End-point assessment plan for DevOps Engineer apprenticeship standard

Apprenticeship standard reference number	Apprenticeship standard level	Integrated end-point assessment
ST0825	4	No

Contents

Introduction and overview

This document sets out the requirements for end-point assessment (EPA) for the DevOps Engineer apprenticeship standard. It is for end-point assessment organisations (EPAOs) who need to know how EPA for this apprenticeship must operate. It will also be of interest to DevOps Engineer apprentices, their employers and training providers.

Full time apprentices will typically spend 24 months on-programme (before the gateway) working towards the occupational standard, with a minimum of 20% off-the-job training. All apprentices must spend a minimum of 12 months on-programme.

The EPA period should only start, and the EPA be arranged, once the employer is satisfied that the apprentice is deemed to be consistently working at or above the level set out in the occupational standard, all of the pre-requisite gateway requirements for EPA have been met and can be evidenced to an EPAO.

For level 3 apprenticeships and above apprentices without English and mathematics at level 2 must achieve level 2 prior to taking their EPA.

The EPA must be completed within an EPA period lasting typically 4 months, after the EPA gateway.

The EPA consists of 2 discrete assessment methods.

The individual assessment methods will have the following grades:

Assessment method 1: Project and Practical Assessment

· Fail
· Pass
· Distinction

Assessment method 2: Professional discussion

· Fail
· Pass
· Distinction

Performance in the EPA will determine the overall apprenticeship standard grade of:

· Fail
· Pass
· Merit
· Distinction

EPA summary table

On-programme (typically 24 months)	Training to develop the occupation standard's knowledge, skills and behaviors (KSBs).
End-point assessment gateway	- Employer is satisfied the apprentice is consistently working at, or above, the level of the occupational standard. - For the Project and Practical Assessment, the apprentice is to provide a brief summary of what the project will cover - For level 3 apprenticeships and above apprentices without English and mathematics at level 2 must achieve level 2 prior to taking their EPA.
End-point assessment (which will typically take 4 months)	Assessment method 1: Project and Practical Assessment . With the following grades: · Fail · Pass · Distinction Assessment method 2: Professional discussion With the following grades: · Fail · Pass · Distinction

Length of end-point assessment period

The EPA will be completed within an EPA period lasting typically 4 months, after the EPA gateway.

Order of assessment methods

The assessment methods can be delivered in any order.

Gateway

The EPA period should only start once the employer is satisfied that the apprentice is consistently working at or above the level set out in the occupational standard, that is to say they are deemed to have achieved occupational competence. In making this decision, the employer may take advice from the apprentice's training provider(s), but the decision must ultimately be made solely by the employer.

For Project and Practical Assessment

- The apprentice will scope out and provide a brief summary of what the project will cover and will submit this to the EPAO at the gateway. This should demonstrate that the work-based project will provide sufficient opportunity for the apprentice to develop the piece of code and meet the assessment criteria. The brief summary is not assessed and will typically be no longer than 500 words
- The brief summary needs to outline the project plan, including high level implementation steps and associated timeframes, as well as the date the work-based project has to be submitted to the independent assessor, taking into account the deadlines stipulated within this end-point assessment plan
- The EPAO will sign off the title of the project report in consultation with the employer within 2 weeks of the Gateway to ensure sufficient scope to develop the piece of code and meet the KSBs mapped to this assessment method.

For Professional discussion:
- no specific requirements

Assessment methods
Assessment method 1: Project and Practical Assessment.

Overview

Apprentices must be observed by an independent assessor completing 1 practical assessment during which they will demonstrate the KSBs assigned to this assessment method based on a post-gateway work-based project. Therefore, the project's subject, title and scope will be agreed between the employer and the EPAO. The employer will ensure that it has a real business application and the EPAO will ensure that it meets the requirements of the EPA (including suitable coverage of the KSBs assigned to this assessment method).

A piece of code will be developed, based on a post-gateway work-based project, and should cover the following:

- operating a performant, secure and highly available platform
- a successful deployment of code from source to the end user
- satisfy the functional and non-functional requirements defined by the work-based project

The piece of code developed must have a real focus on continuous delivery, code branching and management with many developers working on branches of the same code base simultaneously. It is also expected that the practical assessment shows code and data management, use of DevOps tools and pipelines and use of multiple environments.

