

Linux Ağ Yönetimi Final Projesi

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Makinelerin Klonlanması

!!! makinelerin klonlanmasını ekle !!! programlar hakkında metadata ekle

Senaryo 1

NAT ile Host-Guest Ubuntu PC Bağlantısı

Başlangıç olarak guest makinenin Network Adapterini NAT olarak seçiyoruz

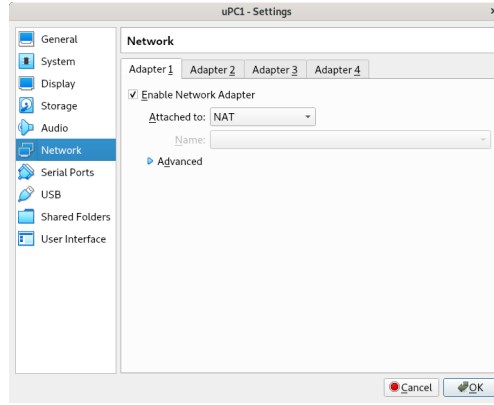


Figure 1: NAT adapter ayarı

SSH

host makineye NAT bağlantı ile erişebilmek için öncelikle gerekli gerekli portu yönlendiriyoruz daha sonra gueste ssh ile bağlanabilmek için open-ssh serveri apt ile yüklüyoruz.

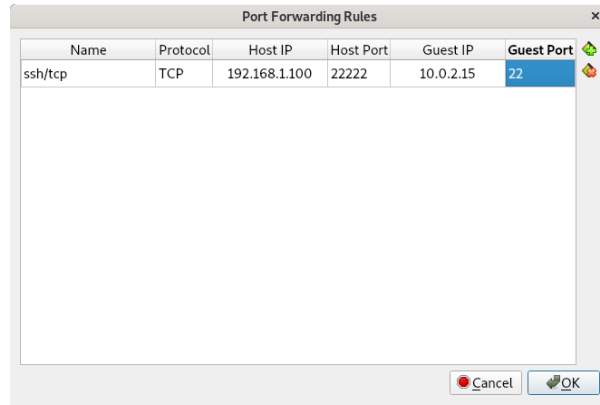


Figure 2: Port forwarding

```
$ apt install opessh-server
```

ssh server servisinin ayarlarını dosyasından 22 numaralı portu ve parolayı kabul edecek şekilde yapıyoruz.

```
$ echo "Port 22" >> /etc/ssh/sshd_config
$ echo "PasswordAuthentication yes" >> /etc/ssh/sshd_config
```

Ayarların aktif olması için ssh servisini yeniden başlatıyoruz.

```
$ sudo service ssh restart
```

Forward ettiğimiz port üzerinden guest'e bağlanabiliriz.

```
$ ssh kumru@192.168.1.100 -p 22222 # hostun ip adresi
```

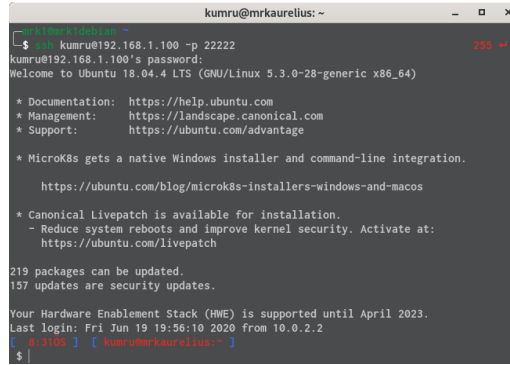


Figure 3: Gueste ssh ile bağlanma

Ping

Eğer ICMP port ile çalışsaydı aynı şekilde onunda portunu yönlendirip gueste ping atabilirdik fakat ICMP TCP/UDP portları üzerinden çalışmıyor.

