

Exhibit 1007

(12) United States Patent
Inohara et al.

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(54) METHOD OF MANAGING DISTRIBUTED SERVERS AND DISTRIBUTED INFORMATION PROCESSING SYSTEM USING THE METHOD

6,141,686 * 10/2000 Jackowski et al. 709/224

OTHER PUBLICATIONS

Menges, et al., Method and apparatus for managing computer processes, EPAB, Pub. No. EP000737922A1, 1-1, Oct. 1996.*

Ando et al., Terminal identification number imparting method and server device, JPAB, Pub. No. JP410271117A, Oct. 1998.*

Matsushita Denki Sangyo, Video disk recorder configured with random access device in a video server, Derwent week, Oct. 1996.*

* cited by examiner

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(30) Foreign Application Priority Data

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(51) Int. Cl.⁷ **G06F 11/00**

(52) U.S. Cl. **714/4; 709/201**

(58) Field of Search 714/4, 15, 16,
 714/25, 27, 38, 39, 42, 43; 709/201, 203,
 207, 205, 220, 221, 229, 249

(57) ABSTRACT

In order to effectively make the grasp of operating conditions of a plurality of servers and a cache management in an information system without increasing a time/labor taken by an administrator, the plurality of servers forms a multi-cast hierarchy dynamically reconstructed by virtue of mutual support and the communication of server status, cache directory and validation is performed on the hierarchy. The administrator has not a need of management for cooperation between servers excepting the designation of some other servers for startup thereof. A cache between servers is shared through the exchange of a cache directory and a validation time is reduced, thereby shortening the response time for users.

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- 5,572,724 * 11/1996 Watanabe et al. 395/616
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- 6,061,722 * 5/2000 Lipa et al. 709/224

