SSH: THE SECURE SHELL

What is ssh:

SSH is a cryptographic network protocol for secure network services

uses:

→ It is used for the remote login
→ Secure File Transfer (SFTP/SCP)
→ Port Forwarding
→ SOCKS protocols for web browsing through encrypted proxy
→ Secure remote file mounting via SSHFS

login with ssh using password:

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requirements:

→ we have two server
1) server1, ip:192.168.0.10/24
2) server2, ip :192.168.0.11/24

1) step1

we need to install the openssh-server in server2[in centos server its actually pre-installed]

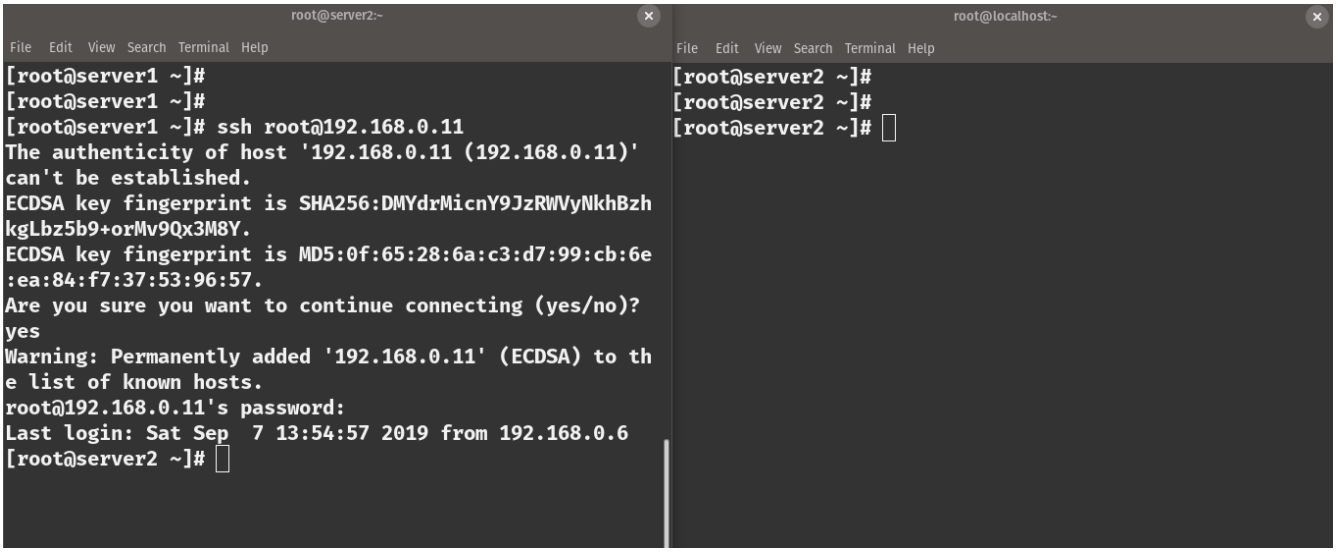
=>yum update -y

=>yum install sshd -y

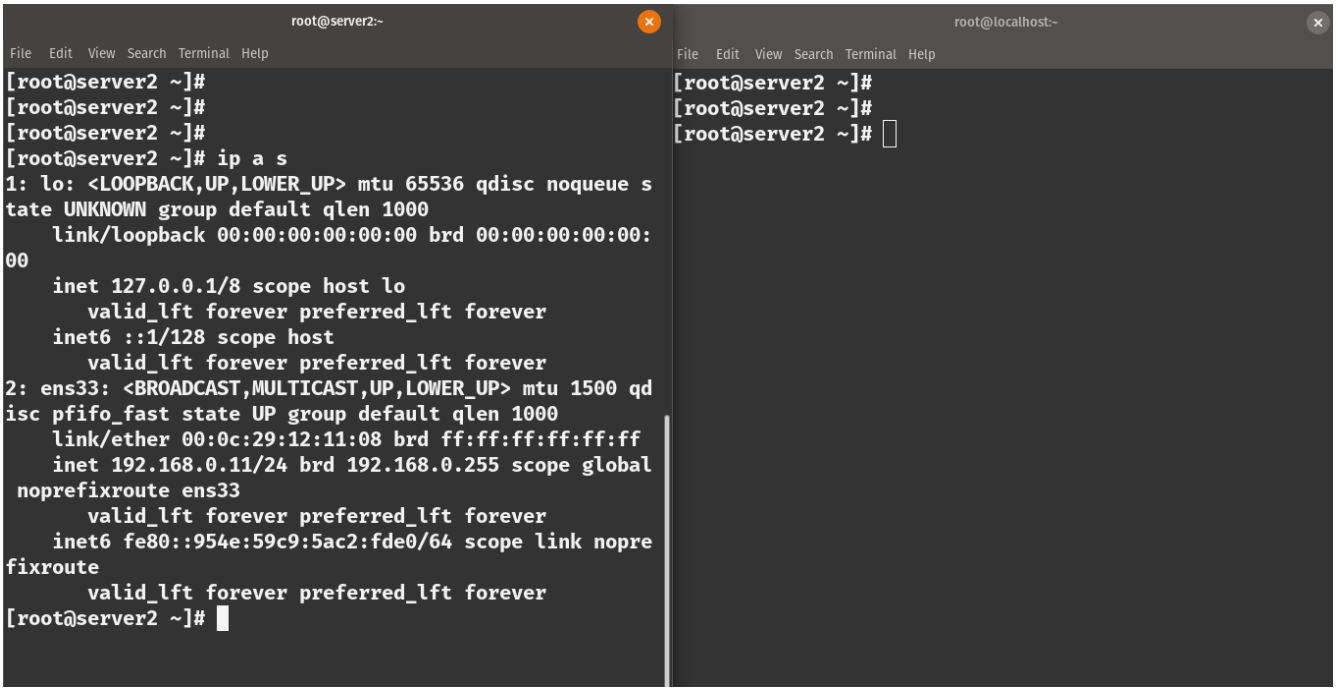
2) from server1 use the command and give the password

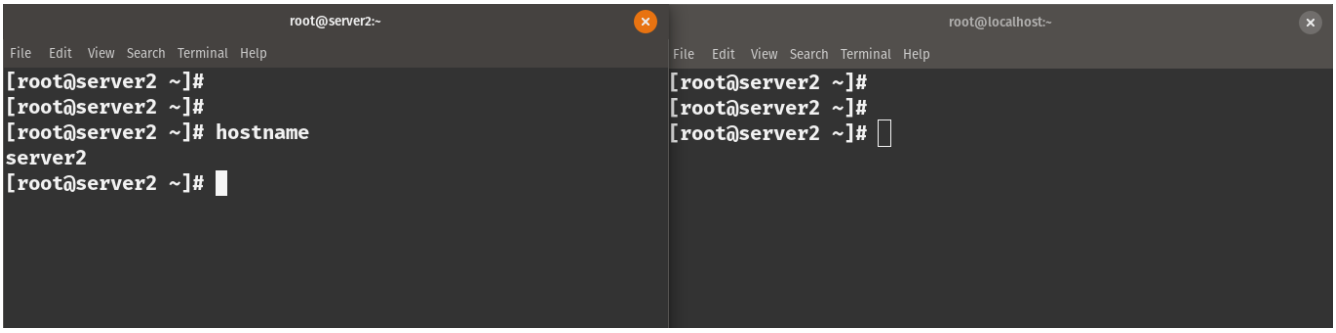
=>ssh root@192.168.0.11

password: <server2 password>



now you are logged in in server 2





login with ssh without password(more secure way):

using password to login with ssh is one way but it is not very secure the other way is to use a private and public key pair. we use a public private key pair for login rather than a password.

Step 1:

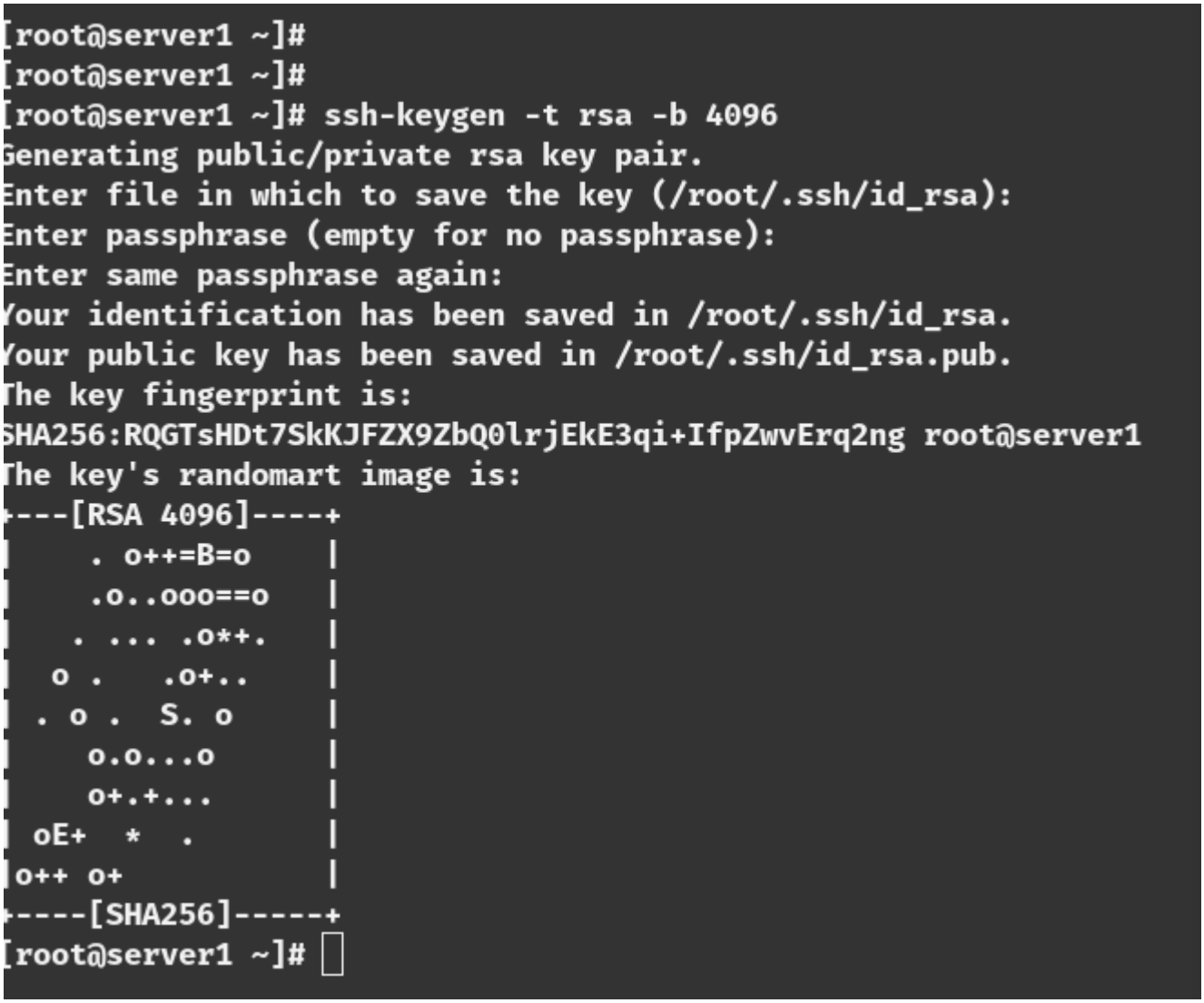
see if there is an existing key
=> **ls -l ~/.ssh**

Step 2:

Create the key pair from server1

[syntax:ssh-keygen -t <algorithm> -b <size>]

=>ssh-keygen -t rsa -b 4096



[it will ask you for a passphrase for now we skip it we will discuss it later]

Step 3:

we need to send the public key to ther server2.we can do it manually or we can do it using this command

=>ssh-copy-id server2@192.168.0.11

```
[root@server1 ~]#
[root@server1 ~]#
[root@server1 ~]# ssh-copy-id root@192.168.0.11
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/ro
ot/.ssh/id_rsa.pub"
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(
s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if
you are prompted now it is to install the new keys
root@192.168.0.11's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'root@192.168.0.11'
"
and check to make sure that only the key(s) you wanted were added.

[root@server1 ~]# ssh root@192.168.0.11
Last login: Sat Sep  7 15:29:15 2019 from 192.168.0.10
[root@server2 ~]#
```

Step 3:

login with

=>ssh root@192.168.0.11

and this time no password will be asked.

