

Provincial Scope Document

IT – Network Systems Administration (Post-Secondary) 2016

Contest Length: 6 hours

Registration: 8:00

Contest Start: 8:30

Purpose of the Challenge:

To evaluate each competitor's skills and to recognize excellence and professionalism in the field of IT network systems administration.

Project Scenario:

For the purpose of this competition the competitor is considered to be a Junior IT Administrator, or as a Computer Technician. The competitor will be required to complete select tasks relating to each of the content areas listed. Not all listed tasks will be tested

Project Tasks

Hardware setup and initial configuration

- Identify, install, and test hardware components
- Troubleshoot hardware failures
- Install and configure virtual machines
- Prepare hard drives for operating system setup
- Install and configure operating systems in a multi-boot environment
- Use disk, system, and file management tools

Networking

- Interpret network diagrams
- Implement both IPv4 and IPv6 to meet the requirements of a small business environment
- Calculate for, and apply to a network, an IPv4 addressing scheme including Variable Length Subnet Masks (VLSM)
- Implement dynamic addressing services for hosts in a Local Area Network

(LAN) environment

- Configure security and remote access on network devices including Secure Shell (SSH)
- Configure and verify Ethernet switch configuration
- Configure and verify Cisco router configuration
- Implement, verify, and troubleshoot access control lists (ACLs)
- Implement, verify, and troubleshoot Wide Area Network (WAN) links
- Interpret network diagrams
- Implement Virtual Local Area Networks (VLANs) and dot1q trunks
- Customize Spanning-Tree Protocol (STP) to optimize traffic flows with a LAN
- Implement First-Hop Redundancy Protocols within a LAN
- Create a Generic Routing Encapsulation (GRE) tunnel
- Implement dynamic routing protocols including RIP, OSPF, and EIGRP
- Configure OSPF to operate as a multiple area domain
- Configure static routes and customize administrative distance
- Configure and test sub-interfaces and virtual interfaces
- Work may be performed on physical or simulated Cisco hardware

Windows Server Operations

- Configure Domain Name System (DNS) for Active Directory
- Create and perform maintenance of Active Directory objects
- Configure, verify, and troubleshoot infrastructure services and roles
- Implement delegated administration
- Implement, verify, and troubleshoot Group Policies
- Configure, verify, and troubleshoot server security
- Perform data provisioning (i.e. shared resources, offline data)
- Enable and configure remote management
- Configure, verify, and troubleshoot IIS
- Configure, verify, and troubleshoot Active Directory infrastructure
- Configure, verify, and troubleshoot Active Directory Certificate Services
- Configure, verify, and troubleshoot Network Policy and Access Services

Linux Server Operations

- Perform package management (e.g. resolving dependencies, updating applications)
- Perform network configuration on both wired and wireless equipment
- Configure and manage local storage devices and file systems
- Configure and manage network storage devices and file systems
- Set and modify file and directory permissions and ownership
- Access and perform Input/Output (I/O) against removable media
- Determine and manage unnecessary services and processes
- Perform remote management
- Create, modify, and delete user and group accounts
- Perform job scheduling
- Manage runlevels and system initialization from configuration files

- Configure system logging and log files
- Configure, verify, and troubleshoot system security
- Configure server-based network services (e.g. Domain Name Service [DNS], Dynamic Host Control Protocol [DHCP], Server Message Block [SMB])
- Set up environment variables
- Set process and special permissions
- Set up user-level security

Skills Required – Ability to:

- Troubleshoot and verify system functionality.
- Install various operating systems and software applications.
- Demonstrate basic security practices.
- Configure Linux services and settings
- Configure Microsoft Server and Clients.
- Activate and customize Active Directory services
- Describe IPv4 and IPv6 operations.
- Interpret network diagrams and configuration instructions.
- Describe IPv4 & IPv6 routing concepts and dynamic routing protocols
- Optimize system performance settings.
- Perform basic network administration and monitoring.
- Describe Ethernet operations and switching concepts
- Configure a Cisco router.
- Configure a Cisco switch.
- Describe Wide Area Networking concepts including Frame Relay, PPP, HDLC
- Record system documentation.

Equipment / Tools / Materials

Supplied by Competitor:

- None required – competitor should have pen and pencil

Supplied by Committee as required:

Software:

- Windows 8.1/10 Professional
- Windows 2012 R2 Server (both full and core editions)
- CentOS 7.x
- Software appropriate to support documentation (office suite, etc)
- Cisco Packet Tracer
- VMWare Workstation or Microsoft Hyper-V virtualization software

Hardware:

- Suitable computer hardware (Intel based desktops)

- Linksys SOHO Integrated Router device
- Suitable work surface
- Power bars / surge protector
- Raw materials for task completion as required.

Clothing Requirements:

- Competitors are to be dressed in a clean and safe manner appropriate for an office environment.

Safety Requirements:

Safety awareness/requirements will exceed the minimum industry standards at all times. A contestant will not be allowed to compete without the safety equipment noted on this scope document.

Judging Criteria:

- Ability to upgrade and properly configure PC workstations & servers.
- Ability to properly install operating systems and application software.
- Ability to properly implement and configure directory services.
- Ability to properly connect and configure networking equipment.
- Complete, appropriate and neat documentation.
- In the case of a tie at the end of the competition, the competitor with the higher score in the general knowledge question(s) will be declared the winner. If the tie continues, then professionalism will be the deciding factor.

Technical Committee:

Nolan Fretz, Okanagan College	co-chair
Bob McAuliffe, University of the Fraser Valley	co-chair
John Murtha, Sardis Secondary School	member
Nathan Wiens, Cisco Systems	member

Skills Canada BC reserves the right to make changes to the scope document. Please check the website for updates.