SOUTH AFRICAN QUALIFICATIONS AUTHORITY

REGISTERED QUALIFICATION THAT HAS PASSED THE END DATE:

Occupational Certificate: Cloud Administrator

SAQA QUAL ID	QUALIFICATION TITLE			
118699	Occupational Certificate: Cloud Administrator			
ORIGINATOR				
Development Quality Partner-MICT SETA				
PRIMARY OR DELEGATED QUALITY ASSURANCE FUNCTIONARY			**NQF SUB-FRAMEWORK**	
-			OQSF - Occupational Qualifications Sub-framework	
QUALIFICATION TYPE	**FIELD**		**SUBFIELD**	
Occupational Certificate	Field 10 - Physical, Mathematical, Computer and Life Sciences		Information Technology and Computer Sciences	
ABET BAND	**MINIMUM CREDITS**	**PRE-2009 NQF LEVEL**	**NQF LEVEL**	**QUAL CLASS**
Undefined	149	Not Applicable	NQF Level 04	Regular-ELOAC
REGISTRATION STATUS		**SAQA DECISION NUMBER**	**REGISTRATION START DATE**	**REGISTRATION END DATE**
Passed the End Date - Status was "Registered"		EXCO 0522/24	2022-02-03	2025-12-31
LAST DATE FOR ENROLMENT		**LAST DATE FOR ACHIEVEMENT**		
2026-12-31		2029-12-31		

In all of the tables in this document, both the pre-2009 NQF Level and the NQF Level is shown. In the text (purpose statements, qualification rules, etc), any references to NQF Levels are to the pre-2009 levels unless specifically stated otherwise.

This qualification does not replace any other qualification and is not replaced by any other qualification.

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:
The purpose of this qualification is to prepare a learner to function as a Cloud Administrator. A Cloud Administrator monitors, maintains, and troubleshoots networks of cloud platforms and computing resources thus ensuring the seamless delivery of all cloud services and maintains protocols to secure cloud environments against unauthorised access, threats, and other risks.

A qualified learner will be able to:
- Implement the cloud management service.
- Monitor and maintain specific elements of the cloud, cloud users, the cloud environment and overall cloud performance.
- Maintain security protocols to secure cloud environments against unauthorised access, threats, and other risks.

Rationale:
Cloud computing is the delivery of computing services; including servers, storage, databases, networking, software, analytics, and intelligence over the Internet ("the cloud") to offer faster innovation, flexible resources, and economies of scale. Rather than owning their own computing infrastructure or data centres, companies can rent access to anything from applications to storage from a cloud service provider (vendor). This has enabled several businesses, especially SMMEs, who could not afford IT Infrastructure to access these cloud services and conduct their business "virtually" anywhere.

There is a growing reliance on external sources of infrastructure, application, management and security services

provided by the Cloud. The Cloud Computing industry is set to grow to $832.1 Billion (R12 502.04 Billion) by 2025, at a compound annual growth rate (CAGR) of 17.5%. Clearly, cloud computing has (and will have) a massive economic impact.

Currently, there are no similar qualifications on the National Qualifications Framework. Even though cloud computing is a new reality in South Africa, South African organisations are consuming significant amounts of cloud services, including software as a service (SaaS), platform as a service (PaaS) and infrastructure as a service (IaaS). Chief information officers (CIO) in South Africa have started adopting cloud-first strategies. This describes the need for a qualification dedicated to increasing the pool of experts who can engage with and assist companies in cloud computing.
Cloud computing specialists such as administrators, engineers and architects are responsible to migrate organisations' (be it a company, institution, or community) systems, information and services into the cloud ensuring a seamless migration. These developments will assist society, including rural communities in expanding their data and information management to the safe environment of "the cloud".

The Occupational Qualification: Cloud Administrator speaks to the increasingly technology-driven economy. Cloud Computing is one of the Fourth Industrial Revolution drivers of change in the economy and is also aligned to the development of human capital as described in the future of work by the Presidential Commission on the 4th Industrial Revolution (PC4IR). Furthermore, the qualification stems from the MICT SETA Sector Skills Plan (18/19) which identifies change drivers as: Digitisation and convergence, analytics and big data, Information security, cloud computing and Internet of Things.

This qualification will prepare learners to conduct administration, maintenance and monitoring of servers; configure, deploy, manage, maintain and troubleshoot cloud ecosystems, and networks services for optimal performance. With this qualification the ICT sector will be strengthened and prepared for future developments and growth in cloud computing.

Typical learners include school leavers, qualified learners from TVET colleges and those currently in employment without formal recognition of competencies. No professional registration or licencing is expected for Cloud Administrators to seek employment in the sector. Cloud Administrators can be employed across various industries that use Cloud services for their clients or for their internal operations. The Cloud Administrators can further progress their career as Cloud Specialists, Cloud Engineers and Cloud Architects as well as Managers.

