



# SLIIT

COMPUTING | BUSINESS | ENGINEERING

**Sri Lanka Institute of Information  
Technology**  
**Year 3 – Semester 1**

---

## Practical 04 – Install and configure DNS-Part-01

---

Main objective of this lab is to equip the students with knowledge on how to install and configure a DNS server in a Linux environment. In parallel students will gain knowledge on using yum install to install a package in Linux.

### DNS

DNS is the naming service provided by the Internet for TCP/IP networks. It was developed so that machines on the network could be identified with common names instead of Internet addresses. DNS performs naming between hosts within your local administrative domain and across domain boundaries.

The collection of networked machines that use DNS are referred to as the **DNS namespace**. The DNS namespace can be divided into a hierarchy of **domains**. A DNS domain is a group of machines. Each domain is supported by two or more **name servers**, a principal server and one or more secondary servers. Each server implements DNS by running a daemon called `in.named`. On the client's side, DNS is implemented through the “resolver.” The resolver's function is to resolve users' queries. It queries a name server, which then returns either the requested information or a referral to another server.

### /etc Files

The original host-based UNIX naming system was developed for standalone UNIX machines and then adapted for network use. Many old UNIX operating systems and machines still use this system, but it is not well suited for large complex networks.

### STEP 01-----

- 1) Stop any running service

```
[root@me tmp]#service dhcpd stop
```

or

```
[root@me tmp]#service <service_name> stop
```

- 2) Set VMware network settings to vmnet2-Host\_only and make your server IP settings to obtain IP address manually.

```
IPADDRESS = 10.0.1.5  
NETMASK=255.255.255.0  
GATEWAY=10.0.1.1
```

- 3) Restart the network service

*Note: You should have a look at your IP address.*

## STEP 02-----

- 4) Open a terminal.
- 5) Provide root privileges to the session.
- 6) Use the **hostname** command, what is the hostname of the machine?

```
[root@me tmp]# hostname
```

- 7) Use the **hostname -f** or **hostname --fqdn** command to view the Fully Qualified Domain Name of the machine. What is the hostname of the machine?

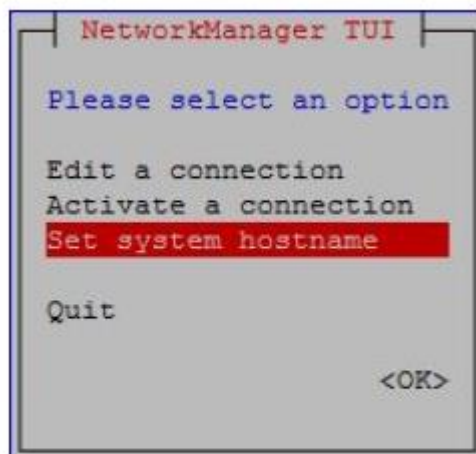
```
[root@me tmp]# hostname -f
```

```
[root@me tmp]# hostname --fqdn
```

*Note:*

*What is a FQDN ? What do you think about your student domain login? Do you have a FQDN?*

- 8) It is required to change the current machine domain in to [csa.lk](http://csa.lk)
- 9) **nmtui tool:**  
Network Management tool is used to set the static host name in /etc/hostname file.



**nmtui -Select Set HostName**

- 10) Set the host name



### **nmtui – Change HostName 2**

- 11) restart the hostnamed to force the hostnamectl to notice the change in static host name.

```
[root@localhost ~]# systemctl restart systemd-hostnamed
```

- 12) You can verify the change in host name.

```
[root@server ~]# hostname
mlb-dcl-centos7.csa.lk
[root@server ~]# cat /etc/hostname
mlb-dcl-centos7.csa.lk
[root@server ~]# cat /etc/sysconfig/network
# Created by anaconda
HOSTNAME= mlb-dcl-centos7.csa.lk
```

- 13) Again use the **hostname -f** or **hostname --fqdn** command to view the Fully Qualified Domain Name of the machine. What is the hostname of the machine now?

```
[root@me tmp]# hostname -f
```

```
[root@me tmp]# hostname --fqdn
```

- 14) Open the file **hosts** under the file **/etc**

```
[root@me tmp]# vi /etc/hosts
```

*Note:*

*What is this so called **hosts** file? When do you use it?*

- 15) Edit the **hosts** file as follows;

```
127.0.0.1  localhost localhost.localdomain localhost4 localhost4.localdomain4
::1       localhost localhost.localdomain localhost6 localhost6.localdomain6
10.0.1.5  mlb-dcl-centos7.csa.lk
```

- 16) Again use the **hostname -f** or **hostname --fqdn** command to view the Fully Qualified Domain Name of the machine. What is the hostname of the machine now?

```
[root@me tmp]# hostname -f
```

```
[root@me tmp]# hostname --fqdn
```

17) Reboot your machine to make this changes in to an effect.

