

## Concepts

# About setting up networks

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### Summary

When you set up a network, you set up NetInfo *domains* that contain information used by various processes. All networks have a *root domain* for the network along with one *local domain* for each computer. In addition, some networks may have *midlevel domains*.

The root domain has information about the entire network.

The midlevel domains have information about a subset of the network.

The local domains have information about individual computers.

You also set up *servers* and *clients*. Servers are processes that provide services to the network. Clients are processes that request services.

For simple networks—with just two levels—you can use SimpleNetworkStarter to set up a root domain and network services at the same time ;SetUpTinyNetwork.rtf;;~. If your network has more than a dozen computers, you may need to split services among several servers of the same kind ;SetUpTwo-LevelNetwork.rtf;;~.

For multilevel networks—with three or four levels—you can use SimpleNetworkStarter to set up the domain structure and services for individual two-level networks. Then use NetInfoManager to combine the individual networks into a single network ;SetUpThree-LevelNetwork.rtf;;~.

For mixed networks—with a combination of NetInfo networks and UNIX networks—you must build an interface between NetInfo and the other networks. You can use the **nidump** and **niload** utilities to exchange information between UNIX and NetInfo networks.

If your network includes subnets, you'll need to include information in NetInfo about their IP address interfaces. Both HostManager and SimpleNetworkStarter have features that let you do this.

**CAUTION** All networks require careful planning for the distribution of services. Be sure you understand both the setup information provided here and the basics of NetInfo domains before you begin to set up a new network or change an existing network ;../NetInfo/AboutNetInfo.rtf;;~.

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## **Network servers**

When you set up a NetInfo network, you typically set up the following kinds of servers:

<b>Master NetInfo server</b>	Provides all the NetInfo services for access to network information for a particular domain.
<b>Home directory server</b>	Maintains a home directory for each user with an account on the network
<b>File servers</b>	Export parts of a file system to the network
<b>Client servers</b>	Import files from the network file servers
<b>E-mail server</b>	Provides network mail services
<b>Peripherals servers</b>	Provide printer, fax, or disk services

**Clone NetInfo server** Provides an alternate to the master NetInfo server to reduce network traffic on a single computer and to provide back up for the domain.

The way you distribute these servers depends on the size and complexity of your network.

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## **Two-level networks**

A simple network has two domain levels: a *local domain* for each computer and a *root domain* for the network.

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The upper-level domain, or **root domain**, stores information common to all the computers on the network.

The lower-level domains, or **local domains**, only store information pertaining specific to each computer.

A two-level network may have two or three computers, or it may include dozens or hundreds of computers.

A network with just a few computers is considered a *tiny network*. When you create a

tiny network, you generally set up all network services on a single computer. The computer that hosts the network services can also serve as a workstation. You probably don't need a clone NetInfo domain server for a tiny network.

A two-level network of more than three or four computers has greater traffic and storage requirements. A single computer isn't likely to have enough storage to host all user home directories as well as all e-mail, shared applications, and data. Nor is it likely to be fast enough. You can distribute these services among several different computers, using SimpleNetworkStarter on each computer that will host a network service. You can also use SimpleNetworkStarter to create a clone NetInfo server running on a separate computer. You should set up one clone for each ten computers on your network.

You can use SimpleNetworkStarter to set up either a tiny network ;SetUpTinyNetwork.rtf;; or a larger two-level network ;SetUpTwo-LevelNetwork.rtf;; and to assign the services you want. SimpleNetworkStarter creates the root domain. (It actually sets up a database named **network** in the **/etc/netinfo** directory as an *instance* of the root domain. Other instances are created when you set up clone servers. You can examine a domain's information with NetInfoManager ;../NetInfo/ExamineDomain.rtf;;.)

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## Multilevel networks

A multilevel network has three or more domain levels. At the top is the root domain.

The local domains are at the bottom. In the middle are domains that organize computers into groups. The midlevel domains store information for groups of computers.

Client requests search the local domain first and then search up the parent hierarchy without querying sibling domains. Information stored in one midlevel domain is inaccessible to queries under another midlevel domain. You can thus use midlevel domains to restrict access—for example, to isolate network information for the payroll department, restrict access to expensive printers, or protect confidentiality of projects in development.

A *three-level network* may have as many midlevel domains as you choose. The midlevel domains may reflect the structure of your organization, the network infrastructure, or different geographical sites.

