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(54) **COORDINATED PEER-TO-PEER (P2P) REPLICATED BACKUP AND VERSIONING**

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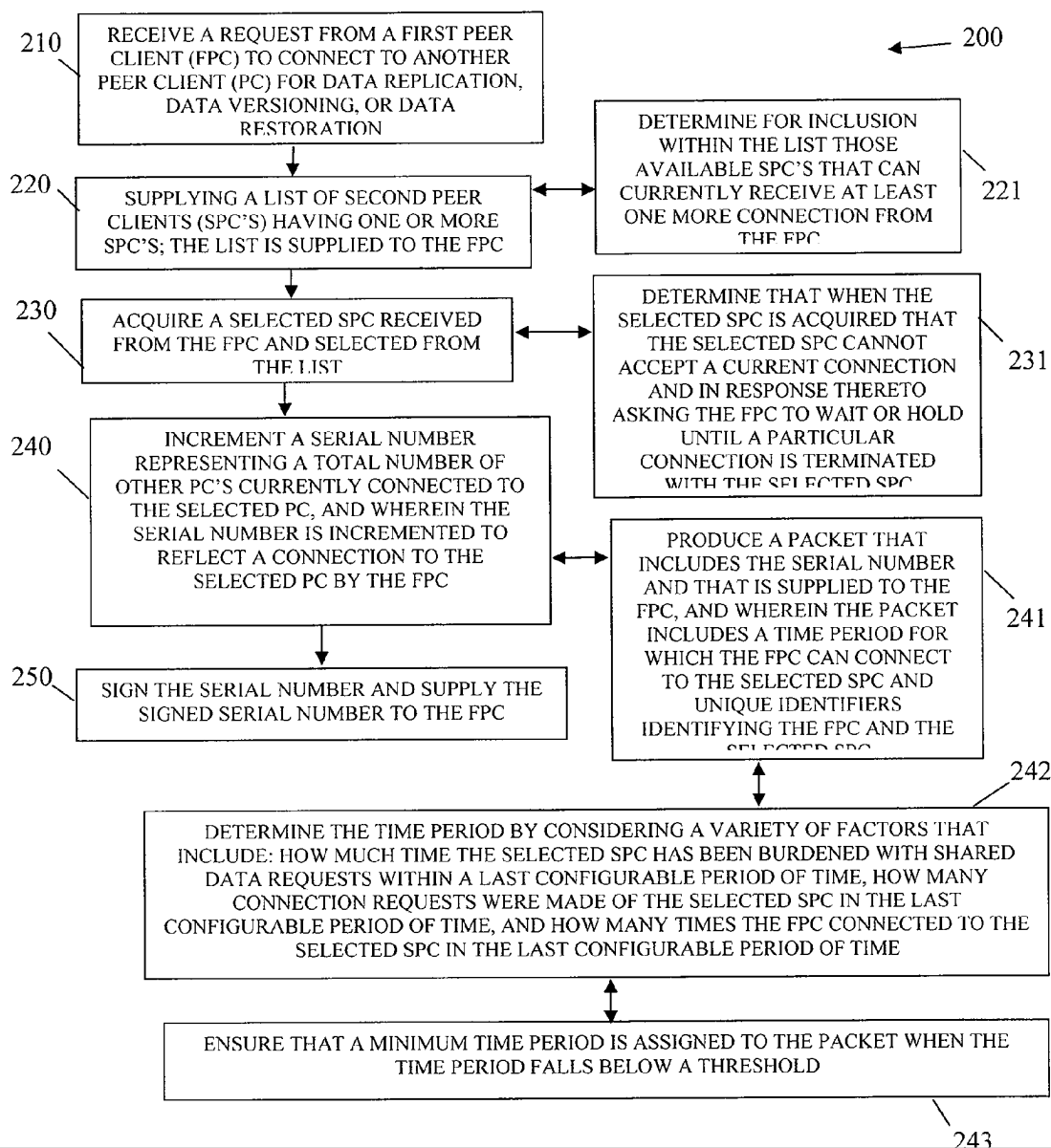
(57) **ABSTRACT**

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Techniques are presented for peer-to-peer (P2P) replicated backup and versioning. Peer clients register and share storage with one another for purposes of P2P data replication, data versioning, and/or data restoration via a P2P server. The P2P server also provides security and management between the peer clients. Moreover, the P2P sever can audit behaviors of the peer clients and take punitive actions against any of the peer clients that violate policy.

