



Apprenticeship Programme Guide

NETWORK ENGINEER

LEVEL 4



DIGITAL AND DEGREE APPRENTICESHIPS

Building tech careers in the workplace

We offer digital and degree apprenticeships that focus on the most in-demand tech skills including; cyber, IT, software development, data and digital marketing, along with others in project management and artificial intelligence (AI).

With programme pathways from Level 3 – Level 7, we help learners to progress and grow within your company, helping you retain talent and build capabilities.

Our award-winning approach to blended learning enables apprentices to develop further and faster, adding immediate value to their roles, whilst our interactive portal with real-time dashboards and trigger alerts enable managers to effectively and efficiently track progress.



Experience: 30,000 apprenticeships placed



An unrivalled talent pool: 100,000 apply to join our programmes every year



Award-winning: Recipient of the Gold Award at the Learning Tech Awards 2020 for our apprenticeship delivery model

98%

Higher than average provider performance with a pass rate of 98.61%

Based on end point assessments by the BCS 2022

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ROLE PROFILE

NETWORK ENGINEER

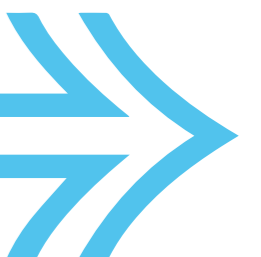
Network Engineers provide networks and systems to deliver organisational objectives.

A key aspect of this role is to ensure that systems are working at optimum capacity and to problem solve where they are not. In order to do this successfully a Network Engineer must interpret technical information and understand organisational requirements and expectations.

Network Engineers manage and support an organisation's hardware and software assets. They hold a primary responsibility in managing the resolution of network failures, supporting network integrity and ensuring network performance meets the organisational requirements. As part of this function a Network Engineer is accountable for ensuring that identified problems are communicated timely and clearly to all necessary parties.

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 network issues
- To appreciate the broader business context and importance of an effective change management and continuity management policy and processes



JOB ROLE SUITABILITY

As an employer is it important to assess whether a candidate (a new hire or existing employee) is working in a suitable job role to successfully complete their programme.

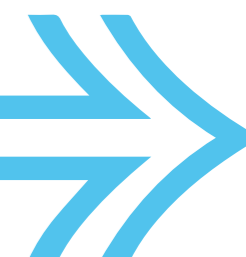
The checklist has been created to help you assess whether your apprentice will be in a position to demonstrate all of the following Network Engineer duties, during their programme.

Job roles this programme is a great match for:

- Network Technician
- Network Engineer
- Systems Engineer
- Network Administrator
- Network Architect
- Infrastructure Engineer

Checklist

- | | |
|----|---|
| 1 | Will the apprentice be installing, configuring and testing network components or devices, whether physical or virtual? |
| 2 | Will they be acquiring and analysing network performance data to monitor network activity? |
| 3 | Will they be responsible for optimising and maintaining the performance of network systems or services? |
| 4 | Will they be investigating and problem solving to address technical performance issues in networks? |
| 5 | Will they be undertaking upgrades to a network including physical or virtual systems? |
| 6 | Will they be interpreting written requirements and technical specifications? |
| 7 | Will they be responsible for maintaining accurate logical records when carrying out network tasks? |
| 8 | Will they be using data to manage weekly work schedule in an efficient and cost-effective way? |
| 9 | Will they be responsible for considering the impact and risks when implementing changes and escalating as required? |
| 10 | Will they need to communicate technical network requirements effectively with a range of stakeholders? |
| 11 | Will they be encouraged to practise continuous self-learning to keep up to date with technological developments? |
| 12 | Will they be encouraged to incorporate considerations of the wider digital context in which they operate? |
| 13 | Will they have the responsibility of ensuring network engineer activities comply with organisational policies and relevant legislation? |
| 14 | Will they be responsible for delivering and managing a high-quality service in a high pressure environment? |



ENTRY REQUIREMENTS

The entry requirements for this programme are as follows:

- An A-Level in ICT
- **OR** An International Baccalaureate at Level 3 in ICT
- **OR** A-Level 3 apprenticeship in a similar subject
- **OR** A BTEC Extended Diploma in IT (180 credits)

Experience (if the learner can't meet the qualification requirements):

Those working in the tech industry e.g. having 1 year plus of experience working in any IT position or 1 year plus work experience in any other profession or sector and able to demonstrate working towards Level 2 in Maths and English.

