

PRACTICAL 5

AIM: To install and configure DNS server in Ubuntu.

Step 1: Make sure your Ubuntu server is up-to-date, if not then use the update and upgrade command.

sudo apt-get update

```
atharva@Atharva:~$ sudo apt-get update
[sudo] password for atharva:
Hit:1 http://in.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:3 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease [109 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu jammy-updates/main i386 Packages [471 kB]
Get:6 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [680 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [894 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [214 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 DEP-11 Metadata [100 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu jammy-updates/main DEP-11 48x48 Icons [36.1 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu jammy-updates/main DEP-11 64x64 Icons [55.1 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [15.6 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted i386 Packages [30.3 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [714 kB]
Get:15 http://security.ubuntu.com/ubuntu jammy-security/main i386 Packages [305 kB]
Get:16 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [155 kB]
Get:17 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [114 kB]
Get:18 http://security.ubuntu.com/ubuntu jammy-security/main amd64 DEP-11 Metadata [42.8 kB]
Get:19 http://security.ubuntu.com/ubuntu jammy-security/main DEP-11 48x48 Icons [16.9 kB]
Get:20 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [536 B]
```

sudo apt-get update

```
atharva@Atharva:~$ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages have been kept back:
  gir1.2-javascriptcoregtk-4.0 gir1.2-webkit2-4.0 gjs initransf-tools initransf-tools-bin initransf-tools-core libgjs0g libjavascriptcoregtk-4.0-18 libwebkit2gtk-4.0-37 linux-generic-hwe-22.04
  linux-headers-generic-hwe-22.04 linux-lnag-generic-hwe-22.04 ubuntu-desktop ubuntu-desktop-minimal
The following packages will be upgraded:
  accountsservice alsa-ucm-conf amd64-microcode apparmor apport apport-gtk apt apt-utils avahi-autoipd avahi-daemon avahi-utils base-files bind9-dnswtills bind9-host bind9-lbns binutils binutils-common
  binutils-x86-64-linux-gnu ca-certificates cpp-11 cpp-12 cups cups-browsed cups-bsd cups-client cups-common cups-core-drivers cups-daemon cups-filters cups-filters-core-drivers cups-ipp-utils cups-ppdc
  cups-server-common distro-info distro-info-data dnsmasq-base dpkg evince evince-common evolution-data-server evolution-data-server-common fonts-opensymbol fwupd fwupd-signed g++-11 gcc-11 gcc-11-base gcc-12
  gcc-12-base gdm3 ghostscript ghostscript-x gir1.2-accountsservice-1.0 gir1.2-adv-1 gir1.2-gdm-1.0 gir1.2-gnome-desktop-3.0 gir1.2-gst-plugins-base-1.0 gir1.2-gtk-4.0 gir1.2-mutter-10 gir1.2-pango-1.0
  gir1.2-rsvg-2.0 gnome-control-center gnome-control-center-data gnome-control-center-faces gnome-desktop3-data gnome-session-canberra gnome-settings-daemon gnome-settings-daemon-common gnome-shell
  gnome-shell-common gnome-shell-extension-ubuntu-dock gstreamer1.0-alsa gstreamer1.0-gi gstreamer1.0-gtk3 gstreamer1.0-plugins-base gstreamer1.0-plugins-base-apps gstreamer1.0-plugins-good
  gstreamer1.0-pulseaudio gstreamer1.0-x in-config intel-microcode ipp-usb iptables isc-dhcp-client isc-dhcp-common language-pack-en language-pack-en-base language-pack-gnome-en language-pack-gnome-en-base
  libaccountsservice0 libadwaita-1-0 libapparmor1 libapt-pkg6.0 libasan6 libasan8 libatomic1 libavahi-client3 libavahi-common-data libavahi-common3 libavahi-core7 libavahi-glib1 libavahi-ut-gtk3-0 libbinutils
