BIICF

Brunei ICT Industry Competency Framework

An initiative by

Supported by

BIICF

Brunei ICT Industry Competency Framework

Disclaimer

This document is prepared by the Brunei ICT Industry Competency Framework Working Group (BIICF WG) and endorsed by the Manpower Industry Steering Committee Working Group for ICT Sector (MISC-WG ICT) and Manpower Industry Steering Committee (MISC) whereby the Authority for Info-communications Technology Industry of Brunei Darussalam (AITI) is the Secretariat.

All information in this document must not be copied or used for any other purpose other than which it is supplied, without the expressed written authority of AITI. AITI disclaims any responsibility or liability for any use or misuse of the document by any person and makes no warranty as to the accuracy or suitability of the information to any third party. Any misuse of the document may be redressed by AITI.

Table of Contents

Foreword from The Chairperson of Manpower Industry Steering Committee (MISC)

Yang Mulia Pengiran Datin Seri Paduka Hajah Zety Sufina binti Pengiran Dato Paduka Haji Sani
Deputy Minister of Finance and Economy (Fiscal)
Ministry of Finance and Economy

Former Permanent Secretary (Industry)
Ministry of Finance and Economy
As Former Chairperson of Manpower Industry Steering Committee (MISC)
(May 2020 - June 2022)

Alhamdulillah, with the blessing of Allah Subhanahu Wata'ala, the Manpower Industry Steering Committee Working Group (MISC-WG) for the ICT sector, which was established under the Manpower Planning and Employment Council (MPEC), has formulated the Brunei ICT Industry Competency Framework (BIICF).

The introduction of this Framework will aid in the development of competencies of the local talent and ensure the workforce supply is in line with the ICT industry needs, thus fulfilling MPEC's objective to align manpower supply to the demand of industries.

The MISC-WG ICT has played a pivotal role in implementing various digital capacity development initiatives in order to prepare our nation with the relevant digital and future-ready skills that will enable our workforce to thrive in the digital transformation, as we realise our ambition for a Smart Nation.

I would like to sincerely thank and congratulate the MISC-WG ICT committee members and the BIICF Working Group, that consisted of ICT industry players, higher learning institutions and training providers, as well as government agencies, who dedicated their precious time and contributed their invaluable knowledge and expertise to develop this Framework. which was crafted following extensive consultations among industry experts to gather inputs in a coherent manner. Crafting this Framework for the ICT industry was surely not an easy task, considering the various challenges, especially the rapid digital transformation in the ever-changing global economy. May Allah Subhanahu Wata'ala bless and reward all those involved for all your hard work and efforts.

Message from The Co-Leads of MISC-WG ICT

Ir. Haji Jailani bin Haji Buntar
Chief Executive
Authority for Info-communications Technology Industry of Brunei Darussalam (AITI)
As Co-Lead of MISC-WG ICT

Sheikh Haji Abas bin Sheikh Mohamad
Infocom Federation Brunei (IFB)
Honourary Advisor

Former Chairman of IFB
As Former Co-Lead of MISC-WG ICT
(June 2020 – March 2022)

Alhamdulillah, as the Co-Leads of the Manpower Industry Steering Committee Working Group for ICT Sector (MISC-WG ICT), we are pleased to share the first publication of the Brunei ICT Industry Competency Framework (BIICF).

The MISC-WG ICT recognises the untapped potential of the domestic ICT talent pool and seeks to enhance and deepen its capabilities to support Brunei Darussalam's digital transformation and Smart Nation agenda. Efforts were put in place to establish a national ICT skills framework, which aims to ensure Brunei's ICT professionals will have the relevant skills to perform their jobs and develop their careers by providing a national standard for ICT job roles, competencies as well as the types of trainings and certifications required.

As the ICT industry is dynamic in nature, new roles and skillsets are being created at a rapid pace whilst existing roles evolve. The ever-changing technology trends demand skill sets to be constantly updated and may even lead some skills and roles towards obsolescence. Employees need the relevant skills and competencies to exploit the development potential of existing and emerging digital technologies, to manage digital transformation, and to keep up to date with accelerated technological advancements. Businesses often face challenges to source for talents with the right digital capabilities – particularly ICT specialist skills to drive innovation as well as to support digital infrastructures and the functioning of the digital eco-system. This skills gap has become even more apparent during the COVID-19 pandemic as many businesses had to quickly embrace digital transformation at the core of their business operations and adopt innovative digital solutions for survival and longevity. The mismatch between the youth's skills and business needs become even wider as Industry Revolution 4.0 transforms businesses and jobs faster than workers can adapt.

As part of our efforts to address the skills mismatch, the BIICF has identified 79 technical and soft skills competencies for 20 ICT job roles which are of high demand across six ICT sub-sectors, including Data and Artificial Intelligence, and ICT Security. The framework was prepared through an extensive and concerted effort by the BIICF Working Group together with the Competency Development Technical Group (CDTG) of the MISC-WG ICT, which comprises representatives from the government, industry, institutes of higher learning, and training providers.

With the assistance of our appointed consultant, Rhymin and Partners Sdn Bhd, the draft BIICF was reviewed, validated and enhanced to ensure they remain industry-relevant by conducting international best practices benchmarking exercise and a series of consultations with more than 50 local industry leaders across different sectors, including Government-Linked Companies (GLCs), Micro, Small and Medium Enterprises (MSMEs), and Start-ups.

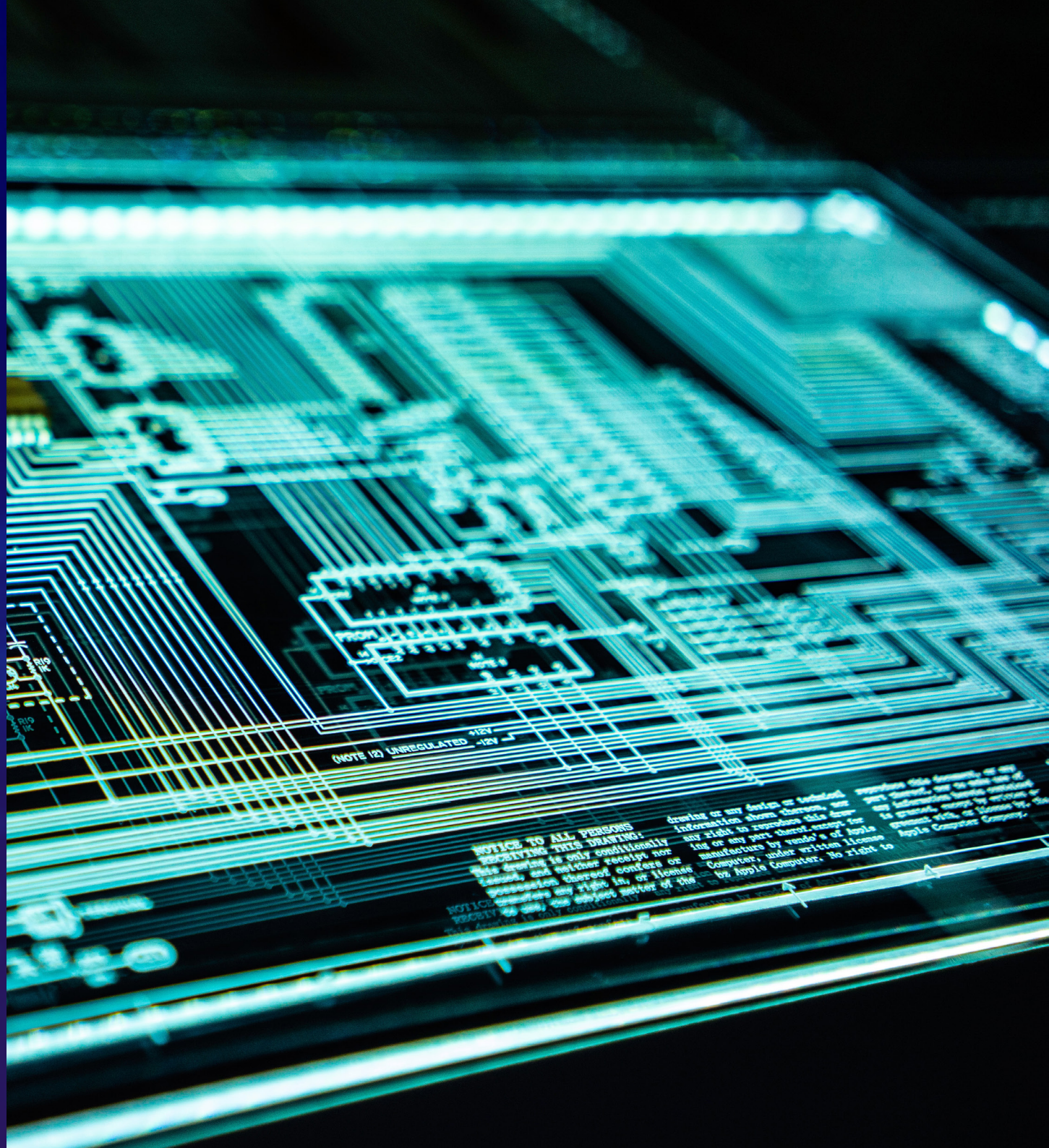
The BIICF is a living document and will be continuously reviewed to ensure it remains relevant in meeting the industry needs and rapidly evolving ICT landscape. It will be enhanced with future career paths, ICT learning roadmaps and added job roles as we progress with identifying other new jobs in demand by the industry.

We would like to take this opportunity to sincerely thank the members of MISC, MISC-WG ICT and BIICF Working Group for their support, guidance and commitment in developing the BIICF. We would also like to extend our appreciation to the industry experts who have participated in the various stages of the BIICF consultation over the past year.

Lastly, we would like to encourage our ICT professionals, students, employers, learning institutions and training providers to take full advantage of the BIICF and adopt it as a reference point for their ICT career path, talent development, curriculum design and training plan. We further hope that the BIICF will enable our local ICT workforce to be better equipped with future-ready skills for the future economy.

Introduction

The world economy is transforming due to the rapid evolution and growing use of Information and Communications Technologies (ICT). ICT and digitalisation continue to transform all aspects of businesses, partly driven by the Fourth Industrial Revolution (4IR). Furthermore, the present global pandemic has further accelerated the adoption of digital technology by all industry sectors. The notion of the digital economy has become commonplace to describe how digital technology is changing patterns of production and consumption.



The Digital Economy Council launched the Digital Economy Masterplan 2025 in June 2020 to spearhead the implementation of key projects under the nine priority clusters which are expected to have a significant impact on economic growth through the implementation of digital transformation in Brunei Darussalam.

The Digital Economy Masterplan 2025 outlines strategies for the country to become a Smart Nation that has a digital and future-ready society, vibrant and sustainable economy as well as a conducive digital ecosystem. The Masterplan highlights the importance of reskilling the labour force, seeking open trade policies, and promoting a conducive business environment, among others.

Cognizant of the various skills and the evolution of the industry, there is a need to be cautious on the skills that are on demand as well as skills that will become obsolete soon. Against this backdrop, the Manpower Industry Steering Committee (MISC) was established under the Manpower Planning and Employment Council (MPEC) as a platform for collaborative partnerships between the respective industries and regulators, as well as education and training institutions in aligning the manpower demand with the necessary supply in the country.

In this regard, the MISC Working Group for ICT sector (MISC-WG ICT) has been tasked to look into how we can better align the supply and demand of ICT manpower in the country. The Brunei ICT Industry Competency Framework (BIICF) is one of the key deliverables of MISC-WG ICT which articulates the competencies needed to perform various ICT job roles and serves as a comprehensive guide for ICT occupations, trainings and professional certifications. It covers various job levels across the ICT industry, including both technical and managerial roles. The target group for BIICF users will consist of ICT professionals, academia, ICT graduates and students, employers and training providers.

BIICF aims to help overcome the present issues on skills gap and mismatch, and further equip our ICT graduates to be industry ready, as well as, to provide the competencies standards to the higher education institutions and training providers, which will be a reference in the design of their curriculum and training programmes. The framework contains a list of recommended technical training courses so that ICT professionals and their employers can conveniently refer to for competency development.

The 20 job roles identified within the BIICF was developed based on the ICT Manpower Survey 2020 for the ICT and non-ICT companies as well as the engagement sessions held with the Industry.

ICT and Digital Transformation

Digital transformation is the process of using digital technologies to create new or modify existing business processes, culture and customer experiences to meet changing business in the digital age.

The proliferation of ICT as a key digital transformation enabler has driven various changes in the roles within the ICT industry and the end-user environment including productivity and innovation. ICT professionals today need a blend of technical and soft skills to effectively deliver solutions that meet the needs of their clients. We are reshaping our views on careers by emphasising on growth through varied experience, exposure and education.

Digital transformation is changing the way we interact with the community and how businesses operate.


KELUAR
KELUAR

Digital Skills Landscape

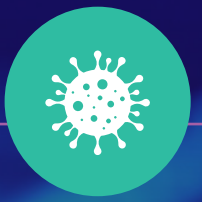
Digital transformation driven by the fast pace of changes in the ICT landscape impacts the work environment. The key changes are as shown.

Nature of work changed by the rapid and widespread digitalisation

The need for soft skills to facilitate employee adaptation to changing work environment

Addressing digital skills gaps comes at a cost

Increasing demand for digital skills by employers but the supply is low



Digital skills and its impact is the forefront of discussion during and post COVID-19 pandemic

Drivers of Digital Skills Gap

The following are the key drivers of the digital skills gap. Timely intervention in developing the right skills helps organisations to reduce the negative impact of the skills gap.

Digitalisation and the application of emerging technologies accelerate the demand for digital skills

Digital and social inequalities affect opportunities to develop digital skills

Traditional modes of education and training may not be keeping up with industry needs for digital skills

COVID-19 pandemic has amplified the urgency to create conditions which effectively leverage digital solutions for virtual or hybrid work

Background

The Brunei ICT Industry Competency Framework (BIICF) has been developed in partnership with the ICT industry and the academia. It is intended to be a common reference tool for employers and employees to navigate and ensure the match between jobs and skills.

BIICF is developed by the BIICF Working Group and Competency Development Technical Group (CDTG) of the MISC-WG ICT. Members consist of representatives from the ICT industry, government agencies, private training providers and the higher education institutions.

The main objective of BIICF is to ensure that Brunei's ICT professionals have the relevant skills to develop their careers by providing a national standard for ICT job roles, competencies and the types of training required.

BIICF becomes the ICT career guidebook for those in the ICT industry. It gives an overview of the roles and the technical and soft skills competencies needed for the role and provides information on the specific skills training that complements the roles that one can pursue to acquire the knowledge and elevate their position.

The development of BIICF has undergone review and validation process to ensure they remain industry-relevant by taking into reference the Skills Framework for Information Age (SFIA Version 8), Singapore Skills Framework for Infocomm Technology, Malaysian Skills Competency Matrix and Japan i-Competency Dictionary.

This benchmarking exercise drove a focused approach to ensure that the ICT industry best practices are captured for Brunei's competitive advantage.

The BIICF was further verified through a series of consultations with leaders, human resource and ICT professionals across the ICT and non-ICT sectors.

The framework will continuously be reviewed to ensure it remains current and relevant to meet the industry's needs. It will be enhanced with more career paths, ICT learning roadmaps and added job roles as we progress with identifying other new jobs in demand by the industry.

Values of BIICF

Employers

- Standardised job description
- Support talent attraction
- Workforce planning guide
- Incorporate into Performance Management system
- Better employee development coordination

Academia

- Industry expectation on graduates skills and competencies sought after
- A reference for review of academic curriculum to be industry centric curriculum and body of knowledge
- Insight on industry knowledge for lecturers and educators
- Better preparation of students for the future of work

ICT Professionals

- Better awareness and understanding on the roles and expectations
- Insight on market expectations
- Awareness on the potential career path and progression to pursue
- Focus on job expectations to deliver better output and valued performance

Students

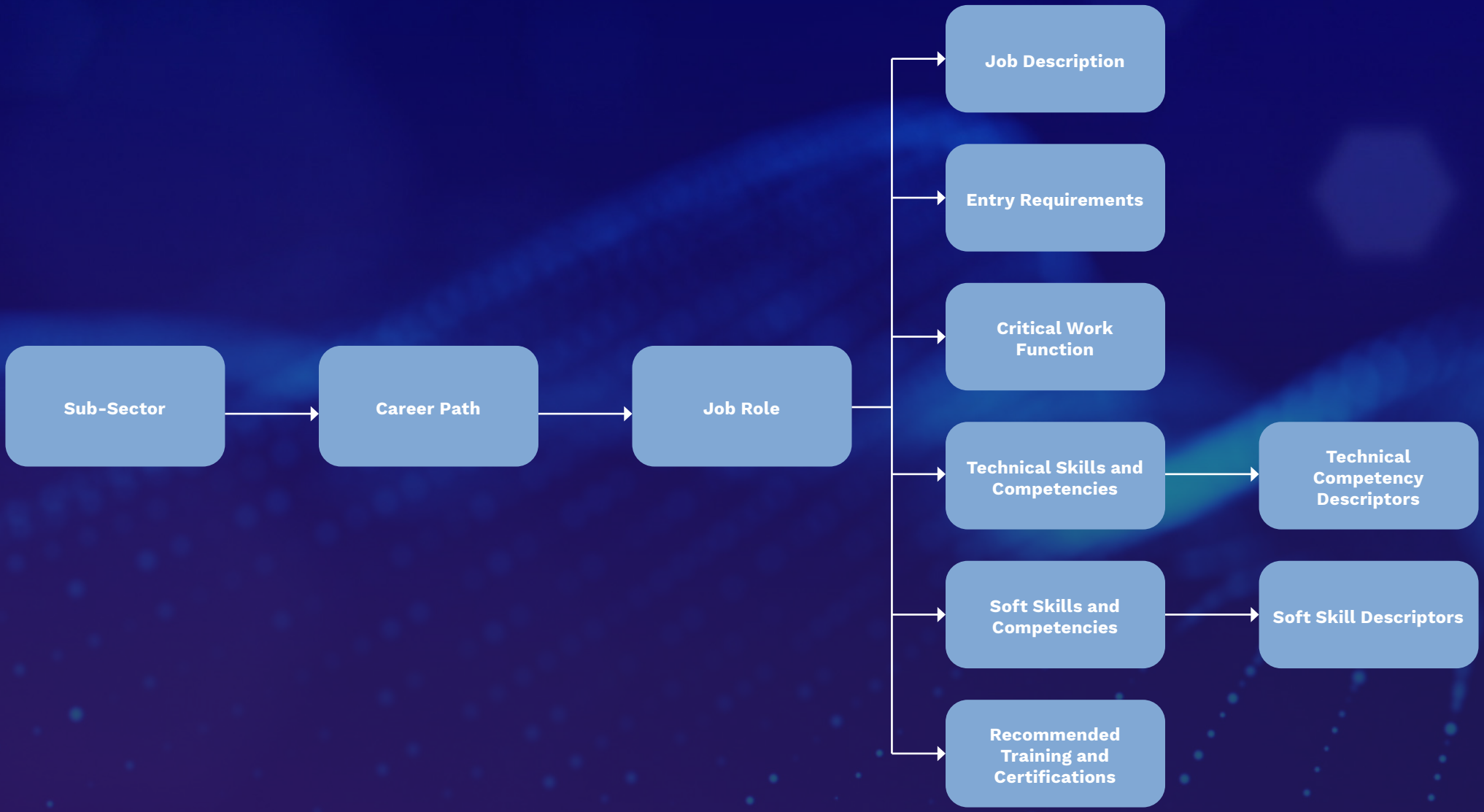
- Direct insight on job prospects and roles to pursue
- Clarity on industry skills and knowledge expectations
- As guidance on course planning
- Insight on professional certifications that the student can embark upon
- Better career planning

Training Providers

- Insight on ICT roles and the required job competencies
- Clarity on industry skills and suitable training requirements
- Offer industry relevant professional certifications

The Framework

The following section comprises the detailed components of the BIICF competency structure. It covers the common industry nomenclature and provides insight on the core technical and soft skill competencies required by the specific job role.



Structure and Components of the BIICF

No	Component of the BIICF	Description
1	Job Title	Name of the job role
2	Alternate Job Title	Alternative or other names for similar job role
3	Sub-Sector	Name of the common sub-sector of the job role
4	Functional Group	Name of the main job areas or functions
5	Job Family	Name of the specific job roles within the function
6	Job Level	Common job level in the company or organisation ie. Entrant, Specialist, Expert/Management, Senior Management
7	Job Description	Common list of key duties and responsibilities for the job role
8	Critical Work Function	Common job activities or task performed by the job holders
9	Entry Requirements	Minimum educational qualification based on the Brunei Darussalam Qualifications Framework (BDQF)[1] required to hold this position
10	Technical Skills and Competencies	List of required technical skills and competencies and expected proficiency levels
11	Soft Skills and Competencies	List of required soft skills and competencies and expected proficiency levels
12	Trainings / Professional Certifications	List of recommended training and professional certifications for the job role
13	Technical Competency Descriptors	Description of each technical competency and proficiency level
14	Soft Skill Descriptors	Description of each soft skill and proficiency level

[1] Refer to Annex 1: Brunei Darussalam Qualifications Framework (BDQF)

Technical Skills Proficiency Description

Proficiency Level 1	Proficiency Level 2	Proficiency Level 3	Proficiency Level 4	Proficiency Level 5
Follow	**Assist**	**Apply**	**Ensure**	**Strategise**
Demonstrates introductory understanding and ability and, with guidance, applies the competency in a few simple situations.	Demonstrates basic knowledge and ability and, with guidance, can apply the competency in common situations that present limited difficulties.	Demonstrates solid knowledge and ability and can apply the competency with minimal or no guidance in the full range of typical situations. Would require guidance to handle novel or more complex situations.	Demonstrates advanced knowledge and ability and can apply the competency in new or complex situations. Guides other professionals.	Demonstrates expert knowledge and ability and can apply the competency in the most complex situations. Develops new approaches, methods, or policies in the area. Is recognised as an expert, internally and/or externally. Leads the guidance of other professionals.

Soft Skills Proficiency Description

Proficiency Level 1	Proficiency Level 2	Proficiency Level 3	Proficiency Level 4
Basic	**Intermediate**	**Advanced**	**Expert**
Foundational understanding of the competency, usage in the business context to achieve the right results.	Moderate understanding on the competency and have the necessary business acumen to use it in a broader context.	Strong understanding on the competency, knows the context on where and how to use it to achieve the expected results.	Have the necessary expertise on the competency, able to use in a strategic context and assist others to use it efficiently.

Sub-Sector Coverage

The BIICF Working Group has identified six sub-sectors to focus on in Brunei Darussalam's ICT industry context.

Based on the ICT Manpower Survey 2020 for the ICT and non-ICT companies, as well as the engagement sessions held with the industry, there were 20 critical job roles identified as follows.

IT SERVICES

- IT Technician
- IT Administrator/Manager
- Systems Engineer
- Project Coordinator
- Project Manager

TELECOMMUNICATIONS AND NETWORK

- Network Technician
- Network Team Lead
- Network Engineer

APPLICATIONS AND SOLUTIONS DEVELOPMENT

- Applications Developer
- Solutions Architect

ICT SECURITY

- Associate Security Analyst
- Cyber Risk Analyst
- Security Engineer

DIGITAL MEDIA

- Market Analyst
- Digital Marketing Executive

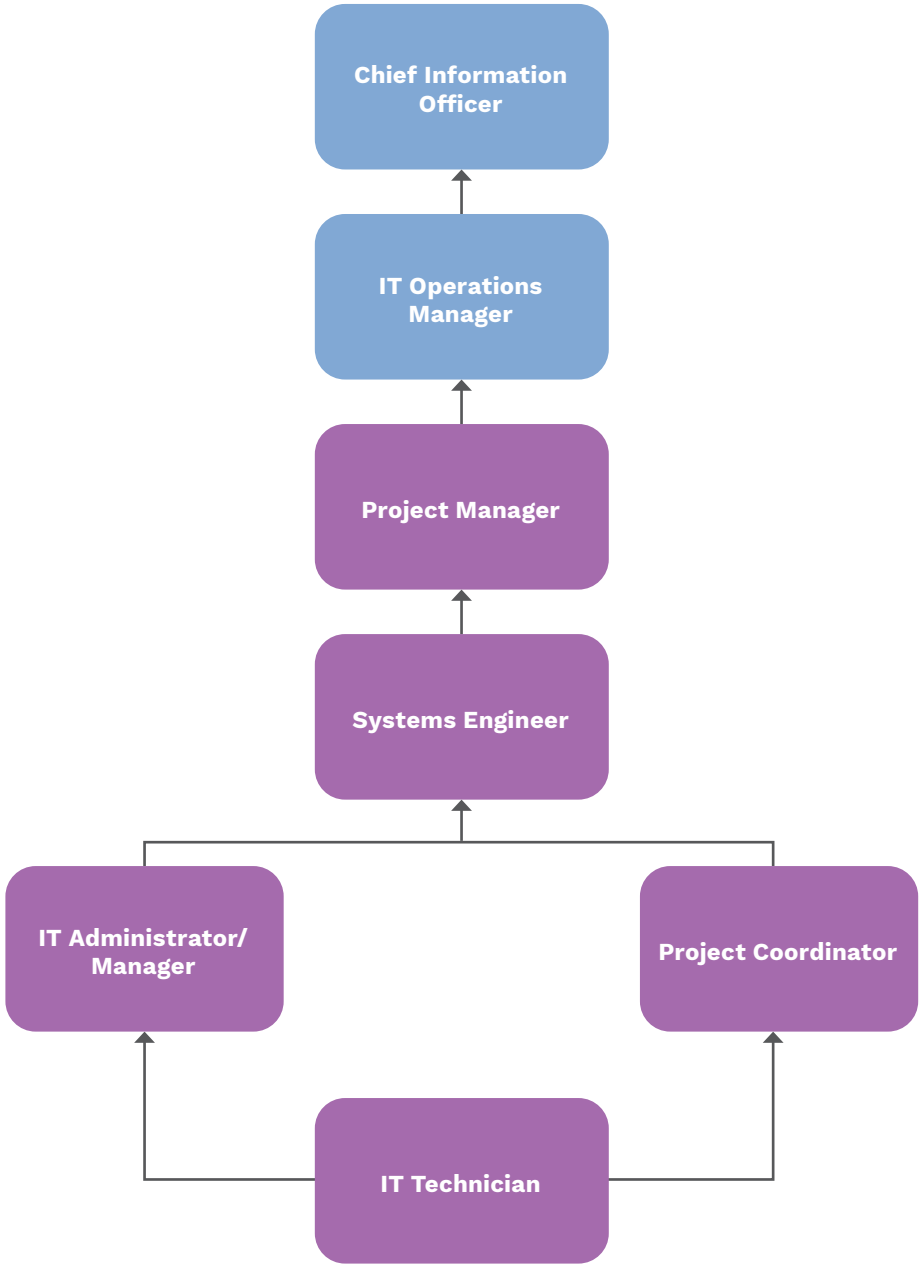
DATA AND ARTIFICIAL INTELLIGENCE

- Data Entry
- Data Analyst
- Data Engineer
- Data Manager
- Data Scientist

IT Services Sub-Sector

IT Services Career Path

Framework developed



IT Technician

Alternate Job Titles	Technology Associate, IT Generalist, Network Administrator, Network Support Technician, IT Administrator, Help Desk Specialist, IT Professional, IT Technical Support Professional, IT Support Engineer		
Sub-Sector	IT Services		
Functional Group	Infrastructure	Hardware Support	Software and Systems
Job Family	Server and network support	Desktop and peripherals installations and maintenance	Applications configurations and installations, and IT security
Job Level	Entrant		

Job Description

- Provide support functions to a variety of functions that range from setting up technology equipment for employees to maintaining internal networks, supporting remote work functions, and providing help desk support.
- Work with a variety of individuals, including IT colleagues, staff at all levels within an organisation, external clients, and vendors.
- Maintain functioning information technology equipment and networks.
- Provide support to technology users, ensures security of information and IT infrastructure, and upholds company policies regarding use, security, redundancy, and confidentiality of data.

Critical Work Functions

Generic Functions

- Install, maintain, and upgrade desktop hardware (including peripherals) and software.
- Set up and remove employee's or client's workstations or devices, including setting up access controls.
- Install, provide user support for, or troubleshoot hardware and commercial software.
- Install, support, and maintain the network infrastructure as well as monitoring network performance.
- Perform minor software modifications to improve performance or customise to user needs.
- Assist in maintaining or updating web content and manages user access profiles and authorities.
- Monitor and help to maintain network security by adhering to security policies.
- Record and interpret detailed diagnostic information.
- Record keeping of incidents and services request.
- Investigate a request for support, record diagnostic information and either resolve or escalate to the appropriate level.
- Prioritise resolution and determine whether external support is required.

Specific Functions

Desktop and Application Support

- Install and test new ICT equipment and peripheral.
- Perform basic PC hardware repairs and upgrades.
- Diagnose and resolve basic PC, printer, peripheral and software faults.
- Install complete applications and set software options.
- Carry out any required maintenance of applications.
- Identify and install essential software patches.

Server and Network Support

- Install and maintain standard network cabling.
- Perform basic diagnostic and recovery routines on network equipment.
- Install and set basic configuration options for equipment such as switches and routers.
- Troubleshoot installation of software and hardware.
- Maintain hardware and software on the server.

Applications Configurations and Installations, and IT Security

- **Configuration and Installation**
  - Follow an acceptance test procedure on new ICT equipment and report results appropriately.
  - Update records of installed hardware and software.
  - Maintain a software library and store original copies of installed applications.
  - Collate and interpret results of testing and advise if goods are fit for use.
  - Retrieve and record information in a configuration management database or log.
  - Assist in creating and implementing a structured approach to rolling out new hardware or software, including procurement, testing, and assessing the needs for user training.

- **Continuity, Maintenance and Security**
  - Note risks to ICT systems and suggest precautions maintenance.
  - Implement and suggest improvements to backup, virus protection and security policies.
  - Assess and differentiate risks to key systems and develop appropriate individual system recovery procedures.
  - Develop a maintenance schedule.
  - Identify failing systems and suggest solutions.
  - Responsible for implementing backup and virus protection policies.

Skills & Competencies

Technical	Proficiency Level		
	Level 1	Level 2	Level 3
Application Development	1	2	2
IT Architecture	1	2	2
Business Analysis	1	2	2
Data Analytics	1	2	2
Database Management	1	2	2
Infrastructure Management	1	2	2
IT Project Management	1	2	2
Telecommunications Network Management	1	2	2
Information Security Management	2	3	3
Software Testing	2	3	3
Service Management	1	2	2

Soft Skills	Proficiency Level		
	Level 1	Level 2	Level 3
Analytical Thinking	Basic	Basic	Intermediate
Decision-Making	Basic	Basic	Intermediate
Communication	Basic	Basic	Intermediate
Work Management	Basic	Basic	Intermediate
Teamwork	Basic	Basic	Intermediate
People Management	Basic	Basic	Intermediate
Creativity and Innovation	Basic	Basic	Intermediate
Results Orientation	Basic	Basic	Intermediate
Service Orientation	Basic	Basic	Intermediate
Negotiation	Basic	Basic	Intermediate
Resilience	Basic	Basic	Intermediate

Entry Requirements

IT Technician Level 1

BDQF Level 2 in IT or related field with relevant industry experience.

IT Technician Level 2

BDQF Level 3 in IT or related field.

IT Technician Level 3

BDQF Level 4 in IT or related field **or**
BDQF Level 3 in IT or related field with relevant industry certification.

Recommended Technical Training Courses

- Cisco Certified Technician (CCT)
- Cisco Certified Network Associate (CCNA)
- CompTIA A+
- CompTIA Network+
- CompTIA Security+
- Microsoft 365 Fundamentals
- PMI Certified Associate in Project Management (CAPM)
- Systems Security Certified Practitioner
- IT Specialist Certification

IT Administrator/ Manager

Alternate Job Titles	Systems Administrator, System Admin, Server Administrator, IT Systems Administrator, MIS Manager
Sub-Sector	IT Services
Functional Group	Hardware Support
Job Family	-
Job Level	Entrant or Expert/Management

Job Description

- Plan, direct, or coordinate activities in fields such as electronic data processing, information systems, systems analysis, and computer programming.
- Procure and manage IT assets.
- Perform supervision, implementation, and maintenance of a company's computing needs.
- Ensure the secure and effective operation of all computer systems, related applications, hardware, and software used within a company.

Critical Work Functions

Overall IT Department Management

- Manage IT staff by recruiting and training employees, communicating job expectations, and monitoring performance.
- Manage the annual IT budget and ensuring cost-effectiveness.
- Monitor daily operations, including server, hardware, software, and operating systems
- Coordinate technology installations, upgrades, and maintenance.
- Select and purchase new and replacement hardware and software, when necessary.
- Test, troubleshoot, and modify information systems so that they operate effectively.
- Generate performance reports for operating systems.
- Ensure all IT activities are performed within the parameters of applicable laws, codes, and regulations.
- Evaluate technology risks in order to develop a network disaster recovery plan and backup procedures.
- Remain up to date with advances in technology and industry best practices.
- Coordinate and supervise IT staff members.
- Manage and coordinate all IT-related matters including data, wireless communications, mobile technology, telephony, security, and computer hardware and software.
- Troubleshoot and solve problems related to hardware, software, and network problems.
- Perform research and recommend acquisition of network hardware and software.
- Monitor network utilisation and performance, implement procedures for network optimisation, reliability, and availability.
- Identify problematic areas and implement strategic solutions in time.
- Build long-term relationships with outside vendors for IT related products and services.

People Management

- Manage the budget expenditure and allocation across teams and projects.
- Monitor and track the team's achievements and key performance indicators.
- Propose new operational plans, including targeted budgets, work allocations and staff forecasts.
- Acquire, allocate and optimise the use of resources.
- Develop learning roadmaps to support the professional development of the team.
- Manage the performance and development process, including providing coaching and development opportunities to maximise the potential of each individual.

Skills & Competencies

Technical	Proficiency Level	
	Entrant	Expert/Management
Business Analysis	3	4
Budgeting	2	4
IT Asset Management	3	3
Performance Management	3	4
Problem Management	3	4
Process Improvement	3	4
Procurement	3	4
Service Level Management	3	4
Information Security Management	3	4
IT Project Management	3	4
Service Management	3	3

Soft Skills	Proficiency Level	
	Entrant	Expert/Management
Analytical Thinking	Intermediate	Advanced
Decision-Making	Intermediate	Advanced
Communication	Intermediate	Advanced
Work Management	Intermediate	Advanced
Teamwork	Intermediate	Advanced
People Management	Intermediate	Intermediate
Creativity and Innovation	Intermediate	Advanced
Results Orientation	Intermediate	Advanced
Service Orientation	Intermediate	Advanced
Negotiation	Intermediate	Intermediate
Resilience	Intermediate	Advanced

Entry Requirements

BDQF Level 6 in IT, Information Systems, Computer Science or related field **or** BDQF Level 5 in IT, Information Systems, Computer Science or related field with relevant industry experience or possess relevant portfolio/experience.