FINDING NEW TALENT

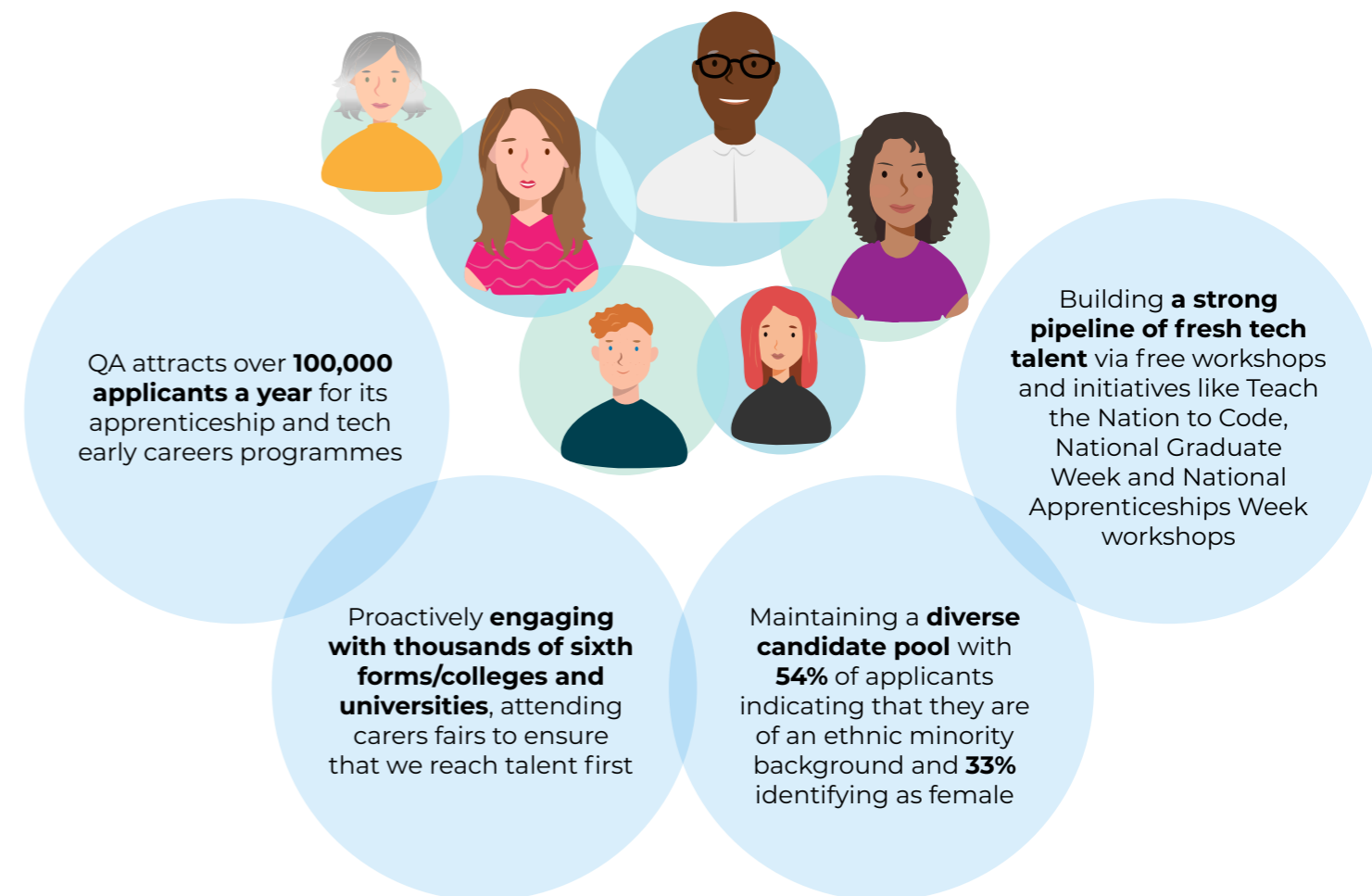
Each year, QA attracts over 100,000 applicants for our early careers opportunities, building a robust pipeline of fresh tech talent.

Our success lies in leveraging a wide array of channels and partnerships that ensure we have a constant flow of applications and access to a diverse range of candidates.

We have strong partnerships in place with educational and career institutions, including local job centres, career networks, youth groups, and universities.

