Nanyang Polytechnic

Specialist Diploma in Cloud Data Centre Technology and Management

EG211S – Data Centre Service Management and Analysis

Network Management & Monitoring Lab – Using RANCID

Note: Ubuntu account is "student" with the password "student". Root password is "password".

For this lab, the network topology you are tasked to manage is based on the network diagram used in the SNMP MIB Browser Lab.

Exercises
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1. Launch VMWare Workstation and start the Ubuntu VM. If the VM is not found, create a new VM and install with the OS. Follow the VM config below:

```
VM Name:    RANCID
vCPU:       1
Memory:     4GB RAM
HDD:        20GB storage
Network:    Bridged
ISO image: To be given
Remove: Floppy, Printer
```

2. Become root, and install the Subversion Version Control System: In addition to Subversion we will specify to install telnet and the mutt email client.

```
$ sudo bash
     # apt-get install subversion telnet mutt
```

3. Install Rancid itself

```
     # apt-get install rancid

     - It will prompt with a warning - Select <OK> and press ENTER
     to continue.
     - It will give you another warning about making a backup copy
     of your rancid data. We have no data, so select <YES> and
     press ENTER to continue.
```

4. Add an alias for the rancid user in /etc/aliases file

```
     # editor /etc/aliases
```

```
      rancid-all: sysadm
      rancid-admin-all: sysadm
```

Save the file, then run:

```
      # newaliases
```

5. Edit /etc/rancid/rancid.conf

```
      # editor /etc/rancid/rancid.conf
```

Find this line in rancid.conf:

```
      #LIST_OF_GROUPS="sl joebobisp"
```

And, underneath it add the following line:

```
      LIST_OF_GROUPS="all"
```

(with no '#' at the front of line, and aligned to the left)

We want to use Subversion for our Version Control System, and not CVS, so find the line with the parameter RCSSYS:

```
      RCSSYS=cvs; export RCSSYS
```

And, change it to:

```
      RCSSYS=svn; export RCSSYS
```

and the line with CVSROOT:

```
      CVSROOT=$BASEDIR/CVS; export CVSROOT
```

And, change it to:

```
      CVSROOT=$BASEDIR/svn; export CVSROOT
```

Note the lowercase "svn". Now exit and save the file.

6. Change to the rancid user

```
#####################################################################
#
# CRITICAL! CRITICAL! CRITICAL!
#
#####################################################################
```

Pay very close attention to what userid you are using during the rest of these exercises. If you are not sure simply type "id" on the command line at any time.

From a root prompt ("#"), switch identity to become the 'rancid' user:

```
# su -s /bin/bash rancid
```

Check that you ARE the rancid user:

```
$ id
```

You should see something similar (numbers may be different):

```
uid=104(rancid) gid=109(rancid) groups=109(rancid)
```

```
######################################################################
```

***** IF YOU ARE NOT USER RANCID NOW, do NOT continue ******

```
######################################################################
```

7. Create /var/lib/rancid/.cloginrc

```
$ editor /var/lib/rancid/.cloginrc
```

Add the following two lines to the file:

```
add user 172.16.240.12 student
add password 172.16.240.12 student password
```

The first 'student' is the username, the first and second 'student' and 'password' respectively are the password and enable password used to login to your router. You can specify domain names instead of ip address if you have setup DNS or /etc/hosts. This way, it may be simply as you can rewrite the lines this way (for example)

```
add user *.dc.mydomain.org student
add password *.dc.mydomain.org student password
```

This way, the star in the name means that it will try to use this username and password for all routers whose names end .dc.mydomain.org.

Exit and save the file.

Now protect this file so that it cannot be read by other users:

```
$ chmod 600 /var/lib/rancid/.cloginrc
```

```
######################################################################
#
# Test login to the router of your group
#
# Login to your router with clogin. You might have to type yes to
# the first warning, but should not need to enter a password, this
# should be automatic.
```

```
#
#     $ /var/lib/rancid/bin/clogin 172.16.240.12
#
# You should get something like:
#
#     spawn ssh -c 3des -x -l student 172.16.240.12
#     The authenticity of host '172.16.240.12'
#     can't be established.
#     RSA key fingerprint is
#     73:f3:f0:e8:78:ab:49:1c:d9:5d:49:01:a4:e1:2a:83.
#     Are you sure you want to continue connecting (yes/no)?
#     Host 172.16.240 added to the list of known
#     hosts.
#     yes
#     Warning: Permanently added '172.16.240.12' (RSA) to the
#     list of known hosts.
#     Password:
#     Router_A>enable
#     Password:
#     Router_A#
#
#     Exit the from the router login:
#     Router_A#exit
#
##########################################################################
```

8. Initialize the SVN repository for rancid:

Make sure you are the rancid user before doing this:

```
$ id
```

If you do not see something like "uid=108(rancid) gid=113(rancid) groups=113(rancid)" then DO NOT CONTINUE until you have become the rancid user.

