

```

        mirror_mod = modifier_ob.mirror_mod
        #set mirror object to mirror_mod
        mirror_mod.mirror_object = mirror_ob

        if operation == "MIRROR_X":
            mirror_mod.use_x = True
            mirror_mod.use_y = False
            mirror_mod.use_z = False
        elif operation == "MIRROR_Y":
            mirror_mod.use_x = False
            mirror_mod.use_y = True
            mirror_mod.use_z = False
        elif operation == "MIRROR_Z":
            mirror_mod.use_x = False
            mirror_mod.use_y = False
            mirror_mod.use_z = True

        #selection at the end -add
        mirror_ob.select= 1
        modifier_ob.select=1
        bpy.context.scene.objects.active = mirror_ob
        bpy.context.scene.objects.active.name = "Selected" + str(modifier_ob.name)
        mirror_ob.select = 0
        bpy.context.selected_objects = [mirror_ob]
        bpy.data.objects[one.name].select = 1

    print("please select exactly one object")

-- OPERATOR CLASSES -----

```

```

bpy.types.Operator):
    bl_name = "Mirror X"
    bl_label = "Mirror X"
    bl_options = {'REGISTER', 'UNDO'}

    def execute(self, context):
        #set mirror object to the selected object
        mirror_mod = modifier_ob.mirror_mod
        mirror_mod.mirror_object = mirror_ob
        mirror_mod.use_x = True
        mirror_mod.use_y = False
        mirror_mod.use_z = False
        bpy.context.scene.objects.active = mirror_ob
        bpy.context.scene.objects.active.name = "Selected" + str(modifier_ob.name)
        mirror_ob.select = 0
        bpy.context.selected_objects = [mirror_ob]
        bpy.data.objects[one.name].select = 1

    print("please select exactly one object")

-- OPERATOR CLASSES -----

```

NETW190  
Final Project

```

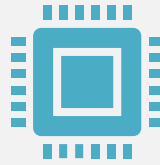
def execute(self, context):
    if context.active_object is not None:
        #set mirror object to the selected object
        mirror_mod = modifier_ob.mirror_mod
        mirror_mod.mirror_object = mirror_ob
        mirror_mod.use_x = True
        mirror_mod.use_y = False
        mirror_mod.use_z = False
        bpy.context.scene.objects.active = mirror_ob
        bpy.context.scene.objects.active.name = "Selected" + str(modifier_ob.name)
        mirror_ob.select = 0
        bpy.context.selected_objects = [mirror_ob]
        bpy.data.objects[one.name].select = 1

    print("please select exactly one object")

-- OPERATOR CLASSES -----

```

# Introduction



In this project you are shown how I designed, built and verified the operation of a small wired and wireless network using IPv4 and IPv6.



In the build, the network utilized a router, a laptop, Windows OS and a Linux System using VMware.



Ethernet cables were also produced using the 568B EIA/TIA standard.

# VMware Player Bridging Settings

- Enable Bridging
- Confirm you have the correct NIC selected

## Automatic Bridging Settings



Select the host network adapter(s) you want to automatically bridge:

- ☐ Bluetooth Device (Personal Area Network)
- ☐ Microsoft Wi-Fi Direct Virtual Adapter #2
- ☐ Microsoft Wi-Fi Direct Virtual Adapter
- ☐ Realtek RTL8821CE 802.11ac PCIe Adapter
- ☒ Realtek PCIe GbE Family Controller

