



Department of Computer Science and Engineering

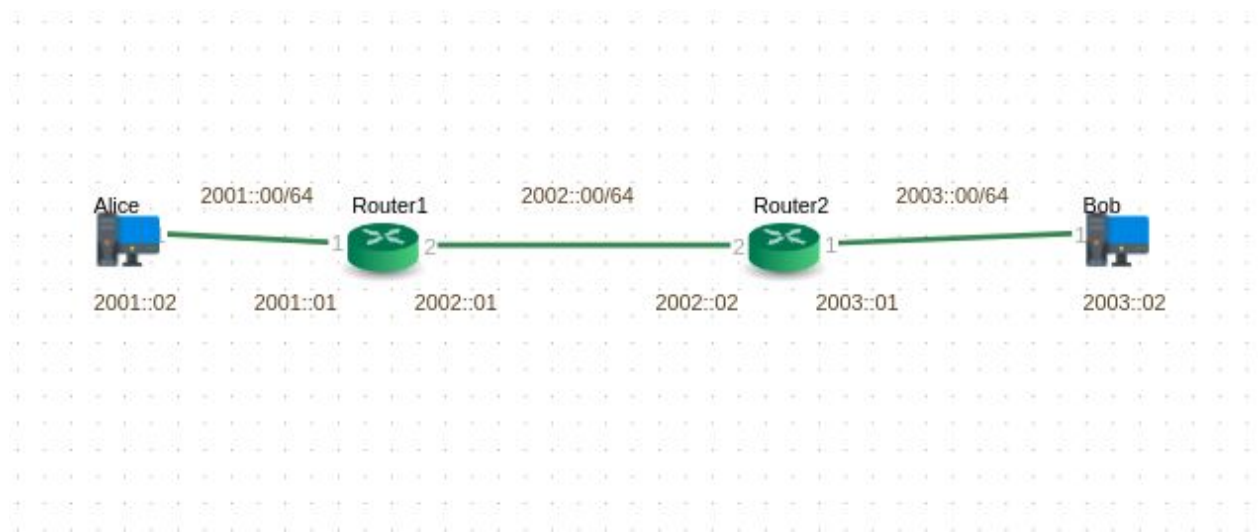
Advanced Computer Networks

UE16CS346

IPv6 Configuration and Static Routing

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Lab Network Topology



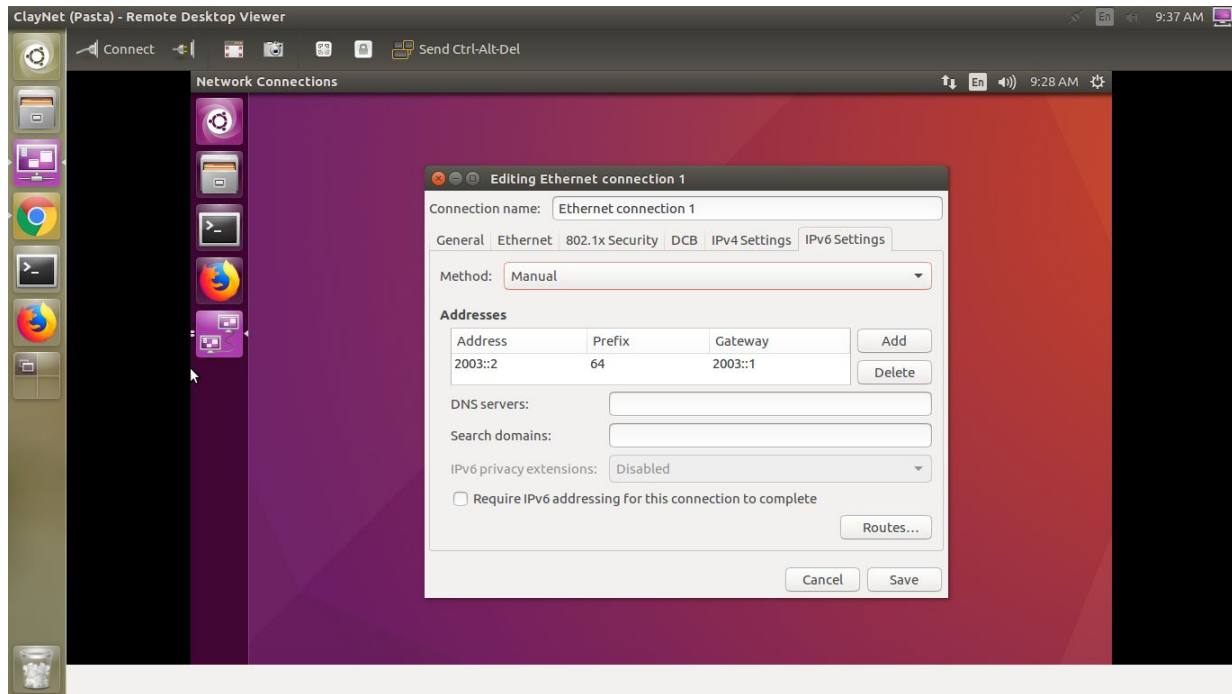
Introduction

IPv6 addressing was introduced to solve the problem of IPv4 addresses getting exhausted. It allows for 