UOS reference number
ST0127_v2

Trailblazer reference number
TB0555

Title of occupation
Network Engineer (revision)

Trailblazer name
Network Engineer

Core and options
No

Resubmission
Yes

Level of occupation
Level 4

Route
Digital

Typical duration of apprenticeship
24 months

Target date for approval

31 May 2020

Occupational profile

Summary
This occupation is found in large and small businesses, in all sectors, and within public, private, and voluntary organisations. Network Engineers are a key occupation in most organisations which are increasingly dependent on their digital networks.

Organisations of all types are increasingly applying digital technologies across all their business functions to maximise productivity. Large organisations will have sophisticated complex systems whilst smaller consultancies offer support to clients on a contract basis

For example, a Network Engineer may work within a network of hotels to ensure that the booking system functionality and performance is maintained and customer access to courtesy systems such as Wi-Fi are managed appropriately for performance.
In a large infrastructure project, a Network Engineer may work in a team to ensure that

significant project milestones are reached in delivering network services both within the project and by servicing the project teams with reliable network capability to enable them to deliver that project successfully.

Large communications organisations use Network Engineers to service world-leading global networks at the cutting edge - adapting and evolving with changes to new technologies to give customers the very best digital experience from delivering major communications installations to monitoring nationwide networks.

The demand for people who can manage, build, maintain virtual and physical networks is increasing. This is because of technological developments such as, 5G and Cloud. The broad purpose of the occupation is to install computer networks, maintain them, and offer technical support to users where necessary.

A Network Engineer provides networks and systems to deliver the objectives of varied organisations. They will make sure that systems are working at optimum capacity and problem solve where they are not. To be able to do this effectively a Network Engineer must interpret technical information and understand organisational requirements and expectations. They support delivery of legislatively compliant solutions to challenges in network and infrastructure.

Network Engineers deal with both hardware and software issues. They are a key part of putting things right quickly when networks fail, and they communicate problems that they have identified with network integrity or performance rapidly to ensure service is resumed and downtime minimised. Network Engineers help customers both technical and non-technical to install computer networks, maintain them, and offer technical support to users where necessary.

Network Engineers can be customer facing or internal. In their daily work, an employee in this occupation interacts with management within organisations, team members, staff, clients, customers, and suppliers. They may interact face to face or remotely by using a range of technologies. They may be working independently or collaboratively as part of a team. They will be aware of their organisational escalation routes and understand their role in their team.

The work of a Network Engineer is office-based, although they may need to work across different sites depending on the size of the organisation and their network. When working as a consultant a Network Engineer may spend a lot of time at clients' offices and on large installations, which may mean spending time away from home or their usual work base.

Typical job titles
Typical job titles include Network Technician, Network Engineer, Systems Engineer, Network Administrator, Network Architect, Desk Based Engineer, Field Based Engineer, Infrastructure Engineer, Dynamic Network Engineer.

**Institute for Apprenticeships
& Technical Education**

Duty	Knowledge	Skills	Behaviours
D1: Install, configure, and test appropriate network components or devices securely to well-defined specifications whether physical or virtual	K2, K4, K9, K10, K11, K12, K13, K14, K15, K16, K17, K18, K19, K20	S1, S2, S4, S18	B1 B2 B6
D2: Acquire and analyse network performance data to monitor network activity	K1, K3, K4, K6, K14, K15, K17, K19	S3, S5	B1 B2 B6
D3: Optimise and maintain the performance of network systems or services in line with well-defined specification whether physical or virtual	K2, K3, K4, K6, K9, K10, K11, K12, K13, K14, K15, K16, K17, K18	S11, S12	B1 B2 B6
D4: Investigate and problem solve to address technical performance issues in networks to return the network to successful operation and escalate as necessary	K1, K2, K3, K4, K5, K6, K7, K8, K9, K10, K11, K12, K13, K14, K15, K16, K17, K19, K20, K21	S6	B1 B2 B3 B4 B6 B8
D5: Undertake upgrades to a network including physical or virtual systems.	K1, K2, K3, K4, K5, K6, K7, K8, K9, K10, K11, K12, K13, K14, K15, K16, K17, K18, K19, K20, K21	S20	B1
D6: Interpret written requirements and technical specifications in relation to delivery of network systems and services.	K2, K5, K6, K7, K14, K16, K21	S10	B2 B4 B6
D7: Maintain accurate logical records in line within organisational policy when carrying out network tasks.	K1, K14, K15, K21	S9, S13	B2 B3 B5
D8: Use operational data to manage weekly work schedule in an efficient and cost-effective way	K5, K6	S17	B1 B2 B4 B5 B6
D9: Consider the impact and risks when implementing network changes in line with work activities and escalating as required by organizational policies.	K1, K4, K5, K6, K7, K16, K19, K21	S8, S19	B2 B4 B8
D10: Communicate technical network requirements effectively and professionally with a range of stakeholders ensuring stakeholder relationships are maintained	K5, K6, K16	S7, S16	B4 B5 B8
D11: Practice continuous self-learning to keep up to date with technological developments to enhance relevant skills and take responsibility for own professional development	K5, K6, K16	—	B1 B7
D12: Incorporate considerations of the requirements of the wider digital context in which they operate to ensure that network engineering activities are carried out effectively.	K1, K5, K6, K7, K16	S14	B1 B2 B3 B4 B6
D13: Ensure all network engineering activity complies with organisational policies, technical standards, health and safety legislation, data security requirements, professional ethics, privacy, and confidentiality.	K5, K6, K16, K21	S15	B1 B2 B3 B4
D14 Deliver and manage a high-quality service under pressure	K6 K17 K21	S7 S6 S13 S14 S16 S19	B4 B5 B6 B8

Knowledge

K1: the causes and consequences of network and IT infrastructure failures

K2: the architecture of typical IT systems, including hardware, OS, server, virtualisation, voice, cloud, and applications

K3: the techniques for systems performance and optimisation

K4: diagnostic techniques and tools to interrogate and gather information regarding systems performance

K5: organizational procedures to deal with recording information effectively and in line with protocols

K6: Service Level Agreements (SLAs) and their application to delivering network engineering activities in line with contractual obligations and customer service

K7: their role in Business Continuity and Disaster Recovery

K8: the purposes and uses of ports and protocols

K9: devices, applications, protocols, and services at their appropriate OSI and/or TCP/IP layers.