LEARNING ASSUMED TO BE IN PLACE AND RECOGNITION OF PRIOR LEARNING

Recognition of Prior Learning:
- Learners will gain access to the qualification through RPL for Access as provided for in the QCTO RPL Policy. RPL for access is conducted by accredited education institution, skills development provider or workplace accredited to offer that specific qualification/part qualification.
- Learners who have acquired competencies of the modules of a qualification or part qualification will be exempted from modules through RPL.
- Learners will be awarded credits for or towards the qualification or part qualification through RPL as provided in the QCTO RPL Policy. RPL for credits provides for the formal award of credits for, or towards a qualification or part-qualification registered on the NQF.
- RPL for access to the external integrated summative assessment:

Accredited providers and approved workplaces must apply the internal assessment criteria specified in the related curriculum document to establish and confirm prior learning. Accredited providers and workplaces must confirm prior learning by issuing a statement of result or certifying a work experience record.

Entry Requirements:
The minimum entry requirement for this qualification is:
- NQF level 3 qualification.

RECOGNISE PREVIOUS LEARNING?

Y

QUALIFICATION RULES

This qualification consists of the following compulsory Knowledge, Practical Skill and Work Experience Modules:

Knowledge Modules:
- 252301-001-00-KM-01, Introduction to Cloud Computing, Level 4, 8 Credits.
- 252301-001-00-KM-02, Cloud Computing Elements, Level 4, 8 Credits.
- 252301-001-00-KM-03, Containers, Cloud Native and Kubernetes, Level 4, 4 Credits.
- 252301-001-00-KM-04, Cloud Security, Risks, Vulnerabilities and Mitigation, Level 4, 3 Credits.
- 252301-001-00-KM-05, Data and Databases in the Cloud, Level 4, 6 Credits.
- 252301-001-00-KM-06, Fundamentals of Cloud Computing Platforms, Level 4, 3 Credits.
- 252301-001-00-KM-07, Introduction to Cloud Computing Governance, Legislation and Ethics, Level 4, 1 Credit.
- 252301-001-00-KM-08, 4th Industrial Revolution (4IR) and Future Skills, Level 4, 4 Credits.
- 252301-001-00-KM-09, Design Thinking Principles for Innovation, Level 4, 1 Credit.

Total number of credits for Knowledge Modules: 38

Practical Skill Modules:
- 252301-001-00-PM-01, Conduct Effective Sever Maintenance and Optimisation , Level 4, 8 Credits.

- 252301-001-00-PM-02, Monitor On-Demand Availability of Data Storage, Storage Capacity and Storage Services over the Internet, Level 4, 8 Credits.
- 252301-001-00-PM-03, Provide Cloud Network Administration and Support for Optimal Performance, Level 4, 16 Credits.
- 252301-001-00-PM-04, Ensure Integrity of the Cloud Ecosystem by Implementing Security Measures, Level 4, 8 Credits.
- 252301-001-00-PM-05, Access and Visualise Structured Data Using Spreadsheets, Level 4, 8 Credits.
- 252301-001-00-PM-06, Participate in a Design Thinking for Innovation Workshop, Level 4, 3 Credits.
- 252301-001-00-PM-07, Function Ethically and Effectively in the Workplace, Level 4, 4 Credits.

Total number of credits for Practical Skill Modules: 55

Work Experience Modules:
- 252301-001-00-WM-01, On-Demand Availability of Server Resources and Services over the Internet, Level 4, 20 Credits.
- 252301-001-00-WM-02, On-Demand Availability of Data Storage, Storage Capacity and Storage Services over the Internet, Level 4, 16 Credits.
- 252301-001-00-WM-03, Ensure Availability and Reliability of Network Connection According to Workflow and Security Protocols, Level 4, 20 Credits.

Total number of credits for Work Experience Modules: 56

EXIT LEVEL OUTCOMES

1. Implement cloud solutions and services related to cloud computing, networks, security, and storage in a cloud environment.
2. Monitor and maintain servers and networks for optimal cloud performance and seamless delivery of all cloud services.
3. Monitor on-demand availability of data, data storage and storage capacity in line with the life cycle of data storage and hardware architecture.
4. Apply security configurations and compliance controls to meet cloud infrastructure requirements.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:
- Demonstrate an overall understanding of the cloud, (cloud infrastructure and cloud related services).
- Set up public or private cloud systems and appropriate network configurations.
- Implement connecting, routing and networking to integrate systems for hosting the solution on the cloud.
- Document systems infrastructure for new and existing environments.
- Execute appropriate testing techniques when deploying cloud services.

