Unit 5: Managing Networks

Unit code: K/601/7663

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

Aim and purpose

The aim of this unit is to enable learners to understand network management functions and develop the knowledge and skills needed to use the tools and technologies available to the network manager.

Unit introduction

In the business world the use of networked computer systems is commonplace and often essential. Therefore, it is important that business network systems run as effectively and efficiently as possible with minimum down-time and flexibility to change as requirements change.

This unit examines the principles of network management, allowing learners to understand the different functions and types of activity that network managers need to understand.

Network managers have a variety of tools to assist them in monitoring and maintaining networks. Specialist software tools are used to assist network managers and learning outcome 1 deals with these tools and techniques, although learners will need to become familiar only with a limited number of products.

The pace of change in networking technologies and the technologies that support network managers is rapid. Learners will research emerging technologies and find out how they will assist or impact on network systems.

For the practical part of this unit, learners will be given the opportunity to plan and carry out a variety of network management activities. The focus will be on the maintenance of the system, including configuration. Keeping accurate records is essential both for checking that work has been carried out and for referencing solutions to potential problems. Learners will be encouraged to develop good record-keeping habits, which will also help them with practical work in other units.

Finally, learners will consider why organisations need to have a network management policy and what it would include.

Learning outcomes

On completion of this unit a learner should:

1 Know about networking management tools and technologies

2 Understand network management functions

3 Be able to carry out network management activities.

Unit content

1 Know about networking management tools and technologies

Network technologies: operating systems; protocols; layout; devices

Networking operating systems: examples eg Windows, Linux

Networking protocols: eg SNMPv3, ICMP

Layout: eg cabling, topologies, wireless

Network devices: servers; workstations; interconnection devices; network cards; vendor specific hardware

Networking tools: purpose eg fault management, performance management; specific examples of tools eg HP Openview, Cisco Works, Wireshark; using system software eg to find network assets

Emerging technologies: examples eg server virtualisation, video on demand

Impact of emerging technologies: enhanced capabilities eg faster, greater storage capacity, improved control; new work methods eg mobile working, home working, web centric applications; ease of use

2 Understand network management functions

Network management functions: configuration; fault management; account management; performance variables eg network throughput, user response times, line utilisation; other activities eg planning, designing, installing; network operations eg security, data logging, checking performance and traffic; reporting

3 Be able to carry out network management activities

Regular maintenance activities: eg backup and restore files; user account creation and deletion; design and develop login scripts; virus scans; file cleanup

Tools: to manage performance or fault find eg SNMP, HP Openview

Documentation: work logs; log resources used; system testing

Configuration options: user accounts location eg choosing server and setting rights; drive mappings; other eg virus scanning options

Security features: eg VPN access, firewall management, access control lists, device hardening, continuous policy review, forensic analysis, user rights

Security policies and procedures: eg periodically review user access and rights, penetration testing, security audits, review firewall and access control list policies

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	**To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:**	**To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:**
P1 describe network technologies		
P2 outline the purpose of networking tools		
P3 identify emerging network technologies [IE2]	**M1** describe the potential impact of emerging network technologies [CT1]	
P4 explain the functions of network management	**M2** explain the goals of fault management	**D1** justify the inclusion of routine performance management activities within a network manager's role [IE6]
P5 interrogate a network to identify the network assets and their configuration [IE4]		
P6 undertake routine network management tasks. [SM5]	**M3** keep accurate records of network management tasks.	**D2** design a network security policy for a small organisation.

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

While much of the content of this unit appears theoretical, underpinning understanding and knowledge is developed best through practical activity. For some of the grading criteria, learners need to work with a network. It is advised that tutors negotiate, before the start of this unit, access to small, networked systems isolated from any corporate network system, that learners can use and configure.

Talks from network managers would be particularly valuable, especially if prior discussions with the speaker ensure that the content of the talk is specifically connected to the unit content in the specification and terminology is consistent.

The unit can be delivered in the same order as the learning outcomes, however to maintain interest and to firm up understanding of theoretical work, practical activities can be arranged in parallel. If resources are limited then providing quality workshop time for a limited and rotating number of learners, while the rest of the group are engaged with other work, may be more effective than hands-off demonstrations to whole groups.

