



## TNE - Troika Network Essential's

Demand of networking professionals has significantly come down in recent years, graduate engineers seek help from professional certifications in order to attain the skills required in order to grab the job opportunities in market.. traditional beginner courses like A+, CCNA, network+ are does not meet the skills requirement organizations are looking for today.

TNE has been designed by industry skilled professionals keeping current organization requirements under consideration. Multi-vendor skills with understanding on converged technologies – both network and security - has become key attribute to success of any training program today.

This multi-vendor course helps beginners to understand design aspects of various network and security technologies with hands on experience on how to install, operate, configure and troubleshoot IPv4 network with in depth understanding on configuring a LAN switch, router , identifying enterprise security requirements, understanding firewall technologies and troubleshooting common network issues.

**Prerequisites:** General knowledge of computer and basic network fundamentals is required.

**Technologies covered** – Cisco routing and switching, Juniper routing, wireshark, Kali Linux

**Take away:** After completion of this course student will attain understanding on network and security technologies including

- Exposure to multi vendor technologies such as Cisco, Juniper & open source router
- Networking basics
  - IP addressing
  - Routing
  - Switching
- Firewall technologies
- Understanding on commonly used networking protocols
  - DNS, DHCP, HTTP
  - FTP, SMTP
- Overview of threat vectors
- Cyber securiry overview and threat landscape
- Understanding security attack vectors
- Working knowledge of Linux kali



# Course contents

## Module1 - Network Basics

### Basics of Networking

- History of networking
- Why networking is required
- What is internet
- Recognize the purpose and functions of various network devices such as Routers, Switches, Bridges and Hubs.
- Overview on Cable Media including Co-Axial Cable, Twisted pair cable and Fiber optic cable
- Understanding networking topology
  - BUS, RING topology
  - STAR & MESH topology
- Describe the purpose and basic operation of the protocols in the OSI Model.
  - Application layer protocols – HTTP, FTP, DNS, HTTPS
  - Transport layer protocols in detail – TCP & UDP
  - Significance of network layer – protocols, routing
  - Understanding data link layer – protocols and frame structure
  - Brief understanding of other layers
- Designing small network with router & switches
- Understating the data flow between two hosts across a network
  - Significance of ARP protocol
  - Why we need default gateway
  - Importance of MAC (Media Access Control) for network communication
  - Significance of RARP (Reverse Address Resolution Protocol)
  - Basics of DHCP server

## Module 2 – TCP/IP

- Understanding TCP/IP
  - TCP/IP 3-way handshake
  - TCP/IP flags in detail
  - Syn , ack, psh
  - Fin, rst, urg
  - Understanding TCP vs UDP protocol

- Brief about packet structure in IP networks
- Packet captures using wireshark and understanding various packet layers
- Describe the operation and necessity of IP addresses
  - Private IP address
  - Public IP address
- Identify the appropriate IPv4 addressing scheme using sub netting and VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment.
  - Internet Protocol Version 6 (IPv6)
  - Why we do need IPv6
  - IPv6 Addressing and Expressions

### Module 3 – IP Routing Technologies

- Router hardware details and understanding router basic operation and command line interface
  - Router configuration modes
  - Configuration of router interfaces
  - Basic router operational commands including configuration save, show commands etc..
- Understanding essential of routing concepts
- Understanding need of static and dynamic routing protocols in network environment
  - Static routing attributes and design parameters
  - Understanding dynamic routing algorithms
    - RIP v1 , RIPv2
    - OSPF
- Designing layer3 network with using static and dynamic routing protocols
  - Configure and verify routing configuration for a static or default route given specific routing requirements
  - Differentiate methods of routing and routing protocols
  - Configure and verify RIP, OSPF routing Protocol

### Module 4 - LAN Switching Technologies

- Determine the technology and media access control method for Ethernet networks
- Basic difference between HUB, Bridge, Non Manageable Switch and Manageable Switch
- LAN switching essentials
  - Access port, trunk ports, VLAN, VTP, logical interfaces/ VLAN interfaces



- Describe how VLANs create logically separate networks and the need for routing between them
- Types of switching
  - Layer2 vs layer3 switching
- Designing layer2 & layer3 switched network with using VLAN's, sub interfaces and routing protocols
  - Configure and verify VLANs
  - Configure and verify trunking on Cisco switches
  - Configure and verify inter VLAN routing (Router on a stick)
- Understanding spanning tree protocol and significance in switched network

## Module 5 – Troubleshooting

- Manage IOS Configuration file
- Password Recovery
- Backup and Restore of Startup Configuration
- Packet captures using wireshark & TCPDUMP
- Interpretation of raw packets in wireshark
- Troubleshooting networking issues using TCPDUMP and wireshark

## Module 6 – Network security basics

- Network security concepts explained
- Enterprise security architecture – defense in depth / layered security architecture
  - Perimeter defense
  - Gateway layer defense
  - Server/end point defense
- Understanding on various enterprise wide network and security technologies
  - Enterprise firewalls,
  - Intrusion prevention systems,
  - Proxy technologies
    - Forward proxy
    - Reverse proxy
    - Transparent proxy
  - Web security & mail security etc..



- Describe various threat vectors
  - Syn attack , ip spoofing
  - DOS attack , password cracking
  - Application oriented attacks
- Understanding firewall concepts in details with types of firewalls'
  - Packet filter firewall
  - Application gateway firewall
  - Stateful Inspection
  - Next generation firewall

## Module 7 – Introduction to Ethical Hacking

- Cyber security overview & threat landscape
- Top information security attack vectors
  - Understanding threat vectors
    - Operating systems attacks
    - Application oriented attacks
    - Network level threats
  - Attack lifecycle and phases of attacks
  - Attackers motives
  - Essential terminologies

## Module 8 – Introduction to Kali Linux

- Setup virtual environment for Kali Linux and target virtual machines
- Overview of Linux command line
  - Directory structure
  - File permissions
  - User privileges
  - Process and services
- Configuring Networking services on Kali including web server, DNS server etc..
- Managing packages
  - Netcat - The Swiss Army Knife of TCP/IP Connections







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