

Ранее были созданы 2 виртуальные машины: **Ubuntu Desktop 22.04** с сетевым адресом 192.168.1.129, установленным вручную, и **Ubuntu Server 24.10**, с сетевым адресом 192.168.1.130, с установленной на него графикой. На хосте установлена **Ubuntu 24.04** с сетевым адресом 192.168.1.16.

На хостовой системе с помощью команды `ssh-keygen -t ed25519 -C "dudzich@Programmer9"` создаю ключ и отправляю его в директорию по умолчанию `/home/dudzich/.ssh/`

```
dudzich@VM-22-04-desktop: ~  
dudzich@Programmer9:~$ ssh-keygen -t ed25519 -C "dudzich@Programmer9"  
Generating public/private ed25519 key pair.  
Enter file in which to save the key (/home/dudzich/.ssh/id_ed25519):  
Enter passphrase (empty for no passphrase):  
Enter same passphrase again:  
Your identification has been saved in /home/dudzich/.ssh/id_ed25519  
Your public key has been saved in /home/dudzich/.ssh/id_ed25519.pub  
The key fingerprint is:  
SHA256:TPGFHuG+QdlfZJDNZpgHqxurlCn8A34h5abdLnKb/zc dudzich@Programmer9  
The key's randomart image is:  
+--[ED25519 256]--+  
| . .O. oOo|  
| +O+ ++|  
| ..=.. +.|  
| o oo o . |  
| Soo o . |  
| .O += + |  
| .O*=oo |  
| ++*O. E. |  
| +=*O... |  
+----[SHA256]-----+
```

После этого с помощью команды `ssh-copy-id dudzich@192.168.1.129` пробрасываю этот ключ на виртуальную машину с Ubuntu Desktop 22.04, оставляя поле пароля пустым.

```
dudzich@Programmer9:~$ ssh-copy-id dudzich@192.168.1.129  
/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  
dudzich@192.168.1.129's password:  
Permission denied, please try again.  
dudzich@192.168.1.129's password:  
  
Number of key(s) added: 1  
  
Now try logging into the machine, with: "ssh 'dudzich@192.168.1.129'"  
and check to make sure that only the key(s) you wanted were added.
```

После чего подключаюсь к этой машине по ssh, используя команду `ssh dudzich@192.168.1.129`

```
dudzich@Programmer9:~$ ssh dudzich@192.168.1.129  
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 6.8.0-47-generic x86_64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:       https://ubuntu.com/pro  
  
Расширенное поддержание безопасности (ESM) для Applications выключено.  
  
0 обновлений может быть применено немедленно.  
  
7 дополнительных обновлений безопасности могут быть применены с помощью ESM Apps.  
Подробнее о включении службы ESM Apps at https://ubuntu.com/esm  
  
New release '24.04.1 LTS' available.  
Run 'do-release-upgrade' to upgrade to it.  
  
Last login: Fri Oct 18 15:40:10 2024 from 192.168.1.16
```

Аналогичные действия проделываю для подключения с первой виртуалки на хост. Подключаюсь к виртуалке по ssh:

```
dudzich@Programmer9:~$ ssh dudzich@192.168.1.129
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 6.8.0-47-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

Расширенное поддержание безопасности (ESM) для Applications выключено.

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Подробнее о включении службы ESM Apps at https://ubuntu.com/esm

New release '24.04.1 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Fri Oct 18 16:15:04 2024 from 192.168.1.16
```

Создаю ключ:

```
dudzich@VM-22-04-desktop:~$ ssh-keygen -t ed25519 -C "dudzich@VM-22-04-desktop"
Generating public/private ed25519 key pair.
Enter file in which to save the key (/home/dudzich/.ssh/id_ed25519):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/dudzich/.ssh/id_ed25519
Your public key has been saved in /home/dudzich/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:cnF1TSVRtCE+LP+JyUiI7hSkHXr/70WZ98wwbugg6Cw dudzich@VM-22-04-desktop
The key's randomart image is:
+--[ED25519 256]--+
|      .o=B*      |
|      o  .oo..+  |
|     = + o  o..  |
|    o = + .  ..  |
|   + S . o o o |
|   * . . + ..  |
|  + . +  oo  |
| Eo . . ++.*  |
|   .o  .o.=o  |
+-----[SHA256]-----+
```

После этого пробрасываю ключ на хост:

```
dudzich@VM-22-04-desktop:~$ ssh-copy-id dudzich@192.168.1.16
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/dudzich/.ssh/id_ed25519.pub"
The authenticity of host '192.168.1.16 (192.168.1.16)' can't be established.
ED25519 key fingerprint is SHA256:6QlGJq8Pp0uWTSKQewrcdIYruIRpzwK48LZHmYvcvgk.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/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
dudzich@192.168.1.16's password:

Number of key(s) added: 1

Now try logging into the machine, with: "ssh 'dudzich@192.168.1.16'"
and check to make sure that only the key(s) you wanted were added.
```

И логируюсь на хост из виртуалки по ssh:

```
dudzich@VM-22-04-desktop:~$ ssh dudzich@192.168.1.16
Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 6.8.0-45-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

Расширенное поддержание безопасности (ESM) для Applications выключено.

10 обновлений может быть применено немедленно.
Чтобы просмотреть дополнительные обновления выполните: apt list --upgradable

9 дополнительных обновлений безопасности могут быть применены с помощью ESM Apps.
Подробнее о включении службы ESM Apps at https://ubuntu.com/esm

*** Требуется перезагрузка системы ***
dudzich@Programmer9:~$
```