We have a prominent presence on all major job boards in the market, ensuring maximum visibility for our job postings.

Our QA team employs social media campaigns to reach specific profiles in certain regions or demographics.



DIVERSITY AND INCLUSION

We're passionate about diversity in tech

It's our mission to help eradicate the gender gap, and make sure equal opportunities are given to applicants from all backgrounds. We do this through our long-standing partnerships, QA-driven initiatives and use of trending tools and software.

Diversity-first candidate attraction

We've invested in using augmented copy checking tools to ensure language is inclusive, open to all and free from bias.

We use inclusive imagery throughout our campaigns – producing visual content that promotes diversity and inclusion.

Promoting inclusivity

We nurture relationships with influencers, schools, colleges and universities via events and interactive sessions to ensure learners from all backgrounds are given the same opportunities.

Diversity partnerships

We forge partnerships with like-minded organisations who share our vision on STEM gender equality including STEM women, Stemettes, Young Professionals and Coding Black Females.

Initial Assessment

Every candidate goes through an initial assessment where their current knowledge, skills and behaviours are measured and mapped against the apprenticeship standard.

This process is an assessment of the apprentice's eligibility for an apprenticeship programme, and ensures they are placed on the right programme at the right time. This contributes towards a successful completion and a good learner experience.

We make tech skills accessible to all

We run free tech workshops including 'Teach the Nation to Code' and 'Teach the Nation to Cloud' so anyone can explore technology career opportunities.

A BLENDED APPROACH TO LEARNING

How we deliver

QA apprenticeships are designed to immerse the apprentice in their job role while providing time for them to complete the required off-the-job training to become occupationally competent and ready to undertake End-Point Assessment to complete their apprenticeship standard.

QA Apprenticeships also provide more flexibility for the employer, allowing apprentices to learn through a combination of project and lab work, live events, self-research, self-paced learning and peer-to-peer learning.

Full-time apprentices (those that work 30 hours per week or more) will be required to spend at least 20% of the apprentice's normal working hours over the planned duration of the apprenticeship practical period on off-the-job training. This means the minimum requirement for apprentices working 30 hours or more per week is an average of 6 hours of off-the-job training per week (i.e. 20% of 30 hours) over the planned duration.

Employer coaching, shadowing and mentoring remain off-the-job training, however, there will be more defined requirements to guarantee this is directly related to the apprenticeship and will be part of the training plan.



LEARNER SUPPORT



Safeguarding at QA

Safeguarding means ensuring the safety and wellbeing of our learners.

At QA, this means ensuring our policies and processes promote and protect learner wellbeing and that while you are on programme, and that while on programme, we teach learners about the types of risk facing modern day British citizens.

This includes cyber risks, mental and physical health information, risks of radicalisation or grooming and much more.

Ways to access support if you are worried for yourself or someone else:

- Call us – anytime 07808 050273
- Email: safeguarding@qa.com
- Contact your Digital Learning Consultant (DLC), tutor or account manager
- Speak to any member of QA staff onsite



Prevent at QA

Prevent is part of the Government's counter-terrorism strategy.

At QA, this means we teach our staff and learners about the four British values: democracy, rule of law, individual liberty and respect and tolerance.

We also work with Prevent partners to identify people at risk of being or causing terror related harm.