Recommended Technical Training Courses

- AMA Certified Professional in Management
- Certified Associate in Project Management (CAPM)
- Certified in Governance of Enterprise IT (CGEIT)
- Certified in Risk and Information Systems Control (CRISC)
- Certified Information Security Manager (CISM)
- Certified Information Systems Security Professional (CISSP)
- Certified Information Technology Manager (CITM)
- Certified ScrumMaster (CSM)
- COBIT 5 Foundation
- CompTIA Network+
- CompTIA Project+
- Information Technology Infrastructure Library (ITIL)
- Information Technology Management and Leadership Professional (ITMLP)
- Microsoft Systems Administration/Systems Engineer
- PMI Agile Certified Practitioner (PMI-ACP)
- Project Management Professional (PMP)
- Six Sigma
- TOGAF 9
- CompTIA Cloud Essentials
- Linux/Red Hat System Administrator

Systems Engineer

Alternate Job Titles	Hardware Engineer, Infrastructure Engineer, Technical Engineer, IT Engineer
Sub-Sector	IT Services
Functional Group	Infrastructure Hardware Support
Job Family	Server and network support Applications configurations and installations and IT Security
Job Level	Entrant or Specialist

Job Description

- Monitor and manage all installed systems and infrastructure.
- Establish, configure, test and maintain operating systems, application software and system management tools.
- Set, install, test and maintain operating systems, application software and system management tools.
- Evaluate the existing systems and provide the technical direction to IT support staff.
- Oversee the development of customised software and hardware requirement.
- Plan and implement systems automation as required for better efficiency.
- Formulate and design the security system in place to maintain data safety.
- Oversee the constant availability of technical resources.
- Maintain and supervise the inventory.
- Timely reporting on the log sheet for the rapid response to any issues and problems.

Critical Work Functions

Systems Deployment

- Plan, carry out, oversee and apply advanced technical skills and independent analysis to IT system installation projects including complex software and hardware installations and relocations.
- Analyse specifications and general instructions to develop appropriate systems.
- Manage project activities and schedules, determine and procure network equipment and supplies.
- Plan implementation of application software, hardware and monitoring.
- Research emerging cloud and infrastructure technologies.
- Assist with piloting of new tools, technologies and processes.
- Execute infrastructure operations activities and installation of systems according to design specification.

Infrastructure and Services Administration

- Assist in the configuration of infrastructures such as computer hardware, systems, software and applications software.
- Assist with infrastructure testing and implementation.
- Explore opportunities to optimise the delivery of systems services with emphasis on availability, reliability, scalability and security.
- Conduct systems audit and upgrades.
- Develop automated processes to define, measure and report on service quality, stability and capacity.
- Schedule installations and upgrades in accordance with organisational policies, procedures and protocols.
- Troubleshoot escalated server, storage and maintenance issues.
- Simulate user problems to resolve operating difficulties.
- Suggest improvements to infrastructure resolution methods and techniques.

Vendor Management

- Act as the primary interface with equipment vendors for resolving problems.
- Liaise with vendor on proposal to ensure that it meets the requirements.
- Escalation of technical support to resolve issues and incidents.
- Work closely with vendor during integration and deployment of the system.
- Monitor and report on the performance of vendors.

Security and Compliance

- Identify and address security and privacy risk.
- Adhere to the compliance of access control provided by the stakeholder.
- Adhere to security requirements and report security issues with infrastructure.
- Monitor compliance to procedures and policies for infrastructure related incidents.
- Provide system support, monitor and tune system for optimal performance including performing scheduled preventative maintenance, monitor systems for unauthorised activities and alert management to security issues.

Oversee Service Level Agreements and Service Improvements

- Manage the development of service-level objectives and targets.
- Monitor service-level objectives to ensure that requirements are met or exceeded
- Develop client satisfaction metrics and service procedures.
- Propose recommendations to improve performance and client satisfaction.

Skills & Competencies

Technical	Proficiency Level
Business Analysis	3
IT Architecture	3
IT Asset Management	3
Cloud Computing	3
System Integration	4
Infrastructure Management	3
IT Project Management	2
Network Security Management	2
Information Security Management	3
Vendor Management	4
Service Management	2

Soft Skills	Proficiency Level
Analytical Thinking	Advanced
Decision-Making	Advanced
Communication	Advanced
Work Management	Advanced
Teamwork	Advanced
People Management	Intermediate
Creativity and Innovation	Advanced
Results Orientation	Advanced
Service Orientation	Advanced
Negotiation	Intermediate
Resilience	Advanced

Entry Requirements

BDQF Level 6 in IT, Computer Science, Software Engineering, or related field **or**
BDQF Level 5 in IT, Computer Science, Software Engineering or related field with relevant industry certification.

Recommended Technical Training Courses

- Certified Information Systems Security Professional - Architecture (CISSP)
- Cisco Certified Entry Networking Technician (CCENT)
- Cisco Certified Network Associate (CCNA)
- CompTIA Server+
- Certified Systems Engineer Professional (CSEP)
- Information Technology Infrastructure Library (ITIL) 4 Foundation
- Master Certified Electronics Technician (CETma)
- Microsoft 365 Certified – Fundamentals
- Microsoft Certified Systems Engineer (MCSE)
- VMware Certified Professional (VCP) Data Centre Virtualization
- ITCA Computing Fundamentals
- Microsoft Azure Fundamentals
- Linux/Red Hat System Administrator

Project Coordinator

Alternate Job Titles	Project Assistant, Project Administrator, Project Scheduler, Project Planner
Sub-Sector	IT Services
Functional Group	Programme Management
Job Family	Programme Management
Job Level	Entrant

Job Description

- Coordinate project implementation and assist the project manager to achieve project objectives.
- Facilitate project resources, manage project progress, and facilitate interactions and tasks of various parties to reduce the risk of overall failure.
- Identify advances and opportunities in project management to improve timely delivery of projects and efficient use of resources.
- Apply knowledge and skills in project management, project planning, budgets and methodologies.
- Adopt an analytical and strategic approach in developing and communicating solutions that meet project's objectives and stakeholder's needs.

Critical Work Functions

Provide Assistance in Project Plan Development

- Develop the project plan with detailed activities, resource planning and estimation of costs.
- Work with stakeholders to develop and achieve consensus on project objectives, goals and results.
- Review project plan to determine time frame, funding constraints and project fulfilment procedures.
- Acquire project requirements such as human resources, information required, multiple agreements and necessary material or technology.

Provide Assistance in Projects Implementation

- Drive project to meet schedules, budget, workforce and technical quality goals.
- Drive project discipline to document changes in scope, problems and risks affecting implementation.
- Work to identify and resolve problems related to project implementation with users, technical staff and management.
- Recommend schedule modifications, cost or resource adjustments, and conduct periodic project reviews.

Team Coordination

- Supervise team leadership, including budgets, forecasts, job allocations and staffing.
- Develop employees through continuous coaching, mentoring, and career discussions.
- Define common objectives, direction and accountability among employees.
- Drive efficient departmental performance management practices in accordance with organisational policies and procedures.

Skills & Competencies

Technical	Proficiency Level
Business Analysis	3
Business Risk Management	3
Contract Management	3
Vendor Management	3
Procurement	3
IT Project Management	3
Information Security Management	2
Service Management	3

Soft Skills	Proficiency Level
Analytical Thinking	Intermediate
Decision-Making	Intermediate
Communication	Advanced
Work Management	Intermediate
Teamwork	Advanced
People Management	Intermediate
Creativity and Innovation	Intermediate
Results Orientation	Intermediate
Service Orientation	Advanced
Negotiation	Intermediate
Resilience	Intermediate

Entry Requirements

BDQF Level 5 in IT-related field **or**
Any relevant Project Management Certification with experience.

Recommended Technical Training Courses

- Accredited Business Communicator (ABC)
- Advanced Project Management Certified Professional
- APM Project Fundamentals Qualification (PFQ)
- APM Project Management Qualification (PMQ)
- Certified Associate in Project Management (CAPM)
- Certified Instrumentation Specialist (CIS)
- Certified Product Manager (CPM)
- Certified Supply Chain Professional (CSCP)
- Change Management Certified Professional
- CompTIA Project+
- Managing Programs and Projects with Project Server 2013
- Managing Projects with Microsoft Project 2013 (MCTS)
- Master Project Manager (MPM)
- PMI Risk Management Professional (PMI)
- Prince2 Foundation
- Program Management Professional (PgMP)
- Project Management Professional (PMP)
- Project Manager E-Business (PME)

Project Manager

Alternate Job Titles	Project Management Specialist
Sub-Sector	IT Services
Functional Group	Programme Management
Job Family	Programme Management
Job Level	Specialist

Job Description

- Provide project planning and management for established initiatives within a company.
- Ensure that projects are completed to specification, within an established time frame and budget.
- Lead subject matter expert within the company regarding technology concerns.
- Improve all aspects of project planning and resource management.

Critical Work Functions

- Plan and define project objectives, milestones and deliverables.
- Identify project approach for successful project completion.
- Assist in defining objectives for a department related project.
- Develop estimates for project costs, time, schedules and manpower requirements.
- Develop project plans and schedules.
- Work with organisation to identify project participants and team members.
- Manage project execution through organisation's project management standards and best practices.
- Manage the team to ensure complete involvement and cooperation towards successful completion of projects.
- Control the use of people and resources within a pre-specified budget to expedite project work completion through efficient coordination of activities; allocate resources and initiate action in emergencies and unforeseen events within budgetary constraints.
- Work with IT Director for decisions impacting budget limits.
- Develop written request for proposals and manage the vendor selection process according to Request for Purchase (RFP) procedures and policies.
- Manage external vendors for project execution according to the Request for Proposal.
- Identify solutions to project-related issues to ensure project continuity and adherence to project schedule and budget.
- Advise, defend and negotiate with superiors or peers for or against a course of action.
- Act as liaison to pertinent employees and groups to achieve cooperation on joint projects.
- Oversee the testing of a system for correct functioning by critically examining information for accuracy, ruling on questions of procedure as applied to projects, and maintaining detailed records of the process.
- Develop hypothesis to explain work or project-related issues.
- Keep abreast of developments by learning new systems, methods and processes associated with information technology and project management.
- Work jointly with the managers and users to define information requirements and operational needs, questions of system intent, output requirements, input data acquisition, internal checks and controls, and conformance with other standards.
- Develop a technical mastery in technical areas associated with assigned project to the extent of understanding project objectives, technical implications and relationships with other technical projects in order to facilitate project decision-making.

Skills & Competencies

Technical	Proficiency Level
Business Analysis	4
Business Risk Management	4
Contract Management	4
Vendor Management	4
Procurement	4
IT Project Management	4
Information Security Management	4
Service Management	4

Soft Skills	Proficiency Level
Analytical Thinking	Advanced
Decision-Making	Advanced
Communication	Advanced
Work Management	Advanced
Teamwork	Advanced
People Management	Advanced
Creativity and Innovation	Advanced
Results Orientation	Advanced
Service Orientation	Advanced
Negotiation	Advanced
Resilience	Advanced

Entry Requirements

BDQF Level 6 in Business IT, Information Systems or related field **or** BDQF Level 5 in Business IT, Information Systems or related field with Project Management Certification and few years of experience.

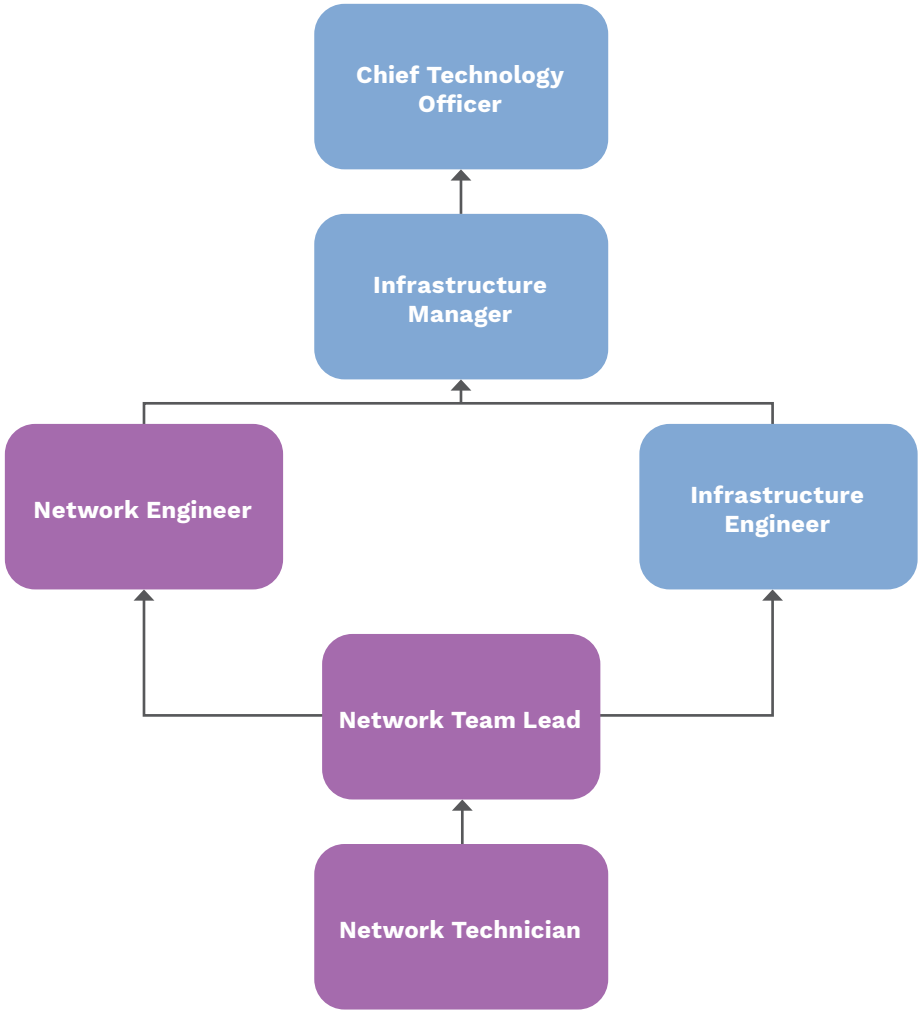
Recommended Technical Training Courses

- Certified Associate in Project Management (CAPM)
- Prince2 Foundation
- APM Project Fundamentals Qualification (PFQ)
- APM Project Management Qualification (PMQ)
- Project Management Professional (PMP)
- Master Project Manager (MPM)
- Certified Associate in Project Management (CAPM) - IT
- Engineer In Training Certification (EIT)
- Certified Supply Chain Professional (CSCP)
- International Accredited Business Analysis (IABA)
- Managing Programs and Projects with Project Server 2013
- Project Manager E-Business (PME)
- Certified Instrumentation Specialist (CIS)
- Managing Projects with Microsoft Project 2013 (MCTS)
- Change Management Certified Professional
- Certified Product Manager (CPM)
- CompTIA Project+
- PMI Risk Management Professional (PMI)
- Certified Personal Trainer
- Program Management Professional (PgMP)
- Advanced Project Management Certified Professional
- Accredited Business Communicator (ABC)
- Agile Project Management

Telecommunications and Network Sub-Sector

Telecommunications and Network Career Path

Framework developed



Network Technician

Alternate Job Titles	Telecommunication Technician, Communication Technician, Engineering Technician
Sub-Sector	Telecommunications and Network
Functional Group	Telecommunications
Job Family	Development and Deployment
Job Level	Entrant

Job Description

- Support the deployment and operations of network infrastructure.
- Perform installation, monitoring, troubleshooting, maintaining and testing of network systems and solutions.
- Perform maintenance (fault repair) and configuration tasks at sites, active network equipment and passive cable systems (ducts, cables, manholes, distribution frames, overhead and underground cable installations), and resolves network incidents.
- Ensure that network activities including the installation, monitoring, troubleshooting, maintaining and testing of network systems and solutions are documented appropriately and in compliance with the required procedures and standards.

Critical Work Functions

- Establish communications systems by installing, operating, and maintaining voice and data telecommunications network circuits and equipment.
- Plan network installations by studying customer orders, plans, manuals, and technical specifications; ordering and gathering equipment, supplies, materials, and tools; assessing installation site; and preparing an installation diagram.
- Establish voice and data networks.
- Verify service by testing circuits, equipment, and alarms; and identifying, correcting or escalating problems.
- Document network by labelling and routing equipment and cables, and recording configuration diagrams and specifications.
- Maintain network by troubleshooting and repairing outages, testing network back-up procedures, and updating documentation.
- Maintain customer rapport by listening to and resolving concerns and answering questions.
- Maintain safe work environment by following codes, standards and legal regulations.
- Keep supplies ready by inventorying stock, placing orders, and verifying receipt.
- Update job knowledge by participating in educational opportunities and reading technical publications.
- Run, pull, terminate, and splice cables; installing telecommunications equipment, routers, switches, multiplexors, cable trays, and alarm and fire-suppression systems; building ironwork and ladder racks; establishing connections; programming features; establishing connections and integrations; following industry standards; activating remote access tools; and coordinating with contractors.

Skills & Competencies

Technical	Proficiency Level
Business Analysis	2
Network Administration and Maintenance	3
Network Configuration	3
Test Planning	2
Infrastructure Support	3
Information Security Management	2
Fault Management	2
IT Project Management	2
Service Management	2
Telecommunication Network Management	3

Soft Skills	Proficiency Level
Analytical Thinking	Intermediate
Decision-Making	Intermediate
Communication	Intermediate
Work Management	Intermediate
Teamwork	Intermediate
People Management	Intermediate
Creativity and Innovation	Intermediate
Results Orientation	Intermediate
Service Orientation	Intermediate
Negotiation	Intermediate
Resilience	Intermediate

Entry Requirements

BDQF Level 4 in IT, Telecommunications Network or related field **or**
BDQF Level 3 in IT, Telecommunications Network or related field with relevant industry certification.

Recommended Technical Training Courses

- Master Certified Electronics Technician (CETma)
- BICSI Technician
- Telecommunications Master Technician Certification
- Cisco Certified Network Associate (CCNA)
- Cisco Certified Network Professional (CCNP)
- Network 5 Certification
- Telecommunications Electronics Technician (TCM)
- Certified Network Computer Technician (CNCT)
- Computer Service Technician (CST)
- Data Cabling Installer (DCI)
- Cisco Certified Entry Networking Technician (CCENT)
- Cisco Optical Specialist 1
- Certified Phlebotomy Technician (CPT)
- Certified Electronics Technician - Journeyman-Level - Computer (CET)

Network Team Lead

Alternate Job Titles	Network Controller, Network Consultant, Network Coordinator, Network Engineer
Sub-Sector	Telecommunications and Networks
Functional Group	Software and Systems – Application Development and Deployment
Job Family	Server and Network Support
Job Level	Specialist

Job Description

- Lead operations team to restore faults and proactively maintain network infrastructure for both fixed and wireless.
- Plan operational readiness and acceptance for new projects and configurations.
- Support 24/7 operation, manage Technician's activity, and resolve escalated issues.
- Engage with contractor and define objectives on incident management.
- Schedule routine preventive maintenance to avoid major incident and fault occurrence.
- Review documentation to ensure compliance with the required procedures and standards on network activities including the installation, monitoring, troubleshooting, maintaining and testing of network systems and solutions.

Critical Work Functions

Network Support

- Provide fixed and/or wireless network support to users such as installation, configuration, testing and troubleshooting.
- Apply Standard Operating Procedures (SOP) in providing the network support.
- Provide information to users on the progress of outstanding support tickets.
- Maintain documentation related to Service Level Agreements (SLAs).

Network Maintenance

- Carry out routine maintenance tasks to detect and/or prevent network faults that disrupt user connectivity.
- Generate fault reports.

Incident Resolution

- Respond to user complaints.
- Identify fixed and/or wireless network problems or issues.
- Troubleshoot, diagnose and resolve network issues.
- Recommend preventive solutions.
- Log incidents into problem fault management system.

Skills & Competencies

Technical	Proficiency Level
Business Analysis	3
IT Architecture	3
Business Risk Management	3
Infrastructure Management	4
Network Administration and Maintenance	3
Network Configuration	4
Emerging Technology Synthesis	4
Vendor Management	3
IT Project Management	3
Telecommunications Network Management	4
Network Security Management	4
Service Management	3
Fault Management	4

Soft Skills	Proficiency Level
Analytical Thinking	Advanced
Decision-Making	Advanced
Communication	Advanced
Work Management	Advanced
Teamwork	Advanced
People Management	Advanced
Creativity and Innovation	Advanced
Results Orientation	Advanced
Service Orientation	Advanced
Negotiation	Advanced
Resilience	Advanced

Entry Requirements

BDQF Level 6 in Information Systems, Computer Science, or related field **or** BDQF Level 5 in Information Systems, Computer Science, or related field with relevant industry experience or possess relevant portfolio/experience.

Recommended Technical Training Courses

- Cisco Certified Internetwork Expert (CCIE)
- Cisco Certified Network Professional (CCNP)
- Cisco Certified Network Professional (CCNP)
- Juniper Networks Certified Internet Expert Enterprise Routing & Switching (JNCIE-ENT)
- Wireshark Certified Network Analyst (WCNA)
- CompTIA A+
- CompTIA Network+
- Microsoft Certified Solutions Associate (MCSA): Windows Server 2016
- Microsoft Certified Solutions Expert (MCSE): Core Infrastructure
- VCP-DCV: VMware Certified Professional 6 – Data Center Virtualization
- VMware Certified Professional – Network Virtualization
- Huawei Certified Network Engineer (HCNE)
- Huawei Certified Network Associate (HCNA)
- RAN Operation and Maintenance
- RAN Troubleshooting
- Certified Fibre Optic Technician
- General Field Operations
- Citrix Certified Associate
- AWS Certified Advanced Networking
- AWS Certified Solutions Architect - Associate
- Google Certified Professional Cloud Architect

Network Engineer

Alternate Job Titles	Network Administrator, Network Analyst, Core Network Engineer, Data Network Engineer, Telecommunications Network Engineer, Wireless Communication Network Engineer
Sub-Sector	Telecommunications and Network
Functional Group	Telecommunications
Job Family	Server and Network Support
Job Level	Specialist or Expert/Management

Job Description

- Plan technical support, do forecasting, designing, project management, installation, monitoring, and support maintenance of the enterprise network wide area, local area, and wireless networks that are converged to data/voice network.
- Perform network monitoring and analysis, performance tuning, troubleshooting and escalating issues, including proactive problem resolution and complex problem analysis as necessary, to maintain network performance to meet user demand.
- Reduce operational risk and improve availability of the data and voice network by ensuring network access, monitoring, control, evaluation and documentation practices are maintained and adhered to.
- Develop, maintain and perform operational procedures and ensure operational tasks are performed reliably and consistently to reduce the risk of unplanned outages.
- Collect and analyse operational data (especially incident and change records) to identify emerging trends and log problem records to assist with problem resolution and increased network availability.
- Troubleshoot and diagnose network problems, and determine the most appropriate technical solutions for resolving problems and issues to improve network performance and satisfy user's needs.
- Monitor and analyse the overall performance of systems to assess the need for performance tuning, updates, upgrades, enhancements, preventive maintenance and new systems, and recommend options for upgrading and improving the performance of systems.
- Evaluate new network hardware and software solutions and undertake systematic monitoring and scanning of the enterprise's external environment to identify emerging technologies that have the potential to create value.
- Reflect organisational values and abide by policies and procedures to ensure a safe, healthy and inclusive work environment.

Critical Work Functions

Network Configuration and Administration

- Design cost-effective network systems and services that meet product specifications and comply to standards and best practices.
- Prepare and execute test plans including integration, performance, coverage and capacity verification.
- Review technical documents for processes, technology and devices.
- Designate the direction for Local Area Network (LAN) and/or Wide Area Network (WAN), internet, wireless and remote access services.
- Validate the Software Defined Network (SDN) infrastructure within the IT ecosystem.
- Oversee the installation, upgrading, operation, control, maintenance and effective use of LAN and/or WAN for the communication of data, voice, text or images.
- Perform technical evaluation and proof-of-concept of new technologies for network infrastructure.

- Review releases, upgrades and fixes available from systems software and supplies, and identify those which merit action.

Network Operations and Incidents Management

- Manage network infrastructure to ensure alignment of technical requirements.
- Plan, carry out, oversee and apply advanced technical skills and independent analysis to network installation projects including complex software and hardware installations and relocations.
- Analyse specifications and general instructions to develop appropriate systems.
- Manage project activities and schedules, as well as determine and procure network equipment and supplies.
- Provide technical inputs on the procurement of network equipment and ensure compliance with procurement policies.
- Develop the disaster recovery plan, processes and protocols for disaster recovery of network infrastructure.
- Ensure disaster recovery plan testing activities are performed and technical criteria are met.
- Perform network fault troubleshooting and root cause analysis to locate sources of network issues.
- Develop and verify recovery solutions in test environments and execute in production network.
- Implement automation workflow for the management of repeated network issues in collaboration with relevant teams.
- Plan and coordinate network security measures for network infrastructure, software and data.

Network Utilisation and Performance Optimisation

- Consolidate data from network based on key parameters or metrics.
- Help in the development of models for capacity planning, load balance and/or redundancy solutions.
- Administer network tuning for optimisation.
- Review bandwidth requirements for facilities and inter-dependencies of systems.
- Review the activities stated in the network documentation in accordance with organisational policies.
- Track network activity and record technical problems.
- Maintain knowledge of emerging solutions for software and/or hardware.

Network Operations Support

- Conduct periodic maintenance, patches, and network upgrades.
- Procure network equipment, prepare technical specifications and documents.
- Perform regular backups and administer protocols for disaster recovery .
- Provide network support, monitor and tune networks for optimal performance including performing scheduled preventative maintenance.
- Act as the primary interface with equipment vendors for resolving problems.

Network Security Management

- Review compliance with information security policies and standards.
- Assess configurations and security procedures for adherence to legal and regulatory requirements.
- Investigate and assess the risks of network attacks and recommend remedial action.
- Prioritise and resolve security incidents, and escalate where necessary.
- Monitor systems for unauthorised activities and alert management to security issues.

Network Strategy

- Review existing policies and procedures to identify potential gaps, problems or opportunities for improvement and develop recommendations.
- Recognise and identify new policies and procedures to support changes including future business expansion.
- Research best practices, develop and draft proposed changes.
- Analyse, interpret, and present research findings on network management best practices, configurations, equipment, and future trends.

Skills & Competencies

Technical	Proficiency Level	
	Specialist	Expert/Management
Business Analysis	3	5
IT Architecture	3	4
Business Risk Management	2	5
Infrastructure Management	4	5
Network Administration and Maintenance	3	4
Network Configuration	4	4
Emerging Technology Synthesis	2	4
Vendor Management	3	4
IT Project Management	3	4
Telecommunications Network Management	4	5
Network Security Management	4	4
Service Management	3	4

Soft Skills	Proficiency Level	
	Specialist	Expert/Management
Analytical Thinking	Advanced	Expert
Decision-Making	Advanced	Expert
Communication	Advanced	Expert
Work Management	Advanced	Expert
Teamwork	Advanced	Expert
People Management	Intermediate	Expert
Creativity and Innovation	Intermediate	Advanced
Results Orientation	Advanced	Expert
Service Orientation	Advanced	Advanced
Negotiation	Intermediate	Expert
Resilience	Advanced	Expert

Entry Requirements

Specialist

BDQF Level 5 in IT, Telecommunications or related field.

Expert/Management

BDQF Level 5 in IT, Telecommunications or related field and 3 years experience.

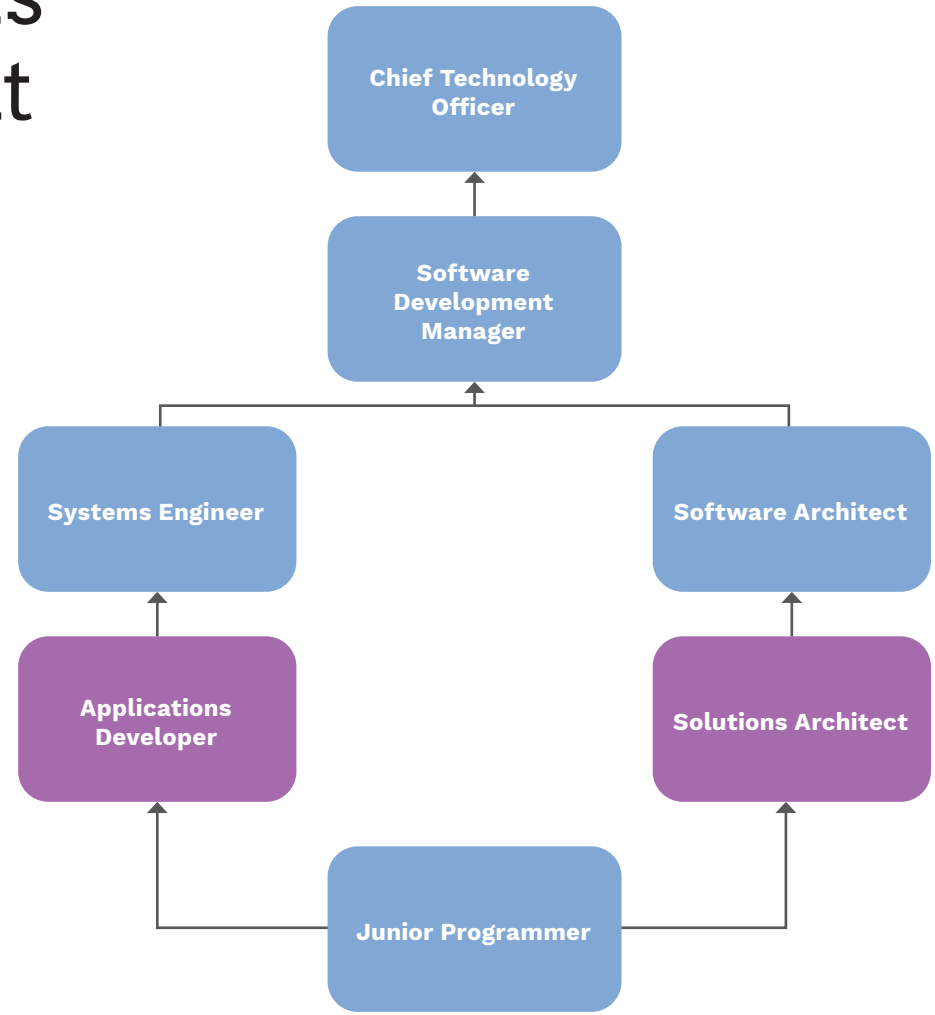
Recommended Technical Training Courses

- AWS Certified Advanced Networking
- AWS Certified Solutions Architect- Associate
- Cisco Certified Internetwork Expert (CCIE)
- Cisco Certified Network Associate (CCNA)
- Cisco Certified Network Professional (CCNP)
- Citrix Certified Associate
- CompTIA A+
- CompTIA Network+
- Google Certified Professional Cloud Architect
- Juniper Networks Certified Internet Expert Enterprise Routing & Switching (JNCIE-ENT)
- Microsoft Certified Solutions Associate (MCSA): Windows Server 2016
- Microsoft Certified Solutions Expert (MCSE): Core Infrastructure
- VCP-DCV: VMware Certified Professional 6 – Data Center Virtualization
- VMware Certified Professional – Network Virtualization
- Wireshark Certified Network Analyst (WCNA)
- Huawei Certified Network Associate (HCNA)
- Huawei Certified Network Engineer (HCNE)
- Information Technology Infrastructure Library (ITIL)
- Risk Management
- IT Project Management

Applications and Solutions Development Sub-Sector

Applications and Solutions Development Career Path

Framework developed



Applications Developer

Alternate Job Titles	Application Engineer, Software Programmer, Programmer, Software Architect
Sub-Sector	Applications and Solutions Development
Functional Group	Software and Systems – Applications Development and Deployment
Job Family	Development and Deployment
Job Level	Entrant or Specialist

Job Description

- Create and test the software/applications in accordance with the detailed technical design to ensure that the business requirements are met.
- Work to resolve software/applications issues.
- Participate and contribute to the review, analysis and verification of business and software requirements.
- Create and maintain software/applications in accordance with the detailed technical design.
- Code from component specifications and test scripts.
- Develop test plan and run unit testing to determine functionality of software/ applications.
- Participate and contribute to the review and verification of test requirements and test cases.
- Prepare technical documentation and reports on software/applications development.
- Develop, create and modify general computer applications software or specialised utility programmes.
- Analyse user needs and develop software solutions.
- Design software or customise software for client use with the aim of optimising operational efficiency.
- Analyse and design databases within an application area.
- Coordinate database development.
- Design, develop, test, debug and implement software applications or specialised utility programmes.
- Work with applications support lead in resolving software/applications issues.

Critical Work Functions

Identification of Requirements

- Support stakeholder discussions to understand business needs and user requirements.
- Support proposal writing for development of applications.
- Support the formulation of specifications and the definition of applications delivery platforms.
- Support analysis of requirements.

- Participate in discussions with stakeholders to understand user requirements.
- Conduct requirements analysis based on user requirements.
- Prepare requirements documentation, descriptions of interfaces, and functional and non-functional requirements.

Application Development

- Integrate applications with databases from the back end.
- Support the creation of programme logic for new applications and functionality.
- Support the creation of the concept of apps, interface design and architecture.
- Analyse and resolve issues using prescribed guidelines or policies.
- Plan and coordinate regular updates and recommend improvements to existing applications.
- Identify and resolve issues which have organisation-wide and long-term impact.
- Identify security risks, create requirements to capture security issues, and perform initial threat modelling to ensure coding standards meet security requirements.
- Develop and maintain the software configuration management plan.

Application Implementation

- Apply bug-fixes.
- Deploy applications as per specifications.
- Create procedures for document implementation.
- Investigate problems and perform root cause analysis.

- Support testing of the applications developed.
- Provide guidance and technical support to the quality testing teams.
- Evaluate changes and updates to source production systems.
- Train end-users on new reports and dashboards.
- Propose new technologies for cutting edge platform development.

