

. Configuring and securing openSSH service

ubuntu में OpenSSH service को Configuring and securing करने के लिए यह verify करने के लिए कई step include हैं कि service ठीक से configure की गई है और unauthorized access से बचाने के लिए safe है। यहाँ Ubuntu में OpenSSH को configure and secure करने के step दिए गए हैं:

Step 1: Install OpenSSH

यदि OpenSSH पहले से install नहीं है, तो आप terminal में following command run करके इसे install कर सकते हैं:

- sudo apt-get update
- sudo apt-get install openssh-server

```
himanshu@himanshu-Inspiron-15-3511:~$ sudo apt-get update
[sudo] password for himanshu:
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:2 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:3 http://dell.archive.canonical.com focal InRelease
Hit:4 http://ppa.launchpad.net/ondrej/php/ubuntu focal InRelease
Get:5 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Hit:6 https://dl.google.com/linux/chrome/deb stable InRelease
Get:7 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu focal-proposed InRelease [267 kB]
Fetched 603 kB in 4s (164 kB/s)
Reading package lists... Done
himanshu@himanshu-Inspiron-15-3511:~$ sudo apt-get install openssh-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  galera-3 gir1.2-goa-1.0 libapache2-mod-php7.4 libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libreadline5
  libsnappy1v5 libterm-readkey-perl libzip5 mariadb-common php7.4 php7.4-bcmath php7.4-curl php7.4-mbstring php7.4-mysql
  php7.4-pgsql php7.4-xml php7.4-zip socat
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  ncurses-term openssh-sftp-server ssh-import-id
Suggested packages:
  molly-guard monkeysphere ssh-askpass
The following NEW packages will be installed:
  ncurses-term openssh-server openssh-sftp-server ssh-import-id
0 upgraded, 4 newly installed, 0 to remove and 1 not upgraded.
Need to get 688 kB of archives.
After this operation, 6,010 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 ncurses-term all 6.2-0ubuntu2 [249 kB]
```

Step 2: Update the SSH Configuration File

text editor जैसे nano या vim का use करके SSH configuration file खोलें। configuration file /etc/ssh/sshd_config पर स्थित है। example के लिए:

- `sudo vim /etc/ssh/sshd_config`

```
himanshu@himanshu-Inspiron-15-3511:~$ sudo vim /etc/ssh/sshd_config
[sudo] password for himanshu:
himanshu@himanshu-Inspiron-15-3511:~$
himanshu@himanshu-Inspiron-15-3511:~$ sudo vim /etc/ssh/sshd_config
himanshu@himanshu-Inspiron-15-3511:~$ cd etc/ssh
bash: cd: etc/ssh: No such file or directory
himanshu@himanshu-Inspiron-15-3511:~$ cd etc
bash: cd: etc: No such file or directory
himanshu@himanshu-Inspiron-15-3511:~$ ls
aks                docker-compose.yml  example-app  laravel_project  mylaravel  Public  Videos
composer-setup.php Documents            hello-world  Music             Pictures    snap
Desktop            Downloads            himanshu     my_first_laravel_project  postgres   Templates
himanshu@himanshu-Inspiron-15-3511:~$ cd/etc
bash: cd/etc: No such file or directory
himanshu@himanshu-Inspiron-15-3511:~$ sudo vim /etc/ssh/sshd_config
himanshu@himanshu-Inspiron-15-3511:~$ sudo vim /etc/ssh/sshd_config
```

In the SSH configuration file, make the following changes:

Change the default SSH port (e.g., to 2222):

- Port 2222

Disable root login:

- PermitRootLogin no

Allow only specific users (your _name):

- AllowUsers john mary

Enable key-based authentication and disable password authentication:

- PasswordAuthentication no
- PubkeyAuthentication yes

Disable empty passwords:

- PermitEmptyPasswords no

Set idle timeout (e.g., 5 minutes of inactivity before disconnecting):

- ClientAliveInterval 300
- ClientAliveCountMax 0

Save and close the file.

Step 3: Restart SSH Service

- `sudo service ssh restart`

Step 4: Configure Firewall

Replace <SSH_PORT> with the actual port number you configured in the SSH configuration file.