Associated Assessment Criteria for Exit Level Outcome 2:
- Monitor and maintain specific elements of the cloud, cloud users, the cloud environment and overall cloud performance.
- Monitor the capabilities and performance of the systems of the cloud ecosystem.
- Test, diagnose and remedy networks of cloud platforms and other computing resources.
- Perform maintenance duties, such as responding to trouble tickets and alerts, developing patches or fixes for any issues that arise and solve operational problems.
- Balance and deploy workload in an automated way.

Associated Assessment Criteria for Exit Level Outcome 3:
- Monitor and maintain on-demand availability of data.
- Monitor and maintain data storage solutions and storage capacity and configure long-term archival storage.
- Perform regular back-up of data and ensure readiness for restoration when needed.
- Apply encryption to protect data in rest, use and transit states.

Associated Assessment Criteria for Exit Level Outcome 4:
- Secure cloud environments, including applications, data, and information against unauthorized use/access, distributed denial of service (DDOS) attacks, hackers, malware, and other risks.
- Apply the appropriate access control lists (ACL) to the target objects to meet access requirements.
- Apply security testing techniques.
- Apply appropriate disaster recovery methods and appropriate steps to ensure business continuity in the case of breach in security.
- Maintain systems standards as they relate to hardening and security within the cloud infrastructure.

Integrated Assessment
Integrated Formative Assessment:
The skills development provider will use the curriculum to guide them on the stipulated internal assessment criteria and weighting. They will also apply the scope of practical skills and applied knowledge as stipulated by the internal assessment criteria. This formative assessment together with work experience leads to entrance in the integrated external summative assessment.

Integrated Summative Assessment:
An external integrated summative assessment, conducted through the relevant QCTO Assessment Quality Partner is required for the issuing of this qualification. The external integrated summative assessment will focus on the exit level outcomes and associated assessment criteria.

The assessment will be conducted through written assessment and the evaluation of practical tasks at decentralised approved assessment sites by a panel of assessors evaluated by assessor(s) registered with the AQP within a period of 1 day.

INTERNATIONAL COMPARABILITY

International comparability was conducted against comparable qualifications from Australia and India.

Australia:
The nationally recognised Certificate IV in Information Technology (Systems Administration and Support) (ICT40120) is presented by the Upskilled Training Institution which specialises in Information Technology training. The duration is 18 months and presented as an online course. Entry requirements are stipulated as completion of year 12, or equivalent, or 3 years of relevant experience in the IT industry.

The following are the elements of the qualification:
- Apply advanced critical thinking to work processes.
- Contribute to cyber security risk management.
- Work collaboratively in the ICT industry.
- Comply with IP, ethics and privacy policies in ICT environments.
- Connect and configure devices and hardware components.
- Evaluate ICT system status.
- Implement maintenance procedures.
- Fault find and troubleshoot ICT equipment, hardware, and software problems.
- Identify and confirm cyber security incidents.
- Gather, analyse and interpret threat data.
- Create technical documentation.
- Support ICT system software.
- Determine and confirm client business requirements.
- Apply introductory programming techniques.
- Identify and evaluate emerging technologies and practices.
- Provide first-level remote help desk support.
- Support operating system users and troubleshoot applications.
- Provide one-to-one instruction.
- Update ICT client support procedures and assist with policy development.
- Identify and resolve client ICT problems.

Similarities:
Both qualifications, Certificate IV in Information Technology (Systems Administration and Support) and the OC: Cloud Administrator, are at the same level, namely Level 4. Both qualifications are nationally recognised. Both qualifications entail a practical skills component. Similar units/modules include:
- Apply advanced critical thinking to work processes.
- Contribute to cyber security risk management.
- Work collaboratively in the ICT industry.
- Comply with IP, ethics and privacy policies in ICT environments.
- Connect and configure devices and hardware components.
- Evaluate ICT system status.
- Implement maintenance procedures.
- Fault find and troubleshoot ICT equipment, hardware and software problems
- Identify and confirm cyber security incidents.
- Gather, analyse and interpret threat data.
- Create technical documentation.
- Support ICT system software.
- Determine and confirm client business requirements.

Differences:
Differences appear in the duration and entry requirements of the qualifications. Upskilled offers a simulated working environment, while the Occupational Certificate: Cloud Administrator requires real-time work experience. The South African qualification has a specific focus on cloud computing, which is not the case with the Certificate IV in Information Technology (Systems Administration and Support). Further differences in content relates to units:
- Apply introductory programming techniques.
- Identify and evaluate emerging technologies and practices.
- Provide first-level remote help desk support.
- Support operating system users and troubleshoot applications.
- Provide one-to-one instruction.
- Update ICT client support procedures and assist with policy development.
- Identify and resolve client ICT problems.