Application Optimisation

- Collect user feedback and generate system reports on the performance of the applications.
- Propose recommendations to improve the performance of applications.
- Support initiatives to enhance applications' functionality and process flow.
- Support the analysis and modification of design logic in existing applications.
- Encourage the integration of new products with existing applications to enhance features.
- Assist in the installation and use of tools for a project's designated design strategy and methodology.
- Assist in architectural design tasks associated with use of standard notations, diagramming techniques, models and patterns.
- Apply selected software design pattern to the design of software components or modules.
- Participate in software design reviews.
- Carry out static analysis tasks to evaluate design quality.
- Assist in development and use of simulation and prototypes to evaluate software design quality.
- Perform integration testing as part of the integration process.
- Adhere to project standards in the collection of security assessment metrics.
- Perform code reviews to identify security vulnerabilities.
- Assist in determining impact of constraints on Software Configuration Management (SCM) imposed by policies, contract and software development life cycle.
- Provide measurement data for SCM measures.
- Assist in identifying software configuration items (SCIs).
- Generate, classify and manage problem reports.

Application Maintenance

- Analyse usage reports on applications.
- Document the technical architecture of the application, changes to code, issue resolutions and procedures.
- Solve routine issues occurring within applications.
- Promote monitoring of compliance with safety measures.
- Support the updating and maintenance of existing applications.
- Collect standard measures of code quality and size.
- Generate codes and systems from models.
- Create and execute unit tests for delivered codes.
- Achieve test coverage goals set by project and organisation standards.
- Identify unit and integration testing success and failure criteria.
- Adhere to software test plans.
- Assist with the development of test plans and test cases.
- Implement the test environment and unit test cases, and integration and system test cases.
- Collect and analyse test execution results.
- Follow recommended coding standards and secure coding principles to avoid security vulnerabilities.

Skills & Competencies

Technical	Proficiency Level	
	Entrant	Specialist
Business Analysis	2	3
Application Development	3	4
Application Integration	3	3
Application Support and Enhancement	3	3
IT Architecture	2	3
Information Security Management	2	3
Security Architecture	2	3
Software Configuration	3	3
Software Design	3	3
Software Testing	3	3
User Interface Design	3	4
IT Project Management	2	3
Service Management	3	4

Soft Skills	Proficiency Level	
	Entrant	Specialist
Analytical Thinking	Intermediate	Advanced
Decision-Making	Intermediate	Intermediate
Communication	Intermediate	Intermediate
Work Management	Intermediate	Intermediate
Teamwork	Intermediate	Intermediate
People Management	Intermediate	Intermediate
Creativity and Innovation	Intermediate	Advanced
Results Orientation	Intermediate	Advanced
Service Orientation	Intermediate	Advanced
Negotiation	Intermediate	Intermediate
Resilience	Intermediate	Advanced

Entry Requirements

BDQF Level 6 in Information Systems, Computer Science or related field with 3 years experience in related fields **or**
BDQF Level 5 in Information Systems, Computer Science or related field with 5 years of relevant industry experience or possess relevant portfolio/experience.

Recommended Technical Training Courses

- NET Core Development
- IBM Certified Mobile Application Developer
- Associate Android Developer (Google)
- GIAC Mobile Device Security Analyst
- Introduction to Development using Flutter
- Mobile App Development Using Flutter
- Salesforce Certified Platform App Builder
- Agile Project Management Foundation Certification
- Android Application Development Certification
- ArchiMate 3 Foundation and Practitioner
- Developing ASP.Net Core MVC Web Applications
- Developer Training for Spark and Hadoop
- Microsoft Azure Fundamental
- Oracle Database Administrator (DBA)
- SAP Certified Development Associate – ABAP
- ITIL Foundation
- Scrum Developer
- Node.js

Programming Languages

Programming Languages in Demand (JavaScript, Python, HTML, CSS, Java, SQL, NoSQL, C#, C++, Rust, Perl, Go, PHP, R, Ruby, Swift)

Solutions Architect

Alternate Job Titles	Software Architect, Technical Architect, Application Architect, Infrastructure Architect, IT Architect
Sub-Sector	Applications and Solutions Development
Functional Group	Application Development
Job Family	Applications Configurations and Installations, and IT Security
Job Level	Specialist

Job Description

- Analyse, design and develop roadmaps and implementation plans based on a current versus future state business architecture.
- Review recommendations to software architectural standards for approval.
- Lead and facilitate the software architecture governance process based on the enterprise architecture governance structure.
- Manage exceptions to architectural standards at a software level by assessing near-term needs to establish business priorities and align architectural requirements with IT strategy.
- Consult with clients and IT teams on software architecture solutions and provide recommendations on emerging technology.
- Oversee the development of guidelines and standards to be used in software development and integration.
- Formulate the conceptual and detailed architecture for the development of applications.
- Research, analyse, design and deliver solutions that are appropriate for business strategy.
- Interplay across several business area and act as visionary to proactively define the direction for future projects.
- Plan, design, and develop integrated information technology architecture solutions for internal and external clients.
- Serve as a technical expert on solutions designs, development and implementation requirements to address business needs.

Critical Work Functions

Identification of Business Requirements

- Formulate the organisation's architecture strategy, roadmap, standards, policies and procedures.
- Liaise with senior stakeholders to determine requirements and define the scope of solution and governance.
- Evaluate client's system specification, work practices and the nature of business.
- Evaluate the state of the enterprise architecture of the organisation.

Leading and Coordination of Domain Technical and Business Discussions

- Participate in ecosystem strategy development, environment analysis and opportunity identification.
- Analyse, design and develop roadmaps and implementation plans based on a current versus future state.
- Design standard configurations and patterns.

Leading and Facilitation of Software Architecture Governance Process Based on the Enterprise Architecture Governance Structure

- Manage exceptions to architectural standards at a software level.
- Review and approve recommendations to software architectural standards.

Development of Architecture Requirements and Maintaining Oversight

- Analyse and develop software architectural requirements.
- Align architectural requirements with IT strategy.
- Assess near-term needs to establish business priorities.
- Ensure compatibility with existing solutions, infrastructure, services and strategic requirements.
- Coordinate architecture implementation and

modification activities.
- Assist in post-implementation and continuous improvement efforts to enhance performance and provide increased functionality.
- Ensure conceptual completeness of the technical solution.

Quality Management and Continuous Improvement of Architecture

- Analyse the current architecture to identify weaknesses and develop opportunities for improvement.
- Identify and propose variances to the architecture to accommodate project needs.
- Perform ongoing architecture quality review activities.
- Research emerging technologies.

Consultation with Clients and IT Teams on Software Architecture Solutions

- Analyse cost versus benefits, risks, impact and technology priorities.
- Provide recommendations on emerging technology to senior management.
- Develop a communication plan for software architecture.
- Lead the research and evaluation of emerging technology, industry and market trends to assist in project development.
- Identify organisational requirements for resources.

Software Architecture Design Management

- Oversee the development of guidelines and standards to be used in software development and integration.
- Formulate the conceptual and detailed architecture for the development of applications.
- Manage the software architecture governance process.
- Define transition steps and strategy from current to future software architecture.
- Develop methods to integrate systems that interact and extend across organisational and functional lines.

Skills & Competencies

Technical	Proficiency Level
Application Development	4
IT Architecture	4
Application Integration	4
Business Analysis	4
Quality Standards	4
Security Architecture	4
Software Configuration	4
Software Design	5
User Interface Design	4
Software Testing	4
Service Management	4

Soft Skills	Proficiency Level
Analytical Thinking	Advanced
Decision-Making	Advanced
Communication	Advanced
Work Management	Advanced
Teamwork	Advanced
People Management	Intermediate
Creativity and Innovation	Advanced
Results Orientation	Advanced
Service Orientation	Advanced
Negotiation	Intermediate
Resilience	Advanced

Entry Requirements

BDQF Level 6 in Computer Science, IT, Software Engineering or related field **or** BDQF Level 5 in Computer Science, IT, Software Engineering or related field with 6 years relevant industry experience.

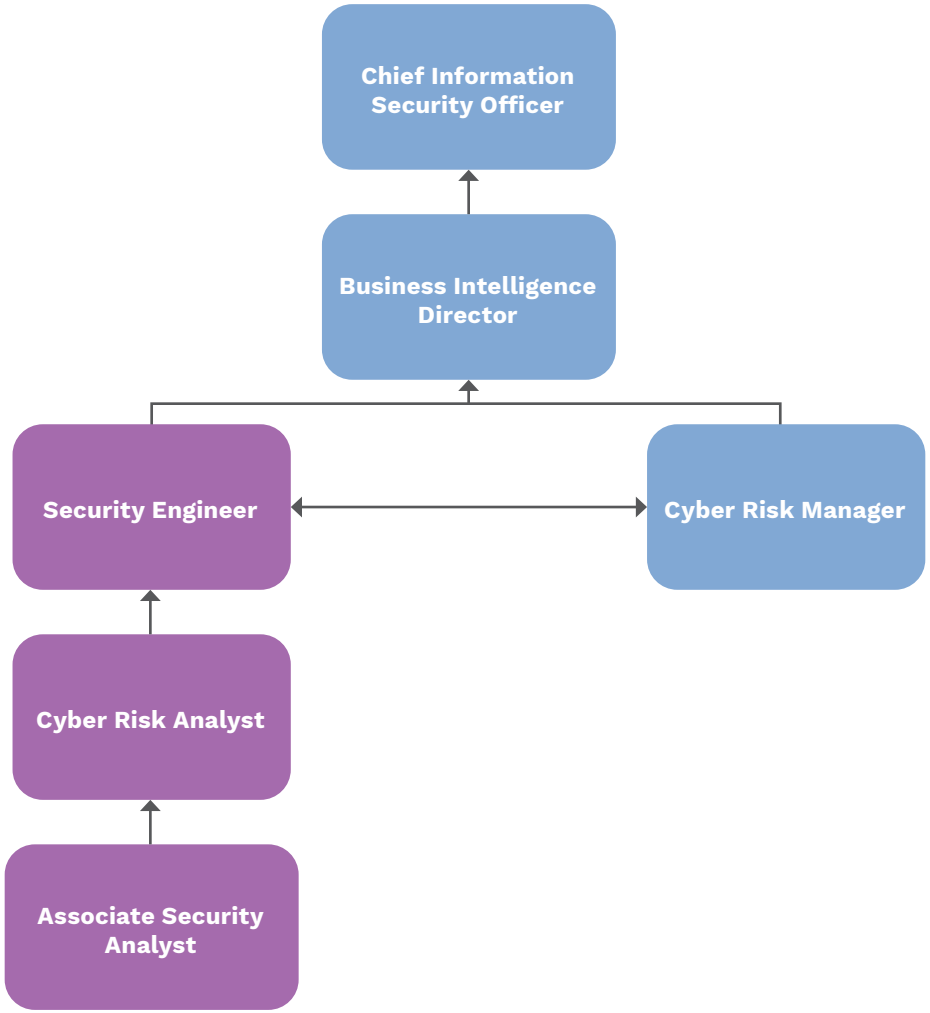
Recommended Technical Training Courses

- Amazon Web Services (AWS)
- AWS Certified Solutions Architect - Associate
- AWS Certified Solutions Architect - Professional
- Azure Solution Architect Certification
- CCNP Service Provider Operations
- Certified Information Systems Security Professional - Architecture (CISSP)
- Certified Scrum Master (CSM)
- Google Cloud Architect Certification
- ITIL Certification (all level)
- The Open Group Architecture Framework (TOGAF)
- VMware Certified Professional 6 - Cloud (VCP-Cloud)
- Microsoft Certified Solutions Expert (MCSE)
- DevOps Engineer Training

ICT Security Sub-Sector

ICT Security Career Path

Framework developed



Associate Security Analyst

Alternate Job Titles	Security Consultant, Information Security Analyst, Security Operations Analyst, Information Security Officer
Sub-Sector	ICT Security
Functional Group	IT Security
Job Family	Applications Configurations and Installations, and IT Security
Job Level	Entrant

Job Description

- Ensure that the company's digital assets are protected from unauthorised access.
- Secure both online and on-premise infrastructures.
- Weed through metrics and data to filter out suspicious activity.
- Find and mitigate risks before breaches occur.
- Generate reports for IT administrators and business managers to evaluate the efficacy of the security policies in place.
- Help to make the necessary changes for a more secure network.
- Create training programmes and modules to educate employees and users on proper security protocols.
- Keep the company's security systems up to date and create documentation and planning for all security-related information, including incident response and disaster recovery plans.

Other Specific Responsibilities

- Monitor security access.
- Conduct security assessments through vulnerability testing and risk analysis.
- Perform both internal and external security audits.
- Analyse security breaches to identify the root cause.
- Continuously update the company's incident response and disaster recovery plans.
- Verify the security of third-party vendors and collaborating with them to meet security requirements.

Critical Work Functions

Monitoring of Cyber Security Systems

- Perform cyber security monitoring activities on IT systems and applications.
- Categorise security incidents and breaches that occur.
- Track and react to security monitoring alert.
- Compile reports on the performance of security operations for management reporting.

Cyber Security Operations Maintenance

- Assist with the implementation of agreed security system changes and maintenance routines.
- Assist in the implementation of new cyber security programmes.
- Assist with conducting vulnerability and penetration assessments.
- Assist in aligning cyber security systems with established service agreement standards.
- Maintain documentation of all maintenance procedures and tests on cyber security systems.

Cyber Security Queries Response

- Assist in responding to cyber security issues.
- Assist in forensic threat investigations.
- Assist with resolution of security-related issues.
- Assist with simulation of user problems to identify drawbacks of cyber security systems.
- Recommend modifications to cyber security systems to address issues.
- Maintain logs of cyber security incidents.

Cyber Security Compliance Facilitatation

- Assist with the implementation security policies, standards and procedures.
- Educate users on cyber security policies, standards and practices.
- Identify improvement areas to existing security policies and procedures.

- Monitor third party compliance with organisational cyber security policies, standards and procedures.
- Monitor users' adherence to cyber security policies, standards and procedures.
- Develop cyber indicators to maintain awareness of the status of the highly dynamic operating environment.
- Collect, process, analyse, and disseminate cyber threat/warning assessments.

Cyber Security System Performance Optimisation

- Assist with piloting of new cyber security tools, technologies and processes.
- Assist with installation of new cyber security related hardware and software.
- Assist with security system testing and ongoing optimisation or changes such as:
  - scheduling upgrades and updates;
  - maintaining documentation of all optimisation activities;
  - recommending security products, services and/or procedures; and
  - proposing improvements to IT operational processes, procedure manuals, and documentation.

Skills & Competencies

Technical	Level
Business Analysis	3
Cyber and Data Breach Incident Management	3
Cyber Risk Management	3
Emerging Technology Synthesis	3
Infrastructure Design	3
Network Security Management	3
Security Architecture	3
Security Administration	3
Security Governance	3
Security Programme Management	3
Stakeholder Management	3
Security Implementation	3
Security Planning	3

Soft Skills	Level
Analytical Thinking	Intermediate
Decision-Making	Intermediate
Communication	Advanced
Work Management	Intermediate
Teamwork	Advanced
People Management	Intermediate
Creativity and Innovation	Advanced
Results Orientation	Advanced
Service Orientation	Advanced
Negotiation	Intermediate
Resilience	Advanced

Entry Requirements

BDQF Level 5 in Information Systems, Computer Science or related field **or**
BDQF Level 4 in Information Systems, Computer Science or related field with 5 years relevant industry experience or possess relevant portfolio/ experience.

Recommended Technical Training Courses

- CompTIA Infrastructure and Cybersecurity Certification
- EC-Council Advanced Certification
- Computational Thinking -Intermediate
- GIAC Advanced Certification
- Certified Information Systems Auditor (CISA)
- Certified Information Security Manager (CISM)
- Security+
- Certified Ethical Hacker (CEH)
- GIAC Security Essentials Certification (GSEC)
- Systems Security Certified Practitioner (SSCP)
- CompTIA Advanced Security Practitioner (CASP+)
- GIAC Certified Incident Handler (GCIH)
- Offensive Security Certified Professional (OSCP)
- Council of Registered Ethical Security Testers (CREST) Certification
- Huawei Certified ICT Associate (HCIA) - Security

Cyber Risk Analyst

Alternate Job Titles	Risk Analyst, IT Risk Analyst, Risk Control Consultant, Risk Assessment Analyst, Information Security Analyst, Threat Analyst
Sub-Sector	ICT Security
Functional Group	Software and Systems
Job Family	IT Security
Job Level	Specialist

Job Description

- Monitor systems at all times and evaluate threats that could potentially breach the network.
- Conduct cyber risk assessment in support of technology initiatives.
- Identify IT-related risks and determine appropriate controls to mitigate risks.
- Monitor, track and manage risk mitigations and exceptions to ensure cyber security standards and policies are established.
- Apply a defined set of analytical or scientific methods.
- Prepare documentation of cyber risk assessment reports.

Critical Work Functions

Establishment of Cyber Security Standards and Policies

- Conduct review of existing security policies, procedures, standards and exceptions.
- Assist in the development of policies for conducting cyber security risk assessments and compliance audits.
- Support implementation of information systems and cyber security policies.
- Manage cyber risks and assessments.

Performing Cyber Risk Assessment Activities Based on Risk Assessment Plans

- Assess third party security controls and internal security systems.
- Establish scope of risk analysis for new technology initiatives.
- Conduct research on emerging cyber security and risk management trends, issues, and alerts.

Development of Cyber Risk Documentation

- Monitor risks and incidents in accordance with the risk mitigation policies and guidelines.
- Document methodologies and tools to mitigate cyber risks.
- Prepare reports for cyber risk assessment reporting.
- Conduct research to develop internal threat awareness reports.

Mitigation of Cyber Security Risks

- Determine cause of security violations.
- Recommend corrective actions or appropriate controls to mitigate technical risks.
- Assist in the implementation of preventive measures against intrusion, frauds, attacks or leaks.
- Track remediation efforts for security and audit deficiencies.

Skills & Competencies

Technical	Proficiency Level
Business Analysis	4
Cyber and Data Breach Incident Management	3
Cyber Risk Management	4
Emerging Technology Synthesis	3
Infrastructure Design	3
Network Security Management	4
Security Architecture	4
Security Administration	4
Security Governance	4
Security Programme Management	3
Stakeholder Management	3
Security Implementation	4
Security Planning	4

Soft Skills	Proficiency Level
Analytical Thinking	Advanced
Decision-Making	Advanced
Communication	Advanced
Work Management	Advanced
Teamwork	Advanced
People Management	Intermediate
Creativity and Innovation	Advanced
Results Orientation	Advanced
Service Orientation	Advanced
Negotiation	Intermediate
Resilience	Advanced

Entry Requirements

BDQF Level 6 in Information Systems, Computer Science or related field **or** BDQF Level 5 in Information Systems, Computer Science or related field with 4 years experience in relevant roles.

Recommended Technical Training Courses

- CompTIA Network+
- CompTIA Security+
- CompTIA Cybersecurity Analyst
- CompTIA Advanced Security Practitioner
- CompTIA Security Analytics Expert Certification
- EC-Council Certified Ethical Hacker Certification
- Certified Security Analyst Training
- GIAC Information Security Fundamentals
- GIAC Security Essentials Certification
- Certified Information Systems Security Professional
- Council of Registered Ethical Security Testers (CREST) Certification
- Certified Information Systems Auditor (CISA)
- Certified Information Security Manager (CISM)
- ISO Training (ISO27001)
- Huawei Certified ICT Expert (HCIE) - Security
- Cisco Certified Network Professional (CCNP) Security

Security Engineer

Alternate Job Titles	Information Security Engineer, Cyber Security Engineer, Security Systems Engineer, IT Security Engineer, Protection Engineer
Sub-Sector	ICT Security
Functional Group	Software and Systems
Job Family	IT Security
Job Level	Specialist

Job Description

- Design, develop and implement secure system architectures.
- Develop system security criteria.
- Describe the baseline security system design.
- Conduct security threat and vulnerability studies.
- Embed security principles into the design of system architectures to mitigate the risks posed by new technologies and business practices.
- Design artefacts, spanning design, development and implementation, into enterprise systems that describe security principles and how they relate to the overall enterprise system architecture.
- Perform routine activities related to the periodic review and audit activities of infrastructure security systems and maintain documentation of security standards and procedure.

Critical Work Functions

Development of Architecture Requirements and Oversight Maintenance

- Design security controls and systems in alignment with security guidelines.
- Analyse and validate the system security baseline.
- Assist in the testing and evaluation of new security technologies and controls.
- Recommend security products, services and procedures to enhance system architecture designs.
- Document the design, operation, use, and expected outputs of new systems.
- Conduct research on modern security software architectures and network architecture design best practices.

Implementation of Security Systems

- Implement the security system design via production and conduct deployment planning.
- Prepare preliminary performance specifications for security hardware and software.
- Implement new enterprise security architecture, technologies and enhancements.
- Identify techniques to scale up and automate security infrastructure and processes.
- Resolve issues that arise in implementation of new security systems.
- Monitor security systems for strengths and weaknesses and propose improvements to address weaknesses.
- Process identified threats and vulnerabilities through system design modifications and risk management techniques.

Management of Security Systems

- Address operational and support security concerns through continual risk management via the programme protection process.
- Determine the acceptable risk level for residual security vulnerabilities in the system/operation.
- Transform security needs into security guidance to be integrated into the activities of other disciplines.
- Oversee the maintenance of security systems, platforms and associated software.
- Develop and implement custom disaster recovery drills and simulation tests on existing systems.
- Assist in the resolution of identified problems and incidents.
- Integrate the efforts of all engineering disciplines and specialties into a combined understanding of the trustworthiness of a system.

Skills & Competencies

Technical	Proficiency Level
Business Analysis	4
Cyber and Data Breach Incident Management	4
Cyber Risk Management	4
Emerging Technology Synthesis	4
Infrastructure Design	5
Network Security Management	5
Security Architecture	5
Security Administration	4
Security Governance	4
Security Programme Management	4
Stakeholder Management	4
Security Implementation	4
Security Planning	4
Service Management	4

Soft Skills	Proficiency Level
Analytical Thinking	Advanced
Decision-Making	Advanced
Communication	Advanced
Work Management	Advanced
Teamwork	Advanced
People Management	Intermediate
Creativity and Innovation	Advanced
Results Orientation	Advanced
Service Orientation	Advanced
Negotiation	Intermediate
Resilience	Advanced

Entry Requirements

BDQF Level 6 in Cyber Security, IT Security Management, Information Security, Computer/System/Network Information Systems, Computer Science or related field **or**
BDQF Level 5 in Cyber Security, IT Security Management, Information Security, Computer/System/Network Information Systems, Computer Science or related field with 4 to 6 years of experience **or**
BDQF Level 4 in Cyber Security, IT Security Management, Information Security, Computer/System/Network Information Systems, Computer Science or related field with 6 to 8 years of relevant industry experience as a Security Analyst or similar role, or possess relevant portfolio/experience.

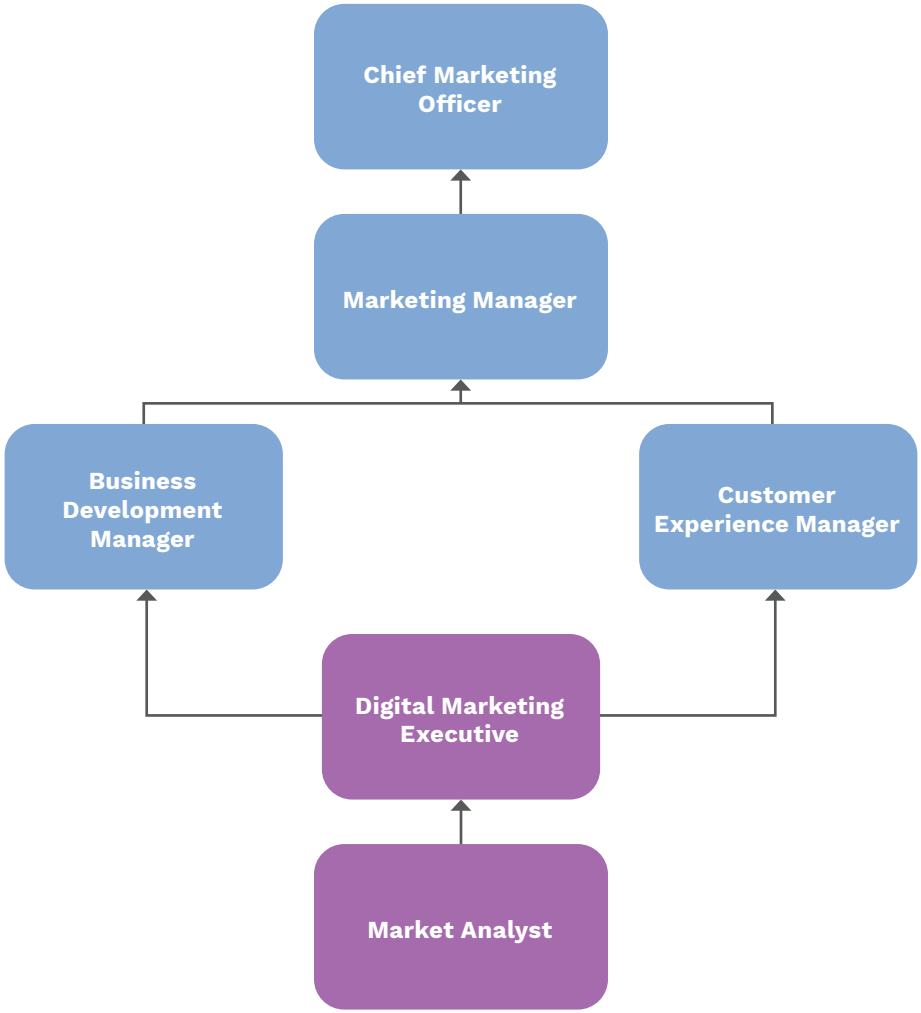
Recommended Technical Training Courses

- Certified Ethical Hacker (CEH)
- Certified Information Security Manager (CISM)
- Certified Information Systems Auditor (CISA)
- Certified Information Systems Security Professional (CISSP)
- Cisco Certified Network Professional (CCNP) Security
- CompTIA Advanced Security Practitioner (CASP+)
- CompTIA Infrastructure and Cybersecurity Certification
- EC-Council Advanced Certification
- GIAC Certified Incident Handler (GCIH)
- GIAC Security Essentials Certification (GSEC)
- Offensive Security Certified Professional (OSCP)
- Security+
- Systems Security Certified Practitioner (SSCP)
- Council of Registered Ethical Security Testers (CREST) Certification
- Red Hat Enterprise Linux (RHEL) Administration
- Cisco Certified CyberOps
- Microsoft Certified Solutions Associate (MCSA): Windows Server Administration

Digital Media Sub-Sector

Digital Media Career Path

Framework developed



Market Analyst

Alternate Job Titles	Marketing Assistant, Marketing Associate, Marketing Coordinator
Sub-Sector	Digital Media
Functional Group	Digital Media/Marketing
Job Family	Distribution
Job Level	Specialist

Job Description

- Assist marketing teams by analysing various marketing initiatives.
- Help transform how the marketing teams look at data by reinforcing the importance of making strategic, numbers-driven decisions for future campaigns.
- Liaise between groups fluidly while helping engage the organisation in data literacy.
- Perform research and provide insights regarding the market, trends, competitors, potential and existing customers, and current campaigns.
- Research, gather and analyse business data for marketing.
- Analyse and interpret data through various tools that track traffic, leads, conversions and other vital metrics.

Critical Work Functions

Strategy and Implementation

- Provide the strategy behind a marketing campaign, analyse the results, and relay results (successes/challenges), and ultimately, recommend viable solutions.
- Conduct research on digital marketing trends (e.g. pay-per-click advertising, email marketing best practices) and how they can relate to company goals.
- Develop strategies for growth, and assess new campaign/client targets.
- Build out demand generation programmes with the goal of generating campaign success, increasing online presence, and driving Return on Investment (ROI).
- Use a wide variety of programmes and technologies to test/develop/implement new ideas and strategies to generate digital marketing success.
- Use a variety of programmes to create and/or deliver campaigns.

Communication Skills

- Analyse campaign data and educate marketers or sales staff on how to use these results to generate leads/sales.
- Relay technical information/data/results to non-technical team members.
- Work closely with outside vendors or contractors and must be able to watch product demos and assess which tools/technologies fit best for an organisation.

Creation of Digital Marketing Campaigns

- Design digital marketing campaigns to effectively promote companies, products, ideas or brands based on the requirements of internal or external clients paying for the advertising.

Analysis of Marketing Data

- Determine the effectiveness of marketing campaigns by analysing page clicks, keyword hits, search engine traffic and other data.

Advising Marketing Teams

- Keep marketing and sales teams up-to-date on current campaigns, informing them on which aspects of campaigns are the most effective or otherwise.
- Advise on how to tweak campaigns to get maximum attention and create more revenue.

Cultivating and Maintaining Client Relationships

- Provide clients with frequent updates on the status of their advertising campaigns.
- Advise them on the success of campaigns compared to marketing costs.
- Make suggestions to increase marketing effectiveness when necessary.

Writing Marketing Reports

- Create detailed reports showing the amount of traffic online campaigns are creating, how much campaigns cost, and outlining the timetables and schedules for online marketing campaigns.

Management of Pay-per-Click Accounts

- Look at the budget data for pay-per-click accounts on a daily basis to manage campaign costs and provide expense information to to in-house/external clients.

Entry Requirements

BDQF Level 5 in Marketing, Communications, Economics or related field with 5 years of experience in the field **or**
BDQF Level 4 in Marketing, Communications, Economics or related field with 3 years of experience.

Skills & Competencies

Technical	Level
Business Analysis	4
Customer Intelligence Analysis	4
Customer Behaviour Analysis	4
Data and Trend Analytics	4
Market Research	4
Media and Platform Management	4
Stakeholder Management	4
Budgeting	4
IT Project Management	3
Service Management	3

Soft Skills	Level
Analytical Thinking	Advanced
Decision-making	Advanced
Communication	Advanced
Work Management	Advanced
Teamwork	Advanced
People Management	Intermediate
Creativity and Innovation	Advanced
Results Orientation	Advanced
Service Orientation	Advanced
Negotiation	Intermediate
Resilience	Advanced

Recommended Technical Training Courses

- Digital Marketing Pro – Digital Marketing Institute
- Google AdWords Certification
- Google Analytics Certification
- Fundamentals of Digital marketing (Google)
- Search Certification (Google)
- Display Certification (Google)
- Video Certification (Google)
- Meta Blueprint Certification
- Meta Certified Digital Marketing Associate
- Meta Certified Media Buying Professional
- Google Analytics IQ Certification
- Hootsuite Social Marketing Certification
- HubSpot Content Marketing Certification
- HubSpot Email Marketing Certification
- Digital Garage: Fundamentals of Digital Marketing Certification
- YouTube Certification
- HubSpot Inbound Marketing Certification
- Deep Learning Specialization Certification – Coursera
- American Marketing Association (AMA) Digital Marketing Certification
- Copyblogger Certified Content Marketer
- Twitter Flight School Certification
- Bing Ads Certification
- BrainStation – Digital Marketing Certificate
- Semrush SEO Toolkit Course
- Data Privacy Management
- Marketing Analytics and Insights
- LinkedIn Training
- Implementing Digital Marketing Campaigns
- Data Science Professional Certification
- Graduate Certificate in Data Science (Applied)

Digital Marketing Executive

Alternate Job Titles	Digital Marketing Assistant, Digital Marketing Coordinator, Digital Marketing Associate, Digital Marketing Analyst, Internet Marketing Specialist, Web Marketing Specialist, SEO specialist, Paid Search Specialist, Social Media Specialist
Sub-Sector	Digital Media
Functional Group	Digital Media/Marketing
Job Family	Distribution
Job Level	Specialist

Job Description

- Plan, develop, implement and manage the overall digital marketing strategy.
- Manage, guide and train digital marketers and other marketing positions in the team.
- Oversee the digital marketing activities of the organisation.
- Oversee the online and digital techniques undertaken by the organisation, with all digital analytical plans until completion.
- Manage lead conversion, brand building, communication, and market lead qualification.
- Promote the online image of the organisation.
- Execute campaigns and marketing projects.
- Be involved in impact analysis, digital performance measurement, and various media campaigns undertaken by the organisation.
- Oversee the collateral distribution, creation and ideation activities of the organisation.
- Attend to the search engine optimisation activities of the organisation.
- Create and implement online marketing campaigns based on email and SMS.
- Conduct market research, gather client insights, collect, and organise feedback from product testing for new marketing, product and/or service ideas.
- Work in a fluid and collaborative environment and support the basic intent of increasing brand awareness and improving products and services.

Critical Work Functions

Operationalisation of Marketing Strategy

- Understand the basic principles of digital marketing, and the range of tools for planning, implementing and monitoring their application on behalf of the organisation.
- Contribute to web and digital marketing and communication planning and implementation activity.
- Suggest creative and innovative ideas for campaigns.
- Monitor results of web marketing and digital communications.
- Understand the key messages for both internal and external audiences.
- Use customer and employee insight to identify industry trends, needs and sales opportunities.
- Present and communicate at marketing events.
- Appraise factors that influence online marketing activity.
- Make creative use of elements relevant to both digital and traditional environments, and draft appropriate support materials.
- Analyse the effectiveness of campaigns and services and their impact on audience behaviour and business outcomes.
- Organise and participate actively in marketing events.
- Devise and manage market research, marketing planning and campaigns.
- Advise on brand management and promotion of corporate reputation through digital channels.
- Engage strategic managers in approval of large-scale web and digital marketing and communications strategies, promoting innovative solutions to marketing challenges.
- Responsible for the production of marketing materials and staging of events.

- Review the effectiveness of digital marketing and communication strategies and services and their impact on business outcomes.

Marketing Budget Management

- Provide data and trends on historical marketing expenses to support budget development.
- Provide current cost estimates for campaign elements to support budget development.
- Track marketing expenses against budget for management reporting.
- Collate customer ratings and advertising sales figures from various sources.
- Track customer activity for brands or media assets across platforms.
- Create detailed reports to present customer trends to management.

Research and Insight

- Carry out market research and identify unique selling points and key messages.
- Investigate and analyse customer and competitor dynamics.
- Use appropriate channels and technologies for target marketing and engagement.
- Recognise and use the similarities and differences between online and traditional marketing concepts and applications.
- Provide advice on channel methodology, effectiveness and implementation.
- Collate customer ratings and advertising sales figures from various sources.
- Track customer activity for brands or media assets across platforms.
- Create detailed reports to present customer trends to management.

Execution of Marketing Campaigns

- Internalise the brand portfolio and positioning of media assets.
- Assist in the creation of marketing collaterals.
- Prepare press kits for marketing campaigns.
- Coordinate the logistics involved in organising marketing activities.
- Maintain databases for campaign life cycle management.
- Send periodic marketing schedules to creative agencies for further dissemination.
- Conduct market research and maintain relevant information, including lessons learned from previous projects.
- Develop creative and innovative ideas for campaigns.
- Apply appropriate strategies and tools, including web and digital, to inform and produce marketing plans.
- Develop and deliver targeted digital and multi-channel communication campaigns to get key messages across and reinforce the organisation's unique selling points, key messages, and brand.
- Apply tools to measure the effectiveness of internal and external web and digital campaigns and recommend appropriate methods to a given situation.

