IT341 Introduction to System Administration
Project III - Implementing NIS

As stated at the start of the previous project, you may wish to make a snapshot of your VM – in its state following successful completion of Project 2 – before continuing with these instructions.

The Network Information Service (NIS), formerly known as Yellow Pages or YP, provides a flat (unstructured) database for keeping track of users and hosts on a local area network. It works best for hundreds of users and/or hosts; Enterprises that have thousands of users and/or hosts might be better off with a more hierarchical database such as DNS or LDAP.

In this exercise, we will set up NIS on our little network and use it to keep track of users and (initially) hosts.

On the Server[1], it20

(This much, we have already done. **You do not do it**):

1. Download and install NIS. When asked, say that the *NIS domain* is **it.cs.umb.edu**. The domain name can be anything, so long as it is the same on the server and all clients on the network

    ```
    sudo apt-get update
    sudo apt-get install nis
    sudo apt-get install sysv-rc-conf (Needed later on)
    ```

2. The installation of NIS includes attempting to start it up. It may not be successful.

    We need to look in /etc/default/nis. Here we make a small change (again, in **boldface**) to say, yes we are the NIS master. Do not make any other changes to the file at this time.

    ```
    sysadmin@it20:/etc$ cat /etc/default/nis
    #
    # /etc/defaults/nis     Configuration settings for the NIS
    # daemons.
    #

    # Are we a NIS server and if so what kind (values: false, slave,
    # master)?
    NISSERVER=master

    # Are we a NIS client?
    NISCLIENT=true
    ```

```
# Location of the master NIS password file (for yppasswdd).
# If you change this make sure it matches with /var/yp/Makefile.
YPPWDDIR=/etc

# Do we allow the user to use ypchsh and/or ypchfn? The
# YPCHANGEOK fields are passed with -e to yppasswdd,
# see it's manpage.
# Possible values: "chsh", "chfn", "chsh,chfn"
YPCHANGEOK=chsh

# NIS master server. If this is configured on a slave server
# then ypinit will be run each time NIS is started.
NISMASTER=master

# Additional options to be given to ypserv when it is started.
YPSERVARGS=
```

3. Look at /etc/nsswitch.conf. Nothing needs to change for now.

```
# /etc/nsswitch.conf
#
# Example configuration of GNU Name Service Switch functionality.
# If you have the `glibc-doc-reference' and `info' packages
# installed, try:
# `info libc "Name Service Switch"'
# for information about this file.

passwd: compat
group: compat
shadow: compat

hosts: files dns
networks: files

protocols: db files
services: db files
ethers: db files
rpc: db files

netgroup: nis
```

4. Modify /etc/yp.conf to identify ourselves (it20) as the NIS server.

```
#
# yp.conf Configuration file for the ypbind process. You can
# define NIS servers manually here if they can't be found by
# broadcasting on the local net (which is the default).
#
# See the manual page of ypbind for the syntax of this file.
#
# IMPORTANT: For the "ypserver", use IP addresses, or make sure
# that the host is in /etc/hosts. This file is only interpreted
# once, and if DNS isn't reachable yet the ypserver cannot
# be resolved and ypbind won't ever bind to the server.

# ypserver it20.it.cs.umb.edu
```

```
ypserver 10.0.0.1
```

5. Check to make sure our defaultdomain is it.cs.umb.edu:

```
sysadmin@it20:/etc$ cat defaultdomain
it.cs.umb.edu
```

6. Now we need to set up the NIS database.

```
sudo /usr/lib/yp/ypinit -m
```

There are no slave servers so enter ctrl-D, then if it20.it.cs.umb.edu (the NIS master server) is in the list the answer Y

7. Now we need to start the service

```
sudo service ypserv start
```

8. Now we need to start the the ypserv run-level configuration for sysV like init script links

```
sudo sysv-rc-conf ypserv on
```

9. Now we must build the NIS database, and restart NIS. To build the database, we go to directory /var/yp, which contains the make file, makefile, for building the database and execute a make:

```
cd /var/yp
sudo make
```

make is a Unix program that builds applications according to instructions in a make file; if you are interested in what a make file looks like you can look at makefile in this directory.

The Clients[2]

1. Download and install NIS. When asked, say that the *NIS domain* is it.cs.umb.edu

```
sudo apt-get update
sudo apt-get install nis
sudo apt-get install sysv-rc-conf
```

When asked for a default domain, supply **it.cs.umb.edu**. It is just a name; any name will do; but, the nis server and all clients must have the same name.

2. The file, /etc/default/nis should not be changed.

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[2]A good reference is http://www.server-world.info/en/note?os=Ubuntu_16.04&p=nis&f=2

```
#
# /etc/defaults/nis Configuration settings for the NIS daemons.
#

# Are we a NIS server and if so what kind (values: false, slave,
# master)?
NISSERVER=false

# Are we a NIS client?
NISCLIENT=true

# Location of the master NIS password file (for yppasswdd).
# If you change this make sure it matches with /var/yp/makefile.
YPPWDDIR=/etc

# Do we allow the user to use ypchsh and/or ypchfn ? The
# YPCHANGEOK fields are passed with -e to yppasswdd, see it's
# manpage.
# Possible values: "chsh", "chfn", "chsh,chfn"
YPCHANGEOK=chsh

# NIS master server. If this is configured on a slave server then
ypinit
# will be run each time NIS is started.
NISMASTER=

# Additional options to be given to ypserv when it is started.
YPSERVARGS=

# Additional options to be given to ypbind when it is started.
YPBINDARGS=

# Additional options to be given to yppasswdd when it is started. Note
# that if -p is set then the YPPWDDIR above should be empty.
YPPASSWDDARGS=

# Additional options to be given to ypxfrd when it is started.
YPXFRDARGS=
```

