



IE2060

Computer Systems Administration

2nd Year, 2nd Semester

Assignment

Individual Assignment

Submitted to
Sri Lanka Institute of Information Technology

In partial fulfillment of the requirements for the
Bachelor of Science Special Honors Degree in Information Technology

26/04/2024

Declaration

I certify that this report does not incorporate without acknowledgement, any material previously submitted for a degree or diploma in any university, and to the best of my knowledge and belief it does not contain any material previously published or written by another person, except where due reference is made in text.

Registration Number : IT22339188

Name : R.M.D.E.Rajapaksha

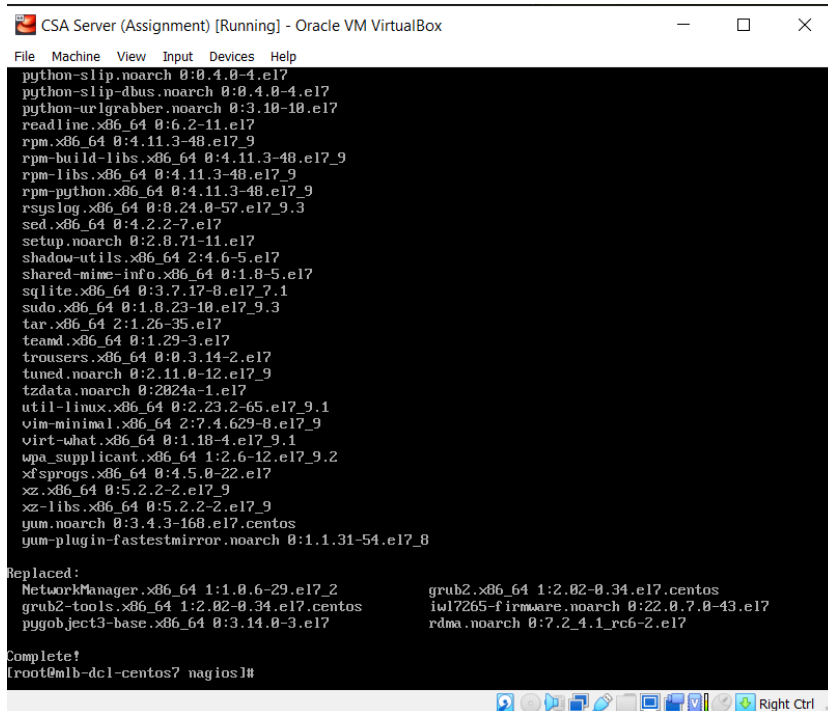
Table of Figures

Figure 1.1. 1 : Update the CentOS server	1
Figure 1.1. 2 : Install necessary packages	1
Figure 1.1. 3 : Download the latest version of Nagios Core.....	2
Figure 1.1. 4: Extract the downloaded file.....	2
Figure 1.1. 5 : Download Nagios Plugins	2
Figure 1.1. 6 : Extract the downloaded file.....	3
Figure 1.1. 7 : List of the file in Nagios - 4.5.1	3
Figure 1.1. 8 : Compile Nagios Core and Install Nagios Core	3
Figure 1.1. 9 : (make all).....	4
Figure 1.1. 10 : (make-install).....	4
Figure 1.1. 11 : (make-install-init / make-install-commandmode)	4
Figure 1.1. 12 : (make-install-config)	5
Figure 1.1. 13 : (make-install-config)	5
Figure 1.1. 14 : (make install -exfoliation)	5
Figure 1.1. 15 : (make install-classicui).....	5
Figure 1.1. 16 : Copy all files and directories from the other directory	6
Figure 1.1. 17 : Creating user account	6
Figure 1.1. 18 : Configure the installation parameters for building Nagios	6
Figure 1.1. 19 : (make).....	7
Figure 1.1. 20 : (make-install).....	7
Figure 1.1. 21 : libexec list.....	8
Figure 1.1. 22 : Summary	8
Figure 1.1. 23 : nagios- localhost.....	9
Figure 1.1. 24 : Install xinetd	9
Figure 1.1. 25 : (./configure).....	10
Figure 1.1. 26 : Install nrpe.....	10
Figure 1.1. 27 : (make-all)	11
Figure 1.1. 28 : (make-install).....	11
Figure 1.1. 29 : (make-init).....	11
Figure 1.1. 30 : nrpe status.....	12
Figure 1.2. 1 : create hosts.cfg file and services.cfg file.....	13
Figure 1.2. 2 : directive specifies the path to a configuration file	13
Figure 1.2. 3 : defining services.....	13
Figure 1.2. 4 :defining host	13
Figure 1.2. 5 : new host in nagios	14
Figure 1.2. 6 : new services in nagios	14
Figure 1.3. 2 : metrics in nagios.....	15
Figure 1.3. 1 : Implement metrics	15

Figure 2.1. 1 : install bind	16
Figure 2.1. 2 : enable status	16
Figure 2.1. 3 : named configuration file	17
Figure 2.2. 1 : query time - 1	18
Figure 2.2. 2 : query time -2	18
Figure 2.3. 1 : query time - 1	19
Figure 2.3. 2 : query time - 2	19

1) Part 1: Nagios Monitoring Setup with CentOS Server and Fedora Client/s

1.1.

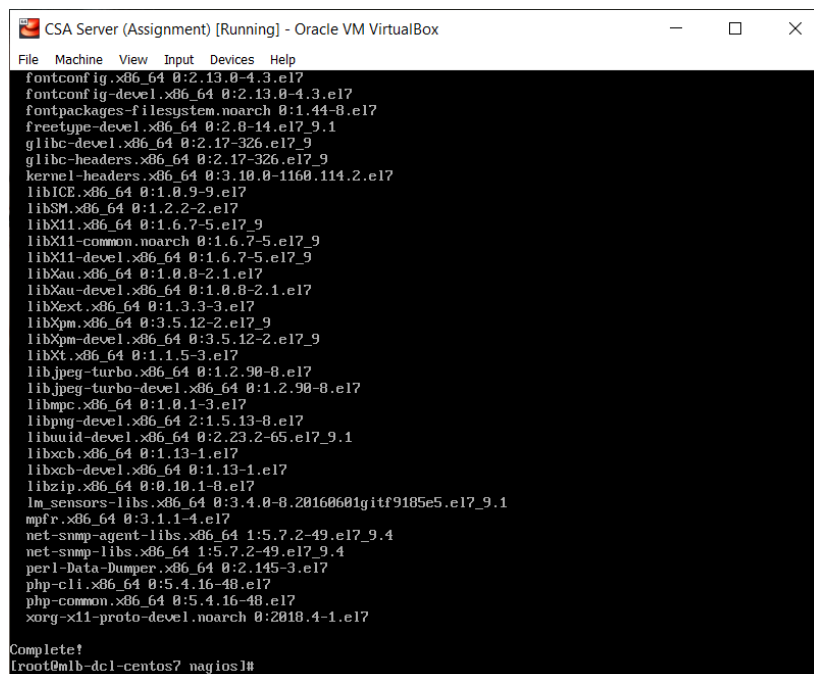


```
python-slip.noarch 0:0.4.0-4.el7
python-slip-dbus.noarch 0:0.4.0-4.el7
python-urlgrabber.noarch 0:3.10-10.el7
readline.x86_64 0:6.2-11.el7
rpm.x86_64 0:4.11.3-48.el7_9
rpm-build-libs.x86_64 0:4.11.3-48.el7_9
rpm-libs.x86_64 0:4.11.3-48.el7_9
rpm-python.x86_64 0:4.11.3-48.el7_9
rsyslog.x86_64 0:8.24.0-57.el7_9.3
sed.x86_64 0:4.2.2-7.el7
setup.noarch 0:2.8.71-11.el7
shadow-utils.x86_64 2:4.6-5.el7
shared-mime-info.x86_64 0:1.0-5.el7
sqlite.x86_64 0:3.7.17-8.el7_7.1
sudo.x86_64 0:1.8.23-10.el7_9.3
tar.x86_64 2:1.26-35.el7
teamd.x86_64 0:1.29-3.el7
trousers.x86_64 0:0.3.14-2.el7
tuned.noarch 0:2.11.0-12.el7_9
tzdata.noarch 0:2024a-1.el7
util-linux.x86_64 0:2.23.2-65.el7_9.1
vim-minimal.x86_64 2:7.4.629-8.el7_9
virt-what.x86_64 0:1.10-4.el7_9.1
wpa_supplicant.x86_64 1:2.6-12.el7_9.2
xfsprogs.x86_64 0:4.5.0-22.el7
xz.x86_64 0:5.2.2-2.el7_9
xz-libs.x86_64 0:5.2.2-2.el7_9
yum.noarch 0:3.4.3-168.el7.centos
yum-plugin-fastestmirror.noarch 0:1.1.31-54.el7_8

Replaced:
NetworkManager.x86_64 1:1.0.6-29.el7_2
grub2-tools.x86_64 1:2.02-0.34.el7.centos
pygobject3-base.x86_64 0:3.14.0-3.el7
grub2.x86_64 1:2.02-0.34.el7.centos
iwl7265-firmware.noarch 0:22.0.7.0-43.el7
rdma.noarch 0:7.2.4.1-rc6-2.el7

Complete!
[root@mlb-dcl-centos7 nagios]#
```

