

Next Generation Higher National Unit Specification

Network Server Operating Systems (SCQF level 8)

Unit code: J7E9 48

SCQF level: 8 (16 SCQF credit points)

Valid from: session 2023–24

Prototype unit specification for use in pilot delivery only (version 1.0) June 2023

This unit specification provides detailed information about the unit to ensure consistent and transparent assessment year on year.

This unit specification is for teachers and lecturers and contains all the mandatory information required to deliver and assess the unit.

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Unit purpose

This unit introduces learners to the issues involved in installing, managing and maintaining a network server operating system. It is particularly useful to learners studying for a Higher National Certificate (HNC) or Higher National Diploma (HND) in Computer Science, Networking and Cloud Infrastructure, or a related area that requires knowledge of the theory and practice of installing, configuring and maintaining a network server.

Entry to the unit is at your centre's discretion. There are no specific requirements, but learners benefit from prior knowledge of computer networks and operating systems. They can demonstrate this by completing Network Concepts at SCQF level 7 and Client Operating Systems at SCQF level 7.

On completion of the unit, learners may progress to more advanced units in networking topics or related computing areas.

Unit outcomes

Learners who complete this unit can:

- 1 install and upgrade a network operating system (NOS)
- 2 manage and maintain physical and logical devices
- 3 manage users, computers, groups, files and folders
- 4 manage and maintain a physical server environment

Evidence requirements

Learners must provide knowledge evidence and product evidence.

You can assess each outcome individually or use a case study or project of sufficient complexity to produce evidence for a sample of the knowledge statements and all the skills statements. Learners must produce their evidence individually and without assistance.

Knowledge evidence

Learners' knowledge evidence must demonstrate that they have sufficient knowledge and understanding for each of the outcomes in the unit. Learners can produce this evidence over an extended period under lightly-controlled conditions.

You can sample the knowledge evidence when testing is used, but you must include one or more questions on each of the following:

- ◆ installation of a NOS
- ◆ upgrading and patching of a NOS
- ◆ local and remote installation of a NOS
- ◆ physical disk management
- ◆ logical disk management
- ◆ principles of redundant array of independent disks (RAID), storage area networks (SANs) and network-attached storage (NAS)
- ◆ network permissions and authentication
- ◆ user, computer and group profiles
- ◆ secure backup of data
- ◆ restoration of data and disaster recovery

Product evidence

Learners' product evidence must include a practical demonstration of all the skills in the 'Knowledge and skills' section.

Learners can produce product evidence over an extended period in lightly-controlled conditions or generate it holistically in conjunction with other units in a group award. Evidence produced in lightly-controlled conditions must be authenticated. The [Guide to Assessment](#) provides further advice on methods of authentication.

The standard of evidence should be consistent with the SCQF level of the unit.

Knowledge and skills

The following table shows the knowledge and skills covered by the unit outcomes:

Knowledge	Skills
<p>Learners should understand:</p> <ul style="list-style-type: none">◆ the principles of NOS deployment◆ physical and logical disk management◆ RAID solutions, SANs and NAS devices◆ user and group permissions◆ authentication◆ local and remote management of networks◆ secure backup and restoration	<p>Learners can:</p> <ul style="list-style-type: none">◆ install a NOS from the manufacturer's installation media◆ install a network operating system from a network distribution point◆ upgrade a network operating system◆ manage network servers locally and remotely◆ monitor and optimise application performance◆ manage physical hard disk subsystems◆ manage logical disks◆ create and manage users and groups◆ assign file and folder permissions to match requirements◆ monitor file and print servers◆ securely backup and restore data

Meta-skills

Throughout the unit, learners develop meta-skills to enhance their employability in the computing sector.

Self-management

This meta-skill includes:

- ◆ focusing: analysing physical and logical disk requirements; installing, patching and upgrading NOS
- ◆ adapting: critically reflecting on new knowledge to attain a deeper understanding, and to embed and extend learning
- ◆ initiative: displaying independent thinking

Social intelligence

This meta-skill includes:

- ◆ communicating: receiving and interpreting information about NOS upgrades and patches; sharing information about network configurations to a range of audiences, both technical and non-technical
- ◆ leading: suggesting the best choice of disk configuration (RAID, SAN, NAS)

Innovation

This meta-skill includes:

- ◆ curiosity: questioning constructively to identify requirements for a network configuration; information sourcing; recognising problems and devising solutions
- ◆ creativity: generating ideas; problem solving
- ◆ sense-making: analysis and synthesis; seeing the bigger picture
- ◆ critical thinking: applying problem-solving approaches to resolve network management issues

Delivery of unit

The time required varies depending on the previous experience of individual learners. Based on 80 hours delivery and assessment time, we suggest the following distribution:

Outcome 1 — Install and upgrade a NOS
(20 hours)

Outcome 2 — Manage and maintain physical and logical devices
(20 hours)

Outcome 3 — Manage users, computers, groups, files and folders
(20 hours)

Outcome 4 — Manage and maintain a physical server environment
(20 hours)

The unit prepares learners for a role in the management of a network server environment. This is a highly practical role, and we suggest that you take a practical approach, wherever possible, to reinforce learning and to develop the practical skills necessary to build and maintain a physical server environment. Building and maintaining servers is typically done in teams, so you should encourage team working wherever possible.

If you deliver the unit with other networking and infrastructure units, opportunities may be available to cross-assess. You should keep a note of any cross-assessment you carry out with other units.

Additional guidance

The guidance in this section is not mandatory.