Now initialize the Version Control repository (it will use Subversion):

```
$ /usr/lib/rancid/bin/rancid-cvs
```

You should see something similar to this:

```
Committed revision 1.
Checked out revision 1.
At revision 1.
A configs
Adding configs

Committed revision 2.
A router.db
Adding router.db
Transmitting file data .
```

```
     Committed revision 3.

******** Do this ONLY if you have problems *******

If this does not work, then either you are missing the subversion
package, or something was not properly configured during the
previous steps. You should verify that subversion is installed and
then before running the rancid-cvs command again do the following:

     $ exit
     # apt-get install subversion
     # su -s /bin/bash rancid
     $ cd /var/lib/rancid
     $ rm -rf all
     $ rm -rf svn

Now try running the rancid-cvs command again:

     $ /usr/lib/rancid/bin/rancid-cvs

**************************************************

9. Create the router.db file

     $ editor /var/lib/rancid/all/router.db

Add this line:

     172.16.240.12:cisco-router:up

Exit and save the file.

10. Let's run rancid!

     $ /usr/lib/rancid/bin/rancid-run

This will take a few moments so be patient.
Run it again, since the first time it might not commit correctly:

     $ /usr/lib/rancid/bin/rancid-run

11. Check the rancid log files:

     $ cd /var/lib/rancid/logs
     $ ls -l

... View the contents of the file(s):

     $ less all.*

NOTE! Using "less" - to see the next file press ":n". To see the
Previous file press ":p". To exit from less press "q".
```

12. Look at the configs

```
$ cd /var/lib/rancid/all/configs
$ less 172.16.240.12
```

If all went well, you can see the config of the router.

```
#####################################################################
#
# LET CHANGE THE ROUTER INTERFACE DESCRIPTION
#
# Here we change an interface Description on the router
#
#    $ /usr/lib/rancid/bin/clogin 172.16.240.12
#
# At the "Router_A#" prompt, enter the command:
#
#    Router_A# conf term
#
# You should see:
#
#    Enter configuration commands, one per line. End with CNTL/Z.
#
#    Router_A(config)#
#
#    Enter:
#
#    Router_A(config)# interface LoopbackXX (replace XX with your
#    pc no.)
#
# You should get this prompt:
#
#    Router_A(config-if)#
#
# Enter:
#
#    Router_A(config-if)# description <put your name here>
#    Router_A(config-if)# end
#
# You should now have this prompt:
#
#    Router_A#
#
# To save the config to memory:
#
#    Router_A# copy running-config startup-config
#
# You should see:
#
#    Building configuration...
#    [OK]
#
# To exit type:
#
```

```
#     Router_A# exit
#
# Now you should be back at your rancid user prompt on your system:
#
#################################################################
```

13. Let's run rancid again:

```
$ /usr/lib/rancid/bin/rancid-run
```

Look at the ranicd logs

```
$ ls /var/lib/rancid/logs/
```

You should see the latest rancid execution as a new log file with the date and time in the name.

14. Let's see the differences

```
$ cd /var/lib/rancid/all/configs
$ ls -l
```

You should see the router config file for your group:

```
$ svn log 172.16.240.12
```

Notice the revisions. Let's view the difference between two versions:

```
$ svn diff -r 5:7 172.16.240.12 | less
```

... can you find your changes?

Notice that svn is the Subversion Version Control system command line tool for viewing Subversion repositories of information. If you type:

```
$ ls -lah
```

You will see a hidden directory called ".svn" - this actually contains all the information about the changes between router configurations from each time you run rancid using /usr/lib/rancid/bin/rancid-run.

Whatever you do, don't edit or touch the .svn directory by hand!

15. Check your mail (This step may be skipped if lack of time)

Now we will exit from the rancid user shell and the root user shell to go back to being the "sysadm" user. Then we'll use the "mutt" email client to see if rancid has been sending emails to the sysadm user.

```
$ exit (takes your from rancid to root user)
```

```
     # exit (take you from root to sysadm user)
     $ id
... check that you are now the 'sysadm' user again;

... if not, log out and in again as sysadm to your virtual host

     $ mutt
```

(When asked to create the Mail directory, say Yes)

If everything goes as planned, you should be able to read the mails sent by Rancid. You can select an email sent by "rancid@mydomain.org" and see what it looks like.

Notice that it is your router description and any differences from the last time it was obtained using the rancid-run command.

Now exit from mutt.

(use 'q' return to mail index, and 'q' again to quit mutt)

16. Let's make rancid run automatically every 30 minutes from using cron (Again, this step may be skipped if lack of time)

     cron is a system available in Linux to automate the running of jobs. First we need to become the root user again:

```
     $ sudo bash
```

Now we will create a new job to run for the rancid user:

```
     # crontab -e -u rancid
```

It will ask you for your favorite editor. Select whichever editor you have been using in class.

Add this line at the bottom of the file (COPY and PASTE):

```
     */30 * * * * /usr/lib/rancid/bin/rancid-run
```

... then save and quit from the file.