The end-point assessment organisation will arrange for the practical assessment to take place, in consultation with the employer. Practical assessments must be carried out over a maximum assessment time of 3 hours. The practical assessment may not be split, other than to allow comfort breaks as necessary. The independent assessor has the discretion to increase the time of the practical assessment by up to 10% to allow the apprentice to complete the last task that is part of this element of the EPA.

The independent assessor may conduct and observe only one apprentice during this assessment method.

The rationale for this assessment method is:

This method allows direct testing under controlled conditions. This occupation is very much about 'learning by doing' and this method provides the best way of assessing the required level of competence. The scope of the practical assessment will require the apprentice to put into practice the mapped KSBs, demonstrating competence in designing, building and iterating a piece of cloud native infrastructure - i.e. infrastructure-as-code.

Delivery

A work-based project title and brief summary will be submitted to the EPAO at the gateway. This can be done via email. The EPAO will sign off the project title and brief summary in consultation with the employer within two weeks of the gateway. Once the project title and brief summary have been signed off by the EPAO, the project, piece of code and preparation for the practical assessment must be completed and submitted to the EPAO within 13 weeks. It is envisaged the project and piece of code will typically take 12 weeks to undertake and the practical assessment preparation will typically take an additional 1 week.

The following are examples of what could be included in a piece of code (although not an exhaustive list):

- Building a piece of infrastructure and deploying an application to it
- Building an element of a platform, resident on this infrastructure
- Development of a new approach to a platform/infrastructure/deployment problem, i.e. novel tooling where no alternates are available
- Development of tooling to automate common deployment/maintenance processes
- Development/implementation of new CI/CD pipelines
- Development of management/support processes

The employer will ensure the apprentice has sufficient time and the necessary resources, within the EPA period, to plan and undertake the work-based project.

The apprentice will need to consider the availability of company and external resources required to complete the work-based project. They must also ensure they are fully aware of the KSBs the work-based project intends to assess as that is what the grading of the practical assessment and questioning will be based on.

Whilst completing the work-based project the apprentice should be subject to the supervision arrangements outlined below:

- Normal line management controls. The apprentice may work as part of a team which could include technical internal or external support however the project will be the apprentices own work and will be reflective of their own role and contribution. The employer is responsible in verifying that the work submitted is that of the apprentice.
- The employer should allow the apprentice 2 days per week to work on their project during the EPA period.

As an outcome of the project the apprentice must produce sufficient evidence of the form, technical breadth and specific technical outputs of the work in order that the independent assessor can familiarise themselves with the project output (i.e. the piece of code) prior to the practical assessment. Therefore the project submitted to the EPAO as an integral part of this Assessment Method must include the following:

- on 'form': an architectural diagram (in a structured or ad-hoc notation) or other artefact which shows high level system structure
- on 'technical breadth': a short analysis, maximum 300 words, of which project areas provide evidence against which KSBs
- on 'specific technical outputs': the independent assessor will need to be provided with implementations which cover all techniques used. These may include source code, deployment/ system build scripts or configuration files and should be communicated to the independent assessor through access to cloud services, an archive of files or in screenshots/videos/documents

Prior to the Practical Assessment, apprentices must be provided with both written and verbal instructions on the task they must complete including the timescales they are working to.

The practical assessment should be conducted in the following way to take account of the occupational context in which the apprentice operates:

The apprentice will demonstrate the piece of code that has been produced following the work-based project and the independent assessor will question them on the methodology used to develop the code.

The practical assessment will cover the following:

- operating a performant, secure and highly available platform
- satisfy the functional and non functional requirements defined by the work-based project
- meets the KSBs mapped to this assessment method

In addition to addressing the above criteria, the following activity MUST be observed during the practical assessment, as a practical assessment without these tasks would seriously hamper the opportunity for the apprentice to demonstrate occupational competence in the KSBs assigned to this assessment method.

- A successful deployment of code from source to the end user.

EPAOs will create and set open questions to assess related underpinning KSBs. The questions can be asked both during and after the practical assessment. The independent assessor can ask up to 16 questions generated from an EPAO question bank and generated by themselves (2 questions for each of the 8 themes within this assessment method). Questioning must be completed within the total time allowed for the practical assessment.

KSBs observed and answers to questions must be documented by the independent assessor.

The independent assessor will make all grading decisions.

Questions and resources development

EPAOs will create and set open questions to assess related underpinning KSBs.

