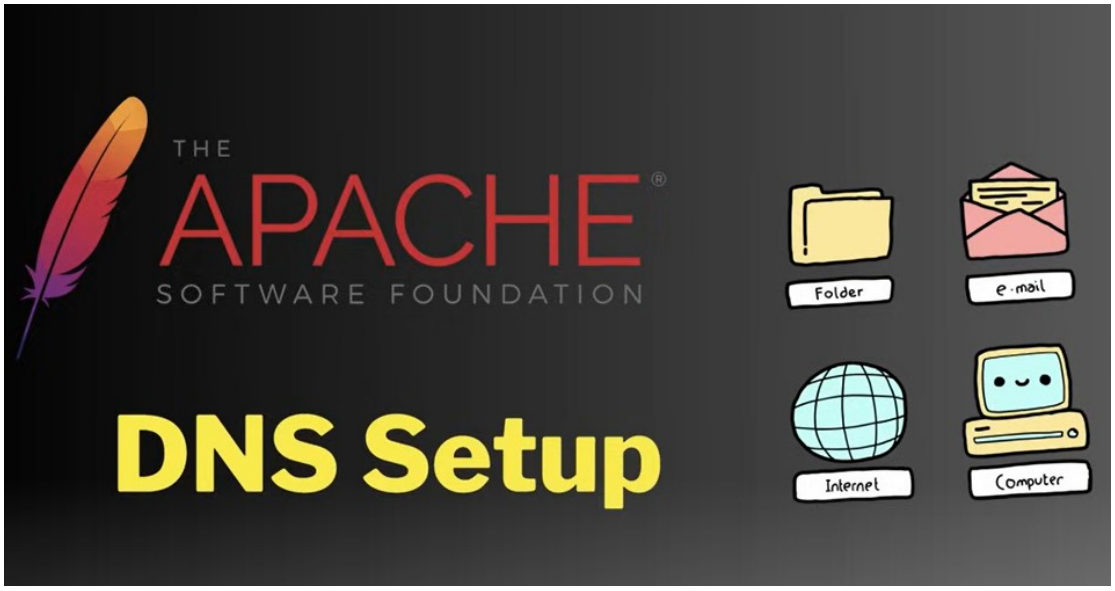
Ultimate DNS Server & Apache Setup Guide with Custom Domain | DNS Config with Example



Dive into the essentials of setting up an Apache HTTPD web server and configuring a DNS server for your custom domain in this complete tutorial. I'll guide you through the process of installing and configuring Apache HTTPD, crafting a simple example webpage, and then setting up a BIND DNS server to manage www.mywebapp.com. Perfect for beginners and intermediate users looking to gain practical experience in web and DNS server management.

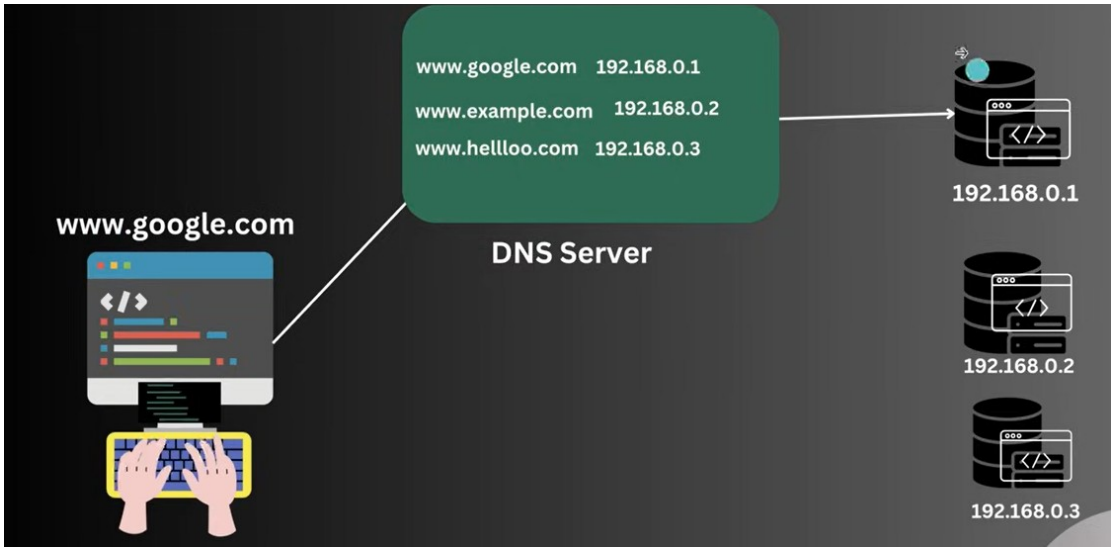
Link for slides: https://www.canva.com/design/DAGDzGS2...

Topics Covered

- Lap setup: Virtual Machine with Centos OS
- Setup Apache webserver (HTTPD) with our custom webpage
- Setup DNS Server on our machine
- Bind Package, Named Service
- Firewall Enable
- DNS config changes
  named.conf and zone files
- Access our website with our own custom domain name i.e. www.mywebpage.com

HTTP Daemon is a software program that runs in the background of a web server and waits for the incoming server requests.
The daemon answers the request automatically and serves the hypertext and multimedia documents over the Internet using HTTP.

DNS, or Domain Name System, is the internet service that translates human-friendly domain names like www.example.com into machine-readable IP addresses.



Installation (CentOS or RedHAT)

Package we need to install

- sudo yum install httpd
- systemctl start/stop/status httpd (httpd is the process or service name)

Enable the Service in Firewall

firewall-cmd --add-service=http --permanent
firewall-cmd --reload

Webserver config file under

- /var/www/html/index.html
- /etc/httpd/conf/httpd.conf

```
[root@centos02 ~]#
[root@centos02 ~]# yum install httpd
```

```
root@centos02:~
 httpd                  aarch64     2.4.57-8.el9      appstream      47 k
Installing dependencies:
 apr                    aarch64     1.7.0-12.el9      appstream     119 k
 apr-util               aarch64     1.6.1-23.el9      appstream      96 k
 apr-util-bdb           aarch64     1.6.1-23.el9      appstream      13 k
 centos-logos-httpd     noarch      90.4-1.el9        appstream     252 k
 httpd-core             aarch64     2.4.57-8.el9      appstream     1.5 M
 httpd-filesystem       noarch      2.4.57-8.el9      appstream      13 k
 httpd-tools            aarch64     2.4.57-8.el9      appstream      82 k
Installing weak dependencies:
 apr-util-openssl       aarch64     1.6.1-23.el9      appstream      15 k
 mod_http2              aarch64     2.0.26-1.el9      appstream     158 k
 mod_lua                aarch64     2.4.57-8.el9      appstream      58 k

Transaction Summary
================================================================================
Install  11 Packages

Total download size: 2.3 M
Installed size: 11 M
Is this ok [y/N]: y
```