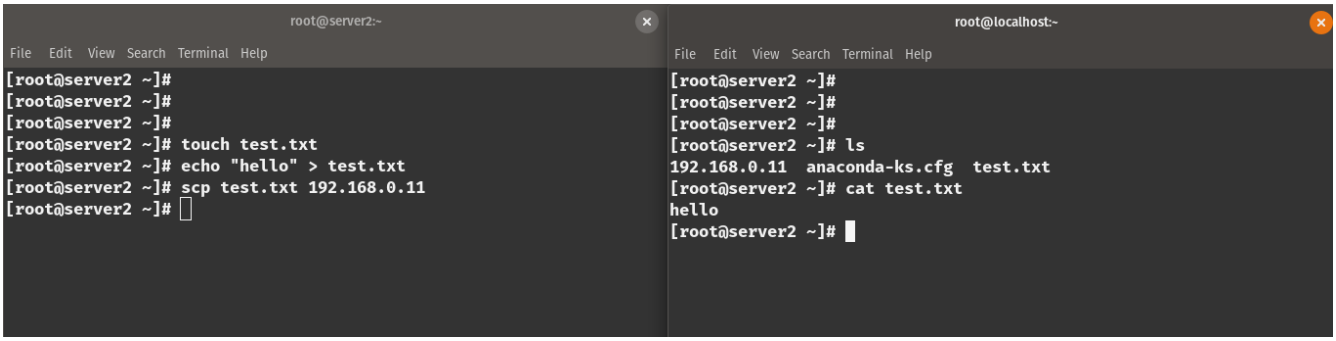
[
what is passphrase:
sometime the ssh connectivity is used by you sometimes not. for example you can make a cron job to connect automatically to a server for data backup. when you are going to use the ssh only its a good idea to use a passphrase .but for automation you should not use it cause there will be no one to type the passphrase .when you use a script to automatically connect to a server don't use any passphrase.
]

copy file with SCP(Secure copy and paste):

syntax:
scp <local_file> <destination>

we are going to send a file name '**test.txt**' from server1 to server2

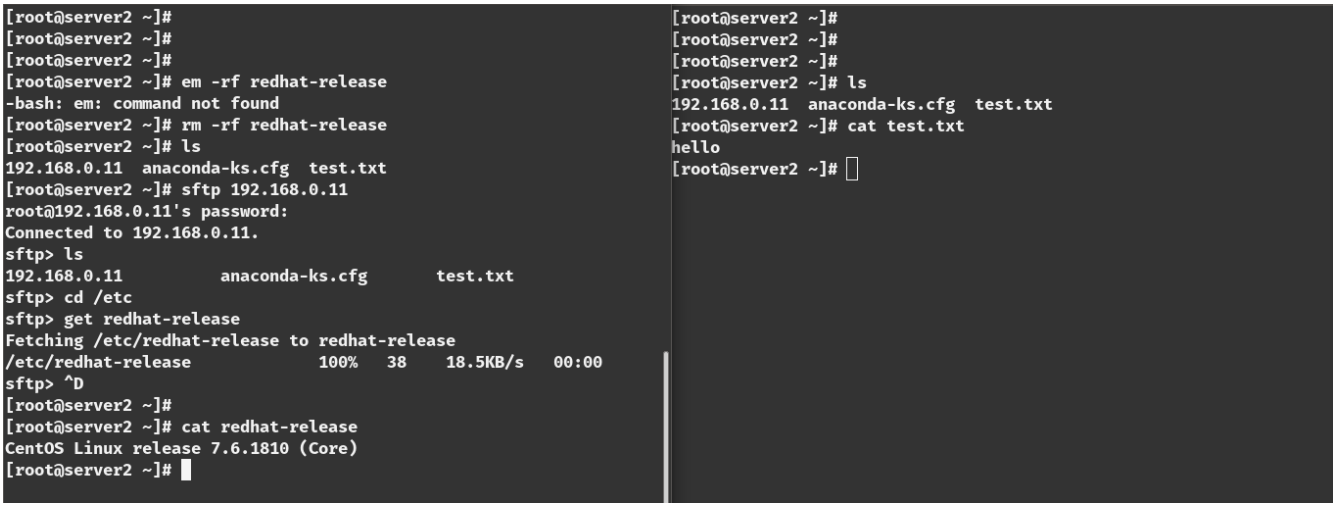
=>scp test.txt 192.168.0.11/test.txt



Copy file with SFTP(Secure File Transfer Protocol):

its a interactive process for sending file over SSH. its a sub system for ssh

=>sftp 192.168.0.10
sftp> cd /etc [go to etc directory]
sftp> get redhat-release [download the file]