EPAOs will produce specifications to outline in detail how the practical assessment will operate, what it will cover and what should be looked for. It is recommended that this be done in consultation with employers. EPAOs should put measures and procedures in place to maintain the security and confidentiality of their specifications if employers are consulted. Specifications must be standardised by the EPAO.

EPAOs must develop 'question banks' of sufficient size to prevent predictability and review them regularly (and at least once a year) to ensure they, and the specifications they contain, are fit for purpose. The specifications, including questions relating to underpinning KSBs must be varied, yet allow assessment of the relevant KSBs.

Venue

EPAO must ensure that the practical assessment and questioning are conducted in a suitable controlled environment and must be conducted in one of the following locations:

- the employer's premises
- other suitable venue selected by the EPAO (e.g. training provider's)
- via video or web conferencing

The venue should be a quiet room, free from distraction and external influence. It must have appropriate web/digital conferencing facilities with a suitable technical environment, including a large monitor, whiteboard and internet access. Video conferencing can be used but the EPAO must have processes in place to verify the identity of the apprentice and ensure that the apprentice is not being aided in some way.

Support material

EPAOs will produce the following material to support this assessment method:

- Outline of the assessment method's requirements
- Marking materials for independent assessor
- Grading guidance
- Question bank

Assessment method 2: Professional discussion

Overview

This assessment will take the form of a professional discussion which must be appropriately structured to draw out the best of the apprentice's competence and excellence and cover the KSBs assigned to this assessment method. It will involve the questions that will focus on activity and analysis of given scenarios; for example, 'the benefits of pairing with other developers' or 'selecting the most appropriate problem solving technique to address a given problem'.

The rationale for this assessment method is:

It ensures the apprentice can demonstrate the application of evidence to DevOps practices and their own continuing professional development. This will allow some KSBs which may not naturally occur in every workplace or may take too long to observe to be assessed and the assessment of a disparate set of KSBs.

Delivery:

The EPAO should provide the apprentice with 2 weeks' notice of the professional discussion.

The independent assessor will conduct and assess the professional discussion.

The professional discussion must last for 60 minutes. The independent assessor has the discretion to increase the time of the professional discussion by up to 10% to allow the apprentice to complete their last answer.

During this method, the independent assessor must combine questions from the EPAO's question bank and those generated by themselves.

The professional discussion will be conducted as set out here:

The discussion should not be led by the independent assessor as it involves both the independent assessor and the apprentice actively listening and participating in a formal conversation, giving the apprentice the opportunity to make detailed and proactive contributions to confirm their competency across the KSBs mapped to this method.

The independent assessor will ask a minimum of 8 open questions (one for each category) from the EPAO's question bank and those generated by themselves sufficient to cover all mapped KSBs. Follow up questions may then be used to draw out further evidence.

The apprentice may use a whiteboard to help with visualising the KSBs; e.g. K18, K19 and K22.

Video conferencing can be used to conduct the professional discussion, but the EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided in some way.

The independent assessor must use the assessment tools and procedures that are set by the EPAO to record the professional discussion.

Venue
The professional discussion should take place in a quiet room, free from distractions and influence.

The professional discussion can take place in any of the following:

- employer's premises
- a suitable venue selected by the EPAO (for example a training provider's premises)

Additional, specific venue requirements include: A whiteboard (for visualising KSBs)

Other relevant information
A structured question bank must be developed by EPAOs. The 'question bank' must be of sufficient size to prevent predictability and the EPAO must reviewed regularly (at least once a year) to ensure that it, and its content, are fit for purpose. The questions relating to the underpinning KSBs, must be varied yet allow assessment of the relevant KSBs.

EPAOs must ensure that apprentices have a different set of questions in the case of re-sits/re-takes.

Independent assessors must be developed and trained by the EPAO in the conduct of professional discussion and reaching consistent judgement.

 EPAOs will produce the following material to support this assessment method:

- Outline of the assessment method's requirements, including an outline of any scenarios
- Marking materials for independent assessor
- Grading guidance
- A question bank

Reasonable adjustments
The EPAO must have in place clear and fair arrangements for making reasonable adjustments for this apprenticeship standard. This should include how an apprentice qualifies for reasonable adjustment and what reasonable adjustments will be made. The adjustments must maintain the validity, reliability and integrity of the assessment methods outlined in this assessment plan.

Weighting of assessment methods

Method 1 (Project and Practical Assessment) is weighted more than Method 2 (Professional discussion). This is reflected in the overall EPA grading table.