The delivery of this unit can be linked with other networking units, IT support, troubleshooting and vendor units. The unit will provide the management link across this range of units.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

Topic and suggested assignments/activities and/assessment
Introduction to the unit
Networking management tools and technologies: • whole-class exercise – tutor presentation on network devices, followed by practical exercise • whole-class exercise – tutor presentation on network operating systems, followed by practical exercise • whole-class exercise – tutor presentation on networking protocols, followed by practical exercise • whole-class exercise – tutor presentation on networking tools, followed by practical exercise • whole-class exercise – tutor presentation on network layout • whole-class exercise – tutor presentation on emerging technologies • whole-class exercise – tutor presentation on the impact of emerging technologies • a mixture of practical exploration of the technologies, learner exercises, case studies and detailed investigation.
Principles of network management: • network management functions, a mixture of practical exploration of the technologies, learner exercises, case studies and detailed investigation.

Topic and suggested assignments/activities and/assessment
Suggested Assignment 1 – Network Managers
Network management activities: • whole-class exercise – tutor presentation on regular maintenance activities, followed by practical exercise • whole-class exercise – tutor presentation on documentation, followed by practical exercise • whole-class exercise – tutor presentation on software tools, followed by practical exercise • whole-class exercise – tutor presentation on configuration, followed by practical exercise • learners will need access to practical resources and suitable technology, they can also use simulators or multimedia tools to gain experience before handling 'live resources'.
Manage a secure network infrastructure: • whole-class exercise – tutor presentation on security features, followed by practical exercise • whole-class exercise – tutor presentation on security policies, followed by practical exercise • learners will need access to practical resources and suitable technology, they can also use simulators or multimedia tools to gain experience before handling 'live resources'.

Assessment

The suggested assessment of this unit is through two assignments as summarised in the *Programme of suggested assignments* (PSA) table.

Suggested Assignment 1 – Network Managers

The suggested scenario for this assignment is for learners to prepare their evidence as a presentation. The presentation could be in any format eg PowerPoint, web-based or paper-based. Learners do not need to deliver the presentation, although this would provide opportunities to access and practise PLTS.

P1 and P2 are straightforward and learners should refer to the detail in the learning outcome (LO) to help decide on the content. P3 will require some research. In this case 'emerging technologies' may be considered as any relatively recent network technologies. M1 requires the learner to have given thought to how these emerging technologies have, or may, affect networks. The effects may best be described by use of examples.

P4 is also straightforward and the unit content indicates the expected content. For this criterion the verb is 'explain', which indicates more than a straightforward description. Including how and why as key questions helps produce an extended answer.

For M2 to be awarded, the explanation of fault management should include why it is necessary, the aim and the consequences of failing.

D1 requires a justification for carrying out routine performance management activities, which should include aspects related to efficiency and quality standards.

Suggested Assignment 2 – Managing a Network

This is a practical assignment and will largely be evidenced through witness statements and/or observation records.

Learners are required to find out the details of a network configuration for P5. Learners should be able to identify suitable software to interrogate the network and make sense of the results, presenting them in a user-friendly format. For P6, learners should undertake as many as possible of the routine maintenance operations outlined in the unit content. Some of the evidence for this may come from the parallel unit 'Maintaining computer systems'. Evidence may also come from records/logs of the activities the learner has completed, which must be supplied if M3 is to be awarded.

Finally for D2, learners will need to be given a suitable small business scenario to design a management security policy. This should include at least those activities outlined in the unit content.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Pearson assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1-P4, M1, M2, D1	Network Managers	Give a presentation explaining the role of network managers to a group of trainee network technicians.	Presentation Hand-outs Supporting documentation
P5, P6, M3, D2	Managing a Network	Undertake network management activities.	Witness statements Observation records Logs Report

Links to other BTEC units

This unit forms part of the BTEC in IT sector suite. This unit has particular links with the following unit titles in the IT suite:

Level 1	Level 2	Level 3
		Unit 9: Computer Networks

Essential resources

Learners will need access to practical resources and suitable technology, they can also use simulators or multimedia tools to gain experience before handling 'live resources'

Employer engagement and vocational contexts

Visits to a local networking company, or using the academic centre network, provide a suitable vocational context.

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
Independent enquirers	identifying emerging technologies justifying routine management activities
Creative thinkers	identifying the potential impact of emerging technologies
Self-managers	dealing with competing pressures, undertaking routine network management tasks.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Reflective learners	keeping records of network activities
Team workers	undertaking routine management activities.

Functional Skills – Level 2

Skill	When learners are …
ICT – Using ICT	
Plan solutions to complex tasks by analysing the necessary stages	undertaking routine maintenance activities
Select, interact with and use ICT systems safely and securely for a complex task in non-routine and unfamiliar contexts	interrogating networks
ICT – Developing, presenting and communicating information	
Combine and present information in ways that are fit for purpose and audience	keeping accurate records of tasks.