Figure 1.1. 1 : Update the CentOS server



```
fontconfig.x86_64 0:2.13.0-4.3.el7
fontconfig-devel.x86_64 0:2.13.0-4.3.el7
fontpackages-filesystem.noarch 0:1.44-8.el7
freetype-devel.x86_64 0:2.8.14-1.el7_9.1
glibc-devel.x86_64 0:2.17-326.el7_9
glibc-headers.x86_64 0:2.17-326.el7_9
kernel-headers.x86_64 0:3.10.0-1160.114.2.el7
libICE.x86_64 0:1.0.9-9.el7
libSM.x86_64 0:1.2.2-2.el7
libX11.x86_64 0:1.6.7-5.el7_9
libX11-common.noarch 0:1.6.7-5.el7_9
libX11-devel.x86_64 0:1.6.7-5.el7_9
libXau.x86_64 0:1.0.0-2.1.el7
libXau-devel.x86_64 0:1.0.0-2.1.el7
libXext.x86_64 0:1.3.3-3.el7
libXpm.x86_64 0:3.5.12-2.el7_9
libXpm-devel.x86_64 0:3.5.12-2.el7_9
libXt.x86_64 0:1.1.5-3.el7
libjpeg-turbo.x86_64 0:1.2.90-8.el7
libjpeg-turbo-devel.x86_64 0:1.2.90-8.el7
libmpc.x86_64 0:1.0.1-3.el7
libpng-devel.x86_64 2:1.5.13-8.el7
libuuid-devel.x86_64 0:2.23.2-65.el7_9.1
libxcb.x86_64 0:1.13-1.el7
libxcb-devel.x86_64 0:1.13-1.el7
libzip.x86_64 0:0.10.1-8.el7
lm_sensors-libs.x86_64 0:3.4.0-8.20160601gitf9185e5.el7_9.1
mpfr.x86_64 0:3.1.1-4.el7
net-snmp-agent-libs.x86_64 1:5.7.2-49.el7_9.4
net-snmp-libs.x86_64 1:5.7.2-49.el7_9.4
perl-Data-Dumper.x86_64 0:2.145-3.el7
php-cli.x86_64 0:5.4.16-48.el7
php-common.x86_64 0:5.4.16-48.el7
xorg-x11-proto-devel.noarch 0:2018.4-1.el7

Complete!
[root@mlb-dcl-centos7 nagios]#
```

Figure 1.1. 2 : Install necessary packages

```

[root@mlb-dcl-centos7 nagios]# wget https://assets.nagios.com/downloads/nagioscore/releases/nagios-4.5.1.tar.gz
--2024-04-24 07:32:47-- https://assets.nagios.com/downloads/nagioscore/releases/nagios-4.5.1.tar.gz
Resolving assets.nagios.com (assets.nagios.com)... 45.79.49.120, 2600:3c00:f03c:92ff:fe7:45ce
Connecting to assets.nagios.com (assets.nagios.com)!45.79.49.120:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 11540195 (11M) [application/x-gzip]
Saving to: 'nagios-4.5.1.tar.gz'

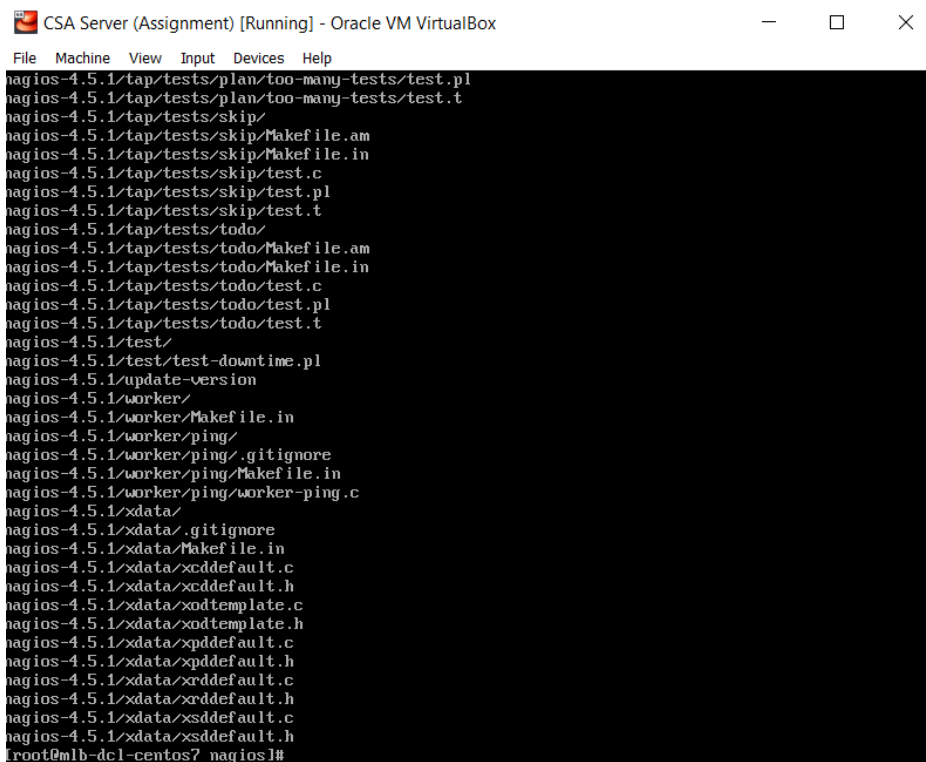
100%[=====>] 11,540,195 689KB/s in 20s

2024-04-24 07:33:08 (564 KB/s) - 'nagios-4.5.1.tar.gz' saved [11540195/11540195]

[root@mlb-dcl-centos7 nagios]#

```

Figure 1.1. 3 : Download the latest version of Nagios Core



```

CSA Server (Assignment) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
nagios-4.5.1/tap/tests/plan/too-many-tests/test.pl
nagios-4.5.1/tap/tests/plan/too-many-tests/test.t
nagios-4.5.1/tap/tests/skip/
nagios-4.5.1/tap/tests/skip/Makefile.am
nagios-4.5.1/tap/tests/skip/Makefile.in
nagios-4.5.1/tap/tests/skip/test.c
nagios-4.5.1/tap/tests/skip/test.pl
nagios-4.5.1/tap/tests/skip/test.t
nagios-4.5.1/tap/tests/todo/
nagios-4.5.1/tap/tests/todo/Makefile.am
nagios-4.5.1/tap/tests/todo/Makefile.in
nagios-4.5.1/tap/tests/todo/test.c
nagios-4.5.1/tap/tests/todo/test.pl
nagios-4.5.1/tap/tests/todo/test.t
nagios-4.5.1/test/
nagios-4.5.1/test/test-downtime.pl
nagios-4.5.1/update-version
nagios-4.5.1/worker/
nagios-4.5.1/worker/Makefile.in
nagios-4.5.1/worker/ping/
nagios-4.5.1/worker/ping/.gitignore
nagios-4.5.1/worker/ping/Makefile.in
nagios-4.5.1/worker/ping/worker-ping.c
nagios-4.5.1/xdata/
nagios-4.5.1/xdata/.gitignore
nagios-4.5.1/xdata/Makefile.in
nagios-4.5.1/xdata/xcddefault.c
nagios-4.5.1/xdata/xcddefault.h
nagios-4.5.1/xdata/xodtemplate.c
nagios-4.5.1/xdata/xodtemplate.h
nagios-4.5.1/xdata/xpddefault.c
nagios-4.5.1/xdata/xpddefault.h
nagios-4.5.1/xdata/xrddefault.c
nagios-4.5.1/xdata/xrddefault.h
nagios-4.5.1/xdata/xsddefault.c
nagios-4.5.1/xdata/xsddefault.h
[root@mlb-dcl-centos7 nagios]#

```

Figure 1.1. 4: Extract the downloaded file

```

[root@mlb-dcl-centos7 nagios]# wget https://nagios-plugins.org/download/nagios-plugins-2.4.9.tar.gz
--2024-04-24 07:37:43-- https://nagios-plugins.org/download/nagios-plugins-2.4.9.tar.gz
Resolving nagios-plugins.org (nagios-plugins.org)... 45.56.123.251
Connecting to nagios-plugins.org (nagios-plugins.org)!45.56.123.251:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 2754403 (2.6M) [application/x-gzip]
Saving to: 'nagios-plugins-2.4.9.tar.gz'

100%[=====>] 2,754,403 339KB/s in 11s

2024-04-24 07:37:55 (255 KB/s) - 'nagios-plugins-2.4.9.tar.gz' saved [2754403/2754403]

[root@mlb-dcl-centos7 nagios]#

```

Figure 1.1. 5 : Download Nagios Plugins

```

CSA Server (Assignment) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
nagios-plugins-2.4.9/plugins-scripts/check_ifstatus.pl
nagios-plugins-2.4.9/plugins-scripts/check_ifoperstatus.pl
nagios-plugins-2.4.9/plugins-scripts/check_wave.pl
nagios-plugins-2.4.9/plugins-scripts/check_mailq.pl
nagios-plugins-2.4.9/plugins-scripts/check_file_age.pl
nagios-plugins-2.4.9/plugins-scripts/check_ssl_validity.pl
nagios-plugins-2.4.9/plugins-scripts/t/
nagios-plugins-2.4.9/plugins-scripts/t/check_disk_smb.t
nagios-plugins-2.4.9/plugins-scripts/t/check_file_age.t
nagios-plugins-2.4.9/plugins-scripts/t/check_ifoperstatus.t
nagios-plugins-2.4.9/plugins-scripts/t/check_ifstatus.t
nagios-plugins-2.4.9/plugins-scripts/t/check_rpc.t
nagios-plugins-2.4.9/plugins-scripts/t/utils.t
nagios-plugins-2.4.9/plugins-root/
nagios-plugins-2.4.9/plugins-root/Makefile.am
nagios-plugins-2.4.9/plugins-root/Makefile.in
nagios-plugins-2.4.9/plugins-root/check_dhcp.c
nagios-plugins-2.4.9/plugins-root/check_icmp.c
nagios-plugins-2.4.9/plugins-root/pst3.c
nagios-plugins-2.4.9/plugins-root/t/
nagios-plugins-2.4.9/plugins-root/t/check_dhcp.t
nagios-plugins-2.4.9/plugins-root/t/check_icmp.t
nagios-plugins-2.4.9/po/
nagios-plugins-2.4.9/po/Makefile.in.in
nagios-plugins-2.4.9/po/remove-potcdate.sin
nagios-plugins-2.4.9/po/Makevars
nagios-plugins-2.4.9/po/POTFILES.in
nagios-plugins-2.4.9/po/fr.po
nagios-plugins-2.4.9/po/de.po
nagios-plugins-2.4.9/po/fr.gmo
nagios-plugins-2.4.9/po/de.gmo
nagios-plugins-2.4.9/po/nagios-plugins.pot
nagios-plugins-2.4.9/po/stamp-po
nagios-plugins-2.4.9/po/ChangeLog
nagios-plugins-2.4.9/po/LINGUAS
nagios-plugins-2.4.9/release
[root@mlb-dcl-centos7 nagios]#