34 Claims, 9 Drawing Sheets

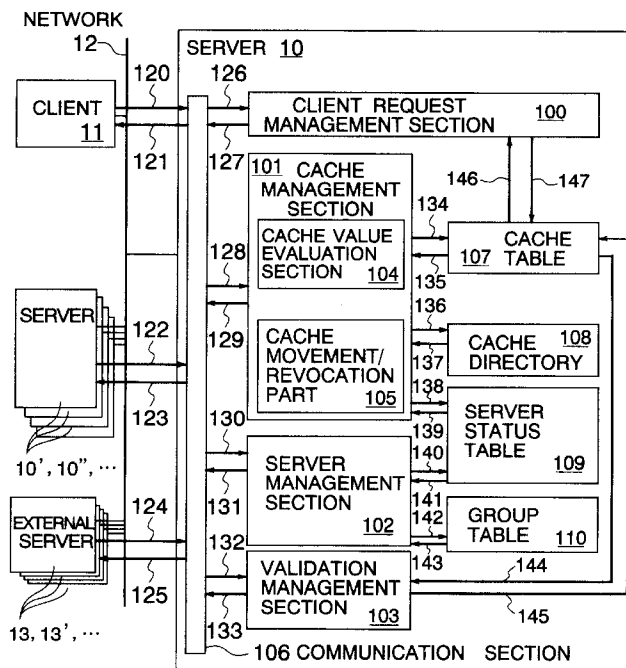


FIG. 1

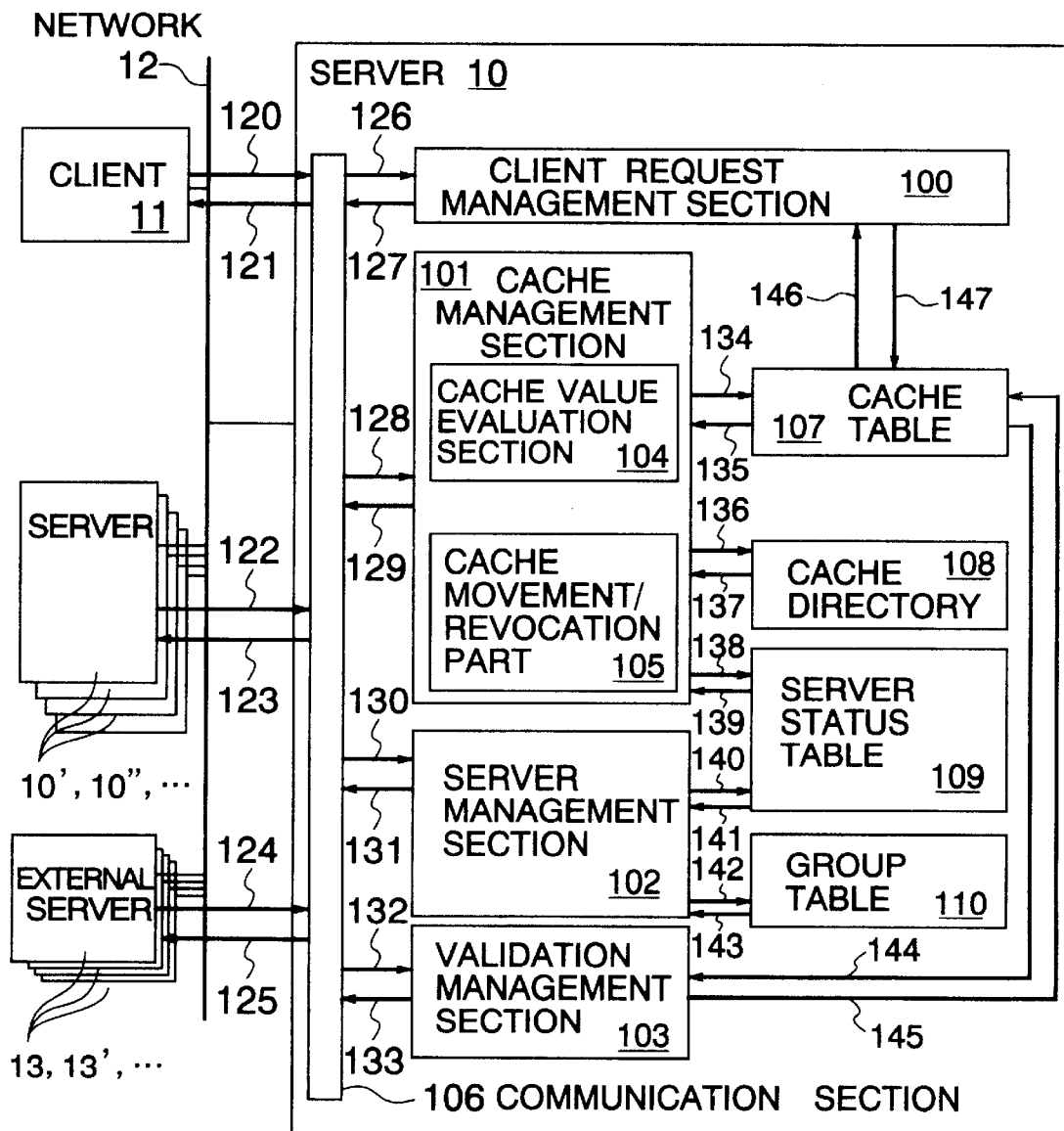


FIG. 2

CACHE TABLE

107

⋮			
URL 201	SIZE 202	DATE 203	NUMBER OF TIMES OF REFERENCE 204
CACHE CONTENT 205			
⋮ CACHE TABLE ENTRY 200			

CACHE DIRECTORY

108

⋮	
URL211	SERVER 212
⋮ CACHE DIRECTORY ENTRY 210	

SERVER STATUS TABLE

109

⋮		
SERVER ID 221	THROUGHPUT 222	LATENCY 223
⋮ SERVER STATUS TABLE ENTRY 220		

GROUP TABLE

110

LEADER SERVER ID 231	UPPER LEADER SERVER ID 233
SERVER ID 232	UPPER SERVER ID 234
SERVER ID 232'	UPPER SERVER ID 234'
SERVER ID 232''	UPPER SERVER ID 234''
⋮	⋮

FIG. 3

GROUP PARTICIPATION TABLE

NEW SERVER ID <u>301</u>
NEW SERVER ID <u>301'</u>
NEW SERVER ID <u>301''</u>
⋮

HIERARCHY MAINTENANCE MESSAGE

TRANSMITTER SERVER ID <u>311</u>	NUMBER OF NESTS <u>313</u>
SERVER ID <u>312</u>	
SERVER ID <u>312'</u>	
SERVER ID <u>312''</u>	
⋮	

GROUP UPDATE MESSAGE

NEW LEADER SERVER ID <u>321</u>

VALIDATION REQUEST MESSAGE

⋮
SERVER ID <u>332</u> URL <u>333</u> DATE <u>334</u>
⋮
VALIDATION REQUEST MESSAGE ENTRY <u>331</u>

CACHE VALUE MESSAGE

⋮
SERVER ID <u>342</u> CACHE VALUE <u>343</u>
⋮
CACHE VALUE MESSAGE ENTRY <u>341</u>

MOVEMENT ADVANCE NOTICE MESSAGE

⋮
SERVER ID <u>352</u> URL <u>353</u> MOVEMENT DESTINATION SERVER <u>354</u>
⋮
MOVEMENT ADVANCE NOTICE MESSAGE ENTRY <u>351</u>

REVOCAATION ADVANCE NOTICE MESSAGE

⋮
SERVER ID <u>362</u> URL <u>363</u>
⋮
REVOCAATION ADVANCE NOTICE MESSAGE ENTRY <u>361</u>

HOST URL MESSAGE

⋮
SERVER ID <u>372</u> URL <u>373</u> FLAG <u>374</u>
⋮
HOST URL MESSAGE ENTRY <u>371</u>

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