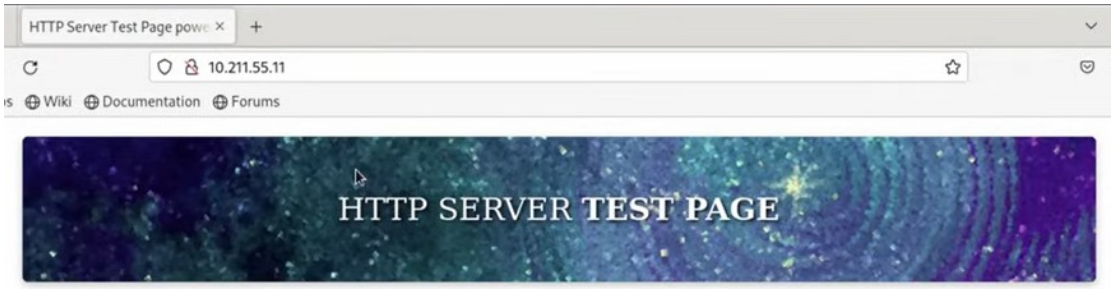
```
  Verifying        : httpd-core-2.4.57-8.el9.aarch64                  7/11
  Verifying        : httpd-filesystem-2.4.57-8.el9.noarch             8/11
  Verifying        : httpd-tools-2.4.57-8.el9.aarch64                 9/11
  Verifying        : mod_http2-2.0.26-1.el9.aarch64                  10/11
  Verifying        : mod_lua-2.4.57-8.el9.aarch64                    11/11

Installed:
  apr-1.7.0-12.el9.aarch64
  apr-util-1.6.1-23.el9.aarch64
  apr-util-bdb-1.6.1-23.el9.aarch64
  apr-util-openssl-1.6.1-23.el9.aarch64
  centos-logos-httpd-90.4-1.el9.noarch
  httpd-2.4.57-8.el9.aarch64
  httpd-core-2.4.57-8.el9.aarch64
  httpd-filesystem-2.4.57-8.el9.noarch
  httpd-tools-2.4.57-8.el9.aarch64
  mod_http2-2.0.26-1.el9.aarch64
  mod_lua-2.4.57-8.el9.aarch64

Complete!
[root@centos02 ~]#
```

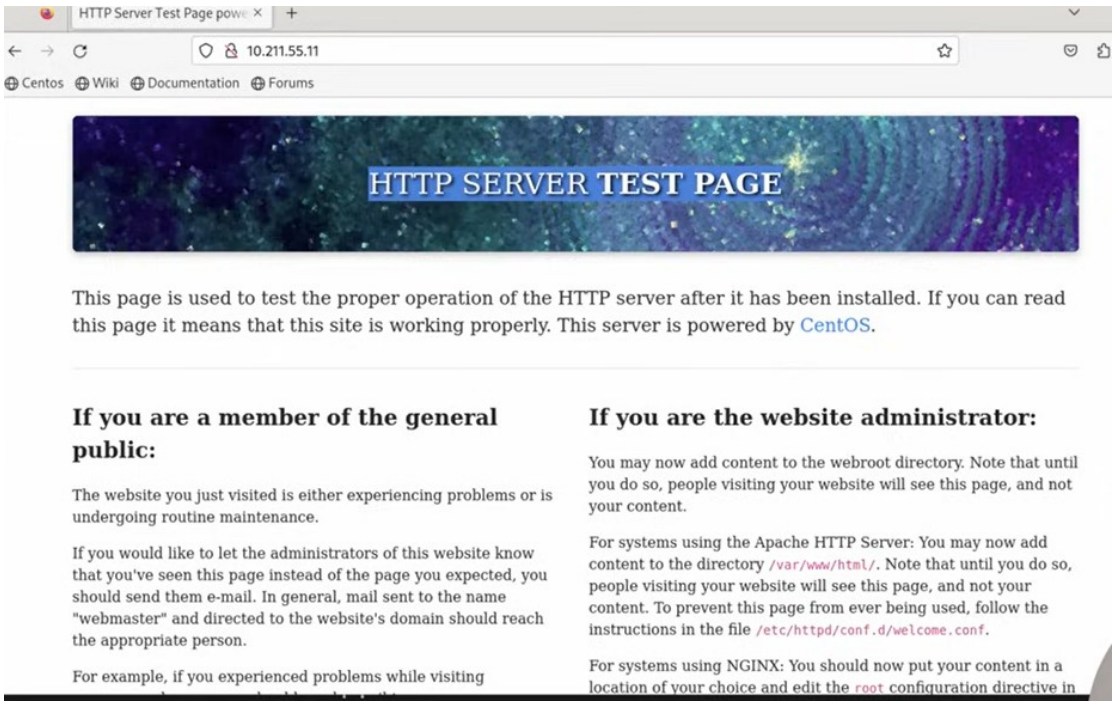
```
[root@centos02 ~]#
[root@centos02 ~]# systemctl start httpd.service
[root@centos02 ~]# systemctl status httpd.service
```

```
● httpd.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; pre>
     Active: active (running) since Mon 2024-04-29 21:59:05 IST; 8s ago
       Docs: man:httpd.service(8)
   Main PID: 4344 (httpd)
     Status: "Started, listening on: port 80"
      Tasks: 177 (limit: 10121)
     Memory: 15.5M
        CPU: 61ms
     CGroup: /system.slice/httpd.service
             ├─4344 /usr/sbin/httpd -DFOREGROUND
             ├─4345 /usr/sbin/httpd -DFOREGROUND
             ├─4346 /usr/sbin/httpd -DFOREGROUND
             ├─4347 /usr/sbin/httpd -DFOREGROUND
             └─4348 /usr/sbin/httpd -DFOREGROUND

Apr 29 21:59:05 centos02 systemd[1]: Starting The Apache HTTP S
Apr 29 21:59:05 centos02 httpd[4344]: AH00558: httpd: Could not
Apr 29 21:59:05 centos02 systemd[1]: Started The Apache HTTP Se
Apr 29 21:59:05 centos02 httpd[4344]: Server configured, listen
lines 1-20
```

 # SERVER -IP

```
[root@centos02 ~]# ifconfig
docker0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.17.0.1  netmask 255.255.0.0  broadcast 172.17.255.255
        ether 02:42:9a:ad:53:79  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

enp0s5: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.211.55.11  netmask 255.255.255.0  broadcast 10.211.55.255
        inet6 fdb2:2c26:f4e4:0:21c:42ff:fecc:bdee  prefixlen 64  scopeid 0
x0<global>
        inet6 fe80::21c:42ff:fecc:bdee  prefixlen 64  scopeid 0x20<link>
        ether 00:1c:42:cc:bd:ee  txqueuelen 1000  (Ethernet)
        RX packets 6118  bytes 3136036 (2.9 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 3332  bytes 318158 (310.7 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions
```





Setup Our Personal Webpage

Installation (CentOS or RedHAT)

Package we need to install

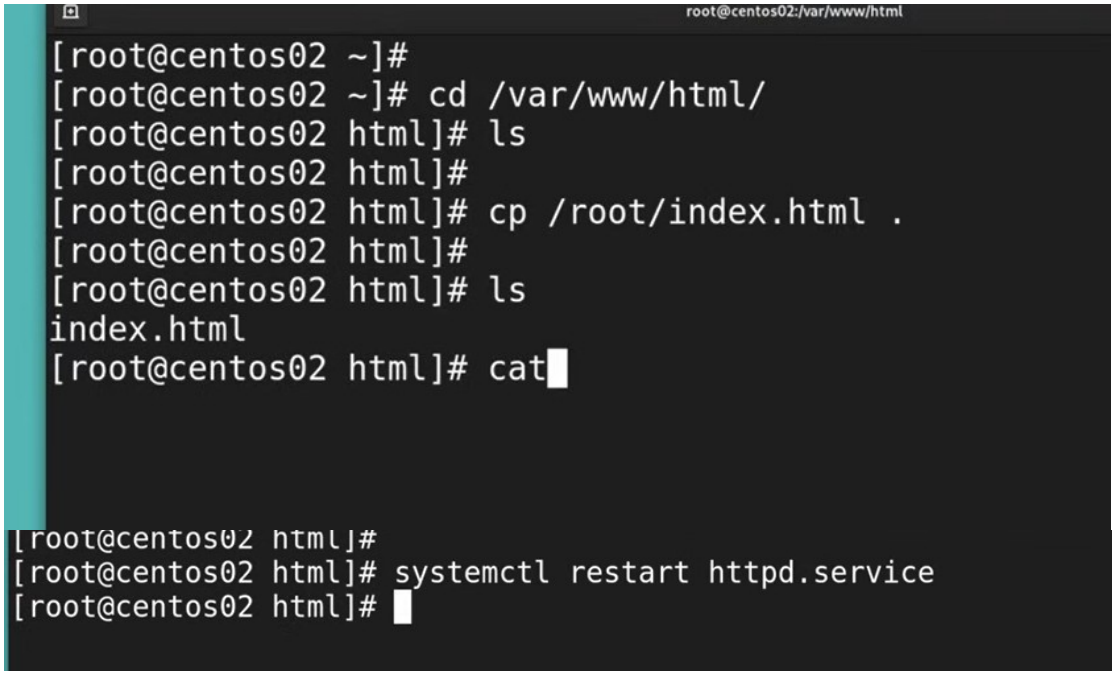
- sudo yum install httpd
- systemctl start/stop/status httpd (httpd is the process or service name)