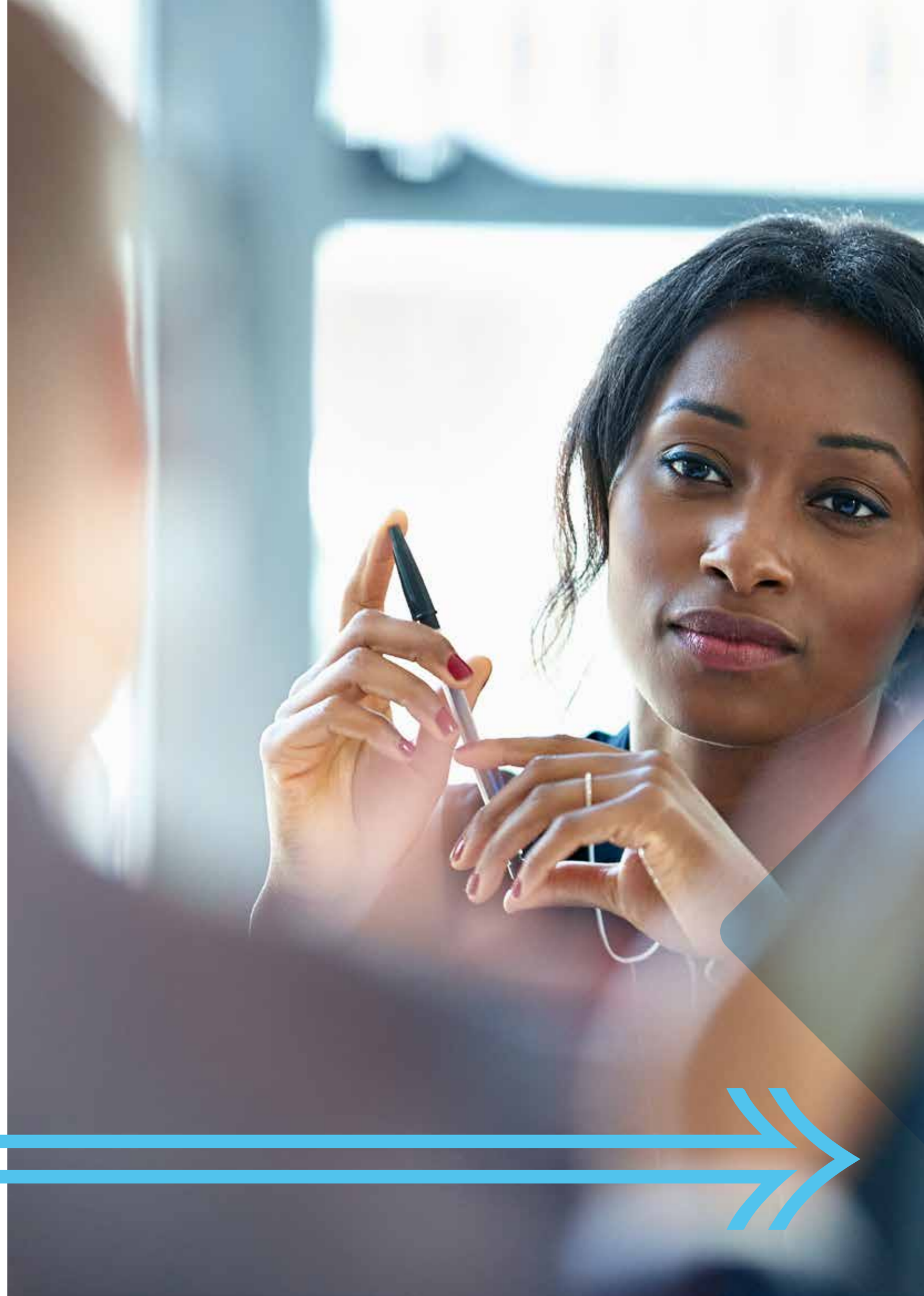


Mental Health at QA

Emotional and mental wellbeing is an important component of successful learning.

Understanding how to protect mental health and promote emotional wellbeing is part of maintaining positive mental welfare.

We will always actively encourage conversations and make sure information is readily available to both learners and staff with regards to mental wellbeing.



DIGITAL BY DESIGN APPRENTICESHIP PROGRAMMES

Digital by Design Programmes

QA Digital by Design apprenticeships provide a greater focus on online learning together with using live 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. This ensures that from the beginning of the programme there is a clear focus 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

Discover, practise and apply

All QA apprenticeships use a guided discovery approach to learning, as opposed to traditional methods of delivery such as live events. This shifts the emphasis from content delivery to our learners and their context, resulting in the apprentice feeling empowered to take ownership of their learning experience through the “Discover, Practise, Apply” model.