Marketing Communication Management

- Identify potential partner advertising agencies for marketing communication.
- Engage advertising agencies on a day-to-day basis to communicate expectations and contingent requirements and take feedback.
- Track performance of partner agencies for management reporting.

Website Design

- Coordinate the design and functionality of a company website, working alongside web developers and web designers and coordinating the process.
- Responsible for all website content and for creating and implementing the content strategy to ensure online objectives are met.
- Responsible for ensuring that the website is easily found by the target audience.
- Drive relevant traffic to the website optimising structure and content for search engines (Search Engine Optimisation) and/or the use of paid online advertising (Search Engine Marketing).
- Responsible for converting website visits into online opportunities/leads by making the online shopping experience as easy as possible and by introducing special deals.
- Responsible for managing the online presence and brand of a company through social networking tools such as Facebook, Twitter and Google+ that allow businesses to engage with their consumers in real time.

Advising on Product Development and Enhancement

- Collaborate with technology teams to ideate commercially viable products.
- Coordinate with industry partners to conduct testing of new or enhanced products to obtain feedback.
- Collect and organise feedback from product testing for analysis.

Skills & Competencies

Technical	Proficiency Level
Business Analysis	4
Customer Intelligence Analysis	4
Customer Behaviour Analysis	4
Data and Trend Analytics	4
Market Research	4
Media and Platform Management	4
Stakeholder Management	4
Budgeting	4
IT Project Management	3
Service Management	4

Soft Skills	Proficiency Level
Analytical Thinking	Advanced
Decision-making	Advanced
Communication	Advanced
Work Management	Advanced
Teamwork	Advanced
People Management	Advanced
Creativity and Innovation	Advanced
Results Orientation	Advanced
Service Orientation	Advanced
Negotiation	Advanced
Resilience	Advanced

Entry Requirements

BDQF Level 5 in Marketing, Communications, Economics or related field with 5 years of experience in the field.

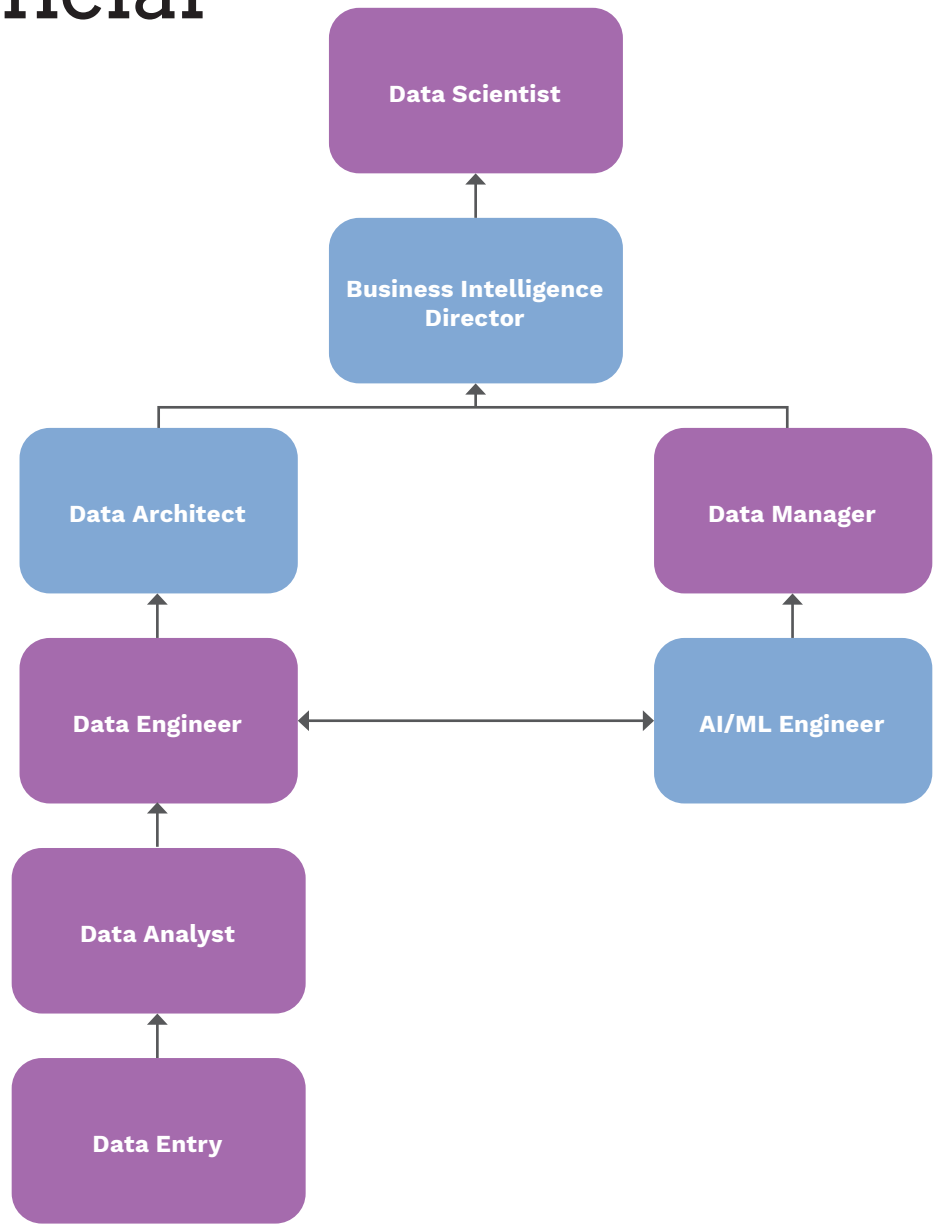
Recommended Technical Training Courses

- American Marketing Association (AMA) Digital Marketing Certification
- Digital Marketing Institute Certified Digital Marketing Certifications
- Bing Ads Certification
- BrainStation – Digital Marketing Certificate
- Copyblogger Certified Content Marketer
- Deep Learning Specialization Certification – Coursera
- Digital Marketing Pro – Digital Marketing Institute
- Meta Blueprint Certification
- Meta Certified Digital Marketing Associate
- Meta Certified Media Buying Professional
- Digital Garage: Fundamentals of Digital Marketing Certification
- Display Certification (Google)
- Fundamentals of Digital Marketing (Google)
- Search Certification (Google)
- Google Ads Certification
- Google Analytics Certification
- Google Analytics IQ Certification
- Hootsuite Social Marketing Certification
- HubSpot Content Marketing Certification
- HubSpot Email Marketing Certification
- HubSpot Inbound Marketing Certification
- Semrush SEO Toolkit Course
- Twitter Flight School Certification
- YouTube Certification

Data and Artificial Intelligence Sub-Sector

Data and Artificial Intelligence Career Path

Framework developed



Data Entry

Alternate Job Titles	Data Entry Operator, Data Entry Processor, Data Entry Clerk
Sub-Sector	Data and Artificial Intelligence
Functional Group	Software, Systems and Analytics
Job Family	Data
Job Level	Entrant

Job Description

- Prepare and sort documents for data entry.
- Check source documents for accuracy through verification of data, as well as obtain further information when current data is incomplete or insufficient.
- Enter data into database software and checking to ensure the accuracy of the data that has been inputted.
- Create data backups as part of a contingency plan.
- Respond to information requests from authorised members.
- Test new database systems and software updates.

Critical Work Functions

- Resolve discrepancies in information and obtain further information for incomplete documents.
- Store completed documents in designated locations and maintain logbooks or records of activities and tasks comply with data integrity and security policies.
- Insert customer and account data by inputting text based and numerical information from source documents within time limits.
- Compile, verify accuracy and sort information according to priorities to prepare source data for computer entry.
- Review data for deficiencies or errors, correct any incompatibilities if possible and check output.
- Research and obtain further information for incomplete documents.
- Apply data program techniques and procedures.
- Generate reports, store completed work in designated locations and perform backup operations.
- Scan documents and print files, when needed.
- Keep information confidential.

Skills & Competencies

Technical	Proficiency Level
Business Analysis	2
Data Analytics	2
Data Ethics	3
Database Administration	2
Data Governance	3
Data Migration	2
Information Security Management	2
Service Management	2

Soft Skills	Proficiency Level
Analytical Thinking	Intermediate
Decision-Making	Basic
Communication	Basic
Work Management	Basic
Teamwork	Basic
People Management	Basic
Creativity and Innovation	Basic
Results Orientation	Basic
Service Orientation	Basic
Negotiation	Basic
Resilience	Basic

Entry Requirements

BDQF Level 4 in Data Analytics, IT, Information Systems or related field.

Recommended Technical Training Courses

- Introduction to Data Entry
- Become A Data Entry Pro
- Become A Virtual Assistant
- Microsoft Excel
- Google Data Analytics
- Power BI
- Power Apps
- Basic Coding

Data Analyst

Alternate Job Titles	Data Modeler, Business Intelligence Analyst, Data Warehouse Analyst, Systems Analyst, Business Analyst, Computer Analyst
Sub-Sector	Data and Artificial Intelligence
Functional Group	Data Services
Job Family	Data
Job Level	Entrant or Specialist

Job Description

- Assist in the data collection, processing, and warehousing tasks, which may also include collection, analysing and visualising large sets of data.
- Perform basic data cleansing and transformation.
- Generate reports, dashboards, clean and prepare the data and analytical solutions according to business rules and specifications utilising development tools.
- Perform analysis to support business and product decisions.
- Work with management team to identify opportunities for improvement.
- Create reports for internal teams and external clients.
- Use graphs, infographics and other methods to establish KPIs to measure the effectiveness of business decisions.
- Structure large data sets to find usable information.
- Work with a team of analysts and other associates to process information.
- Create presentations and reports based on recommendations and findings.
- Coordinate with internal teams to develop projections on outcomes of implementing business strategies that result in actionable insights.

Critical Work Functions

Business Needs Identification

- Identify the information needs of stakeholders for decision-making.
- Assist in translating business needs into analytical and reporting requirements.
- Recommend the types of data and data sources needed to obtain the information and insights required.
- Assist in identifying potential business intelligence services required by the company.

Data Preparation and Analysis

- Perform data entry tasks in data collection systems.
- Gather data from internal systems and external source.
- Clean and update databases to remove duplicated, outdated or irrelevant information.
- Perform data validation and quality control checks.
- Perform basic extract, transform and load related activities to prepare data for analysis or transfer.
- Analyse data to identify trends, patterns and correlations to support decision-making.
- Propose solutions and recommendations to address information needed.
- Manage master data, including creation, updates and deletion.
- Manage users and users' roles.
- Provide quality assurance of imported data, working with quality assurance analysts if necessary.
- Commission and decommission data sets.
- Process confidential data and information according to guidelines.
- Conduct new technology research as requested.

Insight Presentation

- Manage and design the reporting environment, including data sources, security and metadata.
- Support the data warehouse in identifying and revising reporting requirements.
- Support initiatives for data integrity and normalisation.

- Generate reports from single or multiple systems.
- Troubleshoot the reporting database environment and reports.
- Evaluate changes and updates to source production systems.
- Train end-users on new reports and dashboards.
- Provide technical expertise in data storage structures, data mining and data cleansing.
- Carry out routine maintenance tasks to detect and/or prevent system malfunctions that disrupt system connectivity.
- Develop automated and logical data model and data output methods.
- Translate analyses into a common business language to influence business decisions or actions.
- Design of data reports and visualisation tools to facilitate understanding of data through storytelling.

Skills & Competencies

Technical	Proficiency Level	
	Entrant	Specialist
Business Analysis	2	3
Data Analytics	3	4
Data Engineering	3	4
Data Ethics	3	4
Data Visualisation	3	4
Database Administration	3	4
Data Cleansing	3	4
Information Security Management	3	4
Networking	2	3
IT Project Management	2	3
Service Management	3	4

Soft Skills	Proficiency Level	
	Entrant	Specialist
Analytical Thinking	Intermediate	Advanced
Decision-Making	Intermediate	Advanced
Communication	Intermediate	Advanced
Work Management	Intermediate	Advanced
Teamwork	Intermediate	Advanced
People Management	Intermediate	Advanced
Creativity and Innovation	Intermediate	Advanced
Results Orientation	Intermediate	Advanced
Service Orientation	Intermediate	Advanced
Negotiation	Intermediate	Advanced
Resilience	Intermediate	Advanced

Entry Requirements

BDQF Level 6 in Information Systems, Computer Science, Statistics, Mathematics, Actuarial Science or related field **or**
BDQF Level 5 in Information Systems, Computer Science, Statistics, Mathematics, Actuarial Science or related field with relevant industry experience or possess relevant portfolio/experience.

Recommended Technical Training Courses

- Associate Certified Analytics Professional (aCAP)
- Certification of Professional Achievement in Data Sciences
- Certified Analytics Professional
- Cloudera Data Platform Generalist
- EMC Proven Professional Data Scientist Associate (EMCDSA)
- IBM Data Science Professional Certificate
- Microsoft Certified Azure Data Scientist Associate
- Microsoft Certified Data Analyst Associate
- Microsoft Technology Associate
- Open Certified Data Scientist
- SAS Certified Advanced Analytics Professional Using SAS 9
- SAS Certified Data Scientist
- Data Visualization with Tableau
- Power BI
- Google Certified Professional Data Engineer

Data Engineer

Alternate Job Titles	Big Data Engineer, Business Intelligence Engineer, Computer Vision Engineer, Data Architect, Machine Learning Engineer
Sub-Sector	Data and Artificial Intelligence
Functional Group	Software and Systems
Job Family	Applications Configurations and Installations, and IT Security
Job Level	Entrant or Specialist

Job Description

- Support the design, implementation and maintenance of data flow channels and data processing system.
- Assist in developing and implementing data pipelines and data stores.
- Support the collection, storage, batch and real-time processing, and analysis of information in a scalable, repeatable and secure manner.
- Perform administrative tasks to provide accessibility, security and protection of data.
- Design and implement data pipelines and data stores to acquire and prepare data.
- Apply data engineering standards and tools to create and maintain data pipelines and extract, transform and load data.
- Design, implement and maintain complex data engineering solutions to acquire and prepare data.
- Create and maintain data pipelines to connect data within and between data stores, applications and organisations.
- Carry out routine/complex data quality checking and remediation.
- Plan and drive the development of data engineering solutions ensuring that solutions balance functional and non-functional requirements.
- Monitor application of data standards and architectures including security and compliance.
- Contribute to organisational policies, standards and guidelines for data engineering.

Critical Work Functions

Identification of Business Needs

- Lead the selection and development of data engineering methods, tools and techniques.
- Develop organisational policies, standards and guidelines for the development and secure operation of data services and products.
- Ensure adherence to technical strategies and architectures.
- Plan and lead data engineering activities for strategic, large and complex programmes.
- Identify suitable data structures based on business needs to ensure availability and accessibility of data.
- Determine technical system requirements based on data needs.
- Keep abreast of latest technologies and products in database and data processing software, and technologies.

Data Pipeline Building and Maintenance

- Assist in building scalable data pipelines to extract, transform, load and integrate data.
- Develop codes and scripts to process structured and unstructured data in real-time from a variety of data sources.
- Test data pipelines for scalability and reliability to process high data volume, variety and velocity.
- Consolidate and create data storage solutions for storage and retrieval of information.
- Develop prototypes and proof-of-concepts for data solutions.
- Monitor data system performance.
- Support the handling and logging of errors.
- Develop backup data archiving systems to ensure system continuity.
- Implement and monitor data security and privacy measures on existing data solutions.

Architecture Design

- Design the architecture of a data platform.
- Develop data-related instruments/instances.
- Develop, customise and manage integration tools, databases, warehouses, and analytical systems.
- Manage data pipeline maintenance and testing.
- Test the reliability and performance of each part of a system.

Machine Learning Algorithm Deployment

- Design machine learning models by data scientists.
- Responsible for deploying machine learning models into production environment.
- Provide the model with data stored in a warehouse or coming directly from sources.
- Configure data attributes.
- Manage computing resources.
- Set up monitoring tools.

Management of Data and Meta-Data

- Manage the data stored and structuring it properly via database management systems.
- Provide data-access tools.
- Set up tools to view data, generate reports and create visuals.
- Track data pipeline stability.
- Monitor the overall performance and stability of the system.
- Monitor and modify the automated part as change needed for data/models/requirements.

Data Solution Optimisation

- Assist in the integration of data systems with existing infrastructure.
- Develop tools to improve data flows between internal and/or external systems and the data warehouse.
- Automate the data collection and analysis processes, data releasing and reporting tools.
- Test data system configurations to increase efficiency.

Skills & Competencies

Technical	Proficiency Level	
	Entrant	Specialist
Business Analysis	2	3
Data Analytics	3	3
Data Engineering	3	3
Computational Modelling	3	3
Data Ethics	3	4
Database Administration	3	3
Data Design	3	4
Data Governance	3	4
Data Migration	3	3
Emerging Technology Synthesis	3	4
IT Project Management	3	4
Information Security Management	3	3
Service Management	3	4

Technical Skills	Proficiency Level	
	Entrant	Specialist
Analytical Thinking	Intermediate	Advanced
Decision-Making	Intermediate	Advanced
Communication	Intermediate	Advanced
Work Management	Intermediate	Advanced
Teamwork	Intermediate	Advanced
People Management	Intermediate	Intermediate
Creativity and Innovation	Intermediate	Advanced
Results Orientation	Intermediate	Advanced
Service Orientation	Intermediate	Advanced
Negotiation	Intermediate	Intermediate
Resilience	Intermediate	Advanced

Entry Requirements

BDQF Level 6 in Computer Science, Information Systems, Software Engineering or related field **or**
BDQF Level 5 in Computer Science, Information Systems, Software Engineering or related field with minimum 5 years relevant experience and certification.

Recommended Technical Training Courses

- Amazon Web Services (AWS) Certified Data Analytics – Specialty
- Cloudera Certified Associate (CCA) Data Analyst
- Cloudera Certified Professional (CCP) Data Engineer
- Cloudera Data Platform Generalist Certification
- Data Science Council of America (DASCA) Associate Big Data Engineer
- Data Science Council of America (DASCA) Senior Big Data Engineer
- Dell EMC Data Science Track (EMCDS)
- Google Professional Data Engineer
- IBM Certified Data Engineer
- IBM Certified Solution Architect – Cloud Pak for Data v4.x
- IBM Certified Solution Architect – Data Warehouse V1
- IBM Data Science Professional Certificate
- Microsoft Certified: Azure AI Fundamental
- Microsoft Certified: Azure Data Engineer Associate
- Oracle Business Intelligence Certification
- SAS Certified Big Data Professional
- SAS Certified Data Scientist
- Tensor flow Developer Certificate
- Agile Methodologies
- Information Technology Infrastructure Library (ITIL)
- Power BI
- Project Management

Data Manager

Alternate Job Titles	Data Management Specialist, Data Management Analyst, Data Management Manager, Data Management Consultant, Data Management Lead
Sub-Sector	Data and Artificial Intelligence
Functional Group	Data Services
Job Family	Data
Job Level	Specialist

Job Description

- Conduct data collection, surveys and research.
- Perform research and provide high level insights regarding the market, trends, competitors, potential and existing customers, and current campaigns.
- Research, gather, and analyse business data for Marketing Managers and Coordinators to review.
- Use intelligence tools to monitor current customers and to identify new ones.
- Design and carry out social, economic, and marketing surveys, as well as demographic studies to define target markets and their buying habits and preferences, as well as to determine existing and future trends.
- Conduct comparative research on marketing strategies.
- Prepare reports on market trends, consumer habits and outcomes.
- Perform verification duties of data acquired to ensure data accuracy and legitimacy.
- Work with a team of analysts and other associates to process information.
- Create presentations and reports based on recommendations and findings.
- Coordinate with internal teams to develop projections on outcomes of implementing business strategies that result in actionable insights.

Critical Work Functions

Information Gathering and Examination of Buying Trends for Development of Successful Marketing Plans

- Monitor the competitors' marketing activities and outcomes.
- Communicate with customers, competitors, professional organisations and suppliers in order to get information on the industry's trends.
- Compile customers' references and feedback.
- Gather data from different sources such as social media channels, web analytics tools and data rankings.
- Segment the target audience and determine the appropriate markets to be approached.

Preparation of Detailed Reports on Sales Volume, Customer Experience, Market Trends, and Competitors' Outcomes

- Prepare monthly, quarterly, and annual reports on all the aforementioned activities and their results.
- Collect business intelligence data from industry reports or purchased sources to delimit trends and to measure the impact of competitors' marketing activities.
- Compile and analyse information on sales, market trends, forecasts, and account analyses.
- Assess and report on investment return and key performance metrics.
- Make recommendations on the most profitable design, promotion, and distribution approach for existing and upcoming products or services.

Skills & Competencies

Technical	Proficiency Level
Business Analysis	3
Customer Intelligence Analysis	4
Customer Behaviour Analysis	4
Data and Trend Analytics	4
Market Evaluation / Market Intelligence	4
Market Research	4
Stakeholder Management	4
Data Ethics	3
IT Project Management	3
Service Management	4
Quality Assurance	4

Soft Skills	Proficiency Level
Analytical Thinking	Advanced
Decision-Making	Advanced
Communication	Advanced
Work Management	Advanced
Teamwork	Advanced
People Management	Advanced
Creativity and Innovation	Advanced
Results Orientation	Advanced
Service Orientation	Advanced
Negotiation	Advanced
Resilience	Advanced

Entry Requirements

BDQF Level 6 in Information Systems, Computer Science, Statistics, Mathematics, Actuarial Science or related field with at least 3 years experience as a Data Analyst or similar role **or**
BDQF Level 5 in Information Systems, Computer Science, Statistics, Mathematics, Actuarial Science or related field with relevant industry experience or possess relevant portfolio/experience with at least 3 years experience as a Data Analyst or similar role.

Recommended Technical Training Courses

- Data Privacy Management
- Marketing Analytics and Insights
- Implementing Digital Marketing Campaigns
- Certification: Data Science Professional
- The Art of Service Master Data Management Certification
- DAMA Certified Data Management Professional (CDMP)
- Data Governance and Stewardship Professional (DGSP)
- Informatica Master Data Management Administrator Certified Professional
- Power BI
- Power Apps
- General Data Protection Regulation (GDPR) Compliance
- Tableau
- Fundamentals in Data Analytics
- Data Privacy and Protection
- Data Ethics

Data Scientist

Alternate Job Titles	Data Mining Engineer, Machine Learning Engineer, Data Architect, Hadoop Engineer, Data Warehouse Architect, Commercial Intelligence Manager, Competitive Intelligence Manager, Strategic Business and Technology Consultant, Manager of Market Intelligence, Director of Enterprise Strategy, Director of Global Intelligence
Sub-Sector	Data and Artificial Intelligence
Functional Group	Data Management
Job Family	Data
Job Level	Specialist

Job Description

- Autonomously identify and pursue research with significant business impact, and make compelling cases for prioritisation, resource allocation and new product strategy.
- Prioritise and execute in the face of ambiguity, adapt tools to answer complicated questions, and identify the trade-offs between speed and quality of different approaches.
- Plan and lead the development of new and advanced data analytics techniques, methodologies and analytical solutions from design, prototyping and testing.
- Collaborate with specialists in data science, analytics, engineering and economics disciplines to efficiently develop reliable and reproducible analyses at scale.
- Identify and develop core data and Artificial Intelligence (AI) science components for the delivery of projects.
- Architect specialised database and computing environments.
- Explore and visualise complex data set to provide incremental business value.
- Extract and integrate data from various sources, and create advanced models and algorithms suitable for the business use case.
- Conduct testing on data and AI models, interpret findings from testing, and evaluate model performance for scaling and deployment.
- Develop compelling and logically structured communication materials to facilitate stakeholder buy-in.
- Support the design, implementation and maintenance of data flow channels and data processing systems that support the collection, storage, batch and real time processing, and analysis of information in a scalable, repeatable and secure manner.
- Focus on defining optimal solutions to data collection, processing and warehousing.
- Design, code and test data systems, and work on implementing those into the internal infrastructure.
- Collect, parse, manage and analyse large sets of data to turn information into insights accessible through multiple platforms.
- Support data processes - provide the team with ad-hoc analysis, automated dashboards and self-service reporting tools so that everyone gets a good sense of the state of the business.
- Good understanding of creating and maintaining optimal data pipeline architecture.
- Build and maintain organisation's data infrastructure requirements using wide range of data sources.
- Good understanding of data governance and adherence to local and global data governance policies.

Critical Work Functions

Evaluation and Understanding of Business Data Needs

- Build and maintain data pipeline.
- Perform complex data analysis and report outcome to various stakeholders.
- Enhance data reliability and data quality.
- Collaborate with Data Analyst and Data Scientist.

Management of Data Preparation and Modelling

- Define objectives and hypothesis for research on data and AI models.
- Analyse the ways in which datasets may be biased and address this in safety measures and deployment strategies.
- Conduct extraction and integration of data including features from different data sources.
- Develop multiple models and algorithms suitable for the use case.
- Perform model comparison to draw inferences on variable importance.
- Select the best model based on pre-defined evaluation criteria.
- Account for data ethics and policies in model selection and evaluation process.
- Interpret and evaluate model performance for scaling and deployment.

Development and Assessment of Models

- Conduct testing on final model in real-time business conditions prior to deployment.
- Scale and deploy models in real-time business conditions for end-user consumption.
- Initiate autonomous monitoring to scale human oversight.
- Document modelling techniques used and assumptions made against test outcomes.
- Enable end-user capability to use AI and data science products effectively.

Visualisation of Data-Driven Business Value

- Create reports and deliverables based on insights derived from the model results.
- Develop compelling, logically structured presentations including story-telling of research and/or analytics findings to secure stakeholder commitment.
- Contribute to the creation of leading-edge resources, including playbooks, guides, blog posts, videos, etc.

Skills & Competencies

Technical	Proficiency Level
Business Analysis	5
Business Innovation	5
Data Analytics	4
Machine Learning	4
Data Modelling and Design	4
Data Ethics and Governance	4
Data Visualisation	4
Database Administration	4
Intelligent Reasoning	4
Pattern Recognition	4
Software Configuration	4
Information Security Management	4
IT Project Management	5
Emerging Technology Synthesis	5
Service Management	5

Soft Skills	Proficiency Level
Analytical Thinking	Advanced
Decision-Making	Advanced
Communication	Advanced
Work Management	Advanced
Teamwork	Advanced
People Management	Intermediate
Creativity and Innovation	Advanced
Results Orientation	Advanced
Service Orientation	Advanced
Negotiation	Intermediate
Resilience	Advanced

Entry Requirements

BDQF Level 6 in IT, Computer Science, Mathematics, Statistics, Management Information Systems, Software Engineering or related field with minimum 6 years experience in related field **or**
BDQF Level 5 in IT, Computer Science, Mathematics, Statistics, Management Information Systems, Software Engineering or related field with 10 years relevant industry experience in data science field and certification.

Recommended Technical Training Courses

- Fundamentals of Data Science
- Statistics
- Programming knowledge
- Data Manipulation and Analysis
- Data Visualization
- Machine Learning
- Deep Learning
- Big Data
- Software Engineering
- Model Deployment
- Diverse Technologies: Hadoop, Java, Python, C++, ECL, NoSQL, HBase, CouchDB, Spark, R
- Visualization: Flare, HighCharts, AmCharts, D3.js, Processing, Google Visualization API, and Raphael.js
- SQL
- Data Visualization
- Agile
- General Data Protection Regulation (GDPR)

Technical Competencies

Technical Competencies Glossary

No.	Competency	Definition
1	Application Development	Knowledge and ability to design, define, construct, enhance, support, and maintain application software on one or more platforms.
2	Application Support and Enhancement	Provide ongoing technical support and improvements to users of applications. This includes technical guidance and assistance related to the installation and maintenance of applications, fixing and resolution of application problems or disruptions, and response to change requests that will enhance the operations and usage of an application.
3	Applications Integration	Integrate data or functions from one application programme with that of another application programme - involves development of an integration plan, programming and the identification and utilisation of appropriate middleware to optimise the connectivity and performance of disparate applications across target environments.
4	Budgeting	Prepare budgets to support short and long-term marketing plans through forecasting, allocation and financial policy setting.
5	Business Analysis	Knowledge and ability to apply the principles of business analysis in the planning, reengineering, requirement gathering for business environments, operations, processes, and practices.
6	Business Innovation	Identifying, prioritising, incubating and exploiting opportunities provided by information, communication and digital technologies.
7	Business Risk Management	Forecast and assess existing and potential IT risks which impact the operation and/or profitability to the business as well as the development and roll out company-wide strategies and processes to mitigate risks, minimise their impact or effectively manage such business risks.
8	Cloud Computing	Implement cloud solutions to enhance business performance and security of IT systems.

No.	Competency	Definition
9	Computational Modelling	Develop, select and apply algorithms and advanced computational methods to enable systems or software agents to learn, improve, adapt and produce desired outcomes or tasks. This also involves the interpretation of data, including the application of data modelling techniques to explore and address specific issues or requirements.
10	Contract Management	Formalise contracts and/or service level agreements with providers of products and services including measure and manage supplier performance and fulfilment of agreed-upon service level agreements. This includes resolution of contractual issues and maintenance of vendor and/or provider relationships.
11	Customer Behaviour Analysis	Devise tools and approaches for customer behaviour analysis and analysing customer behaviour information.
12	Customer Intelligence Analysis	Devise frameworks for consumer intelligence analysis to develop an understanding of customer knowledge from various customer touch points, for example, Customer Relationship Management (CRM), Point of Sale (POS) and e-commerce systems.
13	Cyber and Data Breach Incident Management	Detect and report cyber and data-related incidents, identify affected systems and user groups, trigger alerts and announcements to relevant stakeholders and efficient resolution of the situation.
14	Cyber Risk Management	Develop cyber risk assessment and treatment techniques that can effectively pre-empt and identify significant security loopholes and weaknesses, demonstrate the business risks associated with these loopholes, and provide risk treatment and prioritisation strategies to effectively address the cyber-related risks, threats and vulnerabilities identified to ensure appropriate levels of protection, confidentiality, integrity and privacy in alignment with the security framework.
15	Data Analytics	Knowledge and ability to identify patterns in data. Ability to use statistics, operations research, and other mathematical tools to make sense of information generated or collected by organisations.
16	Data and Trend Analytics	Implementing data analytics within the organisation using statistical and computational techniques and tools, algorithms, predictive data modelling and data visualisation to generate business insights and intelligence.
17	Data Cleansing	Knowledge and ability to fix or remove incorrect, corrupted, incorrectly formatted, duplicate or incomplete data within a dataset. It includes fixing structural errors, filtering unwanted outliers, handle missing data and validating data.

No.	Competency	Definition
18	Data Design	Specify and create a data structure or database model, including the setting of various parameters or fields that can be modified to suit different structured or unstructured data requirements, the design of data flow, as well as the development of mechanisms for maintenance, storage and retrieval of data based on the business requirements.
19	Data Engineering	Develop and implement efficient and stable processes to collect, store, extract, transform, load and integrate data at various stages in the data pipeline. This also involves processing varying amounts of data from a variety of sources and preparing data in a structure that is easily accessed and analysed according to business requirements.
20	Data Ethics	Apply legal and ethical principles in the collection, use, storage and disposal of data.
21	Data Governance	Develop and implement guidelines, laws, and regulations across the organisation for the handling of data at various stages in its life cycle as well as the provision of advice on proper data handling and resolution of data breaches in a range of complex, ambiguous or multi-faceted contexts.
22	Data Migration	Plan and perform activities to migrate data between computer storage types or file formats.
23	Data Modelling And Design	Knowledge and ability to apply architecture theories, principles, concepts, practices, methodologies, and frameworks.
24	Data Visualisation	Implement contemporary techniques, dynamic visual displays with illustrative and interactive graphics to present patterns, trends, analytical insights from data or new concepts in a strategic manner for the intended audience.
25	Database Administration	Knowledge and ability to apply the methods, practices and policies that are used in the design and the management of databases.
26	Database Management	Knowledge and ability to apply the methods, practices and policies that are used in the design and the management of databases.
27	Emerging Technology Synthesis	Explore the development of ICT technology across multi-sector. Review and conduct research on emerging technologies that correlate to industry technology adoption. Evaluate the usage of the multiple emerging technologies and the benefits to be gained in terms of cost, process and productivity improvement.

No.	Competency	Definition
28	Fault Management	The process of finding, isolating and troubleshooting network faults in the fastest way possible. It minimises downtime and prevents device failures by resolving faults rapidly, thereby ensuring optimal network availability and preventing business losses. Monitor network from Network Operations Centre (NOC) location and undertaking configuration changes, upgrades and node back-up activities.
29	Information Security Management	Knowledge and ability to ensure there are adequate technical and organisational safeguards to protect the continuity of IT infrastructure services by the implementation of IT security principles, methods, practices, policies and tools that are used in securing IT resources including information and operations security, physical security, business continuity/disaster recovery planning and methods to deal with security breaches and security assessment in a technical environment.
30	Infrastructure Design	Establish design policies and principles covering elements of connectivity, capacity, security, access, interfacing as well as the translation of that into the specifications, outline and design of IT infrastructure within the organisation, in order to support the business requirements.
31	Infrastructure Management	Knowledge and ability to support the enterprise computing infrastructure (e.g., enterprise servers, client server, storage devices and systems, hardware, and software) in the provision, management, storage, operation, scheduling, support, and maintenance of the infrastructure.
32	Infrastructure Support	Provide services to end-users by systematically identifying, classifying and troubleshooting technical issues and incidents that disrupt and impact their day-to-day business activities, within a specified timeframe. This also includes implementing an end-to-end problem management process to analyse underlying problems, advising on infrastructure related upgrades and improvements and developing user guides and training materials.
33	Intelligent Reasoning	Design and build intelligent machine reasoning systems that can integrate, make sense of, and act upon heterogeneous sensory information sources, using domain knowledge accumulated in respective industries.
34	IT Architecture	Knowledge and ability to apply architecture theories, principles, concepts, practices, methodologies, and frameworks.
35	IT Asset Management	Manage, optimise and protect the organisation's IT assets. This includes the timely purchase, deployment, categorisation, maintenance and phase out of IT assets within the organisation in a way that optimises business value. Also includes development and implementation of procedures to guide the proper handling, usage and storage of IT assets to limit potential business or legal risks.

