



National Unit specification: general information

Unit title: Server Administration Fundamentals (SCQF level 6)

Unit code: H2N7 12

Superclass: CB

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Summary

This Unit introduces fundamental approaches to server administration in modern computing environments. It covers the role of servers and how they support users and computer management, server installations, storage solutions and performance and maintenance.

This Unit is aimed at candidates who have at least a basic knowledge of computer hardware and computer software, and who are interested in computer networking.

This is a mandatory Unit in the National Progression Award (NPA) in Professional Computer Fundamentals, but can also be taken as a freestanding Unit.

Outcomes

- 1 Demonstrate knowledge and understanding of the installation of a server operating system.
- 2 Identify and explain the role of servers.
- 3 Demonstrate knowledge and understanding of user and computer management.
- 4 Research and evaluate a range of server storage solutions.
- 5 Demonstrate knowledge and understanding of server installations.

Recommended entry

While entry is at the discretion of the centre, it would be beneficial if candidates possessed basic ICT skills and had a working knowledge of computer hardware and software. This may be evidenced by achievement of the following, or equivalent Units:

F1KR 11 *Computing: Computer Hardware and Systems*

F3SY 12 *Computing: Computer Hardware and Systems*

It may also be beneficial for candidates to have some knowledge of computer networks. This may be evidenced by achievement of the following, or an equivalent Unit:

F1KH 11 *Computing: Computer Networking Fundamentals*

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.*

Core Skills

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

Opportunities for developing aspects of Core Skills are highlighted in the support notes of this Unit specification.

National Unit specification: general information

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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

Demonstrate knowledge and understanding of the installation of a server operating system.

Performance Criteria

- (a) Identify the main components of a server operating system.
- (b) Describe the function of device drivers within a server operating system.
- (c) Install a server operating system.
- (d) Configure services on a server.

Outcome 2

Identify and explain the role of servers.

Performance Criteria

- (a) Identify and explain the purpose of a range of application servers.
- (b) Identify and explain the purpose of a range of web servers.
- (c) Explain the function of remote access methods.
- (d) Explain the role of file and print servers.
- (e) Explain the purpose of server virtualisation.

Outcome 3

Demonstrate knowledge and understanding of user and computer management.

Performance Criteria

- (a) Create and manage users and groups.
- (b) Describe advanced user and computer groupings.
- (c) Describe common computer network infrastructure solutions.
- (d) Manage users and computers using policies.

Outcome 4

Research and evaluate a range of server storage solutions.

- (a) Compare data storage technologies.
- (b) Compare RAID solutions.
- (c) Describe common disk types.

Outcome 5

Demonstrate knowledge and understanding of server installations.

- (a) Monitor performance of the main server hardware components.
- (b) Describe a typical server start up process.
- (c) Explain the importance of server backup and fault tolerance.
- (d) Update server software.
- (e) Describe server troubleshooting approaches.

Evidence Requirements for this Unit

Evidence is required to demonstrate that candidates have achieved all Outcomes and Performance Criteria.

All assessment will be produced under controlled, supervised conditions. Evidence is required to demonstrate practical competences for each outcome. Separate evidence is required to demonstrate knowledge and this will be gathered under closed-book conditions.

To demonstrate practical competences written and/or oral evidence is required. Evidence may be captured, stored and presented in a range of media (including audio and video) and formats (analogue and digital). Particular consideration should be given to digital formats and the use of multimedia.

For Outcome 1, candidates must demonstrate practical competences in:

- Server installation — choosing operating version and type; preparing for installation; attended/unattended installations; upgrades/clean installs.

For Outcome 2, candidates must demonstrate practical competences in:

- file and print services — local and network printers; printer pools; print job management; file and folder permissions; share permissions.

For Outcome 3, candidates must demonstrate practical competences in:

- user accounts and groups — local accounts; network accounts; group types and scopes; group nesting.
- policy management — user and computer policy management; order of processing; local policies.

For Outcome 4, candidates must research and evaluate:

- data storage technologies — local disks; network storage; disk types and technologies.
- RAID solutions — RAID 0, RAID 1, RAID 5, RAID 10.
- disk types — basic and dynamic disks; mounted disks; file systems; virtual hard disks; distributed file systems; optical disks.

For Outcome 5, candidates must demonstrate practical competences in:

- performance management tools to analyse network, CPU, memory and disk; creating a baseline; performance management tools; performance logs and alerts.
- server software updates — operating systems updates; driver updates; applications updates; security updates.

Evidence to assess the knowledge of all outcomes in this unit will be generated under controlled, supervised, closed-book conditions.

Candidates should be assessed on a representative sample over all knowledge and skills for all outcomes.

For Outcome 1, candidates must demonstrate knowledge and understanding of:

- server installation options — choosing operating version and type; preparing for installation; attended/unattended installations; upgrades/clean installs
- device drivers — installation; removal; disabling; update; rollback; troubleshooting; driver signing
- services — viewing services; service status and modes; start, stop or restart services

For Outcome 2, candidates must identify and explain:

- application servers — e-mail servers; database servers; security servers
- web services — WWW; FTP; SSL; web hosting
- remote access tools — remote assistance and administration tools; remote desktop tools; VPNs
- file and print services — local and network printers; printer pools; print job management; file and folder permissions; share permissions
- server virtualisation — physical and virtual servers; virtual hard disks; virtual memory
- identification and description of at least three types of malware

For Outcome 3, candidates must demonstrate knowledge and understanding of:

- user accounts and groups — local accounts; network accounts; group types and scopes; group nesting
- advanced grouping and containers — default containers; policy management; nesting; inheritance
- common network infrastructures — hierarchies; server roles; replications; namespace; trusts and links
- policy management — user and computer policy management; order of processing; local policies