DISCOVER

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



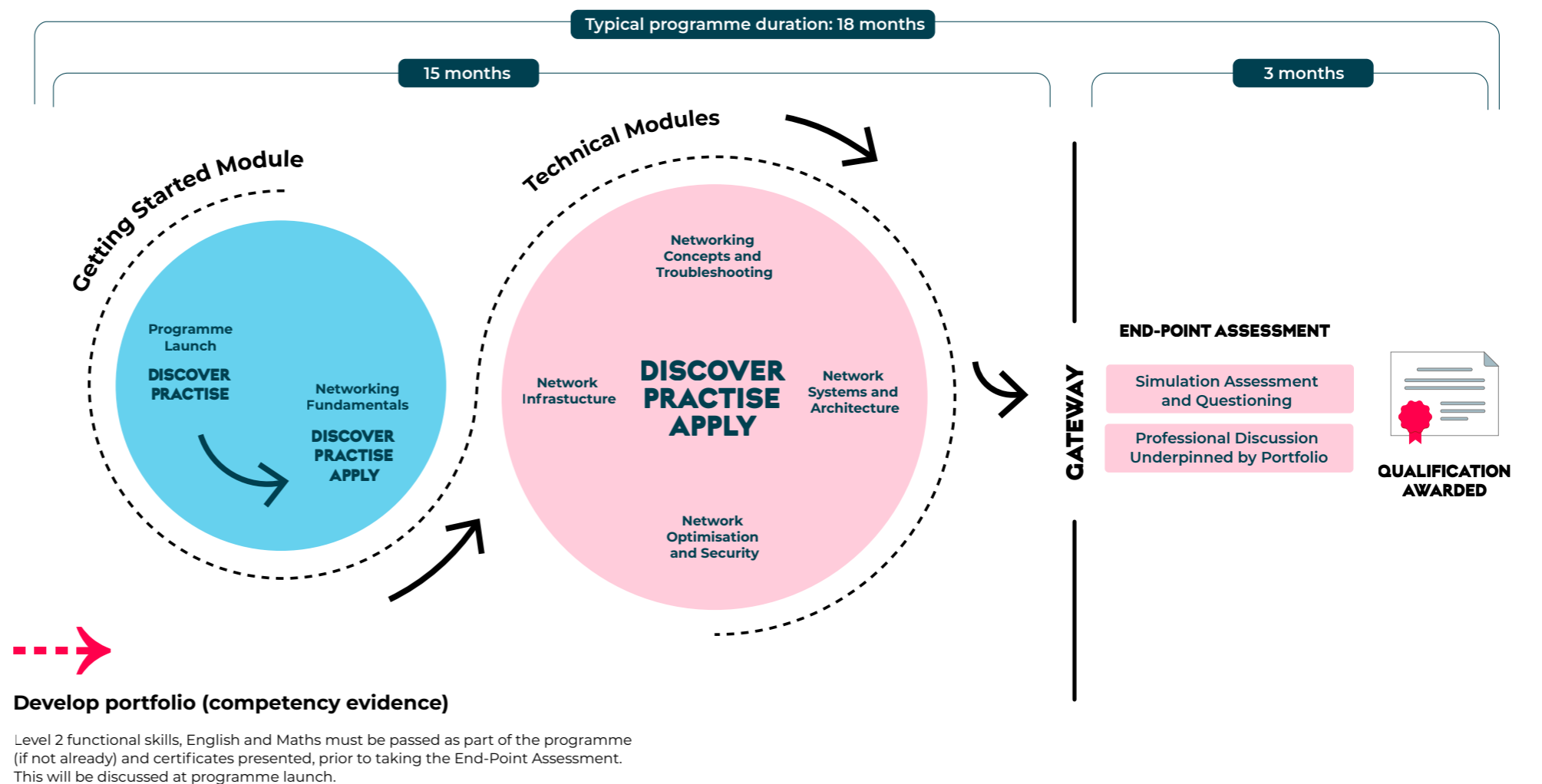
PRACTISE

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



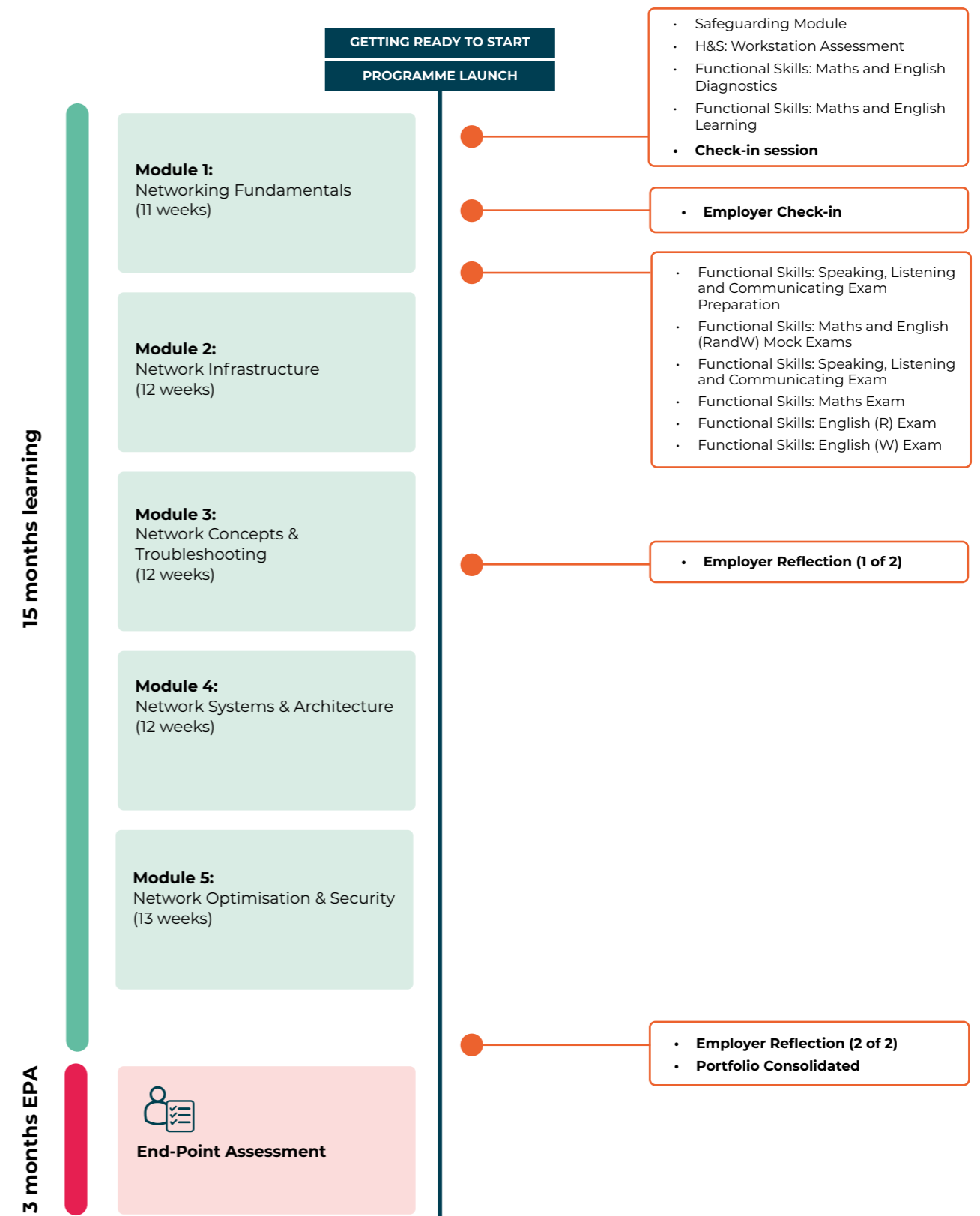
APPLY

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.



THE LEARNER'S JOURNEY

Typical Programme Duration: 15 months (+ 3 months for End-Point Assessment)



Qualification
Awarded

GETTING STARTED MODULE

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', 'practise' 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: Networking Fundamentals

Programme Launch (Synchronous Session Online)

This module will cover numeracy skills (binary), legislation and technical documentation relating to Network Engineering.

Discovery activities include:

- Introduction to key networking concepts
- Understanding binary & IPv4 addressing
- Understanding user level security
- Understanding network architecture
- Practise activities
- Binary game
- Password strengthening
- Network management systems

Module duration: 11 weeks

Learner-led: 9 days

Discover. Practise. 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 enable 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

TECHNICAL MODULES

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

Module 2: Network Infrastructure

This will be a hands-on module introducing the learners to core Networking Skills and Server Administration within a network:

Discovery activities include:

- Consequences of non-compliance in an organisational environment
- Introduction to key networking concepts
- TCP and OSI models
- Binary and subnetting concepts
- Networks services and protocols
- Understanding the use of Cisco Packet Tracer

Practical activities:

- Observe traffic behaviour on a network
- Configure an access port and trunk port
- Examine HTTP web traffic
- Connect devices with their correct cables
- Identify and correct configuration in a wireless network
- Examine DHCP traffic with reference to the OSI & TCP/IP protocol suites
- Add a server to the Packet Tracer network
- Configure the DNS server and create a DNS record to point to a web server
- Configure a router with RIPv2 routing
- Configure and verify NAT and PAT on a router
- Troubleshooting and localise various faulting situations

Module duration: 12 weeks

Learner-led: 8 days

Classroom attendance: 5 days

Discover. Practise. Apply.

