

Unit 13: IT Essentials II: Network Operating Systems

Learning Outcomes:

A candidate following a programme of learning leading to this unit will be able to:

- demonstrate understanding of network operating systems fundamentals
- demonstrate understanding of network concepts and components
- identify the physical components of a network
- demonstrate understanding of the concepts and application of TCP/IP protocol
- identify network services
- demonstrate understanding of the characteristics of a Network Operating System
- demonstrate understanding of the steps involved installing Network Operating System
- identify the main network administrative tasks in Windows
- identify the main network administrative tasks in Linux
- demonstrate advanced Network Operating System administration
- demonstrate understanding and application of network security

NB Before starting this unit please refer to the Vendor website for the up-to-date specifications, examination objectives and availability.

Unit Content: IT Essentials

| Assessment Objectives | Knowledge, Skills and Understanding |
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| 1 Demonstrate understanding of network operating systems fundamentals | |
| a Identify the main components and concepts behind Network Operating Systems | <ul style="list-style-type: none"> Operating System components: kernel, user interface and file system |
| b Demonstrate knowledge of a historical overview of Network Operating Systems | <ul style="list-style-type: none"> Historical overview of Network Operating Systems: Windows, UNIX and Linux |
| c Demonstrate an understanding of the benefits that networks can provide, an overview of the various types of networking environments and their advantages and disadvantages | <ul style="list-style-type: none"> Common Network Operating Systems, client-server model, NOS components and configuration, types of networks: Local Area Networks (LANs), Wide Area Networks WANs, peer-to-peer networks, client/server networks Benefits: file, print, mail, directory and name services, Internet, network administration Networking standards: proprietary verses open standards, OSI Reference Model, DoD model, IEEE, ITU, other standards Network protocols: protocol suite, TCP/IP, IPX/SPX, AppleTalk, LAN architectures: Ethernet, Token Ring and FDDI |
| 2 Identify the physical components of a network | |
| a Identify the physical components of a network | <ul style="list-style-type: none"> Network Interface Card, IP address, gateway, Domain Name System, DHCP servers, default gateway |
| b Demonstrate understanding of the network topologies | <ul style="list-style-type: none"> Topologies: bus, star, ring, mesh, hybrid, physical vs. logical topology |
| c Demonstrate understanding of the various methods for interconnecting WANs and networks | <ul style="list-style-type: none"> Physical media types: networking media, coaxial cable, twisted-pair cable, fibre-optic cable, wireless Network devices: hubs and repeaters, bridge and switches, routers Connecting to the Internet (WAN): synchronous and asynchronous serial lines, modems, dial-up networking, modem standards, AT commands, ISPs and Internet backbone providers, DSL, Cable modems |

| Assessment Objectives | Knowledge, Skills and Understanding |
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| 3 Demonstrate understanding of the concepts and application of TCP/IP protocol | |
| a Demonstrate understanding of the concepts and structure of the TCP/IP protocol | <ul style="list-style-type: none"> • TCP/IP network model, IPv4 addressing, IPv4 address crisis, subnetting |
| b Demonstrate understanding of name resolution | <ul style="list-style-type: none"> • TCP/IP protocols: Address Resolution Protocol (ARP), Internet Control Message Protocol (ICMP), Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Domain Name Service (DNS), Hypertext Transport Protocol (HTTP), File Transfer Protocol (FTP), SMTP, POP, IMAP • Name resolution: hostnames and host tables, domain name system, name services and NOS, WINS |
| 4 Identify network services | |
| a Identify the services that a network can provide | <ul style="list-style-type: none"> • Network services, remote administration, telecommuting, mobile users, terminal emulation services, telnet services, directory services, mail, printing, file sharing, file transfer (FTP), web services, Intranet, Extranet, automating tasks with script services, DNS, DHCP, domains |
| 5 Demonstrate understanding of the characteristics of a Network Operating System | |
| a Demonstrate understanding of the characteristics of a Network Operating System | <ul style="list-style-type: none"> • Overview of Network Operating System characteristics, multiuser, multitasking and multiprocessor systems, NOS server hardware, choosing an NOS |
| b Identify the types of Network Operating System available | <ul style="list-style-type: none"> • Types of NOSs: Windows, Linux, Novell, Macintosh |
| 6 Demonstrate understanding of the steps involved installing Network Operating System | |
| a Demonstrate understanding of the steps involved installing Network Operating System | <ul style="list-style-type: none"> • Preparing for installation: planning for system, review of computer hardware, hardware compatibility issues • Installation process |
| b Demonstrate understanding of the steps involved in the boot process | <ul style="list-style-type: none"> • Boot process |
| c Demonstrate understanding of how to troubleshoot installation and errors | <ul style="list-style-type: none"> • Troubleshooting NOS installation: problems during installation process, post-installation problems |
| 7 Demonstrate understanding the main network administrative tasks in Windows | |
| a Demonstrate understanding the main network administrative tasks in Windows | <ul style="list-style-type: none"> • Installing the NOS, navigating the user interface, managing user accounts and the file system, how to set up server services (i.e. setting up an FTP and Web server, setting up Telnet (remote administration) capabilities, e-mail server, printing server and running scripts). |