  libcanal-1.2-63 libcanberra-gtk3-0 libcanberra-gtk3-module libcanberra-pulse libcanberra0 libcap2 libcap2-bin libcc1-0 libctf-nobfd0 libctf0 libcups2 libcupsfilters1 libcupsimage2 libcurl3-gnutls libcurl4
  libebook-1.2-10 libebook-contacts-1.2-3 libecal-2.0-1 libedata-book-1.2-26 libedata-cal-2.0-1 libedataserver-1.2-26 libedataserverui-1.2-3 libegl-mesa0 libevdev2 libfontconfig3 libfontembed1
  libfontembed2 libfprint-2-2 libfreetype6 libfwupd2 libfwupdplugins1 libgdm1 libgcc-11-dev libgcc-12-dev libgcc-s1 libgdm1 libgfortran5 libgl1-ambr-dri libgl1-mesa-dri libglapi-mesa libglv2-0-0
  libglv2-0-bin libglv2-0-data libglx-mesa0 libgnome-bg-4-1 libgnome-desktop-3-19 libgnome-desktop-4-1 libgnutls30 libgomp1 libgpgme11 libgpgmepp0 libgs9 libgs9-common libgssapi-krb5-2 libgstreameer-gli-0-0
  libgstreameer-plugins-base1.0 libgstreameer-plugins-good1.0 libgtk-4-1 libgtk-4-bin libgtk-4-common libidn2 libinput-bin libinput10 libip4tc2 libipset2 libitm1 libk5crypto3 libkpathsea6 libkrb5-3
  libkrb5support0 libldap-2.5-0 libldap-common libldb2 libllvm13 libllvm15 liblouis-data liblouis20 liblsan0 libmbn-glib4 libmbn-proxy libmw-glib0 libmutter-10-0 libnautilus-extension1a libncurses6
  libncursesw6 libnetplan0 libnss3 libpan-cap libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpangoxft-1.0-0 libpcsc-lite1 libperl5.34 libpoppler-cpp0v5 libpoppler-glib8 libpoppler118 libprotobuf23
  libpulse-mainloop-glib0 libpulse0 libpulse0 libpython3.10 libpython3.10-minimal libpython3.10-stdlib libqglutils libqglutils-bin libquadmath0 libraw20 libreoffice-base-core libreoffice-calc
  libreoffice-common libreoffice-core libreoffice-draw libreoffice-gnome libreoffice-gtk3 libreoffice-impress libreoffice-math libreoffice-ogltrans libreoffice-pdfimport libreoffice-style-breeze
  libreoffice-style-colibre libreoffice-style-elementary libreoffice-style-yaru libreoffice-writer librsync2-2 librsync2-common libsas2-2 libsas2-modules libsas2-modules-db libsas2-modules-gssapi-nt
  libsbclclient libsnmp-base libsnmp40 libspeechd2 libssh-4 libssl3 libstdc++-11-dev libstdc++6 libsynctex2 libtiff5 libtinfo6 libtsan0 libtsan2 libubsan1 libuno-cppu3 libuno-cppuhelpergcc3-3
  libuno-purpnhelpergcc3-3 libuno-sal3 libuno-salhelpergcc3-3 libunwind8 libwbclient0 libwebp7 libwebpdemux2 libwebpmux3 libx11-6 libx11-data libx11-ncb1 libxatracker2 libxkb2 libxtables12 linux-firmware
  linux-libc-dev mesa-va-drivers mesa-vaapi-drivers mesa-vulkan-drivers nodemanager nokuttl mutter-common nautilus nautilus-data ncurses-base ncurses-bin netplan.io open-vn-tools open-vn-tools-desktop
  openssh-client openssl perl perl-base perl-modules-5.34 poppler-utils printer-driver-foo2zjs printer-driver-foo2zjs-common printer-driver-fxplix pulseaudio pulseaudio-module-bluetooth pulseaudio-utils
  python-apt-common python3-apt python3-debian python3-distro-info python3-distupgrad python3-gdm python3-lab python3-lib2to3 python3-louis python3-macaronbakery python3-problem-report
  python3-protobuf python3-renderpm python3-reportlab python3-reportlab-accel python3-requests python3-software-properties python3-speechd python3-tz python3-uno python3.10 python3.10-minimal remmina
  remmina-common remmina-plugin-rdp remmina-plugin-secret remmina-plugin-vnc rsync samba-lsbs snapd software-properties-common software-properties-gtk speech-dispatcher speech-dispatcher-audio-plugins
  speech-dispatcher-espeak-ng sudo systemd-hwe-hwdb tar tcdump thermald tzdata ubuntu-advantage-tools ubuntu-drivers-common ubuntu-minimal ubuntu-release-upgrader-core ubuntu-release-upgrader-gtk
  ubuntu-standard ufw uno-libs-private update-notifier update-notifier-common ure vin-common vin-tiny xserver-common xserver-xephyr xserver-xorg-core xserver-xorg-legacy xwayland xxd yaru-theme-gnome-shell
  yaru-theme-gtk yaru-theme-icon yaru-theme-sound
```