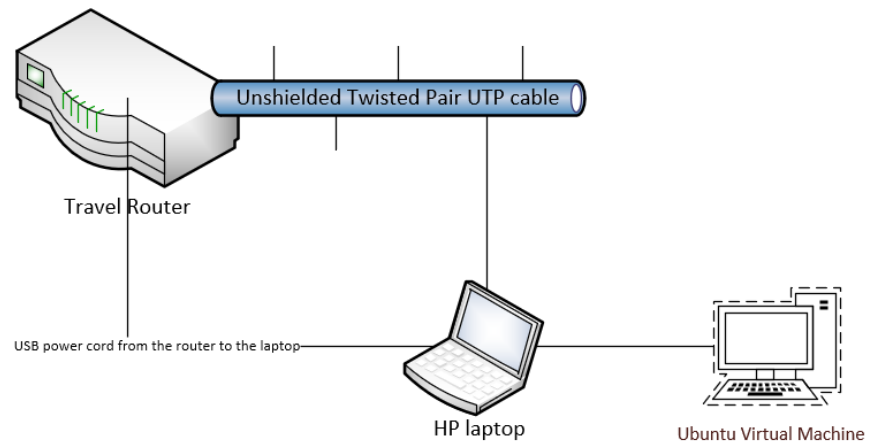
OK

Cancel

Help

# Network Diagram

- Travel Router
- HP laptop
- Ubuntu Virtual Machine (VM)
- Unshielded Twisted Pair (UTP) cables



```

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: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:0c:29:a5:0c:0d brd ff:ff:ff:ff:ff:ff
    inet 192.168.105.193/24 brd 192.168.105.255 scope global dynamic noprefixroute ens33
        valid_lft 43087sec preferred_lft 43087sec
    inet6 2003:dad:be:1::c1c/128 scope global noprefixroute
        valid_lft forever preferred_lft forever
    inet6 2003:dad:be:1:39c2:b32f:d766:e89c/64 scope global temporary dynamic
        valid_lft 604685sec preferred_lft 86145sec
    inet6 2003:dad:be:1:6188:1edd:fab1:2eb3/64 scope global mngtmpaddr noprefixroute
        valid_lft forever preferred_lft forever
    inet6 fe80::ce33:85eb:12e8:985c/64 scope link noprefixroute

```

#### Guest Ubuntu VM Dynamic IP

- Ipv4 is 192.168.105.193/24
- IPv6 is 2003:dad:be:1::c1c/128
- Ifconfig is the test command used in Ubuntu

```

Connection-specific DNS Suffix . : lan
Description . . . . . : Realtek PCIe GbE Family Controller
Physical Address. . . . . : 00-68-EB-D7-5A-75
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
IPv6 Address. . . . . : 2003:dad:be:1::869(Preferred)
Lease Obtained. . . . . : Sunday, May 31, 2020 3:49:16 PM
Lease Expires . . . . . : Wednesday, July 7, 2156 10:32:47 PM
IPv6 Address. . . . . : 2003:dad:be:1:cc06:8eba:a311:4d0(Preferred)
Temporary IPv6 Address. . . . . : 2003:dad:be:1:c9d3:7c02:152e:5344(Preferred)
Link-local IPv6 Address . . . . . : fe80::cc06:8eba:a311:4d0%5(Preferred)
IPv4 Address. . . . . : 192.168.105.153(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : Sunday, May 31, 2020 3:49:21 PM
Lease Expires . . . . . : Monday, June 1, 2020 3:49:35 AM
Default Gateway . . . . . : 192.168.105.1
DHCP Server . . . . . : 192.168.105.1
DHCPv6 IAID . . . . . : 100690155
DHCPv6 Client DUID. . . . . : 00-01-00-01-25-7F-58-90-00-68-EB-D7-5A-75
DNS Servers . . . . . : 2003:dad:be:1::1
                        192.168.105.1

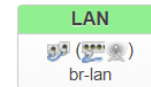
```

#### Host Computer Dynamic IP

- IPv4 is 192.168.105.153
- IPv6 is 2003:dad:be:1:cc06:8eba:a311:4d0
- Ipconfig is the test command used in Windows


## Travel Router

- IPv4 address
- IPv4 netmask



**Protocol:** Static address  
**Uptime:** 0h 2m 29s  
**MAC-Address:** 94:83:C4:00:8D:1C  
**RX:** 484.21 KB (5069 Pkts.)  
**TX:** 2.66 MB (4230 Pkts.)  
**IPv4:** 192.168.105.1/24  
**IPv6:** fdd0:8df1:1a41:10::1/64

Status

 **Device:** br-lan  
**Uptime:** 0h 6m 8s  
**MAC-Address:** 94:83:C4:00:8D:1C  
**RX:** 891.39 KB (8582 Pkts.)  
**TX:** 3.23 MB (7726 Pkts.)  
**IPv4:** 192.168.105.1/24  
**IPv6:** fdd0:8df1:1a41:10::1/64