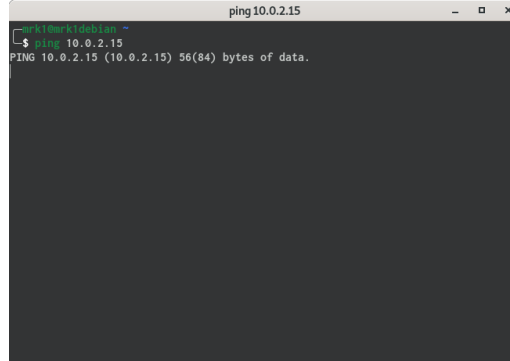


Figure 4: Gueste ping gönderilemiyor

Misafir Eklentileri

Misafir eklentilerini guest makineye sanal disk takarak yükleyebiliriz bu sayede hosttan gueste veya guestten hosta kopyala yapıştır ve dosya sürekli bırak yapabiliriz. Eklenti yüklemek zor değil sanal makine penceresinden **Devices > Insert Guest Additions CD...** seçeneğini seçince bize

autorun.sh'ı çalıştırıyım mı diye soruyor evet diyip parolamızı girince eklentiler yükleniyor

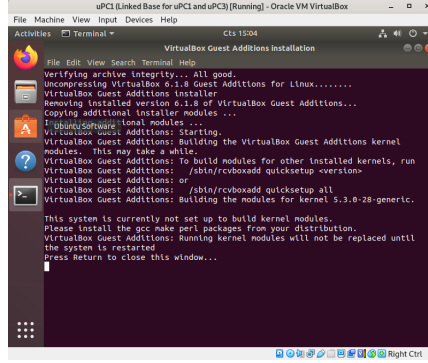


Figure 5: autorun.sh çıktısı

Sanal makinenin penceresinden Devices > Drag and Drop, Devices > Shared Clipboard seçeneklerinden detaylı ayar yapılabilir.

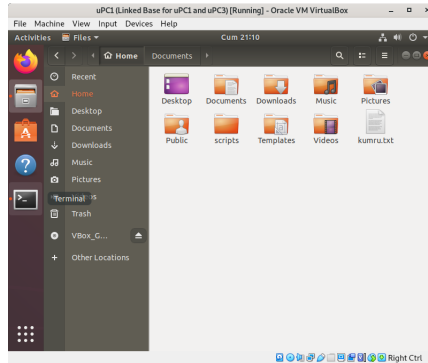


Figure 6: Gueste eklentileri ile sürükleyip bırak

Network Bridge ile Host, TinyCore Guest Bağlantısı

Guestin network adapter ayarını Bridge Adapter olarak seçiyoruz

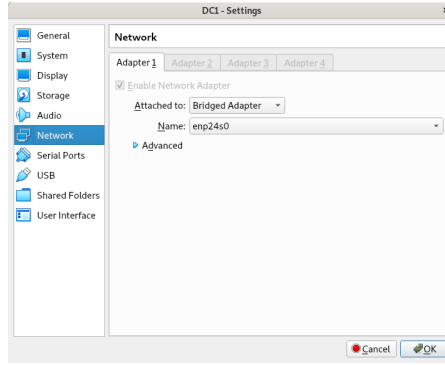


Figure 7: Network Bridge Ayarı

TinyCore'da IP'mizi ifconfig komutu ile kontrol edebiliyoruz.

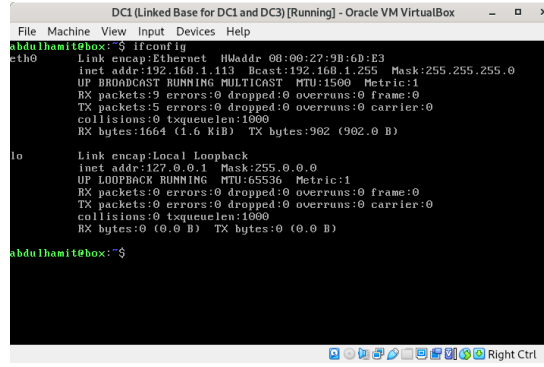


Figure 8: ifconfig çıktısı

Network Bridge ile Guest LAN'daki makine gibi kullanılabilir.

