## National Unit specification: general information

## Unit title: Computing: Routing Concepts (SCQF level 6)

## Unit code: FX1T 12

**Superclass:** CB

**Publication date:** October 2011

**Source:** Scottish Qualifications Authority

**Version:** 01

## Summary

The purpose of this Unit is to introduce candidates to some of the functions and features of a router. Candidates will configure a router for a simple Local Area Network (LAN).

This is an optional Unit in the NC Computing: Technical Support (SCQF level 6). It is also available as a freestanding Unit. The Unit is suitable for candidates with knowledge of computer networks and related security issues

## Outcomes

1 Identify router components.
2 Describe common routing protocols.
3 Configure and test a simple router configuration.

## Recommended entry

While entry is at the discretion of the centre, knowledge of computer networks and related security issues would be beneficial.

## Credit points and level

1 National Unit credit at SCQF level 6: (6 SCQF credit points at SCQF level 6*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

## National Unit specification: general information (cont)

**Unit title:** Computing: Routing Concepts (SCQF level 6)

## Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes of this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

## National Unit specification: statement of standards

## Unit title: Computing: Routing Concepts (SCQF level 6)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

## Outcome 1

Identify router components.

### Performance Criteria

(a) Identify primary hardware and software components.
(b) Identify router interfaces.
(c) Identify a router boot up process.

## Outcome 2

Describe common routing protocols.

### Performance Criteria

(a) Identify classes of routing protocol, their operation and functional characteristics.
(b) Identify common distance vector protocols, their operation and functional characteristics.
(c) Identify common link state protocols, their operation and functional characteristics.

## Outcome 3

Configure and test a simple router configuration.

### Performance Criteria

(a) Create a simple router configuration from a given scenario.
(b) Configure serial and Ethernet interfaces on network routers.
(c) Configure a routing protocol on network routers.
(d) Configure static routing on network routers.
(e) Configure end devices.
(f) Test end to end connectivity.

## National Unit specification: statement of standards (cont)

## Unit title: Computing: Routing Concepts (SCQF level 6)

### Evidence Requirements for this Unit

Evidence is required to demonstrate that candidates meet the requirements of all Outcomes and Performance Criteria.

**Outcome 1**

Written and/or oral recorded evidence is required that demonstrates that candidates can identify the type, operation and functional characteristics of:

- CPU; RAM, NVRAM and Flash memory types; Internetworking OS
- 4 interface types (to include LAN, WAN, Management and Auxiliary)
- POST, IOS location & loading, Configuration file location & loading

Evidence for this Outcome will be obtained under closed-book, supervised conditions.

**Outcome 2**

Written and/or oral recorded evidence is required that demonstrates that candidates can identify the type, operation and functional characteristics of:

- Classful, Classless, Interior, Exterior, Distance Vector, Link State
- RIP, RIPv2, metrics and differences
- EIGRP, OSPF metrics and differences

The evidence for this Outcome will be obtained under closed-book, supervised conditions.

**Outcome 3**

Performance evidence is required that demonstrates that candidates can:

- configure an appropriate connection to each router through a management interface
- configure serial and Ethernet interfaces on each router
- configure a common routing protocol on each router
- configure static routing on each router
- configure IP addressing on network end devices
- test device connectivity for successful communication

Evidence for this Outcome should be obtained under supervised, open-book conditions. Candidates will have access to notes and reference books.

## National Unit specification: support notes

## Unit title: Computing: Routing Concepts (SCQF level 6)

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

## Guidance on the content and context for this Unit

At present there are no specific national Occupational Standards that this Unit aligns to, however candidates will be working within contexts relating to industry standards.

The overall aim of this Unit is to introduce candidates to the functions and features of a router. Candidates should be exposed to common routing terminology and concepts throughout.

**Outcome 1**

This Outcome relates to the router hardware components and their function. The candidate will be required to know the function of router motherboard components such as the CPU, RAM, ROM, NVRAM and Flash memory.

The Outcome will involve the identification of console and aux ports and their configuration and function and the identification of a variety of contemporary LAN and WAN interfaces.

In addition, candidates will require to understand the router boot up process including:

- POST
- locating and loading IOS
- locating the configuration file
- loading the start-up file

**Outcome 2**

This Outcome relates to the identification of routing protocols. Candidates could be asked to categorise routing protocols as Interior or Exterior, Classful or Classless and Distance Vector or Link State.

In addition candidates will need to understand the differences between vendor neutral and vendor specific routing protocols. The main features of common interior gateway protocols should be covered, together with their appropriateness in certain networking scenarios.

**Outcome 3**

This Outcome relates to the configuration and testing of a small routed network. Candidates will use appropriate utility software to configure the routers and end devices on the network to meet the requirements of the scenario.

Candidates will establish correct connections between the different computers on the network and test these by transferring data across the network. Candidates will be required to maintain a log book of all router and end device configurations and validation tests.

## National Unit specification: support notes (cont)

**Unit title:** Computing: Routing Concepts (SCQF level 6)

## Guidance on learning and teaching approaches for this Unit

The overall aim of this Unit is to introduce candidates to the functions and features of a router. Candidates should be exposed to common routing terminology and concepts throughout.

Candidates are not expected to know the exact command line syntax of a significant number of commands on specific routers.

## Guidance on approaches to assessment for this Unit

Outcomes 1 and 2 can be assessed via a set of multiple choice/restricted response questions. The instrument of assessment may be designed to combine the content of Outcomes 1 and 2.

Outcome 3 can be assessed via a practical exercise. The assessment should be conducted under open-book, controlled conditions.

The assessments for Outcomes 1 and 2 are essentially suited to use of multiple choice/restricted response questions covering all of the Performance Criteria. It is anticipated that these assessment will be carried out towards the end of the Unit once candidates have had an opportunity to acquire the essential knowledge and understanding required to give them a realistic prospect to pass the assessment.

## Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003), SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

## National Unit specification: support notes (cont)

**Unit title:** Computing: Routing Concepts (SCQF level 6)

## Opportunities for developing Core Skills

In this Unit candidates will develop skills in configuring a router for a simple Local Area Network (LAN).

Candidates will:

- identify router hardware components and their function, console and aux ports and their configuration and function and a variety of contemporary LAN and WAN interfaces
- locate and load IOS, configuration and startup files
- identify, categorise and understand the differences between specific routing protocols and their appropriateness in certain networking situations
- use appropriate utility software to configure the routers and end devices on the network to meet client requirements
- establish correct connections between the different computers on the network and test these by transferring data across the network
- maintain a record of all router and end device configurations and validation tests

As candidates are doing this Unit they will be developing aspects of the Core Skills of *Problem Solving*, *Information and Computer Technology*, *Numeracy* and *Communication*.

## Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

## History of changes to Unit

| Version | Description of change | Date |
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