

Level 3 Award in Cloud Services (9628-08)

Version (2.0) April 2018

Qualification Handbook

Qualification at a glance

Industry area	IT Professional
City & Guilds number	9628
Age group	16+
Assessment	Online multiple choice test.
Approvals	Approval application required. Please see www.cityandguilds.com for details.
Registration and certification	Registration and certification of this qualification is through the Walled Garden, and is subject to end dates.

Title and level	GLH	TQT	City & Guilds qualification number	Ofqual accreditation number
Level 3 Award in Cloud Services	24	100	9628-08	603/0620/8

Version and date	Change detail	Section
2.0 April 2018	Test specification detail added	Assessment

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1 Introduction

This document tells you what you need to do to deliver the qualification:

Area	Description
Who is the qualification for?	This qualification is designed to support learners to develop a full range of underpinning knowledge that can be used in a variety of businesses and industries that demonstrate confidence and transferability in a Digital Technology Environment.
What does the qualification cover?	The primary role of an Infrastructure Technician is to provide support to internal and external customers, helping them to be productive when using technology to do their own jobs, by using tools to problem solve and troubleshoot non-routine problems. This qualification covers the basic concepts of cloud computing, including the features of Cloud, Cloud models, Cloud services, and the importance of relevant legislation. Disaster recovery, the policies and strategy that should be followed within organisations as well as the roles, responsibilities and procedures for implementing a disaster recovery plan.
What opportunities for progression are there?	This qualification is part of the Digital Industries Apprenticeship programme and is not offered as a standalone product. On achieving this module the learner will have completed a section of the Knowledge element as part of their apprenticeship journey.
Who did we develop the qualification with?	It was developed in collaboration with employers, sector experts and training providers using the Standard as the baseline. The Standards have been created by The Tech Partnership and their Employer Groups for the specific areas. The qualification embodies the required learning for an apprentice to have the opportunity to successfully gain the relevant knowledge for their chosen career path in a Digital Technology environment.
Is it part of an apprenticeship framework or initiative?	Yes – 9648 Infrastructure Technician

Structure

Learners must complete the single unit 308 to gain this qualification.

Total Qualification Time

Total Qualification Time (TQT) is the number of notional hours which represents an estimate of the total amount of time that could reasonably be expected for a learner to achieve and demonstrate the achievement of the level of attainment necessary for the award of a qualification.

TQT is comprised of the following two elements:

- The number of hours which an awarding organisation has assigned to a qualification for Guided Learning, and
- an estimate of the number of hours a Learner will reasonably be likely to spend in preparation, study or any other form of participation in education or training, including assessment, which takes place as directed by - but, unlike Guided Learning, not under the Immediate Guidance or Supervision of - a lecturer, supervisor, tutor or other, appropriate provider of education or training.

Title and level	GLH	TQT
Level 3 Award in Cloud Services	24	100

2 Centre requirements

Approval

Fast Track Approval is offered to existing City & Guilds Centres offering the SASE framework for the Apprenticeship, Advanced Apprenticeship and/or Higher Apprenticeship for IT, Software, Web and Telecoms through City & Guilds. See the separate document on our website that provides details of the Fast Track Process and actions to be taken. Please note the Fast Track form will list the Apprenticeship package under 9648 which relates to the Apprenticeship Standards. The form will automatically approve centres to this qualification and the other knowledge qualifications that sit in the Apprenticeship Standard.

City & Guilds is offering the opportunity for existing City & Guilds centres delivering SASE framework for the Advanced and/or Higher Level Apprenticeship for IT, Software, Web and Telecoms with other Awarding Organisations to gain approval for these Apprenticeship Standards through the Common Approval Framework. See the separate document at www.cityandguilds.com which provides details of the New Programme Process and actions to be taken.

Centres that are not currently with City & Guilds will need to complete a Customer Application Form for the parent package 9648-03 and once accepted they will be asked to complete the Centre Approval Process. Please note that approval to the 9648 package will automatically approve you to this qualification and the other knowledge qualifications in this package - centres will not need to register onto the individual knowledge qualifications and therefore do not need direct approval. See the separate document on our website that provides details of the New Centre Approval Process and actions to be taken.

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualification before designing a course programme.

Resource requirements

Resources

Please see the individual unit information for any resources required.

Centre staffing

Staff delivering this qualification must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be occupationally competent or technically knowledgeable in the areas for which they are delivering training and/or have experience of providing training. This knowledge must be to the same level as the training being delivered
- have recent relevant experience in the specific area they will be assessing
- have credible experience of providing training.

