Network Engineer Apprenticeship Level 4

A Digital by Design programme

PROGRAMME GUIDE

QA.com

What does "Digital by Design" mean?

It means a greater focus on online learning together with using face-to-face interaction where it adds the most value for learners.

It means that there is a single learner journey which brings teaching, coaching, learning and assessment into a single, repeatable flow for every module.

It means that there is a clear focus from the beginning of the programme on successful completion of the End-Point Assessment (EPA).

In Digital by Design, these three elements will work together:

- The Content
- The Service and Support
- The Technology

CONTENTS

ROLE PROFILE

Network Engineer

Network Engineers design, install, maintain and support communication networks within an organisation or between organisations. Network engineers need to maintain high levels of operation of communication networks in order to provide maximum performance and availability for their users, such as staff, clients, customers and suppliers.

They will understand network configuration, cloud, network administration and monitoring tools, and be able to give technical advice and guidance.

Network Engineers need:

- Strong Maths skills
- A methodical, step-by-step approach to troubleshooting
- Attention to detail
- Business skills like effective communication, teamwork and task/time management
- The ability to troubleshoot code where needed
- The ability to work under direction, use discretion and determine when to escalate issues

JOB ROLE SUITABILITY

To help you determine whether a candidate (a new hire or existing employee) will be working in a suitable job role to successfully complete this programme, you must be able to answer “yes” to the following questions.

Will they be doing a full time technical role revolving around networks?

Will they be using diagnostic tools and analysers to monitor and test network performance and systems?

Will they be responsible for designing networks based on specifications?

Will they be actively troubleshooting and supporting with network issues?

Will they be responsible for installing and configuring network components – such as switches, routers and firewalls?

Will they be responsible for upgrades to network equipment, software and operating systems?

Speak to your Account Manager for more advice on eligibility and job role/existing staff suitability for this programme.

QUALIFICATIONS EARNED

By completing the Network Engineer Level 4 apprenticeship, learners will earn the following qualifications:

Network Engineer Level 4 Apprenticeship

CompTIA Network+

BCS Level 4 Certificate in Network Systems and Architecture

BCS Level 4 Certificate in Network Security

Evidencing 20% off-the-job learning

This 20% off-the-job learning is an apprenticeship requirement. It must be completed in working hours.

Our programme facilitates off-the-job learning.

We blend online learning, on-the-job learning, and classroom training in a seamless way.

We are the apprenticeship experts and can advise you on this topic.

DISCOVER, PRACTICE AND APPLY

Discover, practice and apply are the three pillars of apprenticeship learning.

No matter what part of the apprenticeship a learner is on, discover, practice and apply are combined into each activity.

Discover

Learners will learn the theory, by exploring subjects online and in the classroom.

Practice

Learners will practise their new-found knowledge by completing activities - online, in the classroom and (most importantly) directly at work in their day-to-day role.

Apply

Learners will apply what they've discovered and practised at work. They will actively contribute to your organisation whilst building their portfolio of evidence (showing how they've applied their new skills) to gain their qualification.

INTRODUCING... DIGITAL LEARNING CONSULTANTS

In the new world of apprenticeships, learners will be taken through their programme by a team of people called Digital Learning Consultants, or DLCs for short (they're subject matter experts).

On-programme support:

- **3, 2, 1....launch!** The structured programme launch is tailored to the learner and focussed on learning engagement and setting expectations.
- **More help for learners.** Any Digital Learning Consultant can support any learner - so no waiting around for a specific person to be available (this is called a many-to-many approach).
- **Digital first.** Using digital, you're connected to help. Face-to-face visits are only arranged when specific help is required.
- **Faster.** We provide feedback on submissions within 24 hours.
- **Group sessions.** There are still regular, planned group guidance sessions to get the benefit of working with others.
- **EPA Readiness.** We check-in regularly, with planned EPA readiness checks that demonstrate distance travelled through the apprenticeship and highlight areas for development.
- **Data driven.** We proactively monitor data to identify learners at risk of falling behind. We take action to re-engage them with their apprenticeship to make sure they stay on track to achieve and remain on the programme.
- **Right learner, right role, right time.** We have developed a 5-week initial support plan to make sure the right learner is in the right role at the right time. This is essential to success.

