NIS

Network Information Service

CIS 68C2

UNIX Network Administration
NIS

- **Overview**
  - Network Information Service - NIS
    - Formerly: Yellow Pages - YP
  - Client/server database provides central point of control for UNIX administrative files
    - Supported databases
      - passwd, groups, hosts, rpc, services, netid, protocols, mail, netgrp, shadow, publickey, networks, ethers, bootparams, printcap, amd.home, auto.master, auto.home, auto.local, passwd.adjunct, timezone, locale, netmasks
  - Widely supported by UNIX vendors
    - Client support also available on many other platforms
NIS Servers

- **Master Server**
  - Single master server maintains authoritative records
  - Records originate from standard system files
    
  Eg. /etc/passwd, /etc/hosts
  - Must run `ypserv` daemon
    - Responds to network queries for records

- **Slave Server(s)**
  - One or more authoritative servers
  - Reduces load on master
  - Increases chances that at least one server is available
  - Copies database from master server
NIS Clients

- Network client apps make NIS queries
  - If configured in `/etc/nsswitch.conf`
- Must run `ypbind` daemon
  - Performs database queries for a client
  - Sends IP broadcast to locate some server within the NIS domain
    - Does not cross networks
      - At least one server per physical network must exist
    - Found server becomes `bound`
      - The bound server will be used for queries
    - Red hat allows binding a server to avoid broadcast
NIS Domains

- NIS Domains
  - Servers and clients operate within a single NIS domain
    - No relation to DNS domains
    - Set with the `domainname` command
  - Domains are not hierarchical
  - Multiple domains may exist within a network
    - Must be administrated separately
NIS Domains

- NIS Domains

  - Consist of a master server, any number of slave servers, and clients
NIS Database

- DBM databases created from system files
  - Makefile defines rules to update DBM files whenever necessary
  - Run make command while in /var/yp directory
  - Databases stored in the directory /var/yp/NISdomain

- Each database is searchable only by a single key
  - Requires files to have several hashed translations called maps
  - Eg. /etc/hosts file translates into these hashed databases:
    - hosts.byname
    - /etc/hosts file searchable only by name
    - hosts.byaddr
    - /etc/hosts file searchable only by IP Address
NIS Database Transfer

- Master runs `yppush` command to instruct slaves to obtain a copy of database
  - Used by `/var/yp/Makefile`
  - Slave servers listed in `/var/yp/ypservers`
- Slaves pull data from master using `ypxfr` command
  - Data is pulled
    - Periodically via `cron` jobs
    - Or when requested by master via `yppush`
NIS Configuration

- Overview - Master configuration
  - Set NIS `domainname`
  - Edit all rules in `/var/yp/Makefile`
  - Start `portmap` daemon
  - Edit configuration files (optional, as needed)
    - `/var/yp/securenet` and `/etc/ypserv.conf`
  - Run `ypinit -m`
  - Start `ypserv` server daemon
  - From `/var/yp`, run `make`
  - Run `yppasswd` daemon so users can change passwords
NIS Configuration

- Overview – Slave configuration
  - Set NIS `domainname`
  - Start `portmap` daemon
  - Edit configuration files (optional, as needed)
    - `/var/yp/securenet` and `/etc/ypserv.conf`
  - Run `ypinit -s master`
  - Start `ypserv` server daemon
  - Setup `cron` entries to transfer maps periodically
    - See `/usr/lib/yp/ypxfr_*`
NIS Configuration

- Overview – Client configuration
  - Set NIS *domainname*
  - Start *portmap* daemon
  - Start *ypbind* server daemon
  - Add *nis* service switch to lines in */etc/nsswitch.conf*
  - Minimal hosts, passwd and group file are needed for boot
NIS Command Summary

- **Administrative**
  - `ypinit` - initializes servers, must be run to once to use NIS
  - `domainname` - sets NIS domain name; must be set to use NIS
    - Red Hat - assign `NISDOMAIN` variable in `/etc/sysconfig/network` file for boot time binding to an NIS server
  - `yppush` - instructs slaves to update their copies of databases
  - `ypxfr` - transfers data (pull from master by slave)

- **Daemons**
  - `ypserv` - server daemon - runs only on NIS server(s)
  - `ypbind` - client daemon - runs on all systems using NIS services
  - `yppasswdd` - server for `yppasswd`, `ypchfn`, `ypchsh`
NIS Command Summary

- Diagnostic and Query
  - `ypwhich` - outputs name of bound NIS server
  - `ypcat` - outputs an entire NIS served map
  - `ypmatch` - outputs single entry from NIS map
    - Function and syntax is like `grep`

- User Commands
  - `yppasswd, ypchfn, ypchsh`
    - Changes passwd, finger, and shell info in passwd database
NIS Limitations

- Limitations
  - Somewhat insecure
    - Any host can serve / view NIS data
  - Slave databases can be out-of-date
    - Must poll periodically using `cron` for updates
  - Not suitable for very large networks
    - Only allows a single configuration of data
  - Clients can fixate on one server
    - Query response time is decreased
  - Not particularly efficient
    - Entire database is transferred from master to slaves
Additional Information

See Also

- USAH - Page 521-532
- Linux NIS HOWTO