Protocol

Static address ▼

IPv4 address

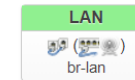
192.168.105.1

IPv4 netmask

255.255.255.0 ▼

## Travel Router

- IPv6 address
- IPv6 prefix



**Protocol:** Static address

**Uptime:** 0h 16m 18s

**MAC-Address:** 94:83:C4:00:8D:1C

**RX:** 2.14 MB (19752 Pkts.)

**TX:** 4.70 MB (18395 Pkts.)

**IPv4:** 192.168.105.1/24

**IPv6:** 2003:dad:be:1::1/64

IPv6 ULA-Prefix

2003:DAD:BE::/48

IPv6 assignment length

64

Assign a part of given length of every

IPv6 assignment hint

1::

Assign prefix parts using this hexade

IPv6 suffix

::1

Optional. Allowed values: 'eui64', 'ran  
delegating server use the suffix /like



# Inventory needed to make an Ethernet Cable

UTP cable

RJ-45 connectors

Crimp tool



# UbiGear Ethernet Cable Tester

Successful test of new Ethernet cable

Self  
produced  
Ethernet  
Cable



UbiGear  
pin to  
pin  
tester.



# Connectivity Test between the Host Computer and Ubuntu VM

successful ping test

Command Prompt

```
C:\Users\there>ping 192.168.105.153
```

```
Pinging 192.168.105.153 with 32 bytes of data:
```

```
Reply from 192.168.105.153: bytes=32 time<1ms TTL=128
```

```
Reply from 192.168.105.153: bytes=32 time<1ms TTL=128
```

```
Reply from 192.168.105.153: bytes=32 time<1ms TTL=128
```

```
Reply from 192.168.105.153: bytes=32 time<1ms TTL=128
```

```
Ping statistics for 192.168.105.153:
```

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
C:\Users\there>ping -6 2003:dad:be:1:cc06:8eba:a311:4d0
```

```
Pinging 2003:dad:be:1:cc06:8eba:a311:4d0 with 32 bytes of data:
```

```
Reply from 2003:dad:be:1:cc06:8eba:a311:4d0: time<1ms
```

```
Reply from 2003:dad:be:1:cc06:8eba:a311:4d0: time<1ms
```

```
Reply from 2003:dad:be:1:cc06:8eba:a311:4d0: time<1ms
```

```
Reply from 2003:dad:be:1:cc06:8eba:a311:4d0: time<1ms
```

```
Ping statistics for 2003:dad:be:1:cc06:8eba:a311:4d0:
```

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
C:\Users\there>
```

# Connectivity Test between the Host Computer and Travel Router

successful ping test

Command Prompt

```
C:\Users\there>ping 192.168.105.1
```

```
Pinging 192.168.105.1 with 32 bytes of data:
```

```
Reply from 192.168.105.1: bytes=32 time=1ms TTL=64
```

```
Reply from 192.168.105.1: bytes=32 time<1ms TTL=64
```

```
Reply from 192.168.105.1: bytes=32 time<1ms TTL=64
```

```
Reply from 192.168.105.1: bytes=32 time<1ms TTL=64
```

```
Ping statistics for 192.168.105.1:
```

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

```
C:\Users\there>ping -6 2003:dad:be:1::1
```

```
Pinging 2003:dad:be:1::1 with 32 bytes of data:
```

```
Reply from 2003:dad:be:1::1: time<1ms
```

```
Reply from 2003:dad:be:1::1: time<1ms
```

```
Reply from 2003:dad:be:1::1: time<1ms
```

```
Reply from 2003:dad:be:1::1: time<1ms
```

```
Ping statistics for 2003:dad:be:1::1:
```