THE APPRENTICESHIP PROGRAMME

Network Engineer Level 4

This apprenticeship is typically 18 months long. The minimum duration of the practical period is 15 months, and then 3 months for EPA. Some learners may finish their programme in less time if their EPA is completed quickly.

This flowchart shows how learners progress throughout the apprenticeship and how the whole programme uses our blended approach to learning.

GETTING STARTED

After enrolling in the programme, learners will attend an online session. This will give them an overview of the programme and a hands-on introduction to networking. Learners will then start their first module. After enrolling in the programme, learners will attend an online session. This will give them an overview of the programme and a hands-on introduction to Cloud-enabled Networking, their first module.

REMAINING MODULES MONTHS 3–15

Learners work through 5 modules, which include online learning material on a virtual learning environment, classroom sessions, and applying the learning hands-on in their job.

Learners will also build their portfolio and have regular check-ins with a Digital Learning Consultant (DLC) and their line manager.

GATEWAY 3 MONTHS BEFORE LEARNER'S TARGET END DATE

Learners will go through the 'gateway' stage when they have:

> Completed all knowledge modules

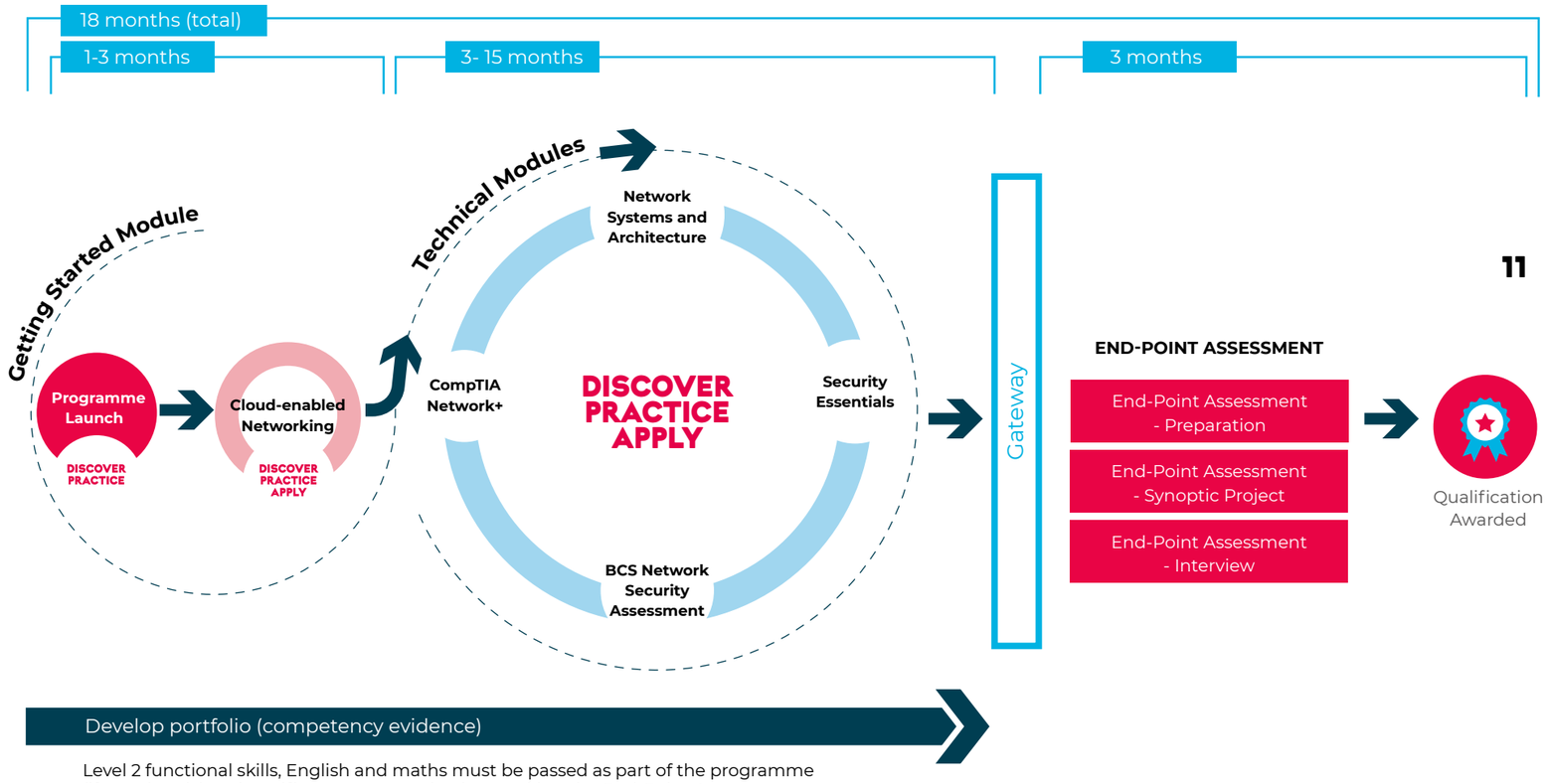
> Passed all mandatory exams

> Passed all Functional skills exams, or when exemptions have been confirmed

> Completed both their summative portfolio, and final employer reference

EPA MONTHS 15-18

Learners complete their End-Point Assessment (including the synoptic project and interview).



Level 2 functional skills, English and maths must be passed as part of the programme (if not already) and certificates presented, prior to taking the End-Point Assessment. This will be discussed at programme launch.

GETTING STARTED

The modules in our Network Engineer apprenticeship equip learners with the advanced technical skills they need for their role. Each module develops the core set of skills they must be able to do well to be competent.

In each module, learners will 'discover', 'practice' and 'apply' what they've learned. This helps them put their newly-found knowledge into action back at work.

There are 5 modules to complete with the following learning outcomes.

Module 1: Cloud-enabled Networking