```

Figure 1.1. 6 : Extract the downloaded file

```

[root@mlb-dcl-centos7 nagios]# ls
nagios-4.5.1  nagios-4.5.1.tar.gz  nagios-plugins-2.4.9  nagios-plugins-2.4.9.tar.gz
[root@mlb-dcl-centos7 nagios]# cd nagios-4.5.1/
[root@mlb-dcl-centos7 nagios-4.5.1]# ls
aclocal.m4      configure      html           LICENSE        README.md      t-tap
autoconf-macros  configure.ac  include        Makefile.in    sample-config  update-version
base            contrib       indent-all.sh make-tarball    startup        UPGRADING
cgi             CONTRIBUTING.md indent.sh       mkpackage      subst.in       worker
Changelog      debian        INSTALLING     module         t              xdata
common         docs          install-sh     nagios.spec    tap
config.guess   doxy.conf    LEGAL          nagios.sysconf test
config.sub     functions    lib            pkginfo.in     THANKS

```

Figure 1.1. 7 : List of the file in Nagios - 4.5.1

```

config.status: creating t-tap/Makefile
config.status: creating include/config.h
config.status: creating lib/snprintf.h
config.status: creating lib/iobroker.h

Creating sample config files in sample-config/ ...

*** Configuration summary for nagios 4.5.1 2024-02-28 ***:

General Options:
-----
Nagios executable: nagios
Nagios user/group: nagios,nagios
Command user/group: nagios,nagcmd
Event Broker: yes
Install ${prefix}: /usr/local/nagios
Install ${includedir}: /usr/local/nagios/include/nagios
Lock file: /run/nagios.lock
Check result directory: /usr/local/nagios/var/spool/checkresults
Init directory: /lib/systemd/system
Apache conf.d directory: /etc/httpd/conf.d
Mail program: /sbin/sendmail
Host OS: linux-gnu
IOBroker Method: epoll

Web Interface Options:
-----
HTML URL: http://localhost/nagios/
CGI URL: http://localhost/nagios/cgi-bin/
Traceroute (used by WAP):

Review the options above for accuracy. If they look okay,
type 'make all' to compile the main program and CGIs.

[root@mlb-dcl-centos7 nagios-4.5.1]#

```

Figure 1.1. 8 : Compile Nagios Core and Install Nagios Core

```

make install-exfoliation
- This installs the Exfoliation theme for the Nagios
  web interface

make install-classicui
- This installs the classic theme for the Nagios
  web interface

*** Support Notes ****

If you have questions about configuring or running Nagios,
please make sure that you:

- Look at the sample config files
- Read the documentation on the Nagios Library at:
  https://library.nagios.com

before you post a question to one of the mailing lists.
Also make sure to include pertinent information that could
help others help you. This might include:

- What version of Nagios you are using
- What version of the plugins you are using
- Relevant snippets from your config files
- Relevant error messages from the Nagios log file

For more information on obtaining support for Nagios, visit:

https://support.nagios.com

*****

Enjoy.

```

Figure 1.1. 9 : (make all)

```

CSA Server (Assignment) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
/bin/install -c -m 664 -o nagios -g nagios bootstrap-3.3.7/css/bootstrap-theme.min.css /usr/local/nagios/share/bootstrap-3.3.7/css
/bin/install -c -m 664 -o nagios -g nagios d3/d3.min.js /usr/local/nagios/share/d3
/bin/install -c -m 664 -o nagios -g nagios ./spin/spin.min.js /usr/local/nagios/share/spin
make[1]: Leaving directory '/root/nagios/nagios-4.5.1/html'
make install-exfoliation
make[1]: Entering directory '/root/nagios/nagios-4.5.1'
*** Exfoliation theme installed ***
NOTE: Use 'make install-classicui' to revert to classic Nagios theme
make[1]: Leaving directory '/root/nagios/nagios-4.5.1'
make install-basic
make[1]: Entering directory '/root/nagios/nagios-4.5.1'
/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/libexec
/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/var
/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/var/archives
/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/var/spool/checkresults
chmod g+s /usr/local/nagios/var/spool/checkresults
*** Main program, CGIs and HTML files installed ***
You can continue with installing Nagios as follows (type 'make'
without any arguments for a list of all possible options):

make install-init
- This installs the init script in /lib/systemd/system

make install-commandmode
- This installs and configures permissions on the
  directory for holding the external command file

make install-config
- This installs sample config files in /usr/local/nagios/etc
make[1]: Leaving directory '/root/nagios/nagios-4.5.1'
[root@mlb-dcl-centos7 nagios-4.5.1]#

```

Figure 1.1. 10 : (make-install)

```

[root@mlb-dcl-centos7 nagios-4.5.1]# make install-init
/bin/install -c -m 755 -d -o root -g root /lib/systemd/system
/bin/install -c -m 755 -o root -g root startup/default-service /lib/systemd/system/nagios.service
[root@mlb-dcl-centos7 nagios-4.5.1]# make install-commandmode
/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/var/rw
chmod g+s /usr/local/nagios/var/rw
*** External command directory configured ***
[root@mlb-dcl-centos7 nagios-4.5.1]# _

```

Figure 1.1. 11 : (make-install-init / make-install-commandmode)


```

[root@mlb-dcl-centos7 nagios-4.5.1]# make install-config
/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/etc
/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/etc/objects
/bin/install -c -b -m 664 -o nagios -g nagios sample-config/nagios.cfg /usr/local/nagios/etc/nagios.
cfg
/bin/install -c -b -m 664 -o nagios -g nagios sample-config/cgi.cfg /usr/local/nagios/etc/cgi.cfg
/bin/install -c -b -m 660 -o nagios -g nagios sample-config/resource.cfg /usr/local/nagios/etc/resou
rce.cfg
/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/templates.cfg /usr/local
nagios/etc/objects/templates.cfg
/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/commands.cfg /usr/local/
nagios/etc/objects/commands.cfg
/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/contacts.cfg /usr/local/
nagios/etc/objects/contacts.cfg
/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/timeperiods.cfg /usr/loc
al/nagios/etc/objects/timeperiods.cfg
/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/localhost.cfg /usr/local
nagios/etc/objects/localhost.cfg
/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/windows.cfg /usr/local/n
agios/etc/objects/windows.cfg
/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/printer.cfg /usr/local/n
agios/etc/objects/printer.cfg
/bin/install -c -b -m 664 -o nagios -g nagios sample-config/template-object/switch.cfg /usr/local/n
agios/etc/objects/switch.cfg

*** Config files installed ***

Remember, these are *SAMPLE* config files. You'll need to read
the documentation for more information on how to actually define
services, hosts, etc. to fit your particular needs.

[root@mlb-dcl-centos7 nagios-4.5.1]#

```

Figure 1.1. 12 : (make-install-config)

```

[root@mlb-dcl-centos7 nagios-4.5.1]# make install-webconf
/bin/install -c -m 644 sample-config/httpd.conf /etc/httpd/conf.d/nagios.conf
if [ 0 -eq 1 ]; then \
    ln -s /etc/httpd/conf.d/nagios.conf /etc/apache2/sites-enabled/nagios.conf; \
fi

*** Nagios/Apache conf file installed ***

[root@mlb-dcl-centos7 nagios-4.5.1]# _

```

Figure 1.1. 13 : (make-install-config)

```

[root@mlb-dcl-centos7 nagios-4.5.1]# make install-exfoliation

*** Exfoliation theme installed ***
NOTE: Use 'make install-classicui' to revert to classic Nagios theme

[root@mlb-dcl-centos7 nagios-4.5.1]#

```

Figure 1.1. 14 : (make install -exfoliation)

