



Revised: 9/30/93  
Security: Everyone

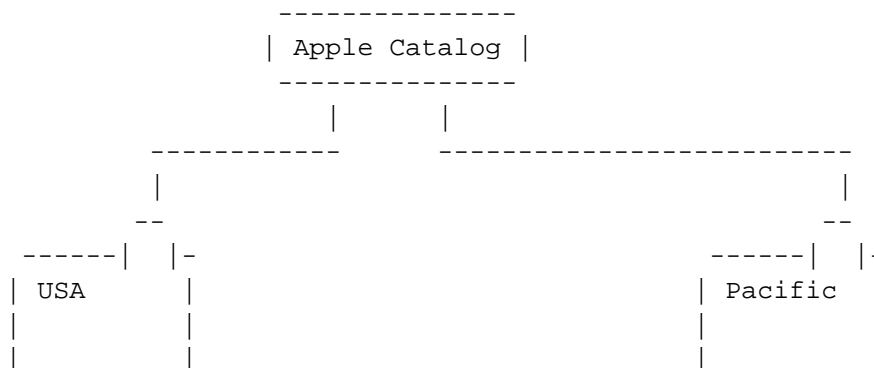
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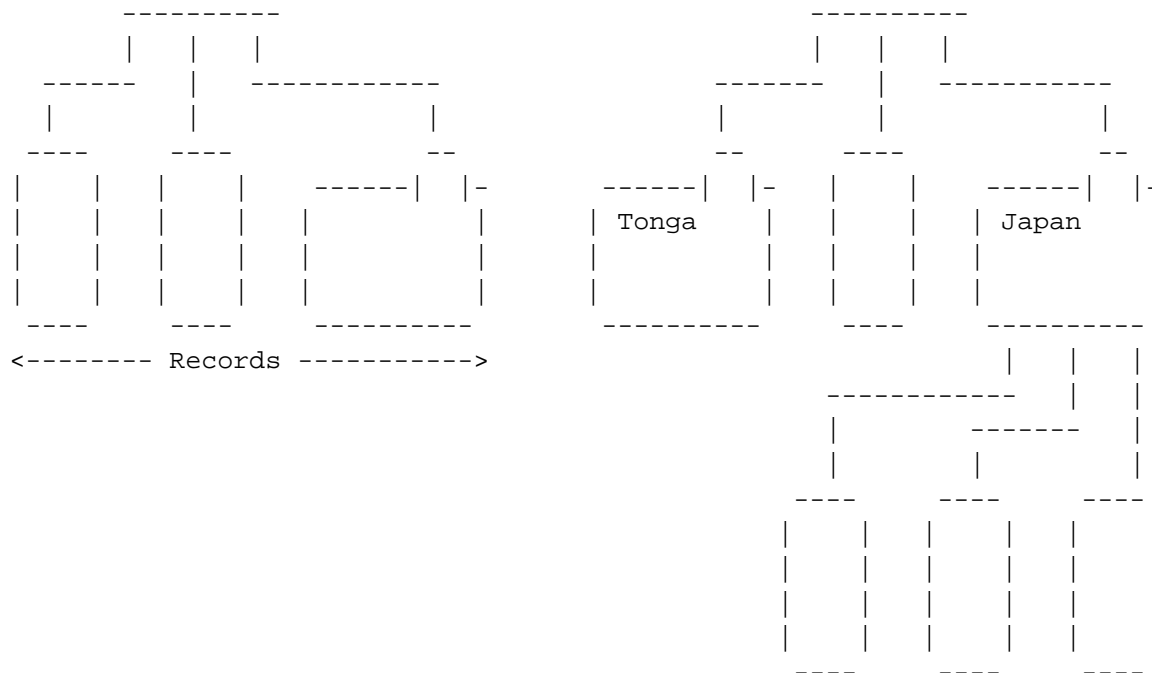
TOPIC -----

DISCUSSION -----

The relationship between a PowerShare Catalog and a PowerShare Catalog Server is not necessarily one to one. In fact, in all but the smallest installations, there will be several PowerShare Catalog servers for each PowerShare Catalog.

- Hierarchical Structure  
An PowerShare Catalog is organized in a hierarchical manner. For example, a PowerShare Catalog could be created for Apple Computer.





