

Лабораторная работа №3
Введение в аппаратные и программные системы

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Цель - Получить практические навыки по конфигурированию SSH сервера под Linux, работы с удалённым хостом через терминал SSH. Познакомится с утилитами диагностики сетевых соединений. Закрепить теоретические понятия, связанные с взаимодействием по сетевому стеку.

Артефакты

1. Проверка сетевой конфигурации

hostname, host IP address, and DNS address of the host

```
[kunal@localhost ~]$ hostname
localhost.localdomain
[kunal@localhost ~]$ hostname -I
192.168.100.100 192.168.122.1
[kunal@localhost ~]$ grep nameserver /etc/resolv.conf
nameserver 192.168.29.1
[kunal@localhost ~]$
```

Pinging 5 packets to 1.1.1.1

```
[kunal@localhost ~]$ su
Password:
[root@localhost kunal]# ping -c 5 1.1.1.1
PING 1.1.1.1 (1.1.1.1) 56(84) bytes of data.
64 bytes from 1.1.1.1: icmp_seq=1 ttl=53 time=82.9 ms
64 bytes from 1.1.1.1: icmp_seq=2 ttl=53 time=94.8 ms
64 bytes from 1.1.1.1: icmp_seq=3 ttl=53 time=84.5 ms
64 bytes from 1.1.1.1: icmp_seq=4 ttl=53 time=84.8 ms
64 bytes from 1.1.1.1: icmp_seq=5 ttl=53 time=83.3 ms

--- 1.1.1.1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 82.939/86.102/94.862/4.449 ms
[root@localhost kunal]#
```

Checking that the sshd service is waiting for connections on the network interface on port 22

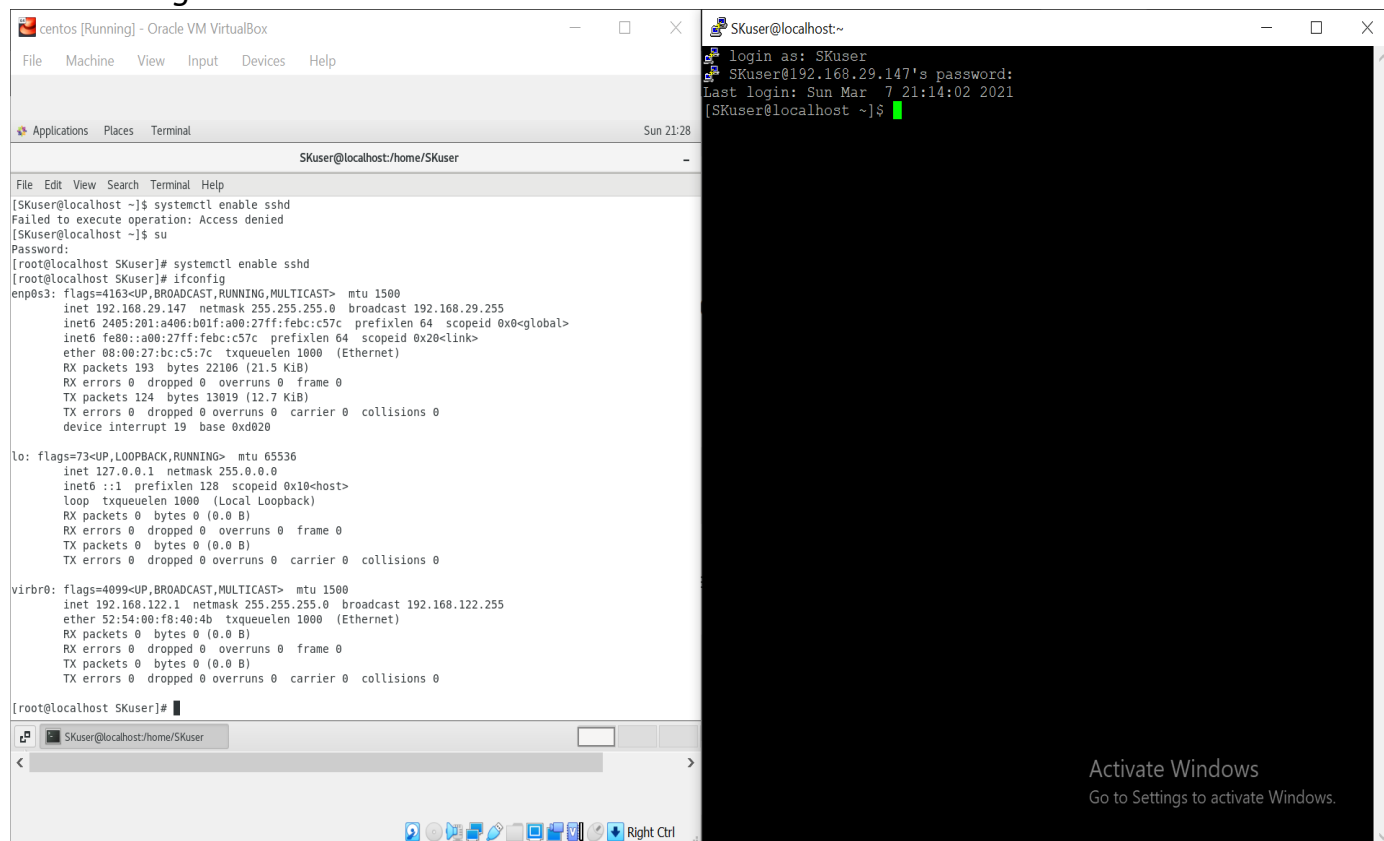
```
[root@localhost kunal]# lsof -i :22
COMMAND  PID USER  FD   TYPE DEVICE SIZE/OFF NODE NAME
sshd     1207 root   3u    IPv4  22013      0t0  TCP *:ssh (LISTEN)
sshd     1207 root   4u    IPv6  22022      0t0  TCP *:ssh (LISTEN)
[root@localhost kunal]#
```