SSH

tce-load programı ile TinyCore'da program yükleyebiliyoruz.

```
# openssh client/server paketini yükleme
tce-load -w -i openssh.tcz
# ssh/sshd ayarları
cp /usr/local/etc/ssh/ssh_config.orig /usr/local/etc/ssh/ssh_config
cp /usr/local/etc/ssh/sshd_config.orig /usr/local/etc/ssh/sshd_config
echo "Port 22" >> /usr/local/etc/ssh/sshd_config
echo "PasswordAuthentication yes" >> /usr/local/etc/ssh/sshd_config
# servisi çalıştırma
/usr/local/etc/init.d/openssh start
```

```
ssh abdulhamit@192.168.1.113
$ ssh -a
Linux mrk1debian 4.19.0-9-amd64 #1 SMP Debian 4.19.118-2+deb10u1 (2020-06-07) x86_64 GNU/Linux
$ ssh abdulhamit@192.168.1.113
abdulhamit@192.168.1.113's password:
( ' > ' )
 / ) TC ( \ Core is distributed with ABSOLUTELY NO WARRANTY.
 ( / _ _ _ \ ) www.tinycorelinux.net

abdulhamit@box:~$ uname -a
Linux box 5.4.3-tinycore #2020 SMP Tue Dec 17 17:00:50 UTC 2019 i686 GNU/Linux
abdulhamit@box:~$
```

Figure 9: Gueste ssh bağlantısı

Ping

```
ping 192.168.1.113
$ ping 192.168.1.113
PING 192.168.1.113 (192.168.1.113) 56(84) bytes of data:
64 bytes from 192.168.1.113: icmp_seq=1 ttl=64 time=0.244 ms
64 bytes from 192.168.1.113: icmp_seq=2 ttl=64 time=0.237 ms
```

Figure 10: Gueste ping gönderebiliyoruz

Host only Adapter ile Host, Ubuntu Server Guest Bağlantısı

Host only Adapter kullanabilmek için öncelikle Host Network oluşturmak gerekli. Ana Menüden **File > Host Network Manager...**i seçip create tıklıyoruz ve Network Oluşuyor.

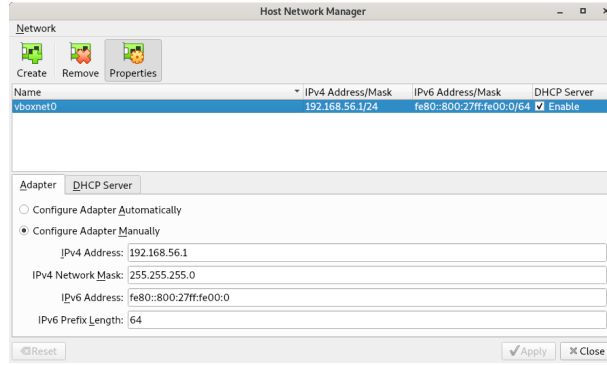


Figure 11: Host Network

Guestimizin Network adapterini Host only Adapter seçip alt seçenekten oluşturduğumuz Host Network'ü seçiyoruz.