Module 3: Network Concepts & Troubleshooting

This module will cover the CompTIA Network+ Syllabus.

Discovery activities include:

- Recap of networking topics

Practical activities:

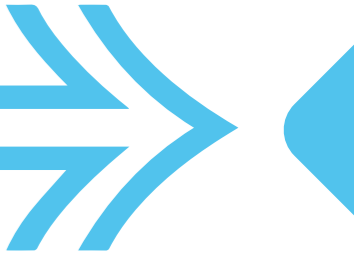
- VM orientation
- Configuring ethernet networking
- Configuring IPv4 networking
- Configuring IPv4 subnets
- Configuring IPv6 networking
- Configuring address autoconfiguration
- Configuring routing
- TCP and port scanning
- Configuring name resolution and IPAM
- Performance testing and monitoring
- Configuring application protocols
- Configuring a NAT firewall
- Secure appliance administration
- Configuring secure access channels

Module duration: 12 weeks

Learner-led: 8 days

Classroom attendance: 5 days

Discover. Practise. Apply.



Module 4: Network Systems and Architecture

This module dives deeper into the day to day management of networks. It focusses on network hardware & software, network services and routing protocols.

Discovery activities include:

- Storage and backup configurations
- Installing a server
- DNS & DHCP
- Server operating systems
- Install Windows/Linux server and post configuration activities
- Installing active directory
- Configuring a domain controller

Practical activities include:

- RAID setup and configuration
- Installing a server
- Install active directory services
- DNS and DHCP
- VLANs
- Routing protocols

Module duration: 12 weeks

Learner-led: 7 days

Classroom attendance: 5 days

Discover. Practise. Apply.

Module 5: Network Optimisation and Security

Discovery activities include:

- Business continuity
- The importance of security
- Information security
- Risk management
- Security controls
- Defining security terminology and identifying threats
- Causes and consequences of network and IT infrastructure failure
- Network security tools
- Secure cloud services and virtualisation
- Change management

Practical activities include:

- Wireless security and optimisation
- Automating tasks
- Cloud Incident response and forensics

Module duration: 13 weeks

Learner-led: 7 days

Classroom attendance: 0 days

Discover. Practise. Apply.

Gateway and End-Point Assessment Consolidation, Preparation and Assessment (Online)

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
- Conduct a mock EPA

In addition to the items above, learners must have successfully completed all the Functional Skills exams (except exempt learners).

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

During this time, learners will:

- Complete their simulation assessment and questioning
- Complete their interview

Duration: 6 learner-led days + EPA

Qualifications Earned



When they achieve this apprenticeship, learners will earn the following qualifications:

- Network Engineer Level 4 Apprenticeship

OPTIONAL

- CompTIA Network+*
- BCS Certificate in Information Security Management Principles - CISMP**

* QA will offer one attempt free of charge. Any further attempts could be funded by the employer.

**Optional content on Cloud Academy, in addition to the programme. The exam, if the learner chooses to sit it, is funded by the learner/employer



LEARNING OUTCOMES

Apprentices will be assessed on 3 key areas; their ability to convey knowledge, their ability to demonstrate practical skills and their capability of displaying professional workplace behaviour. These will be developed during an apprentice's learning journey, with the goal of displaying all of these competencies during their assessment.

These knowledge, skills and behaviour points ensure rounded development, as the standards provide a greater emphasis on the importance of both technical and soft skills in the workplace.

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: organisational 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 system's 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 organisational 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 organisation 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 prioritising 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's 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



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, digital learning consultants and employers to work together to ensure learners are supported to succeed in their apprenticeship's End-Point Assessment (EPA).

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

Preparation for the end-point assessment starts from day one.