3. The file, /etc/nsswitch.conf should look like this (add **nis** to the four indicated lines):
(**NOTE:** *You should not change the permissions for this file. You may need to use sudo, instead, in order to perform the edits.*)

```
# /etc/nsswitch.conf
#
# Example configuration of GNU Name Service Switch functionality.
# If you have the `glibc-doc-reference' and `info' packages
# installed, try:
# `info libc "Name Service Switch"' for information about this file.

passwd: compat nis  #add here
group: compat nis   #add here
shadow: compat nis  #add here
```

```
hosts: files nis dns  #add here
networks: files

protocols: db files
services: db files
ethers: db files
rpc: db files

netgroup: nis
```

4. Modify /etc/yp.conf to identify it20 as the NIS server. As the comment suggests, this should not be necessary as broadcasting ought to work, but NIS appears to work more smoothly when we explicitly identify the server.

```
#
# yp.conf Configuration file for the ypbind process. You can
# define NIS servers manually here if they can't be found by
# broadcasting on the local net (which is the default).
#
# See the manual page of ypbind for the syntax of this file.
#
# IMPORTANT: For the "ypserver", use IP addresses, or make sure
# that the host is in /etc/hosts. This file is only interpreted
# once, and if DNS isn't reachable yet the ypserver cannot
# be resolved and ypbind won't ever bind to the server.

# ypserver it20.it.cs.umb.edu
ypserver 10.0.0.1
```

5. Check to make sure our defaultdomain is `it.cs.umb.edu`

```
sysadmin@itvm2x-yz:~$ cat /etc/defaultdomain
it.cs.umb.edu
```

6. On your virtual machine add a home directory for yourself, using your cs.umb.edu login name; If you don't have a cs.umb.edu user account, GET ONE! For example, if my username were bja, the command would read:

```
sysadmin@itvm2x-yz:/etc$ sudo mkdir /home/bja³
```

7. Do a restart of NIS on your client side

```
sudo service ypbind restart
```

```
sudo sysv-rc-conf ypbind on
```

8. **See me for this step. I will do it on it20 as soon as you are ready!**

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³ **bja** is replaced with your CS Linux username, which will also be the name of your home directory on your virtual machine.

Then, on the server it20 I will add you with the same name you used for your home directory (e.g. I used bja), that is, your cs.umb.edu user name. Then define a new password.

```
sysadmin@it20:~$ sudo adduser --no-create-home bja
```

We don't want a home directory created since we have one on our home (client) host. Of course, it exists only on the client for now, but that is fine for now – that is where we are working. There is an alternative to adduser – the command useradd; but the one we use allows us to suppress the creation of a home directory and prompts for a user password. Get used to both of them.

9. Again on the server it20, after we have **ALL** added ourselves, I will rebuild the NIS database and restart NIS (**I will do this**):

```
cd /var/yp
sudo make

sudo sysv-rc-conf ypbind on
```

10. Then, back on your client, login using your own login name and password that you added to it20 in step 6. Of course, you will want to use your own login name in place of bja.

```
itvm2x-yz login:  bja
Passwd: *******
```

(**NOTE:** If you are unable to log into your VM using your own login name, see if you can at least log into **it20** itself. Your VM *should* be accepting log-ins from anyone with an account on **it20**, by way of NIS. If this is not the case, see instructions at the end of this document.)

You may get a message, which goes like:

```
Could not chdir to home directory /home/bja:
No such file or directory
```

Whether you get this message or not, it simply means that you have no home directory on your own host. This is because you don't *own* it. (When you created it in step 9, it was owned by user root.) Log in again, but as (the sudo-er) sysadmin and take a look:

```
sysadmin@itvm2x-yz:~$ ls -l /home
total 8
drwxr-xr-x 3 root root 4096 2011-02-07 11:04 bja
drwxr-xr-x 4 sysadmin sysadmin 4096 2011-01-26 11:57 sysadmin
```

We can change your home directory's owner using the chown command.

```
sysadmin@itvm2x-yz:~$ sudo chown bja /home/bja
```

We can also change the home directory's group using the chgrp command

```
sysadmin@itvm2x-yz:~$ sudo chgrp bja /home/bja
```

Now, we own it and it is in our group:

```
sysadmin@itvm2x-yz:~$ ls -l /home
total 8
drwxr-xr-x 3 bja bja 4096 2011-02-07 11:04 bja
drwxr-xr-x 4 sysadmin sysadmin 4096 2011-01-26 11:57 sysadmin
```

11. Now, if you log out, and log in again, you should end up in your home directory. You should be able to log into any host (client or server) on the it.cs.umb.edu network, but you will have a home directory on your own client.

It would be nice if all of our home directories were available on all of the hosts in our network. We'll use the network file system (NFS) to accomplish that in the next exercise.

Oh, by the way: it's not just users that NIS keeps track of. NIS also keeps track of hosts. You can take the definitions of itvm21-yz… itvm28-yz out of your own host's /etc/hosts file (just comment them out if you want to try); NIS will serve up the information from it20:/etc/hosts.

If you cannot log into your VM with your own username (that we created for you in step 8), this is likely due to the **rpcbind** utility failing to start for **ypbind**. See more info here:

https://bugs.launchpad.net/ubuntu/+source/rpcbind/+bug/1558196

To fix this, you will need to go through an alternative series of steps, after step 8:
(See me before trying these instructions!)
1. Complete _On The Client – Step 1_ from Project 4. (Then, when you officially start Project 4, start at _On The Client – **Step 2**_.)
2. Log off and reboot your VM.
3. Log in as **sysadmin**.
4. Execute the command **ps –ef | grep bind**
5. You should see entries for both **ypbind** and **rpcbind**. If you do not, please let me know.
6. Log off, and resume work at step 10.