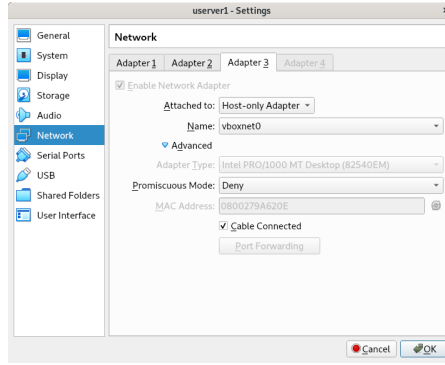


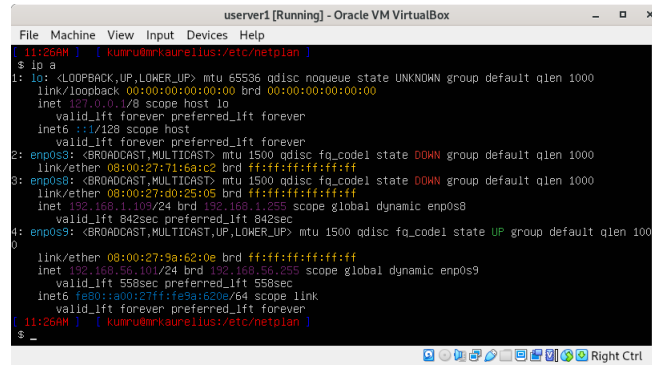
Figure 12: Host Only Adapter Ayarı

yaml formatındaki `/etc/netplan/50-cloud-init.yaml` dosyasını Network Interfacemizi DHCP ile yönetilmesi için ayarlıyoruz

```
# /etc/netplan/50-cloud-init.yaml
network:
  version: 2
  renderer: networkd
  ethernets:
    enp0s9:
      dhcp4: yes
```

Yeni ayarların kullanması için netplan komutunu çalıştırıyoruz.

```
$ sudo netplan --debug apply
```



```
userver1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
[ 11:26AM ] [ kumru@mrkaurelius:/etc/netplan ]
$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST> mtu 1500 qdisc fq_codel state DOWN group default qlen 1000
    link/ether 08:00:27:71:6a:c2 brd ff:ff:ff:ff:ff:ff
3: enp0s8: <BROADCAST,MULTICAST> mtu 1500 qdisc fq_codel state DOWN group default qlen 1000
    link/ether 08:00:27:d0:25:05 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.109/24 brd 192.168.1.255 scope global dynamic enp0s8
        valid_lft 842sec preferred_lft 842sec
4: enp0s9: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:9a:62:0e brd ff:ff:ff:ff:ff:ff
    inet 192.168.56.101/24 brd 192.168.56.255 scope global dynamic enp0s9
        valid_lft 558sec preferred_lft 558sec
    inet6 fe80::a00:27:ff:fe9a:620e/64 Scope Link
        valid_lft forever preferred_lft forever
[ 11:26AM ] [ kumru@mrkaurelius:/etc/netplan ]
$
```

Figure 13: Host-only Adapterin Host Networkten aldığı IP.

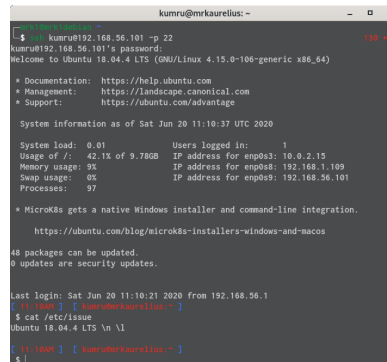
SSH

NAT ile Host, Guest Ubuntu PC Bağlantısı bölümünde yaptığımız komutları burada tekrar ediyoruz.

```
$ apt install opessh-server
$ echo "Port 22" >> /etc/ssh/sshd_config
$ echo "PasswordAuthentication yes" >> /etc/ssh/sshd_config
$ sudo service ssh restart
```

userver1'e SSH ile bağlanıyoruz.

```
$ ssh kumru@192.168.56.101
```



```
kumru@mrkaurelius:~$ cat /etc/issue
kumru@192.168.56.101 ~$
kumru@192.168.56.101's password:
Welcome to Ubuntu 18.04.4 LTS (GNU/Linux 4.15.0-106-generic x86_64)

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

System information as of Sat Jun 20 11:10:37 UTC 2020

System load: 0.01          Users logged in: 1
Usage of /: 42.1% of 9.7GB  IP address for enp0s3: 10.0.2.15
Memory usage: 3%          IP address for enp0s8: 192.168.1.109
Swap usage: 0%            IP address for enp0s9: 192.168.56.101
Processes: 97

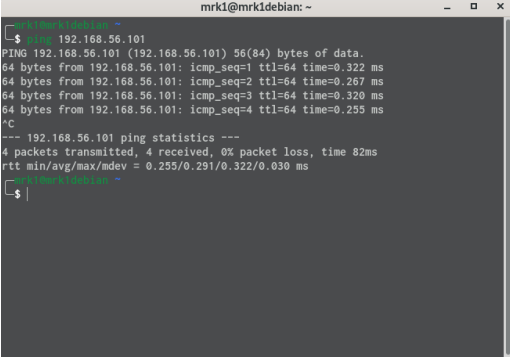
 * MicroK8s gets a native Windows installer and command-line integration.
   https://ubuntu.com/blog/microk8s-installers-windows-and-macos

46 packages can be updated.
0 updates are security updates.

Last login: Sat Jun 20 11:10:21 2020 from 192.168.56.1
$ cat /etc/issue
Ubuntu 18.04.4 LTS \n \l
[ 11:10AM ] [ kumru@mrkaurelius:~ ]
$
```