- `sudo ufw allow 2222`
- `sudo UFW enable`

Step 5: Generate and Use SSH Keys

Generate SSH key pair on your local machine (if not already done):

- `ssh-keygen -t rsa`

Copy the public key to the remote server (replace <USERNAME> and <REMOTE_IP> with your actual username and remote server's IP address):

- `ssh-copy-id -p 2222 <USERNAME>@<REMOTE_IP>`

Step 6: Keep Software Up to Date

- `sudo apt-get update`

- sudo apt-get upgrade

```

himanshu@himanshu-Inspiron-15-3511:~$ sudo service ssh restart
himanshu@himanshu-Inspiron-15-3511:~$ sudo ufw allow 2222
Rules updated
Rules updated (v6)
himanshu@himanshu-Inspiron-15-3511:~$ sudo ufw enable
Firewall is active and enabled on system startup
himanshu@himanshu-Inspiron-15-3511:~$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/himanshu/.ssh/id_rsa): ^C
himanshu@himanshu-Inspiron-15-3511:~$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/himanshu/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/himanshu/.ssh/id_rsa
Your public key has been saved in /home/himanshu/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:/KIeA59+NXfOMEF3AzWa70hQ+aTUTivK6qzoDMuWEc4 himanshu@himanshu-Inspiron-15-3511
The key's randomart image is:
+----[RSA 3072]-----+
|          ooo |
|          * =.o |
|          = 0 .. |
| .      . o 0 . |
|o . . . S. + = |
| E  o ...* + . |
|.o  = .+. + * |
|.o+ ...+o.  o |
|.o.+ o*= |
+----[SHA256]-----+

```

That's it! इन step का follow करके, आपने unauthorized access से बचाने और अपने system की overall security बढ़ाने के लिए ubuntu में OpenSSH service को configured and secured किया गया है। अपनी SSH service को secure रखने और अपने system और software को latest security patches के साथ up to date रखने के लिए हमेशा best practices को follow करना चाहिए |

. Installing and Updating Software Packages

ubuntu में, एक popular linux distribution , used package management system apt (Advanced Package Tool) है जो software package के management के लिए एक command-line tool है। ubuntu में package को install करने और upgrade करने के लिए general commands यहां दिए गए हैं:

1. एक package install करें: एक package install करने के लिए, आप apt-get या apt command का use कर सकते हैं, जिसके बाद install subcommand और उस package का नाम जिसे आप install करना चाहते हैं। example के लिए:

- `sudo apt-get install <package_name>`
- `sudo apt install <package_name>`

<package_name> को उस package के actual name से बदलें जिसे आप install करना चाहते हैं।

2. Upgrade Packages : आपके ubuntu system पर installed सभी packages को उनके latest versions में upgrade करने के लिए, आप निम्न command का use कर सकते हैं:

- `sudo apt-get upgrade`
- `sudo apt upgrade`

यह उन सभी packages को upgrade करेगा जिनके latest versions में update उपलब्ध हैं।

```
hu@himanshu-Inspiron-15-3511:~$ sudo apt-get update
Get: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 [108 kB]
Fetched 337 kB in 5s (67.1 kB/s)
Reading package lists... Done
```

```
hu@himanshu-Inspiron-15-3511:~$ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages were automatically installed and are no longer required:
  linux-tool linux-generic-hwe-20.04 linux-headers-generic-hwe-20.04
  linux-image-generic-hwe-20.04 oem-fix-misc-cn1-tlp-estar-conf
  oem-somerville-meta tlp tlp-rdw ubuntu-oem-keyring
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

```
hu@himanshu-Inspiron-15-3511:~$ sudo apt install docker
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
docker is already the newest version (1.5-2).
The following packages were automatically installed and are no longer required:
  linux-tool linux-generic-hwe-20.04 linux-headers-generic-hwe-20.04 linux-image-generic-hwe-20.04 oem-fix-misc-cn1-tlp-estar-conf oem-somerville-meta
  tlp-rdw ubuntu-oem-keyring
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
hu@himanshu-Inspiron-15-3511:~$ sudo apt install podman
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
podman is already the newest version (3.4.4+ds1-1ubuntu1).
The following packages were automatically installed and are no longer required:
  linux-tool linux-generic-hwe-20.04 linux-headers-generic-hwe-20.04 linux-image-generic-hwe-20.04 oem-fix-misc-cn1-tlp-estar-conf oem-somerville-meta
  tlp-rdw ubuntu-oem-keyring
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
hu@himanshu-Inspiron-15-3511:~$ docker --version
Docker version 20.10.21, build 20.10.21-0ubuntu1-22.04.2
hu@himanshu-Inspiron-15-3511:~$ podman --version
Podman version 3.4.4
hu@himanshu-Inspiron-15-3511:~$
```