2. Подготовка системы

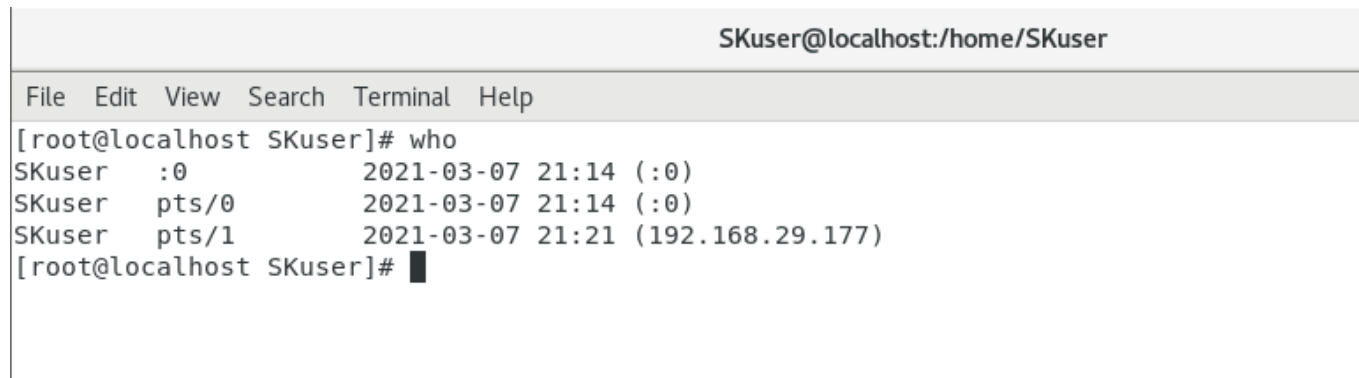
Creating a new user

```
[SKuser@localhost ~]$ who
SKuser      :0                2021-03-07 19:28 (:0)
SKuser      pts/0            2021-03-07 19:28 (:0)
[SKuser@localhost ~]$
```