While the Assessor/Verifier (A/V) units/TAQA are valued as qualifications for centre staff, they are not currently a requirement for these qualifications. However, City & Guilds encourage trainers and assessors to qualify to the current TAQA standard. Centre staff may undertake more than one role, eg tutor and assessor or internal verifier, but cannot internally verify their own assessments.

Continuing Professional Development (CPD)

Centres are expected to support their staff in ensuring that their knowledge and/or practice remains current. This includes currency within the occupational area and of best practice in delivery, mentoring, training, assessment and quality assurance. It should also take account of any national, international policy and legislative developments.

Internal quality assurance is key to ensuring that the assessment of evidence for units is of consistent and appropriate quality. They should:

- be occupationally competent or technically knowledgeable in the area for which they are internally quality assuring
- have recent relevant experience in the specific area they will be assessing
- have credible experience of providing training
- have a CV available demonstrating relevant experience and any qualifications held.

In certain circumstances, City & Guilds will recognise non-accredited learning and experience as equivalent as follows:

- If the Internal Quality Assurer does not hold a qualification they must be able to demonstrate evidence of working to their own organisation's internal quality assurance standards which clearly link to V1/TAQA or other equivalent standards for internal quality assurance.

Learner entry requirements

City & Guilds does not set entry requirements for these qualifications. However, centres must ensure that learners have the potential and opportunity to gain the qualifications successfully and that they have the full engagement of the employers for the full programme.

Age restrictions

City & Guilds cannot accept any registrations for learners under 16 as these qualifications are not approved for learners under 16.

3 Delivering the qualification

Initial assessment and induction

An initial assessment of each learner should be made before the start of their programme to identify:

- if the learner has any specific training needs
- support and guidance they may need when working towards their qualifications
- any units they have already completed, or credit they have accumulated which is relevant to the qualifications
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the learner fully understands the requirements of the qualification, their responsibilities as a learner, and the responsibilities of the centre. This information can be recorded on a learning contract.

Recording documents

Learners and centres may decide to use a paper-based or electronic method of recording evidence.

City & Guilds endorses several ePortfolio systems, including our own, Learning Assistant, an easy-to-use and secure online tool to support and evidence learners' progress towards achieving qualifications. Further details are available at: www.cityandguilds.com/eportfolios.

City & Guilds has developed a set of *Recording forms* including examples of completed forms, for new and existing centres to use as appropriate. Recording forms are available on the City & Guilds website.

Although new centres are expected to use these forms, centres may devise or customise alternative forms, which must be approved for use by the external verifier, before they are used by learners and assessors at the centre. Amendable (MS Word) versions of the forms are available on the City & Guilds website.

4 Assessment

Summary of assessment methods

Candidates must:

- successfully complete one assessment for the mandatory unit

Assessment Types

Unit	Title	Assessment method	Where to obtain assessment materials
308	Cloud Services	Multiple Choice questions – online Evolve test.	www.cityandguilds.com

Assessment strategy

Test Specifications

The way the knowledge is covered by each test is laid out in the table below:

Assessment type: Multiple-choice online test

Assessment conditions: Invigilated examination conditions

Number of questions: 40

Duration: 1 hour

Pass mark: 28/40 (70%)

Grading: Pass/Fail

	Learning Outcome	Number of marks	%
Unit 308	1. Understand Cloud and Cloud Services.	25	63
	2. Understand disaster recovery and disaster recovery plans	15	37
	Total	40	100

Recognition of prior learning (RPL)

Recognition of prior learning means using a person's previous experience, or qualifications which have already been achieved, to contribute to a new qualification.

For this qualification, RPL is not allowed.

5 Administration

Quality assurance

Internal quality assurance

Registered centres must have effective quality assurance systems to ensure optimum delivery and assessment of qualifications. Quality assurance includes initial centre registration by City & Guilds and the centre's own internal procedures for monitoring quality. Centres are responsible for internal quality assurance and City & Guilds is responsible for external quality assurance.

Standards and rigorous quality assurance are maintained by the use of:

- internal quality assurance
- City & Guilds external moderation.

In order to carry out the quality assurance role, Internal Quality Assurers must have appropriate teaching and vocational knowledge and expertise.

Access arrangements

We can make arrangements so that learners with disabilities, special educational needs and temporary injuries can access the assessment. These arrangements must be made before the examination. For example, we can produce a Braille paper for a learner with visual impairment.