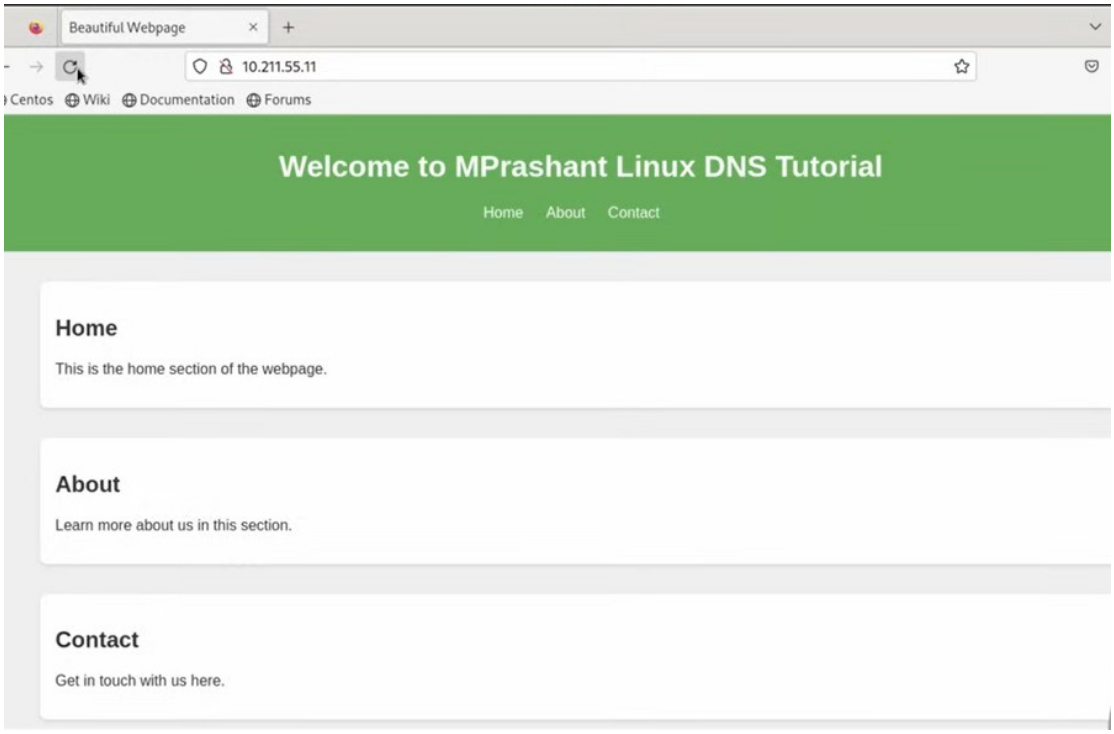
Enable the Service in Firewall

```
firewall-cmd --add-service=http --permanent
firewall-cmd --reload
```