No.	Competency	Definition
36	IT Project Management	Knowledge and ability to apply formal project management principles and practices during the planning, implementation, monitoring and completion of projects, ensuring effective management of scope, resources, time, cost, quality, risk, and communications.
37	Machine Learning	Developing systems that learn through experience and by the use of data.
38	Market Evaluation / Market Intelligence	A research of a marketplace aimed at determining whether a new product can perform well and succeed in a new business environment. It helps receive insights into competitors, market trends and make strategic business decisions.
39	Market Research	Extract useful business insights, plan, and conduct marketing and digital research and analysis to uncover market, customer and competitor trends. This also includes assessing the effectiveness of marketing activities and developing ways of optimising marketing efforts.
40	Media and Platform Management	Drive organisational policies and procedures for the use of the media and develop and implement business media plans while assessing their effectiveness.
41	Network Administration and Maintenance	Monitor the network in order to provide for optimum levels of network performance and minimisation of downtime. This includes detection, isolation, recovery and limitation of the impact of failures on the network as well as provision of support to system users through ongoing maintenance information sharing and training.
42	Network Security Management	Design and configure network systems to ensure the integrity of network infrastructure through the use of appropriate protection, detection and response mechanisms.
43	Network Configuration	Configure network hardware and software components according to organisational guidelines and technical requirements. This includes the implementation and configuration of multiple servers, network devices and network management tools as well as the management of user network access to ensure stable and reliable network operations.
44	Networking	Knowledge and ability to implement the methods, practices and policies governing the design, analysis, development, management and use of the IT hardware and software to transfer information such as data, voice, images, and video over fibre optics, wired or wireless for intra-building or enterprise-wide networking. This involves management of network performance through systems application and networking protocols. The networking system components comprises of software (operating systems and applications) and hardware (computer, routers, switch, cable and hub).

No.	Competency	Definition
45	Pattern Recognition	Develop and apply intelligent pattern recognition systems and techniques to analyse data and derive useful hidden patterns to solve problems.
46	Performance Management	Evaluate and optimise network, system and/or software performance against user and business requirements. This involves the introduction and utilisation of new tools and mechanisms to gather, analyse and fully optimise performance data. This also includes the initiation of controls, modifications and new investments to enhance end-to-end performance of ICT components, systems and services.
47	Problem Management	Manage the life cycle of problems to prevent problems and incidents from occurring, eliminate recurring incidents and minimise impact of unavoidable incidents.
48	Process Improvement	Establish systems to discover critical processes and maximise these processes to achieve maximum efficiency in accordance with organisation procedures.
49	Procurement	Develop and apply procurement processes related to the solicitation of technology services through external providers. This includes the review of proposals, setting of vendor selection guidelines, risk assessment through appropriate audits and tests and selection of external service providers based on stipulated evaluation criteria.
50	Quality Standards	Develop, review and communicate a clear, quality expectations and standards within an organisation that are aligned to the company's values and business objectives. This encompasses the setting and implementation of quality expectations for IT products and services delivered to both internal or external clients.
51	Quality Assurance	Part of quality management focused on providing confidence that quality requirements will be fulfilled.
52	Security Administration	Administer, configure and update of security programmes and mechanisms, including the application of system patches to ensure that enterprise assets are adequately protected against threats. This also includes the authorisation, management and monitoring of access control permissions and/or rights to various IT facilities.
53	Security Architecture	Design security architectures and controls; either by embedding security principles into the design of architectures to mitigate the risks posed by new technologies and business practices, or by the actual design and specification of implementable security components, along with the accompanying control measures, to meet defined business security needs.

No.	Competency	Definition
54	Security Governance	Develop and disseminate corporate security policies, frameworks and guidelines to ensure that day-to-day business operations guard or are well protected against risks, threats and vulnerabilities.
55	Security Implementation	Execute and implement operational and tactical-level action plans in alignment with the organisation's business strategies.
56	Security Planning	Develop organisational strategies and policies by analysing the impact of internal and external influencing factors and seeking consultation from relevant stakeholders.
57	Security Programme Management	Develop and manage security solutions, products and services through technology innovation, experimentation and collaboration. This includes security programme planning, developing and testing new security capabilities and implementing security technologies and programmes.
58	Service Level Management	Plan, monitor and manage service provisions for the achievement of agreed service level targets.
59	Service Management	Knowledge and ability to implement the methods, practices and policies governing the design of the services, development and use of the IT support services designed to keep the IT environment functioning efficiently, effectively and securely.
60	Software Configuration	Configure software products and apply scripts and automation tools to integrate and deploy software releases to various platforms and operating environments. This includes subsequent modifications to software configuration, based on outcomes of systems and/or configuration tests.
61	Software Design	Create and refine the overall plan for the design of software, including the design of functional specifications starting from the defined business requirements as well as the consideration and incorporation of various controls, functionality and interoperability of different elements into a design blueprint or model which describes the overall architecture in hardware, software, databases, and third-party frameworks that the software will use or interact with.
62	Software Testing	Knowledge and ability to perform testing of software and/or hardware using a systematic approach (i.e., the orderly progression of testing in which software elements, hardware elements or both are combined and tested until the entire system has been integrated).

No.	Competency	Definition
63	Stakeholder Management	Managing the expectations and needs of stakeholders by aligning them with the organisation's demands and goals. This includes planning actions to communicate with, negotiate with and influence stakeholders effectively.
64	System Integration	Develop and implement a roadmap and specific integration solutions to facilitate integration of various ICT components and optimise interoperability of systems and their interfaces. This includes the integration of various architectural components such as networks, servers, system platforms and their interfaces.
65	Telecommunications Network Management	Knowledge and ability to implement the methods, practices and policies governing the design, analysis, development, management and use of the IT and telecommunications hardware and software to transfer information such as data, voice, images, video and other telecommunication services over fibre optic, wired or wireless over short or long distances. This involves utilisation of telecommunication network management systems and signalling network protocols. The telecommunications networking system components comprises of software (operating systems and applications) and hardware (computer, routers, radiocommunication equipment, fibre optic, switches, cable and hub) whether underground or above ground.
66	Test Planning	Develop a test strategy and systematic test procedures to verify and ensure that a product, system or technical solution meets its design specifications as well as the performance, load and volume levels set out. This includes the ability to define when different requirements will be verified across the product life stages, the tools used to perform the test, the data and/or resources needed to conduct the tests and testware in test cases, test scripts, test reports and test plans required.
67	User Interface Design	Design user interfaces for machines and software, incorporating visual, technical, and functional elements that facilitate ease of access, understanding and usage. This would involve adding, removing, modifying or enhancing elements to make the user's interaction with the product as seamless as possible.
68	Vendor Management	Manage vendor relationships by ensuring performance as per contracts, operations within standards established by the organisation such as adherence to safety, security, and compliance standards.

Technical Competencies Descriptor

Technical Competency	Application Development
Competency Description	Knowledge and ability to design, define, construct, enhance, support, and maintain application software on one or more platforms.
Level 1 (Follow)	▷ Demonstrate a basic level of understanding of software specifications or design techniques. ▷ Demonstrate a basic understanding of programming concepts. ▷ Demonstrate a general familiarity with one or more programming languages and/or methodologies. ▷ Understand the importance of testing, documentation, and production assurance. ▷ Know where to look for standards.
Level 2 (Assist)	▷ Demonstrate a working knowledge of one or more programming languages. ▷ Write or adapt software modules for testing and integration. ▷ Understand and employ basic development methods and standards. ▷ Test/debug programme modules. ▷ Use a testing tool and prepare basic test cases. ▷ Understand the migration cycle and prepares programme for migration. ▷ Prepare operational documentation.
Level 3 (Apply)	▷ Demonstrate a detailed knowledge of several programming environments and a good working knowledge of hardware and software interfaces. ▷ Write original multi-module/complex programmes or apply reusable modules. ▷ Design, test and integrate software modules, and resolve programming errors using various debugging tools and techniques. ▷ Provide support, guidance and production assurance for common problems. ▷ Conduct impact analysis for proposed changes to the system. ▷ Prepare technical documentation (e.g., user guides, technical specifications). ▷ Undertake routine analysis and work with designers and analysts to clarify and improve specifications or to identify alternative programming solutions. ▷ Enforce standards (e.g., at walkthroughs).

Level 4 (Ensure)	▷ Demonstrate in-depth knowledge and capability in software construction, testing, infrastructure, configuration, a wide range of system development methodologies and operating standards. ▷ Demonstrate knowledge in multiple applications, data management systems and technologies or in a single area of expertise. ▷ Demonstrate application and corporate knowledge and understand how a change would affect multiple applications. ▷ Make recommendations/decisions in application and programme design, standards, and programme enhancements. ▷ Debug very complex or urgent problems. ▷ Analyse and model business functions, processes, and information flow within or between systems. ▷ Provide guidance/mentorship on programming practices and techniques to individuals and cross-functional teams.
Level 5 (Strategise)	▷ Demonstrate expert knowledge of software design, construction, programming trends, programming, and scripting languages across organisations/agencies in multiple applications and data management systems or in a single area of expertise. ▷ Provide effective strategic direction to enterprise-wide application design. ▷ Guide and oversee multiple-concurrent software construction projects. ▷ Work with users at all levels to define system requirements and specify appropriate system environments to meet operational needs and system performance objectives. ▷ Present software construction disciplines to peers in public forums. ▷ Develop policy and standards for software construction.

Technical Competency	Application Support and Enhancement
Competency Description	Provide ongoing technical support and improvements to users of applications. This includes technical guidance and assistance related to the installation and maintenance of applications, fixing and resolution of application problems or disruptions, and response to change requests that will enhance the operations and usage of an application.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Perform routine installation and maintenance of applications. ▷ Collate performance statistics and user feedback on an application.
Level 3 (Apply)	▷ Install, maintain and troubleshoot commonly encountered problems in applications. ▷ Respond to simple change requests.
Level 4 (Ensure)	▷ Analyse application performance statistics and user feedback. ▷ Resolve bugs as required. ▷ Review application change requests, reengineering, models and processes redesign.
Level 5 (Strategise)	N/A

Technical Competency	Applications Integration
Competency Description	Integrate data or functions from one application programme with that of another application programme - involves development of an integration plan, programming and the identification and utilisation of appropriate middleware to optimise the connectivity and performance of disparate applications across target environments.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Integrate data and functions across application programmes. ▷ Perform follow-up tests to verify proper functioning.
Level 4 (Ensure)	▷ Oversee end-to-end process of application integration. ▷ Determine suitable middleware and testing procedures. ▷ Resolve issues that arise.
Level 5 (Strategise)	▷ Establish a business case for application integration. ▷ Introduce new middleware tools and methodologies to enable both intra and inter-enterprise application integration.

Technical Competency	Budgeting
Competency Description	Preparing organisational budgets to support short and long-term business plans through forecasting, allocation and financial policy setting.
Level 1 (Follow)	▷ Understand basics of the budgeting process, including purpose and use. ▷ Analyse historical revenues and expenses to determine seasonal patterns and anticipate annual requirements.
Level 2 (Assist)	▷ Anticipate operational and capital requirements. ▷ Develop financial budgets to support goals of a small to midsize organisation or department/division. ▷ Validate assumptions made by departments.
Level 3 (Apply)	▷ Prepare business unit's operational budgets.
Level 4 (Ensure)	▷ Manage budgeting and forecasting for annual financial and business planning within the business unit. ▷ Develop long-term financial plans and budget requirements. ▷ Recommend an appropriate budgeting methodology (e.g., flexible, continuous, rolling, zero-based) to use in a given business situation. ▷ Link budgeting process to forecasting and strategic planning process. ▷ Integrate and consolidate information from diverse departments. ▷ Communicate budget to organisation effectively.
Level 5 (Strategise)	▷ Endorse organisational financial and treasury management policies, systems, budgets and plans. ▷ Design and lead budget and financial planning process across multiple business units in a complex organisation using advanced software tools. ▷ Understand complex budgets and communicate them to others. ▷ Serve as an expert in the field.

Technical Competency	Business Analysis
Competency Description	Knowledge and ability to apply the principles of business analysis in the planning, reengineering, requirement gathering for business environments, operations, processes, and practices.
Level 1 (Follow)	▷ Demonstrate awareness of business rules and concepts.
Level 2 (Assist)	▷ Understand business lines. ▷ Understand basic industry, organisation and departmental services. ▷ Draft simple requirements.
Level 3 (Apply)	▷ Understand client's business requirements, business roles, business planning and business processes. ▷ Understand and work within governance principles. ▷ Understand audit and compliance principles, change management principles and the impact of changes. ▷ Understand how technologies can enable business processes. ▷ Translate business requirements into technical requirements. ▷ Develop clear requirement statements. ▷ Develop simple business cases. ▷ Carry out simple business process reengineering, models and processes redesign.
Level 4 (Ensure)	▷ Validates business requirements and applies business priorities. ▷ Gather/refine complex business requirements, recommend, or make decisions on business requirements/inter-dependencies. ▷ Develop complex business cases. ▷ Carry out impact analyses and environmental scans to make recommendations. ▷ Lead business process reengineering. ▷ Present and defend complex positions and strategies for business decisions, processes, and plans. ▷ Guide other business analysts. ▷ Advise on compliance, governance structures and audit principles.
Level 5 (Strategise)	▷ Work at the "integration level" by understanding the business architecture and its relationship to other architectures. ▷ Make recommendations to senior management on strategies and plans. ▷ Carry out environmental scans of architecture. ▷ Assess corporate impacts of changes and recommend strategies to senior management. ▷ Develop complex business cases across multiple business lines and platforms. ▷ Set standards for compliance and governance structures. ▷ Understand and apply standards (Quality standards). ▷ Address governance issues. ▷ Define metadata models at the enterprise level, information models and the interoperability model. ▷ Extend the body of knowledge and contributes to industry standards.

Technical Competency	Business Innovation
Competency Description	Identify, prioritise, incubate and exploit opportunities provided by information, communication and digital technologies.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	N/A
Level 4 (Ensure)	▷ Manage the innovation pipeline and execute innovation processes. ▷ Develop and adapt innovation tools, processes and infrastructures to drive the process of innovation. ▷ Identify resources and capabilities needed to support innovation. ▷ Encourage and motivate innovation communities, teams and individuals to share creative ideas and learn from failures. ▷ Manage and facilitate the communication and open flow of creative ideas between interested parties and the set-up of innovation networks and community.
Level 5 (Strategise)	▷ Obtain organisational commitment to innovation. ▷ Develop organisational capabilities to drive innovation. ▷ Lead and plan the development of innovation capabilities and implementation of innovation processes, tools and frameworks. ▷ Lead the communication and an open flow of creative ideas between interested parties and the set-up of innovation networks and communities. ▷ Lead development of a culture that encourages innovation, risk-taking and collaboration. ▷ Embed innovation processes throughout business units and link strategy execution with innovation. ▷ Align organisational and individual objectives, measures and rewards with innovation.

Technical Competency	Business Risk Management
Competency Description	Forecast and assess existing and potential IT risks which impact the operation and/or profitability to the business as well as the development and roll out of company-wide strategies and processes to mitigate risks, minimise their impact or effectively manage such business risks.
Level 1 (Follow)	▷ Being aware of what kind of business problems can be addressed by data-driven solutions. ▷ Understand the principles and general ideas of creating a data science/analytics solution.
Level 2 (Assist)	▷ Undertake basic risk management activities. ▷ Maintain documentation of risks, threats, vulnerabilities and mitigation actions.
Level 3 (Apply)	▷ Identify risks and their business impact and propose measures to manage risks. ▷ Carry out risk management activities within a specific function, technical area or project of medium complexity. ▷ Identify risks and vulnerabilities, assess their impact and probability, develop mitigation strategies and reports to the business. ▷ Involve specialists and domain experts as necessary. ▷ Assess current and potential risks within a defined functional area, and develop risk countermeasures and contingency plans.
Level 4 (Ensure)	▷ Critically evaluate, review and drive organisation-wide risk mitigation and management initiatives. ▷ Plan and implement complex and substantial risk management activities within a specific function, technical area, project or programme. ▷ Implement consistent and reliable risk management processes and reporting to key stakeholders. ▷ Engage specialists and domain experts as necessary. ▷ Advise on the organisation's approach to risk management. ▷ Plan and manage the implementation of organisation-wide processes and procedures, tools and techniques for risk management. ▷ Consider organisation-wide risk and mitigation activities within the context of business risk as a whole and the organisation's appetite for risk. ▷ Provide leadership on risk management at the organisational and business levels.
Level 5 (Strategise)	▷ Anticipate emerging threats and potential risks, and define the overarching risk management strategy for the business. ▷ Establish organisational strategy for risk management. ▷ Define and communicate the organisation's appetite for risk. ▷ Provide resources to implement the organisation's risk strategy. ▷ Delegate authority for detailed planning and execution of risk management activities across the organisation.

Technical Competency	Cloud Computing
Competency Description	Implement cloud solutions to enhance business performance and security of IT systems.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Deploy cloud solutions and resolve cloud integration issues. ▷ Design cloud services and capabilities using appropriate modelling techniques following agreed architectures, design standards, patterns and methodology. ▷ Identify and evaluate alternative design options and trade-offs. ▷ Create multiple design views to address the concerns of the different stakeholders of the architecture and to handle both functional and non-functional requirements. ▷ Model, simulate or prototype the behaviour of proposed cloud services to enable approval by stakeholders. ▷ Produce detailed service design specification to form the basis for the realisation of cloud-based service solutions. ▷ Review, verify and improve own designs against specifications.
Level 4 (Ensure)	▷ Develop plans to implement cloud solutions. ▷ Adopt and adapt appropriate cloud computing design methods, tools and techniques selecting appropriately from predictive (plan-driven) approaches or adaptive (iterative/agile) approaches, and ensure they are applied effectively. ▷ Design large or complex cloud-based service solutions. ▷ Undertake impact analysis on major design options and trade-off. ▷ Make recommendations and assess and manage associated risks. ▷ Review others' cloud-based service designs to ensure selection of appropriate technology, efficient use of resources, and integration of multiple cloud providers and technology. ▷ Ensure that the cloud-based service design balances functional and non-functional requirements. ▷ Contribute to development of service design policies and standards and selection of architecture components and building blocks. ▷ Plan and direct migration of IT services from traditional infrastructure to cloud computing-based infrastructures and/or services.

Level 5 (Strategise)	▷ Develop organisational policies, standards, guidelines, and methods for cloud-based service design. ▷ Champion the importance and value of cloud-based design principles and the selection of appropriate service design life cycle models; whether predictive (plan-driven) approaches or more adaptive (iterative/agile) approaches ▷ Drive adoption of and adherence to relevant policies, standards, strategies and architectures. ▷ Lead cloud-based service design activities for strategic, large and complex solution development programmes. ▷ Develop effective implementation and procurement strategies, consistent with specified requirements, architectures and constraints of performance and feasibility. ▷ Develop cloud-based service solutions requiring introduction of new technologies or new uses for existing technologies. ▷ Evaluate the suitability of cloud computing-based solutions for IT services considering policies, standards, cost-effectiveness, performance and corporate strategy.

Technical Competency	Computational Modelling
Competency Description	Develop, select and apply algorithms and advanced computational methods to enable systems or software agents to learn, improve, adapt and produce desired outcomes or tasks. This also involves the interpretation of data, including the application of data modelling techniques to explore and address a specific issues or requirements.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Identify and utilise appropriate statistical algorithms and data models to test hypotheses and derive patterns or solutions. ▷ Establish, modify or maintain simple data structures and associated components. ▷ Use specific data modelling and design techniques under guidance. ▷ Apply standard data modelling and design techniques based upon a detailed understanding of requirements. ▷ Establish, modify and maintain data structures and associated components. ▷ Communicate the details of data structures and associated components to others using the data structures and associated components.
Level 4 (Ensure)	▷ Investigate enterprise data requirements where there is some complexity and ambiguity. ▷ Plan own data modelling and design activities, selecting appropriate techniques and the correct level of detail for meeting assigned objectives. ▷ Provide advice and guidance to others using the data structures and associated components.
Level 5 (Strategise)	▷ Set standards for data modelling and design tools and techniques, advise on their application and ensure compliance. ▷ Manage the investigation of enterprise data requirements based upon a detailed understanding of information requirements. ▷ Coordinate the application of analysis, design and modelling techniques to establish, modify or maintain data structures and their associated components. ▷ Manage the iteration, review and maintenance of data requirements and data models.

Technical Competency	Contract Management
Competency Description	Formalise contracts and/or service level agreements with providers of products and services including measure and manage supplier performance and fulfilment of agreed-upon service level agreements. This includes resolution of contractual issues and maintenance of vendor and/or provider relationships.
Level 1 (Follow)	▷ Basic knowledge of purchasing. ▷ Knowledge of purchasing techniques. ▷ Ability to research and apply laws, regulations, and policies. ▷ Knowledge of negotiated procurement procedures and the laws, regulations and precedents governing procurement by this method, to perform developmental assignments or segments of large procurement actions.
Level 2 (Assist)	▷ Knowledge of the principles, techniques, methods, and procedures of contracting to perform pre-award and post-award procurement actions where the actions are well defined and well precedented. ▷ Knowledge and skills sufficient to evaluate bids and proposals, recommend competitive ranges, make standard investigations of contractor capabilities concerning financial, personnel, equipment, and managerial resources necessary to fulfil contract terms. ▷ Limited knowledge of negotiation methods, techniques, and principles sufficient to work with request for quotations and requests for proposals for standard items. ▷ Knowledge and skill sufficient to monitor the progress of contractors with fixed price contracts; to advise contractors regarding contractual requirement limitations; to coordinate requests for deviations from contract specifications; to review payment requests; and to recommend approval payment or withholding of partial or final payment. ▷ Research, interpret, and analyse precedent decisions, laws, and regulations. ▷ Communicate orally and in writing to present instructions, policy, and/or supporting documentation.
Level 3 (Apply)	▷ Source and collect contract performance data (such as pricing and supply chain costs), and monitor performance against KPIs. ▷ Identify and report under-performance and develop opportunities for improvement. ▷ Monitor compliance with Terms and Conditions and take appropriate steps to address non-compliance. ▷ Pro-actively manage risk and reward mechanisms in the contract. ▷ Monitor progress against business objectives specified in the business case. ▷ Identify where change is required, and plan for variations. ▷ Ensure that change management protocols are implemented in consultation with stakeholders.

Level 4 (Ensure)	▷ Oversee and measure the fulfilment of contractual obligations. ▷ Use Key Performance Indicators (KPIs) to monitor and challenge performance and identify opportunities for continuous improvement. ▷ Develop strategies to address under-performance and compliance failures, including application of contract terms. ▷ Identify where changes are required, evaluate the impact, and advise stakeholders about the implications and consequences for the business and/or the procurement element of programmes/projects. ▷ Negotiate variations and seek appropriate authorisation. ▷ Actively support and engage with experts and stakeholders to ensure continuous improvements are identified through review and benchmarking processes.
Level 5 (Strategise)	▷ Negotiate and resolve contractual issues, including failure to meet contractual obligations. ▷ Promote change control processes and lead variation negotiations when necessary. ▷ Champion continuous improvement programmes, jointly developing strategies and incentives to enhance performance. ▷ Undertake comprehensive financial evaluations. ▷ Ensure non-discriminatory behaviour and legal compliance. ▷ Ensure that lessons learned from reviews are documented and promoted with all stakeholders. ▷ Develop broad industry/category credentials as “best practice” champion.

Technical Competency	Customer Behaviour Analysis
Competency Description	Devising tools and approaches for customer behaviour analysis and analysing customer behaviour information.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Collect information based on established research frameworks and historical data on customer behaviours and characteristics.
Level 3 (Apply)	▷ Analyse information to develop customer behaviour insights, such as how marketing activities can be affected to increase the customer base. ▷ Understand the range of metrics used to measure value and effectiveness and can use analytics to review the business impact of key marketing activities.
Level 4 (Ensure)	▷ Manage customer behaviour analysis activities and present findings and recommendations relating to possible changes in marketing activities with a view to influence the behaviour of target consumers.
Level 5 (Strategise)	▷ Establish a model and framework of customer behaviour analysis and devise parameters to identify types of customer characteristics that are essential for making informed decisions about changes in marketing activities.

Technical Competency	Customer Intelligence Analysis
Competency Description	Devise frameworks for consumer intelligence analysis to develop an understanding of customer knowledge from various customer touch points, for example, Customer Relationship Management (CRM), Point of Sale (POS) and e-commerce systems.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Analyse data from CRM, POS and e-commerce systems. ▷ Generate relevant customer insights.
Level 3 (Apply)	▷ Determine the value of accumulated business, CRM, POS, and e-commerce data and integrate customer interaction data across all touch-points. ▷ Demonstrate an ability to take a comprehensive approach to insights development, through demonstrating integrated thinking (both behavioural and data). ▷ Work with cross functional teams across the business to ensure that the organisation is gathering good quality behavioural information and data.
Level 4 (Ensure)	▷ Design the consumer intelligence analysis framework to drive efforts to collect data and set specific consumer intelligence analysis goals and generate derived measures. ▷ Lead the business insights strategy for the organisation and makes a significant contribution to the overall marketing and strategic planning process. ▷ Ensure that the power and benefits of all relevant information sources, is shared across the organisation and not restricted to marketing.
Level 5 (Strategise)	▷ Drive data collection efforts and set specific objectives of consumer intelligence analysis. ▷ Generate derived measure.

Technical Competency	Cyber and Data Breach Incident Management
Competency Description	Detect and report cyber and data-related incidents, identify affected systems and user groups, trigger alerts and announcements to relevant stakeholders and efficient resolution of the situation.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Develop incident management procedures and synthesise incident-related analyses to distil key insights, resolve incidents and establish mitigating and preventive solutions. ▷ Apply and maintain specific security controls as required by organisational policy and local risk assessments. ▷ Communicate security risks and issues to business managers and others. ▷ Perform basic risk assessments for small information systems. ▷ Contribute to the identification of risks that arise from potential technical solution architectures. ▷ Suggest alternate solutions or countermeasures to mitigate risks. ▷ Define secure systems configurations in compliance with intended architectures. ▷ Support investigation of suspected attacks and security breaches.
Level 4 (Ensure)	▷ Provide guidance on the application and operation of elementary physical, procedural and technical security controls. ▷ Explain the purpose of security controls and perform security risk and business impact analysis for medium complexity information systems. ▷ Identify risks that arise from potential technical solution architectures. ▷ Design alternate solutions or countermeasures and ensure identified risks are mitigated. ▷ Investigate suspected attacks and support security incident management. ▷ Formulate incident response strategies and direct teams in the remediation, resolution, communication and post-mortem of large-scale, unpredictable cyber and data incidents. ▷ Develop and communicate corporate information security policy, standards and guidelines. ▷ Ensure architectural principles are applied during design to reduce risk. ▷ Drive adoption and adherence to policy, standards and guidelines. ▷ Provide advice and guidance on security strategies to manage identified risks and ensure adoption and adherence to standards. ▷ Contribute to development of information security policy, standards and guidelines. ▷ Obtain and act on vulnerability information and conduct security risk assessments, business impact analysis and accreditation on complex information systems. ▷ Investigate major breaches of security, and recommend appropriate control improvements. ▷ Develop new architectures that mitigate the risks posed by new technologies and business practices.

Level 5 (Strategise)	▷ Direct the development, implementation, delivery and support of an enterprise information security strategy aligned with the business strategy. ▷ Ensure compliance between business strategies and information security. ▷ Lead the provision of information security expertise, guidance and systems needed to execute strategic and operational plans. ▷ Secure organisational resources to execute the information security strategy. ▷ Contribute to the development of organisational strategies that address information control requirements. ▷ Identify and monitor environmental and market trends and proactively assess impact on business strategies, benefits and risks. ▷ Lead the provision of authoritative advice and guidance on the requirements for security controls in collaboration with subject matter experts. ▷ Drive cross-collaboration efforts to co-develop strategies to manage cyber and data incidents on an industry, national or international scale.

Technical Competency	Cyber Risk Management
Competency Description	Develop cyber risk assessment and treatment techniques that can effectively pre-empt and identify significant security loopholes and weaknesses, demonstrate the business risks associated with these loopholes and provide risk treatment and prioritisation strategies to effectively address the cyber-related risks, threats and vulnerabilities identified to ensure appropriate levels of protection, confidentiality, integrity and privacy in alignment with the security framework.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Develop cyber risk assessment techniques and roll out endorsed measures to address identified cyber security risks, threats and vulnerabilities.
Level 4 (Ensure)	▷ Assess and direct enhancements to cyber risk assessment techniques, and develop strategies to address cyber security loopholes. ▷ Evaluate the readiness and robustness of the organisation's cyber security defences, and authorise cyber risk assessment activities.
Level 5 (Strategise)	N/A

Technical Competency	Data Analytics
Competency Description	Knowledge and ability to identify patterns in data. Ability to use statistics, operations research, and other mathematical tools to make sense of information generated or collected by organisations.
Level 1 (Follow)	▷ Appreciation of custom coding requirement to customise every step of the data science/analytics life cycle. ▷ Awareness of the mainstream programming languages available (e.g., R, Python, etc). ▷ Awareness and understanding of all stages of data science/analytics life cycle and specifics of the data science/analytics project management.
Level 2 (Assist)	▷ Familiarity with the wide range of mainstream commercial and open-source data science/analytics software tools, their constraints, advantages, disadvantages and areas of application. ▷ Intermediate skills in using at least one such tool. ▷ Familiarity with programming languages (e.g., R, Python, etc). ▷ Basic programming skills. ▷ Interpret an existing script of moderate complexity. ▷ General understanding of all stages of Data Science/Analytics life cycle and project management. ▷ Assist in the scoping, planning and delivery of projects under the direction of Senior Analyst or Lead Analyst, including documenting business requirements. ▷ Manage moderate-scale projects and assist in management of large-scale or multi-stage projects.
Level 3 (Apply)	▷ Familiarity with the wide range of data science/analytics commercial and open-source software tools, their constraints, advantages, disadvantages, areas of application and mainstream packages relevant to technical stages of data science/analytics projects. ▷ Expertise with at least one such tool from intermediate to advanced skills in programming languages used for data science/analytics (e.g., R, Python, etc) and ability to apply these for data acquisition, pre-processing, modelling and model deployment. ▷ Interpret and modify existing scripts and conduct quality checks. ▷ Conduct general impact analysis on database change management. ▷ Prepare a project plan, communicate the plan to the team and allocate the tasks. ▷ Experience in working with stakeholders and the collection of business requirements for data science projects including establishing the business need, key stakeholders, scope, resourcing and success criteria for a specific issue.
Level 4 (Ensure)	▷ Familiarity with the wide range of data science/analytics commercial and open-source software tools, their constraints, advantages, disadvantages, areas of application and best-practice packages. ▷ In-depth expertise with at least one or two such tools. ▷ Advanced skills in programming languages used for data science/ analytics (e.g., R, Python, etc). ▷ Apply these skills for data acquisition, pre-processing, modelling and model deployment. ▷ Ability to coordinate quality checks of scripts for one or more projects as well as to maintain and monitor a library of team scripts and coordinate its review and updates.

Level 5 (Strategise)	▷ In-depth knowledge of big data technologies, the specifics of integrating them with existing information systems and using them for data science/analytics solutions. ▷ Design and lead data science/analytics projects including creation of a big data environment by setting up and deploying tools, capturing and evaluating results and deploying big data solutions on large-scale data sets in the enterprise. ▷ Lead a team in identifying a big data problem, selecting the adequate techniques and performing data acquisition, data audit, cleansing, pre-processing, model development and testing and deployment. ▷ Design and implement a multi-stage solution that encapsulates systems dealing with both structured and unstructured data. ▷ Share knowledge, experience and skills with team members through coaching and mentoring. ▷ In-depth understanding of all stages of data science/analytics life cycle and specifics of data science/analytics project management, the relevant resources, time requirements, etc. ▷ Manage large-scale data science/analytics projects and assist in managing data science/analytics programmes.

Technical Competency	Data and Trend Analytics
Competency Description	Implement data analytics within the organisation using statistical and computational techniques and tools, algorithms, predictive data modelling and data visualisation to generate business insights and intelligence.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Collect data by conducting research, support the analysis of market trends and developments and prepare research documentation. ▷ Use statistical and computational methods and instruments to identify underlying trends and patterns in business data.
Level 3 (Apply)	▷ Analyse market trends and industry developments. ▷ Analyse findings or report of market trends and industry developments on impact on business strategies or business operations strategies. ▷ Identify underlying trends and patterns in data modelling, as well as develop, apply and evaluate algorithms, predictive data modelling and data visualisation. ▷ Utilise forecasting techniques to interpret future demands.
Level 4 (Ensure)	▷ Identify market trends and developments that may impact organisational marketing activities. ▷ Analyse market trends and developments to forecast emerging market needs and develop appropriate recommendations. ▷ Drive organisational decisions and insights as well as design and conduct data studies.
Level 5 (Strategise)	▷ Manage and improve the capacity of organisational data science by refining criteria for financial and other business performance and design data studies. ▷ Devise situational analysis frameworks to obtain information regarding organisation and competitors' competencies.

Technical Competency	Data Cleansing
Competency Description	Knowledge and ability to fix or remove incorrect, corrupted, incorrectly formatted, duplicate or incomplete data within a dataset. It includes fixing structural errors, filtering unwanted outliers, handle missing data and validating data.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Experience in utilising a number of data cleansing techniques and approaches for structured and unstructured data such as data wrangling, batch processing, data mining, data enhancement, data harmonisation and data standardisation. ▷ Conduct data cleansing of noisy, incomplete data or data with established data quality issues using experience of relevant tools and programming languages. ▷ Utilise knowledge of how the interaction of multiple data issues, such as missing data, outliers, multiple values and meaning of data, impact analysis and identify an appropriate cleansing approach.
Level 4 (Ensure)	▷ Extensive and/or in-depth knowledge of best-practice data cleansing techniques and approaches for a variety of data types such as data wrangling, batch processing, data mining, data enhancement, data harmonisation and data standardisation. ▷ Extensive experience in utilising these techniques and approaches for cleansing complex, large, incomplete data or data with established quality issues. ▷ Ability to design and implement data cleansing approach for complex data and projects.
Level 5 (Strategise)	N/A

Technical Competency	Data Design
Competency Description	Specify and create a data structure or database model, including the setting of various parameters or fields that can be modified to suit different structured or unstructured data requirements, the design of data flow, as well as the development of mechanisms for maintenance, storage and retrieval of data based on the business requirements.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Identify data requirements and support the design of database models, incorporating parameters, fields and mechanisms for the maintenance, storage and retrieval of data. ▷ Interpret installation standards to meet project needs and produces database or data warehouse component specifications. ▷ Develop appropriate physical database or data warehouse design elements, within set policies, to meet data requirements.
Level 4 (Ensure)	▷ Implement physical database designs to support transactional data requirements for performance and availability. ▷ Develop and maintain specialist knowledge of database and data warehouse concepts, design principles, architectures, software and facilities. ▷ Assess proposed changes to object/data structures and evaluate alternative options. ▷ Implement data warehouse designs that support demands for business intelligence and data analytics.
Level 5 (Strategise)	▷ Provide specialist expertise in the design characteristics of database management systems or data warehouse products/services. ▷ Provide expert guidance in the selection, provision and use of database and data warehouse architectures, software and facilities. ▷ Ensure that physical database design policy supports transactional data requirements for performance and availability. ▷ Ensure that data warehouse design policy supports demands for business intelligence and data analytics.