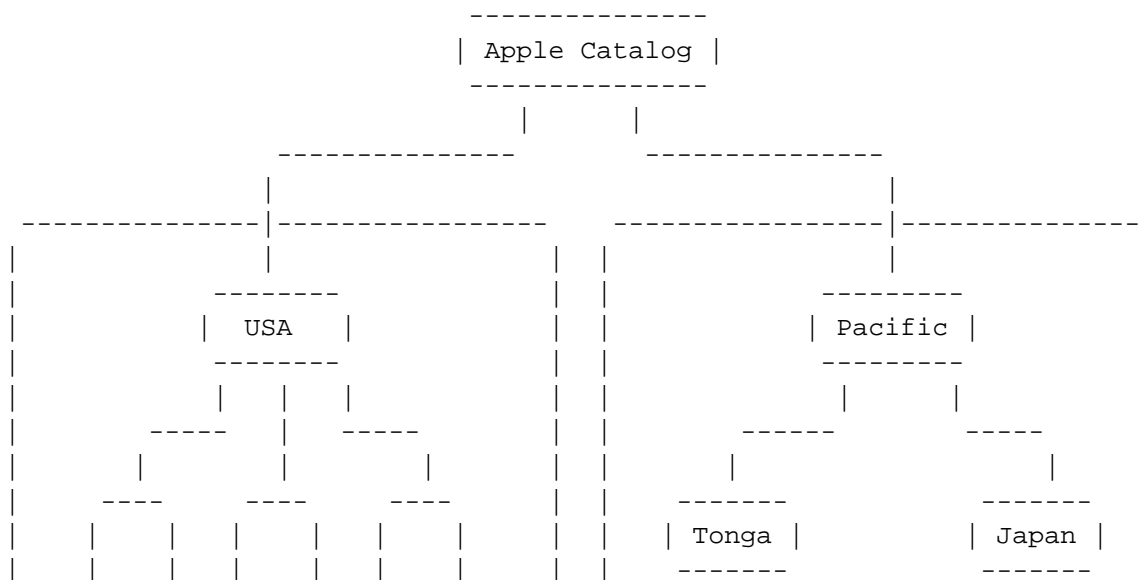
Catalog Structure

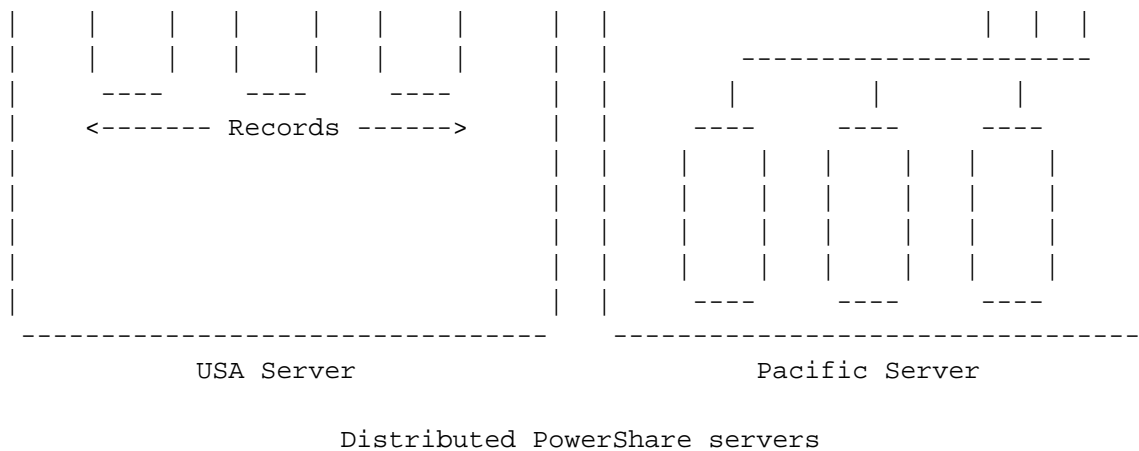
Records are stored in catalog folders. It is possible to have a catalog folder that contains both records and other catalog folders.

- Where are the Servers?

Notice in the above diagram that there are no servers represented. This diagram is a picture of the logical structure of the information in the catalog. The catalog structure does not necessarily indicate which PowerShare Catalog Servers contain which information.