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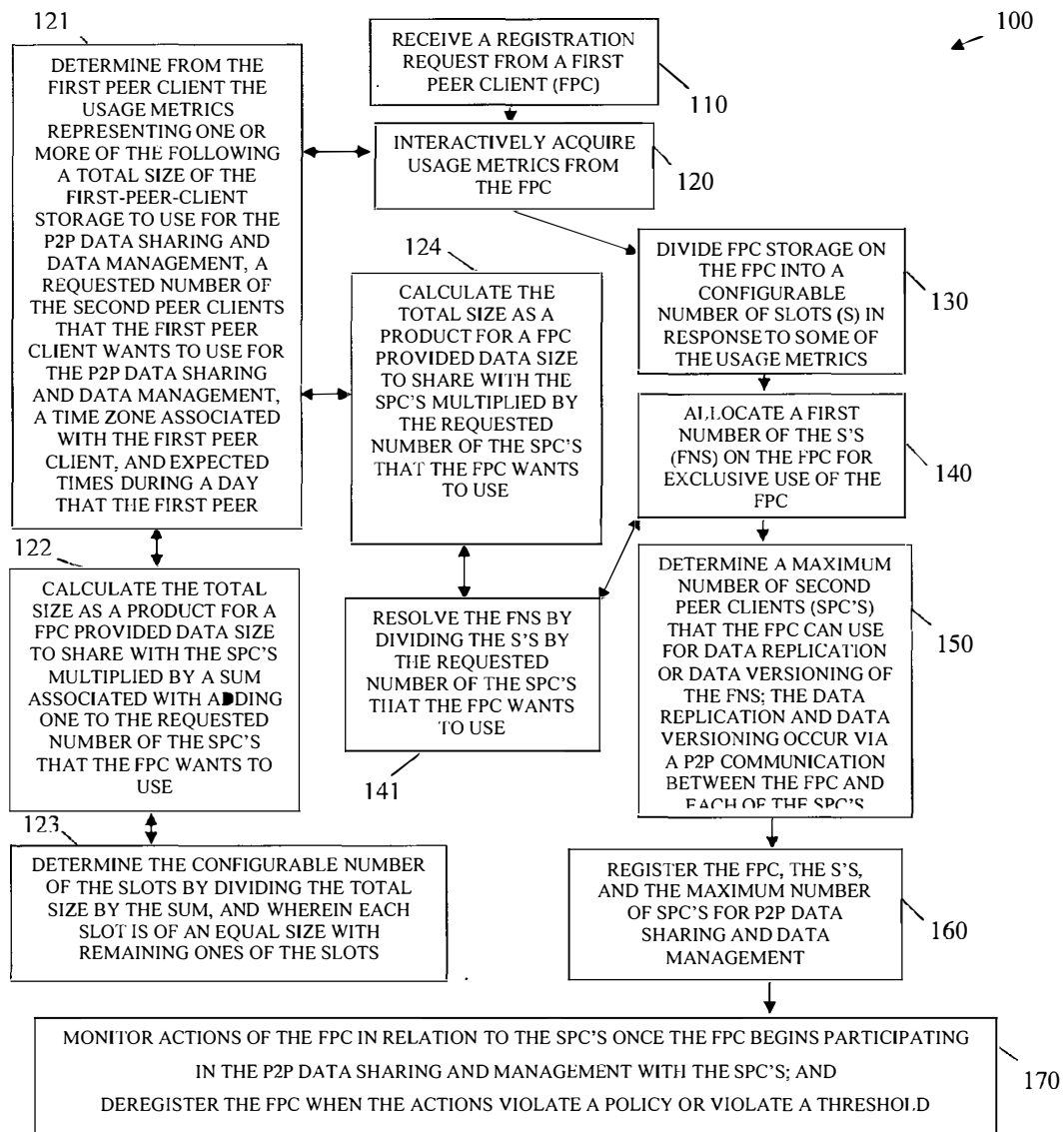