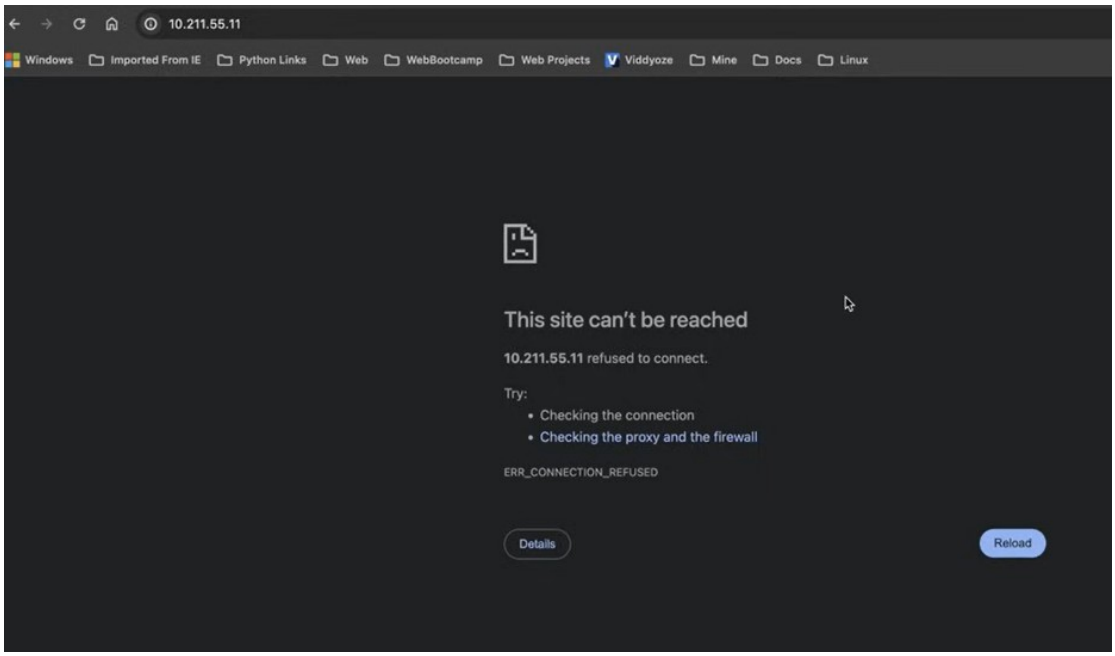
Webserver config file under

- /var/www/html/index.html
- /etc/httpd/conf/httpd.conf



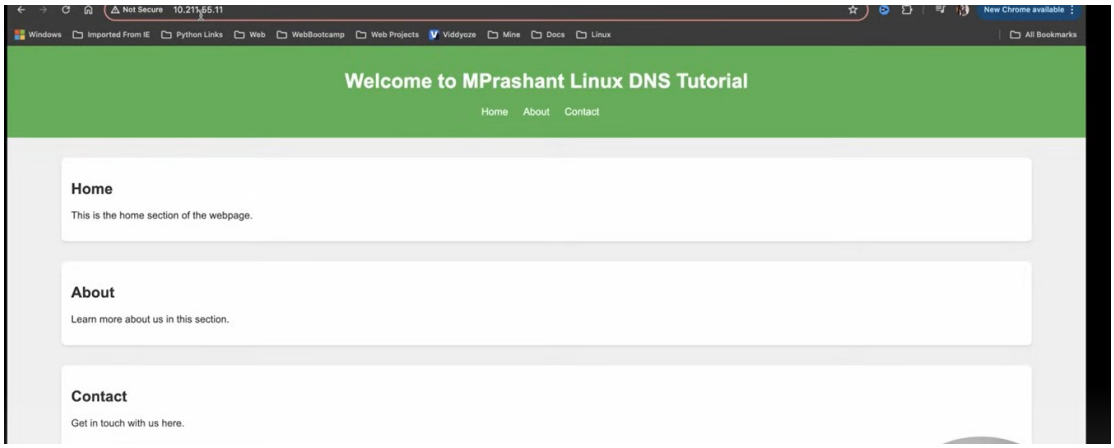


now Locate this address / browse in Chrome / Mozilla

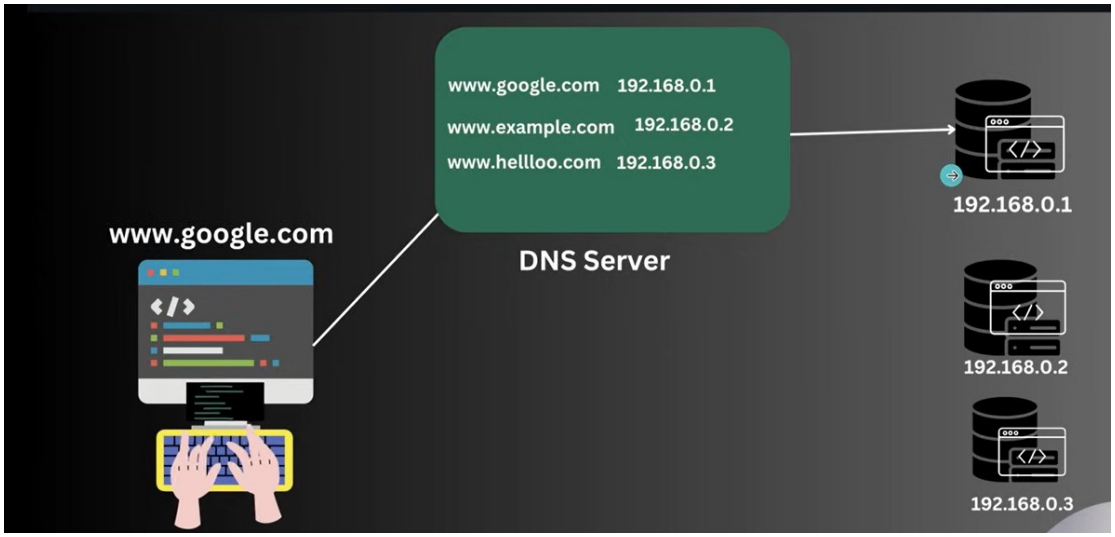


Enable Firewall For HTTP Service

```
[root@centos02 html]# firewall-cmd --add-service=http --permanent
success
[root@centos02 html]# firewall-cmd --reload
success
[root@centos02 html]#
```



Setting up DNS SERVER



Installation (CentOS or RedHAT)

Package we need to install for the DNS is BIND (Berkeley Internet Name Domain)

- sudo yum install bind bind-utils
- systemctl start/stop/status named (named is the process or service name)

Enable the Service in Firewall

```
firewall-cmd --add-service=dns --permanent
firewall-cmd --reload
```

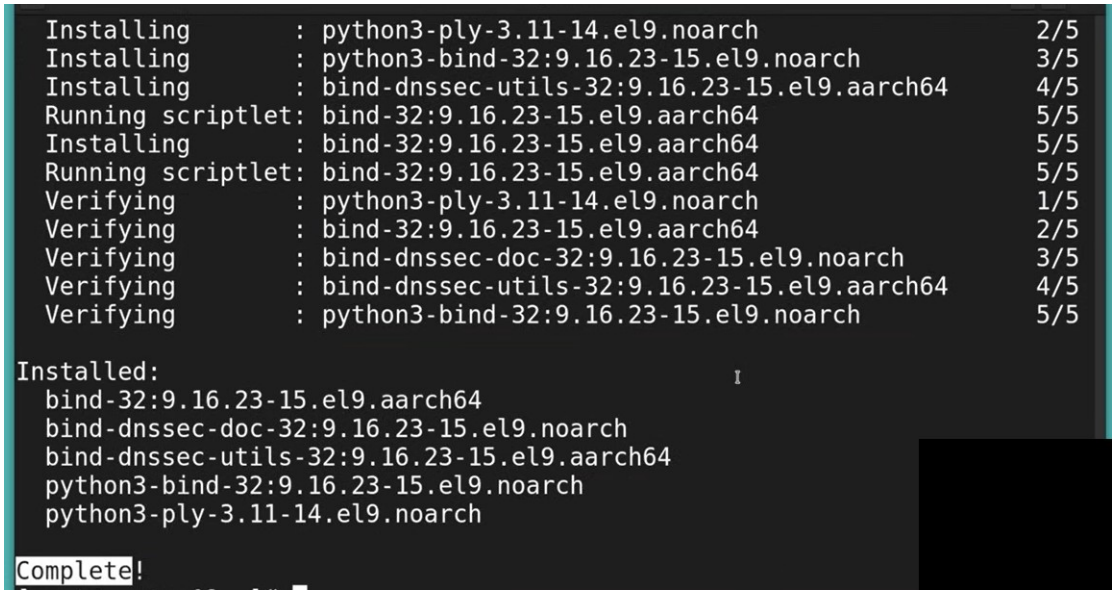
DNS config file under

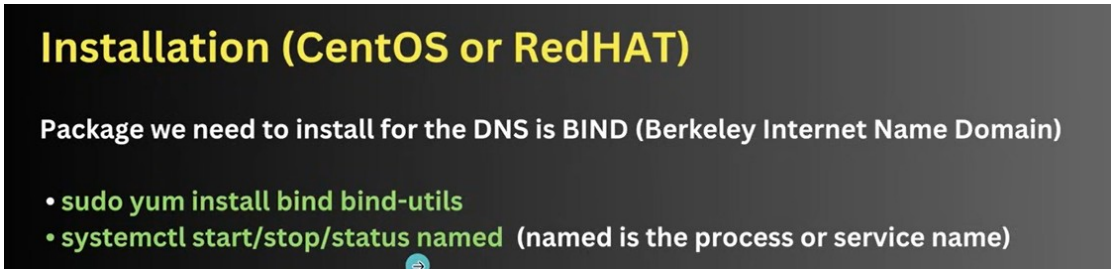
- /etc/named.conf

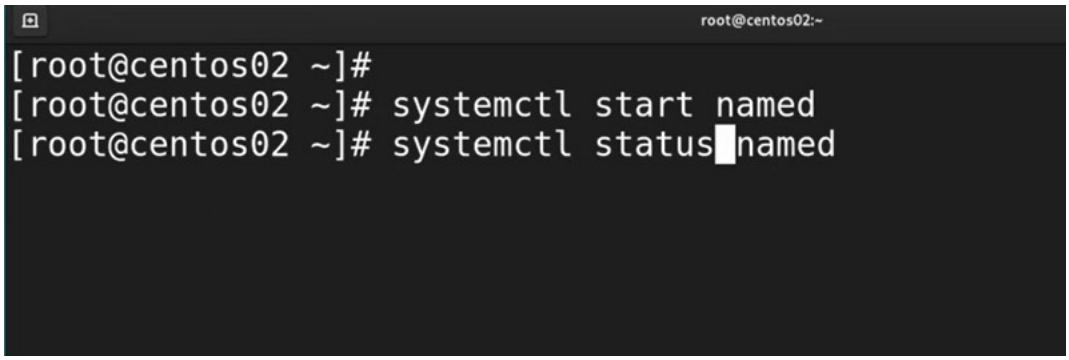
Directory where all the zone files are present where you define hostname to

