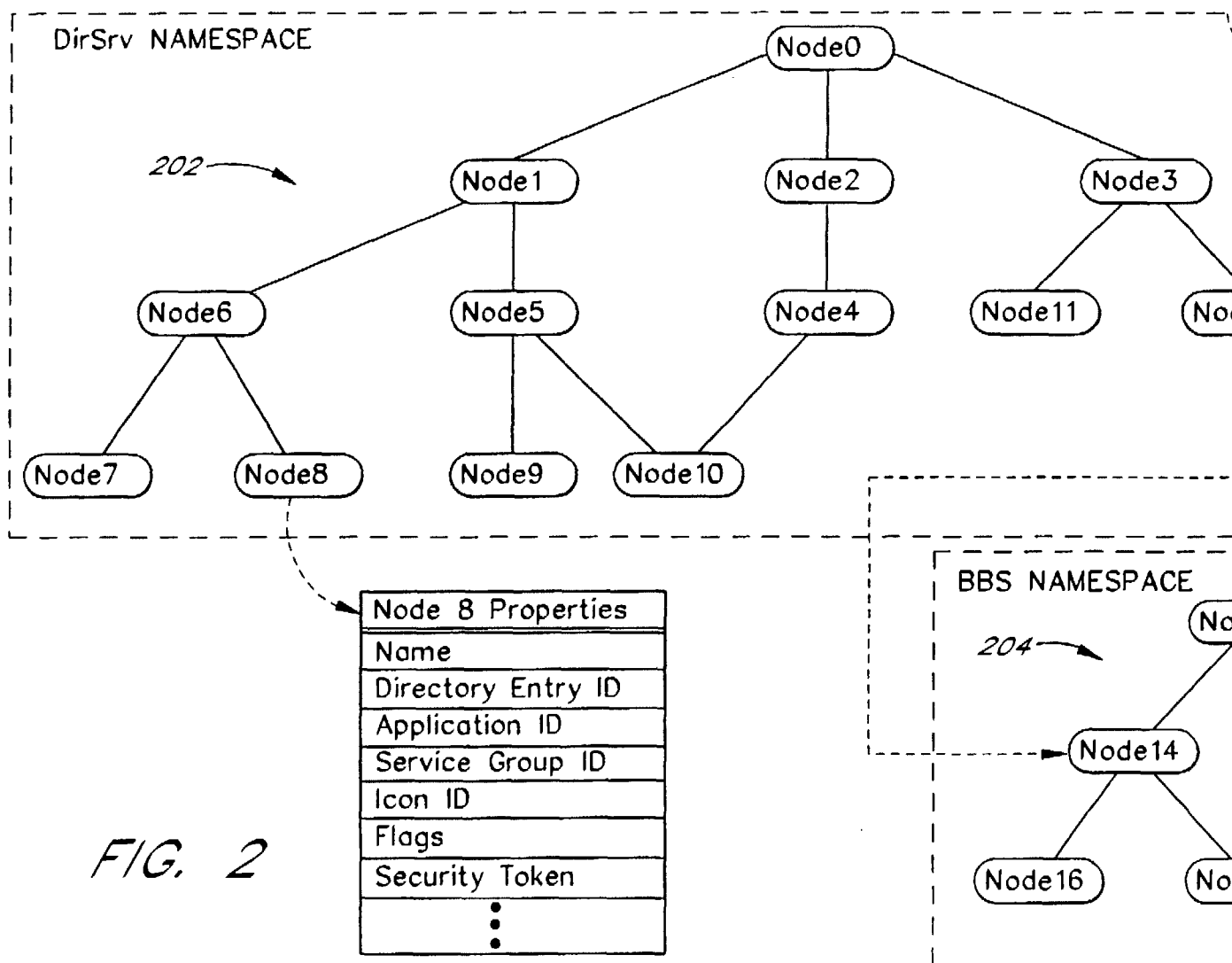


FIG. 2

Access Control Matrix 300

	Node 0	Node 1	...	Node i
User 1	XXXX	XXXX		XXXX
User 2	XXXX	XXXX		XXXX
⋮				
User N	XXXX	XXXX		XXXX

FIG. 3A

FIG. 3

User Privilege Level

Bit 0	Viewer
Bit 1	Observer
Bit 2	User
Bit 3	Host
Bit 4	Sysop Manager
Bit 5	Sysop
Bit 6	SuperSysop
Bits 7-15	(Reserved For Future Definition)

FIG. 3B

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.