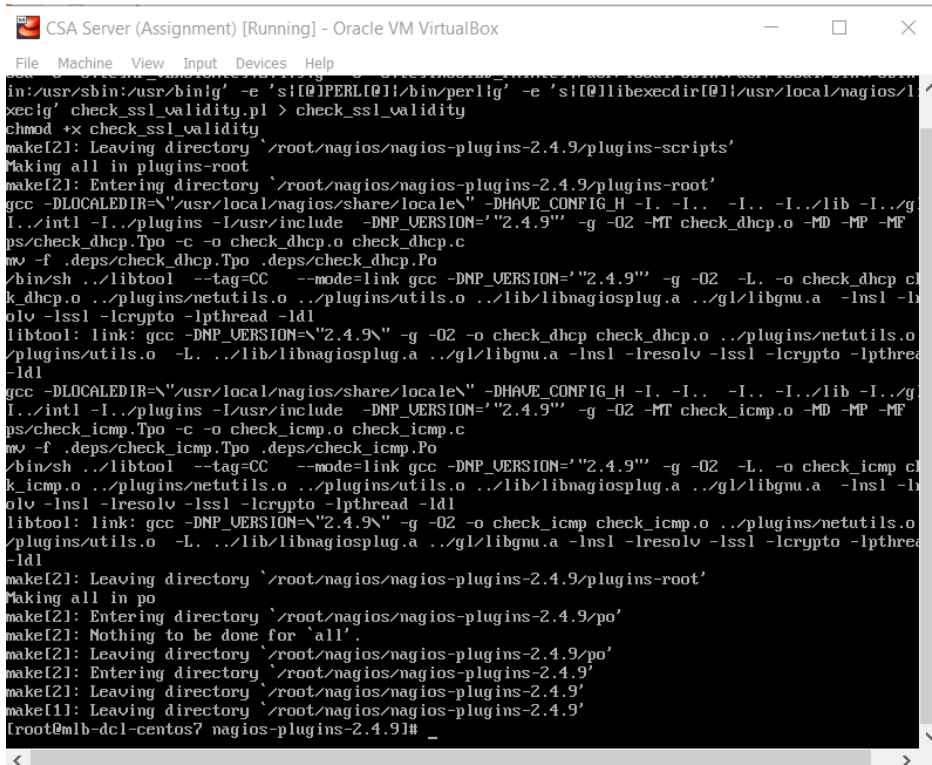
```

[root@mlb-dcl-centos7 nagios-4.5.1]# make install-classicui

*** Classic theme installed ***
NOTE: Use 'make install-exfoliation' to use new Nagios theme

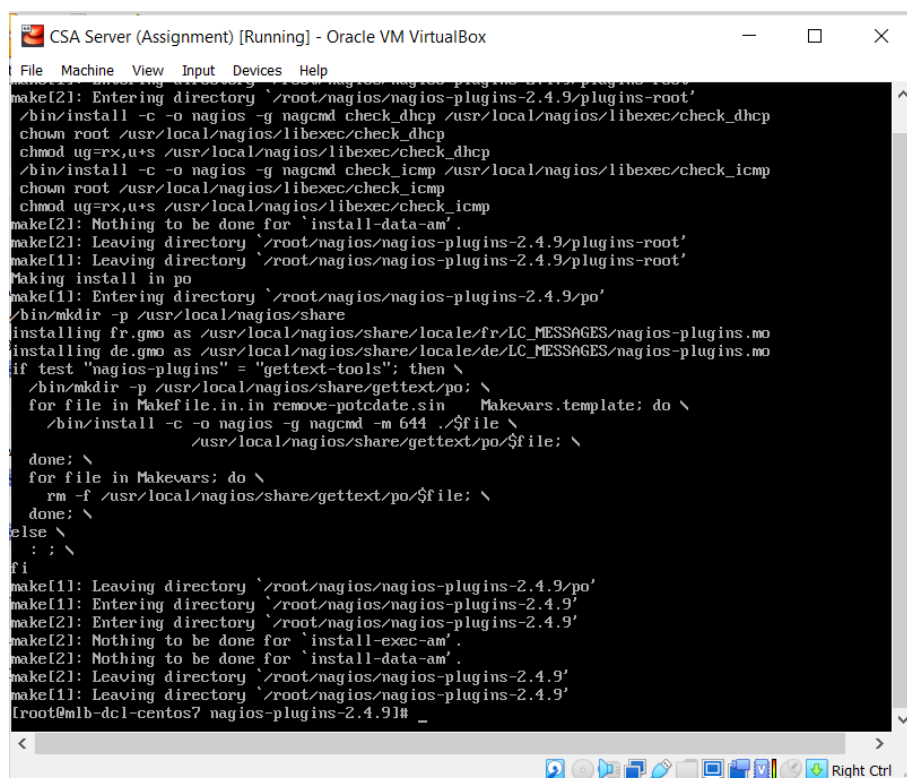
```

Figure 1.1. 15 : (make install-classicui)



```
in:/usr/sbin:/usr/bin:/usr/bin/perl' -e 's![@!PERL!@!bin/perl!g' -e 's![@!libexecdir!@!usr/local/nagios/libexec!g' > check_ssl_validity
chmod +x check_ssl_validity
make[Z1]: Leaving directory '/root/nagios/nagios-plugins-2.4.9/plugins-scripts'
Making all in plugins-root
make[Z1]: Entering directory '/root/nagios/nagios-plugins-2.4.9/plugins-root'
gcc -DLOCALEDIR=\"/usr/local/nagios/share/locale\" -DHAVE_CONFIG_H -I. -I.. -I../lib -I../glib -I../intl -I../plugins -I/usr/include -DNP_VERSION=\"2.4.9\" -g -O2 -MT check_dhcp.o -MD -MP -MF .deps/check_dhcp.Tpo -c -o check_dhcp.o check_dhcp.c
mv -f .deps/check_dhcp.Tpo .deps/check_dhcp.Po
/bin/sh ../libtool --tag=CC --mode=link gcc -DNP_VERSION=\"2.4.9\" -g -O2 -L. -o check_dhcp check_dhcp.o ../plugins/netutils.o ../plugins/utills.o ../lib/libnagiosplug.a ../gl/libgnu.a -lnsl -lresolv -lssl -lcrypto -lpthread -ldl
libtool: link: gcc -DNP_VERSION=\"2.4.9\" -g -O2 -o check_dhcp check_dhcp.o ../plugins/netutils.o ../plugins/utills.o -L. -L../lib/libnagiosplug.a -L../gl/libgnu.a -lnsl -lresolv -lssl -lcrypto -lpthread -ldl
gcc -DLOCALEDIR=\"/usr/local/nagios/share/locale\" -DHAVE_CONFIG_H -I. -I.. -I../lib -I../glib -I../intl -I../plugins -I/usr/include -DNP_VERSION=\"2.4.9\" -g -O2 -MT check_icmp.o -MD -MP -MF .deps/check_icmp.Tpo -c -o check_icmp.o check_icmp.c
mv -f .deps/check_icmp.Tpo .deps/check_icmp.Po
/bin/sh ../libtool --tag=CC --mode=link gcc -DNP_VERSION=\"2.4.9\" -g -O2 -L. -o check_icmp check_icmp.o ../plugins/netutils.o ../plugins/utills.o ../lib/libnagiosplug.a ../gl/libgnu.a -lnsl -lresolv -lssl -lcrypto -lpthread -ldl
libtool: link: gcc -DNP_VERSION=\"2.4.9\" -g -O2 -o check_icmp check_icmp.o ../plugins/netutils.o ../plugins/utills.o -L. -L../lib/libnagiosplug.a -L../gl/libgnu.a -lnsl -lresolv -lssl -lcrypto -lpthread -ldl
make[Z1]: Leaving directory '/root/nagios/nagios-plugins-2.4.9/plugins-root'
Making all in po
make[Z1]: Entering directory '/root/nagios/nagios-plugins-2.4.9/po'
make[Z1]: Nothing to be done for 'all'.
make[Z1]: Leaving directory '/root/nagios/nagios-plugins-2.4.9/po'
make[Z1]: Entering directory '/root/nagios/nagios-plugins-2.4.9'
make[Z1]: Leaving directory '/root/nagios/nagios-plugins-2.4.9'
make[1]: Leaving directory '/root/nagios/nagios-plugins-2.4.9'
[root@mlb-dcl-centos7 nagios-plugins-2.4.9]#
```

Figure 1.1. 19 : (make)



```
make[Z1]: Entering directory '/root/nagios/nagios-plugins-2.4.9/plugins-root'
/bin/install -c -o nagios -g nagcmd check_dhcp /usr/local/nagios/libexec/check_dhcp
chown root /usr/local/nagios/libexec/check_dhcp
chmod ug=rx,u+s /usr/local/nagios/libexec/check_dhcp
/bin/install -c -o nagios -g nagcmd check_icmp /usr/local/nagios/libexec/check_icmp
chown root /usr/local/nagios/libexec/check_icmp
chmod ug=rx,u+s /usr/local/nagios/libexec/check_icmp
make[Z1]: Nothing to be done for 'install-data-am'.
make[Z1]: Leaving directory '/root/nagios/nagios-plugins-2.4.9/plugins-root'
make[1]: Leaving directory '/root/nagios/nagios-plugins-2.4.9/plugins-root'
Making install in po
make[1]: Entering directory '/root/nagios/nagios-plugins-2.4.9/po'
/bin/mkdir -p /usr/local/nagios/share
installing fr.gmo as /usr/local/nagios/share/locale/fr/LC_MESSAGES/nagios-plugins.mo
installing de.gmo as /usr/local/nagios/share/locale/de/LC_MESSAGES/nagios-plugins.mo
if test "nagios-plugins" = "gettext-tools"; then \
  /bin/mkdir -p /usr/local/nagios/share/gettext/po; \
  for file in Makefile.in.in remove-potcdate.sin Makevars.template; do \
    /bin/install -c -o nagios -g nagcmd -m 644 ./.$file \
      /usr/local/nagios/share/gettext/po/$file; \
  done; \
  for file in Makevars; do \
    rm -f /usr/local/nagios/share/gettext/po/$file; \
  done; \
else \
  :; \
fi
make[1]: Leaving directory '/root/nagios/nagios-plugins-2.4.9/po'
make[1]: Entering directory '/root/nagios/nagios-plugins-2.4.9'
make[Z1]: Entering directory '/root/nagios/nagios-plugins-2.4.9'
make[Z1]: Nothing to be done for 'install-exec-am'.
make[Z1]: Nothing to be done for 'install-data-am'.
make[Z1]: Leaving directory '/root/nagios/nagios-plugins-2.4.9'
make[1]: Leaving directory '/root/nagios/nagios-plugins-2.4.9'
[root@mlb-dcl-centos7 nagios-plugins-2.4.9]#
```