Grading
Assessment method 1: Project and Practical Assessment
Fail: Does not meet the pass criteria

KSBs	Pass – meets all the pass criteria	Distinction - meets all the distinction criteria
K1 K2 K4 K5 K7 K8 K10 K11 K12 K13 K14 K15 K16 K17 K21 S3 S5 S6 S7 S9 S10 S11 S12 S14 S15 S17 S18 S19 S20 S22 B3	**Code Quality** Writes code, both general purpose and infrastructure-as-code (including cloud infrastructure) that is correctly versioned and easy to merge, while adhering to the principles of distributed Source Control. Demonstrates an iterative approach to evolving code consistent with cloud security best practice, evidenced by a lack of vulnerabilities and that all dependent components are present at run time. Writes code around unit tests, including the appropriate use of test doubles and mocking strategies. Explains troubleshooting methods used to identify and resolve issues and gives an example of identifying and remediating an issue that compromised code quality. (K2, K5, K7, K14, S9, S11, S14, S17, S18, S20, S22)	
	Meeting User Needs Writes user stories that are understandable to a wide range of stakeholders, stand up to scrutiny and lend themselves to a solution based on common	**Meeting User Needs** Produces a piece of code that meets the 'should have' identified functional/non-functional user needs

	architectural patterns - i.e. reducing the number of moving/redundant parts; passes all acceptance tests. The piece of code meets the 'must have' identified functional/non-functional user needs encapsulated in the acceptance criteria for the task. Creates a quality product in terms of Mean Time To Recovery (MTTR) - i.e. reduced time to fix bugs. (K4, K10, K21, S3)	encapsulated in the acceptance criteria for the task.
	The CI-CD Pipeline Builds a fully functioning, automated CI-CD pipeline with all tests passing. Evidences a code commit progressing seamlessly from a build artefact to the end user. Explains the pipeline capability, including the benefits of frequent merging of code, in terms of Continuous Integration/Delivery/Deployment. (K1, K15, S15)	
	Refreshing and Patching Deploys immutable infrastructure that enables the regular recycling of servers and refreshing of associated software based on manual processes. (K8, S5)	**Refreshing and Patching** Fully automates the refreshing and patching process.
	Operability Installs and manages monitoring and alerting tools that provide coverage of the infrastructure and applications, including RAM and CPU utilisation, application error rates and availability (health check). Configures appropriate alerting thresholds and visualisations. Interprets these in terms of failure scenarios and remedial/follow up actions taken to deliver continuous improvement. (K11, S6, S19, B3)	**Operability** Introduces custom metrics that provide additional improvement areas. Explains how these improvement areas may be interpreted, implemented and delivered.
	Data Persistence Employs and operates an appropriate data persistence technology, such as database,	

	configuration/infrastructure state management to meet non-functional and functional needs. Explains troubleshooting steps taken to locate issues across the end-to-end service. (K12, S7)	
	Automation Introduces process efficiencies by automating the setting up/deploying of the project (infrastructure and applications) from scratch, both locally, including all tests, and to a hosted environment. (K13, K17, S12)	**Automation** Identifies an additional opportunity and introduces automation that reduces overall effort.
	Data Security Builds in security so that all data in transit is encrypted and secure. Explains the types of threats and the rationale behind the decision to either encrypt data at rest or not. (K16, S10)	

Assessment method 2: Professional discussion

Fail: Does not meet the pass criteria

KSBs	Pass- meets all the pass criteria	Distinction- meets all the distinction criteria
K3 K6 **K9** **K18** **K19** **K20** **K22** **K23** **K24** **K25** **S1 S2** **S4 S8** **S13** **S16** **S21**	**Organisational Culture** Explains how an organisation's culture can both provide creative freedom and introduce constraints. Explains the connection between culture and the organisation's potential for continuous improvement with both internal and external parties. (K9, K23, S2)	**Organisational Culture** Explains the mindsets that underpin organisational culture - e.g. outcome versus activity driven, collaboration versus silos, accountability, trust and empowerment and their impact on the organisation. Assesses the difference between risk avoidance and risk acceptance and how these link to culture.