Language of examinations

We will provide this specification in English only.

Other issues

European Dimension

City & Guilds has taken account of the 1988 Resolution of the Council of the European Community in preparing this specification and associated specimen units.

Environmental Education

City & Guilds has taken account of the 1988 Resolution of the Council of the European Community and the Report Environmental Responsibility: An Agenda for Further and Higher Education 1993 in preparing this specification and associated specimen units.

Avoidance of bias

City & Guilds has taken great care in the preparation of this specification and specimen units to avoid bias of any kind.

6 Units

Availability of units

The unit information can be found in this document.

Structure of the units

These units each have the following:

- City & Guilds reference number
- Title
- Level
- Guided learning hours (GLH)
- Learning outcomes, which are comprised of a number of topics

Centres must deliver the full breadth of the range. Specialist equipment or commodities may not be available to all centres, so centres should ensure that their delivery covers their use.

Unit 308 Cloud Services and Disaster Recovery

LEVEL:	3
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GLH:	24
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What is this unit about?

This unit provides learners with the basic concepts of cloud computing, including the features of Cloud, Cloud models, Cloud services, and the importance of relevant legislation.

This unit also provides an overview of Disaster recovery, the policies and strategy that should be followed within organisations as well as the roles, responsibilities and procedures for implementing a disaster recovery plan.

The primary role of an Infrastructure Technician is to provide support to internal and external customers, helping them to be productive when using technology to do their own jobs, by using tools to problem solve and troubleshoot non-routine problems. The Infrastructure Technician sets people up on systems and provides support when they need it, rectifying issues to maintain the organisations productivity.

Upon completion, learners studying this unit will have gained the knowledge to support the competencies of an Infrastructure Technician. Specific competencies supported by this unit include being able to undertake the following tasks:

- Provide support to the provisioning of cloud services for client use.
- Provide first line support to clients utilising cloud services, provisioning of password resets and user rights.
- Provide support to the implementation of a disaster recovery plan.
- Respond to system failures and support clients in the recovery of system data and backups.

Learning outcomes

In this unit, learners will be able to

- 1 Understand Cloud and Cloud Services
- 2 Understand disaster recovery and disaster recovery plans

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome

1 Understand Cloud and Cloud Services

Topics

- 1.1 Cloud features
- 1.2 Technology
- 1.3 Provisioning
- 1.4 Identity and access

Depth

In this learning outcome the learner will explore the fundamental nature of Cloud services and the elements to be considered when provisioning them

Topic 1.1

The learner will be able to describe the characteristics of Cloud technology, Cloud models, Cloud services and the importance of relevant legislation.

- Cloud Technology
 - o Elasticity
 - o Ubiquitous access
 - o Rapid deployment
 - o On-demand self-service
 - o Resource pooling
 - o Pay-as-you-grow
 - o Multi-tenancy
 - o Automation
 - o Chargeback
 - o Cloud bursting
 - o Minimal management effort
- Cloud models
 - o Private
 - o Public
 - o Hybrid
 - o Community
- Cloud services
 - o Software-as-a-Service (SaaS)
 - o Platform-as-a-Service (PaaS)
 - o Infrastructure-as-a-Service (IaaS)
 - o Anything (or everything)-as-a-Service (XaaS)
- Relevant legislation and consequences of a breach

- o Data Protection Act
- o Privacy and Electronic Communications Regulations
- o Computer Misuse Act
- o Official Secrets Act

Topic 1.2

The learner will be able to describe considerations specific to the use of technology for delivering Cloud services:

- Hardware
 - o Server performance
 - Components (CPU, memory, etc.)
 - Load balancing
- Datacentre components
 - o Power provision
 - o Cooling provision
- Storage
 - o Performance
 - o Reliability
 - o Redundancy
- Networking
 - o Services
 - DNS
 - DHCP
- Availability
 - o Bandwidth
 - o Quality of service (QoS)
- Client connectivity
 - o User device
 - o User access method
 - o Portal location (domain)
- Software
 - o Operating system configuration
 - o Management tools
 - Command line interfaces
 - Graphical utilities
 - Portal site
 - o Hosted applications
 - Database
 - Productivity applications
 - Web applications
 - Email
- Virtual machine configuration
 - o Virtual machines (VM)
 - o Network virtualisation
 - o Orchestration

Topic 1.3

The learner will be able to describe the use and importance of provisioning tenants:

- SLAs
 - Terms and conditions
 - Exit plan
- Service provisioning
 - Sign-up process
 - Configuration of DNS records
 - Licensing
 - Deployment
 - Optimisation (user experience)
- Multiple tenants
 - Data segregation
 - Network isolation

Topic 1.4

The learner will be able to describe the configuration of user identity and access to Cloud services, to include:

- Secure access
 - Passwords
Complexity
 - Biometrics
 - Geo-location
 - Device ID
- Users and groups
 - Account credentials
 - Permissions management
 - Self-service portal
 - Devices/points of access
 - Authentication
 - Multifactor authentication (MFA)
 - Managing users and rights across multiple Cloud services

Learning outcome

- 2 Understand disaster recovery and disaster recovery plans
-

Topics

- 2.1 Disaster recovery plan
- 2.2 Back-up and recovery methods

Depth

In this learning outcome the learners will explore the fundamentals of disaster recovery and use of disaster recovery plans

Topic 2.1

The learner will be able to describe organisational considerations for producing a disaster recovery plan:

- Policies
 - o Scope
 - ISO/IEC standards
 - Local/national guidelines
 - o Purpose
- Risk management/strategy
 - o Risk analysis
 - People
 - Facilities
 - Technology
 - Data
 - Supplier
 - o Risk response
 - Avoidance
 - Mitigation
 - Acceptance
- Contingency planning
- Roles and responsibilities
 - o CEO/owner
 - o CIO/IT manager
 - o End user

Topic 2.2

The learner will be able to describe the steps of a Disaster Recovery Plan, including where to find it, Cloud backup and recovery methods:

- Prevent
 - o Back-up procedures
 - o Systems security
 - o Site security
- Detect
 - o Continuous monitoring
 - o System failure
 - o Auditing
- Respond
 - o Analysis
 - o Report incident
 - o Action plan
 - o Document

- Recover
 - o Recovery time objective (RTO)/ Recovery point objective (RPO)
 - o System
 - Local machines
 - File systems
 - ApplicationsSystem testing
- File
 - o General principles
 - o File recovery requests
 - o Testing
- Restore
 - o Verification
 - o Communication (inform stakeholders)
 - o Review

Guidance for delivery

Mentors/tutors should be teaching concepts and fundamentals that apply across any Cloud services, ie not specific to particular vendor platforms or technology. However, mentors/tutors may wish to teach vendor specific technology where this is useful to the learners employment or apprenticeship conditions.

Disaster recovery plans will be determined by the size of the organisation and the strategies that the organisation applies, therefore this will vary between SMEs and large employers.

The types of technology required to carry out disaster recovery is not covered in this unit as the focus of this unit is the underlying principles, policy and process for disaster recovery. However, trainers may wish to teach vendor specific technology where this is useful to learners employment or apprenticeship conditions.

This unit can be delivered within a workplace environment if appropriate, providing the learners with paper based, or hands on practical exercises and case studies representative of the Infrastructure Technician competencies in operation.

Learners should be encouraged to explore and use as wide a range of hardware and software as possible, this should also include researching and utilising new and emerging technologies where available.

Equipment

Below is an indicative list, not an exhaustive list.

Access to cloud-based services e.g. Azure, Amazon Web Services (AWS) and Google Compute

Employer engagement

Employer engagement is essential in order to maximise the value of learner' experience. A partnership approach should be adopted where possible with relevant employers in the sector.

When delivering the learning, the organisation or employer should aim to maintain contact with the wider industry to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date. Mentors/tutors should also undertake regular CPD activities in the industry to maintain knowledge of current industry practice.

1. Local branches of BCS The Chartered Institute for IT can often provide access to local employers, since many members will be senior practitioners and leaders in organisations that employ IT professionals. The BCS has an extensive branch network of volunteers operating across the UK, Channels Islands and Isle of Man. <http://www.bcs.org/category/5897>
2. Invite local businesses to visit the delivery centre to talk about their experience in using Digital Technology for IT system support, especially in respect of their dealing with coding and logic issues and processes. Ask the students to identify aspects of the IT support practices of local business that may be considered 'good practice'.
3. The Computing/IT faculty of every university will have links to employers in the local economy and their faculty staff may be willing to introduce delivery centres to major employers of IT skilled graduates and apprentices. Such links should be developed by FE colleges so as to better understand the skills needs and career options for IT practitioners at all levels from school leaver to

graduate (i.e., think of how your learners can develop their career beyond the FE stage, and open their eyes to a full career).