3.4×10^{38} addresses (2^{128}), as against 4.29×10^9 (2^{32}) in IPv4. Though few addresses are reserved, the total number of possible IPv6 addresses is more than 7.9×10^{28} times as many as IPv4.

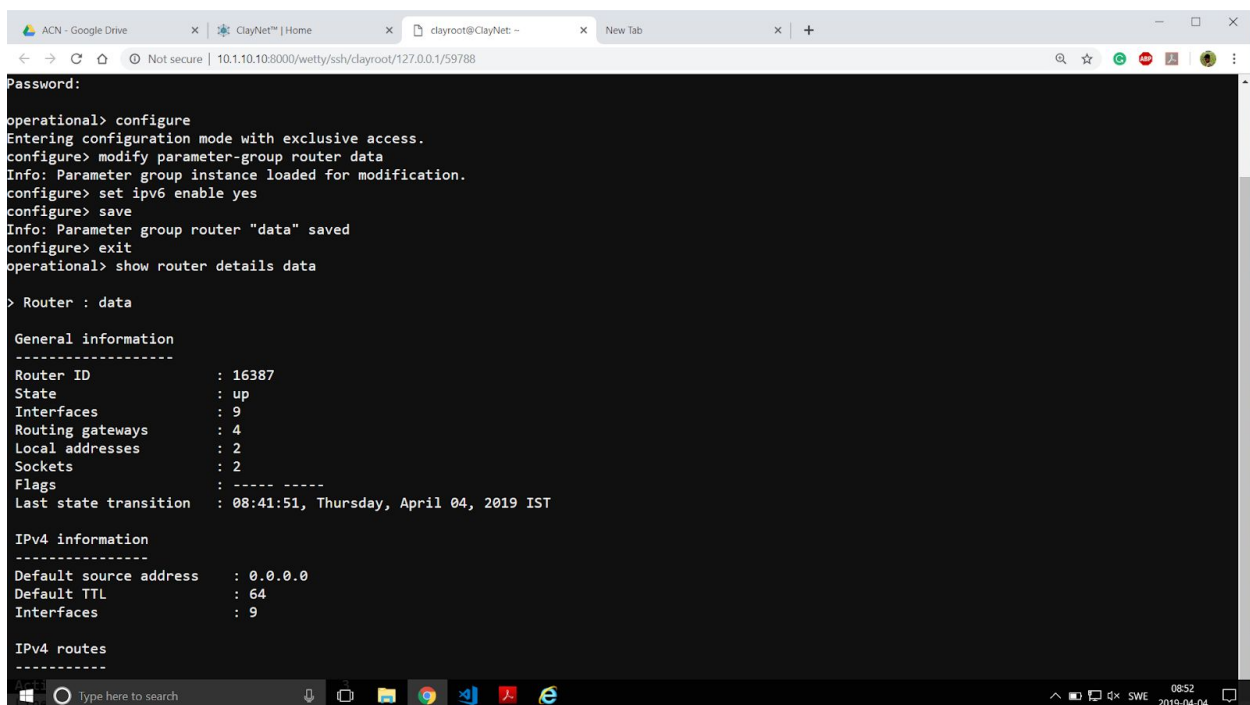
In this lab, we performed basic IPv6 configurations on Desktops and Routers. We created the topology on ClayNet and used the ping6 command to check the communication between the hosts.