B1 B2 B4		
	Data Ethics Identifies relevant data protection legislation and assesses its impact on the ethical use of customer data, as well as its relevance to emerging technologies, such as Artificial Intelligence and Machine Learning. (K3)	
	Problem Solving Identifies different problem solving techniques and evaluates how they use modelling approaches that are best suited to each technique in order to gain consensus as a team. (K6, S21)	Describes how they facilitated an incident post-mortem/lessons learned session. Explains the root cause analysis process. Gains consensus on an improvement plan, including accountabilities and the implementation timeline.
	The Profession in Context Identifies the typical multi-disciplinary team roles and explains how they fit within the organisation and the wider digital landscape. Explains how they completed a task, deploying a flexible, collaborative and pragmatic approach with peers and other stakeholders. Describes examples of different communication methods used when dealing with internal and external stakeholders Explains how they have acted in an inclusive and professional manner. (K18, K19, K22, S8, B4)	
	Tooling & Technology Explains the difference between the various types of implementation - on premise v SaaS, open source v enterprise, bespoke v off-the-shelf. Explains an example of having utilised the right type of tool for a particular task, describing the pros and cons of the alternatives.	Justifies their choice of tooling and the potential impact of making an alternative choice explaining the cause and effect of making the wrong decision.

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	(K24)	
	Continuous Learning & Development Explains the CPD undertaken by themselves in order to keep up with cutting edge technologies and maintain appropriate certifications. Explains how they invest in others continuous learning and activities and the impact this has on their own development. (K25, S16, B2)	Gives examples of how their CPD has had a positive impact on theirs and their team's work. Explains how this has helped them perform their role better and make better technology choices.
	Peer review Explains the benefits, in terms of security and overall quality, of subjecting written code to the scrutiny of others. Explains how they collaborate on code through pair/mob commits. (K20, S13)	

	Communicating and Knowledge Sharing
	Explains when they have:
	  a) lead a demonstration or discussion in an engaging manner, communicating at the right level to suit technical and non-technical audiences.
	  b) worked collaboratively to share knowledge through, for example, blog posts and pairing on tasks.
	
	(S1, S4, B1)	

Overall EPA grading

All EPA methods must be passed for the EPA to be passed overall.

Apprentices must gain a pass in both methods to gain a pass overall
Apprentices must gain a distinction in both assessment methods to gain a Distinction.

Apprentices must gain a pass in the professional discussion and a distinction in the Project and Practical Assessment to gain a Merit.

Grades from individual assessment methods should be combined in the following way to determine the grade of the EPA as a whole:

Project and Practical Assessment	Professional Discussion	Overall grading
Fail	Fail	Fail
Fail	Pass	Fail
Fail	Distinction	Fail
Pass	Fail	Fail
Pass	Pass	Pass
Pass	Distinction	Pass
Distinction	Fail	Fail
Distinction	Pass	Merit
Distinction	Distinction	Distinction

Re-sits and re-takes

Apprentices who fail one or more assessment method/s will be offered the opportunity to take a re-sit or a re-take at the employer's discretion. The apprentice's employer will need to agree that either a re-sit or re-take is an appropriate course of action.

Apprentices should have a supportive action plan to prepare for the re-sit or a re-take. The apprentice's employer will need to agree that either a re-sit or re-take is an appropriate course of action.

An apprentice who fails an assessment method, and therefore the EPA in the first instance, will be required to re-sit or re-take any failed assessment methods only. The same project/code may be used in the event this method is failed.

Any assessment method re-sit or re-take must be taken during a 6 month period, otherwise the entire EPA must be taken again, unless in the opinion of the EPAO exceptional circumstances apply outside the control of the apprentice or their employer.

Re-sits and re-takes are not offered to apprentices wishing to move from pass to merit/distinction or merit to distinction.

Where any assessment method has to be re-sat or re-taken, the apprentice will be awarded a maximum EPA grade of pass, unless the EPAO determines there are exceptional circumstances requiring a re-sit or re-take.