Module duration: 10 weeks | **Learner-led:** 7 days | **Classroom attendance:** 3 days

Programme Launch
(Synchronous Session Online)

This synchronous online session will cover the following items:

- Programme outline and structure
- Assessments, certification and qualifications included
- Typical workflow expected
- Time commitment
- Calendar planning for the apprenticeship
- Setting of expectations
- Introduction to Bud, and other technology requirements

Learners will complete an introductory technical activity on networking. At the end of this session, learners will be ready to progress with their learning online.

Discover. Practice. Apply.

This module will introduce the learner to the world of Networking. It will involve lots of hands-on activities.

This will include:

- TCP/IP and OSI
- IPv4 and IPv6
- Routing Protocols
- Configuring Wired and Wireless networks
- How to use a network visualisation tool such as Cisco Packet Tracer to create a basic network

This module's hands-on activities will get the learner to:

- Use Windows and Linux networking tools to troubleshoot networks
- Use of Cisco Packet Tracer Simulator to set up wired and wireless
- networks based on requirements
- Network using virtual machines on Hyper-V
- Configure networking on cloud systems

REMAINING MODULES

The remaining modules focus on the knowledge and skills required of a Infrastructure Technician in detail. After each module learners will 'apply' what they've learned at work on current projects.

Module 2:

CompTIA Network+

Module duration: 10 weeks | **Learner-led:** 7 days | **Classroom attendance:** 5 days

Discover. Practice. Apply.

The module will prepare the learner for the CompTIA Network+ exam:

It will include:

- Topologies and the OSI Model
- Ethernet
- Switches and Routers
- Infrastructure and Design
- Policies and Best Practices
- IPv4 and IPv6 Addressing
- DHCP and APIPA
- Routing
- TCP and UDP
- Name Resolution and IPAM
- Monitoring and Scanning
- Applications and Services
- Virtualization, SAN, and Cloud Services
- Network Security Design
- Network Security Appliances
- Authentication and Endpoint Security
- Network Site Management
- Installing Cabled Networks
- Installing Wireless Networks
- Installing WAN Links
- Configuring Remote Access

Learners will attempt the CompTIA Network+ exam a few weeks after the classroom session.