That's it. The command "rancid-run" will execute automatically from now on every 30 minutes all the time (every day, week and month).

17. Now add all the other routers

Note the addresses for the routers (refer to the network topology diagram)

     172.16.240.x where X is different for each routers added.

Only include the actual, available routers.

Become the rancid user and update the router.db file:

```
# su -s /bin/bash rancid
$ editor /var/lib/rancid/all/router.db
```

Add the other classroom routers to the file. You should end up with something like (COPY and PASTE):

```
172.16.240.12:cisco-router:up
172.16.240.13:cisco-router:up
172.16.240.14:cisco-router:up
172.16.240.15:cisco-router:up
```

(Note that "cisco-router" means this is Cisco equipment -- it tells Rancid that we are expecting to talk to a Cisco device here. You can also talk to Juniper, HP, ...).

Be sure the entries are aligned to the left of the file.

18. Run rancid again:

```
$ /usr/lib/rancid/bin/rancid-run
```

This should take a minute or more now, be patient.

19. Check out the logs:

```
$ cd /var/lib/rancid/logs
$ ls -l
```

... Pick the latest file and view it

```
$ less all.YYYYMMDD.HHMMSS
```

This should be the last file listed in the output from "ls -l"
You should notice a bunch of statements indicating that routers have been added to the Subversion version control repository, and much more.

20. Look at the configs

```
$ cd /var/lib/rancid/all/configs
$ more 172.16.240.12
```

Press the SPACE bar to continue through each file. Or, you could do:

```
$ less 172.16.240.12
```

And press the SPACE bar to scroll through each file and then press ":n" to view the next file. Remember, in both cases you can press "q" to quit at any time.

If all went well, you can see the configs of ALL routers

21. Run RANCID again just in case someone changed some configuration on the router

```
$ /usr/lib/rancid/bin/rancid-run
```

This could take a few moments, so be patient....

22. Play with clogin:

```
$ /usr/lib/rancid/bin/clogin -c "show clock" 172.16.240.12
```

What do you notice?

Even better, we can show the power of using a simple script to make changes to multiple devices quickly:

```
$ editor /tmp/newuser
```

... in this file, add the following commands (COPY and PASTE):

```
configure terminal
username student1 secret 0 student1
exit
copy run start
```

Save the file, exit, and run the following commands from the command line:

```
$ for r in 2 3 4 5

Your prompt will now change to be ">". Continue by typing:

> do
> /var/lib/rancid/bin/clogin -x /tmp/newuser 172.16.240.1$r
> done
```

Now your prompt will go back to "$" and rancid clogin command will run and execute the commands you just typed above on routers Router_A, Router_B, Router_C and Router_D. This is simple shell scripting in Linux, but it's very powerful.

Q. How would you verify that this has executed correctly? Hint: "show run | inc"

A. Connect to Router_A, Router_B, Router_C and Router_D. Type "enable" and then type "show run | inc username" to verify that the NewUser username now exists.

Type exit to leave each router. Naturally you could automate this like we just did above.

23. Add the RANCID SVN (Subversion) repository in to WebSVN

If you are still logged in as user rancid, get back to root.
Remember you can type "id" to check what userid you are.

```
$ exit
#
```

Install WebSVN:

```
# apt-get install websvn
```

* Select <Yes> to the question if you want to configure WebSVN now and press ENTER

* Select <Ok> for the next question about supporting various web servers and press ENTER

* When asked for the "svn parent repositories" change the path to be:

/var/lib/rancid/svn

Select <Ok> and press ENTER. Do the same when asked about "svn repositories" on the next screen. That is, use the path:

/var/lib/rancid/svn

and not what is shown by default. Select <Ok> and press ENTER.

* Select <Ok> for the next screen talking about permissions and press ENTER.

24. Fix permissions. The web server must be able to read the SVN (Subversion) folder

```
# chgrp -R www-data /var/lib/rancid/svn
# chmod g+w -R /var/lib/rancid/svn
```

25. Browse the rancid files from your Web browser!
http://localhost/websvn

Browse the files under the 'all/configs' directory.
You can see all your router configuration files here.

26. Review revisions

WebSVN lets you see easily the changes between versions.

* Browse to http://localhost/websvn again, go to all, configs.
* Click on your router file (172.16.240.12) name. You will get a new screen
* Click "Compare with Previous" at the top of the screen.
* You should now see the latest changes highlighted.

Click on "REPOS 1" to back to the main WebSVN page:
* Click on "all/" under "Path"

* Click on "configs/"
* Select two of the routers that are next to each other. I.E. Router_A and Router_B, Router_C and Router_D.
* Click on Compare Paths

This will show you the differences between two separate router configurations.

WebSVN is a convenient way to quickly see differences via a GUI between mulitple configuration files. Note, this is a potential security hole so you should limit access to the URL http://localhost/websvn using passwords (and SSL) or appropriate access control lists.

--- End of Lab ---