Technical Competency	Data Engineering
Competency Description	Develop and implement efficient and stable processes to collect, store, extract, transform, load and integrate data at various stages in the data pipeline. This also involves processing varying amounts of data from a variety of sources and preparing data in a structure that is easily access and analysed according to business requirements.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Assist in developing and implementing data pipelines and data stores. ▷ Perform administrative tasks to provide accessibility, retrievability, security and protection of data.
Level 3 (Apply)	▷ Design and implement data pipelines and data stores to acquire and prepare data. ▷ Apply data engineering standards and tools to create and maintain data pipelines and extract, transform and load data. ▷ Carry out routine data quality checks and remediation. ▷ Implement data management processes and systems to map data sources. ▷ Implement processes and relationships, and transform and process multiple streams of data.
Level 4 (Ensure)	▷ Design, implement, and maintain complex data engineering solutions to acquire and prepare data. ▷ Create and maintain data pipelines to connect data within and between data stores, applications and organisations. ▷ Carry out complex data quality checking and remediation. ▷ Translate business requirements into data structures and processes to standardise data, verify data reliability and validity, as well as store, extract, transform, load and integrate data.
Level 5 (Strategise)	▷ Plan and drive the development of data engineering solutions ensuring that solutions balance functional and non-functional requirements. ▷ Monitor application of data standards and architectures including security and compliance. ▷ Contribute to organisational policies, standards, and guidelines for data engineering. ▷ Lead the selection and development of data engineering methods, tools and techniques. ▷ Develop organisational policies, standards, and guidelines for the development and secure operation of data services and products. ▷ Ensure adherence to technical strategies and architectures. ▷ Plan and lead data engineering activities for strategic, large and complex programmes.

Technical Competency	Data Ethics
Competency Description	Apply legal and ethical principles in the collection, use, storage and disposal of data.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Apply and uphold principles of professional, legal and ethical conduct, policies and procedures in the handling of data. ▷ Fully understand the importance and application of security and ethics to own work and the operation of the organisation. ▷ Understand how own role impacts security and ethics, and demonstrate routine security and ethical practice and knowledge required for own work. ▷ Fully aware of and comply with essential organisational security and ethical practices expected of the individual. ▷ Proactively ensure security and ethics are appropriately addressed within their area by self and others. ▷ Engage or work with security and ethics specialists as necessary. ▷ Contribute to the security and ethics culture of the organisation.
Level 4 (Ensure)	▷ Analyse unethical practices and apply ethical decision-making models and strategies to address ethical dilemmas and issues. ▷ Contribute to the security and ethics culture of the organisation and ensures implementation in area of responsibility.
Level 5 (Strategise)	▷ Champion security and ethics within own area of work and throughout the organisation. ▷ Take a leading role in promoting security and ethics throughout own area of responsibilities and collectively in the organisation.

Technical Competency	Data Governance
Competency Description	Develop and implement guidelines, laws, and regulations across the organisation for the handling of data at various stages in its life cycle as well as the provision of advice on proper data handling and resolution of data breaches in a range of complex, ambiguous or multi-faceted contexts.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Ensure implementation of information and record management policies and standard practices. ▷ Ensure effective controls are in place for internal delegation, audit and control relating to information and records management. ▷ Assess and manage risks around the use of information. ▷ Provide reports on the consolidated status of information controls to inform effective decision-making. ▷ Recommend remediation actions as required. ▷ Ensure that information is presented effectively.
Level 4 (Ensure)	▷ Implement guidelines, laws, statutes and regulations on appropriate handling of data at various stages in their life cycle. ▷ Monitor compliance with data policies. ▷ Understand the implications of information, both internal and external, that can be mined from business systems and elsewhere. ▷ Make decisions based on that information, including the need to make changes to the systems. ▷ Review new change proposals and provide specialist advice on information and records management, including advice on and promotion of collaborative working and assessment and management of information-related risk. ▷ Create and maintain an inventory of information assets, which are subject to relevant legislations. ▷ Prepare and review the periodic notification of registration details and submit them to the relevant regulatory authorities. ▷ Ensure that formal information access requests and complaints are dealt with according to approved procedures. ▷ Contribute to development of policy, standards and procedures for compliance with relevant legislation.

Level 5 (Strategise)	▷ Develop organisational policies, standards, and guidelines for information and records management ensuring that uniformly recognised and accepted data definitions are developed and applied throughout the organisation. ▷ Ensure that the business processes and information required to support the organisation are defined, and devise appropriate processes and data architectures. ▷ Identify the impact of any relevant statutory, internal or external regulations on the organisation's use of information and develop strategies for compliance. ▷ Lead and plan activities to communicate and implement information management strategies. ▷ Coordinate information resources to meet specific business objectives whilst maintaining the principles of professional standards, accountability, openness, equality, diversity and clarity of purpose. ▷ Implement systems and controls to measure performance and manage risk. ▷ Specify at a strategic level the business functions and data subjects needed to support future business, thereby enabling the development of an Information Architecture.

Technical Competency	Data Migration
Competency Description	Plan and perform activities to migrate data between computer storage types or file formats.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Assist in providing accessibility, retrievability, security and protection of data in an ethical manner.
Level 3 (Apply)	▷ Apply ethical and robust techniques in the transformation of data from one format/medium to another, in line with organisational policies and procedures and being sensitive to risks around the use of information. ▷ Prepare data and perform manual or automated data migration. ▷ Troubleshoot database errors faced. ▷ Validate migrated data post-migration to ensure accuracy. ▷ Take responsibility for the accessibility, retrievability, security, quality, retention and ethical handling of specific subsets of data. ▷ Assess the integrity of data from multiple sources. ▷ Provide advice on the transformation of data/information from one format or medium to another. ▷ Maintain and implement information handling procedures. ▷ Enable the availability, integrity and searchability of information through the application of formal data and metadata structures and protection measures. ▷ Manipulate specific data from information services to satisfy defined information needs.
Level 4 (Ensure)	▷ Devise and implement master data management processes, including classification, security, quality, ethical principles, retrieval and retention processes. ▷ Derive data management structures and metadata to support consistency of information retrieval, combination, analysis, pattern recognition and interpretation, throughout the organisation. ▷ Plan effective data storage, sharing and publishing within the organisation. ▷ Independently validate external information from multiple sources. ▷ Assess issues which might prevent the organisation from making maximum use of its information assets.
Level 5 (Strategise)	▷ Derive an overall strategy of master data management, within an established information architecture, that supports the development and secure operation of information and digital services. ▷ Develop organisational policies, standards and guidelines for data management, aligned with ethical principles. ▷ Take overall responsibility for planning effective data storage, security, quality, sharing, availability, retention and publishing within the organisation. ▷ Plan, establish and manage processes for regular and consistent access to data, and independent validation of external information from multiple sources.

Technical Competency	Data Modelling And Design
Competency Description	Knowledge and ability to apply architecture theories, principles, concepts, practices, methodologies, and frameworks.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Apply standard data modelling and design techniques based upon a detailed understanding of requirements. ▷ Establish, modify and maintain data structures and associated components. ▷ Communicate the details of data structures and associated components to others using the data structures and associated components.
Level 4 (Ensure)	▷ Investigate enterprise data requirements where there is some complexity and ambiguity. ▷ Plan own data modelling and design activities, selecting appropriate techniques and the correct level of detail for meeting assigned objectives. ▷ Provide advice and guidance to others using the data structures and associated components. ▷ Investigate enterprise data requirements where there is some complexity and ambiguity. ▷ Plan own data modelling and design activities, selecting appropriate techniques and the correct level of detail for meeting assigned objectives. ▷ Provide advice and guidance to others using the data structures and associated components.
Level 5 (Strategise)	▷ Set standards for data modelling and design tools and techniques and advise on their application and ensure compliance. ▷ Manage the investigation of enterprise data requirements based upon a detailed understanding of information requirements. ▷ Coordinate the application of analysis, design and modelling techniques to establish, modify or maintain data structures and their associated components. ▷ Manage the iteration, review and maintenance of data requirements and data models.

Technical Competency	Data Visualisation
Competency Description	Implement contemporary techniques, dynamic visual displays with illustrative and interactive graphics to present patterns, trends, analytical insights from data or new concepts in a strategic manner for the intended audience.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Use a visualisation product, as guided, to design and create data visuals. ▷ Select appropriate visualisation techniques from the options available. ▷ Engage with the target user to prototype and refine specified visualisations.
Level 4 (Ensure)	▷ Apply a variety of visualisation techniques and designs the content and appearance of data visuals. ▷ Operationalise and automate activities for efficient and timely production of data visuals. ▷ Select appropriate visualisation approaches from a range of applicable options. ▷ Contribute to exploration and experimentation in data visualisation.
Level 5 (Strategise)	▷ Lead exploration of new approaches for data visualisation. ▷ Establish the purpose and parameters of the data visualisation. ▷ Provide overall control to ensure the appropriate use of data visualisation tools and techniques. ▷ Format and communicate results using textual, numeric, graphical and other visualisation methods appropriate to the target audience. ▷ Advise on the appropriate use of data visualisation for different purposes and contexts to satisfy requirements. ▷ Develop plans showing how the identified user needs will be met.

Technical Competency	Database Administration
Competency Description	Knowledge and ability to apply the methods, practices and policies to ensure that databases are always available and in working condition.
Level 1 (Follow)	▷ Demonstrate basic understanding of database management, logical design concepts and levels of database security. ▷ Understand the difference between different database structures (e.g, relational vs. network). ▷ Comprehend database design (e.g., diagrams, schemas, models). ▷ Demonstrate basic understanding of data manipulation language (DML). ▷ Demonstrate an awareness of performance issues (e.g., distribution of data, size definitions).
Level 2 (Assist)	▷ Understand a single database management system (DBMS), its components and how they relate to each other. ▷ Demonstrate a good knowledge of data manipulation language (DML) and data definition language (DDL). ▷ Code/test basic database access modules (e.g., stored procedures). ▷ Troubleshoot, at a basic level, to understand database problem and identify where to direct it (e.g., basic database accessibility). ▷ Recognise the importance of database basic recovery and, with guidance, perform backup and recovery. ▷ Understand database release management, applications business rules, data integrity issues, database security implementation, workload manager and interaction with DBMS. ▷ Perform data population, debugging and testing. ▷ Conduct basic impact analysis for database change management. ▷ Assist in database support activities.
Level 3 (Apply)	▷ Use database management system software and tools to collect agreed performance statistics. ▷ Carry out agreed database maintenance and administration tasks. ▷ Demonstrate working level understanding of single DBMS relevant operating systems, applications business rules and its dependencies with other applications, databases and/or business partners. ▷ Apply wide range of concepts to the corporate/vendor environment (e.g., database security and/or individual profiles). ▷ Make recommendations on logical/physical models (e.g., converts from logical model, implements, and maintains physical model to meet storage, availability, and performance requirements). ▷ Develop, code, test, and review complex database access modules. ▷ Solve problems that impact on the business or service, resolves data integrity issues and implements data integrity safeguards, and use diagnostic and monitoring tools to prevent problems/enhance performance and availability. ▷ Demonstrate a solid knowledge of system testing and integration environments. ▷ Develop, select, recommend, and implement strategies for backup and recovery, data population and migration. ▷ Conduct general impact analysis on database change.

Level 4 (Ensure)	▷ Use database management system software and tools, and knowledge of logical database schemata, to investigate problems and collect performance statistics and create reports. ▷ Carry out routine configuration, installation, and reconfiguration of database and related products. ▷ Develop and configure tools to enable automation of database administration tasks. ▷ Identify problems and issues and recommend corrective actions.
Level 5 (Strategise)	▷ Develop and maintain procedures and documentation for databases. ▷ Identify, evaluate and manage the adoption of appropriate database administration tools and processes, including automation. ▷ Contribute to the setting of standards for definition, security and integrity of database objects and ensures conformance to these standards. ▷ Manage database configuration including installing and upgrading software and maintaining relevant documentation. ▷ Monitor database activity and resource usage. ▷ Optimise database performance and plans for forecast resource needs.

Technical Competency	Database Management
Competency Description	Knowledge and ability to apply methods, practices and policy to plan, develop, manage databases and retrieval.
Level 1 (Follow)	▷ Demonstrate basic understanding of database management, logical design concepts and levels of database security. ▷ Understand the difference between different database structures (e.g, relational vs. network) ▷ Comprehend database design (e.g., diagrams, schemas, models). ▷ Demonstrate basic understanding of data manipulation language (DML). ▷ Demonstrate an awareness of performance issues (e.g., distribution of data, size definitions).
Level 2 (Assist)	▷ Understand a single database management system (DBMS), its components and how they relate to each other. ▷ Demonstrate a good knowledge of data manipulation language (DML) and data definition language (DDL). ▷ Code/test basic database access modules (e.g., stored procedures). ▷ Troubleshoot, at a basic level, to understand database problem and identify where to direct it (e.g., basic database accessibility). ▷ Recognise the importance of database basic recovery and, with guidance, perform backup and recovery. ▷ Understand database release management, applications business rules, data integrity issues, database security implementation, workload manager and interaction with DBMS. ▷ Perform data population, debugging and testing. ▷ Conduct basic impact analysis for database change management.
Level 3 (Apply)	▷ Demonstrate working level understanding of single DBMS relevant operating systems, applications business rules and its dependencies with other applications, databases and/or business partners. ▷ Apply wide range of concepts to the corporate/vendor environment (e.g., database security and/or individual profiles). ▷ Make recommendations on logical/physical models (e.g., converts from logical model, implements, and maintains physical model to meet storage, availability, and performance requirements). ▷ Develop, code, test, and review complex database access modules. ▷ Solve problems that impact on the business or service, resolves data integrity issues and implements data integrity safeguards, and use diagnostic and monitoring tools to prevent problems/enhance performance and availability. ▷ Demonstrate a solid knowledge of system testing and integration environments. ▷ Develop, select, recommend, and implement strategies for backup and recovery, data population and migration. ▷ Conduct general impact analysis on database change.

Level 4 (Ensure)	▷ Demonstrate broad understanding of multiple DBMS or an in-depth knowledge of one or more DBMS. ▷ Develop logical models incorporating business requirements such as high availability, redundancy, and disaster recovery into the logical/physical database design. ▷ Research, pilot, evaluate new technologies and standards, identify how they will integrate with the corporate network and recommend strategies. ▷ Solve unusual problems or problems with a significant impact on the business. ▷ Deal with major and/or multiple application groups. ▷ Create or review certification testing. ▷ Develop standards and procedures for implementing new database technology. ▷ Mentor people and provide input/guidance to cross-functional teams.
Level 5 (Strategise)	▷ Demonstrate expert knowledge of data management, data stewardship, government-wide data management initiatives and trends in data management and how they can be applied. ▷ Hold an enterprise-wide view and/or is regarded as the subject matter expert in one or more areas of expertise and provide effective strategic direction to enterprise-wide data management. ▷ Develop enterprise-wide multi-disciplinary architectural documents translating business data requirements into topographical format. ▷ Demonstrate broad-based knowledge of information technology (e.g., programming, data management, platforms). ▷ Develop business cases for enterprise-wide data management initiatives as a direct response to business drivers. ▷ Guide and oversee multiple-concurrent data management projects. ▷ Conduct procurement for data management solutions and related services. ▷ Develop strategies, policy and standards for corporate data management and contributes to standards working groups and/or industry.

Technical Competency	Emerging Technology Synthesis
Competency Description	Explore the development of ICT technology across multi-sector. Review and conduct research on emerging technologies that correlate to industry technology adoption. Evaluate the usage of the multiple emerging technologies and the benefits to be gained in terms of cost, process and productivity improvement.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Support monitoring of the external environment and assessment of emerging technologies. ▷ Contribute to the creation of reports, technology road mapping and the sharing of knowledge and insights.
Level 4 (Ensure)	▷ Evaluate new and emerging technologies and trends against the organisational needs and processes. ▷ Monitor the external environment to gather intelligence on emerging technologies. ▷ Assess and document the impacts, threats and opportunities to the organisation. ▷ Create reports and technology roadmaps and shares knowledge and insights with others.
Level 5 (Strategise)	▷ Plan and lead the identification and assessment of emerging technologies and the evaluation of potential impacts, threats and opportunities. ▷ Create technology roadmaps that align organisational plans with emerging technology solutions. ▷ Engage with and influence relevant stakeholders to obtain organisational commitment to technology roadmaps. ▷ Develop organisational guidelines for monitoring emerging technologies. ▷ Collaborate with internal and external parties to facilitate intelligence gathering.

Technical Competency	Fault Management
Competency Description	The process of finding, isolating and troubleshooting network faults in the fastest way possible. It minimises downtime and prevents device failures by resolving faults rapidly, thereby ensuring optimal network availability and preventing business losses. Monitor network from Network Operations Centre (NOC) location and undertaking configuration changes, upgrades and node back-up activities.
Level 1 (Follow)	▷ Ensure continuous monitoring of network alarms on the Network Monitoring System (NMS). ▷ Ensure monitoring of threshold levels to prevent occurrence of faults. ▷ Ensure tickets are raised for all alarms as per the priority matrix. ▷ Coordinate with the Infra NOC to verify if alarm was caused by fault with passive infrastructure sites. ▷ Follow agreed procedures to identify, register and categorise incidents. ▷ Gather information to enable incident resolution and allocate incidents as appropriate.
Level 2 (Assist)	▷ Provide first line investigation and gather information to enable incident resolution and allocate incidents. ▷ Determine alarm severity, priority, Service Level Agreements (SLAs) and the affected network elements. ▷ Conduct diagnose from NOC location to identify root cause of fault. ▷ Isolate the cause of fault by conducting appropriate diagnostic test like remotely interrogating the active equipment. ▷ Determine the options to rectify the fault and confirm with supervisors if required. ▷ Advise relevant persons of actions taken.
Level 3 (Apply)	▷ Able to maintain network uptime by ensuring coordination with field team. ▷ Able to direct and coordinate with the field team to carry out corrective/change activities on site. ▷ Ensure clear and concise instructions are given to field staff to facilitate fault rectification efforts. ▷ Ensure rectification of network problem/ fault within the alarm SLAs and monitor the activities performed by the Infra engineer and technicians. ▷ Able to upgrade configurations and perform backups.
Level 4 (Ensure)	▷ Ensure that fault incidents are handled according to agreed procedures. ▷ Prioritise and diagnose incidents. Investigate causes of incidents and seeks resolution. Escalate unresolved incidents. ▷ Facilitate recovery, following resolution of incidents. Documents and close resolved incidents. ▷ Contribute to testing and improving incident management procedures. ▷ Ensure periodic updates to the SOPs to ensure repeat faults are corrected promptly.
Level 5 (Strategise)	▷ Analyse performance reports and identify instances of deteriorating performance sites. ▷ Develop, maintain and test incident management procedures in agreement with service owners. ▷ Investigate escalated, non-routine and high-impact incidents to responsible service owners and seek resolution. ▷ Facilitate recovery, following resolution of incidents. Ensure that resolved incidents are properly documented and closed. ▷ Analyse causes of incidents, and inform service owners to minimise probability of recurrence, and contribute to service improvement. Analyse metrics and reports on the performance of the incident management process.

Technical Competency	Information Security Management
Competency Description	Knowledge and ability to ensure there are adequate technical and organisational safeguards to protect the continuity of IT infrastructure services by the implementation of IT security principles, methods, practices, policies and tools that are used in securing IT resources including information and operations security, physical security, business continuity/disaster recovery planning, methods to deal with security breaches and security assessment in a technical environment.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Demonstrate awareness of security requirements. ▷ Demonstrate awareness of certification policies. ▷ Demonstrate awareness of privacy requirements and standards. ▷ Understand concepts of IT security and its application to computer systems architecture.
Level 3 (Apply)	▷ Execute security test plans. ▷ Deal with low impact threats. ▷ Act to protect integrity of system data at operation level (e.g., single key incident). ▷ Perform security certifications. ▷ Provide advice on disaster recovery planning. ▷ Participate in disaster recovery tests. ▷ Recommend security safeguards. ▷ Execute standards.
Level 4 (Ensure)	▷ Demonstrate a broad understanding or very detailed area of expertise in security subject(s). ▷ Demonstrate a broad knowledge of security policies and interprets policies. ▷ Understand a specific security application or tool and how it works. ▷ Conduct risk assessments. ▷ Assess security safeguards. ▷ Deal with threats and serious incidents. ▷ Deal with intrusions at a high threat level.
Level 5 (Strategise)	▷ Demonstrate an expert understanding or very detailed area of expertise in multiple security subject(s). ▷ Demonstrate expert knowledge of law, regulation, and policies, and interpret policies and standards. ▷ Expert in multiple security applications and tools. ▷ Lead risk and security safeguards assessments. ▷ Mitigate threats and serious security incidents at the enterprise level. ▷ Consult on security issues and recommend corporate strategies. ▷ Lead the development of enterprise policies and standards. ▷ Direct employees and consultants and provide mentorship to others.

Technical Competency	Infrastructure Design
Competency Description	Establish design policies and principles covering elements of connectivity, capacity, security, access, interfacing as well as the translation of that into the specifications, outline and design of IT infrastructure within the organisation, in order to support the business requirements.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Translate a broader infrastructure blueprint into technical specifications and develop prototypes for simple infrastructure components.
Level 4 (Ensure)	▷ Define and deliver technical and conceptual visualisation of IT infrastructure components and features.
Level 5 (Strategise)	▷ Project infrastructure requirements and define IT infrastructure design policies and principles, evaluating the viability and managing the impact of design options.

Technical Competency	Infrastructure Management (Network Engineer & Network Team Lead)
Competency Description	Knowledge and ability to support the enterprise computing infrastructure (e.g., enterprise servers, client server, storage devices and systems, hardware, and software) in the provision, management, storage, operation, scheduling, support, and maintenance of the infrastructure.
Level 1 (Follow)	▷ Demonstrate awareness of the platform principles and procedures. ▷ Understand the need for capacity planning and performance management. ▷ Operate the platform at a simple level under supervision. ▷ Demonstrate awareness of the standards for the platform.
Level 2 (Assist)	▷ Understand the platform technology and concepts. ▷ Understand how basic concepts relate to each other and apply them. ▷ Understand how the platform integrates with other environments, at a basic level, from an end-user perspective. ▷ Operate the platform at a simple level. ▷ Troubleshoot basic physical or software problems. ▷ Understand and apply the standards.
Level 3 (Apply)	▷ Understand how the platform integrates with other environments (e.g., network). ▷ Participate in day-to-day operations (e.g., monitoring operations of the platform). ▷ Use performance data collection tools and techniques. ▷ Install software and hardware on the platform. ▷ Solve routine problems. ▷ Solve typical hardware and software problems. ▷ Use diagnostic tools to solve complex problems. ▷ Execute standards.
Level 4 (Ensure)	▷ Demonstrate in-depth knowledge of an area of expertise. ▷ Contribute to high-level architecture. ▷ Evaluate/pilot new technologies, assess the results, identify how they integrate with the platform and implement them. ▷ Carry out performance measurement and capacity planning. ▷ Incorporate business requirements such as high availability, redundancy, and disaster recovery into platform design. ▷ Resolve complex problems. ▷ Develop and monitor/enforce standards and procedures for new technology configuration and implementation. ▷ Mentor/guide individuals and cross-functional teams.

Level 5 (Strategise)	▷ Demonstrate expert knowledge of platform principles, technology, government-wide technology initiatives and technological trends. ▷ Demonstrate an intimate knowledge of the environment, interdependencies, and impact of change. ▷ Provide effective strategic direction to enterprise-wide platform design and initiatives. ▷ Develop enterprise-wide multi-disciplinary architectural and design documents. ▷ Resolve very complex problems and recommend capacity and performance improvements. ▷ Conduct procurement for platform hardware and services. ▷ Set standards and technology direction for the platform. ▷ Lead the development of people in the infrastructure domain.

Technical Competency	Infrastructure Management (IT Technician)
Competency Description	Knowledge and ability to support the enterprise computing infrastructure (e.g., enterprise servers, client server, storage devices and systems, hardware, and software) in the provision, management, storage, operation, scheduling, support, and maintenance of the infrastructure.
Level 1 (Follow)	▷ Demonstrate awareness of the platform principles and procedures. ▷ Understand need for capacity planning and performance management. ▷ Operate the platform at a simple level under supervision. ▷ Demonstrate awareness of the standards for the platform.
Level 2 (Assist)	▷ Understand the platform technology and concepts. ▷ Understand how basic concepts relate to each other and apply them. ▷ Understand how the platform integrates with other environments, at a basic level, from an end-user perspective. ▷ Operate the platform at a simple level. ▷ Troubleshoot basic physical or software problems. ▷ Understand and apply the standards.
Level 3 (Apply)	N/A
Level 4 (Ensure)	N/A
Level 5 (Strategise)	N/A

Technical Competency	Infrastructure Management (Systems Engineer)
Competency Description	Knowledge and ability to support the enterprise computing infrastructure (e.g., enterprise servers, client server, storage devices and systems, hardware, and software) in the provision, management, storage, operation, scheduling, support, and maintenance of the infrastructure.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Understand the platform technology and concepts. ▷ Understand how basic concepts relate to each other and apply them. ▷ Understand how the platform integrates with other environments, at a basic level, from an end-user perspective. ▷ Operate the platform at a simple level. ▷ Troubleshoot basic physical or software problems. ▷ Understand and apply the standards.
Level 3 (Apply)	▷ Understand how the platform integrates with other environments (e.g., network). ▷ Participate in day-to-day operations (e.g., monitoring operations of the platform). ▷ Use performance data collection tools and techniques. ▷ Install software and hardware on the platform. ▷ Solves routine problems. ▷ Solve typical hardware and software problems. ▷ Use diagnostic tools to solve complex problems. ▷ Execute standards.
Level 4 (Ensure)	▷ Demonstrate in-depth knowledge of an area of expertise. ▷ Contribute to high-level architecture. ▷ Evaluate/pilot new technologies, assess the results, identify how they integrate with the platform and implement them. ▷ Carry out performance measurement and capacity planning. ▷ Incorporate business requirements such as high availability, redundancy, and disaster recovery into platform design. ▷ Resolve complex problems. ▷ Develop and monitor/enforce standards and procedures for new technology configuration and implementation. ▷ Mentor/guide individuals and cross-functional teams.
Level 5 (Strategise)	▷ Establish an integration strategy and a clear vision for an integrated ICT architectural design.

Technical Competency	Infrastructure Support
Competency Description	Provide services to end-users by systematically identifying, classifying and troubleshooting technical issues and incidents that disrupt and impact their day-to-day business activities, within a specified timeframe. This also includes implementing an end-to-end problem management process to analyse underlying problems, advising on infrastructure related upgrades and improvements and developing user guides and training materials.
Level 1 (Follow)	▷ Follow a fixed set of procedures to execute basic infrastructure administration and support.
Level 2 (Assist)	▷ Analyse issues or incidents encountered by users and conduct troubleshooting, and roll out upgrades.
Level 3 (Apply)	▷ Diagnose, troubleshoot and provide end-to-end management of infrastructure disruptions or technical issues encountered by users, and plan infrastructure upgrade activities.
Level 4 (Ensure)	▷ Develop plans and retain accountability for maximising service quality, speed and availability in infrastructure administration and support activities.
Level 5 (Strategise)	N/A

Technical Competency	Intelligent Reasoning
Competency Description	Design and build intelligent machine reasoning systems that can integrate, make sense of, and act upon heterogeneous sensory information sources, using domain knowledge accumulated in respective industries
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	N/A
Level 4 (Ensure)	▷ Build knowledge-based intelligent software applications using machine reasoning techniques and computer programming.
Level 5 (Strategise)	▷ Evaluate, design and build intelligent software systems.

Technical Competency	IT Architecture
Competency Description	Knowledge and ability to apply architecture theories, principles, concepts, practices, methodologies, and frameworks.
Level 1 (Follow)	▷ Possess basic understanding of architecture principles. ▷ Read and understand architecture specifications and models. ▷ Distinguish between different architecture domains.
Level 2 (Assist)	▷ Create basic models based upon specifications. ▷ Define key terms and concepts.
Level 3 (Apply)	▷ Focus on a single area of expertise. ▷ Produce analytic and candidate design models to be used for further analysis (e.g., telecommunications, networks). ▷ Demonstrate awareness of other architectures. ▷ Validate models created by projects and/or junior staff. ▷ Sign off functional models.
Level 4 (Ensure)	▷ Demonstrate good understanding of architecture across the business lines and how they interact but focus on a single architecture. ▷ Produce frameworks for a single architecture. ▷ Assess new requirements and make design recommendations. ▷ Sign off architecture models. ▷ Manage transformations. ▷ Define metadata models and information models. ▷ Monitor standards.
Level 5 (Strategise)	▷ Understand how architecture relates to the organisation's vision, how new business fits in the current business lines, the integration of business and technology, and relate government priorities to target architectures. ▷ Build corporate data model. ▷ Deliver and sign off frameworks for architectures and integration models. ▷ Recommend priorities for business based upon the architecture. ▷ Understand and apply standards (e.g., International Organization for Standardization (ISO), Quality standards). ▷ Address governance issues. ▷ Define metadata models at the enterprise level, information models and the interoperability model. ▷ Extend the body of knowledge and contribute to government standards.

Technical Competency	IT Asset Management
Competency Description	Manage, optimise and protect the organisation's IT assets. This includes the timely purchase, deployment, categorisation, maintenance and phase out of IT assets within the organisation in a way that optimises business value. Also includes development and implementation of procedures to guide the proper handling, usage and storage of IT assets to limit potential business or legal risks.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Procure and categorise IT assets across different life cycle stages, and monitor IT asset levels regularly. ▷ Use agreed procedures to create and maintain an accurate register of assets. ▷ Perform activities related to the administration of assets. ▷ Produce routine reports to assist asset management activities and decision-making.
Level 3 (Apply)	▷ Determine the IT assets to be procured and guidelines for proper handling, storage and maintenance, and manage the phase-in and phase-out of IT assets. ▷ Apply tools, techniques and processes to create and maintain an accurate asset register. ▷ Produce reports and analysis to support asset management activities and aid decision-making. ▷ Control assets in one or more significant areas ensuring that administration of full life cycle of assets is carried out. ▷ Produce and analyse registers and histories of authorised assets and verify that all these assets are in a known state and location. ▷ Act to highlight and resolve potential instances of unauthorised assets.
Level 4 (Ensure)	▷ Integrate understanding of future IT asset requirements and policy changes to define an asset management plan that optimises business value and minimise risk. ▷ Manage and maintain the service compliance of IT and service assets in line with business and regulatory requirements. ▷ Identify, assess and communicate associated risks. ▷ Ensure asset controllers, infrastructure teams and the business co-ordinate and optimise value, maintain control and maintain appropriate legal compliance.
Level 5 (Strategise)	▷ Set the strategy for asset management across the organisation. ▷ Communicate the policy, governance, scope, and roles involved in asset management. ▷ Promote awareness of and commitment to the role of asset management in the continuing economic and effective provision of services. ▷ Provide information and advice on complex asset management issues. ▷ Initiate impact assessment arising from decisions to obtain, change or continue the possession or use of an asset, system or service.

Technical Competency	IT Project Management
Competency Description	Knowledge and ability to apply formal project management principles and practices during the planning, implementation, monitoring and completion of projects, ensuring effective management of scope, resources, time, cost, quality, risk, and communications.
Level 1 (Follow)	▷ Demonstrate awareness of the platform principles and procedures. ▷ Understand need for capacity planning and system performance management. ▷ Operate platform at a simple level under supervision. ▷ Demonstrate awareness of the standards for the platform.
Level 2 (Assist)	▷ Understand the platform technology and concepts. ▷ Understand how basic platform concepts relate to each other and apply them. ▷ Understand how the platform integrates with other environments, at a basic level, from an end-user perspective. ▷ Operate the platform at a simple level. ▷ Troubleshoot basic physical or software problems. ▷ Understand and apply the standards.
Level 3 (Apply)	▷ Manage a complete multi-stage project in own area. ▷ Identify, allocate and manage resources needed to meet project objectives. ▷ Develop and manage the project plan, including timelines, deliverables, milestones, and costs. ▷ Identify potential roadblocks and risks and develop contingency plans to deal with them. ▷ Oversee implementation of the project plan, monitor progress, resource usage and quality, and make needed adjustments.
Level 4 (Ensure)	▷ Manage complex, multifaceted/interrelated IT projects that span own area or department boundaries. ▷ Conduct comprehensive risk assessment and develop plans for eliminating and mitigating the risks identified. ▷ Mentor other project managers. ▷ Understand the impact of the project on the department. ▷ Develop complex plans (e.g., with interdependencies or cross-department). ▷ Articulate project Implementation standards.
Level 5 (Strategise)	▷ Oversee/manage large, highly complex, diverse or strategic projects that impact the organisation as a whole. ▷ Develop departmental policies and standards. ▷ Market project management principles and benefits across the department. ▷ Set/evolve the vision of how project management should be done. ▷ Change project management practices. ▷ Know multiple project management disciplines.

Technical Competency	Machine Learning
Competency Description	Develop systems that learn through experience and by the use of data.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Apply existing machine learning techniques to new problems and datasets. ▷ Evaluate the outcomes and performance of machine learning systems. ▷ Identify issues and recommend improvements to machine learning systems and the data they use.
Level 4 (Ensure)	▷ Given a well-described problem and dataset, assess whether machine learning is likely to provide an effective solution. ▷ Implement algorithms developed by others. ▷ Advise on the effectiveness of specific techniques, based on project findings and wider research. ▷ Contribute to the development, evaluation, monitoring and deployment of machine learning systems. ▷ Understand and apply rules and guidelines specific to the industry, and anticipate risks and other implications of modelling. ▷ Design, implement, test and improve machine learning architectures and systems. ▷ Select techniques based on a breadth of knowledge of the strengths, weaknesses and expected performance of different approaches. ▷ Establish good practice in the development, evaluation, monitoring and deployment of machine learning systems.
Level 5 (Strategise)	▷ Lead the development of new approaches and organisational capabilities to design, train, and evaluate machine learning systems. ▷ Set standards and guidelines for the application and traceability of machine learning systems to business problems, and oversees their implementation. ▷ Design and oversee organisational policies on the creation, training and use of machine learning systems.