In this example, it is highly unlikely that the entire Catalog could be maintained on one PowerShare Catalog Server. Instead, the load would be distributed among several PowerShare Catalog Servers. No one server would contain all of the data.





From the AOCE client's perspective, there is no concept of PowerShare Catalog Servers, only PowerShare Catalogs. AOCE clients never select a particular server. In fact, an end user never knows which specific PowerShare Catalog Server is responding to an information request.

In this example, all data for Apple USA resides on the Apple USA server and all data for Apple Pacific resides on the Apple Pacific server. There is no one server that contains all of the records for the entire database. The data is distributed across two servers. However, all the data is in one PowerShare Catalog.

If a user in Apple USA needs information from the Apple Pacific catalog folder, the user need only open the Apple Pacific catalog folder from the Catalogs icon on the desktop. PowerTalk takes care of finding out which PowerShare Catalog Server serves the Apple Pacific catalog folder and directs the information request accordingly. The end user never has to select a PowerShare Server.

- Folders Directory

PowerTalk keeps a list of which PowerShare servers serve the Folders Directory. The Folders Directory is a copy of the structure of the PowerShare Catalog. The Folders Directory is a type of PowerShare Catalog which is used by PowerTalk and PowerShare to keep track of which servers serve which catalog folders. While the entire Folders Directory might be replicated in several places in a PowerShare system, the Folders Directory does not contain any user data. It contains only path information to direct PowerTalk and PowerShare users to the appropriate PowerShare Servers.

PowerTalk asks one of the servers serving the Folders Directory which PowerShare servers serve the catalog folder containing the requested data. PowerTalk receives a list of servers serving the appropriate catalog folder. Finally, PowerTalk picks a server from the list and sends the information request.

This process is transparent to the end user. An AOCE client never sees the different servers. The client only sees different catalog folders. In the Catalogs icon, the end user never knows nor cares which PowerShare Catalog Servers serve which catalog folders.

## Replication

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If the server containing data for a particular catalog folder goes down, the information in that catalog folder is no longer available. To guard against this situation, two PowerShare Catalog Servers can serve the same catalog folder, replicating the information among themselves.

A replicated server system can also balance the load between several servers, providing quicker responses to client systems. This means more clients can simultaneously access the same catalog folders with no loss of performance.

For example, if Pacific Server #1 would go down for some reason, users would still have access to data in a Apple Pacific catalog folder because Pacific Server #2 also contains a copy of that information.

The end user still sees only the catalog and not the servers. The replication is transparent from the point of view of the AOCE client system.

Replication happens automatically with no intervention required by the catalog administrator. To add a record to a catalog folder, the catalog administrator would run PowerShare Admin to add the new record. As with PowerTalk, the catalog administrator cannot specify which PowerShare Catalog Server will be updated. Instead, the PowerShare System Manager's Utility will add the record to the catalog folder. The PowerShare System Manager's Utility picks one of the PowerShare Catalog Servers that serve that particular catalog folder. That PowerShare Catalog Server takes care of communicating the changes to other PowerShare Catalog Servers that serve the same catalog folder. The catalog administrator only has to update the catalog folder once, instead of updating each and every PowerShare Catalog Server that serves that particular catalog folder.

The PowerShare Catalog Servers keep each other up to date by exchanging updates to information on the catalog folders they serve. The replication mechanism is peer to peer based, not master-slave based. Any server can accept and distribute updates to other servers serving the same directory folders. If one PowerShare Catalog Server receives an update, that server propagates the new information to other PowerShare Catalog Servers that serve the same catalog folder.

While it is true that the servers communicate with each other to check for new information, this exchange does not cause an excessive increase in network traffic. There are two reasons for this. The first is that the servers only exchange information on updates. They do not automatically exchange the entire contents of a catalog folder. The second reason is that the frequency with which the servers check with each other for new information is proportional to the rate of new information. If a large number of updates have been made recently, the servers will communicate frequently. As the amount of new information drops off, the servers drop the frequency with which they communicate with each other. The amount of network traffic generated by PowerShare Catalog Servers is directly

proportional to the amount of information changing in the PowerShare Catalog structure.

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