Content and context for this unit

This unit provides learners with the basic skills they need to install, upgrade, configure and maintain a network server operating system in small- to medium-sized enterprises. You can deliver the unit with Client Operating Systems at SCQF level 7 to provide an integrated view of a client operating systems networking architecture.

This is a practical unit, and you should deliver it in a networking environment that enables learners to work in teams to develop relevant skills in building various types of servers, such as print or file servers. We suggest that you cover at least three types of server in the unit.

The content of the unit is not vendor-specific, however you can use current vendor learning materials for delivery if your centre believes it is beneficial to learners. You can virtualise the network environment you use for teaching to make better use of resources.

Install and upgrade a NOS (outcome 1)

You should examine the principles and practice of deploying NOS software. On completing this outcome, learners should be able to deploy an operating system from its distribution media. Alternatively, learners might install the operating system remotely using a pre-configured image or server-based distribution service.

Learners should experience upgrading a NOS to a current version and applying a patch to an operating system to keep it current and secure.

Manage and maintain physical and logical devices (outcome 2)

You should introduce the principles of physical and logical disk management. On completion of this outcome, learners should be capable of initialising and partitioning a disk; viewing and updating disk properties; managing mounted drives; creating volumes on a disk; and any other disk management function specific to the operating system of choice. Learners should also know how to implement redundant array of independent disks (RAID) solutions, storage area networks (SAN) and network-attached storage (NAS) devices.

Manage users, computers, groups, files and folders (outcome 3)

You should cover the creation and management of users and groups, along with the assignment of permissions, to allow users and groups to securely access the minimum set of resources required by their role and level in an organisation.

Learners should be able to create, modify and troubleshoot accounts for users and groups, and resolve authentication issues. They should also be able to assign permissions to users and groups to provide secure access to networked resources, such as files, folders, and printers. Learners should troubleshoot problems from unintentional conflicts that might arise when a user is a member of more than one group with different access permissions to resources.

Manage and maintain a physical server environment (outcome 4)

This outcome introduces local and remote management of resources, and the secure backup and restoration of data. Learners should be able to:

- ◆ manage servers remotely
- ◆ monitor file and print servers
- ◆ monitor and optimise the performance of applications
- ◆ securely backup and restore data

Approaches to assessment

Learners can produce knowledge evidence from a question paper that satisfies the constraints in the 'Evidence requirements' section. You must conduct this test under exam conditions with no access to notes or other materials, including online.

Alternatively, learners can produce knowledge evidence in the form of a portfolio that could include case studies, assignments, videos and blog posts.

The assessments of practical competence and skills take place over the duration of the unit and involve learners in a series of tasks that you design to allow them to produce the evidence they need. Where possible, you should use a virtualised network environment to economise on resources.

Equality and inclusion

This unit is designed to be as fair and as accessible as possible with no unnecessary barriers to learning or assessment.

You should take into account the needs of individual learners when planning learning experiences, selecting assessment methods or considering alternative evidence.

Guidance on assessment arrangements for disabled learners and/or those with additional support needs is available on the assessment arrangements web page:

www.sqa.org.uk/assessmentarrangements.

Information for learners

Network Server Operating Systems (SCQF level 8)

This information explains:

- ◆ what the unit is about
- ◆ what you should know or be able to do before you start
- ◆ what you need to do during the unit
- ◆ opportunities for further learning and employment

Unit information

This unit is for learners carrying out a computing- or IT-related qualification, who want to understand network server operating systems. It helps you to develop an understanding of the issues involved in installing and administering a desktop operating system and gain practical competence as a network administrator.

On completion of the unit, you can:

- 1 install and upgrade a network operating system (NOS)
- 2 manage and maintain physical and logical devices
- 3 manage users, computers, groups, files and folders
- 4 manage and maintain a physical server environment

You learn the principles and practice of deploying NOS software to install an operating system from its distribution media. You may also install a NOS remotely, using a pre-configured image or server-based distribution service. You upgrade an operating system to the most recent version and install patches from the manufacturer that keep it efficient and secure.

You learn about physical and logical devices and how to:

- ◆ manage and maintain hard disk subsystems
- ◆ monitor server hardware
- ◆ optimise server disk performance
- ◆ install and configure server hardware devices

You learn about the management of user and group accounts and the characteristics of user profiles. You can manage users, computers and groups, including user profiles, and create, manage, and troubleshoot user, group and computer accounts. You gain an understanding of permissions and the importance of authentication to network security. You manage and maintain access to resources, including configuring access to shared folders, troubleshooting terminal services and configuring file system permissions.

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You learn how to monitor and analyse network events and system performance and gain competence in managing and maintaining a server environment, including:

- ◆ software updates and site licensing
- ◆ managing servers remotely
- ◆ monitoring file and print servers
- ◆ monitoring and optimising application performance
- ◆ managing a web server

You learn about approaches to secure backup and how to:

- ◆ restore, manage and implement disaster recovery
- ◆ perform system recovery for a server
- ◆ manage backup procedures
- ◆ recover from server hardware failure
- ◆ restore backup data
- ◆ schedule backup jobs

You are assessed on evidence you provide of your knowledge and understanding in the unit. This can be from a question paper, but your centre may ask for other forms of knowledge evidence. You evidence your practical competence by completing a logbook, which might include video or other recordings, of the practical tasks you have carried out during the unit.

Throughout the unit, you develop meta-skills covering self-management, social intelligence and innovation.

On completion of the unit, you have the knowledge and skills you need to progress to more advanced study of computer networks and other related computing topics.

Administrative information

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Superclass: CB

History of changes

Version	Description of change	Date

Note: please check [SQA's website](#) to ensure you are using the most up-to-date version of this document.