Technical Competency	Market Evaluation / Market Intelligence
Competency Description	The research, analysis and stimulation of potential or existing markets for IT and related products and services, both to provide a sound basis for business development and to generate a satisfactory flow of customer enquiries.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Collect and monitor results of marketing activities. ▷ Assist in market research and data collection providing summary reports of their findings. ▷ Understand the basic principles of marketing and tools used by the organisation for planning, implementing and monitoring marketing activities.
Level 3 (Apply)	▷ Leverage on market research materials, customer and employee insights and other sources, to identify industry trends, needs and opportunities. ▷ Select and use marketing tools appropriate to the allocated assignment. ▷ Conduct market research. ▷ Maintain relevant information, including lessons learned from previous campaigns, and effectiveness measures for current and previous activities. ▷ Contribute to marketing plans, identifying and articulating unique selling points and key messages for marketing material. ▷ Present and communicate at marketing events.
Level 4 (Ensure)	▷ Plan and conduct market research to investigate and understand customer and competitor dynamics. ▷ Use appropriate channels and tools to engage with the desired audience. ▷ Use research and lessons learned to inform marketing plans. ▷ Create unique selling points and key messages for marketing material. ▷ Make creative use of elements relevant to both digital and traditional environments, and drafts appropriate support materials. ▷ Analyse the effectiveness of campaigns and services, and their impact on audience behaviour and business outcomes. ▷ Organise and participate actively in marketing events.
Level 5 (Strategise)	▷ Manage and monitor market research, analysis and the marketing planning process. ▷ Devise and manage marketing campaigns within specified budgets to meet specified objectives. ▷ Advise on brand management and promotion of corporate reputation. ▷ Play an active role in promoting engagement of staff and business partners. ▷ Produce marketing materials and stage events. ▷ Find innovative solutions to marketing problems. ▷ Use experience and data to make recommendations to senior management. ▷ Review and report on the effectiveness of marketing approaches and services and their impact on business outcomes. ▷ Provide oversight of all marketing plans and direct the marketing planning process.

Technical Competency	Market Research
Competency Description	Extract useful business insights, plan and conduct marketing and digital research and analysis to uncover market, customer and competitor trends. This also includes assessing the effectiveness of marketing activities and developing ways of optimising marketing efforts.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Analyse product performance, market trends and marketing effectiveness, conduct research and collect data on customers and competitors to support. ▷ Use the organisation's information systems and external customer and market information sources to develop customer, service and market insights.
Level 3 (Apply)	▷ Market competitor and client research activities, plan and analyse trends and dynamics through collected data. ▷ Understand the range of metrics used to measure value and effectiveness. Use analytics and tailored research to review the effectiveness of key marketing activities. ▷ Develop and implement an effective research strategy to guide and direct the strategic marketing planning process and to inform business planning overall. ▷ Lead the research strategy for the organisation and make a significant contribution to the marketing and strategic planning processes.
Level 4 (Ensure)	▷ Expertise in research and make a strong contribution to executive team and board, problem solving and decision-making processes. ▷ Influence the organisation's ICT strategy, to ensure that the organisation has the ability to manage and mine big data. ▷ Strongly support the organisation's capacity to implement its market research strategy. Ensure the overall strategy meets the business's strategic information needs. ▷ Optimise the amount and quality of responses and business insights through direct market research and analytics activities and processes.
Level 5 (Strategise)	▷ Define critical business issues, develop new ways of optimising digital data and presenting marketing and digital research insights to senior management. ▷ Provide clear leadership across the organisation and demonstrate the power of effective research to appropriately drive problem solving and strategic decision making.

Technical Competency	Media and Platform Management
Competency Description	Drive organisational policies and procedures for the use of the media and develop and implement business media plans while assessing their effectiveness.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Develop a good understanding of the marketing communications process and create strong contributions to the development of highly effective campaigns. ▷ Collect information on types of media and support the implementation of plans and activities for media platforms. ▷ Work effectively with internal stakeholders and external creative partners in order to develop highly effective campaigns.
Level 3 (Apply)	▷ Strong ability to select high quality external creative partners. ▷ Capacity to effectively brief partners and manage performance of external agency outputs. ▷ Comprehensively review each campaign to assess its marketing and business impacts. Following review, make the required changes in approach to improve overall impacts. ▷ Monitor different options for media platforms and propose suitable social media platforms and tools to achieve communication objectives.
Level 4 (Ensure)	▷ Manage the creation of media plan frameworks, content, and media platform integration to achieve business strategies. ▷ Make the business case for key marketing campaigns as a means of driving sales, growing customer loyalty and building brand equity.
Level 5 (Strategise)	▷ Drive organisational policies and procedures for the use of media, and set guidelines and metrics for audience participation to measure the success of media activities.

Technical Competency	Network Administration and Maintenance
Competency Description	Monitor the network in order to provide for optimum levels of network performance and minimisation of downtime. This includes detection, isolation, recovery and limitation of the impact of failures on the network as well as provision of support to system users through ongoing maintenance information sharing and training.
Level 1 (Follow)	▷ Contribute to the operational configuration of network components. ▷ Assist in the investigation and resolution of network problems. ▷ Assist with specified maintenance procedures.
Level 2 (Assist)	▷ Carry out agreed network maintenance tasks and specified operational configuration of network components. ▷ Establish and diagnose network problems/faults using the required troubleshooting methodology and tools. ▷ Use network management software and tools to collect agreed performance and traffic statistics.
Level 3 (Apply)	▷ Maintain the network support process and check that all requests for support are dealt with according to agreed procedures. ▷ Ensure network configurations are applied to meet operational requirements in line with agreed procedures. ▷ Use network management software and tools to investigate and diagnose network problems, collect performance statistics and create reports.
Level 4 (Ensure)	▷ Demonstrate in-depth knowledge and capability in software construction, testing, infrastructure, configuration, a wide range of system development methodologies and operating standards. ▷ Demonstrate knowledge in multiple applications, data management systems and technologies or in a single area of expertise. ▷ Demonstrate application and corporate knowledge, and understand how a change would affect multiple applications.
Level 5 (Strategise)	▷ Draft and maintain procedures and documentation for network support and operation. ▷ Make a significant contribution to the investigation, diagnosis and resolution of network problems. ▷ Ensure that all requests for support are dealt with according to set standards and procedures. ▷ Develop policy and standards for software construction.

Technical Competency	Network Security Management
Competency Description	Design and configure network systems to ensure the integrity of network infrastructure through the use of appropriate protection, detection and response mechanisms.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Install, configure and test network security. ▷ Manage network security throughout a network.
Level 4 (Ensure)	▷ Maintain the network security process and procedures. ▷ Check that all security vulnerabilities are dealt with according to agreed procedures. ▷ Use network management software and tools to investigate and diagnose network problems.
Level 5 (Strategise)	▷ Design, develop and maintain procedures and documentation for network security management. ▷ Coordinate investigation, diagnosis and resolution of network security challenges. ▷ Ensure that all requests for support are dealt with according to set standards and procedures. ▷ Play custodial role for network security standards.

Technical Competency	Network Configuration
Competency Description	Configure network hardware and software components according to organisational guidelines and technical requirements. This includes the implementation and configuration of multiple servers, network devices and network management tools as well as the management of user network access to ensure stable and reliable network operations.
Level 1 (Follow)	▷ Contribute to the operational configuration of network components. ▷ Assist in the investigation and resolution of network problems. ▷ Assist with specified maintenance procedures.
Level 2 (Assist)	▷ Carry out agreed network maintenance tasks and specified operational configuration of network components. ▷ Establish and diagnose network problems/faults using the required troubleshooting methodology and tools. ▷ Use network management software and tools to collect agreed performance and traffic statistics.
Level 3 (Apply)	▷ Maintain the network support process and check that all requests for support are dealt with according to agreed procedures. ▷ Ensure network configurations are applied to meet operational requirements in line with agreed procedures. ▷ Use network management software and tools to investigate and diagnose network problems, collect performance statistics and create reports, working with users, other staff and suppliers as appropriate.
Level 4 (Ensure)	▷ Evaluate organisational network requirements and develop a network configuration blueprint. ▷ Maintain the network support process and check that all requests for support are dealt with according to agreed procedures. ▷ Ensure network configurations are applied to meet operational requirements in line with agreed procedures. ▷ Use network management software and tools to investigate and diagnose network problems, collect performance statistics and create reports, as well as working with users, other staff and suppliers as appropriate.
Level 5 (Strategise)	▷ Draft and maintain procedures and documentation for network support and operation. ▷ Make a significant contribution to the investigation, diagnosis and resolution of network problems. ▷ Ensure that all requests for support are dealt with according to set standards and procedures.

Technical Competency	Networking
Competency Description	Knowledge and ability to implement the methods, practices and policies governing the design, analysis, development, management and use of the IT hardware and software to transfer information such as data, voice, images, and video over fibre optics, wired or wireless for intra-building or enterprise-wide networking. This involves management of network performance through systems application and networking protocols. The networking system components comprises of software (operating systems and applications) and hardware (computer, routers, switch, cable and hub).
Level 1 (Follow)	▷ Demonstrate basic understanding of function of common networking protocols. ▷ Able to identify commonly used Transmission Control Protocols (TCP) and User Datagram Protocols (UDP) and their features. ▷ Able to troubleshoot connection issues on both TCP and UDP. ▷ Understand need for capacity planning and performance management of TCP and UDP. ▷ Basic knowledge on address formats such as IPv6 and IPv4.
Level 2 (Assist)	▷ Able to identify common routing protocol which includes link state, distance vector and hybrid protocols. ▷ Able to identify and articulate the purpose and properties of routing. ▷ Good knowledge on the basic elements of unified and communication standards. ▷ Familiar with implementation technologies to support cloud and virtualisation.
Level 3 (Apply)	▷ Capable to identify the common physical network topologies. ▷ Capable to identify common connector types. ▷ Able to differentiate and fabricate cables according to Telecommunications Industry Association (TIA)/Electronic Industries Alliance (EIA) standards. ▷ Able to install components of wiring distribution. ▷ Able to install, configure and differentiate between common network connectivity devices.
Level 4 (Ensure)	▷ In-depth knowledge and able to provide details insights on layers of TXP/IP and Open Systems Intercommunication (OSI) models. ▷ Able to configure appropriate encryption, configure channels and frequencies. ▷ Advanced knowledge on feature of switches. ▷ Mentor/guide individuals and cross-functional teams on networking technologies.
Level 5 (Strategise)	▷ Demonstrate expert knowledge of telecommunications networking technology. ▷ Have good insight on network technology initiatives and technological trends to support national telecommunication strategy. ▷ Demonstrate broad-based knowledge of information technology. ▷ Develop business cases for enterprise-wide network technology initiatives as a direct response to business drivers. ▷ Develop policy and standards for networking technology and contributes to governmental and/or industry standards working groups (e.g., International Telecommunication Union).

Technical Competency	Pattern Recognition
Competency Description	Develop and apply intelligent pattern recognition systems and techniques to analyse data and derive useful hidden patterns to solve problems.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	N/A
Level 4 (Ensure)	▷ Analyse data by deriving useful hidden patterns in the data. ▷ Select and apply the most suitable pattern recognition techniques to solve problems and develop pattern recognition systems.
Level 5 (Strategise)	▷ Develop intelligent systems using machine learning techniques.

Technical Competency	Performance Management
Competency Description	Evaluate and optimise network, system and/or software performance against user and business requirements. This involves the introduction and utilisation of new tools and mechanisms to gather, analyse and fully optimise performance data. This also includes the initiation of controls, modifications and new investments to enhance end-to-end performance of ICT components, systems and services.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Develop a performance management framework that meets the asset management system objectives, levels of service and requirements. ▷ Design a performance management framework that is balanced and concise. ▷ Test the performance framework to ensure it delivers the desired objectives and avoid unintended consequences. ▷ Establish metrics and mechanisms to assess network, software or system performance, and determine ICT infrastructure components and parameters to be enhanced.
Level 4 (Ensure)	▷ Evaluate and integrate new mechanisms and technology, and leverage analytics to optimise performance data, and determine implications of performance levels reported. ▷ Review the risk register and report the performance of the mitigation measures. ▷ Identify benefits realised from the opportunities taken. ▷ Chart direction on key performance indicators of ICT infrastructure and develop a strategy to enable achievement to achieve long term business requirements.
Level 5 (Strategise)	N/A

Technical Competency	Problem Management
Competency Description	Manage the life cycle of problems to prevent problems and incidents from occurring, eliminate recurring incidents and minimise impact of unavoidable incidents.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Handle specific problems from diagnosis and prioritisation to the identification and implementation of solution. ▷ Review the risk register and report the performance of the mitigation measures.
Level 4 (Ensure)	▷ Introduce processes, guidelines and technologies to facilitate the management of problems throughout their life cycle. ▷ Establish problem management strategies, protocols, and mechanisms to guide the prevention, resolution and minimisation of problems and their effects.
Level 5 (Strategise)	N/A

Technical Competency	Process Improvement
Competency Description	Establish systems to discover critical processes and maximise these processes to achieve maximum efficiency in accordance with organisation procedures.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Identify and implement the adoption of process improvement and optimisation methods. ▷ Evaluate the effectiveness of the opportunity benefits being realised. ▷ Measure performance against desired standards. ▷ Identify issues or improvements needed, based on deviations and corrective actions required.
Level 4 (Ensure)	▷ Analyse and develop, review of plans for process improvement and optimisation. ▷ Communicate performance and recommendations for improvement. ▷ Communicate successes and learning across the organisation and/or sector with verification of benefits and cost savings. ▷ Utilise a continuous improvement framework to drive performance management improvements.
Level 5 (Strategise)	▷ Devise strategies for the adoption of improvements and optimisation of processes.

Technical Competency	Procurement
Competency Description	Develop and apply procurement processes related to the solicitation of technology services through external providers. This includes the review of proposals, setting of vendor selection guidelines, risk assessment through appropriate audits and tests and selection of external service providers based on stipulated evaluation criteria.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Conduct research and simple quality, risk and security checks on IT vendors, preparing draft documents and materials required in the procurement process. ▷ Assist in the preparation of pre-qualification questionnaires and tender invitations in response to business cases. ▷ Assemble relevant information for tenders. ▷ Produce detailed evaluation criteria for simple tender criteria. ▷ Assist in the evaluation of tenders. ▷ Prepare pre-qualification questionnaires and tender invitations in response to business cases. ▷ Recognise the difference between open source and proprietary systems options. ▷ Apply standard procedures and tools to produce detailed evaluation criteria for complex tenders and to evaluate tenders.
Level 3 (Apply)	▷ Prepare Requests for Proposals (RFP), and assess them against selection criteria and technical specifications, implement security due diligence review in the vendor selection process. ▷ Review business cases (requirements, potential benefits and options) and determine appropriate procurement routes. ▷ Use market knowledge to inform specifications, and ensure detailed pre-qualification questionnaires and tender invitations are prepared. ▷ Collect and collate data to support collaboration and negotiate terms and conditions to reflect the scale of requirements and encourage good performance. ▷ Evaluate tenders based on specification and evaluation criteria, prepare acceptance documentation and advise on contracts and SLAs.
Level 4 (Ensure)	▷ Develop a procurement plan including vendor selection guidelines, and select a suitable service provider considering potential risks. ▷ Plan and manage procurement activities. ▷ Manage tender, evaluation and acquisition processes. ▷ Research suppliers and markets, and maintain a broad understanding of the commercial environment in order to inform and develop commercial strategies and sourcing plans. ▷ Advise on the business case for alternative sourcing models. ▷ Advise on policy and procedures covering tendering, the selection of suppliers and procurement. ▷ Negotiate with potential partners and suppliers, developing acceptance criteria and procedures. ▷ Draft and place contracts.

Level 5 (Strategise)	▷ Develop policy and procedures for sourcing and procurement activities. ▷ Establish procurement strategies, standards, methods, processes and good practices that ensure compliance with legislation, regulation and third-party information security. ▷ Lead the procurement process, from clarifying requirements through to placing, monitoring and terminating contracts. ▷ Identify external partners, engaging with professionals in related disciplines as appropriate. ▷ Ensure that terms and conditions are aligned with current legislation and policy. ▷ Establish an organisation-wide procurement process as well as policies and criteria for security due diligence review, retaining accountability for procurement decisions made. ▷ Determine overall strategies for managing supplier relationships, embracing effective operational relationships at all levels. ▷ Take overall responsibility for sourcing and procurement activities. ▷ Develop, deploy and review acquisition processes. ▷ Negotiate major contracts.

Technical Competency	Quality Standards
Competency Description	Develop, review and communicate a clear, quality expectations and standards within an organisation that are aligned to the company's values and business objectives. This encompasses the setting and implementation of quality expectations for IT products and services delivered to both internal or external client.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Assess existing quality standards and align processes and activities with IT product and service quality expectations. ▷ Contribute to the collection of evidence and the conduct of formal audits or reviews of activities. ▷ Examine records for evidence that appropriate testing and other quality control activities have taken place. ▷ Determine compliance with organisational directives, standards and procedures and identify non-compliances, non-conformances and abnormal occurrences. ▷ Plan, organise and conduct assessment activity and determines whether appropriate quality control has been applied. ▷ Conduct formal assessments or reviews for given domain areas, suppliers, or parts of the supply chain. ▷ Collate, collect and examine records, analyse the evidence and drafts all or part of formal compliance reports. ▷ Determine the risks associated with findings and non-compliance and propose corrective actions. ▷ Provide advice and guidance in the use of organisational standards.
Level 4 (Ensure)	▷ Establish and control quality expectations in line with organisation directions and selected benchmarks. ▷ Debug very complex or urgent problems. ▷ Analyse and model business functions, processes, and information flow within or between systems. ▷ Provide guidance/mentorship on programming practices and techniques to individuals and cross-functional teams. ▷ Plan, organise and conduct formal reviews and assessments of complex domains areas, cross-functional areas, and across the supply chain. ▷ Evaluate, appraise and identify non-compliances with organisational standards and determine the underlying reasons for non-compliance. ▷ Prepare and report on assessment findings and associated risks. ▷ Ensure that appropriate owners for corrective actions are identified. ▷ Identify opportunities to improve organisational control mechanisms. ▷ Oversee the assurance activities of others, providing advice and expertise to support assurance activity.

Level 5 (Strategise)	▷ Lead, develop and be accountable for an organisational approach and commitment to quality assurance. ▷ Ensure that quality assurance parameters and activities are robust and reliable, and appropriately tailored to the organisation's quality objectives. ▷ Plan and resource the organisational quality assurance setting activities, using internal or third-party resources. ▷ Consider the implications of emerging technology, approaches, trends, regulations and legislation. ▷ Monitor and report on quality standard activities, levels of compliance, and improvement opportunities. ▷ Review organisation's quality guidelines against emerging trends and industry best practices, ensuring alignment with company values and objectives.

Technical Competency	Quality Assurance
Competency Description	The process of ensuring that the agreed quality standards within an organisation are adhered to and that best practice is promulgated throughout the organisation
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Use appropriate methods and tools in the development, maintenance, control and distribution of quality and environmental standards. ▷ Make technical changes to quality and environmental standards according to documented procedures, and distribute new and revised standards.
Level 3 (Apply)	▷ Investigate and document the internal control of specified aspects of automated or partly automated processes, and assess compliance with the relevant standard. ▷ Assist projects, functions or teams in planning the quality management for their area of responsibility. ▷ Assist in the development of new or improved practices and organisational processes or standards. ▷ Facilitate localised improvements to the quality system or services.
Level 4 (Ensure)	▷ Use quality standards to review past performance and plan future activities. ▷ Conduct audits of quality requirements and produces audit reports. ▷ Monitor and report on the outputs from the quality assurance and audit processes. ▷ Optimise the amount and quality of responses and business insights, direct market research and analytics activities and processes.
Level 5 (Strategise)	▷ Develop organisational commitment to ongoing quality and environmental improvement by ensuring that the quality assurance process is robust and is based on the best industry practice. ▷ Consider implications of emerging technological developments, economic and social trends, etc. ▷ Plan and resource periodic quality assurance audits. ▷ Conduct and/or manage audits of quality requirements, and analyses audit results, to ensure appropriate quality standards and operational definitions are in place. ▷ Prepare and deliver formal audit reports.

Technical Competency	Security Administration
Competency Description	Administer, configure and update of security programmes and mechanisms, including the application of system patches to ensure that enterprise assets are adequately protected against threats. This also includes the authorisation, management and monitoring of access control permissions and/or rights to various IT facilities.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Run system diagnostic tools, and install and update simple, basic security programmes, virus protection and system patches.
Level 3 (Apply)	▷ Administer, configure and troubleshoot security programmes and mechanisms, and analyse impact of patches and updates on system and networks. ▷ Apply standards for testing.
Level 4 (Ensure)	▷ Plan the administration and technical operationalisation of security programmes, and investigate security breaches in information, system and network access.
Level 5 (Strategise)	N/A

Technical Competency	Security Architecture (Applications Developer)
Competency Description	Design security architectures and controls; either embedding of security principles into the design of architectures to mitigate the risks posed by new technologies and business practices, or the actual design and specification of implementable security components, along with the accompanying control measures, to meet defined business security needs.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Perform basic analysis on enterprise-wide security systems. ▷ Assist end-user on security related issues upon trigger raised. ▷ Assist in performing security gap analysis. ▷ Contribute to the identification of risks that arise from potential technical solution architectures.
Level 3 (Apply)	▷ Design secure systems and define security specifications of components, integrating appropriate security controls. ▷ Demonstrate awareness of other architectures.
Level 4 (Ensure)	▷ Design a security blueprint and direct the design of a robust and coherent security architecture, based on a suite of security solutions and key design principles.
Level 5 (Strategise)	▷ Establish organisational guidelines and principles for the design of security architecture and controls, and drive the enhancement of organisation-wide security systems.

Technical Competency	Security Architecture (Solutions Architect, Associate Security Analyst, Cyber Risk Analyst, Security Engineer)
Competency Description	Design security architectures and controls; either embedding of security principles into the design of architectures to mitigate the risks posed by new technologies and business practices, or the actual design and specification of implementable security components, along with the accompanying control measures, to meet defined business security needs.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Interpret relevant security policies and risk profiles into secure architectural solutions that mitigate the risks and conform to legislation. ▷ Present security architecture solutions as a view within broader IT architectures. ▷ Relate security architectures to business needs and risks. ▷ Work with recognised security architecture. ▷ Devise standard solutions that address requirements delivering specific security functionality whether for a business solution or for a product. ▷ Minimise the risk to an asset or product through “standard” security architecture practices. ▷ Deliver the security architecture that supports the risk management strategy using current security technologies and techniques. ▷ Maintain awareness of the security advantages and vulnerabilities of common products and technologies. ▷ Design secure systems and define security specifications of components, integrating appropriate security controls.
Level 4 (Ensure)	▷ Establish organisational guidelines and principles for the design of security architecture and controls, and drive the enhancement of organisation-wide security systems. ▷ Minimise the risk to an asset or product through the use of “standard” security technologies and products. ▷ Design and develop processes for maintaining the security of an asset or product through its full life cycle. ▷ Maintain awareness of the security advantages and vulnerabilities of common products and technologies. ▷ Design robust and fault-tolerant security mechanisms and components appropriate to the perceived risks. ▷ Select the appropriate security products, components and technologies to meet a security requirement. ▷ Select the most appropriate information interchange protocols that meet the security requirements.
Level 5 (Strategise)	▷ Design a security blueprint and direct the design of a robust and coherent security architecture, based on a suite of security solutions and key design principles.

Technical Competency	Security Governance
Competency Description	Develop and disseminate corporate security policies, frameworks and guidelines to ensure that day-to-day business operations guard or are well protected against risks, threats and vulnerabilities.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Proactively identify security risks in business operations and implement security guidelines and protocols, in line with corporate security policies. ▷ Recognise potential strategic application of information security and initiate investigation and development of innovative methods of protecting information assets, to the benefit of the organisation and the interface between business and information security. ▷ Exploit opportunities for introducing more effective secure business and operational processes.
Level 4 (Ensure)	▷ Evaluate security risks and establish corporate security policies and frameworks to guard against them. ▷ Establish frameworks to develop and maintain appropriate information security expertise within an organisation. ▷ Gain management commitment and resources to support the governance structure. ▷ Incorporate physical, personnel and procedural issues into the overall security governance process. ▷ Relate an organisation's business needs to their requirements for information security. ▷ Encourage an information risk awareness culture within an organisation. (e.g., raising awareness of how the various forms of social engineering can be used to compromise information).
Level 5 (Strategise)	▷ Anticipate potential security threats and emerging trends in security management, establish targets for the organisation's security policies and systems. ▷ Establish frameworks for maintaining the security of information throughout its life cycle.

Technical Competency	Security Implementation
Competency Description	Execute and implement operational and tactical-level action plans in alignment with the organisation's business strategies.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Receive and respond to routine requests for security support. ▷ Maintain records and advise relevant persons of actions taken. ▷ Assist in the investigation and resolution of issues relating to access controls and security systems.
Level 3 (Apply)	▷ Analyse strategies for critical business functions to ensure plans are within risk mitigation factors. ▷ Investigate minor security breaches in accordance with established procedures. ▷ Assist users in defining their access rights and privileges. ▷ Perform non-standard security administration tasks and resolve security administration issues.
Level 4 (Ensure)	▷ Evaluate strategies for critical business functions to ensure plans are realistic and reflect health of business. ▷ Monitor the application and compliance of security administration procedures and review information systems for actual or potential breaches in security. ▷ Ensure that all identified breaches in security are promptly and thoroughly investigated and that any system changes required to maintain security are implemented. ▷ Ensure that security records are accurate and complete and that request for support are dealt with according to set standards and procedures. ▷ Contribute to the creation and maintenance of policy, standards, procedures and documentation for security.
Level 5 (Strategise)	▷ Develop policies, standards, processes, guidelines for ensuring the physical and electronic security of automated systems. ▷ Ensure that the policy and standards for security administration are fit for purpose, current and are correctly implemented. ▷ Review new business proposals and provide specialist advice on security issues and implications.

Technical Competency	Security Planning
Competency Description	Develop organisational strategies and policies by analysing the impact of internal and external influencing factors and seeking consultation from relevant stakeholders.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Develop resource allocation plans and implement strategies and policies. ▷ Explain the purpose of and provide advice and guidance on the application and operation of elementary physical, procedural and technical security controls. ▷ Perform security risk, vulnerability assessments, and business impact analysis for medium complexity information systems. ▷ Investigate suspected attacks and manage security incidents. ▷ Use forensics where appropriate.
Level 4 (Ensure)	▷ Formulate the strategies and policies that are forward-looking and focus on bottom line results. ▷ Provide advice and guidance on security strategies to manage identified risks and ensure adoption and adherence to standards. ▷ Obtain and act on vulnerability information and conduct security risk assessments, business impact analysis and accreditation on complex information systems. ▷ Investigate major breaches of security, and recommend appropriate control improvements. ▷ Contribute to the development of information security policy, standards and guidelines.
Level 5 (Strategise)	▷ Build actionable organisation strategy plans and policies that are forward-looking, anticipate strategic risks and focus on bottom line results. ▷ Develop and communicate corporate information security policy, standards and guidelines. ▷ Contribute to the development of organisational strategies that address information control requirements. ▷ Identify and monitor environmental and market trends and pro-actively assess impact on business strategies, benefits and risks. ▷ Lead the provision of authoritative advice and guidance on the requirements for security controls in collaboration with experts in other functions such as legal and technical support. ▷ Ensure architectural principles are applied during design to reduce risk and drive adoption and adherence to policy, standards and guideline. ▷ Direct the development, implementation, delivery and support of an enterprise information security strategy aligned to the strategic requirements of the business.

Technical Competency	Security Programme Management
Competency Description	Develop and manage security solutions, products and services through technology innovation, experimentation and collaboration. This includes security programme planning, developing and testing new security capabilities and implementing security technologies and programmes.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Detail the security requirements for system architecture components and implement security programmes. ▷ Establish processes for maintaining the security of information throughout its existence. ▷ Establish and maintain security operating procedures in accordance with security policies, standards and procedures. ▷ Coordinate penetration testing on information processes against relevant policies. ▷ Assess and respond to new technical, physical, personnel or procedural vulnerabilities. ▷ Manage implementation of information security programmes, and co-ordinate security activities across the organisation.
Level 4 (Ensure)	▷ Manage large-scale secure system initiatives and collaborations with programmers to develop new security solutions and capabilities. ▷ Securely configure information and communications equipment in accordance with relevant security policies, standards and guidelines. ▷ Maintain security records and documentation in accordance with Security Operating Procedures. ▷ Administer logical and physical user access rights. ▷ Monitor processes for violations of relevant security policies (e.g. acceptable use, security, etc.).
Level 5 (Strategise)	▷ Spearhead new, complex or revolutionary security programmes, and integrate a suite of enterprise-wide security programmes into a cohesive security architecture. ▷ Develop and implement procedures for responding to and stabilising the situation following an incident or event. ▷ Establish and manage a security emergency operations centre to be used as a command centre during an emergency. ▷ Mount pre-plan and coordinate plan exercises, and evaluate and document plan exercise results. ▷ Verify that the plan will prove effective by comparison with a suitable standard, and of reporting results in a clear and concise manner. ▷ Establish applicable procedures and policies for coordinating continuity and restoration activities with external agencies while ensuring compliance with applicable statutes or regulations. ▷ Coordinate, evaluate, and exercise plans to communicate with internal stakeholders, external stakeholders and the media.

Technical Competency	Service Level Management
Competency Description	Plan, monitor and manage service provisions for the achievement of agreed service level targets.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Monitor service levels, review and report service delivery deviations.
Level 3 (Apply)	▷ Manage fulfilment of SLAs and resolve issues to maintain overall service levels.
Level 4 (Ensure)	▷ Evaluate service levels and oversee improvements to enhance service performance.
Level 5 (Strategise)	▷ Formulate the organisation's service delivery standards and strategy, drive an SLA-oriented mindset, and establish strategic networks and partnerships.

Technical Competency	Service Management
Competency Description	Knowledge and ability to implement the methods, practices and policies governing the design, development and use of the IT support processes which are designed to keep the IT environment functioning efficiently, effectively and securely. Plan, monitor and manage service provisions for the achievement of agreed service level targets.
Level 1 (Follow)	▷ Understand service management processes and concepts (e.g., incident management, change management, release management). ▷ Understand concepts, techniques and practices of helpdesk operations and service delivery.
Level 2 (Assist)	▷ Monitor service levels, review and report service delivery deviations. ▷ Understand and follow a process in problem management, change management or configuration management. ▷ Provide IT helpdesk support services. ▷ Gather information from end-users to determine the nature of problems and resolve them. ▷ Monitor SLAs and escalate problems. ▷ Perform initial evaluation of problem and routes as necessary. ▷ Understand the requirements of process (e.g., involvement of service management early in the process). ▷ Monitor service levels, review and report service delivery deviation.
Level 3 (Apply)	▷ Understand interrelationships and interdependencies between service management processes. ▷ Install, configure, troubleshoot and support application software. ▷ Analyse, evaluate, and diagnose technical problems and propose solutions. ▷ Manage processes ensuring they are followed (e.g., change, problem, testing, costing, backup and recovery, QA release). ▷ Schedule release after ensuring absence of conflicts. ▷ Serve as a point of escalation. ▷ Conduct customer satisfaction surveys. ▷ Guide others in processes. ▷ Implement changes to processes.
Level 4 (Ensure)	▷ Implement and manage services using the principles and methods associated with Information Technology Infrastructure Library (ITIL) and other industry best practices. ▷ Identify who to call for severe or complex problems. ▷ Manage the provision of helpdesk services and problem resolution. ▷ Analyse problem trends and make recommendations. ▷ Develop service management processes. ▷ Write/negotiate SLAs for operational level agreements and internal SLAs. ▷ Develop customer satisfaction surveys. ▷ Set guidelines for others to follow.

Level 5 (Strategise)	▷ Formulate the organisation's service delivery standards and strategy, drive an SLA-oriented mindset, and establish strategic networks and partnerships. ▷ Negotiate, develop, implement and manage SLAs. ▷ Develop service management standards, practices and policies. ▷ Build and maintain a network of experts. ▷ Develop SLA templates. ▷ Negotiate complex SLAs. ▷ Provide guidelines for service management (e.g., recommend changes based upon results of a customer satisfaction survey). ▷ Recommend continual improvements in service management strategy and processes.

Technical Competency	Software Configuration (Applications Developer)
Competency Description	Configure software products and apply scripts and automation tools to integrate and deploy software releases to various platforms and operating environments. This includes subsequent modifications to software configuration, based on outcomes of systems and/or configuration tests.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Apply standard scripts and tools to deploy software products. ▷ Assist in document release and deployment activities. ▷ Perform modifications to software configurations.
Level 3 (Apply)	▷ Identify appropriate scripts and tools. ▷ Perform configuration of software products to run effectively on various platforms.
Level 4 (Ensure)	▷ Establish and revise an effective release and configuration plan. ▷ Evaluate configuration test results to recommend modifications to the product or deployment process.
Level 5 (Strategise)	N/A

Technical Competency	Software Configuration (Solutions Architect)
Competency Description	Configure software products and apply scripts and automation tools to integrate and deploy software releases to various platforms and operating environments. This includes subsequent modifications to software configuration, based on outcomes of systems and/or configuration tests.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Assist in designing, verifying, documenting, amending and refactoring moderately complex software configurations for deployment. ▷ Apply agreed standards and tools, to achieve a ell-engineered result. ▷ Collaborate in reviews of work with others as appropriate. ▷ Apply standard scripts and tools to deploy software products, and document release and deployment activities as well as modifications to software configurations.
Level 3 (Apply)	▷ Identify appropriate scripts and tools, and configure software products to run effectively on various platforms. ▷ Establish and revise an effective release and configuration plan. ▷ Evaluate configuration test results to recommend modifications to the product or deployment process. ▷ Design, verify, document, amend and refactor complex software configurations for deployment.
Level 4 (Ensure)	▷ Contribute to the selection of the software configuration methods, tools and techniques. ▷ Apply agreed standards and tools, to achieve well-engineered outcomes. ▷ Participate in reviews of own work and leads reviews of colleagues' work. ▷ Take technical responsibility across all stages and iterations of configuration development and deployment. ▷ Plan and drive software configuration activities. Adopts and adapts appropriate software configuration methods, tools and techniques. ▷ Measure and monitor the application of standards for configuration design and deployment including software security. ▷ Contribute to the development of organisational policies, standards, and guidelines for software configuration design and deployment.
Level 5 (Strategise)	▷ Develop organisational policies, standards, and guidelines for software configuration design, deployment and refactoring. ▷ Plan and lead software configuration and deployment activities for strategic, large and complex deployment projects. ▷ Develop new methods and organisational capabilities and drives adoption of, and adherence to policies and standards.