Execution

Desktop configuration



Enabling IPv6 on Router



Router Interfaces (All)

```
ACN - Google Drive x ClayNet™ | Home x clayroot@ClayNet: ~ x New Tab
Not secure | 10.1.10.10:8000/wetty/ssh/clayroot/127.0.0.1/59788
configure> save
Info: Parameter group interface "if-port-1" saved
configure> modify parameter-group interface if-port-2
Info: Parameter group instance loaded for modification.
configure> default ip ipv4
configure> set ip ipv6 enable yes
configure> set ip ipv6 address 2003::02/64
configure> save
Info: Parameter group interface "if-port-2" saved
configure> set ip ipv6 address 2002::02/64
configure> save
Info: Parameter group interface "if-port-2" saved
configure> exit
operational> show interface all

Interface name      Status  Encaps-  IP address
-----
if-port-1           up      ethernet 2003::1/64
                  fe80::2a2:26ff:fe00:272/64
if-port-2           up      ethernet 2002::2/64
                  fe80::2a2:26ff:fe00:273/64
if-port-3           down    ethernet -
if-port-4           down    ethernet -
if-port-5           down    ethernet -
if-port-6           down    ethernet -
if-port-7           down    ethernet -
if-port-8           down    ethernet -
management          disabled ethernet 10.0.0.12/24

Total number of interfaces displayed : 9

operational>
```

Router Interface Details - Port 1 and Port 2

```
ACN - Google Drive x ClayNet™ | Home x clayroot@ClayNet: ~ x New Tab
Not secure | 10.1.10.10:8000/wetty/ssh/clayroot/127.0.0.1/59788
General Information
-----
ID : 19
Encapsulation : ethernet
MTU : 1500
Base port type : fast-ethernet
Base port location : ( shelf-1 { active-controller base-slot } port-1 )

State Information
-----
State : up
Last state transition : 08:47:22, Thursday, April 04, 2019 IST
Work flags : ..

Ethernet information
-----
VLAN tagging : disabled

IP information
-----
Router : data

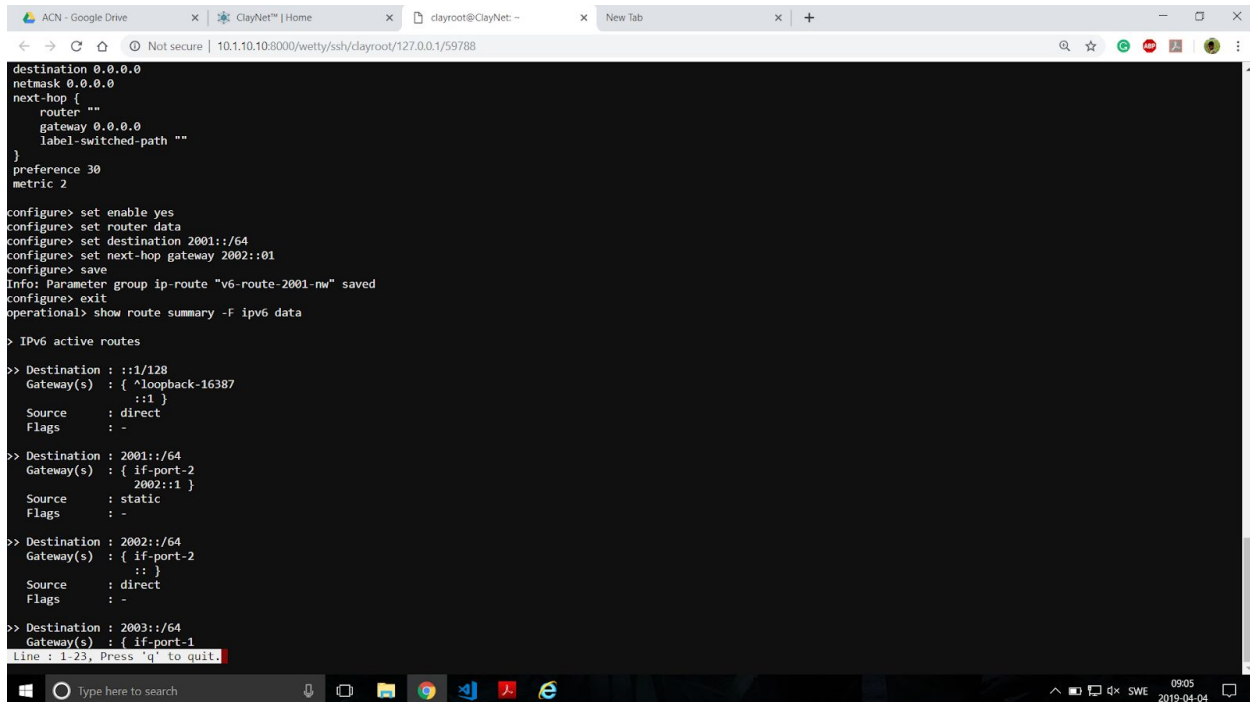
IPv6 information
-----
Address : 2003::1
Netmask : ffff:ffff:ffff:ffff::
Link local Address : fe80::2a2:26ff:fe00:272
Link local Netmask : ffff:ffff:ffff:ffff::
Scope Zone : 33488915
Preference : 1
Metric : 1

TE information
-----
Maximum Bandwidth : 10000 kbps
Maximum Reservable Bandwidth : 10000 kbps
Update threshold percentage : 10

> Interface : if-port-2
General Information
-----
ID : 21
Encapsulation : ethernet
MTU : 1500
Base port type : fast-ethernet
Base port location : ( shelf-1 { active-controller base-slot } port-2 )

State Information
-----
Line : 31:53, Press "q" to quit.
```