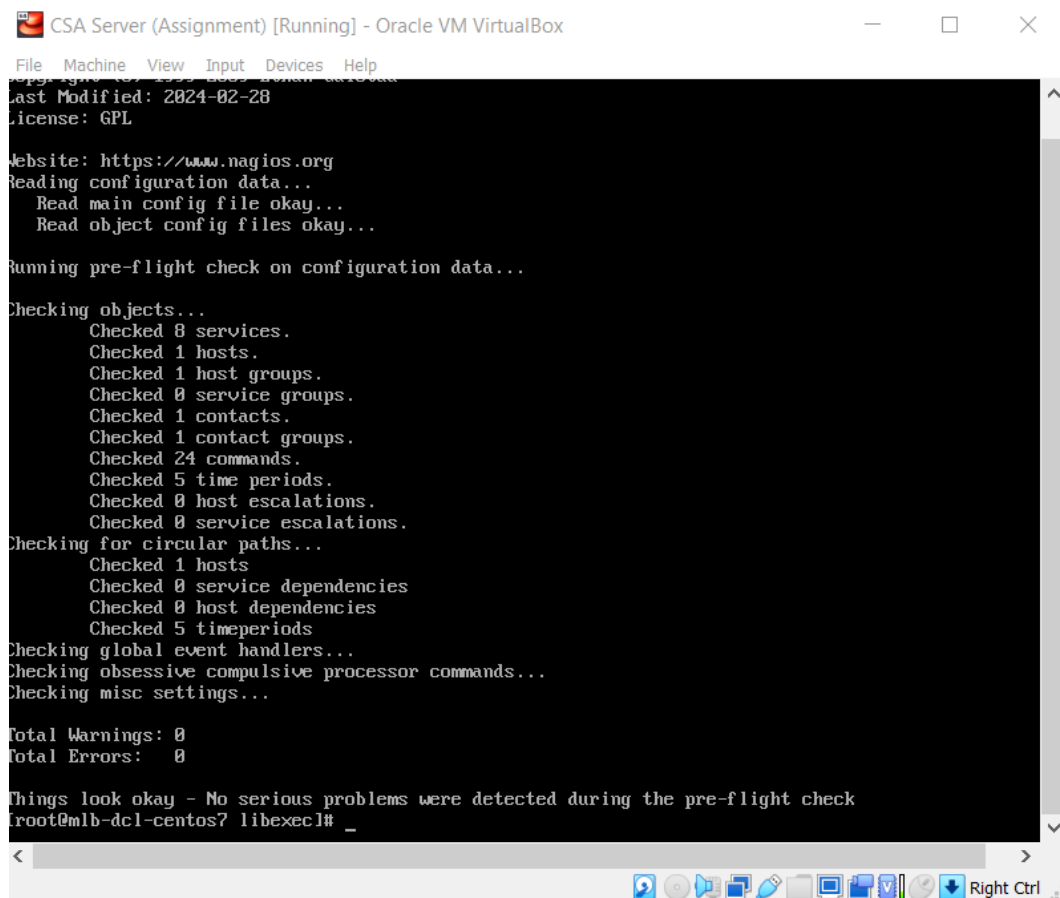
Figure 1.1. 20 : (make-install)

```

[root@mlb-dcl-centos? nagios-plugins-2.4.9]# cd /usr/local/nagios/libexec/
[root@mlb-dcl-centos? libexec]# ls
check_apt      check_ftp      check_mailq    check_ping     check_tcp
check_breeze   check_http     check_mrtg     check_pop      check_time
check_by_ssh   check_icmp     check_mrtgtraf check_procs     check_udp
check_clamd    check_ide_smart check_nagios    check_real     check_ups
check_cluster  check_ifoperstatus check_nntp     check_rpc      check_uptime
check_dhcp     check_ifstatus  check_nntp     check_sensors  check_users
check_dig      check_imap     check_nt       check_simap    check_wave
check_disk     check_ircd     check_ntp      check_smtp     eventhandlers
check_disk_smb check_jabber    check_ntp_peer check_spop     negate
check_dns      check_ldap     check_ntp_time check_ssh       remove_perfdata
check_dummy    check_ldaps    check_nwstat   check_ssl_validity urlize
check_file_age check_load     check_oracle   check_ssmtp    utils.pm
check_flexlm   check_log      check_overcr   check_swap     utils.sh

```

Figure 1.1. 21 : libexec list



```

CSA Server (Assignment) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Last Modified: 2024-02-28
License: GPL

Website: https://www.nagios.org
Reading configuration data...
  Read main config file okay...
  Read object config files okay...

Running pre-flight check on configuration data...

Checking objects...
  Checked 8 services.
  Checked 1 hosts.
  Checked 1 host groups.
  Checked 0 service groups.
  Checked 1 contacts.
  Checked 1 contact groups.
  Checked 24 commands.
  Checked 5 time periods.
  Checked 0 host escalations.
  Checked 0 service escalations.

Checking for circular paths...
  Checked 1 hosts
  Checked 0 service dependencies
  Checked 0 host dependencies
  Checked 5 timeperiods

Checking global event handlers...
Checking obsessive compulsive processor commands...
Checking misc settings...

Total Warnings: 0
Total Errors: 0

Things look okay - No serious problems were detected during the pre-flight check
libexec1# _

```

Figure 1.1. 22 : Summary

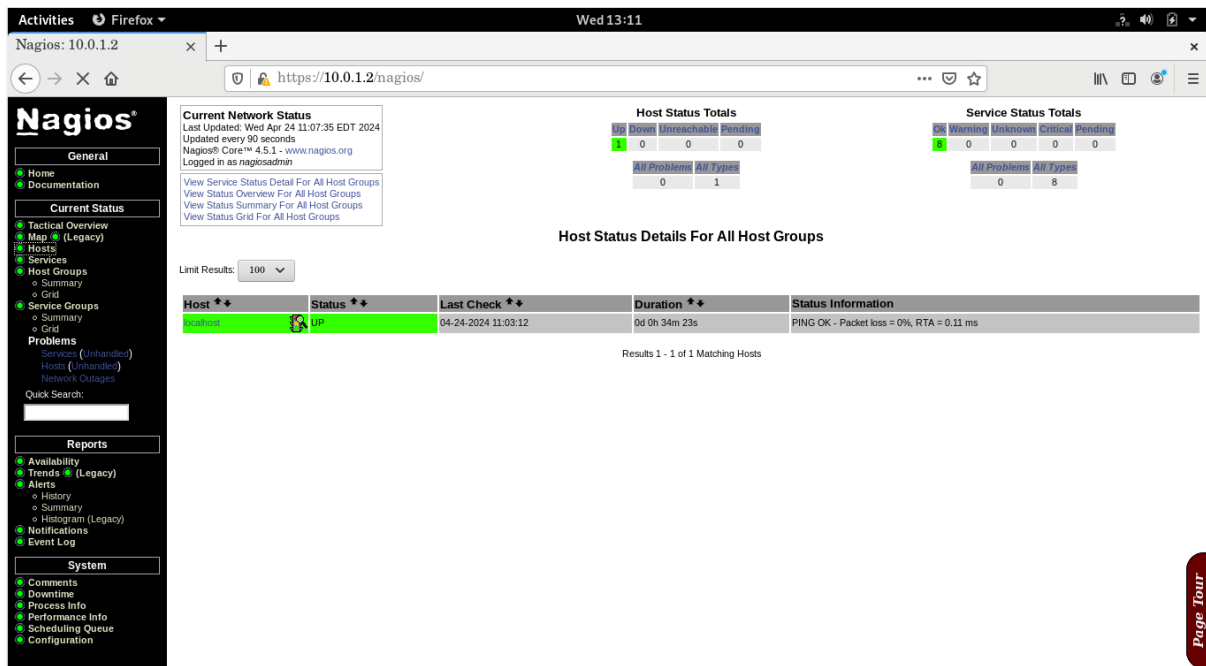


Figure 1.1. 23 : nagios- localhost

```

damitha@mlb-dc1-fedora:~
File Edit View Search Terminal Help
Install 1 Package

Total download size: 125 k
Installed size: 283 k
Is this ok [y/N]: y
Downloading Packages:
xinetd-2.3.15-27.fc29.x86_64.rpm                99 kB/s | 125 kB    00:01
-----
Total                                         57 kB/s | 125 kB    00:02
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing      :                                1/1
  Installing     : xinetd-2:2.3.15-27.fc29.x86_64 1/1
  Running scriptlet: xinetd-2:2.3.15-27.fc29.x86_64 1/1
  Verifying      : xinetd-2:2.3.15-27.fc29.x86_64 1/1

Installed:
  xinetd-2:2.3.15-27.fc29.x86_64

Complete!
[damitha@mlb-dc1-fedora ~]$

```

Figure 1.1. 24 : Install xinetd

```
damitha@mlb-dc1-fedora:~/nagios x
File Edit View Search Terminal Help
ctor_id=0&key_id=0&repo_id=16119653&response-content-disposition=attachment%3B%20filename%3Dnrpe-4.0.3.tar.gz&response-content-type=application%2Foctet-stream [following]
--2024-04-25 02:27:12-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/16119653/32805a80-896b-11ea-905e-de706cd33ff1?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAVCODYLSA53PQK4ZA%2F20240425%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20240425T062711Z&X-Amz-Expires=300&X-Amz-Signature=7601a8a23568c9071709e5458ec484bb1fcd00e9f66a5b94a9b72e359d2ab841&X-Amz-Signature=host&actor_id=0&key_id=0&repo_id=16119653&response-content-disposition=attachment%3B%20filename%3Dnrpe-4.0.3.tar.gz&response-content-type=application%2Foctet-stream
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.111.133, 185.199.110.133, 185.199.109.133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)|185.199.111.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 524160 (512K) [application/octet-stream]
Saving to: 'nrpe-4.0.3.tar.gz'

nrpe-4.0.3.tar.gz  100%[=====>] 511.88K  925KB/s  in 0.6s
2024-04-25 02:27:13 (925 KB/s) - 'nrpe-4.0.3.tar.gz' saved [524160/524160]
```