Roles and responsibilities

Role	Responsibility
Apprentice	- participate in development opportunities to improve their knowledge skills and behaviours as outlined in the standard - meet all gateway requirements when advised by the employer - understand the purpose and importance of EPA and undertake EPA
Employer	- support the apprentice to achieve the KSBs outlined in the standard to their best ability - determines when the apprentice is working at or above the level outlined in the standard and is ready for EPA - select the EPAO - confirm arrangements with EPAO for the EPA (who, when, where) in a timely manner - ensure apprentice is well prepared for the EPA - should not be involved in the delivery of the EPA
EPAO	As a minimum EPAOs should: - understand the occupational role - appoint administrators/invigilators and markers to administer/invigilate and mark the EPA - provide training and CPD to the independent assessors they employ to undertake the EPA - provide adequate information, advice and guidance documentation to enable apprentices, employers and providers to prepare for the EPA - deliver the end-point assessment outlined in this EPA plan in a timely manner - prepare and provide all required material and resources required for delivery of the EPA in-line with best practices - use appropriate assessment recording documentation to ensure a clear and auditable mechanism for providing assessment decision feedback to the apprentice

	- have no direct connection with the apprentice, their employer or training provider i.e. there must be no conflict of interest - maintain robust internal quality assurance (IQA) procedures and processes, and conducts these on a regular basis - conform to the requirements of the nominated external quality assurance body - organise standardisation events and activities in accordance with this plan's IQA section - organise and conduct moderation of independent assessors' marking in accordance with this plan - have, and operate, an appeals process - arrange for certification with the relevant training provider
Independent assessor	As a minimum an independent assessor should: - understand the standard and assessment plan - deliver the end-point assessment in-line with the EPA plan - comply with the IQA requirements of the EPAO - be independent of the apprentice, their employer and training provider(s) i.e. there must be no conflict of interest - satisfy the criteria outlined in this EPA plan - hold or be working towards an independent assessor qualification e.g. A1 and have had training from their EPAO in terms of good assessment practice, operating the assessment tools and grading - have the capability to assess the apprentice at this level - attend the required number of EPAOs standardisation and training events per year (as defined in the IQA section)
Training provider	As a minimum the training provider should: - work with the employer to ensure that the apprentice is given the opportunities to develop the KSBs outlined in the standard and monitor their progress during the on-programme period - advise the employer, upon request, on the apprentice's readiness for EPA prior to the gateway - plays no part in the EPA itself

Internal Quality Assurance (IQA)

Internal quality assurance refers to the requirements that EPA organisations must have in place to ensure consistent (reliable) and accurate (valid) assessment decisions. EPA organisations for this EPA must:

- appoint independent assessors who have knowledge of the following occupational areas:
    - Experience in the digital technology sector, including cloud infrastructure engineering, agile software development and DevOps practices gained in the last two years

- appoint independent assessors who have recent relevant experience of the occupation/sector at least one level above the apprentice gained in the last two years or significant experience of the occupation/sector
- Deliver annual standardisation events for independent assessors
- appoint independent assessors who are competent to deliver the end-point assessment
- provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading
- have robust quality assurance systems and procedures that support fair, reliable and consistent assessment across the organisation and over time
- operate induction training and standardisation events for independent assessors when they begin working for the EPAO on this standard and before they deliver an updated assessment method for the first time
- independent assessors attend standardisation events on an ongoing basis and at least once per year.

Affordability

Affordability of the EPA will be aided by using at least some of the following practice:

- using an employer's premises
- remote assessment for the professional discussion

Professional body recognition

Professional body recognition is not relevant to this occupational apprenticeship.

Mapping of knowledge, skills and behaviours (KSBs)

Assessment method 1: Project and Practical Assessment.

Knowledge
K1 Continuous Integration - the benefits of frequent merging of code, the creation of build artefacts and ensuring all tests pass, with automation throughout - including common tooling.
K2 The principles of distributed Source Control, including how to exploit the features of the tool, such as branching.
K4 The business value of DevOps in terms of Time, Cost, Quality, with an emphasis on building in internal Quality throughout the lifetime of the product.
K5 A range of modern security tools and techniques - e.g. threat modelling, vulnerability scanning and dependency checking, with a general awareness of penetration testing - in order to deal with threats and attack vectors within code and across the cyber domain.
K7 General purpose programming and infrastructure-as-code.
K8 Immutable infrastructure and how it enables continuous refreshing of software, namely the updating of the operating system, container and security patching.
K10 How the user experience sits at the heart of modern development practices in terms of strategies to understand diverse user needs, accessibility and how to drive adoption.
K11 Monitoring and alerting technologies and an awareness of the insights that can be derived from the infrastructure and applications - collecting logs and metrics, configuring alerting thresholds, firing alerts and visualising data.
K12 The persistence/data layer, including which database/storage technologies are appropriate to each platform type and application when considering non-functional and functional needs; e.g. monolith, microservice, read heavy, write heavy, recovery plans.
K13 Automation techniques, such as scripting and use of APIs.
K14 Test Driven Development and the Test Pyramid. How the practice is underpinned by unit testing, the importance of automation, appropriate use of test doubles and mocking strategies, reducing a reliance on end-to-end testing.
K15 The principles and application of Continuous Integration, Continuous Delivery and Continuous Deployment, including the differences between them.
K16 How best to secure data; e.g. encryption in transit, encryption at rest and access control lists (ACL).
K17 What an API is, how to find them and interpret the accompanying documentation.
K21 Architecture principles, common patterns and common strategies for translating user needs into both cloud infrastructure and application code.
Skills
S3 Translate user needs into deliverable tasks, writing clear, concise and unambiguous user stories that the whole team can understand.
S5 Deploy immutable infrastructure
S6 Install, manage and troubleshoot monitoring tools
S7 Navigate and troubleshoot stateful distributed systems, in order to locate issues across the end-to-end service.
S9 Application of a range of cloud security tools and techniques - e.g. threat modelling, vulnerability scanning, dependency checking, reducing attack surface area - incorporating these tools and techniques into the automated pipeline wherever possible.