For example, you might have an accounting domain, a sales domain, and an engineering domain, each with information about pertinent network resources. Or you might set up midlevel domains for different office buildings, different cities, or for *subnets* of computers, connected to the rest of the network by *routers*.

You can set up a *four-level network* to divide your network more finely, perhaps reflecting both organizational structure and geographic distribution.

For example, the **/accounting** domain might include the **/accounting/chicago** and the **/accounting/london** child domains. In this case, the accounting domain would

store network information for the accounting department as a whole, while the child domains would store information for hardware resources for their respective sites.

With NetInfo, you can create an unlimited number of levels. However, NeXT does not recommend building hierarchies of more than four levels—the potential confusion outweighs the slight organizational benefits of finer divisions.

To create a multilevel network from scratch, use SimpleNetworkStarter (SNS) to create individual two-level networks for each group. Then use NetInfoManager to combine the groups.

To build a three-level network, use SNS to create two-level networks for each mid-level domain, then use NetInfoManager to combine the separate networks under a single root domain `;SetUpThree-LevelNetwork.rtf`;␣. To build a four-level network, repeat the process; when you have built a number of three-level networks, use NetInfoManager to combine them all under a single root domain `;SetUpFour-LevelNetwork.rtf`;␣. You can also modify existing NetInfo networks to create three- and four-level domain hierarchies.

For managing a large volume of host and user information, however, you can use shell scripts that include the NetInfo command-line utilities, especially **nidump**, **niload**, and **nigrep**.

If you're changing an existing network, you can use NetInfoManager to create new root `;CreateNewRootDomain.rtf`;␣ and child `;CreateNewChildDomain.rtf`;␣

domains according to your plan .

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## **Mixed networks**

You can use a NetInfo network with a UNIX network or with a Novell network to form a mixed network. When you manage a mixed network, you need to pay attention to the way different kinds of networks share information about computers, shared filesystems, users and groups, printing, and mail.

If you're joining NetInfo and UNIX networks, decide whether to use NetInfo or Network Information Service (NIS) to administer the network. With NetInfo you get the benefits of NetInfo's powerful administration features, including an automatic configuration server. You can use NIS to store information that is then passed to a NetInfo domain. Or you can use NIS and bypass NetInfo entirely, losing all of the NetInfo administrative advantages.

You use shell scripts to manage the flow of information between UNIX and NetInfo networks. The **nidump** and **rcp** utilities direct information from NetInfo to UNIX. The **rsh** and **niload** utilities control the flow of information from UNIX to NetInfo. You can set up a crontab entry to manage updates.

You can also set up a NEXTSTEP computer in a Domain Name Service (DNS) environment and use it as a secondary DNS server.



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## Networks with subnets

Subnets are separate physical networks connected together by routers, bridges, or other similar equipment. These devices manage the flow of traffic across the subnets.

Each computer within a subnet must bind to one or more upper-level domains. Because binding requests are not broadcast beyond the subnet boundaries, you need a NetInfo server for each domain that any computer in the subnet needs to bind to.

You can use HostManager or SimpleNetworkStarter to set up NetInfo with subnet information, which may include a netmask for the subnet and the IP address of a particular router or similar device. You may want to include user home directories, e-mail service, and shared applications, and data file areas as appropriate within each subnet.

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**Related topics** (*click a* LinkDiamond.tiff ↗)

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### Concepts

Before you set up a new network or change an existing one, be sure you understand how NetInfo networks are organized.

;../NetInfo/AboutNetInfo.rtf;↗ **About NetInfo**

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### How to

;SetUpTinyNetwork.rtf;;↵ Set up a tiny network  
;SetUpTwo-LevelNetwork.rtf;;↵ Set up a two-level network  
;SetUpThree-LevelNetwork.rtf;;↵ Set up a three-level network  
;SetUpFour-LevelNetwork.rtf;;↵ Set up a four-level network  
  
;CreateMasterServer.rtf;;↵ Create a master NetInfo server  
;MoveMasterServer.rtf;;↵ Move a master NetInfo server  
;CreateTwoLevelCloneServer.rtf;;↵ Create a clone NetInfo server for a two-level network  
;CreateMultiLevelCloneServer.rtf;;↵ Create clone NetInfo server for a multilevel network  
  
;CreateNewRootDomain.rtf;;↵ Create a new root domain  
;CreateNewChildDomain.rtf;;↵ Create a new child domain