IT NETWORK SYSTEMS ADMINISTRATION
TI – GESTION DE RÉSEAUX

POST- SECONDARY / NIVEAU POSTSECONDAIRE

SCNC / OCMT

2020

VANCOUVER

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1 THE ESSENTIAL SKILLS FOR CAREERS IN THE SKILLED TRADES AND TECHNOLOGY

SCC is currently working with Employment and Social Development Canada (ESDC) in order to bring awareness to the importance of Essential Skills that are absolutely crucial for success in the workforce. Part of this ongoing initiative requires the integration and identification of Essential Skills in contest descriptions, projects, and project documents. The next phase and very important aspect of our Essential Skills (ES) initiative is to provide an ES report card to each competitor at the Skills Canada National Competition. The purpose of the ES report card is to inform the competitor about their current level of essential skills based on their competition scores. With this knowledge, the competitor will be made aware which essential skill may require improvement. Full implementation is expected in the next Skills Canada National Competition.

The following 9 skills have been identified and validated as key essential skills for the workplace in the legend below:

[1]Numeracy, **[2]**Oral Communication, [3]Working with Others, [4]Continuous Learning, [5]Reading Text, [6]Writing, **[7]**Thinking, [8]Document Use, [9]Digital

These essential skills have been identified in section 2.4 and/or 3.2 of your Contest Description and if applicable, in your Project and supporting documents.

2 CONTEST INTRODUCTION

2.1 Description of the associated work role(s) or occupation(s).

http://skillscompetencescanada.com/en/careers/information-technology/it-network-support/

2.2 Purpose of the Challenge

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

2.3 Duration of contest

12 hours

2.4 Skills and Knowledge to be tested

The competition evaluates a competitor's knowledge of computer and network hardware, and systems administration of Windows and Linux operating systems.

3 CONTEST DESCRIPTION

3.1 List of documents produced and timeline for when competitors have access to the documents.

DOCUMENT	DATE OF DISTRIBUTION VIA WEBSITE
No other competition document will be released prior to the competition	

3.2 Tasks that may be performed during the contest

3.2.1 Essential Skills

- Create, interpret and modify textual and graphical documentation[8]
- Calculate and apply to a network, an IPv4 and/or IPv6 addressing scheme using subnetting and/or Variable Length Subnet Mask (VLSM)
- Troubleshoot hardware and/or software issues with network and/or desktop configuration[7]
- Implement, verify and troubleshoot networking device security[7]
- Design a network solution based on a User Requirements document[8]

3.2.2 Hardware setup and initial configuration[9]

- Identify, install and test hardware components
- Troubleshoot hardware failures[7]
- Install and configure virtual machines
- Use disk, system, and file management tools
- Prepare and manage disk volumes including redundancy

3.2.3 Networking[7, 9]

- Implement, verify, and troubleshoot Local Area Network (LAN), Wide Area Network (WAN), Network Address Translation (NAT) and wireless networking services
- Implement, verify, and troubleshoot IPv4 and IPv6 routing protocols including Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP) and Border Gateway Protocol (BGP) on Layer 3 devices
- Implement, verify, and troubleshoot route distribution and route summarization
- Implement, verify, and troubleshoot spanning-tree operation
- Implement, verify, and troubleshoot ether-channel operation
- Implement, verify, and troubleshoot Virtual Local Area Networks (VLANs) and inter-VLAN communications and protocols
- Implement, verify, and troubleshoot access control lists (ACLs) for IPv4 and IPv6
- Implement, verify, and troubleshoot port security
- Implement, verify, and troubleshoot Virtual Private Network (VPN) tunnels
- Implement network monitoring and make decisions based on gathered data [7]
- Implement, verify, and troubleshoot IOS images and licensing

- Implement, Verify, and troubleshoot First Hop Redundancy Protocols (FHRP)
- Implement, verify, and troubleshoot a zone-based policy firewall (ZPF)

3.2.4 Windows Server Operations[9]

- Configure Domain Name System (DNS), Dynamic Host Control Protocol (DHCP), and Active Directory (AD)
- Create and perform maintenance of Active Directory objects
- Configure, verify, and troubleshoot infrastructure services and roles
- Delegate administrative roles
- Implement and verify Group Policies
- Manage server security, including windows firewall
- Perform data provisioning (i.e. shared resources, offline data)
- Perform and verify backups and restores
- Enable and configure remote management
- Manage Internet Information Service (IIS) services
- Automate tasks using batch files and PowerShell scripts
- Perform automated server or workstation deployment
- Manage Active Directory infrastructure
- Deploy Active Directory Certificate Services
- Manage Server upgrades and/or migrations including Active Directory services