FIG. 1

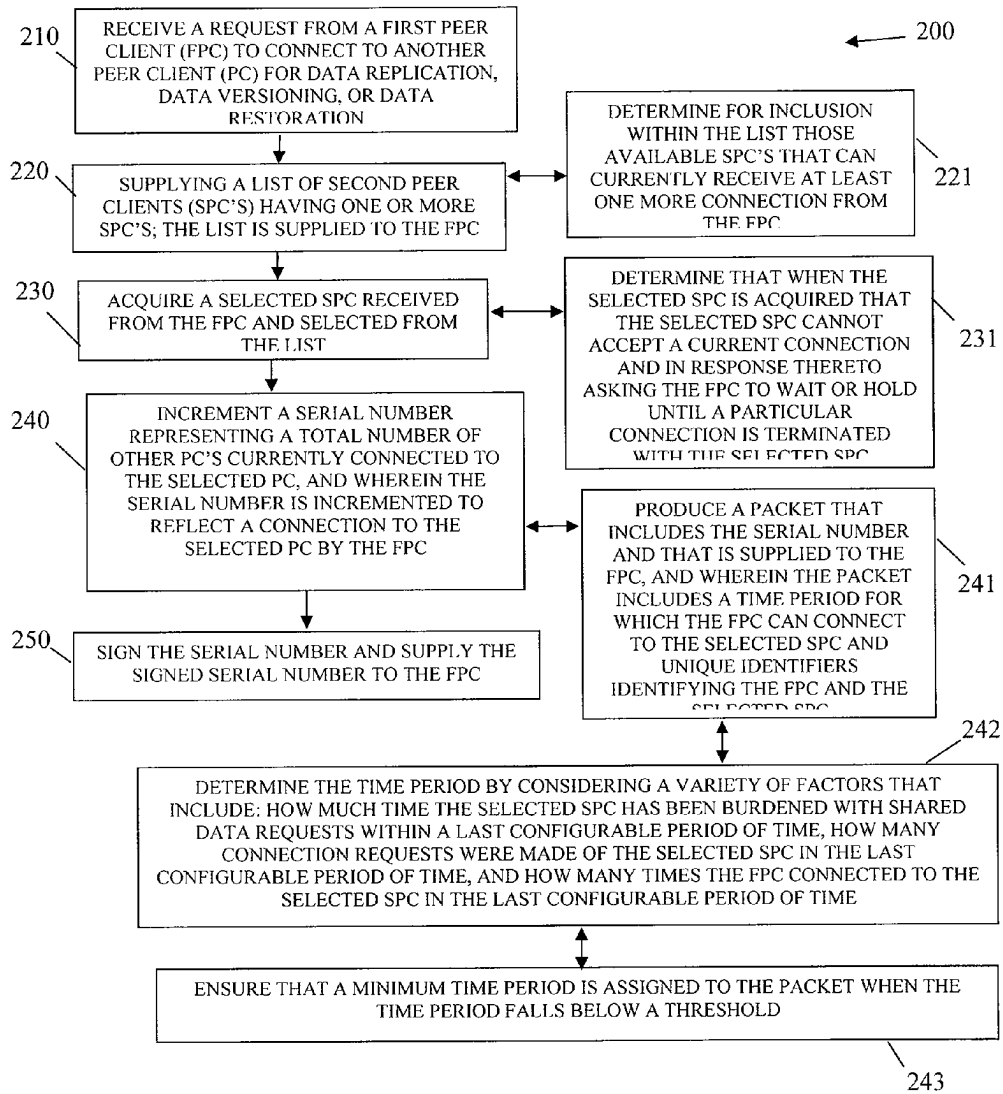


FIG. 2

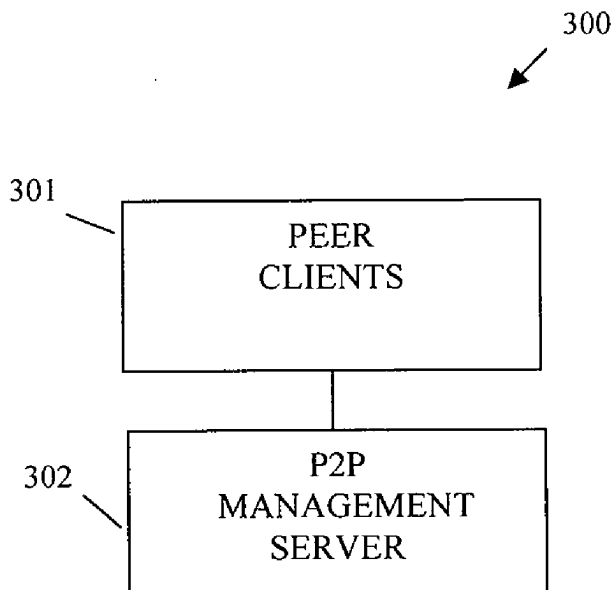


FIG. 3

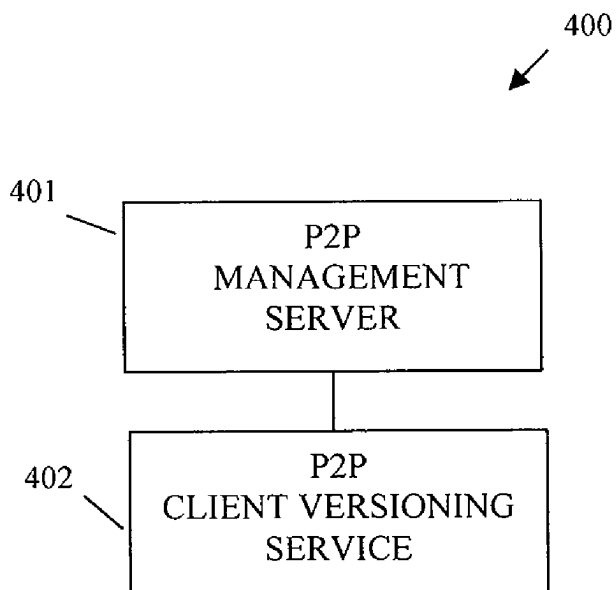


FIG. 4

## COORDINATED PEER-TO-PEER (P2P) REPLICATED BACKUP AND VERSIONING

### BACKGROUND

**[0001]** Data and information are rapidly becoming the life blood of enterprises. Transactions with customers, operational data, financial data, corporate intelligence data; in fact, all types of information are now captured, indexed, stored, and mined by enterprises in today's highly competitive and world economy.

**[0002]** Since information is vital to the enterprise, it is often made available twenty-four hours a day, seven days a week, and three hundred sixty-five days a year. To achieve this, the enterprises have to implement a variety of data replication, data backup, and data versioning techniques against their data models, users' storage devices, and/or their data warehouses.

**[0003]** It is not unusual for an enterprise to expend roughly \$6 for every gigabyte (GB) of data storage used for data backup and replication per year. This is a best case scenario and does not include the management overhead, risk associated with data loss, restore overhead in the event of data loss, periodic tape drive cleansing overhead/cost, higher recover times when data is lost, etc.