Step 2: After updating the system, run the following command to install BIND9 packages which are used to setup DNS server.

```
sudo apt-get install bind9 bind9utils bind9
```

```
atharva@Atharva:~$ sudo apt-get install bind9 bind9utils bind9
[sudo] password for atharva:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  linux-headers-5.19.0-32-generic linux-hwe-5.19-headers-5.19.0-32 linux-image-5.19.0-32-generic linux-modules-5.19.0-32-generic linux-modules-extra-5.19.0-32-generic
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  bind9-utils
Suggested packages:
  bind-doc resolvconf
The following NEW packages will be installed:
  bind9 bind9-utils bind9utils
0 upgraded, 3 newly installed, 0 to remove and 5 not upgraded.
Need to get 425 kB of archives.
After this operation, 1,714 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-utils amd64 1:9.18.12-0ubuntu0.22.04.2 [161 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9 amd64 1:9.18.12-0ubuntu0.22.04.2 [260 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 bind9utils all 1:9.18.12-0ubuntu0.22.04.2 [3,928 B]
Fetched 425 kB in 7s (62.1 kB/s)
Selecting previously unselected package bind9-utils.
(Reading database ... 241530 files and directories currently installed.)
Preparing to unpack .../bind9-utils_1%3a9.18.12-0ubuntu0.22.04.2_amd64.deb ...
Unpacking bind9-utils (1:9.18.12-0ubuntu0.22.04.2) ...
Selecting previously unselected package bind9.
Preparing to unpack .../bind9_1%3a9.18.12-0ubuntu0.22.04.2_amd64.deb ...
Unpacking bind9 (1:9.18.12-0ubuntu0.22.04.2) ...
Selecting previously unselected package bind9utils.
Preparing to unpack .../bind9utils_1:9.18.12-0ubuntu0.22.04.2_all.deb ...
Unpacking bind9utils (1:9.18.12-0ubuntu0.22.04.2) ...
Setting up bind9-utils (1:9.18.12-0ubuntu0.22.04.2) ...
Setting up bind9 (1:9.18.12-0ubuntu0.22.04.2) ...
Setting up bind9utils (1:9.18.12-0ubuntu0.22.04.2) ...
```

```
sudo apt-get install bind9 bind9utils bind9-docs
```

```
atharva@Atharva:~$ sudo apt-get install bind9 bind9utils bind9-doc
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
bind9 is already the newest version (1:9.18.12-0ubuntu0.22.04.2).
bind9utils is already the newest version (1:9.18.12-0ubuntu0.22.04.2).
The following packages were automatically installed and are no longer required:
  linux-headers-5.19.0-32-generic linux-hwe-5.19-headers-5.19.0-32 linux-image-5.19.0-32-generic linux-modules-5.19.0-32-generic linux-modules-extra-5.19.0-32-generic
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  bind9-doc
0 upgraded, 1 newly installed, 0 to remove and 5 not upgraded.
Need to get 3,195 kB of archives.
After this operation, 7,452 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-doc all 1:9.18.12-0ubuntu0.22.04.2 [3,195 kB]
Fetched 3,195 kB in 4s (912 kB/s)
Selecting previously unselected package bind9-doc.
(Reading database ... 241630 files and directories currently installed.)
Preparing to unpack .../bind9-doc_1%3a9.18.12-0ubuntu0.22.04.2_all.deb ...
Unpacking bind9-doc (1:9.18.12-0ubuntu0.22.04.2) ...
Setting up bind9-doc (1:9.18.12-0ubuntu0.22.04.2) ...
```