Module 3:

Network Systems and Architecture

Module duration: 10 weeks | **Learner-led:** 7 days | **Classroom attendance:** 5 days

Discover. Practice. Apply.

The module will prepare the learner for the BCS Network Systems and Architecture exam:

It will include:

- Load Balancing Failures
- Storage Protocol Failures
- Hardware Failures
- Configuration Errors
- Environmental Problems
- Errors in Security
- Errors Resulting from a Lack of Capacity
- Network Infrastructure Components
- Features of Client-Server Operating Systems and Applications
- Components and functions of virtualised systems

At the end of the classroom block, the learner will attempt the BCS Network Systems and Architecture exam.

Module 4:

Security Essentials

Module duration: 10 weeks | **Learner-led:** 7 days | **Classroom attendance:** 5 days

Discover. Practice. Apply.

This module will introduce IT Security concepts. It will involve lots of hands-on activities.

It will include:

- Understand the threats faced by modern networks, systems and application platforms
- Understand the techniques used to detect, prevent and respond to these threats
- Build enablement solutions for detection and situational awareness
- Respond, contain and start hunting out known and unknown threats
- Use leading 'open source' security tools to serve active and passive defence techniques
- Discover and analyse 'high risk' weakness within systems
- Create an actionable and auditable policies
- Understand cryptography and its applications in a digital world
- Begin to analyse, attribute and predict the threats and create an active defence posture

Module 5:

BCS Network Security Assessment

Module duration: 10 weeks | **Learner-led:** 8 days | **Classroom attendance:** 2 days

Discover. Practice. Apply.

The module will prepare the learner for the BCS Network Security exam:

It will include:

- Types of security threats
- Types of Vulnerabilities
- Mitigating security threats
- Security procedures
- Protecting data
- Protection against malicious software
- Network Security

At the end of the classroom block, the learner will attempt the BCS Network Security exam.

Gateway and End-Point Assessment

Consolidation, Preparation and Assessment (Online)

Duration: 12 learner-led days + EPA

This final component will get learners ready to go through the 'gateway'.

The apprenticeship gateway is an internal QA process. It will ensure that your learner's work is ready to be assessed by BCS. This exists to increase their chances of success.

At this pre-gateway stage learners will:

- Consolidate and submit their portfolio
- Consolidate and submit their final employer reference
- Conduct a mock EPA

In addition to the items above, learners must have successfully completed:

- All your compulsory exams
- All the Functional Skills exams (except exempted learners)

Once learners have met all the above criteria, they will go through the gateway. When approved, it takes 3 months from gateway to achievement. During this time, learners will:

- Complete their synoptic project
- Complete their interview

LEARNING OUTCOMES

As well as being assessed on their technical knowledge, apprentices are also assessed on their ability to demonstrate the following more advanced competencies through their portfolio and interview. This ensures balanced development – as the competency standards provide a greater emphasis on the importance of both technical and soft skills relevant to their role in the workplace. QA DLC will help apprentices build a portfolio and record these skills throughout the programme.

Technical Competencies

NETWORKING

Design simple networks from a well-defined specification and apply appropriate security products and processes.

Install and configure network components, including switches, routers and firewalls.

Optimise the performance of network systems and services.

Monitor, test and adjust network systems and performance to meet accepted standards using diagnostic tools, analysers and other equipment.

TROUBLESHOOTING

Apply diagnostic tools and techniques to identify the causes of network performance issues.

Apply structured approaches to troubleshooting network issues and repair faults in hardware, software products and the network.

DOCUMENTING WORK

Interpret written requirements and technical specifications for network activities and maintain accurate records of network maintenance activities.

Document work done in accordance with agreed procedures

SYSTEM UPGRADES

Perform system upgrades to network hardware, software and operating systems.