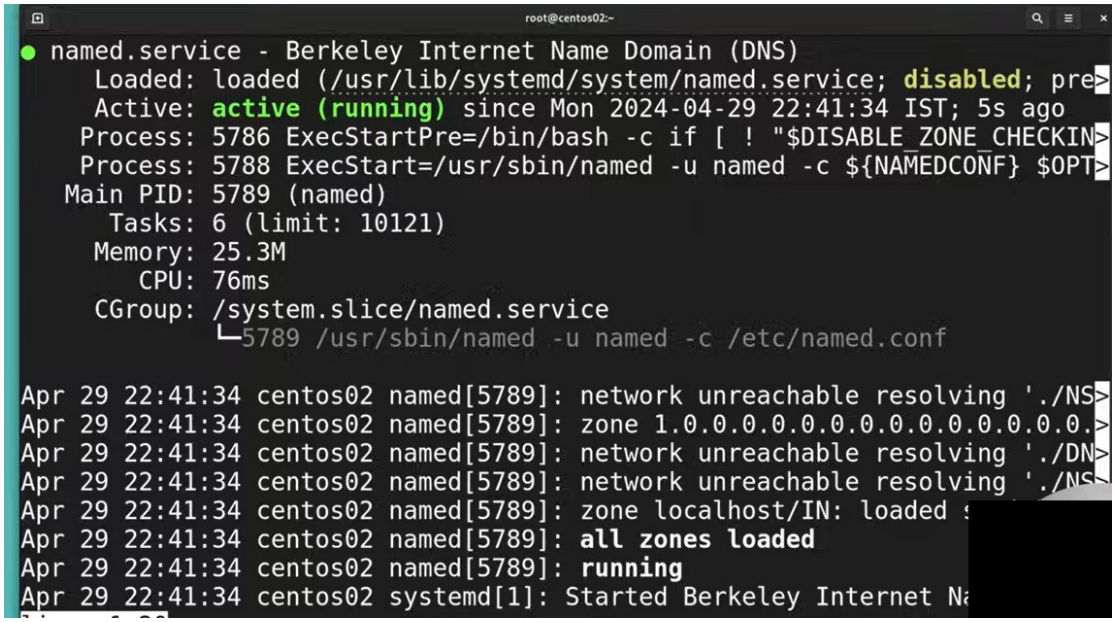
- /var/named

```
root@centos02:~
[root@centos02 ~]#
[root@centos02 ~]# yum install bind bind-utils -y
```


Installing : python3-ply-3.11-14.el9.noarch 2/5
Installing : python3-bind-32:9.16.23-15.el9.noarch 3/5
Installing : bind-dnssec-utils-32:9.16.23-15.el9.aarch64 4/5
Running scriptlet: bind-32:9.16.23-15.el9.aarch64 5/5
Installing : bind-32:9.16.23-15.el9.aarch64 5/5
Running scriptlet: bind-32:9.16.23-15.el9.aarch64 5/5
Verifying : python3-ply-3.11-14.el9.noarch 1/5
Verifying : bind-32:9.16.23-15.el9.aarch64 2/5
Verifying : bind-dnssec-doc-32:9.16.23-15.el9.noarch 3/5
Verifying : bind-dnssec-utils-32:9.16.23-15.el9.aarch64 4/5
Verifying : python3-bind-32:9.16.23-15.el9.noarch 5/5
Installed:
bind-32:9.16.23-15.el9.aarch64
bind-dnssec-doc-32:9.16.23-15.el9.noarch
bind-dnssec-utils-32:9.16.23-15.el9.aarch64
python3-bind-32:9.16.23-15.el9.noarch
python3-ply-3.11-14.el9.noarch
Complete!

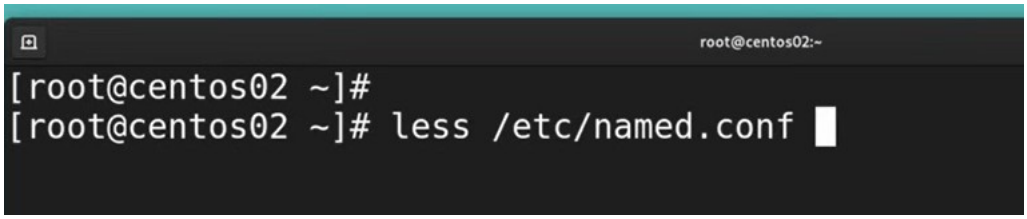

Installation (CentOS or RedHAT)
Package we need to install for the DNS is BIND (Berkeley Internet Name Domain)
• sudo yum install bind bind-utils
• systemctl start/stop/status named (named is the process or service name)


root@centos02:~
[root@centos02 ~]#
[root@centos02 ~]# systemctl start named
[root@centos02 ~]# systemctl status named


root@centos02:~
named.service - Berkeley Internet Name Domain (DNS)
Loaded: loaded (/usr/lib/systemd/system/named.service; disabled; pre>
Active: active (running) since Mon 2024-04-29 22:41:34 IST; 5s ago
Process: 5786 ExecStartPre=/bin/bash -c if [! "$DISABLE_ZONE_CHECKIN>
Process: 5788 ExecStart=/usr/sbin/named -u named -c ${NAMEDCONF} $OPT>
Main PID: 5789 (named)
Tasks: 6 (limit: 10121)
Memory: 25.3M
CPU: 76ms
CGroup: /system.slice/named.service
└5789 /usr/sbin/named -u named -c /etc/named.conf
Apr 29 22:41:34 centos02 named[5789]: network unreachable resolving './NS>
Apr 29 22:41:34 centos02 named[5789]: zone 1.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.>
Apr 29 22:41:34 centos02 named[5789]: network unreachable resolving './DN>
Apr 29 22:41:34 centos02 named[5789]: network unreachable resolving './NS>
Apr 29 22:41:34 centos02 named[5789]: zone localhost/IN: loaded
Apr 29 22:41:34 centos02 named[5789]: all zones loaded
Apr 29 22:41:34 centos02 named[5789]: running
Apr 29 22:41:34 centos02 systemd[1]: Started Berkeley Internet Na


Enable the Service in Firewall
firewall-cmd --add-service=dns --permanent
firewall-cmd --reload


[root@centos02 ~]#
[root@centos02 ~]# firewall-cmd --add-service=dns --permanent
success
[root@centos02 ~]# firewall-cmd --reload
success
[root@centos02 ~]#


root@centos02:~
[root@centos02 ~]#
[root@centos02 ~]# less /etc/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";
        secroots-file   "/var/named/data/named.secroots";
        recursing-file  "/var/named/data/named.recursing";
        allow-query     { localhost; };

        /*
         - If you are building an AUTHORITATIVE DNS server, do NO
```

```
        /* https://fedoraproject.org/wiki/Changes/CryptoPolicy */
        include "/etc/crypto-policies/back-ends/bind.config";
};

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";

(END)
```

```
[root@centos02 ~]# cd /var/named/
[root@centos02 named]# ls
data       named.ca     named.localhost  slaves
dynamic    named.empty  named.loopback
[root@centos02 named]#
```

DNS Server
Config Changes

```
[root@centos02 ~]#
[root@centos02 ~]# ifconfig
docker0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.17.0.1  netmask 255.255.0.0  broadcast 172.17.255.255
        ether 02:42:9a:ad:53:79  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

enp0s5: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.211.55.11  netmask 255.255.255.0  broadcast 10.211.55.255
        inet6 fdb2:2c26:f4e4:0:21c:42ff:fecc:bdee  prefixlen 64  scopeid 0x0<gl
obal>
        inet6 fe80::21c:42ff:fecc:bdee  prefixlen 64  scopeid 0x20<link>
        ether 00:1c:42:cc:bd:ee  txqueuelen 1000  (Ethernet)
        RX packets 13539  bytes 9163469 (8.7 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 7348  bytes 1349615 (1.2 MiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions
```

```
[root@centos02 ~]#
[root@centos02 ~]# vi /etc/named.conf
```

```
//
// 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; 10.211.55.11; };
        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";
        secroots-file   "/var/named/data/named.secroots";
        recursing-file  "/var/named/data/named.recursing";
        allow-query     { localhost; };