3.2.5 Linux Server Operations[9]

- Application package management, including custom package sources
- Configure and manage network and local storage devices and their respective file systems including RAID
- Set and modify file and directory permissions, special permissions, and ownership
- Perform and verify backups and restores
- Monitor and troubleshoot network activity and services[7]
- Perform remote management
- Create, modify, and use shell scripts with BASH
- Create, modify, and delete user and group accounts
- Perform job scheduling
- Manage and troubleshoot HTTP, and FTP services[7]
- Manage runlevels and system initialization from configuration files
- Configure and verify 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
- Implement security auditing for files and authentication
- Set up user-level security, such as LDAP and NIS
- Configure user access security with Pluggable Authentication Modules [PAM]
- Perform server security tasks using Linux-based software tools

- Setup and configure server monitoring tools (e.g. Syslog / SNMP)
- Implement email routing systems (e.g, postfix, sendmail)
- Install system certificates for application use

Essential Skills – [7]Thinking (Problem Solving, Job Task Planning & Organizing), [8]Document Use, [9]Digital

4 EQUIPMENT, MATERIAL, CLOTHING

4.1 Equipment and material provided by Skills/Compétences Canada.

- Suitable computer hardware
- Cisco Packet Tracer Software
- Virtualization software
- Current version of Windows Server (2016 or later) including both *Desktop Experience* and *Core* editions
- Current version of Windows (10 (1809) or later)
- Current version of Debian linux (9.9 or later)
- Current version of Kali linux
- Software tools including
  - Nmap
  - Nessus
  - Wireshark
  - John the Ripper

4.2 Equipment and material provided by the competitor.

- Pen and paper

4.3 Required clothing provided by the competitor.

- Competitors must be dressed as appropriate for an office environment.

5 SAFETY REQUIREMENTS

5.1 Safety workshop.

Upon arrival at the Skill area, Competitors will participate in a Safety workshop and they will be expected to work and maintain a safe working area during the competition. Any Competitor breaking any health, safety and environmental rules, may be required to undertake a second safety workshop, this will not affect the Competitor's competition time.

5.2 List of required personal protective equipment (PPE) provided by the competitor.

- No PPE required

6 ASSESSMENT

6.1 Point breakdown

POINT BREAKDOWN	/100
Windows Administration	25
System Support & Troubleshooting	25
Linux Administration	25
Network Infrastructure	25

7 CONTEST SPECIFIC RULES

Contest specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from contest to contest. Any additional contest rules will be reviewed during competitor orientation.

TOPIC/TASK	CONTEST SPECIFIC RULE
Use of technology - personal laptops, tablets and mobile phones	• Competitors are not allowed to bring USB/memory sticks into the skill area. • Apart for the section on Linux, competitors will not have access to Internet during the competition. • Competitors are not allowed to bring personal laptops tablets or mobile phones into the skill area.
Source file/notes	• Competitors are not allowed to bring notes into the skill area. All notes made at the Competitor workstation must remain on the Competitors desk at all times. No notes may be taken outside of the skill area.
Equipment failure	• In the occurrence of equipment failure Competitors must notify the National Technical Committee (NTC) immediately by raising their hand. NTC members will take note of the time that the Competitor is not able to make use of their equipment. Any time lost due to equipment failure will be provided to the Competitor at the end of the standard Module time • No additional time will be granted for work not saved prior to the equipment failure
Breaks	• No extra time will be given to Competitors who stop work during competition time to go to the bathroom or for those who break for a food and/or drink. When time is completed all Competitors must stop all work on their computer immediately.
National Technical Committee (NTC) room	• Competitors are not allowed to enter the National Technical Committee meeting room in the skill area

8 ADDITIONAL INFORMATION

8.1 Interpreter

If a competitor requires the help of an interpreter once onsite during the competition, the Skills/Compétences Canada Provincial/Territorial offices must advise Skills/Compétences Canada National Secretariat a minimum of 1 month prior to the competition or this service might not be guaranteed.

8.2 Ties

- Tiebreaker #1: The competitor with the highest score in the System Support & Troubleshooting module will be declared the winner.
- Tiebreaker #2: The competitor with the highest score in the Networking Infrastructure module will be declared the winner
- Tiebreaker #3: The winner will be determined by the Linux module.

8.3 Competition rules

Please refer to the competition rules of the Skills Canada National Competition which can be found on the Skills/Compétences Canada website.

9 NATIONAL TECHNICAL COMMITTEE MEMBERS

Member Organization	Name
Alberta	TDA
Manitoba	Andrew Strahl
Ontario	John Ulakovich
Québec – Co-Chair	Jean-Francois Savard
Newfoundland & Labrador	Brian Forward
British Columbia - Chair	Nolan Fretz
Prince Edward Island	Rob Blanchard
Saskatchewan	Heath Armbruster

Contact the Skills/Compétences Canada national secretariat for any questions or concerns: Nathalie Maisonneuve (nathaliem@skillscanada.com).