Establishing connection



who command



All established network connections

```
Applications Places Terminal Sun 21:35
SKuser@localhost:/home/SKuser

File Edit View Search Terminal Help

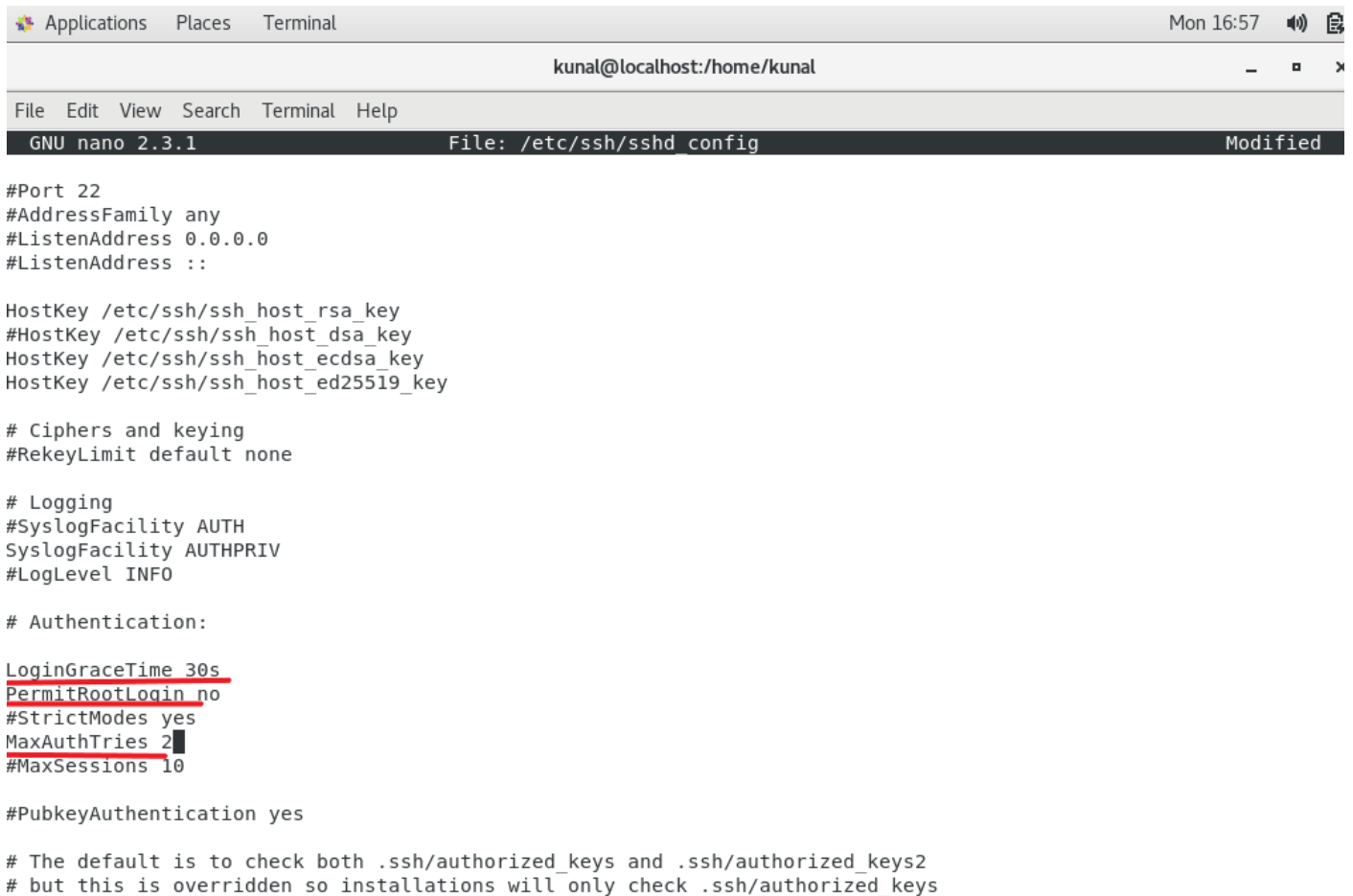
[root@localhost SKuser]# who
SKuser :0 2021-03-07 21:14 (:0)
SKuser pts/0 2021-03-07 21:14 (:0)
SKuser pts/1 2021-03-07 21:21 (192.168.29.177)
[root@localhost SKuser]# lsof -i
COMMAND PID USER FD TYPE DEVICE SIZE/OFF NODE NAME
rpcbind 663 rpc 6u IPv4 16205 0t0 UDP *:sunrpc
rpcbind 663 rpc 7u IPv4 16206 0t0 UDP *:838
rpcbind 663 rpc 8u IPv4 16207 0t0 TCP *:sunrpc (LISTEN)
rpcbind 663 rpc 9u IPv6 16208 0t0 UDP *:sunrpc
rpcbind 663 rpc 10u IPv6 16209 0t0 UDP *:838
rpcbind 663 rpc 11u IPv6 16210 0t0 TCP *:sunrpc (LISTEN)
chronyd 679 chrony 5u IPv4 17007 0t0 UDP localhost:323
chronyd 679 chrony 6u IPv6 17008 0t0 UDP localhost:323
avahi-dae 703 avahi 12u IPv4 18934 0t0 UDP *:mdns
avahi-dae 703 avahi 13u IPv4 18935 0t0 UDP *:41599
dhclient 1064 root 6u IPv4 20098 0t0 UDP *:bootpc
cupsd 1188 root 10u IPv6 22534 0t0 TCP localhost:ipp (LISTEN)
cupsd 1188 root 11u IPv4 22535 0t0 TCP localhost:ipp (LISTEN)
sshd 1195 root 3u IPv4 22198 0t0 TCP *:ssh (LISTEN)
sshd 1195 root 4u IPv6 22202 0t0 TCP *:ssh (LISTEN)
master 1398 root 13u IPv4 23181 0t0 TCP localhost:smtp (LISTEN)
master 1398 root 14u IPv6 23182 0t0 TCP localhost:smtp (LISTEN)
dnsmasq 1516 nobody 3u IPv4 23755 0t0 UDP *:bootps
dnsmasq 1516 nobody 5u IPv4 23758 0t0 UDP localhost.localdomain:domain
dnsmasq 1516 nobody 6u IPv4 23759 0t0 TCP localhost.localdomain:domain (LISTEN)
sshd 2753 root 3u IPv4 34286 0t0 TCP localhost.localdomain:ssh->192.168.29.177:63797 (ESTABLIS
HED)
sshd 2759 SKuser 3u IPv4 34286 0t0 TCP localhost.localdomain:ssh->192.168.29.177:63797 (ESTABLIS
HED)
[root@localhost SKuser]#
```

