

# Windows 2000 Global Catalog

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Administrators who are new to Windows 2000 - and even some who have been running Active Directory networks for a while - may be a little fuzzy on the function of some of the roles that servers play on a Windows 2000 network. In NT, server roles were pretty simple: you had a Primary Domain Controller, optionally one or more Backup Domain Controllers, and member servers that had nothing to do with authentication.

It's a little more complex in a network that uses Active Directory. Now, all domain controllers are ostensibly created equal - except that they're not. While there is no longer a distinction between primary and backup DCs, there are specific roles assigned to them. If you've done a little studying of AD, you can probably name the five "masters of operations": the Domain Naming Master, the Schema Master, the Infrastructure Master, the Relative ID (RID) Master, and the PDC emulator.

In addition to these "master" roles, there is another important role played by at least one server on a Windows 2000 network: the Global Catalog server. Although it is essential to the proper operation of Active Directory, it is still a mystery to many. In this article, we will explain what the global catalog is, what it does, and why you need one (or more) on your network.

## What does the Global Catalog Catalog?

You probably know that the Active Directory is a hierarchically structured database that stores information about the objects in a domain. This information resides in a partition on each domain controller. If you have multiple domains on your network, each has its own Active Directory.

The Global Catalog contains information about all the objects in an entire forest of domains. The Global Catalog does not reside on every domain controller; it only resides on special domain controllers that are designated as GC servers. Because it is a full-fledged DC for the domain to which it belongs, the GC server has a complete set of the object attributes for that domain, but for other domains, the GC only stores enough information about an object to allow it to be located in the appropriate Directory.

Note that you can use the Schema Manager to control which object attributes are stored in the Global Catalog. See Q248717, [How to Modify Attributes That Replicate to the Global Catalog](#).

## How Does a DC Become a GC Server?

For reasons we'll discuss in a moment, you need at least one GC server in every forest. To ensure that you have one, Windows 2000 automatically designates the first domain controller that you install in a forest as a GC server, and creates the global catalog on that server.

You can reassign this role to a different domain controller, or you can create additional GC servers. You may want to have multiple GCs if some of your network segments are connected by slow links, to reduce traffic across those links when the Global Catalog is queried. If you do not have multiple sites connected by slow links, you will not benefit by enabling the GC on additional servers, and performance may be negatively impacted.

To turn a domain controller into a GC server, you use the Active Directory Sites and Services administrative tool. In the left console tree, expand the Sites node, and under the selected site name, expand the Servers folder. Locate the domain controller you want to make a GC and double click it. In the right details pane, right click NTDS Settings and select Properties. On the General tab of the NTDS Settings properties box, check the Global Catalog checkbox.

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## Now I've got it; What Does it Do?

The Global Catalog serves a few very important functions. First, it allows objects such as network resources to be located by computers or users when they reside in a different domain in the forest.

Does this mean that if your network has only one domain, you don't need a GC server? The answer is no, as many Windows 2000 administrators have discovered when the domain controller that holds the Global Catalog went down. Because every domain controller holds a copy of the Directory, you might think things would function normally when one DC is offline. However, if the missing DC is also the GC server, you may be surprised to find that most users cannot log onto the network (they can, however, log onto their local machines, so it may not be immediately apparent until they attempt to access network resources).

This is because the GC is queried when a user logs onto the network, for universal group information. If no GC is present to respond, users will not be able to log on - with one exception: users who are members of the domain admins group can log on without a Global Catalog available. This is by design, so that the domain administrator can still perform administrative tasks on the network.

You may also have a problem changing your password when the GC server is down. This occurs if you try to make the change using your User Principal Name (UPN) which is formatted as username@domain name (for example, dshinder@tacteam.net). You should, however, be able to change the password when you use the down-level username (such as dshinder). It is preferable, though, to use the UPN when changing your password. You will need to bring a GC server back onto the network to do so.

Note that in .NET networks, GC data can be cached so that users are still able to log on without going through a Global Catalog.

## Special Relationship: the GC Server and the Infrastructure Master

The Infrastructure Master updates group-to-user information when a user is placed in or removed from a group, or a user or group is created, renamed, or deleted. The Infrastructure Master does this by comparing its data to that in the Global Catalog and requesting updated data from the Catalog. Then the Infrastructure Master replicates the information to other DCs in its domain.

Thus the Infrastructure Master is dependent on the GC Server. For this reason, the role of Infrastructure Master should be assigned to a DC that is not a GC Server. If the same server holds both roles, the Infrastructure Master will never find that its information is different from that of the GC, and it will not replicate information to other DCs.

If you have only one domain controller in the domain, or if all the domain controllers act as GC servers (not generally recommended), it will not matter that the Infrastructure Master is also a GC server.

## Summary

Understanding how the Global Catalog works can help you to optimize performance and troubleshoot problems on your Windows 2000 network.