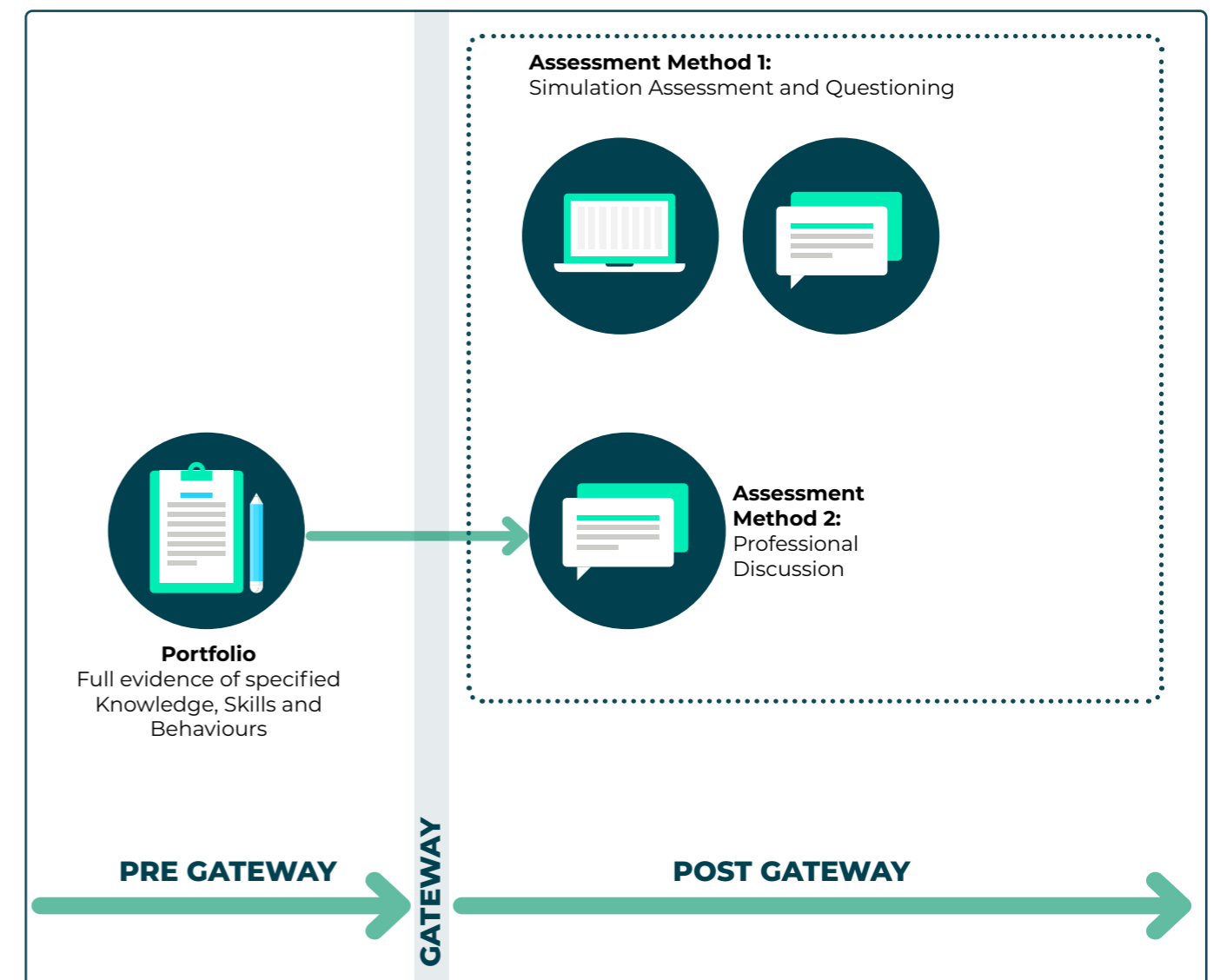
STAYING ON-TRACK THROUGHOUT THE PROGRAMME

Learners and employers should start preparing for EPA from the start of the programme. Employers will need to ensure that learners are given the right opportunities at work to develop and prove the knowledge, skills and behaviours in the standard.

For this reason, it is very important to keep learners, digital learning consultants and employers informed about the programme progress. 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 15% 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



EXPANDING TECHNICAL SKILLS WITH cloud academy A QA COMPANY

Our apprentices are given full access to our proprietary Cloud Academy platform for the duration of their programme.

Cloud Academy brings the very latest and up-to-date content to our apprentices through single units, courses and comprehensive learning paths to really build on the core learning outcomes defined within the programme. Furthermore, apprentices are able to prepare for the full suite of vendor qualifications across AWS, GCP and Azure and much more.

Cloud Academy users also benefit from Hands-On Labs, Lab Challenges and Lab Playgrounds providing a safe, sandbox environment in which our learners are able to practise in real time through guided walkthroughs or through their own exploration.

Check out the [Training Library - Cloud Academy](#).



**FOR MORE
INFORMATION,
PLEASE CONTACT**

0333 060 7701
qa.com/contact



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