## STEP 03-----

18) Stop any running service

```
[root@me tmp]#service dhcpd stop
```

or

```
[root@me tmp]#service <service_name> stop
```

19) Set VMware network settings to vmnet8-NAT and make your server IP settings to obtain IP address automatically.

20) Restart the network service

*Note: You should have a look at your IP address to check whether the IP is within the network range defined by vmnet8-NAT configured DHCP server.*

*\*\*Ignore if you are using a manual DHCP Server*

21) Again use the **hostname -f** or **hostname --fqdn** command to view the Fully Qualified Domain Name of the machine. Has it changed?

```
[root@me tmp]# hostname -s
```

```
mlb-dc1-centos7
```

```
[root@me tmp]# hostname --fqdn
```

```
mlb-dc1-centos7.csa.lk
```

22) Open the **resolv.conf** file under **/etc** folder and look inside

```
[root@me tmp]# cat /etc/resolv.conf
```

```
nameserver 127.0.0.1
```

```
search mlb-dc1-centos7.csa.lk
```

*Note:*

*The resolver is a set of routines that provide access to the Internet Domain Name System. See resolver(3RESOLV). resolv.conf is a configuration file that contains the information that is read by the resolver routines the first time they are invoked by a process. The file is designed to be human readable and contains a list of keywords with values that provide various types of resolver information.*

*The resolv.conf file contains the following configuration directives:*

*nameserver*

*Specifies the Internet address in dot-notation format of a name server that the resolver is to query. Up to MAXNS name servers may be listed, one per keyword. See <resolv.h>. If there are multiple servers, the resolver library queries them in the order listed. If no name server entries are present, the resolver library queries the name server on the local machine. The resolver library follows the algorithm to try a name server until the query times out. It then tries the the name servers that follow, until each query times out. It repeats all the name servers until a maximum number of retries are made.*

*domain*

*Specifies the local domain name. Most queries for names within this domain can use short names relative to the local domain. If no domain entry is present, the domain is determined from sysinfo(2) or from gethostname(3C). (Everything after the first '.' is presumed to be the domain name.) If the host name does not contain a domain part, the root domain is assumed. You can use the LOCALDOMAIN environment variable to override the domain name.*

*search*

*The search list for host name lookup. The search list is normally determined from the local domain name. By default, it contains only the local domain name. You can change the default behavior by listing the desired domain search path following the search keyword, with spaces or tabs separating the names. Most resolver queries will be attempted using each component of the search path in turn until a match is found. This process may be slow and will generate a lot of network traffic if the servers for the listed domains are not local. Queries will time out if no server is available for one of the domains.*

*The search list is currently limited to six domains and a total of 256 characters.*

## STEP 04-----

- 23) Open a terminal.
- 24) Provide root privileges to the session.
- 25) Use the **ping** command and perform a querying to existing internet domains.

```
[root@me tmp]# ping google.lk
```

```
[root@me tmp]# ping yahoo.com
```

- 26) To install DNS server on CentOS 6.5, enter the following command:

```
$ yum install -y bind*
```

*Note:*

*If it indicate that the command cannot be executed and a process is currently blocking the operation.*

- *Stop the warning messages into the terminal. (Ctrl+C)*
- *Kill the process*

- *BIND is the most popular freely available domain name server*

## STEP 05-----

27) Set VMware network settings to vmnet2-Host\_only and make your server IP settings to obtain IP address manually.

**IPADDRESS = 10.0.1.5**  
**NETMASK=255.255.255.0**  
**GATEWAY=10.0.1.1**

28) Restart the network service

*Note: You should have a look at your IP address.*

## STEP 06-----

29) **named** is the Domain Name Service name here.