3. Передача файлов через SSH

```
[SKuser@localhost ~]$ scp -P 22 /etc/ssh/ssh_config ~/Desktop
[SKuser@localhost ~]$ scp -P 22 ~/Desktop/ssh_config root@127.0.0.1:/home
The authenticity of host '127.0.0.1 (127.0.0.1)' can't be established.
ECDSA key fingerprint is SHA256:/eQP4odwC7sqFt32kN6xXEf5N39W72ocWtcMixWjeEg.
ECDSA key fingerprint is MD5:10:35:67:c1:59:72:02:0a:7e:de:89:68:ee:ef:da:62.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '127.0.0.1' (ECDSA) to the list of known hosts.
root@127.0.0.1's password:
Permission denied, please try again.
root@127.0.0.1's password:
ssh_config 100% 2276 2.5MB/s 00:00
[SKuser@localhost ~]$ cd /home
[SKuser@localhost home]$ ls
kunal SKuser ssh_config
[SKuser@localhost home]$
```

```
[SKuser@localhost ~]$ cd /home
[SKuser@localhost home]$ ls
kunal SKuser ssh_config
[SKuser@localhost home]$
```

4. Настройка sshd



```
Applications Places Terminal Mon 16:57
kunal@localhost:/home/kunal
File Edit View Search Terminal Help
GNU nano 2.3.1 File: /etc/ssh/sshd_config Modified

#Port 22
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::

HostKey /etc/ssh/ssh_host_rsa_key
#HostKey /etc/ssh/ssh_host_dsa_key
HostKey /etc/ssh/ssh_host_ecdsa_key
HostKey /etc/ssh/ssh_host_ed25519_key

# Ciphers and keying
#RekeyLimit default none

# Logging
#SyslogFacility AUTH
SyslogFacility AUTHPRIV
#LogLevel INFO

# Authentication:

LoginGraceTime 30s
PermitRootLogin no
#StrictModes yes
MaxAuthTries 2
#MaxSessions 10

#PubkeyAuthentication yes

# The default is to check both .ssh/authorized_keys and .ssh/authorized_keys2
# but this is overridden so installations will only check .ssh/authorized_keys
```

Ответы на вопросы

1. Перед первым подключением к ssh серверу клиент показывает пользователю набор чисел. Что это за набор?

SSH-key is a key that serves to grant access to the server

2. Возможен ли, по-вашему, запуск нескольких ssh серверов на одном хосте? Если да, то при каких условиях?

Yes, but they should be on different ports