**[0004]** In fact, assuming an enterprise has 10,000 employees each employee having a modest 20 GB of data, then the cost of data backup and replication is \$1,200,000 (20×\$6×10,000). Again, this is best case scenario and does not even account for a variety of overhead costs, which were discussed above. Thus, it can be seen that data backup and replication for medium to large enterprises can easily be in the millions of dollars and can affect the enterprise's bottom line in any year but most especially during tough or lean years.

**[0005]** Additionally, many users of an enterprise never fully utilize their existing storage capacity. Still, the enterprise has to retain sufficient backup space to account for the situation when a user does fully utilize his/her storage capacity. So, the reality is and enterprise not only expends a lot of time, resources, and money on data backup and replication but the enterprise is also wasting and underutilizing a lot of existing storage capacity.

**[0006]** Thus, it is desirable to have improved techniques for data backup and replication within enterprises.

### SUMMARY

**[0007]** In various embodiments, techniques are provided for coordinated peer-to-peer (P2P) replicated backup and versioning. More particularly and in an embodiment, a method is provided for registering and configuring a client for coordinated P2P replicated backup and version. A registration request is received from a first peer client. Usage metrics are interactively acquired from the first peer client. The first-peer-client storage on the first peer client is divided into a configurable number of slots in response to some of the usage metrics. A first number of the slots on the first peer client are allocated for exclusive use of the first peer client. Next, a maximum number of second peer clients are determined, where the second peer clients are used by the first peer client for data replication or data versioning of the first number of the slots. The data replication and data versioning occur via a

client, the slots, and the maximum number of second peer clients are registered for P2P data sharing and data management.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0008]** FIG. 1 is a diagram of a method for registering and configuring a client for coordinated P2P replicated backup and version, according to an example embodiment.

**[0009]** FIG. 2 is a diagram a method for centralized P2P data sharing and management, according to an example embodiment.

**[0010]** FIG. 3 is a diagram of a P2P data management and sharing system, according to an example embodiment.

**[0011]** FIG. 4 is a diagram of another P2P data management and sharing system, according to an example embodiment.

### DETAILED DESCRIPTION

**[0012]** According to an embodiment, the techniques presented herein may be implemented within Novell products distributed by Novell, Inc. of Provo, Utah. Of course it is to be understood that any network architecture, device, proxy, operating system (OS), or product may be enhanced to utilize and deploy the techniques presented herein and below.

**[0013]** FIG. 1 is a diagram of a method 100 for registering and configuring a client for coordinated P2P replicated backup and version, according to an example embodiment. The method 100 (hereinafter "P2P registration service") is implemented in a machine-accessible and computer-readable medium as instructions that process on a machine (computer, processor-enabled device, etc.) and the P2P registration service is accessible over a network. The network may be wired, wireless, or a combination of wired and wireless.

**[0014]** The P2P registration service is implemented within and processes on a P2P centralized server machine. Users interact with their client machines (referred to as "peers" or "peer clients" herein) to register with and be configured by the P2P registration service for P2P data sharing and management with other peer clients.

**[0015]** At 110, the P2P registration service receives a registration request from a first peer client. The first peer client desires to share storage associated with its processing environment and desires to have one or more other second peer clients remotely located over the network house replicated backup data for the first peer client's storage or to house versioned data for the first peer client's storage.

**[0016]** The request can be received from a user associated with the first peer client. Alternatively, the request can be received from an automated service or daemon running of the first peer client. In some cases, the request can be received from an administrator on behalf of the first peer client and from a machine that is not associated with the first peer client.

**[0017]** Before the first peer client can share storage and have storage accessible via other peer clients, the first peer client has to register via the P2P registration service. The registration request received at 110 reflects the initiation of that registration.

**[0018]** At 120, the P2P registration service interactively acquires usage metrics from the first peer clients. A variety of usage metrics can be received from information obtained from the first peer client. Some of the information may be

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