Figure 1.1. 26 : Install nrpe

```
damitha@mlb-dc1-fedora:~/nagios/nrpe-4.0.3 x
File Edit View Search Terminal Help
config.status: creating startup/solaris-inetd.xml
config.status: creating startup/tmpfile.conf
config.status: creating startup/upstart-init
config.status: creating startup/rh-upstart-init
config.status: creating include/common.h
config.status: creating include/config.h

*** Configuration summary for nrpe 4.0.3 2020-04-28 ***:

General Options:
-----
NRPE port:      5666
NRPE user:      nagios
NRPE group:     nagios
Nagios user:    nagios
Nagios group:   nagios

Review the options above for accuracy.  If they look okay,
type 'make all' to compile the NRPE daemon and client
or type 'make' to get a list of make options.

[root@mlb-dc1-fedora nrpe-4.0.3]#
```

Figure 1.1. 25 : (./configure)

```

[root@mlb-dc1-fedora nrpe-4.0.3]# make all
cd ./src/; make
make[1]: Entering directory '/root/nagios/nrpe-4.0.3/src'
gcc -g -O2 -DHAVE_CONFIG_H -I ../include -I ../../include -o nrpe ./nrpe.c ./utils.c ./acl.c -lssl -lcrypto
gcc -g -O2 -DHAVE_CONFIG_H -I ../include -I ../../include -o check_nrpe ./check_nrpe.c ./utils.c -lssl -lcrypto
make[1]: Leaving directory '/root/nagios/nrpe-4.0.3/src'

*** Compile finished ***

You can now continue with the installation or upgrade process.

Read the PDF documentation (docs/NRPE.pdf) for information on the next
steps you should take to complete the installation or upgrade.

[root@mlb-dc1-fedora nrpe-4.0.3]#

```

Figure 1.1. 27 : (make-all)

```

damitha@mlb-dc1-fedora:~/nagios/nrpe-4.0.3
File Edit View Search Terminal Help
[root@mlb-dc1-fedora nrpe-4.0.3]# make install
cd ./src/; make install
make[1]: Entering directory '/root/nagios/nrpe-4.0.3/src'
make install-plugin
make[2]: Entering directory '/root/nagios/nrpe-4.0.3/src'
/usr/bin/install -c -m 755 -d /usr/local/nagios/bin
/usr/bin/install -c -m 755 ../uninstall /usr/local/nagios/bin/nrpe-uninstall
/usr/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/libexec
/usr/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/libexec
/usr/bin/install -c -m 775 -o nagios -g nagios check_nrpe /usr/local/nagios/libexec
make[2]: Leaving directory '/root/nagios/nrpe-4.0.3/src'
make install-daemon
make[2]: Entering directory '/root/nagios/nrpe-4.0.3/src'
/usr/bin/install -c -m 755 -d /usr/local/nagios/bin
/usr/bin/install -c -m 755 ../uninstall /usr/local/nagios/bin/nrpe-uninstall
/usr/bin/install -c -m 755 nrpe /usr/local/nagios/bin
/usr/bin/install -c -m 755 -d /usr/lib/tmpfiles.d
/usr/bin/install -c -m 644 ../startup/tmpfile.conf /usr/lib/tmpfiles.d/nrpe.conf
make[2]: Leaving directory '/root/nagios/nrpe-4.0.3/src'
make[1]: Leaving directory '/root/nagios/nrpe-4.0.3/src'
[root@mlb-dc1-fedora nrpe-4.0.3]# make install-config
/usr/bin/install -c -m 775 -o nagios -g nagios -d /usr/local/nagios/etc
/usr/bin/install -c -m 644 -o nagios -g nagios sample-config/nrpe.cfg /usr/local/nagios/etc
[root@mlb-dc1-fedora nrpe-4.0.3]#

```

Figure 1.1. 28 : (make-install)

```

[root@mlb-dc1-fedora nrpe-4.0.3]# make install-init
/usr/bin/install -c -m 644 startup/default-service /usr/lib/systemd/system/nrpe.service

```

Figure 1.1. 29 : (make-init)

```

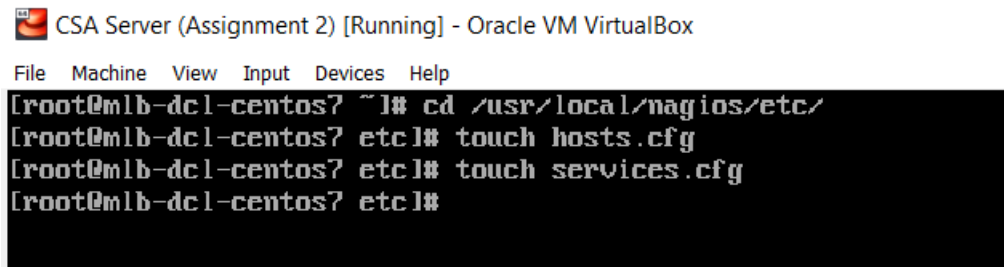
[root@mlb-dc1-fedora nrpe-4.0.3]# systemctl enable nrpe.service
Created symlink /etc/systemd/system/multi-user.target.wants/nrpe.service → /usr/lib/systemd/system/nrpe.service.
[root@mlb-dc1-fedora nrpe-4.0.3]# systemctl start nrpe.service
[root@mlb-dc1-fedora nrpe-4.0.3]# systemctl status nrpe.service
● nrpe.service - Nagios Remote Plugin Executor
   Loaded: loaded (/usr/lib/systemd/system/nrpe.service; enabled; vendor preset: disabled)
   Active: active (running) since Thu 2024-04-25 04:18:42 EDT; 10s ago
     Docs: http://www.nagios.org/documentation
  Main PID: 306 (nrpe)
    Tasks: 1 (limit: 2345)
   Memory: 780.0K
    CGroup: /system.slice/nrpe.service
            └─306 /usr/local/nagios/bin/nrpe -c /usr/local/nagios/etc/nrpe.cfg -f

Apr 25 04:18:42 mlb-dc1-fedora.csa.lk systemd[1]: Started Nagios Remote Plugin Executor.
Apr 25 04:18:43 mlb-dc1-fedora.csa.lk nrpe[306]: Starting up daemon
Apr 25 04:18:43 mlb-dc1-fedora.csa.lk nrpe[306]: Server listening on 0.0.0.0 port 5666.
Apr 25 04:18:43 mlb-dc1-fedora.csa.lk nrpe[306]: Server listening on :: port 5666.
Apr 25 04:18:43 mlb-dc1-fedora.csa.lk nrpe[306]: Listening for connections on port 5666
Apr 25 04:18:43 mlb-dc1-fedora.csa.lk nrpe[306]: Allowing connections from: 127.0.0.1,::1
[root@mlb-dc1-fedora nrpe-4.0.3]#

```

Figure 1.1. 30 : nrpe status

1.2



```
CSA Server (Assignment 2) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
[root@mlb-dcl-centos? ~]# cd /usr/local/nagios/etc/
[root@mlb-dcl-centos? etc]# touch hosts.cfg
[root@mlb-dcl-centos? etc]# touch services.cfg
[root@mlb-dcl-centos? etc]#
```

Figure 1.2. 1 : create hosts.cfg file and services.cfg file



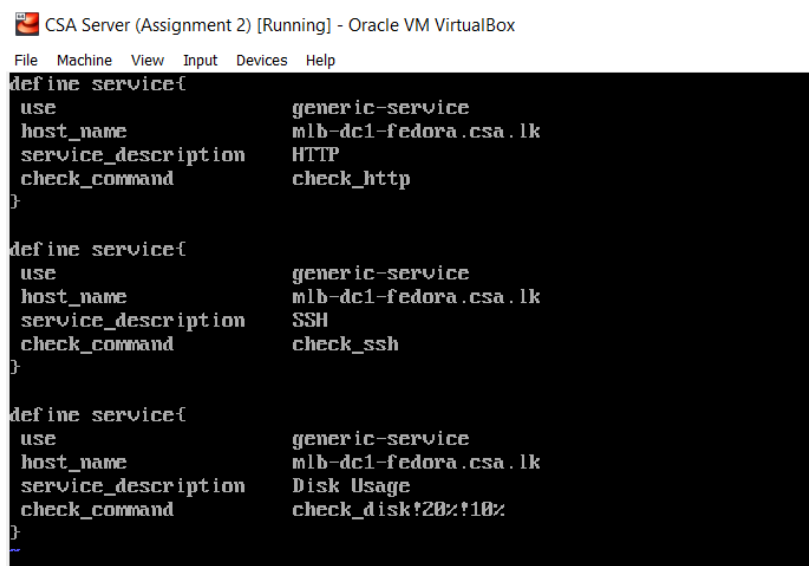
```
cfg_file=/usr/local/nagios/etc/hosts.cfg
cfg_file=/usr/local/nagios/etc/services.cfg
"nagios.cfg" 1380L, 45928C written
[root@mlb-dcl-centos? etc]#
```

Figure 1.2. 2 : directive specifies the path to a configuration file



```
CSA Server (Assignment 2) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
define host {
use          generic-host
host_name    mlb-dcl-fedora.csa.lk
alias        fedora-client
address      10.0.1.3
max_check_attempts 10
check_interval 1
}
```

Figure 1.2. 4 :defining host



```
CSA Server (Assignment 2) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
define service{
use          generic-service
host_name    mlb-dcl-fedora.csa.lk
service_description HTTP
check_command check_http
}

define service{
use          generic-service
host_name    mlb-dcl-fedora.csa.lk
service_description SSH
check_command check_ssh
}

define service{
use          generic-service
host_name    mlb-dcl-fedora.csa.lk
service_description Disk Usage
check_command check_disk%20%?10%?
```

