Mininet

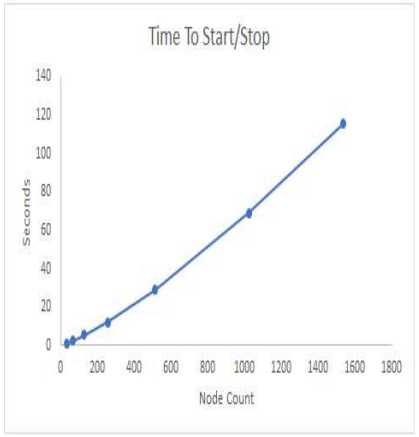
What is Mininet?

- Define custom network graphs
  - Each node is a virtual server
  - Each edge is routing policy
- Run everything from single laptop

Fully Scriptable from Python

```
class LinuxRouter( Node ):
  "A Node with IP forwarding enabled."

  def config( self, **params ):
    super( LinuxRouter, self).config( **params )
    # Enable forwarding on the router
    self.cmd( 'sysctl net.ipv4.ip_forward=1' )

  def terminate( self ):
    self.cmd( 'sysctl net.ipv4.ip_forward=0' )
    super( LinuxRouter, self ).terminate()

class NetworkTopo( Topo ):

  def build( self, **_opts ):
    # Create the router
    router = self.addNode('r0', cls=LinuxRouter, ip='172.15.0.1/16')
    self.setup_switch_1(router)
    self.setup_switch_2(router)

  def setup_switch_1(self, router):
    # Create the switch and link to router
    s1 = self.addSwitch('s1')
    self.addLink(s1, router,
      intfName2='r0-sw1-15',
      params2={'ip': '172.15.0.1/16'})
    self.addLink(s1, router,
      intfName2='r0-sw1-20',
      params2={'ip':'172.20.0.1/16'})

    # Add hosts attached to switch 1
    h1 = self.addHost(
      'h1',
      ip='172.15.0.100/16',
      defaultRoute='via 172.15.0.1'
    )

    h2 = self.addHost(
      'h2',
      ip='172.20.0.100/16',
      defaultRoute='via 172.20.0.1'
    )
```

Time to create topologies



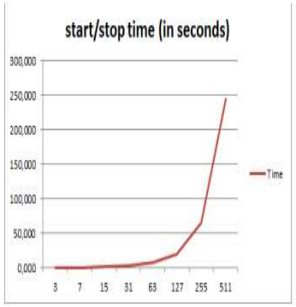


Fig 4. Graphic displaying the time spent for creating and destroying the virtual networks.

Previous research suggested that start times are exponential (red).

Updated test results (blue) show environments scale linearly

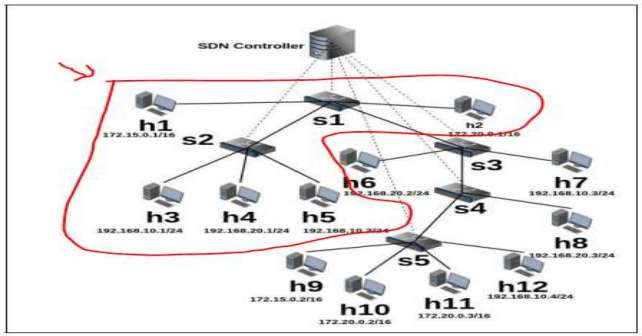


Fig.9. Custom Topology with Multiple IP Network Addresses

Nate Bachmeier
TIM-7010 Computer Networking
August 18th, 2019 - NCU