Route Summary



```
destination 0.0.0.0
netmask 0.0.0.0
next-hop {
  router
  gateway 0.0.0.0
  label-switched-path ""
}
preference 30
metric 2

configure> set enable yes
configure> set router data
configure> set destination 2001::/64
configure> set next-hop gateway 2002::01
configure> save
Info: Parameter group ip-route "v6-route-2001-nw" saved
configure> exit
operational> show route summary -F ipv6 data

> IPv6 active routes

>> Destination : ::1/128
  Gateway(s) : { ^loopback-16387
  Source : ::1
  Flags : direct
  Flags : -

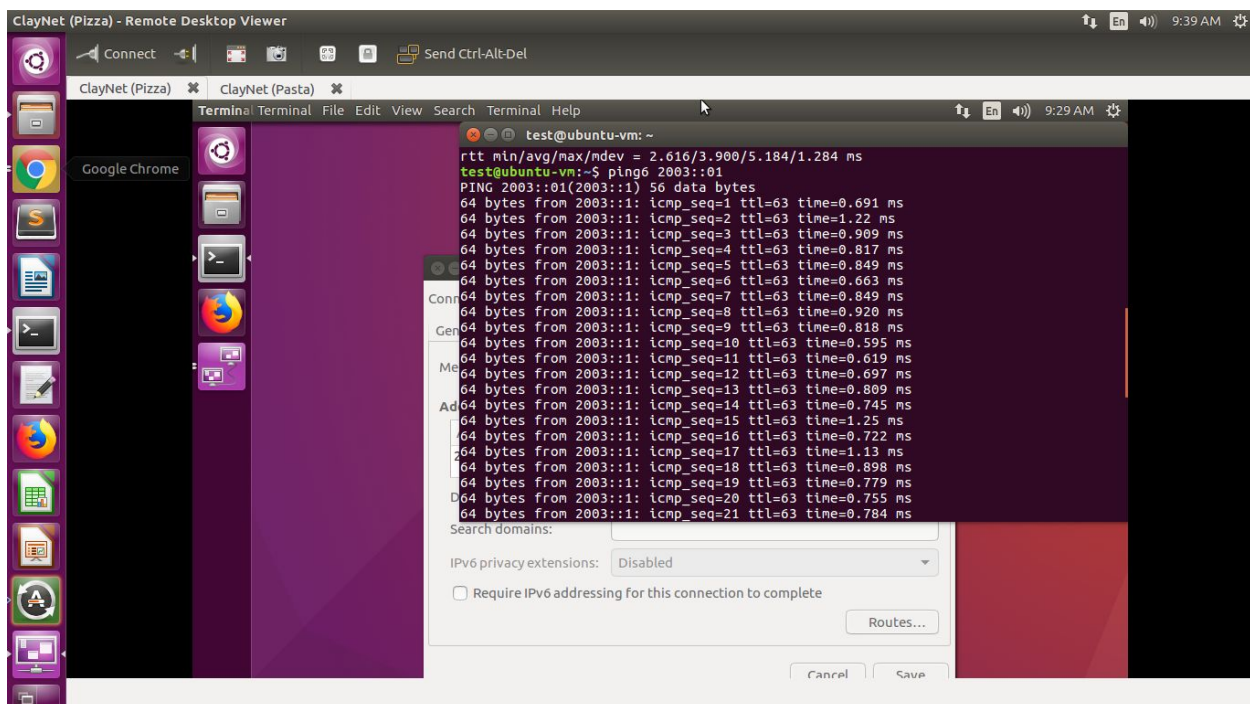
>> Destination : 2001::/64
  Gateway(s) : { if-port-2
  Source : static
  Flags : -

>> Destination : 2002::/64
  Gateway(s) : { if-port-2
  Source : ::
  Flags : direct
  Flags : -

>> Destination : 2003::/64
  Gateway(s) : { if-port-1
  Source : ::
  Flags : direct
  Flags : -

Line : 1-23, Press "q" to quit.
```

