Networks: Fundamentals and Scenarios

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SII-300 **5 Days (35 Hours)**

Description

The "Networks: Fundamentals and Simulations" training aims to provide an in-depth understanding of computer networks and how they work.

Who is this training for ?

For whom

Computer maintenance technician, Junior network administrators, System administrators needing to review network fundamentals

Prerequisites

Computer knowledge

Training objectives

- Know the main types of networks and the protocols involved

Training program

Découvrir les fondamentaux des réseaux

- Presentation of networks
- The different elements and their roles
- Users and their needs
- Architecture and topology aspects
- Network scopes: PAN, LAN, MAN and WAN

Comprendre la structure modèle OSI

- Organization
- Encapsulation principle
- Presentation of the 7 layers

Découvrir les supports de communication

- Limited and non-limited supports
- Twisted pairs
- Optical fibers
- Wireless links

Identifier les différents équipements réseau

- Repeaters and Hubs
- Bridges and Switches
- The Spanning Tree (principle and mode of operation)
- Routers: roles and interest
- Discovery of active elements: LLDP and CDP protocols

Fonctionnement d'un réseaux sans-fil

- WLAN concept
- SSID
- Communication methods 802.11, 802.11a;b;g;n
- Security: WEP, WPA, WPA2, EAP, 802.1x, RADIUS

Découvrir la couche Liaison

- Media access methods: concept of collision
- Collision management: CSMA/CD and CSMA/CA
- Concept of MAC address: role and format
- Unicast, Broadcast and Multicast MAC address
- Format of an Ethernet frame
- Port aggregation: 802.3ad standard, LACP and PAGP protocols

Comprendre le protocole IP

- Addresses and address classes
- Classless addresses: CIDR
- Unicast, Broadcast and Multicast
- IP/MAC resolution: protocol ARP
- The IP protocol
- Format of an IP packet

Gérer les sous-réseaux

- Subnet concepts and CIDR notation
- Subnet aggregation: VLSM

Connaître le protocole ICMP

- Principle
- Structure of an ICMP datagram
- Usage examples: ping and traceroute

Routage IP

- Routing overview
- Routing table
- Static routing
- Dynamic routing
- - Principles
- - Dynamic routing types
- - Main protocols (OSPF, EIGRP,ISIS, BGP)
- MPLS overview

Comprendre les VLAN

- Principle of VLANs
- Types of VLANS
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Présentation d'IPv6

- IPv4 address space issues
- Introduction to IPv6
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Comprendre les protocoles UDP et TCP

- Transport layer protocols: concept of port and socket
- UDP - communication in non-connected mode
- Structure of a UDP datagram
- TCP: communication in connected mode
- Principle of establishing a TCP connection
- Structure of a TCP segment
- Sequence numbers, windows and acknowledgments
- The states of a TCP connection
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Comprendre le service DHCP

- DHCP: Dynamic IP configuration
- Structure of a DHCP negotiation
- DHCP relay
- Other services provided by DHCP
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Découvrir le service DNS

- Name resolution
- Role and interest of DNS
- DNS architecture and the different types of DNS servers
- Iterative and recursive queries
- The DNS Name Server
- - Primary Server
- - Secondary Server
- - Zone Transfer
- DNS Records
- Zone delegation
- DNS query: nslookup and dig utilities
- Coupling with DHCP: dynamic updates
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Comprendre des VPN

- Principles of a VPN
- Typology of VPNs
- Main protocols: GRE, PPTP, L2TP, IPSec, SSL/TSL
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Se sensibiliser à la sécurité des réseaux

- Security issues
- Filtering router
- Address/port translator
- Proxy
- Firewall
- DMZ
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Mettre en place un réseau simple de machines virtuelles

- Reminder of the basics with simple routing solution
- Adding static route(s)
- Attempting to access the Internet: problem, analysis and resolution
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Mettre en place un réseau de machine virtuelle avec NAT/PAT

- Using Private Address Ranges
- Implementing NAT
- Installing a Web Server on the LAN
- Implementing work of PAT

Détection/diagnostic d'anomalies de fonctionnement réseau

- Malfunction detection
- Analysis of the approach
- Proposal of corrections
- Implementation of corrections