Figure 14: Gueste ssh ile bağlanma

Ping



```
mrk1@mrk1debian: ~  
$ ping 192.168.56.101  
PING 192.168.56.101 (192.168.56.101) 56(84) bytes of data.  
64 bytes from 192.168.56.101: icmp_seq=1 ttl=64 time=0.322 ms  
64 bytes from 192.168.56.101: icmp_seq=2 ttl=64 time=0.267 ms  
64 bytes from 192.168.56.101: icmp_seq=3 ttl=64 time=0.320 ms  
64 bytes from 192.168.56.101: icmp_seq=4 ttl=64 time=0.255 ms  
^C  
--- 192.168.56.101 ping statistics ---  
4 packets transmitted, 4 received, 0% packet loss, time 82ms  
rtt min/avg/max/mdev = 0.255/0.291/0.322/0.030 ms  
$
```

Figure 15: Gueste Ping gönderme

Senaryo 2

Internal Network ile Host-Guest, Guest-Guest Bağlatısı

Internal Network Ayarı

Senaryo gereği ip Ubuntu Serverların ipleri

host: 192.168.0.1 userver1: 192.168.0.2 userver2: 192.168.0.3
userver3: 192.168.0.4

Internal network için Network Adapterin modunu seçmek yeterli.

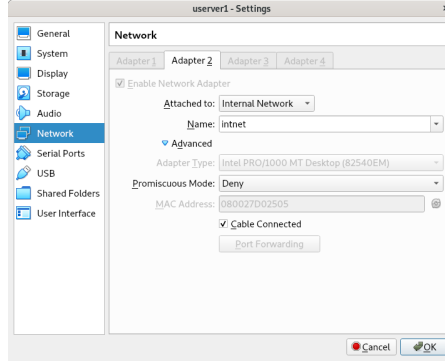


Figure 16: Internal Network Ayarları

Netplan Ayarları

netplan ayarlarını Senaryo 1 de yaptığımız gibi yapıyoruz. Farklı olarak dhcp olmadan statik bir şekilde IP alıyoruz

```
# /etc/netplan/50-cloud-init.yaml
# S:0 R:2
network:
  version: 2
  renderer: networkd
  ethernets:
    enp0s8:
      dhcp4: no
      addresses:
        - 192.168.0.2/24 # userver1 için
      gateway4: 192.168.0.1
      nameservers:
        # aslında nameserver ayarlamasının anlamı yok ama adet yerini bulsun
        addresses: [8.8.8.8, 1.1.1.1]
```

SSH

SSH server yüklediğimiz için ve diğer makineler klon olduğu için bir daha SSH yükleme ve ayarlamaya gerek yok. Guestler arasında SSH bağlantısı yapılabiliyor.

```
userver2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

$ ssh 192.168.0.2
Warning: Permanently added '192.168.0.2' (ED2661) to the list of known hosts.
kumru@192.168.0.2:~$
Welcome to Ubuntu 18.04.4 LTS (GNU/Linux 4.15.0-106-generic x86_64)

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

System information as of Sun Jun 21 18:34:51 UTC 2020

System load:  0.0          Processes:    32
Usage of /:   43.9% of 9.7GB    Users logged in: 1
Memory usage: 32             IP address for enp0s3: 192.168.0.2
Swap usage:   0%

48 packages can be updated.
0 updates are security updates.
Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings.

Last login: Sun Jun 21 18:30:54 2020
zsh: corrupt history file /home/kumru/.zsh_history
kumru@192.168.0.2:~$
```