Figure 1.2. 3 : defining services

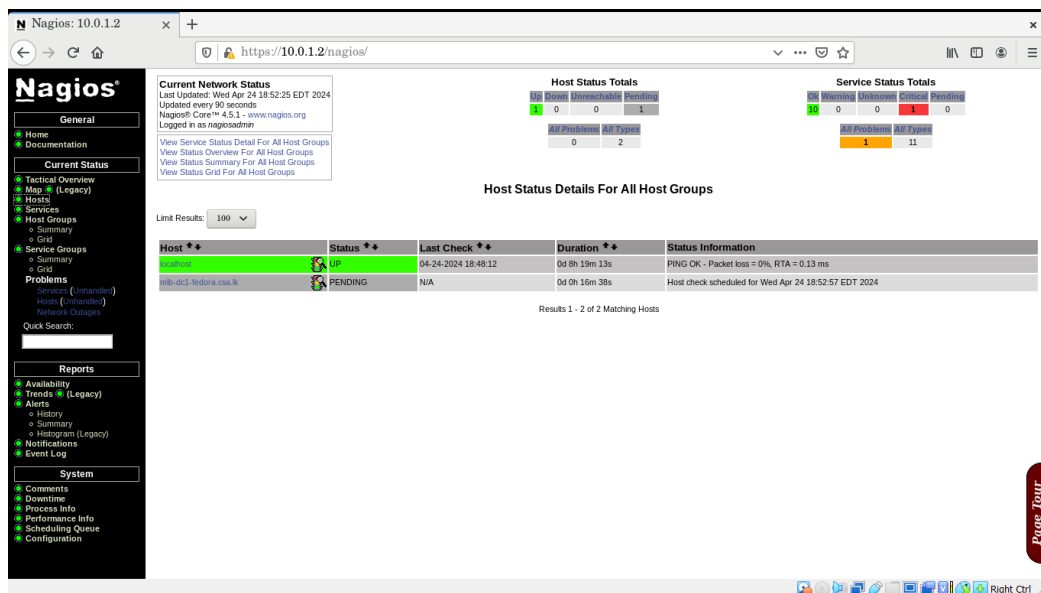


Figure 1.2. 5 : new host in nagios

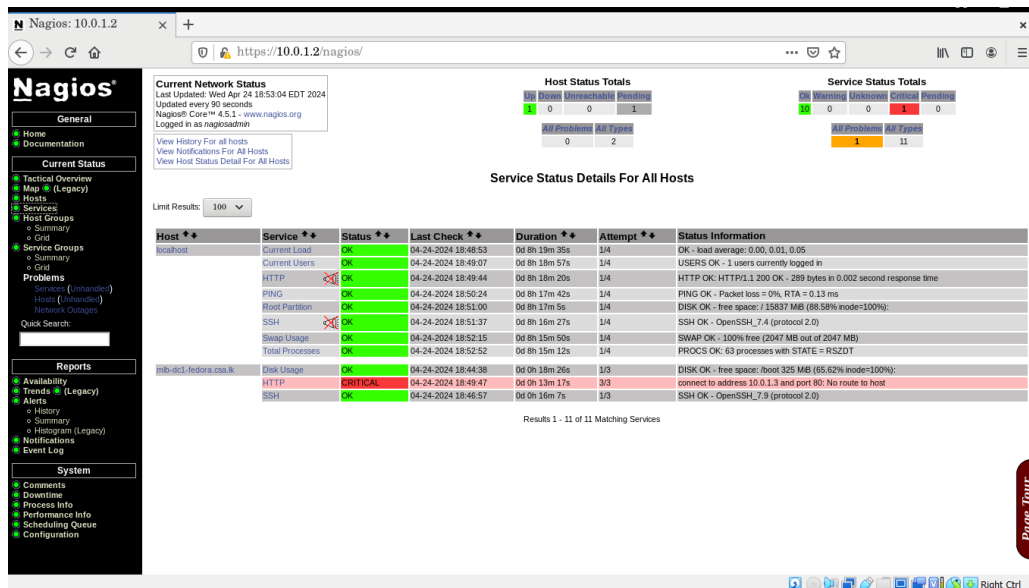


Figure 1.2. 6 : new services in nagios

```
}

define service{
    use                generic-service
    host_name          mlb-dc1-fedora.csa.lk
    service_description Disk Usage
    check_command       check_disk
}

define service {
    use                generic-service
    host_name          mlb-dc1-fedora.csa.lk
    service_description CPU Usage
    check_command       check_nrpe!check_cpu_usage
}

define service {
    use                generic-service
    host_name          mlb-dc1-fedora.csa.lk
    service_description Memory Usage
    check_command       check_nrpe!check_memory_usage
}

define service {
    use                generic-service
    host_name          mlb-dc1-fedora.csa.lk
    service_description Disk Space
    check_command       check_nrpe!check_disk_space
}

define service{
    use                generic-service
    host_name          mlb-dc1-fedora.csa.lk
    service_description Network Connectivity
    check_command       check_ping!-H 10.0.1.3
}
```

Figure 1.3. 2 : Implement metrics

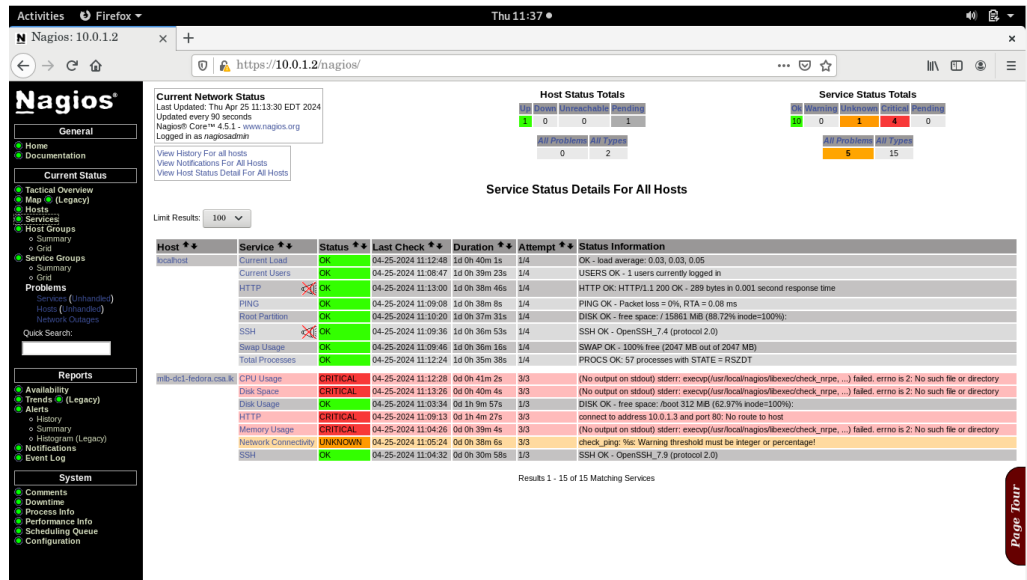


Figure 1.3. 1 : metrics in nagios

2) Part 2: DNS Caching Setup with CentOS Server and Fedora Clients

2.1

```
[root@mlb-dcl-centos7 ~]# yum install bind bind-utils -y
Loaded plugins: fastestmirror
Determining fastest mirrors
 * base: mirror.kku.ac.th
 * extras: mirror.kku.ac.th
 * updates: mirror.kku.ac.th
base                                                    | 3.6 kB  00:00:00
extras                                                  | 2.9 kB  00:00:00
updates                                                 | 2.9 kB  00:00:00
Package 32:bind-9.11.4-26.P2.el7_9.15.x86_64 already installed and latest version
Package 32:bind-utils-9.11.4-26.P2.el7_9.15.x86_64 already installed and latest version
Nothing to do
[root@mlb-dcl-centos7 ~]# _
```

Figure 2.1. 1 : install bind

```
[root@mlb-dcl-centos7 ~]# systemctl enable named
Created symlink from /etc/systemd/system/multi-user.target.wants/named.service to /usr/lib/systemd/system/named.service.
[root@mlb-dcl-centos7 ~]# systemctl start named
[root@mlb-dcl-centos7 ~]# systemctl status named
■ named.service - Berkeley Internet Name Domain (DNS)
   Loaded: loaded (/usr/lib/systemd/system/named.service; enabled; vendor preset: disabled)
   Active: active (running) since Fri 2024-04-26 04:06:33 EDT; 15s ago
     Process: 1664 ExecStart=/usr/sbin/named -u named -c ${NAMEDCONF} $OPTIONS (code=exited, status=0/SUCCESS)
     Process: 1661 ExecStartPre=/bin/bash -c if [ ! "${DISABLE_ZONE_CHECKING}" == "yes" ]; then /usr/sbin/named-checkconf -z "${NAMEDCONF}"; else echo "Checking of zone files is disabled"; fi (code=exited, status=0/SUCCESS)
    Main PID: 1666 (named)
      CGroup: /system.slice/named.service
              └─1666 /usr/sbin/named -u named -c /etc/named.conf

Apr 26 04:06:33 mlb-dcl-centos7.csa.lk named[1666]: network unreachable resolving 'ns1.dreamhos...53
Apr 26 04:06:33 mlb-dcl-centos7.csa.lk named[1666]: network unreachable resolving 'ns1.dreamhos...53
Apr 26 04:06:33 mlb-dcl-centos7.csa.lk named[1666]: network unreachable resolving 'ns1.dreamhos...53
Apr 26 04:06:33 mlb-dcl-centos7.csa.lk named[1666]: network unreachable resolving 'ns1.dreamhos...53
Apr 26 04:06:33 mlb-dcl-centos7.csa.lk named[1666]: network unreachable resolving 'ns1.dreamhos...53
Apr 26 04:06:33 mlb-dcl-centos7.csa.lk named[1666]: network unreachable resolving 'ns3.dreamhos...53
Apr 26 04:06:33 mlb-dcl-centos7.csa.lk named[1666]: network unreachable resolving 'ns2.dreamhos...53
Apr 26 04:06:33 mlb-dcl-centos7.csa.lk named[1666]: network unreachable resolving 'ns3.dreamhos...53
Apr 26 04:06:33 mlb-dcl-centos7.csa.lk named[1666]: network unreachable resolving 'ns2.dreamhos...53
Hint: Some lines were ellipsized, use -l to show in full.
[root@mlb-dcl-centos7 ~]# _
```