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

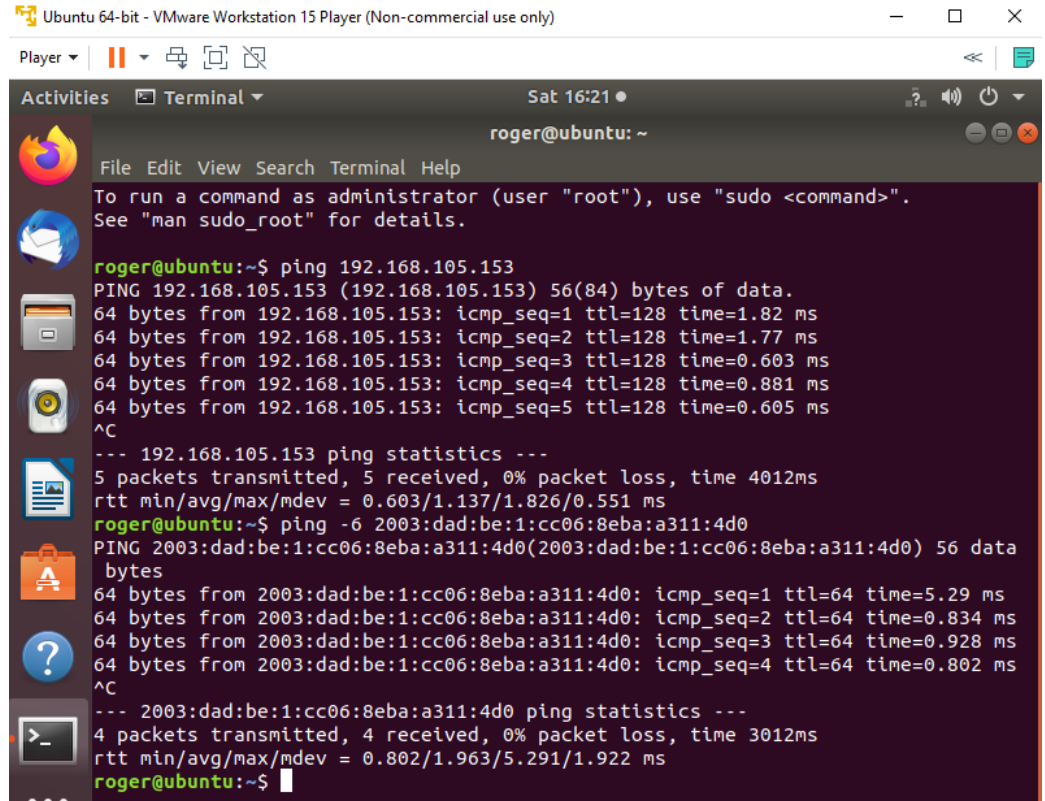
```
Approximate round trip times in milli-seconds:
```

```
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
C:\Users\there>
```