Ping from Host 1 (Pizza - 2001::02)



```
ClayNet (Pizza) - Remote Desktop Viewer
ClayNet (Pizza) x ClayNet (Pasta) x
Terminal Terminal File Edit View Search Terminal Help

test@ubuntu-vm: ~
rtt min/avg/max/ndev = 2.616/3.900/5.184/1.284 ms
test@ubuntu-vm:~$ ping6 2003::01
PING 2003::01(2003::1) 56 data bytes
64 bytes from 2003::1: icmp_seq=1 ttl=63 time=0.691 ms
64 bytes from 2003::1: icmp_seq=2 ttl=63 time=1.22 ms
64 bytes from 2003::1: icmp_seq=3 ttl=63 time=0.909 ms
64 bytes from 2003::1: icmp_seq=4 ttl=63 time=0.817 ms
64 bytes from 2003::1: icmp_seq=5 ttl=63 time=0.849 ms
64 bytes from 2003::1: icmp_seq=6 ttl=63 time=0.663 ms
64 bytes from 2003::1: icmp_seq=7 ttl=63 time=0.849 ms
64 bytes from 2003::1: icmp_seq=8 ttl=63 time=0.920 ms
64 bytes from 2003::1: icmp_seq=9 ttl=63 time=0.818 ms
64 bytes from 2003::1: icmp_seq=10 ttl=63 time=0.595 ms
64 bytes from 2003::1: icmp_seq=11 ttl=63 time=0.619 ms
64 bytes from 2003::1: icmp_seq=12 ttl=63 time=0.697 ms
64 bytes from 2003::1: icmp_seq=13 ttl=63 time=0.809 ms
64 bytes from 2003::1: icmp_seq=14 ttl=63 time=0.745 ms
64 bytes from 2003::1: icmp_seq=15 ttl=63 time=1.25 ms
64 bytes from 2003::1: icmp_seq=16 ttl=63 time=0.722 ms
64 bytes from 2003::1: icmp_seq=17 ttl=63 time=1.13 ms
64 bytes from 2003::1: icmp_seq=18 ttl=63 time=0.898 ms
64 bytes from 2003::1: icmp_seq=19 ttl=63 time=0.779 ms
64 bytes from 2003::1: icmp_seq=20 ttl=63 time=0.755 ms
64 bytes from 2003::1: icmp_seq=21 ttl=63 time=0.784 ms

Search domains:
IPv6 privacy extensions: Disabled
☐ Require IPv6 addressing for this connection to complete
Routes...
Cancel Save
```

Ping from Host 2 (Pasta - 2003::02)