        /*
```

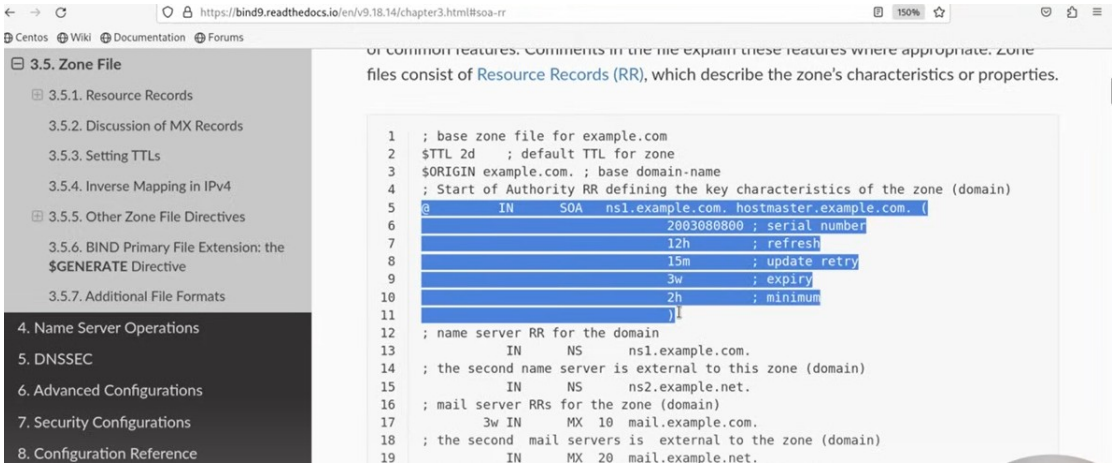
Add Your own Custom Zone

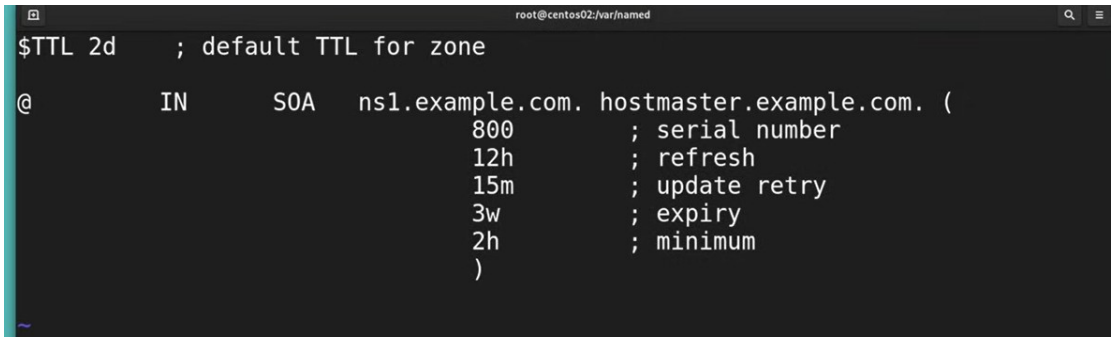
```
        channel default_debug {
                file "data/named.run";
                severity dynamic;
        };
};

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


zone "mywebapp.com" IN {
        type master;
        file "mywebapp.com.fzone";
        allow-query { any; };
};

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

~
```

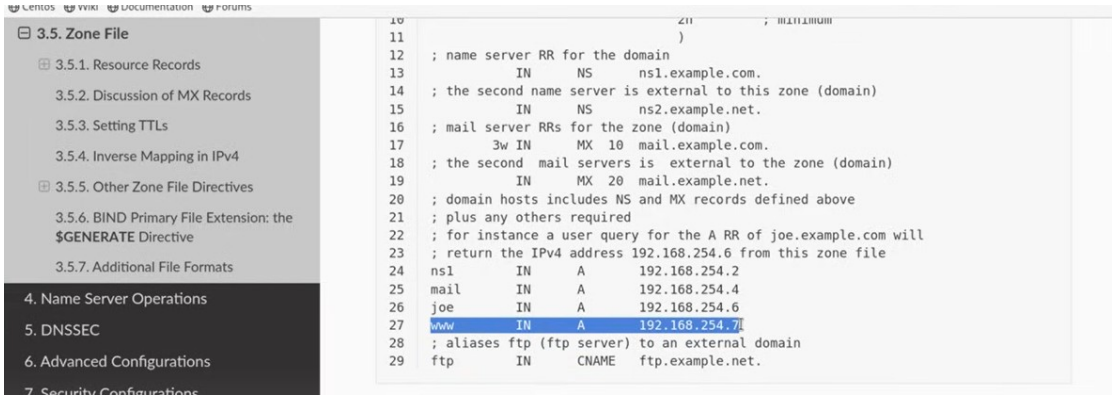
```
[root@centos02 ~]#
[root@centos02 ~]# vi /etc/named.conf
[root@centos02 ~]#
[root@centos02 ~]# named-checkconf
[root@centos02 ~]#
```

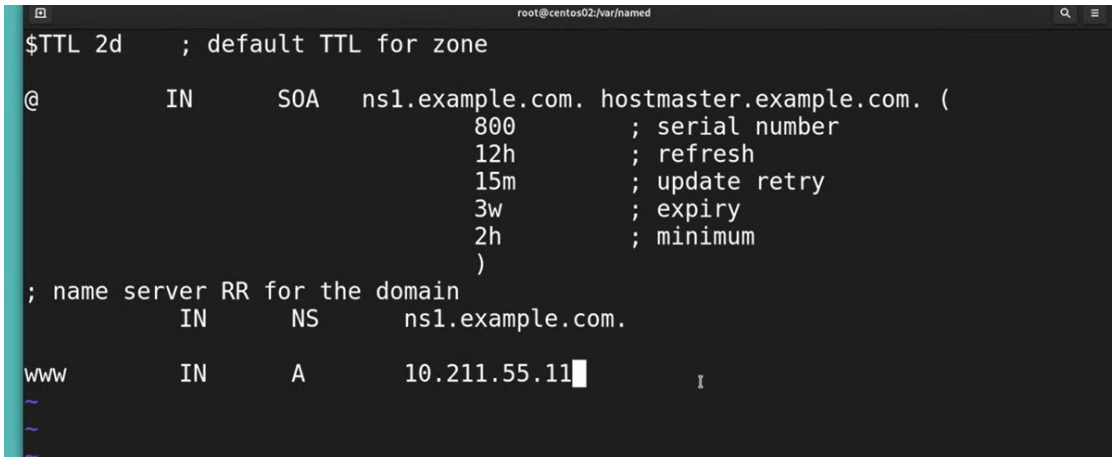
```
[root@centos02 ~]# cd /var/named
[root@centos02 named]# ls
data  dynamic  named.ca  named.empty  named.localhost  named.loopback  slaves
[root@centos02 named]#
[root@centos02 named]#
[root@centos02 named]# touch mywebapp.com.fzone
[root@centos02 named]# ls
data      mywebapp.com.fzone  named.empty      named.loopback
dynamic   named.ca            named.localhost  slaves
[root@centos02 named]#
```