K10: the concepts and characteristics of routing and switching

K11: the characteristics of network topologies, types, and technologies.

K12: wireless technologies and configurations.

K13: cloud concepts and their purposes.

K14: functions of network services

K15: the different types of network maintenance

K16: how current legislation relates to or impacts occupation

K17: troubleshooting methodologies for network and IT infrastructure

K18: how to integrate a server into a network

K19: the types of security threats to networks and IT infrastructure assets

K20: how to use tools to automate network tasks

K21: approaches to change management

Skills

S1: apply the appropriate tools and techniques when securely operating and testing Networks

S2: install and configure the elements required to maintain and manage a secure Network

S3: implement techniques to monitor and record systems performance in line with defined specifications

S4: maintain security and performance of the system against known and standard threats

S5: apply the appropriate tools and techniques to identify systems performance issues

S6: apply the appropriate tools and techniques to gather information to troubleshoot issues and isolate, repair or escalate faults

S7: communicate outcomes of tasks and record in line with organisational procedures and SLAs including adherence to good customer service standards

S8: upgrade, apply and test components to systems configurations ensuring that the system meets the organisation's requirements and minimises downtime. This should include backup processes.

S9: record task details whether face-to-face, remote or in writing in line with ogranisational requirements

S10: interpret information received from a manager, customer or technical specialist and accurately implement the defined requirements

S11: monitor, identify and implement required maintenance procedures

S12: implement techniques to optimise systems performance in line with defined specifications

S13: organise and prioritise clients/stakeholders' requests in line with SLAs and organization processes

S14: explain their job role within the business context to stakeholders to enable a clear understanding on both sides of what their remit is and convey technical constraints in appropriate language considering accessibility and diversity implications.

S15: operate securely and apply the appropriate process, policies, and legislation within their business responsibilities

S16: communicate with a range of stakeholders taking into consideration of organisations cultural awareness and technical ability

S17: apply the appropriate level of responsibility when planning and prioritizing work tasks

S18: apply the relevant numerical skills (Binary, dotted decimal notation) required to meet the defines specifications

S19: ensure compliance of network engineering outputs with change management processes

S20: select the appropriate tools and comply with organisation policies and processes when upgrading systems

Behaviours

B1: work independently and demonstrate initiative being resourceful when faced with a problem and taking responsibility for solving problems within their own remit

B2: work securely within the business

B3: work within the goals, vision, and values of the organisation

B4: take a wider view of the strategic objectives of the tasks/ projects they are working on including the implications for accessibility by users and diversity.

B5: works to meet or exceed customers' requirements and expectations

B6: Identifies issues quickly, investigates and solves complex problems and applies appropriate solutions. Ensures the true root cause of any problem is found and a solution is identified which prevents recurrence

B7: Committed to continued professional development to ensure growth in professional skill and knowledge.

B8: work effectively under pressure showing resilience

Duty	Training requirement	Method of delivery	Provider type	OTJ days
D1: Install, configure and test appropriate network components or devices securely to well-defined specifications				40
D2: Acquire and analyse network performance data to monitor network activity				5
D3: Optimise and maintain the performance of network systems or services in line with well-defined specification				15
D4: Investigate and problem solve to address technical performance issues in networks to return the network to successful operation and escalate as necessary				20
D5: Undertake upgrades to a network including physical or virtual systems.				5
D6: Interpret written requirements and technical specifications in relation to delivery of network systems and services.				5
D7: Maintain accurate logical records in line within organisational policy when carrying out network tasks.				2
D8: Use operational data to manage weekly work schedule in an efficient and cost-effective way				3
D9: Consider the impact and risks when implementing network changes in line with work activities and escalating as required by organizational policies.				5
D10: Communicate technical network requirements effectively and professionally with a range of stakeholders.				5
D11: Practice continuous self-learning to keep up to date with technological developments to enhance relevant skills and take responsibility for own professional development				1

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Duty	Training requirement	Method of delivery	Provider type	OTJ days
D12: Incorporate considerations of the requirements of the wider digital context in which they operate to ensure that network engineering activities are carried out effectively.				3
D13: Ensure all network engineering activity complies with organisational policies, technical standards, health and safety legislation, data security requirements, professional ethics, privacy, and confidentiality.				5
D14: Deliver a high-quality service under pressure				2

Entry requirements

No entry requirements specified

Professional recognition

Professional body	Level
BCS	RITTech

Registration for IT Technicians

Trailblazer membership details

Chair

Dave Barlow (Royal Signals MOD)

Facilitator

No facilitator

Employer members

Name	Employer
Daniel Criddle	Land Registry
Jayne Middleton	Royal Mail
Jonathan Goodall	Risual
Joshua Robinson	Cisco
Mark Toole	Telent
Reace Wade	BT
Simon Godfrey	Saga
Simon Keyland	RAF

Other members

Name	Employer
G Holmes	Leicester College
John Pritchard	Arch
Richard Lester	BCS
Waleed Mir	BCS
Zeshan Zattar	Comptia