Figure 2.1. 2 : enable status

```

// See /usr/share/doc/bind*/sample/ for example named configuration files.
//
// See the BIND Administrator's Reference Manual (ARM) for details about the
// configuration located in /usr/share/doc/bind-(version)/Bv9ARM.html

options {
    listen-on port 53 { 127.0.0.1; 10.0.1.2; };
    listen-on-v6 port 53 { ::1; };
    directory      "/var/named";
    dump-file       "/var/named/data/cache_dump.db";
    statistics-file "/var/named/data/named_stats.txt";
    memstatistics-file "/var/named/data/named_mem_stats.txt";
    recursing-file  "/var/named/data/named.recursing";
    secroots-file   "/var/named/data/named.secroots";
    allow-query     { localhost; 10.0.1.0/24; };

    /*
     - If you are building an AUTHORITATIVE DNS server, do NOT enable recursion.
     - If you are building a RECURSIVE (caching) DNS server, you need to enable
       recursion.
     - If your recursive DNS server has a public IP address, you MUST enable access
       control to limit queries to your legitimate users. Failing to do so will
       cause your server to become part of large scale DNS amplification
       attacks. Implementing BCP38 within your network would greatly
       reduce such attack surface
    */
    recursion yes;

    dnssec-enable yes;
    dnssec-validation yes;

    /* Path to ISC DLV key */
    bindkeys-file "/etc/named.root.key";

    managed-keys-directory "/var/named/dynamic";

```

Figure 2.1. 3 : named configuration file

2.2

```
[root@mlb-dcl-centos7 ~]# dig google.co.in

; <<>> DiG 9.11.4-P2-RedHat-9.11.4-26.P2.el7_9.15 <<>> google.co.in
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 57693
;; flags: qr rd ra: QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:: udp: 4096
;; QUESTION SECTION:
;google.co.in.                IN      A

;; ANSWER SECTION:
google.co.in.                84      IN      A      142.250.192.67

;; Query time: 39 msec
;; SERVER: 192.168.8.1#53(192.168.8.1)
;; WHEN: Fri Apr 26 04:10:04 EDT 2024
;; MSG SIZE rcvd: 57
```

Figure 2.2. 1 : query time - 1

```
[root@mlb-dcl-centos7 ~]# dig google.co.in

; <<>> DiG 9.11.4-P2-RedHat-9.11.4-26.P2.el7_9.15 <<>> google.co.in
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 157
;; flags: qr rd ra: QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:: udp: 4096
;; QUESTION SECTION:
;google.co.in.                IN      A

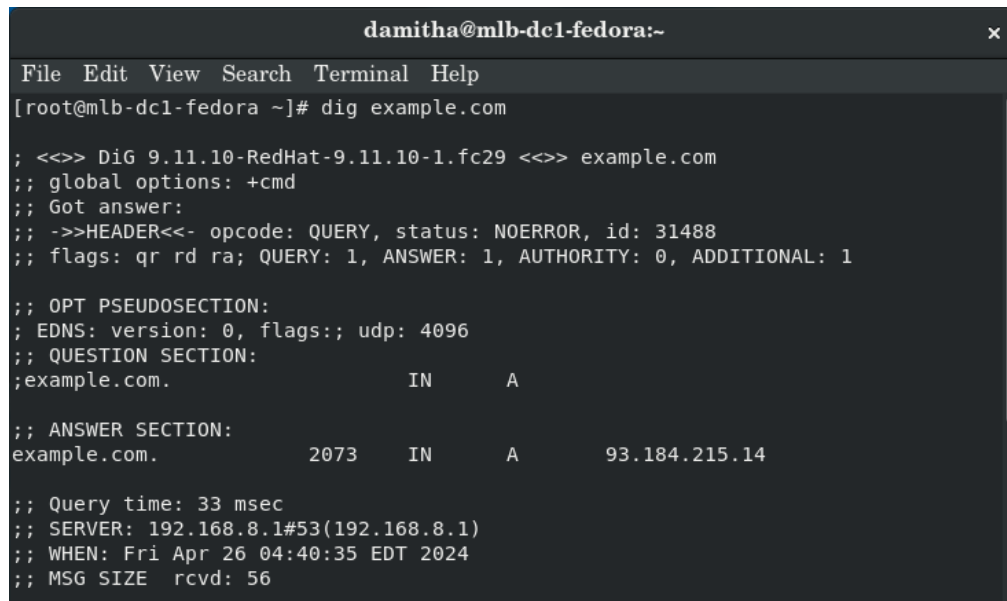
;; ANSWER SECTION:
google.co.in.                49      IN      A      142.250.192.67

;; Query time: 4 msec
;; SERVER: 192.168.8.1#53(192.168.8.1)
;; WHEN: Fri Apr 26 04:10:38 EDT 2024
;; MSG SIZE rcvd: 57

[root@mlb-dcl-centos7 ~]#
```

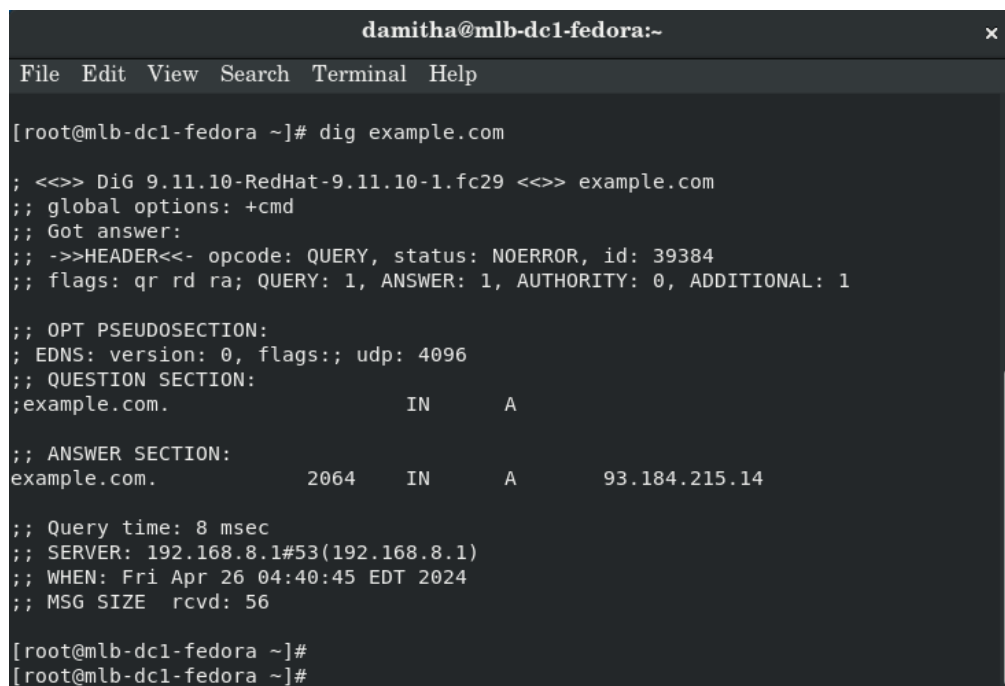
Figure 2.2. 2 : query time -2

2.3



```
damitha@mlb-dcl-fedora:~  
File Edit View Search Terminal Help  
[root@mlb-dcl-fedora ~]# dig example.com  
  
; <<>> DiG 9.11.10-RedHat-9.11.10-1.fc29 <<>> example.com  
;; global options: +cmd  
;; Got answer:  
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 31488  
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1  
  
;; OPT PSEUDOSECTION:  
; EDNS: version: 0, flags:; udp: 4096  
;; QUESTION SECTION:  
example.com.                IN      A  
  
;; ANSWER SECTION:  
example.com.                2073    IN      A      93.184.215.14  
  
;; Query time: 33 msec  
;; SERVER: 192.168.8.1#53(192.168.8.1)  
;; WHEN: Fri Apr 26 04:40:35 EDT 2024  
;; MSG SIZE  rcvd: 56
```

Figure 2.3. 1 : query time - 1



```
damitha@mlb-dcl-fedora:~  
File Edit View Search Terminal Help  
[root@mlb-dcl-fedora ~]# dig example.com  
  
; <<>> DiG 9.11.10-RedHat-9.11.10-1.fc29 <<>> example.com  
;; global options: +cmd  
;; Got answer:  
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 39384  
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1  
  
;; OPT PSEUDOSECTION:  
; EDNS: version: 0, flags:; udp: 4096  
;; QUESTION SECTION:  
example.com.                IN      A  
  
;; ANSWER SECTION:  
example.com.                2064    IN      A      93.184.215.14  
  
;; Query time: 8 msec  
;; SERVER: 192.168.8.1#53(192.168.8.1)  
;; WHEN: Fri Apr 26 04:40:45 EDT 2024  
;; MSG SIZE  rcvd: 56  
  
[root@mlb-dcl-fedora ~]#  
[root@mlb-dcl-fedora ~]#
```

Figure 2.3. 2 : query time - 2