S10 Assess identified and potential security threats and take appropriate action based on likelihood v impact.
S11 Employ a systematic approach to solving problems, using logic and hypotheses / experimentation to identify the source of issues.
S12 Automate tasks where it introduces improvements to the efficiency of business processes and reduces waste, considering the effort and cost of automation.
S14 Write tests and follow Test Driven Development discipline in various different contexts.
S15 Release automation and orchestration as part of a Continuous Integration workflow and Continuous Delivery pipeline, automating the delivery of code from source control to the end users.
S17 Code in a general purpose programming language.
S18 Specify cloud infrastructure in an infrastructure-as-code domain-specific language.
S19 Interpret logs and metrics data within the appropriate context to identify issues and make informed decisions.
S20 Writing code in such a way that makes merging easier and facilitates branching by abstraction - i.e. feature toggling.
S22 Incremental refactoring by applying small behaviour-preserving code changes to evolve the architecture.
Behaviours
B3 Displays a commitment to the mantra 'You build it, you run it', taking ownership of deployed code and being accountable for its continual improvement, learning from experience and taking collective responsibility when things fail.

Assessment method 2: Professional discussion

Knowledge
K3 How to use data ethically and the implications for wider society, with respect to the use of data, automation and artificial intelligence within the context of relevant data protection policy and legislation.
K6 A range of problem solving techniques appropriate to the task at hand, such as affinity mapping, impact maps, plan-do-check-act/Deming.
K9 Different organisational cultures, the development frameworks utilised and how they can both complement each other and introduce constraints on delivery.
K18 Roles within a multidisciplinary team and the interfaces with other areas of an organisation.
K19 Different methods of communication and choosing the appropriate one - e.g. face-to-face (synchronous, high bandwidth), instant messaging, email (asynchronous, low bandwidth), visualisations vs. words.
K20 Pair/mob programming techniques and when to use each technique.
K22 How their occupation fits into the wider digital landscape and any current or future regulatory requirements.
K23 The importance of continual improvement within a blameless culture.
K24 The difference between Software-as-a-Service (SaaS) v bespoke v enterprise tooling and how to make an informed choice that suits each use case.
K25 Maintain an awareness of cloud certification requirements.
Skills
S1 Communicate credibly with technical and non-technical people at all levels, using a range of methods; e.g. 'Show and Tell' and 'Demonstrations'.
S2 Work within different organisational cultures with both internal and external parties

S4 Initiate and facilitate knowledge sharing and technical collaboration
S8 Work in agile, multi-disciplinary delivery teams, taking a flexible, collaborative and pragmatic approach to delivering tasks.
S13 Engage in productive pair/mob programming.
S16 Invest in continuous learning, both your own development and others, ensuring learning activities dovetail with changing job requirements. Keep up with cutting edge.
S21 Application of lightweight modelling techniques, such as whiteboarding, in order to gain consensus as a team on evolving architecture.
Behaviours
B1 Exhibits enthusiasm, openness and an aptitude for working as part of a collaborative community; e.g. sharing best practice, pairing with team members, learning from others and engaging in peer review practices.
B2 Invests time and effort in their own development, recognising that technology evolves at a rapid rate.
B4 Is inclusive, professional and maintains a blameless culture.