4. Tech Partnership, the UK sector skills council for the IT/Telecoms industry, have an extensive list of small/medium sized employers of IT skilled apprentices and college leavers. They also provide a wealth of free resources for FE colleges to enable better engagement with local employers.
<https://www.thetechpartnership.com/>

5. The Computing Technology Industry Association (CompTIA) is a non-profit, international trade association representing more than 2,000 members, 3,000 academic and training partners and tens of thousands of registered users spanning the entire information communications and technology (ICT) industry. Anyone can sign up to become a registered user and gain access to a vast library of resources that includes cutting edge research into technology trends from the UK and around the world.

Suggested learning resources

Books

Deploying and Managing a Cloud Infrastructure
Published by: Sybex, 2015
ISBN: 978-1118875100

Salam A, Gilani Z, Haq S

Cloud Essentials
Published by: John Wiley & Sons, 2013
ISBN: 978-1-118-40873-5

Hausman K, Cook L, Sempaio T

Cloud Computing Bible
Published by: John Wiley & Sons, 2011
ISBN: 978-0-470-90356-8

Sosinsky B

Journals and magazines

Websites

<https://certification.comptia.org/certifications/cloud-essentials>

<https://certification.comptia.org/certifications/cloud>

[https://ico.org.uk/media/for-](https://ico.org.uk/media/for-organisations/documents/1540/cloud_computing_guidance_for_organisations.pdf)

[organisations/documents/1540/cloud_computing_guidance_for_organisations.pdf](https://ico.org.uk/media/for-organisations/documents/1540/cloud_computing_guidance_for_organisations.pdf)

<http://www.lawsociety.org.uk/support-services/advice/practice-notes/cloud-computing/>

<https://www.microsoftvirtualacademy.com/en-US/training-courses/windows-server-administration-fundamentals-8477>

Appendix 1 Relationships to other qualifications

Links to other qualifications

Centres are responsible for checking the different requirements of all qualifications they are delivering and ensuring that candidates meet requirements of all units/qualifications.

Literacy, language, numeracy and ICT skills development

This qualification can develop skills that can be used in the following qualifications:

- Functional Skills (England) – see www.cityandguilds.com/functionalskills
- Essential Skills (Northern Ireland) – see www.cityandguilds.com/essentialskillsni
- Essential Skills Wales – see www.cityandguilds.com/esw

Appendix 2 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the Centres and Training Providers homepage on www.cityandguilds.com.

Centre Manual - Supporting Customer Excellence contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification, as well as updates and good practice exemplars for City & Guilds assessment and policy issues.

Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

Our Quality Assurance Requirements encompasses all of the relevant requirements of key regulatory documents such as:

- SQA Awarding Body Criteria (2007)
- NVQ Code of Practice (2006)

and sets out the criteria that centres should adhere to pre and post centre and qualification approval.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information on such things as:

- **Walled Garden:** how to register and certificate candidates on line
- **Events:** dates and information on the latest Centre events
- **Online assessment:** how to register for e-assessments.

Centre Guide – Delivering International Qualifications contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification.

Specifically, the document includes sections on:

- The centre and qualification approval process and forms
- Assessment, verification and examination roles at the centre
- Registration and certification of candidates

- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Frequently asked questions.

Appendix 3 Useful contacts

UK learners

General qualification information

E: learnersupport@cityandguilds.com

International learners

General qualification information

F: +44 (0)20 7294 2413

E: intcg@cityandguilds.com

Centres

Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results

F: +44 (0)20 7294 2413

E: centresupport@cityandguilds.com

Single subject qualifications

Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change

F: +44 (0)20 7294 2413

F: +44 (0)20 7294 2404 (BB forms)

E: singlesubjects@cityandguilds.com

International awards

Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports

F: +44 (0)20 7294 2413

E: intops@cityandguilds.com

Walled Garden

Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems

F: +44 (0)20 7294 2413

E: walledgarden@cityandguilds.com

Employer

Employer solutions, Mapping, Accreditation, Development Skills, Consultancy

T: +44 (0)121 503 8993

E: business@cityandguilds.com

Publications

Logbooks, Centre documents, Forms, Free literature

F: +44 (0)20 7294 2413

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City & Guilds Group

The City & Guilds Group is a leader in global skills development. Our purpose is to help people and organisations to develop their skills for personal and economic growth. Made up of City & Guilds, City & Guilds Kineo, The Oxford Group and ILM, we work with education providers, businesses and governments in over 100 countries.

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