For Outcome 4, candidates must research and evaluate:

- data storage technologies — local disks; network storage; disk types and technologies
- RAID solutions — RAID 0, RAID 1, RAID 5, RAID 10
- disk types — basic and dynamic disks; mounted disks; file systems; virtual hard disks; distributed file systems; optical disks

For Outcome 5, candidates must demonstrate knowledge and understanding of:

- performance management tools to analyse network, CPU, memory and disk; creating a baseline; performance management tools; performance logs and alerts
- server start up process — bios; boot sectors; boot files; POST; safe modes; backup and restore; disaster recovery; clustering; folder redirection; data redundancy; uninterruptible power supply (UPS)
- server software updates — operating systems updates; driver updates; applications updates; security updates
- troubleshooting servers — methodologies; troubleshooting tools; monitoring resources; event viewing, logging and filtering

National Unit specification: support notes

Unit title: Server Administration Fundamentals (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

This is a mandatory Unit in the National Progression Award in Professional Computer Fundamentals, but can also be taken as a freestanding Unit. It is aimed at providing candidates with the underpinning theory required for a career in system administration and/or network design. The Unit may be useful for any candidates who are preparing to undertake the Microsoft Technology Associate (MTA) exam Server Administration Fundamentals (exam number: 98-365).

It is expected that the following content would be relevant to the delivery of Outcome 1:

- server installation options — choosing operating version and type; preparing for installation; attended/unattended installations; upgrades/clean installs
- device drivers — installation; removal; disabling; update; rollback; troubleshooting; driver signing
- services — viewing services; service status and modes; start, stop or restart services

It is expected that the following content would be relevant to the delivery of Outcome 2:

- application servers — e-mail servers; database servers; security servers
- web services — WWW; FTP; SSL; web hosting
- remote access tools — remote assistance and administration tools; remote desktop tools; VPNs
- file and print services — local and network printers; printer pools; print job management; file and folder permissions; share permissions
- server virtualisation — physical and virtual servers; virtual hard disks; virtual memory

It is expected that the following content would be relevant to the delivery of Outcome 3:

- user accounts and groups — local accounts; network accounts; group types and scopes; group nesting
- advanced grouping and containers — default containers; policy management; nesting; inheritance
- common network infrastructures — hierarchies; server roles; replications; namespace; trusts and links

- policy management — user and computer policy management; order of processing; local policies

It is expected that the following content would be relevant to the delivery of Outcome 4:

- data storage technologies — local disks; network storage; disk types and technologies
- RAID solutions — RAID 0, RAID 1, RAID 5, RAID 10
- disk types — basic and dynamic disks; mounted disks; file systems; virtual hard disks; distributed file systems; optical disks

It is expected that the following content would be relevant to the delivery of Outcome 5:

- performance management tools to analyse network, CPU, memory and disk; creating a baseline; performance management tools; performance logs and alerts
- server start up process — bios; boot sectors; boot files; POST; safe modes; backup and restore; disaster recovery; clustering; folder redirection; data redundancy; uninterruptible power supply (UPS)
- server software updates — operating systems updates; driver updates; applications updates; security updates
- troubleshooting servers — methodologies; troubleshooting tools; monitoring resources; event viewing, logging and filtering

National Unit specification: support notes (cont)

Unit title: Server Administration Fundamentals (SCQF level 6)

Guidance on learning and teaching approaches for this Unit

While the main focus of this Unit is theoretical, there is an element of practical work, but it is expected that tutors will use considerable practical and hands-on methods as part of their classes to ensure candidates see the theory in practice. It is suggested that practical exercises and/or demonstrations would be particularly relevant and beneficial when teaching the following:

Outcome 1

- server installation options
- device drivers — installation
- services — viewing services; service status and modes; start, stop or restart services

Outcome 2

- application servers
- remote access tools
- file and print services
- server virtualisation

Outcome 3

- user accounts and groups
- advanced grouping and containers
- common network infrastructures
- policy management

Outcome 4

- data storage technologies
- RAID solutions
- disk types

Outcome 5

- performance management tools to analyse network
- server start up process
- server software updates
- troubleshooting servers — methodologies; troubleshooting tools
- monitoring resources; event viewing, logging and filtering

National Unit specification: support notes (cont)

Unit title: Server Administration Fundamentals (SCQF level 6)

Guidance on approaches to assessment for this Unit

To test knowledge, all outcomes could be assessed via a multiple-choice test of around 45 questions, with adequate sampling of the required evidence. A cut off score of 60% could be applied to measure success. The test would be expected to last one hour and candidates must not know in advance on which items they will be tested.

Multiple-choice questions should be constructed so as to allow candidates to demonstrate their knowledge at an appropriate level. Where re-assessment is required, a different Instrument of Assessment should be used under the same conditions, but should assess a different representative sample.

To assess practical competences candidates may be provided with a proforma logbook. This should show screenshots of tasks supported by appropriate narrative. This evidence could be gathered in a portfolio of work or could be in the form of blog or vlog.

The practical research task for Outcome 4 may be assessed by using a table, which the candidates have to complete based on their research activity. There is no requirement, or time, for candidates to produce a formal report to present their findings.

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)*.

Opportunities for developing Core Skills

In this Unit, there are opportunities to develop aspects of the Core Skills of *Information and Communication Technology* in particular, and *Communication*. *Information and Communication Technology* skills will be developed naturally through the content of the Unit which focuses on the theory behind computer networks. *Communication* skills may be developed through written and/or verbal reporting throughout assessments if using instruments other than multiple choice questioning.

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
02	Amendments to sections 'Evidence Requirements for this unit' and 'Guidance on approaches to assessment for this unit', to add information and provide clarification regarding practical element.	12/06/17

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