



Troubleshooting Commands

- ipconfig
- arp
- ping
- traceroute
- netstat
- nslookup
- Wireshark
- Carrier/Link light



ipconfig

- Purpose:
 - Windows utility to obtain IP usage information
- Options and Usage:
 - ipconfig: obtain basic IP configuration information: host IP address, mask, gateway, MAC address
 - ipconfig /all includes additional IP information: DNS, DHCP server addresses
 - ipconfig /flushdns
 - ipconfig /release and ipconfig /renew: get updated IP information



arp

- Purpose:
 - utility to manage the arp cache.
- Options:
 - arp –a: show the arp cache
 - arp -d * : delete the contents of the arp cache
- Uses:
 - discover the MAC address of devices in the same network segment



ping

Purpose:

 utility to send echo request message and obtain response from any layer 3 connected device. <u>Uses ICMP protocol</u>. (Internet Control Messaging Protocol)

Options:

- ping ipaddr: send an echo request to ipaddr
- Ping ipaddr -t: continuously send a ping to ipaddr

Uses:

- Verify a layer 3 path to an end device such as a gateway router
- Simple assessment of packet delay and packet loss



tracert

- Purpose:
 - utility to identify the layer 3 path to a destination device.
 - Uses ICMP Protocol
- Options:
 - tracert ipaddr: show the layer 3 path to ipaddr
- Uses:
 - show the layer 3 path
 - identify elements of the routing table
 - identify number of routers in the path to the destination



netstat

- Purpose:
 - utility to display TCP connections including source and destination sockets.

```
C:\Users\krymm>netstat -n

Active Connections

Proto Local Address Foreign Address State
TCP 10.50.5.50:54009 10.254.21.138:10123 ESTABLISHED
TCP 127.0.0.1:54650 127.0.0.1:62522 ESTABLISHED
TCP 127.0.0.1:62522 127.0.0.1:54650 ESTABLISHED
```

- Options:
 - netstat: show TCP connections
 - netstat –n: show the TCP connections using numeric addresses



nslookup

- Purpose:
 - utility to query the DNS server.
- Options:
 - nslookup URL: translate the URL into an IP address
- Uses:
 - verify DNS configuration
 - get IP information
 - verify connectivity to DNS server



route print

- Purpose:
 - Windows Utility to show node routing table
- Options:
 - route print

```
IPv4 Route Table
Active Routes:
Network Destination
                                                Gateway
                                                               Interface Metric
                             0.0.0.0
                                             10.50.5.1
          0.0.0.0
                                                               10.50.5.50
                                                                               10
                                              On-link
                                                                              266
                                                                              266
                                              On-link
                                                                              266
                                              On-link
                                                                              306
                                              On-link
                                                                127.0.0.1
                                                                              306
                                              On-link
                                                                127.0.0.1
                                              On-link
                                                                127.0.0.1
                                                                              306
                                                                              306
                                              On-link
                                                                127.0.0.1
                                                                              266
                                              On-link
                                              On-link
Persistent Routes:
  None
```





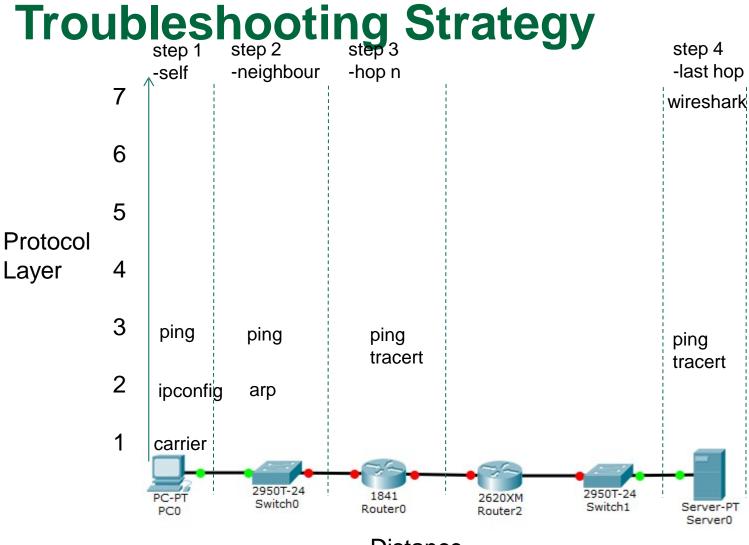
Carrier indicator (Link Light)

- Purpose:
 - Verify physical connection.



Carrier indication Light

- Options:
 - Observer carrier indication on Ethernet port
- Uses:
 - Verify cable connection and integrity
 - Verify NIC



Distance

Network Design

- Data Network
- Management
 - Observable
 - Controllable
- Security
- Resiliency
 - Survive Single Points of Failure
- Performance and Capacity
 - Delay, Loss, Jitter
 - Traffic Volume (Packets per Second)



Network Operations

- Monitoring and Control
- Troubleshoot and Repair
 - Failure
 - Performance

Forecasts and Upgrades

- Features
- Growth
- Technology
- Backup and Restore