```
Activities Terminal Apr 7 14:58 himanshu@himanshu-Inspiron-15-3511: ~
hu@himanshu-Inspiron-15-3511:~$ sudo apt-get update
password for himanshu:
http://in.archive.ubuntu.com/ubuntu jammy InRelease
http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease [108 kB]
Fetched 337 kB in 5s (67.1 kB/s)
Reading package lists... Done
hu@himanshu-Inspiron-15-3511:~$ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages were automatically installed and are no longer required:
  ethtool linux-generic-hwe-20.04 linux-headers-generic-hwe-20.04
  linux-image-generic-hwe-20.04 oem-fix-misc-cn1-tlp-estar-conf oem-somerville-meta
  tlp tlp-rdw ubuntu-oem-keyring
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
hu@himanshu-Inspiron-15-3511:~$ sudo apt-get update
http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
http://in.archive.ubuntu.com/ubuntu jammy InRelease
http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease [108 kB]
Fetched 337 kB in 3s (125 kB/s)
Reading package lists... Done
hu@himanshu-Inspiron-15-3511:~$ sudo apt install docker
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
docker is already the newest version (1.5-2).
The following packages were automatically installed and are no longer required:
  ethtool linux-generic-hwe-20.04 linux-headers-generic-hwe-20.04 linux-image-generic-hwe-20.04 oem-fix-misc-cn1-tlp-estar-conf oem-somerville-meta
  tlp tlp-rdw ubuntu-oem-keyring
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
hu@himanshu-Inspiron-15-3511:~$ sudo apt install podman
Reading package lists... Done
Building dependency tree... Done
```

Note: apt-get command का use Ubuntu के old versions (Ubuntu 16.04 से पहले) में किया जाता है जबकि apt command का use new version (Ubuntu 16.04 और बाद के version) में किया जाता है। दोनों command same work करते हैं और regular use किए जा सकते हैं। हालाँकि, इसकी बेहतर services और users -friendliness के लिए Ubuntu 16.04 और बाद में apt का use करने की recommend की जाती है।

. Booting Process

ubuntu में booting process, जैसा कि most Linux-based operating systems के साथ होता है, में कई step include होते हैं, जिनमें hardware initialization, bootloader loading , kernel initialization और system initialization include होते हैं। यहाँ ubuntu terminal में booting process का एक high-level overview होता है:

- Power-on and hardware initialization : जब आप अपने ubuntu machine को start करते हैं, तो hardware को initialized किया जाता है, जिसमें CPU, memory and storage drives, network cards, and graphics cards जैसे device include होते हैं।
- Bootloader load हो रहा है: Bootloader एक small software program है जो operating system को memory में load करने के लिए responsible होता है। ubuntu में use किए जाने वाले common bootloader GRUB (Grand Unified Bootloader) या कभी-कभी GRUB2 हैं। bootloader users को एक boot menu show करता है यदि system पर कई operating system install हैं, जिससे users को यह choice करने की permission मिलती है कि कौन सा OS boot करना है।
- Kernel Initialization : एक बार जब bootloader Ubuntu kernel को memory में load कर देता है, तो kernel initialized हो जाता है। kernel operating system का main component है जो direct hardware के साथ interact करता है और system resources जैसे memory, processes, and devices को manage करता है।
- System initialization: : kernel के initialized होने के बाद, ubuntu system different system initialization processes से होकर जाता है, जिसमें system services को initialized करना, file system को mount करना और system daemons को start करना include होता है। System services background processes हैं जो background

में run होती हैं और networking, printing, and user authentication जैसी different function provide करती हैं।

- Login and user initialization : एक बार system initialization complete हो जाने के बाद, terminal में ubuntu login prompt show होता है। users फिर login करने के लिए अपना users name और password enter कर सकता है। successful login पर, users का shell (जैसे bash) start हो जाता है, और users का environment उनकी specific settings, preferences, and permissions के साथ start हो जाता है।
- User session : users का shell start होने के बाद, users terminal के medium से command running , running applications , और performing various tasks Ubuntu system के साथ interaction कर सकता है।

यह Ubuntu Terminal में booting process का एक brief overview है। यह ध्यान दें कि actual process ubuntu के specific version , hardware configuration and system settings based पर different हो सकते हैं।