| Assessment Objectives | Knowledge, Skills and Understanding |
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| 8 Demonstrate understanding the main network administrative tasks in Linux | |
| a Demonstrate understanding the main network administrative tasks in Linux | <ul style="list-style-type: none"> Installing the NOS, navigating the user interface, managing user accounts and the file system, how to set up daemons in Linux (i.e. setting up an FTP and Web server, setting up Telnet (remote administration) capabilities, e-mail server, printing server and running scripts) |
| 9 Demonstrate advanced Network Operating System administration | |
| a Demonstrate understanding of how to perform backups and map drives b Demonstrate understanding how to monitor server resources c Demonstrate understanding how to analyse and optimize network performance using network monitoring software. Backup methods, drive mapping | <ul style="list-style-type: none"> Backup methods, drive mapping Monitor system resources: disk management, memory usage, CPU usages, reviewing daily logs Analysing and optimising network performance: key concepts, bottlenecks, baselines, determining Internet connection speed, network monitoring software, network management software, hardware monitoring and troubleshooting devices, troubleshooting network problems, problem-solving guidelines |
| 10 Demonstrate understanding and application of network security | |
| a Demonstrate understanding of how to develop and implement a network security policy b Demonstrate knowledge of the various threats that are posed to networks and the common types of security attacks and how to prevent them c Demonstrate understanding of how to apply security patches and how to install and implement firewalls on networks | <ul style="list-style-type: none"> Develop a network security policy: assessing security needs, Acceptable User Policy (AUP), username and password standards, rules for network access, policy for disposal of materials (data and hardware), virus protection standards, on-line security resources Threats to network security: internal/external security, outside threats, Denial of Service (DoS), Inside threats, on-line security resources Implementing Security measures: file encryption, IP security, Secure Socket Layer (SSL), E-mail security, public/private key security Patching the NOS: finding, selecting and applying patches and upgrades Firewalls: packet filtering, firewall placement, common firewall solutions, using the NOS as a firewall |

Assessment

Form of assessment

Assessment will take the form of an external examination. Examinations are set and externally marked by OCR/Cisco Systems (via computer). Examinations take the form of computerised multiple choice objective tests.

The examination is administered on a computer at an authorised Cisco network academy. In an easy to use format, the computerised tests look very much like other multiple choice tests.

The 90-minute examination consists of 60 objective test items.

The test item format used in the computerised test is:

Multiple choice: The examinee selects one option that best answers the question.

To achieve this unit within the OCR Level 3 Certificate/Diploma for IT Professionals all candidates must achieve a Final Exam score of 70% or more, and centres should not submit gradebooks for candidates who have failed to achieve this.

The gradebook must display the correct candidate name, the name of the Cisco qualification and the required Final Exam score.