# Connectivity Test between the Ubuntu VM and Host Computer

successful ping test

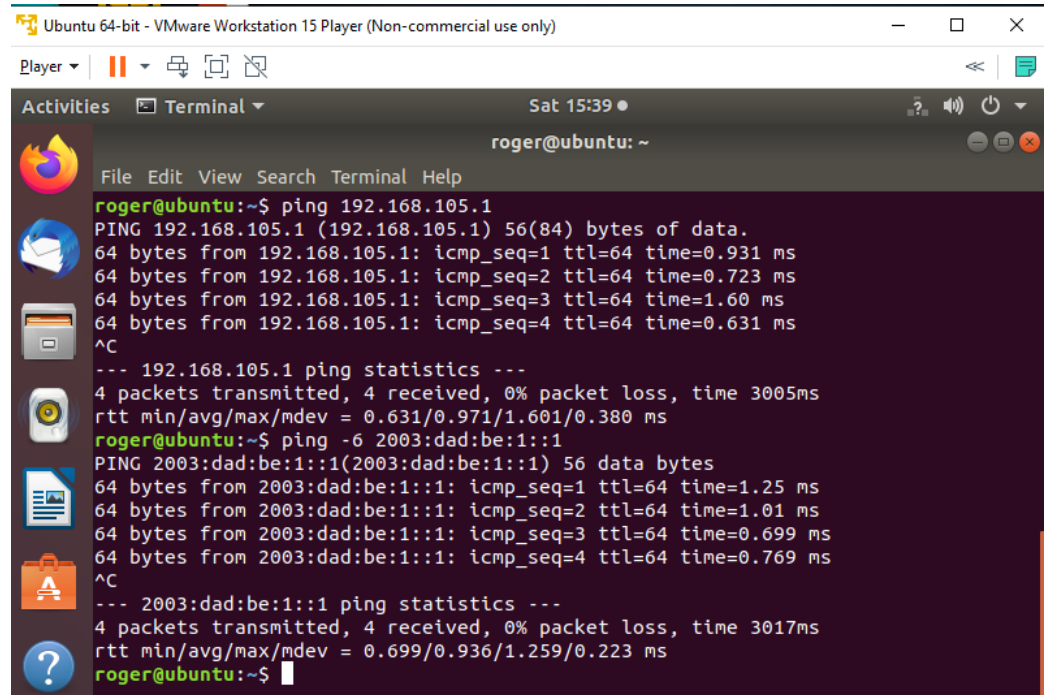


The screenshot shows a terminal window titled "Ubuntu 64-bit - VMware Workstation 15 Player (Non-commercial use only)". The terminal displays the following commands and output:

```
roger@ubuntu: ~  
File Edit View Search Terminal Help  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
roger@ubuntu:~$ ping 192.168.105.153  
PING 192.168.105.153 (192.168.105.153) 56(84) bytes of data.  
64 bytes from 192.168.105.153: icmp_seq=1 ttl=128 time=1.82 ms  
64 bytes from 192.168.105.153: icmp_seq=2 ttl=128 time=1.77 ms  
64 bytes from 192.168.105.153: icmp_seq=3 ttl=128 time=0.603 ms  
64 bytes from 192.168.105.153: icmp_seq=4 ttl=128 time=0.881 ms  
64 bytes from 192.168.105.153: icmp_seq=5 ttl=128 time=0.605 ms  
^C  
--- 192.168.105.153 ping statistics ---  
5 packets transmitted, 5 received, 0% packet loss, time 4012ms  
rtt min/avg/max/mdev = 0.603/1.137/1.826/0.551 ms  
roger@ubuntu:~$ ping -6 2003:dad:be:1:cc06:8eba:a311:4d0  
PING 2003:dad:be:1:cc06:8eba:a311:4d0(2003:dad:be:1:cc06:8eba:a311:4d0) 56 data  
bytes  
64 bytes from 2003:dad:be:1:cc06:8eba:a311:4d0: icmp_seq=1 ttl=64 time=5.29 ms  
64 bytes from 2003:dad:be:1:cc06:8eba:a311:4d0: icmp_seq=2 ttl=64 time=0.834 ms  
64 bytes from 2003:dad:be:1:cc06:8eba:a311:4d0: icmp_seq=3 ttl=64 time=0.928 ms  
64 bytes from 2003:dad:be:1:cc06:8eba:a311:4d0: icmp_seq=4 ttl=64 time=0.802 ms  
^C  
--- 2003:dad:be:1:cc06:8eba:a311:4d0 ping statistics ---  
4 packets transmitted, 4 received, 0% packet loss, time 3012ms  
rtt min/avg/max/mdev = 0.802/1.963/5.291/1.922 ms  
roger@ubuntu:~$
```

# Connectivity Test between the Ubuntu VM and Travel Router

successful ping test



The screenshot shows a terminal window titled "Ubuntu 64-bit - VMware Workstation 15 Player (Non-commercial use only)". The terminal displays the following commands and output:

```
roger@ubuntu: ~  
File Edit View Search Terminal Help  
roger@ubuntu:~$ ping 192.168.105.1  
PING 192.168.105.1 (192.168.105.1) 56(84) bytes of data.  
64 bytes from 192.168.105.1: icmp_seq=1 ttl=64 time=0.931 ms  
64 bytes from 192.168.105.1: icmp_seq=2 ttl=64 time=0.723 ms  
64 bytes from 192.168.105.1: icmp_seq=3 ttl=64 time=1.60 ms  
64 bytes from 192.168.105.1: icmp_seq=4 ttl=64 time=0.631 ms  
^C  
--- 192.168.105.1 ping statistics ---  
4 packets transmitted, 4 received, 0% packet loss, time 3005ms  
rtt min/avg/max/mdev = 0.631/0.971/1.601/0.380 ms  
roger@ubuntu:~$ ping -6 2003:dad:be:1::1  
PING 2003:dad:be:1::1(2003:dad:be:1::1) 56 data bytes  
64 bytes from 2003:dad:be:1::1: icmp_seq=1 ttl=64 time=1.25 ms  
64 bytes from 2003:dad:be:1::1: icmp_seq=2 ttl=64 time=1.01 ms  
64 bytes from 2003:dad:be:1::1: icmp_seq=3 ttl=64 time=0.699 ms  
64 bytes from 2003:dad:be:1::1: icmp_seq=4 ttl=64 time=0.769 ms  
^C  
--- 2003:dad:be:1::1 ping statistics ---  
4 packets transmitted, 4 received, 0% packet loss, time 3017ms  
rtt min/avg/max/mdev = 0.699/0.936/1.259/0.223 ms  
roger@ubuntu:~$
```

# Conclusion



After enabling bridging on the Ubuntu system I was to perform a successful ping test.



The first attempt at making the Ethernet cord I had pin 4 and 5 crossed.