The Network Information System

Introduction

- What is NIS?
  - Sun introduced Network Information System (NIS), formerly called Yellow Pages, or YP
  - provides a mechanism for keeping important files synchronized between hosts on a network
- What does NIS do?
  - allows networked machines to have a common interface regardless of the workstation that you log into
  - allows you to coordinate the distribution of database information throughout your networked environment
  - focused on making network administration more manageable by providing centralized control over a variety of network information

Systems support for NIS

System	Supports NIS?
Solaris	Partially
HP-UX	Yes
IRIX	Yes
SunOS	Yes
OSF/1	Yes
BSDI	No

Advantages and Disadvantages of NIS

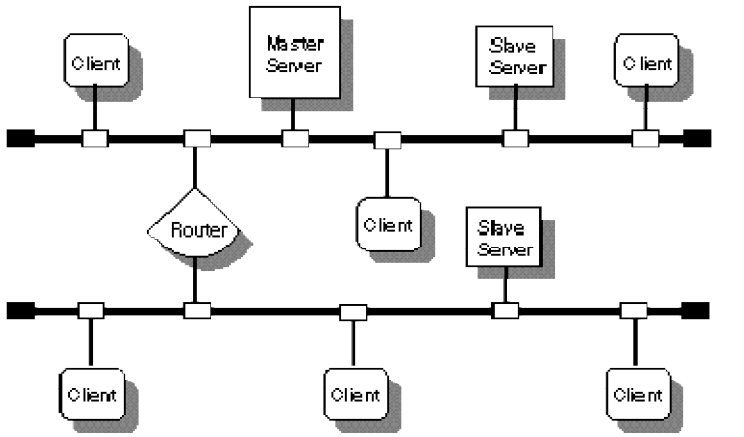
- Advantage
  - unnecessary for administrators to be aware of NIS's internal data formats
- Disadvantages
  - not suitable for managing a large network of machines
  - consume a fair amount of network bandwidth
  - If a slave server is down or inaccessible when a map is changed, the slave's copy will not be updated
  - not secure

The NIS Environment

NIS uses a client-server arrangement.

Systems can have the following roles:

- Master server -- A system that stores the master copy of the NIS database files, or maps. Only the master maps can be modified, whereas slave servers provide read-only access. Each domain can have only one master server.
- Slave server -- A system that obtains and stores copies of the master server's NIS maps. Each domain can have multiple slave servers distributed throughout the network.
- Client -- Any system that queries NIS servers for NIS database information. Clients do not store and maintain copies of the NIS maps for their domain locally.



NIS Maps

- Information distributed by NIS is stored in database files called maps
- Most of the NIS maps represent files that were traditionally stored in the /etc directory, include the following:
  - aliases
  - group
  - hosts
  - netgroups
  - networks
  - passwd
  - protocols
  - rpc
  - services
- Each NIS map contains a set of keys and associated values. Each NIS map has a map name, used by programs to access data in the map.

NIS Domains

- A named set of NIS maps is called a domain.
- A domain name is required for retrieving data from an NIS database. It is set at the time the system is booted
- An NIS domain is an administrative entity that consists of a master server, one or more slave servers, and numerous clients
- All systems in a domain share the same set of NIS database files
- NIS uses domains to arrange the workstations, users, and networks in its namespace.

NIS Data Storage

- The data in NIS maps is stored as databases in **dbm/ndbm**, **btree**, or **hash** format
- Each NIS map is stored as a pair of **ndbm** files, one called map.**dir** and the other called map.**pag**, in a subdirectory of the NIS directory named for the NIS domain
- For example, the NIS map for the **/etc/hosts** file in the domain **market** might be stored in these **dbm/ndbm** files:

  /var/yp/market/hosts.byaddr.dir

  /var/yp/market/hosts.byaddr.pag

  /var/yp/market/hosts.byname.dir

  /var/yp/market/hosts.byname.pag

Selected NIS commands and daemons:

Program	Description
ypserv	NIS server daemon, started at boot time
ypbind	NIS client daemon, started at boot time
domainname	Sets the NIS domain a machine is in (run at boot time)
ypxfrd	Serves requests from **ypxfr** (runs on master server)
makedbm	Builds an **ndbm** map from a flat file
ypmake	Rebuilds **ndbm** maps from flat files that have changed
ypinit	Configures a host as a master or slave server
ypset	Makes **ypbind** connect to a particular server
ypwhich	Finds out which server the current host is using
ypmatch	Prints map entries for a specified key
yppasswd	Changes a password on the NIS master server
ypupdate	Server for updating NIS maps (managed by inetd)

Setting Up an NIS Domain 1

- NIS must be initialized on the master server, on the slave servers, and on each client.
- It can be done in two steps.

  First, run **ypinit** on each server.

  Second, on every machine in the domain, set the domain name from one of the system startup files and configure **/etc/passwd** and **/etc/group** to import NIS data.

Setting Up an NIS Domain 2

- Configuring NIS servers

  ypinit is used to initialize both the master and slave servers for a domain.

  – On the master, the following commands are used:

  cd/var/yp */* The NIS directory, wherever it is. */*

  domainname *foo* */* Name the new domain. */*

  ypinit –m */* Initialize as master server. */*

  /usr/etc/ypserv */* Start the NIS server. */*

  – Once the master is up and running, each slave server should be primed by running **ypinit** with the **–s** (slave) flag:

  cd/var/yp

  ypinit –s *master* */* Argument is master's hostname. */*

  /usr/etc/ypserv

  On each slave, you should set up crontab entries that pull fresh copies of all maps from the master. **ypxfr** map, where map is the mane such as **passwd.byuid**, will transfer the specified map from the master server. You must run the command once for each map

Setting Up an NIS Domain 3

- Configuring NIS Clients

The second step is to inform each machine that it is a member of the new domain, and to configure it so that it pays attention to the network versions of ***/etc/passwd*** and ***/etc/group***. The servers of a domain are generally clients as well. The ***/etc/passwd*** and ***/etc/group*** files on the master server are the files from which the NIS maps are built