Port Forwarding:

Port forwarding allows us to access from one system to another system and use their network services .for exmple you are running a web server in the server2 in port 80.you can access it with a browser or see the html using this command in server2

=>curl localhost

```
[root@server2 ~]# curl localhost
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN" "http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd"><html><head>
<meta http-equiv="content-type" content="text/html; charset=UTF-8">
               <title>Apache HTTP Server Test Page powered by CentOS</title>
               <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">

    <!-- Bootstrap -->
    <link href="/noindex/css/bootstrap.min.css" rel="stylesheet">
    <link rel="stylesheet" href="noindex/css/open-sans.css" type="text/css" />

<style type="text/css"><!--

body {
  font-family: "Open Sans", Helvetica, sans-serif;
  font-weight: 100;
  color: #ccc;
  background: rgba(10, 24, 55, 1);
  font-size: 16px;
}

h2, h3, h4 {
  font-weight: 200;
}
```

but you cant browse it with the server1using curl .you have to do port forwarding to established that connection.

```
[root@server1 ~]#
[root@server1 ~]# curl 192.168.0.11
curl: (7) Failed connect to 192.168.0.11:80; No route to host
[root@server1 ~]#
```

So if we forward the port 80 of the server2 to port 8000 in server1 we can access the content of the web server in server2 with server1in port 8000

command from server1:

=>ssh -L 8000:localhost:80 root@192.168.0.11

```
[root@server2 ~]# ssh -L 8000:localhost:80 root@192.168.0.10
The authenticity of host '192.168.0.10 (192.168.0.10)' can't be established.
ECDSA key fingerprint is SHA256:Vb8jzXFWtxe/Z7yco6NR2IPPJ+1uotVhlseVEx+/e2o.
ECDSA key fingerprint is MD5:bd:62:cb:ab:28:3b:ad:47:61:da:b5:8f:d8:b6:85:4c.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.0.10' (ECDSA) to the list of known hosts.
root@192.168.0.10's password:
Last login: Sat Sep  7 16:44:29 2019 from 192.168.0.6
[root@server1 ~]#
```

it will forward the port and we can access the resources from server1.it can be very useful for accessing a file that is behind a firewall.

```
[root@server1 ~]#
[root@server1 ~]# curl localhost:8000
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN" "http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd"><html><head>
<meta http-equiv="content-type" content="text/html; charset=UTF-8">
               <title>Apache HTTP Server Test Page powered by CentOS</title>
               <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">

    <!-- Bootstrap -->
    <link href="/noindex/css/bootstrap.min.css" rel="stylesheet">
    <link rel="stylesheet" href="noindex/css/open-sans.css" type="text/css" />

<style type="text/css"><!--
```

Copy configuration :

ssh server and configuration file is in the '/etc/ssh/' directory.

1) **'sshd_config'** is the ssh server configuration file
2) **'ssh_config'** is the ssh client configuration file

Lets see the server configuration file and important propertise

vim /etc/ssh/sshd_server

PasswordAuthentication yes
Port 22
PubkeyAuthentication yes
X11Forwarding yes

PermitRootLogin no

→ you can change the port from 22 to any port you want but default is 22

```
# If you want to change the port on a SELinux system, you have to tell
# SELinux about this change.
# semanage port -a -t ssh_port_t -p tcp #PORTNUMBER
#
#Port 22
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::
```

→ password authentication is set to no for some cloud server Because the use public private key pair which is more secure

→ X11 forwarding is by default set to yes. if you want to work with a gui interface this will let you do this

```
#AllowAgentForwarding yes
#AllowTcpForwarding yes
#GatewayPorts no
X11Forwarding yes
#X11DisplayOffset 10
#X11UseLocalhost yes
#PermitTTY yes
#PrintMotd yes
#PrintLastLog yes
```

→ Permit root login is set to no. It should be always set to no because root login can make major security risk