```
root@centos02 named]#
root@centos02 named]# vi mywebapp.com.fzone
```


https://bind9.readthedocs.io/en/v9.18.14/chapter3.html#soa-rr
Centos Wiki Documentation Forums
3.5. Zone File
3.5.1. Resource Records
3.5.2. Discussion of MX Records
3.5.3. Setting TTLs
3.5.4. Inverse Mapping in IPv4
3.5.5. Other Zone File Directives
3.5.6. BIND Primary File Extension: the $GENERATE Directive
3.5.7. Additional File Formats
4. Name Server Operations
5. DNSSEC
6. Advanced Configurations
7. Security Configurations
8. Configuration Reference
files consist of Resource Records (RR), which describe the zone's characteristics or properties.
; base zone file for example.com
$TTL 2d ; default TTL for zone
$ORIGIN example.com. ; base domain-name
; Start of Authority RR defining the key characteristics of the zone (domain)
@ IN SOA ns1.example.com. hostmaster.example.com. (
2003080800 ; serial number
12h ; refresh
15m ; update retry
3w ; expiry
2h ; minimum
)
; name server RR for the domain
IN NS ns1.example.com.
; the second name server is external to this zone (domain)
IN NS ns2.example.net.
; mail server RRs for the zone (domain)
3w IN MX 10 mail.example.com.
; the second mail servers is external to the zone (domain)
IN MX 20 mail.example.net.


root@centos02:/var/named
$TTL 2d ; default TTL for zone
@ IN SOA ns1.example.com. hostmaster.example.com. (
800 ; serial number
12h ; refresh
15m ; update retry
3w ; expiry
2h ; minimum
)


3.5. Zone File
3.5.1. Resource Records
3.5.2. Discussion of MX Records
3.5.3. Setting TTLs
3.5.4. Inverse Mapping in IPv4
3.5.5. Other Zone File Directives
3.5.6. BIND Primary File Extension: the $GENERATE Directive
3.5.7. Additional File Formats
4. Name Server Operations
5. DNSSEC
6. Advanced Configurations
; name server RR for the domain
IN NS ns1.example.com.
; the second name server is external to this zone (domain)
IN NS ns2.example.net.
; mail server RRs for the zone (domain)
3w IN MX 10 mail.example.com.
; the second mail servers is external to the zone (domain)
IN MX 20 mail.example.net.
; domain hosts includes NS and MX records defined above
; plus any others required
; for instance a user query for the A RR of joe.example.com will
; return the IPv4 address 192.168.254.6 from this zone file
ns1 IN A 192.168.254.2
mail IN A 192.168.254.4
joe IN A 192.168.254.6
www IN A 192.168.254.7
; aliases ftp (ftp server) to an external domain
ftp IN CNAME ftp.example.net.

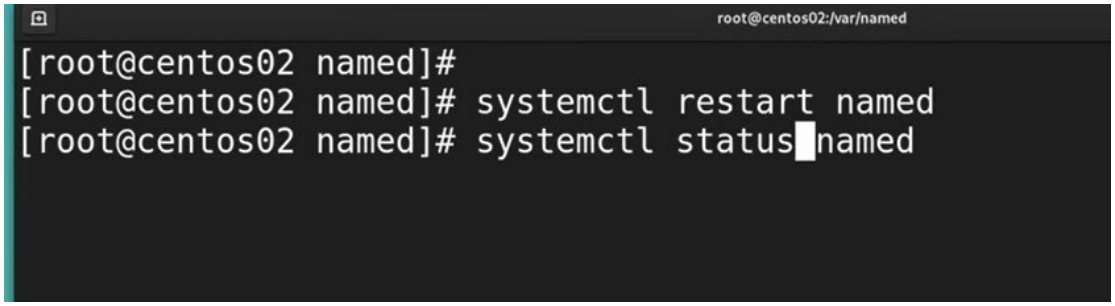

root@centos02:/var/named
$TTL 2d ; default TTL for zone
@ IN SOA ns1.example.com. hostmaster.example.com. (
800 ; serial number
12h ; refresh
15m ; update retry
3w ; expiry
2h ; minimum
)
; name server RR for the domain
IN NS ns1.example.com.
www IN A 10.211.55.11

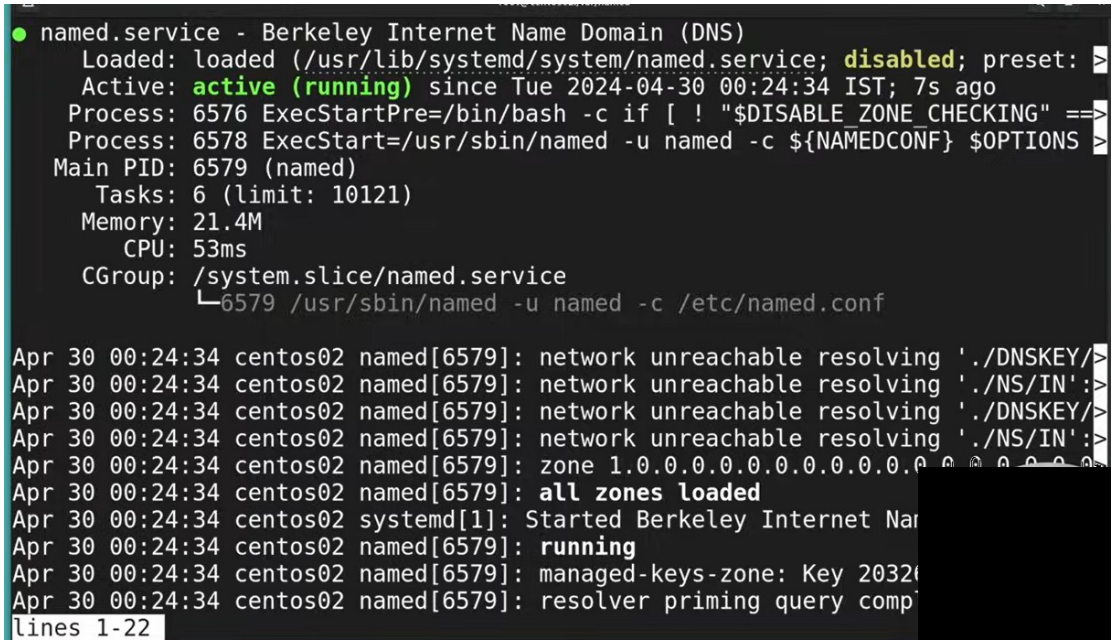
```
[root@centos02 named]# vi mywebapp.com.fzone
[root@centos02 named]#
[root@centos02 named]# named-checkzone mywebapp.com mywebapp.com.fzone
zone mywebapp.com/IN: loaded serial 800
OK
[root@centos02 named]#
```

```
root@centos02:/var/named
[root@centos02 named]#
[root@centos02 named]# less /etc/named.conf
```

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

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

```
zone "mywebapp.com" IN {
        type master;
        file "mywebapp.com.fzone";
        allow-query { any; };
};

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

(END)
```


root@centos02:/var/named
[root@centos02 named]#
[root@centos02 named]# systemctl restart named
[root@centos02 named]# systemctl status named


named.service - Berkeley Internet Name Domain (DNS)
Loaded: loaded (/usr/lib/systemd/system/named.service; disabled; preset:
Active: active (running) since Tue 2024-04-30 00:24:34 IST; 7s ago
Process: 6576 ExecStartPre=/bin/bash -c if [! "$DISABLE_ZONE_CHECKING" ==
Process: 6578 ExecStart=/usr/sbin/named -u named -c ${NAMEDCONF} $OPTIONS
Main PID: 6579 (named)
Tasks: 6 (limit: 10121)
Memory: 21.4M
CPU: 53ms
CGroup: /system.slice/named.service
└6579 /usr/sbin/named -u named -c /etc/named.conf
Apr 30 00:24:34 centos02 named[6579]: network unreachable resolving './DNSKEY/
Apr 30 00:24:34 centos02 named[6579]: network unreachable resolving './NS/IN':
Apr 30 00:24:34 centos02 named[6579]: network unreachable resolving './DNSKEY/
Apr 30 00:24:34 centos02 named[6579]: network unreachable resolving './NS/IN':
Apr 30 00:24:34 centos02 named[6579]: zone 1.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0
Apr 30 00:24:34 centos02 named[6579]: all zones loaded
Apr 30 00:24:34 centos02 systemd[1]: Started Berkeley Internet Na
Apr 30 00:24:34 centos02 named[6579]: running
Apr 30 00:24:34 centos02 named[6579]: managed-keys-zone: Key 2032
Apr 30 00:24:34 centos02 named[6579]: resolver priming query comp
lines 1-22


Verify
DNS Setup