Integrate network-related software into an existing network environment.

PROVIDING TECHNICAL SUPPORT

Log and respond to network service calls and provide technical network support to end users as required.

PROBLEM SOLVING

Demonstrate the ability to use both logical and creative thinking skills when undertaking work tasks, recognising and applying techniques from both.

Recognise problems inherent in, or emerging during, work tasks, and tackle them effectively.

WORKING EFFECTIVELY IN A BUSINESS ENVIRONMENT

Operate within the parameters of service level agreements, standards and/or agreed response times.

Operate effectively in the business environment and respond to business issues related to network engineering.

Demonstrate the full range of skills, knowledge and behaviours required to fulfil their job role.

Demonstrate how they contribute to wider business objectives and show an understanding of the wider business environment.

INTERPERSONAL SKILLS

Manage relationships with work colleagues, including those in more senior roles, customers/clients and other stakeholders.

Keep stakeholders involved and maintain their support for the task/project in hand.

Establish and maintain productive working relationships, and use a range of different techniques for doing so.

COMMUNICATION

Communicate effectively with a range of people at work, one-to-one and in groups, in different situations and using a variety of methods.

Demonstrate various methods of communication, with an understanding of the strengths, weaknesses and limitations of these, the factors that may disrupt it, and the importance of checking other people's understanding.

HOW TO GET READY FOR THE END-POINT ASSESSMENT

We want to deliver memorable learning experiences, whilst developing learners with well-rounded skillsets, ready to meet their professional requirements.

To ensure we are achieving this goal consistently, it is important for learners, DLCs and employers to work together to ensure learners are supported to succeed in their Apprenticeship's third-party End-Point Assessment (EPA).

In this section we outline a number of guidelines which intend to provide a framework so that can be achieved in a consistent way.

Preparation for the End-Point Assessment starts from day one.

STAYING ON-TRACK THROUGHOUT THE PROGRAMME

The EPA preparation starts as soon as each new learner joins a programme, as all its components will support the learner to develop the necessary technical knowledge, skills, and behaviours to confidently meet, or exceed, all the requirements specified in the standard.

For this reason, it is very important to keep learners, DLCs and employers informed about the expected programme progress plan. It is critical to the success of the apprenticeship programme that all of the above work together to ensure that each learning journey is kept on-track avoiding further interventions (and time commitment) whenever possible.

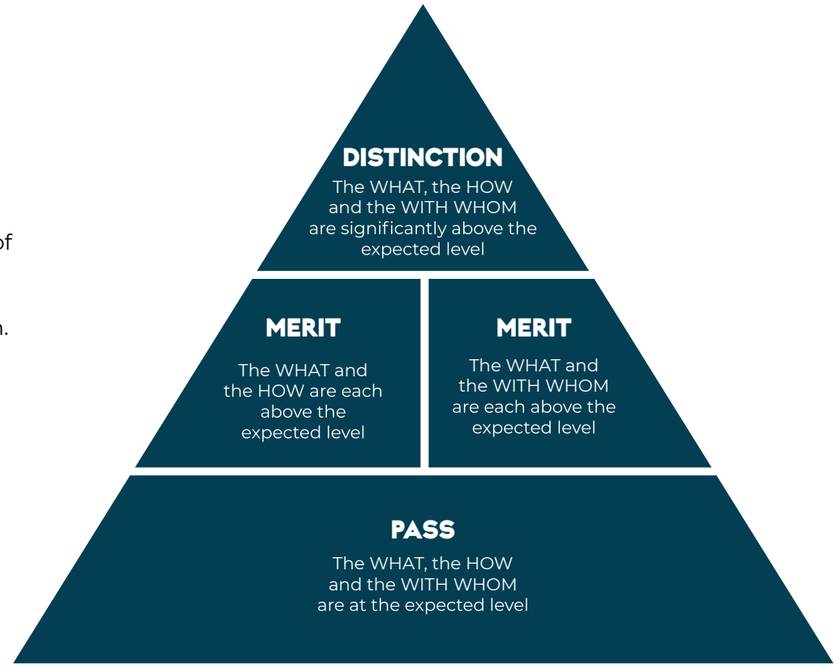
To help learners with this, we have created two guiding documents – a programme timeline, and a progress review map – so progress can be checked against it, at any time. Any progress deviations above 20% will be reviewed on a case-by-case basis. This is to ensure the apprenticeship is progressing in a timely manner.