Figure 17: Guestler Arasında SSH

```
userver1 [Linked Base for userver1 and userver2] [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

$ ssh 192.168.0.4
Warning: Permanently added '192.168.0.4' (ED2661) to the list of known hosts.
kumru@192.168.0.4:~$
Welcome to Ubuntu 18.04.4 LTS (GNU/Linux 4.15.0-106-generic x86_64)

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

System information as of Sun Jun 21 18:41:55 UTC 2020

System load:  0.08         Processes:    88
Usage of /:   43.9% of 9.7GB    Users logged in: 1
Memory usage: 72             IP address for enp0s3: 192.168.0.4
Swap usage:   0%

48 packages can be updated.
0 updates are security updates.
Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings.

Last login: Sun Jun 21 18:30:25 2020
zsh: corrupt history file /home/kumru/.zsh_history
kumru@192.168.0.4:~$
```

Figure 18: Guestler Arasında SSH

Internal Networkte hostdan guestlere ulaşmak mümkün değil.

```
mrk1@mrk1debian:~$
$ ssh -o StrictHostKeyChecking=no kumru@192.168.0.3
ssh: connect to host 192.168.0.3 port 22: No route to host
$
```

Figure 19: Hosttan Geste SSH denemesi

Ping

Guestler birbirlerine ulaşabildiği için birbirlerine ping göndermeleri mümkün.

```
userver2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

$ ping 192.168.0.2
PING 192.168.0.2 (192.168.0.2) 56(84) bytes of data:
64 bytes from 192.168.0.2: icmp_seq=1 ttl=64 time=0.566 ms
64 bytes from 192.168.0.2: icmp_seq=2 ttl=64 time=0.513 ms
64 bytes from 192.168.0.2: icmp_seq=3 ttl=64 time=0.495 ms
^C
--- 192.168.0.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2036ms
rtt min/avg/max/mdev = 0.495/0.525/0.566/0.029 ms
$ ping 192.168.0.3
PING 192.168.0.3 (192.168.0.3) 56(84) bytes of data:
64 bytes from 192.168.0.3: icmp_seq=1 ttl=64 time=0.028 ms
64 bytes from 192.168.0.3: icmp_seq=2 ttl=64 time=0.037 ms
64 bytes from 192.168.0.3: icmp_seq=3 ttl=64 time=0.044 ms
^C
--- 192.168.0.3 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2012ms
rtt min/avg/max/mdev = 0.028/0.036/0.044/0.008 ms
$ ping 192.168.0.4
PING 192.168.0.4 (192.168.0.4) 56(84) bytes of data:
64 bytes from 192.168.0.4: icmp_seq=1 ttl=64 time=0.314 ms
64 bytes from 192.168.0.4: icmp_seq=2 ttl=64 time=0.492 ms
64 bytes from 192.168.0.4: icmp_seq=3 ttl=64 time=0.459 ms
^C
--- 192.168.0.4 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2029ms
rtt min/avg/max/mdev = 0.314/0.408/0.459/0.066 ms
^C
$ -
```

Figure 20: Guestler Arası Ping

SCP

Gerek olmasada boş dosya göndermek yerine sıfır yazılmış 100M büyüklüğünde dosyalar gönderelim.

```
# dosyalari hazirlama
$ dd if=/dev/zero of=abdulhamit.txt count=100 bs=1M
$ cat abdulhamit.txt > kumru.txt > 170202020.txt
# scp komutu
$ scp *.txt 192.168.0.3:/home/kumru/
```

```
userver1 (Linked Base for userver1 and userver3) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

$ scp 1702020.txt abdulhamit.txt kumru.txt 192.168.0.3:/home/kumru/
userver1:192.168.0.3's password:
170202020.txt                                100% 100MB 87.9MB/s  00:01
abdulhamit.txt                               100% 100MB 83.5MB/s  00:01
kumru.txt                                    100% 100MB 82.3MB/s  00:01
^C
$
```

Figure 21: scp Komutu Çıktısı

Senaryo 3