```
[root@centos02 named]# nslookup www.google.com
Server:         10.211.55.1
Address:        10.211.55.1#53

Non-authoritative answer:
Name:   www.google.com
Address: 142.251.208.100

[root@centos02 named]#
```

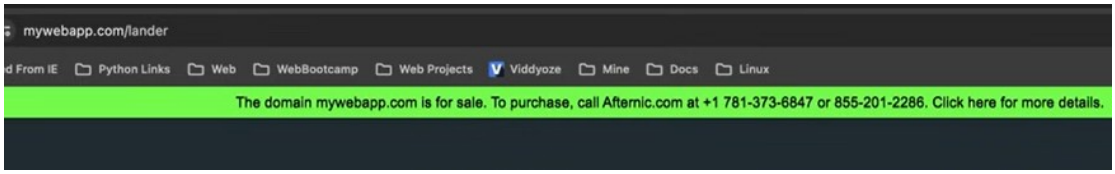
```
[root@centos02 named]# nslookup www.mywebapp.com
Server:         10.211.55.1
Address:        10.211.55.1#53

Non-authoritative answer:
Name:   www.mywebapp.com
Address: 13.248.169.48
Name:   www.mywebapp.com
Address: 76.223.54.146

[root@centos02 named]#
```

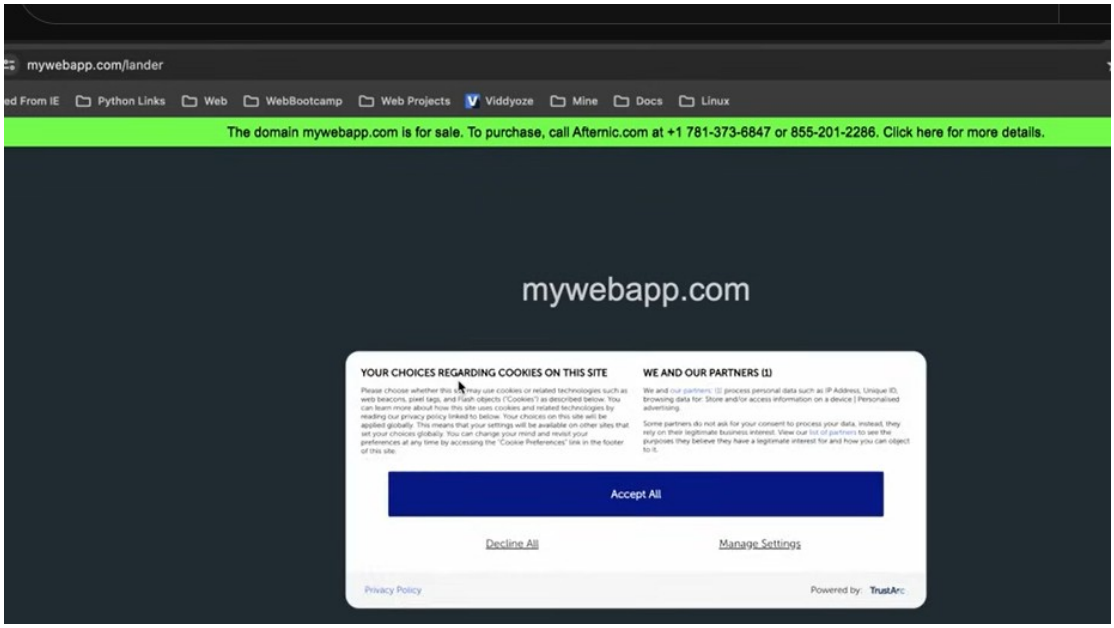
```
[root@centos02 named]# vi /etc/resolv.conf
```

```
# Generated by NetworkManager
search localdomain
nameserver 10.211.55.11
~
~
```

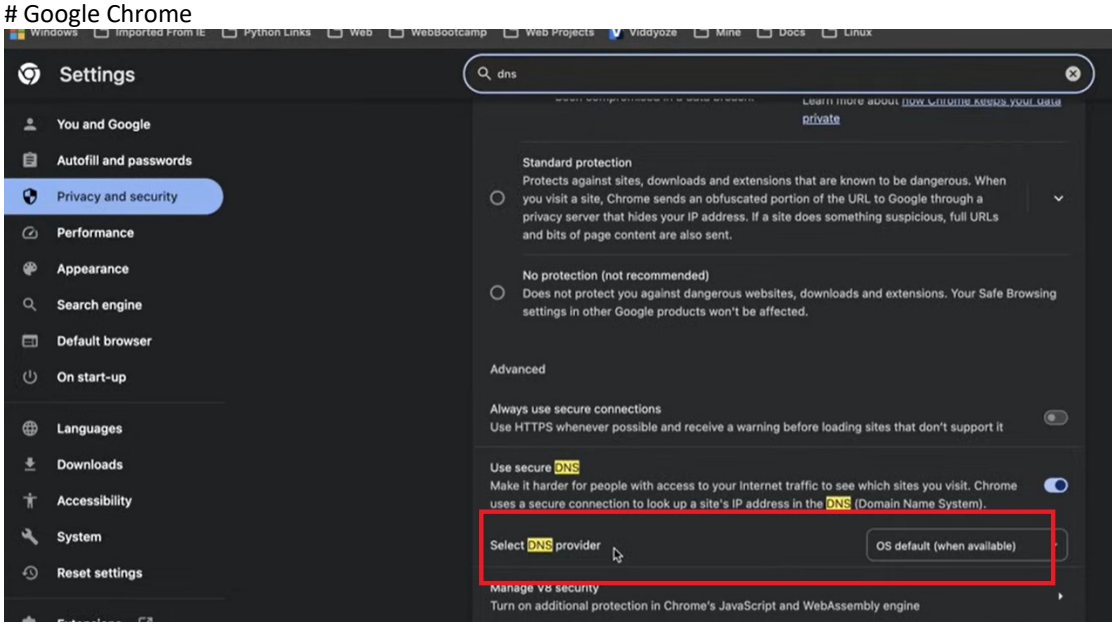
DNS Mapping

```
[root@centos02 named]# nslookup www.mywebapp.com
Server:         10.211.55.11
Address:        10.211.55.11#53

Name:   www.mywebapp.com
Address: 10.211.55.11

[root@centos02 named]#
```





Google Chrome



Here's how to configure your DNS settings on different operating systems:

- Windows: Go to Control Panel > Network and Internet > Network and Sharing Center > Change adapter settings. Right-click your network connection, select Properties, then select Internet Protocol Version 4 (TCP/IPv4) or Version 6 (TCP/IPv6) and click Properties. Here, you can set your preferred DNS server.
- macOS: Go to System Preferences > Network, select your network interface, click Advanced, and go to the DNS tab. You can add your DNS server here.
- Linux: This depends on your distribution and network manager, but typically you can edit /etc/resolv.conf directly or configure through network management tools (like NetworkManager) to add your DNS server.

DNS Translate

- Hostname to 192.168.1.2 (Called A Record)
- 192.168.1.2 to hostname (Called PTR Record)
- Hostname to hostname (Called CNAME Record)

Zones Files

- Forward zone - resolve Domain to IP
- Reverse zone - resolve IP to Domain