HOW THE EPA IS GRADED

After the EPA interview, the assessor will make a holistic judgement of the apprentice's performance across all four assessment methods based on three criteria:

1. **WHAT**
   What has been learned
2. **HOW**
   The way the work was done
3. **WITH WHOM**
   The personal and interpersonal qualities brought to working relationships

The learner will receive a single grade for their entire apprenticeship: **Pass, Merit** or **Distinction.** For an in-depth understanding of grading, please refer to the assessment plan.



THE LEARNER'S JOURNEY

Network Engineer L4

Programme timeline | Duration: 18 Months **| Gateway:** 15 Months

GETTING READY TO START

PROGRAMME LAUNCH

Programme Launch:
- Programme Launch Virtual Session
- **Start Module 1:** Cloud-enabled Networking

MONTH 1
- Safeguarding Module
- Check-in session 1#
- Functional Skills: Maths and English Diagnostics

MONTH 2
- Check-in Session 2#
- End Module 1: Cloud-enabled Networking

MONTH 3
- **Start Module 2:** CompTIA Network+
- Employer reference 1 of 5

MONTH 4
- Functional Skills: Speaking, Listening and Communicating Exam Preparation
- On-programme Evaluation
- Functional Skills: Maths and English Mock Exams
- Functional Skills: Speaking, Listening and Communicating Exam
- Functional Skills: Maths and English (R&W) Exams
- End Module 2: CompTIA Network+

MONTH 6
- Employer reference 2 of 5
- Upload: CompTIA Network+ Exam Certificate
- **Start Module 3:** Network Systems and Architecture

MONTH 7
- End Module 3: Network Systems and Architecture

MONTH 8
- Employer reference 3 of 5
- Upload: BCS Level 4 Certificate in Network Systems and Architecture Exam Certificate
- **Start Module 4:** Security Essentials

MONTH 9
- End Module 4: Security Essentials

MONTH 10
- Employer reference 4 of 5
- **Start Module 5:** BCS Network Security Assessment

MONTH 11
- End Module 5: BCS Network Security Assessmentls

MONTH 13
- Employer reference 5 of 5
- Upload: BCS Level 4 Certificate in Network Security Exam Certificate
- **Start EPA Overview & Summative Portfolio Consolidation**

MONTH 15
- Submit - Consolidated Summative Portfolio
- **Start Employer Reference Consolidation**
- Submit - Consolidated Employer Reference
- **Start Synoptic Project and Interview Preparation**
- Complete Synoptic Project and Interview Preparation

Qualification Awarded

THE LEARNER'S JOURNEY

Network Engineer L4

Progress review map | **Duration:** 18 Months | **Gateway:** 15 Months

Workplace induction

Loading qualification

15% Progress

33% PROGRESS + Functional Skills

This diagram gives an estimate of what progress looks like in this learning journey. It covers specific time frames for illustration purposes only.

Each learner will see their progress percentage update live, as they complete activities in Bud.

MONTH 3

Completion by end of month 3	Completion %
Activity 1.1: Programme overview and practical introduction to Cloud-enabled Networking: Discover and Practice (Online)	Complete
SG1: Safeguarding Module	Complete
Activity 1.2: CompTIA Network+: Discover & Practice (Online & Classroom)	9%
CS1: Check-in session 1#	Complete
FS1: Functional Skills: Maths and English Diagnostics	Complete
CS2: Check-in session 2#	Complete
Activity 1.3: Cloud-enabled Networking: Apply & Prove (Online & Workplace)	15%
Activity 1.4: Employer reference 1 of 5	Complete

By the end of month 3:

A learner should have completed **15%** of their programme

MONTH 6

Completion by end of month 6	Completion %
FS2: Functional Skills: Maths and English Learning	Complete
Activity 2.1: CompTIA Network+: Discover & Practice (Online & Classroom)	27%
FS3: Functional Skills: Speaking, Listening and Communicating Exam Preparation	Complete
FS4: Functional Skills: Maths and English Mock Exams	Complete
FS5: Functional Skills: Speaking, Listening and Communicating Exam	Complete
FS6: Functional Skills: Maths and English (R&W) Exams	Complete
Activity 2.2: CompTIA Network+: Apply & Prove (Online & Workplace)	33%
Activity 2.3: Employer reference 2 of 5	Complete
Activity 2.4: Upload: CompTIA Network+ Exam Certificate	Complete

By the end of month 6:

A learner should have completed **33%** of their programme

Note: by the end of month 6 all the Functional Skills components will be completed.

Is the learner on track?

QA will be monitoring each learner's progress on an on-going basis.

At any point, they will be in one of three categories:

- **Green:** on track, or 0-5% behind target progress.
- **Amber:** 6-14% behind target progress.
- **Red:** 15% or more behind target progress.

Whenever deemed required, QA will put in place proactive measures to get learners back on track.

How is the learner performing?

QA will continuously track the quality of each learner's work, and discuss performance:

- At every **activity submission**. The work submitted will be reviewed and discussed with the learner. This will happen in the messaging system, inside each activity.
- At **EPA readiness checks**. The first of these checks will happen on the week following programme launch. After that, at every 16 weeks. This will take place in the form of a scheduled call.

Either way, our feedback will let the learner know how they are performing.
We may ask learners to refine their work, or complete extra tasks, before approving it. These interactions will use Bud virtual learning environment, where they will be recorded.

62% PROGRESS

MONTH 9

Completion by the end of month 9	Completion %
Activity 3.1: Network Systems and Architecture: Discover & Practice (Online & Classroom)	44%
Activity 3.2: Network Systems and Architecture: Apply & Prove (Online & Workplace)	50%
Activity 3.3: Employer reference 3 of 5	Complete
Activity 4.4: Upload: BCS Level 4 Certificate in Network Systems and Architecture Exam Certificate	Complete
Activity 4.1: Security Essentials: Discover and Practice (Online & Classroom Exam)	62%

By the end of month 9:

A learner should have completed **62%** of their programme

77% PROGRESS

MONTH 12

Completion by the end of month 12	Completion %
Activity 4.2: Security Essentials: Apply & Prove (Online & Workplace)	68%
Activity 4.3: Employer reference 4 of 5	Complete
Activity 5.1: BCS Network Security Assessment: Discover and Practice (Online & Classroom Exam)	77%

By the end of month 12:

A learner should have completed **77%** of their programme

100% PROGRESS

EPA (END-POINT ASSESSMENT)

Qualification Awarded

MONTH 15

Completion by end of month 15	Completion %
Activity 5.2: BCS Network Security Assessment: Apply (Online & Workplace)	83%
Activity 5.3: Employer reference 5 of 5	Complete
Activity 5.4: Upload: BCS Level 4 Certificate in Network Security Exam Certificate	Complete
SPC: EPA Overview & Summative Portfolio Consolidation	97%
ERC: Employer Reference Consolidation	Complete
EPAP: Synoptic project and interview preparation	100%

By the end of month 15:

A learner should have completed **100%** of their programme

MONTH 16

Completion by the end of month 16	Completion %
Synoptic project submitted to BCS	Completed
Initiate interview preparation	Completed

By the end of month 13:

Has the learner completed the synoptic project?	YES	○
	NO	○

QA Apprenticeships does not formally grade the apprenticeship, this is the responsibility of the End-Point Assessment organisation.

MONTH 17

Completion by the end of month 17	Completion %
Interview	Completed

MONTH 18

Completion by the end of month 18	Completion %
Result from BCS	Completed

YOUR NOTES

Funded by


Education & Skills
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European Union
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Apprenticeships