30) Check the status of the named service by using the following command.

```
[root@me tmp]# service named status
```

*What is the status of the **named** service?*

31) Start the service up

```
[root@me tmp]# service named start
```

32) Check the status now.

*Note:*

*Remember that you haven't configured the server yet. You are just running the dns server.  
What is this **rndc.key** in **etc** folder?*

## STEP 07-----

33) Open the configuration files of the dns server.

```
[root@me tmp]# vi /etc/named.conf
```

34) Read the file and try to understand the coding.

```
//  
// named.conf  
//  
// Provided by Red Hat bind package to configure the ISC BIND named(8) DNS  
// server as a caching only nameserver (as a localhost DNS resolver only).  
//  
// See /usr/share/doc/bind*/sample/ for example named configuration files.  
//
```

```

options {
    listen-on port 53 { 127.0.0.1; };
    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";
    allow-query   { localhost; };
    recursion yes;

    dnssec-enable yes;
    dnssec-validation yes;
    dnssec-lookaside auto;

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

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

logging {
    channel default_debug {
        file "data/named.run";
        severity dynamic;
    };
};

zone "." IN {
    type hint;
    file "named.ca";
};

include "/etc/named.rfc1912.zones";
include "/etc/named.root.key";

```

The **named.conf** file is a collection of statements using nested options surrounded by opening and closing ellipse characters, { }. Administrators must be careful when editing **named.conf** to avoid syntactical errors as many seemingly minor errors will prevent the named service from starting

**listen-on port 53 { 127.0.0.1; }; # PRIMARY Bind DNS IP Address and listing port**

*Note:*

*Specifies the network interface on which named listens for queries. By default, all interfaces are used. Using this directive on a DNS server which also acts a gateway, BIND can be configured to only answer queries that originate from one of the networks.*

*What is the listening port number of the dns server?*

*Why use this port number?*

*Why does the DNS server need a listening port in the first place?*

*Do you think the IP address should change?*

```
listen-on-v6 port 53 { ::1; };
```

*Note:*

*What is the difference between the previous listening declaration and this one?*

```
directory "/var/named";
```

*Note:*

*Specifies the named working directory if different from the default value, [/var/named/](#).*

```
allow-query { localhost; };
```

*Note:*

*Specifies which hosts are allowed to query this nameserver. By default, all hosts are allowed to query. An access control list, or collection of IP addresses or networks may be used here to only allow particular hosts to query the nameserver.*

*Does anything needed to be changed?*

*How are you going to allow query from your network?*

## **dnssec**

*Note:*

*The Domain Name System Security Extensions (DNSSEC) is a suite of Internet Engineering Task Force (IETF) specifications for securing certain kinds of information provided by the Domain Name System (DNS) as used on Internet Protocol (IP) networks. It is a set of extensions to DNS which provide to DNS clients (resolvers) origin authentication of DNS data, authenticated denial of existence, and data integrity, but not availability or confidentiality.*

```
zone "." IN {  
    type hint;  
    file "named.ca";  
};
```

*Note:*

*A zone statement defines the characteristics of a zone such as the location of its configuration file and zone-specific options. This statement can be used to override the global options statements.*

- a. allow-query — Specifies the clients that are allowed to request information about this zone. The default is to allow all query requests.*
- b. file — Specifies the name of the file in the named working directory that contains the zone's configuration data.*
- c. type — Defines the type of zone. Below is a list of valid options:*



- i. *forward* — *Forwards all requests for information about this zone to other nameservers.*
- ii. *hint* — *A special type of zone used to point to the root nameservers which resolve queries when a zone is not otherwise known. No configuration beyond the default is necessary with a hint zone.*
- iii. *master* — *Designates the nameserver as authoritative for this zone. A zone should be set as the master if the zone's configuration files reside on the system.*
- iv. *slave* — *Designates the nameserver as a slave server for this zone. Also specifies the IP address of the master nameserver for the zone.*

## **STEP 08 – DO THIS BY YOUR SELF-----**

35) Try to specify two zones. One forward look up zone. One reverse lookup zone.

36) Try to start a service using the GUI options available.

\*\*\*\*\*Refer Domain Name.docx for more details