Step 3: Configuring the caching name server, caching name server saves the DNS query results locally for a particular period of time. To configure caching name server, edit /etc/bind/named.conf.options file. Which will be done by the following command.

```
sudo nano /etc/bind/named.conf.options
```

```
options {
    directory "/var/cache/bind";

    // If there is a firewall between you and nameservers you want
    // to talk to, you may need to fix the firewall to allow multiple
    // ports to talk.  See http://www.kb.cert.org/vuls/id/800113

    // If your ISP provided one or more IP addresses for stable
    // nameservers, you probably want to use them as forwarders.
    // Uncomment the following block, and insert the addresses replacing
    // the all-0's placeholder.

    forwarders {
        0.0.0.0;
    };

    //=====
    // If BIND logs error messages about the root key being expired,
    // you will need to update your keys.  See https://www.isc.org/bind-keys
    //=====
    dnssec-validation auto;

    listen-on-v6 { any; };
};
```

Step 4: Now restart the bind9 service to take effect the changes. This will be done by following command

```
sudo systemctl restart bind9
```

```
atharva@Atharva:~$ sudo systemctl restart bind9
```

```
sudo systemctl status bind9
```

```
atharva@Atharva:~$ sudo systemctl status bind9
● named.service - BIND Domain Name Server
   Loaded: loaded (/lib/systemd/system/named.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2023-08-18 20:33:08 IST; 1min 12s ago
     Docs: man:named(8)
  Process: 54448 ExecStart=/usr/sbin/named $OPTIONS (code=exited, status=0/SUCCESS)
 Main PID: 54449 (named)
    Tasks: 10 (limit: 9433)
   Memory: 6.3M
      CPU: 87ms
  CGroup: /system.slice/named.service
          └─54449 /usr/sbin/named -u bind

Aug 18 20:33:08 Atharva named[54449]: network unreachable resolving './DNSKEY/IN': 2001:500:2d::d#53
Aug 18 20:33:08 Atharva named[54449]: network unreachable resolving './NS/IN': 2001:500:2d::d#53
Aug 18 20:33:08 Atharva named[54449]: network unreachable resolving './DNSKEY/IN': 2001:500:200::b#53
Aug 18 20:33:08 Atharva named[54449]: network unreachable resolving './NS/IN': 2001:500:200::b#53
Aug 18 20:33:08 Atharva named[54449]: network unreachable resolving './DNSKEY/IN': 2001:7fe::53#53
Aug 18 20:33:08 Atharva named[54449]: network unreachable resolving './NS/IN': 2001:7fe::53#53
Aug 18 20:33:08 Atharva named[54449]: network unreachable resolving './DNSKEY/IN': 2001:500:1::53#53
Aug 18 20:33:08 Atharva named[54449]: network unreachable resolving './NS/IN': 2001:500:1::53#53
Aug 18 20:33:08 Atharva named[54449]: managed-keys-zone: Key 20326 for zone . is now trusted (acceptance timer complete)
Aug 18 20:33:09 Atharva named[54449]: resolver priming query complete: success
```