India:
The Advanced Diploma (Vocational) qualification in IT, Networking & Cloud Computing is offered by National Skill Training Institute (NSTI) Mumbai. On successful completion of the qualification, the trainee will be awarded Technical Diploma by National Council of Vocational Training (NCVT) which has worldwide recognition. The duration of the qualification is two years. It includes three electives each of 320 hours and workplace internship of 800 hours. In addition, the trainees will be awarded employability skills of 160 hours. Entry requirements are specified as Grade 12. The qualification is at National Skills Qualifications Framework (NSQF) level 6. Modules included in the syllabus are:

- Core Module 1 (Computer Hardware Maintenance)
- Core Module 2 (Computer Networking)
- Core Module 3 (Web Designing)
- Core Module 4 (Web Development)
- Core Module 5 (Business Data Analytics)
- Elective Module 1 (Cloud Application Developer)
- Elective Module 2 (Cloud Enterprise Developer)
- Elective Module 3 (Web Development using Java)

Similarities:
The Advanced Diploma (Vocational) Course in IT, Networking & Cloud Computing includes an on-the-job component which is comparable to the South African work experience component. Similarities in the content of the qualification refer to several modules. These are:

- Understand the Cloud architecture patterns.
- Working with the WebSphere /Deployment environment.
- Overview of cloud platform dashboards. (IBM Blue mix).
- Operations like creation, launch, security, and cleaning of instances will be performed.
- Bluemix and the Cloud Foundry command line interface (CLI).
- Develop Bluemix applications with Eclipse.
- Develop Bluemix applications with IBM Bluemix DevOps services.
- Bluemix with Cloud ant.
- Build a mobile data Bluemix application.
- Extend the Bluemix mobile data application to access it from a mobile web application.
- Skills on Developing Cloud Applications with IBM SDK for Node.js
- Set up your Node.js development environment in
- Install and configure Server-Client Network. Install and Configure Windows Server Configure a server as the web server.
- Configure Mailbox Server
- Backup and Restore ADS and DHCP.
- Backup and Restore User Data.
- Permit FAT and NTFS Sharing.
- Understand basic computer technology.
- IBM Bluemix 1.10 Asynchronous I/O with call-back 1.11 Node packages.
- Basic computer network technology.
- Data Communications System and its components.
- Types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP.
- Explain the function(s) of each layer.
- Identify the different types of network devices and their functions within a network.
- Understand and build the skills of sub netting and routing mechanisms.
- Understand the basic protocols of computer networks, and how they can be used to assist in network design and implementation.
- Understand Client server concepts.

Differences
The Occupational Certificate: Cloud Administrator is a one-year qualification while the Advanced Diploma (Vocational) Course in IT, Networking & Cloud Computing is a two-year qualification. The Occupational Certificate: Cloud Administrator is technology agnostic whereas the Advanced Diploma (Vocational) Course in IT, Networking & Cloud Computing uses IBM technology in the training program. Entry requirements for the Advanced Diploma (Vocational) Course in IT, Networking & Cloud Computing are stated as Gr 12. The South African qualification states NQF Level 3 qualification as entry requirements. The Occupational Certificate: Cloud Administrator includes a component of soft skills, which is not the case with the Indian qualification.

The Occupational Certificate: Cloud Administrator does not include content referring to:

- Core Module 3 Web Designing.
- Core Module 4 Web Development.
- Core Module 5 Business Data Analytics.

Conclusion:
The Occupational Certificate: Cloud Administrator compares favourably with the above international qualifications.

ARTICULATION OPTIONS

This qualification allows possibilities for both horizontal and vertical articulation.

Horizontal Articulation:

- Further Education and Training Certificate: Information Technology: Technical Support, NQF Level 4.

Vertical Articulation:

- National Certificate: Information and Communications Technology (ICT) Software Testing, NQF Level 5.

NOTES

Qualifying for External Assessment:
To qualify for an external assessment, learners must provide proof of completion of all required modules by means of

statements of results and work experience records.

Additional legal or physical entry requirements
None

Criteria for the accreditation of providers
Accreditation of providers will be done against the criteria as reflected in the relevant curriculum on the QCTO website.

The curriculum title and code are: Cloud Administrator: 252301-001-00-00.

Encompassed Trades
This qualification encompasses the following trades as recorded on the NLRD.
- None

Assessment Quality Partner (AQP)
- Services Sector Education and Training Authority.

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION:

NONE

PROVIDERS CURRENTLY ACCREDITED TO OFFER THIS QUALIFICATION:

This information shows the current accreditations (i.e. those not past their accreditation end dates), and is the most complete record available to SAQA as of today. Some Primary or Delegated Quality Assurance Functionaries have a lag in their recording systems for provider accreditation, in turn leading to a lag in notifying SAQA of all the providers that they have accredited to offer qualifications and unit standards, as well as any extensions to accreditation end dates. The relevant Primary or Delegated Quality Assurance Functionary should be notified if a record appears to be missing from here.

NONE