Теперь реализую подключение второй машины Ubuntu Server 24.10 к первой машине Ubuntu Desktop 22.04

Логинюсь на вторую машину:

```
dudzich@Programmer9:~$ ssh dudzich@192.168.1.130
Welcome to Ubuntu 24.10 (GNU/Linux 6.11.0-8-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Пт 18 окт 2024 13:53:55 UTC

System load:  0.0               Processes:    195
Usage of /home: 0.0% of 52.85GB Users logged in: 1
Memory usage:  25%             IPv4 address for enp0s3: 192.168.1.130
Swap usage:    0%

 * Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
   just raised the bar for easy, resilient and secure K8s cluster deployment.

   https://ubuntu.com/engage/secure-kubernetes-at-the-edge

0 updates can be applied immediately.

Last login: Fri Oct 18 12:43:13 2024 from 192.168.1.129
```

Создаю ключ:

```
dudzich@ubuntu-server-24:~$ ssh-keygen -t ed25519 -C "ubuntu-server-24"
Generating public/private ed25519 key pair.
Enter file in which to save the key (/home/dudzich/.ssh/id_ed25519):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/dudzich/.ssh/id_ed25519
Your public key has been saved in /home/dudzich/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:imrpvJ7JcJvP18D+w6rXfjTzLKRe19XjDdoV1dldeG8 ubuntu-server-24
The key's randomart image is:
+--[ED25519 256]--+
|      .O|
|      ..*|
|      o.|
|      .E|
|   . S   ooo|
|   .o. = =.oo|
| . . . . . = +. = + ...|
| =oB  + *.o.o |
| +%o++.=+o .   |
+----[SHA256]-----+
```

Знакомлю с ним виртуальную машину номер 1, она же Ubuntu Desktop 22.04:

```
dudzich@ubuntu-server-24:~$ ssh-copy-id dudzich@192.168.1.129
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/dudzich/.ssh/id_ed25519.pub"
The authenticity of host '192.168.1.129 (192.168.1.129)' can't be established.
ED25519 key fingerprint is SHA256:UCFzxQaBvvFdVCw3sTVgvVGLZ2Zahmj5QkTg4fxr13o.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/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
dudzich@192.168.1.129's password:

Number of key(s) added: 1

Now try logging into the machine, with:  "ssh 'dudzich@192.168.1.129'"
and check to make sure that only the key(s) you wanted were added.
```

И подключаюсь к виртуальной машине №1 с виртуальной машины №2:

```
dudzich@ubuntu-server-24:~$ ssh dudzich@192.168.1.129
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 6.8.0-47-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

Расширенное поддержание безопасности (ESM) для Applications выключено.

0 обновлений может быть применено немедленно.

7 дополнительных обновлений безопасности могут быть применены с помощью ESM Apps.
Подробнее о включении службы ESM Apps at https://ubuntu.com/esm

New release '24.04.1 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Fri Oct 18 16:42:27 2024 from 192.168.1.16
dudzich@VM-22-04-desktop:~$
```

Запрет соединения к хосту с виртуальной машины №2, она же Ubuntu Server 24.10, осуществляю с помощью утилиты **iptables**, а именно команды **sudo iptables -A OUTPUT -d 192.168.1.16 -p tcp --dport 22 -j REJECT**, которая блокирует исходящий tcp трафик через порт 22, по которому и происходит коннект по ssh.

```
dudzich@ubuntu-server-24:~$ sudo iptables -L -v -n
Chain INPUT (policy ACCEPT 3423 packets, 959K bytes)
 pkts bytes target     prot opt in     out     source         destination
Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source         destination
Chain OUTPUT (policy ACCEPT 1542 packets, 288K bytes)
 pkts bytes target     prot opt in     out     source         destination
dudzich@ubuntu-server-24:~$ sudo iptables -A OUTPUT -d 192.168.1.16 -p tcp --dport 22 -j REJECT
dudzich@ubuntu-server-24:~$ sudo iptables -L -v -n
Chain INPUT (policy ACCEPT 3437 packets, 961K bytes)
 pkts bytes target     prot opt in     out     source         destination
Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source         destination
Chain OUTPUT (policy ACCEPT 1542 packets, 288K bytes)
 pkts bytes target     prot opt in     out     source         destination
 0      0 REJECT     6     --  *      *      0.0.0.0/0      192.168.1.16      tcp dpt:22 reject-with icmp-port-unreachable
dudzich@ubuntu-server-24:~$ ssh dudzich@192.168.1.16
ssh: connect to host 192.168.1.16 port 22: Connection refused
dudzich@ubuntu-server-24:~$
```

Подключение с хоста на эту машину осталось без изменений исправным:

```
dudzich@Programmer9:~$ ssh dudzich@192.168.1.130
Welcome to Ubuntu 24.10 (GNU/Linux 6.11.0-8-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Пт 18 окт 2024 15:00:36 UTC

System load:  0.0               Processes:    206
Usage of /home: 0.0% of 52.85GB  Users logged in: 1
Memory usage:  32%             IPv4 address for enp0s3: 192.168.1.130
Swap usage:    0%

 * Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
   just raised the bar for easy, resilient and secure K8s cluster deployment.

   https://ubuntu.com/engage/secure-kubernetes-at-the-edge

0 updates can be applied immediately.

Last login: Fri Oct 18 14:55:27 2024 from 192.168.1.16
dudzich@ubuntu-server-24:~$
```