Technical Competency	Software Design (Applications Developer)
Competency Description	Create and refine the overall plan for the design of software, including the design of functional specifications starting from the defined business requirements as well as the consideration and incorporation of various controls, functionality and interoperability of different elements into a design blueprint or model which describes the overall architecture in hardware, software, databases, and third-party frameworks that the software will use or interact with.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Design simple software components. ▷ Assess functionality of different elements, and produce design documentation.
Level 4 (Ensure)	▷ Create a software design blueprint based on a broad design concept, and business and user requirements.
Level 5 (Strategise)	N/A

Technical Competency	Software Design (Solutions Architect)
Competency Description	Create and refine the overall plan for the design of software, including the design of functional specifications starting from the defined business requirements as well as the consideration and incorporation of various controls, functionality and interoperability of different elements into a design blueprint or model which describes the overall architecture in hardware, software, databases, and third-party frameworks that the software will use or interact with.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Design simple software components, assessing functionality of different elements, and produce design documentation. ▷ Create and document detailed designs for simple software applications or components. ▷ Apply agreed modelling techniques, standards, patterns and tools. ▷ Contribute to the design of components of larger software systems. ▷ Review own work.
Level 3 (Apply)	▷ Create a software design blueprint based on a broad design concept, and business and user requirements. ▷ Undertake complete design of moderately complex software applications or components. ▷ Apply agreed standards, guidelines, patterns and tools. ▷ Assist as part of a team in the design of components of larger software systems. ▷ Specify user and/or system interfaces. ▷ Create multiple design views to address the different stakeholders' concerns and to handle functional and non-functional requirements. Assists in the evaluation of options and trade-offs. ▷ Collaborate in reviews of work with others as appropriate.
Level 4 (Ensure)	▷ Translate complex software ideas and concepts into a design blueprint and establish key design principles and methodologies. ▷ Design complex software applications, components and modules. ▷ Use appropriate modelling techniques following agreed software design standards, guidelines, patterns and methodology. ▷ Create and communicate multiple design views to balance stakeholders' concerns and to satisfy functional and non-functional requirements. ▷ Identify, evaluate and recommend alternative design options and trade-offs. ▷ Model, simulate or prototype the behaviour of proposed software to enable approval by stakeholders, and effective construction of the software. ▷ Verify software design by constructing and applying appropriate methods. ▷ Review, verify and improve own designs against specifications. ▷ Lead reviews of others' designs.

Level 5 (Strategise)	▷ Adopt and adapt software design methods, tools and techniques. ▷ Undertake impact analysis on major design options, make recommendations and assess and manage associated risks. ▷ Specify prototypes/simulations to enable informed decision-making. ▷ Evaluate software designs to ensure adherence to standards and identify corrective action. ▷ Ensure that the software design balances functional, quality, security and systems management requirements. ▷ Contribute to the development of organisational software design and architecture policies and standards. ▷ Inspire new and innovative software design ideas, and align design principles and parameters with current and future needs. ▷ Lead the selection and development of software design methods, tools and techniques. ▷ Develop organisational policies, standards, and guidelines for software design and software architectures. ▷ Ensure adherence to technical strategies and systems architectures (including security).

Technical Competency	Software Testing
Competency Description	Assess and test the overall effectiveness and performance of an application. This involves the setting up of suitable testing conditions, definition of test cases and/or technical criteria.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Demonstrate awareness of testing principles and processes. ▷ Understand testing terminology. ▷ Test and debug software modules. ▷ Conduct unit testing. ▷ Understand testing methodologies and principles. ▷ Understand standards for testing. ▷ Execute test scripts. ▷ Report test results. ▷ Understand and apply IT system security for applications. ▷ Use a testing tool.
Level 3 (Apply)	▷ Understand systems integration principles (i.e., the methods, practices and policies that are used during a systems integration process, including hardware, software, network, and applications). ▷ Understand release and certification processes. ▷ Prepare test cases/scripts. ▷ Carry out complex testing/validation (e.g., volume testing, integration testing). ▷ Ensure other applications are not affected. ▷ Match results with expectations in the design document. ▷ Troubleshoot/resolve issues. ▷ Implement test tools. ▷ Apply standards for testing.

Level 4 (Ensure)	▷ Conduct application testing. ▷ Conduct. complex series test scenarios. ▷ Prepare test plans and strategies. ▷ Research/test testing tools and make recommendations. ▷ Develop test practices. ▷ Implement and monitor standards for testing. ▷ Test standards. ▷ Understand the impact of testing on the environment and other tests being carried out. ▷ Ensure that the right/appropriate tests are being carried out. ▷ Mentor others. ▷ Guide application stakeholders in testing methods and tools.
Level 5 (Strategise)	▷ Manage integration testing. ▷ Set standards for cycle testing. ▷ Design testing methodologies. ▷ Develop test standards, best practices and policies.

Technical Competency	Stakeholder Management
Competency Description	Manage stakeholder expectations and needs by aligning those with requirements and objectives of the organisation. This involves planning of actions to effectively communicate with, negotiate with and influence stakeholders.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Identify key stakeholder relationships, needs and interests, and coordinate with stakeholders on a day-to-day basis. ▷ Serve as the organisation's main contact point for stakeholder communications, clarifying responsibilities among stakeholders, and engaging them to align expectations. ▷ Understand which external and internal stakeholders are relevant to own work.
Level 3 (Apply)	▷ Develop a stakeholder engagement plan and negotiate with stakeholders to arrive at mutually beneficial arrangements. ▷ Build relationships with relevant external peers reflecting business needs. ▷ Be an ambassador for the organisation, supporting its strategy and living its values and behaviours. ▷ Proactively share information gained from external stakeholder engagement in a helpful and timely way. ▷ Build and maintain positive relationships with internal peers and other colleagues, in ways that help to deliver the strategy as a whole.
Level 4 (Ensure)	▷ Define a strategic stakeholder management roadmap, and lead critical discussions and negotiations, addressing escalated issues or problems encountered. ▷ Build relationships and networks with relevant external peers, regulators, relevant stakeholders or professional bodies. ▷ Maintain a positive approach to influence, persuade and negotiate effectively as required by the project(s). ▷ Develop and maintain an understanding of different approaches to stakeholder management and be able to make an informed recommendation about which approach to use to maximum effect. ▷ Develop awareness and identify opportunities to collaborate effectively.
Level 5 (Strategise)	▷ Establish the overall vision for the alignment of organisation's and stakeholders' objectives, co-creating shared goals and strategic initiatives with senior stakeholders. ▷ Develop and maintain a good understanding of the organisation's stakeholder landscape, interactions and linkages across it, trends over time, and future movements. ▷ Play a key role in using stakeholder engagement (including collaborative working) to deliver strategic benefits. This may include developing networks and influencing on issues beyond regulation. ▷ Drive the development of stakeholder activities across the organisation remit to maintain relationships that deliver maximum strategic benefit.

Technical Competency	System Integration
Competency Description	Develop and implement a roadmap and specific integration solutions to facilitate integration of various ICT components and optimise interoperability of systems and their interfaces. This includes the integration of various architectural components such as networks, servers, system platforms and their interfaces.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Perform basic compatibility assessments and integrate selected system components according to plan. ▷ Produce software builds from software source code. ▷ Conduct tests as defined in an integration test specification and record the details of any failures. ▷ Analyse and report on integration test activities and results. ▷ Identify and report issues and risks.
Level 3 (Apply)	▷ Determine interoperability of system components and develop a system integration plan. ▷ Define the software modules needed for an integration build and produce a build definition for each generation of the software. ▷ Accept completed software modules, ensuring that they meet defined criteria. ▷ Produce software builds from software source code for loading onto target hardware. ▷ Configure the hardware and software environment as required by the system being integrated. ▷ Produce integration test specifications, conduct tests and record and report on outcomes. ▷ Diagnose faults and record and report on the results of tests. ▷ Produce system integration reports.
Level 4 (Ensure)	▷ Design a feasible integration roadmap, monitor system integration outcomes and drive enhancements to integration plans. ▷ Provide technical expertise to enable the configuration of software, other system components and equipment for systems testing. ▷ Collaborate with technical teams to develop and agree on system integration plans and report on progress. ▷ Define complex/new integration build. ▷ Ensure that integration test environments are correctly configured. ▷ Design, perform and report results of tests of the integration build. ▷ Identify and document system integration components for recording in the configuration management system. ▷ Recommend and implement improvements to processes and tools.

Level 5 (Strategise)	▷ Establish an integration strategy and a clear vision for an integrated ICT architectural design. ▷ Identify, evaluate and manage the adoption of appropriate tools, techniques and processes (including automation and continuous integration) to create a robust integration framework. ▷ Lead integration work in line with the agreed system and service design. ▷ Monitor and report on the results of each integration and build. ▷ Design and build integration components and interfaces. ▷ Contribute to the overall design of the service and the definition of criteria for product and component selection. ▷ Contribute to development of systems integration policies, standards and tools. ▷ Develop organisational policies, standards, and guidelines for systems integration and build. ▷ Lead the development of organisational capabilities for systems integration and build, including automation and continuous integration. ▷ Provide resources to ensure systems integration and build can operate effectively and ensure adoption and adherence to policies and standards.

Technical Competency	Telecommunications Network Management
Competency Description	Knowledge and ability to implement the methods, practices and policies governing the design, analysis, development, management and use of the IT and telecommunications hardware and software to transfer information such as data, voice, images, video and other telecommunication services over fibre optic, wired or wireless over short or long distances. This involves utilisation of telecommunication network management systems and signalling network protocols. The telecommunications networking system components comprises of software (operating systems and applications) and hardware (computer, routers, radiocommunication equipment, fibre optic, switches, cable and hub) whether underground or above ground.
Level 1 (Follow)	▷ Demonstrate basic understanding of telecommunication, data communications and components, definitions, key concepts, communication protocols and platforms (e.g., firewalls, security, passive optical network (PON), hubs/routers/ gateways switches, Voice over Internet Protocol (VoIP), routing protocols).
Level 2 (Assist)	▷ Understand telecommunication services routing, data routing and switching technology. ▷ Understand how basic concepts relate to each other and apply them. ▷ Understand how telecommunication services, data communications integrate with other environments (e.g., telecommunications data centre and switches) and are distributed, at a basic level, from an end-user perspective. ▷ Assist in the design of basic connections (e.g., connecting 100 people to a Fibre-To-The-Home (FTTH) network or a wireless radiocommunication network). ▷ Troubleshoot basic physical or software connectivity problems, network congestion (e.g., cables/connections defective equipment, logging in to network equipment, checking configuration of routers/switches). ▷ Use telecommunication and data communications diagnostic tools. ▷ Test, configure, install, and support hardware and software at any typical site. ▷ Talk clients through troubleshooting.
Level 3 (Apply)	▷ Understand how telecommunication or data communications integrate with other environments such as mainframe, firewalls, and external networks, at a component level. ▷ Demonstrate and apply wide range of concepts to the corporate/vendor environment. ▷ Understand vendor-specific network switching and routing products. ▷ Translate multiple client network connectivity requirements and limitations into technical specifications for building/site designs. ▷ Design complex building environments using existing standards and deployment best practices. ▷ Resolve typical hardware and software problems (e.g., connectivity, network congestion, protocols, and uses diagnostic tools). ▷ Conduct certification testing. ▷ Apply telecommunication standards and best practices.

Level 4 (Ensure)	▷ Incorporate business requirements (e.g., high availability, redundancy, disaster recovery) into data communications design using analytical techniques. ▷ Evaluate/pilot new technologies, identify how they integrate with the corporate network and implement. ▷ Resolve unusual or atypical network problems without clear precedents and/or that have significant impact or consequence on the business or service. ▷ Create or review certification testing. ▷ Develop standards and procedures for new technology configuration and implementation. ▷ Mentor/guide individuals and cross-functional teams. ▷ Deal with major client groups (e.g., regional or national client).
Level 5 (Strategise)	▷ Demonstrate expert knowledge of telecommunication and data communications principles, network technology, enterprise-wide technology for public/private sector and technological trends. ▷ Demonstrate broad-based knowledge of information, radiocommunication, deployment technology. ▷ Develop enterprise-wide multi-disciplinary telecommunication architectural documents. ▷ Develop business cases for enterprise-wide telecommunication network technology initiatives as a direct response to business drivers. ▷ Provide effective strategic direction to enterprise-wide telecommunication network design. ▷ Guide and oversee multiple-concurrent telecommunication network projects. ▷ Conduct procurement for telecommunications network solutions, hardware and services. ▷ Develop policy and standards for telecommunication networking technology and contribute to governmental and/or industry standards working groups (e.g., International Telecommunication Union).

Technical Competency	Test Planning
Competency Description	Develop a test strategy and systematic test procedures to verify and ensure that a product, system or technical solution meets its design specifications as well as the performance, load and volume levels set out. This includes the ability to define when different requirements will be verified across the product life stages, the tools used to perform the test, the data and/or resources needed to conduct the tests and test ware in test cases, test scripts, test reports and test plans required.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Identify and document the basic tools, test ware, resources and processes to carry out required tests.
Level 3 (Apply)	▷ Determine requirements and develop a phase test plan, identifying optimal schedules and means for executing test scripts.
Level 4 (Ensure)	▷ Define testing objectives, and design a master test plan including a series of systematic test procedures to achieve them.
Level 5 (Strategise)	▷ Develop a test strategy, and establish testing policies, guidelines and metrics according to internal and external standards.

Technical Competency	User Interface Design
Competency Description	Design user interfaces for machines and software, incorporating visual, technical and functional elements that facilitate ease of access, understanding and usage. This involves adding, removing, modifying or enhancing elements to make the user's interaction with the product as seamless as possible.
Level 1 (Follow)	N/A
Level 2 (Assist)	N/A
Level 3 (Apply)	▷ Identify functionalities and information flows to develop components of user interface prototypes. ▷ Making tweaks to graphical user interfaces. ▷ Apply standard techniques and tools for designing user interactions with and experiences of selected system, product or service components. ▷ Review design goals and agreed security, usability and accessibility requirements. ▷ Create storyboards, static wireframes and dynamic or workable prototypes. ▷ Assist as part of a team, with overall user experience design. ▷ Assist in the evaluation of design options and trade-offs. ▷ Consistently apply visual design and branding guidelines.
Level 4 (Ensure)	▷ Design the information architecture, process flow and user interface prototypes as well as graphical user interfaces. ▷ Select appropriate tools, methods and design patterns to design user interactions with and experiences of a product, system or service. ▷ Translate concepts into outputs and prototypes and capture user feedback or evaluation to improve designs. ▷ Evaluate alternative design options and recommend designs taking into account performance, security, usability and accessibility requirements. ▷ Interpret and follow visual design and branding guidelines to create a consistent and impactful user experience. ▷ Plan and drive user experience design activities, providing expert advice and guidance to support the adoption of agreed approaches. ▷ Determine the approaches to be used to design user experiences. ▷ Use iterative approaches to incorporate user feedback or evaluation rapidly into designs. ▷ Integrate required visual design and branding into the user experience design activities.
Level 5 (Strategise)	▷ Direct the development of prototypes and user interface. ▷ Customise complex graphical user interfaces. ▷ Obtain organisational commitment to strategies to deliver required user experience, usability, accessibility and security. ▷ Define organisational policies, standards and techniques for user experience design. ▷ Plan and lead user experience design activities for strategic, large or complex programmes.

Technical Competency	Vendor Management
Competency Description	Manage vendor relationships by ensuring performance as per contracts, operations within standards established by the organisation such as adherence to safety, security, and compliance standards.
Level 1 (Follow)	N/A
Level 2 (Assist)	▷ Monitor vendors' performance and resolve contractual issues.
Level 3 (Apply)	▷ Develop and sustain vendor relationships and manage vendors' performance.
Level 4 (Ensure)	▷ Establish organisation's expectations of vendors and manage critical vendor interactions.
Level 5 (Strategise)	N/A

Soft Skills Competencies

Soft Skills Competencies Glossary

No.	Competency	Definition
1	Analytical Thinking	Work systematically and logically to resolve problems, address opportunities, or manage the situation at hand. Analyse the situation; identify the underlying problem; identify causes, relationships and implications; identify opportunities; draw from a range of resources, contexts and experiences; conceptualise solutions; consider alternatives; and implement the most appropriate action.
2	Communication	Express ideas effectively in individual and group situations. Listen effectively; share information, ideas and arguments; adjust terminology, language and communication modes to the needs of the audience; ensure accurate understanding; act in a way that facilitates open exchange of ideas and information; use appropriate non-verbal communication.
3	Creativity and Innovation	Generate creative solutions to work situations. Generate and promote new ideas and uses them to develop new or improved processes, methods, systems, solutions, products, or services; try different and novel ways to deal with problems and opportunities.
4	Decision-Making	Decision-making process is a series of steps taken by an individual to determine the best option or course of action to meet their needs. In a business context, it is a set of steps taken by managers in an enterprise to determine the planned path for business initiatives and to set specific actions in motion. Ideally, business decisions are based on an analysis of objective facts, aided by the use of Business Intelligence (BI) and analytics tools.
5	Negotiation	Effectively explore alternatives and positions to reach outcomes that gain the support and acceptance of all parties.
6	People Management	Motivate and guide others to accomplish work objectives through performance management. Set clear performance expectations; use appropriate interpersonal skills to gain commitment from staff; monitor and guide progress; seek and give feedback; appraise performance outcomes; plan and support the development of others; facilitate relationships with others; advise staff to better navigate complexity in roles; allocate decision-making authority and task responsibilities to appropriate subordinates; utilise subordinate's time, skills and potential effectively.

No.	Competency	Definition
7	Resilience	Handle disappointment and/or rejection while maintaining effectiveness. Stay with a position or plan of action until the desirable objective is achieved or is no longer reasonably attainable.
8	Results Orientation	Stay focused on the efforts necessary to achieve quality results consistent with institutional and departmental goals. Demonstrate the ability to achieve effective results; demonstrate concern for the successful achievement of results; work persistently to overcome obstacles to goal achievement.
9	Service Orientation	Make client's needs a primary focus of actions. Proactively develop and sustain productive client relationships; understand the client needs; anticipate and provide solutions to client needs; demonstrate concern for meeting and exceeding immediate and future needs of clients; give high priority to client satisfaction.
10	Teamwork	Work effectively with team/work groups or those outside formal line of authority to accomplish goals. Actively participate as a member of a team; take action that respects the needs and contributions of others; contribute to and accept the consensus, subordinating own needs to those of the team; develop and build cohesive team relations to produce required outputs; possess knowledge and understanding of peer's work.
11	Work Management	Establish a course of action for self-and/or others to accomplish a specific goal. Effectively plan, schedule, prioritise and control activities; identify, integrate and orchestrate resources (people, material, information, budget, and/or time) to accomplish goals; prioritise work according to the organisation's goals, not just formal position responsibilities; manage own time effectively.

Soft Skills Competencies Descriptor

Soft Skills Competency	Analytical Thinking
Competency Description	Work systematically and logically to resolve problems, address opportunities, or manage the situation at hand. Analyses the situation; identify the underlying problem; identify causes, relationships and implications; identify opportunities; draw from a range of resources, contexts and experiences; conceptualise solutions; consider alternatives; and implement the most appropriate action.
Basic	▷ Effectively use existing procedures, processes, and tools to identify and solve routine problems. ▷ Appropriately apply learned concepts, procedures, or “rules of thumb” to analyse data. ▷ Identify the information needed to solve a problem. ▷ Recognise a match or mismatch between current data and a known standard.
Intermediate	▷ Appropriately derive and organise the essence of information to draw solid conclusions. ▷ Effectively resolve problems of a moderately complex nature. ▷ Synthesise data from different sources to identify trends. ▷ Look beyond symptoms to uncover root causes of problems to be solved. ▷ Present problem analysis and a recommended solution rather than just identifying and describing the problem itself. ▷ Proactively approach others to obtain missing information. ▷ Take action to reconcile discrepancies.
Advanced	▷ Effectively resolve complex problems that require substantial, in-depth analysis. ▷ Quickly identify key issues, stakeholders and viewpoints in a complex situation or problem. ▷ Find ways to condense large amounts of information into a useful form. ▷ Anticipate the consequences of situations and proactively work to overcome potential obstacles. ▷ Asks perceptive, probing questions to get to the heart of the matter.
Expert	▷ Effectively resolve the most difficult and complex problems that require the creation of new, innovative approaches. ▷ Analyse and appropriately weigh the pros, cons, opportunities, and risks before deciding on a course of action. ▷ Integrate seemingly unrelated information from different sources to identify new approaches that strengthen the long-term position of the organisation.

Soft Skills Competency	Communication
Competency Description	Express ideas effectively in individual and group situations. Listen effectively; share information, ideas and arguments; adjust terminology, language and communication modes to the needs of the audience; ensure accurate understanding; act in a way that facilitates open exchange of ideas and information; use appropriate non-verbal communication.
Basic	▷ Appropriately express one's own opinion. ▷ Listen closely to the message being delivered. ▷ Wait until the speaker has ended the intended message before responding. ▷ Accurately report mistakes, errors and unintended outcomes without glossing over what went wrong.
Intermediate	▷ Ask open ended questions that encourage others to give their point of view. ▷ Check understanding by stating what he/she understands of the message and asking the speaker to verify or clarify. ▷ Show respect for the opinion of others. ▷ Adapt communication (vocabulary, pace, etc.) for the audience.
Advanced	▷ Refrain from immediate judgement and criticism of others' ideas delivering criticism in a way that demonstrates sensitivity to the feelings of others. ▷ Stand firm when presenting own ideas yet is flexible in listening to and accepting others' input. ▷ Help the other person to vent anger and negative emotions. ▷ Encourage the open expression of dissent and contrary viewpoints. ▷ Alert appropriate parties upon the discovery of potential problems, ensuring no surprises.
Expert	▷ Create a climate that promotes the free flow of communication in own team, department and organisation. ▷ Communicate effectively across all functions and levels of the organisation. ▷ Being sensitive to individual or group communication patterns and work to overcome dysfunctional behaviour, if necessary.

Soft Skills Competency	Creativity and Innovation
Competency Description	Generate creative solutions to work situations. Generate and promotes new ideas and uses them to develop new or improved processes, methods, systems, solutions, products, or services; try different and novel ways to deal with problems and opportunities.
Basic	▷ Generate ideas for own area of responsibility. ▷ Try new methods for completing required tasks more efficiently. ▷ Contribute ideas in team meetings.
Intermediate	▷ Generate ideas beyond own area of responsibility, benefiting the team or department. ▷ Question established processes and procedures to find a better way. ▷ Help to develop new approaches by building on the ideas of others. ▷ Possess good judgement of which ideas and suggestions.
Advanced	▷ Generate ideas for creatively applying existing technology or processes to the benefit of the department/organisation. ▷ Continually look for ways to expand the department's capabilities. ▷ Energise others to come up with creative ideas. ▷ Facilitate idea generation by creating networking opportunities. ▷ Promote the further development and implementation of creative ideas. ▷ Assess the impact of institutional/legislative/policy/context changes and determine appropriate tactics to respond.
Expert	▷ Generate ideas that create breakthrough opportunities and change (not just extensions of the past). ▷ Continually examine and challenge the assumptions of organisation policies and strategies. ▷ Lead initiatives to promote creativity and innovation throughout the department/organisation. ▷ Translate creative ideas into strategies and plans that will succeed in the organisation. ▷ Anticipate how institutional/legislative/policy/context changes will affect the organisation and develop strategies to capitalise on these changes.

Soft Skills Competency	Decision-Making
Competency Description	Decision-making process is a series of steps taken by an individual to determine the best option or course of action to meet their needs. In a business context, it is a set of steps taken by managers in an enterprise to determine the planned path for business initiatives and to set specific actions in motion. Ideally, business decisions are based on an analysis of objective facts, aided by the use of Business Intelligence (BI) and analytics tools.
Basic	▷ Use sound judgement to make appropriate and timely decisions in well-structured or routine situations. ▷ Weigh the advantages and consequences of alternative options before deciding on the approach to take. ▷ Know when to escalate a decision to a higher level. ▷ Make decisions that have an impact on own area of responsibility.
Intermediate	▷ Use sound judgement to make appropriate, timely decisions in moderately complex situations. ▷ Make decisions with available information, even if such information is not fully conclusive. ▷ Evaluate situations objectively. ▷ Avoid making assumptions about the facts of a situation or the motivation of others. ▷ Make decisions having an impact on own team or other related teams. ▷ Appropriately solicit the input of those who will be affected by the decision. ▷ Set priorities in accordance with team/departmental objectives and strategies.
Advanced	▷ Use sound judgement to make appropriate, timely decisions in complex situations. ▷ Make decisions that may have a major impact on other functions. ▷ Make courageous decisions in the face of risks or uncertainty. ▷ Appropriately weigh the costs and benefits of an immediate decision versus further analysis. ▷ Predict how a decision will affect individuals and groups in the department and organisation and develop strategies to build support for the decision and overcome obstacles. ▷ Develop contingency plans prior to their need. ▷ Set priorities in accordance with organisational objectives and strategies.
Expert	▷ Use sound judgement to make appropriate, timely decisions in highly complex situations. ▷ Make key decisions that have an organisation-wide or strategic impact. ▷ Predict how a decision will affect key stakeholder groups (internal and external) and develop strategies to build support for the decision and overcome obstacles. ▷ Rapidly identify the key issues that need to be considered when making strategic decisions. ▷ Set priorities in accordance with organisational objectives and strategies.

Soft Skills Competency	Negotiation
Competency Description	Effectively explore alternatives and positions to reach outcomes that gain the support and acceptance of all parties.
Basic	▷ Question others to gain clarity on their needs and desired outcomes. ▷ Keep calm and use assertive, tactful and diplomatic behaviour. ▷ Listen carefully to the arguments of the other party. ▷ Respond to opposing views in a non-defensive manner. ▷ Make sure there is an agreed deadline for resolution. ▷ List all the issues which are important to both sides and identify the key issues. ▷ Identify any areas of common ground.
Intermediate	▷ Clearly communicate own needs and desired outcomes of the discussion. ▷ Understand the underlying concerns and needs of the parties involved. ▷ Summarise the points of agreement and areas of difference in the positions of the parties involved in the discussion and test the understanding by communicating to parties involved. ▷ Know when to compromise to achieve desired outcomes. ▷ Modify argument to suit audience. ▷ Use a range of approaches and strategies to gain support for ideas.
Advanced	▷ Be a master negotiator. ▷ Be sought out by others to mediate prolonged, complex and difficult disputes. ▷ Try to achieve a mutually agreeable outcome by offering ideas and possible solutions which take all parties' needs into consideration.
Expert	▷ Identify minimal or ideal conditions of others during negotiations. ▷ Demonstrate use of a direct and diplomatic style; challenge information to detect discrepancies in reasoning. ▷ Show an excellent sense of timing, quickly gain trust and respect of all other parties to the negotiations. ▷ Lead the most complex negotiations and demonstrate expert closing skills and excellent political and cultural savvy.

Soft Skills Competency	People Management
Competency Description	Motivate and guide others to accomplish work objectives through performance management. Set clear performance expectations; use appropriate interpersonal skills to gain commitment from staff; monitor and guide progress; seek and give feedback; appraise performance outcomes; plan and support the development of others; facilitate relationships with others; advise staff to better navigate complexity in roles; allocate decision-making authority and task responsibilities to appropriate subordinates; utilise subordinate's time, skills and potential effectively.
Basic	▷ Display people management potential. ▷ Demonstrate leadership fundamentals. ▷ Demonstrate self-awareness and self-control. ▷ Demonstrate growth mindset.
Intermediate	▷ Take action to clarify goals and objectives for the team if there is uncertainty around performance expectations. ▷ Continually examine own and team's actions to assess whether they are in line with team objectives. ▷ Monitor the progress of the team toward the accomplishment of performance expectations; give timely, constructive, actionable feedback. ▷ Make plans to facilitate progress towards objectives. ▷ Implement performance improvement process where necessary. ▷ Define tasks and activities of team members.
Advanced	▷ Define roles and responsibilities of team members. ▷ Set measurable and achievable performance expectations for team members that align with department and organisation objectives. ▷ Delegate assignments and tasks appropriately, ensuring that the individual has the skills and competencies to get it done. ▷ Provide appropriate guidance and support for delegated tasks. ▷ Push responsibility back to team members (rather than taking charge) if they have the capability to accomplish something. ▷ Conduct productive performance feedback discussions, giving team members necessary focus, guidance, and direction. ▷ Hold team members responsible for the attainment of established performance expectations; deal effectively with poor performance. ▷ Recognise and reward successful behaviours and results within policy.
Expert	▷ Ensure that faculty/departmental goals and objectives are aligned with organisation's strategy. ▷ Focus own department on the accomplishment of key objectives. ▷ Ensure commitment to and application of the performance feedback process throughout the department/organisation.

Soft Skills Competency	Resilience
Competency Description	Handle disappointment and/or rejection while maintaining effectiveness. Stay with a position or plan of action until the desirable objective is achieved or is no longer reasonably attainable.
Basic	▷ Pursue objectives with energy and persistence. ▷ Set high personal standards for performance. ▷ Adapt working methods in order to achieve objectives. ▷ Accept ownership of and responsibility for own work. ▷ Do not give up at the first obstacle.
Intermediate	▷ Measure progress against targets. ▷ Acknowledge the work and contribution of others. ▷ Make adjustments to activities/processes based on feedback. ▷ Seek to understand reasons for obstacles and to find ways to overcome. ▷ Maintain performance after disappointment or rejection. ▷ Assist others in dealing with disappointment/rejection.
Advanced	▷ Tackle difficult and complex problems and take personal responsibility and accountability for reaching solutions. ▷ Remain determined despite frequent obstacles. ▷ Maintain enthusiasm of others after disappointment or rejection; bounce back very quickly. ▷ Lead others through dealing with disappointment/rejection. ▷ Re-engineer or create new processes and systems to get around obstacles. ▷ Anticipate problems and proactively design contingency plans.
Expert	▷ Make decision through weighing up the cost-benefit and risk implications. ▷ Stay the course in the face of adversity while ensuring the motivation and commitment of others. ▷ Lead the organisation through challenging times. ▷ Build organisation-wide support for the cause and appoint champions. ▷ Re-engineer or create new strategy to get around obstacles. ▷ Proactively scan environment to identify long-term risks and proactively designs contingency plans.

Soft Skills Competency	Result Orientation
Competency Description	Stay focused on the efforts necessary to achieve quality results consistent with institutional and departmental goals. Demonstrate the ability to achieve effective results; demonstrate concern for the successful achievement of results; work persistently to overcome obstacles to goal achievement.
Basic	▷ Clarify results/expectations for all work he/she is taking on; go back to manager if there is any lack of clarity about results/ expectations. ▷ Stay focused on task despite distractions, demonstrating commitment to the successful achievement of challenging goals. ▷ Clearly define the expected output and results of all assignments and projects.
Intermediate	▷ Put in extra efforts (above what would normally be required) to accomplish a goal. ▷ Take on-going, repeated action to overcome obstacles to goal achievement. ▷ Look for and identify better, faster, less expensive, or more efficient ways to achieve results. ▷ Continuously monitor progress towards goal achievements and act decisively when progress is stalling. ▷ Willingly take on difficult assignments.
Advanced	▷ Give advice and guidance to others on how to define their work in terms of results expectations. ▷ Reinforce effective behaviours and results in others. ▷ Take multiple, different actions to overcome resistance or obstacles. ▷ Engage others who can help “turn the tides” towards successful goal achievement. ▷ Hold self and others accountable for achieving results. ▷ Willingly take on very difficult tasks and assignments.
Expert	▷ Facilitate progress towards desired results by anticipating potential obstacles and taking steps to avoid or minimise the barriers. ▷ Continuously “raise the bar” for increasingly high levels of excellence and success. ▷ Willingly take on the most complex and difficult assignments and ensure the successful achievement of expected results.

Soft Skills Competency	Service Orientation
Competency Description	Make client's needs a primary focus of actions. Proactively develop and sustain productive client relationships; understand the client needs; anticipate and provide solutions to client needs; demonstrate concern for meeting and exceeding immediate and future needs of clients; give high priority to client satisfaction.
Basic	▷ Ask questions to identify needs and expectations. ▷ Respond with the appropriate level of urgency. ▷ Take into account the impact on the client when carrying out one's own position tasks. ▷ Take personal ownership in ensuring that expectations are met.
Intermediate	▷ Be alert and responsive to changes in expectations. ▷ Seek information about real needs, beyond those expressed initially. ▷ Take personal responsibility to ensure external and internal satisfaction despite time pressures and significant obstacles. ▷ Develop on-going relations with clients. ▷ Take a variety of actions to assess satisfaction.
Advanced	▷ Clearly state what one can and cannot do to meet desires with strong emphasis on creatively applying what one can do to meet the needs. ▷ Work to remove barriers that get in the way of providing exceptional service. ▷ Work to meet the client's needs rather than own or department's short-term needs. ▷ Design solutions to address key priorities and adapt solutions as needed to changing client and market demands. ▷ Build relationships with key decision-makers in the client area. ▷ Set up systems to effectively monitor satisfaction.
Expert	▷ Develop strategic, long-term relationships, gaining trust and respect. ▷ Use feedback for developing future-oriented client service strategies. ▷ Look for trends that are likely to shape the wants and needs in the future. ▷ Develop scenarios and strategies that anticipate future needs. ▷ Identify products and services that meet the needs.

Soft Skills Competency	Teamwork
Competency Description	Work effectively with team/work groups or those outside formal line of authority to accomplish goals. Actively participate as a member of a team; take action that respects the needs and contributions of others; contribute to and accept the consensus, subordinating own needs to those of the team; develop and build cohesive team relations to produce required outputs; possess knowledge and understanding of peer's work.
Basic	▷ Contribute willingly towards the accomplishment of own and team goals, doing his or her share of the work. ▷ Demonstrate respect for the opinions and ideas of others. ▷ Not remaining silent or withhold differing opinions in team settings. ▷ Willing to accept compromises to progress toward the achievement of group goals. ▷ Follow through on commitments made to other team members. ▷ Keep people informed and up to date.
Intermediate	▷ Solicit the input of team members and encourage their participation. ▷ Ensure participation of others who are affected by plans or actions. ▷ Put team's agenda and the good of the whole ahead of personal needs. ▷ Find areas of agreements when working with conflicting individuals or groups. ▷ Support and act in accordance with final group decisions even if such decisions may not reflect entirely, one's own opinion. ▷ Help others to solve work problems and achieve team objectives.
Advanced	▷ Establish goals for the team that are aligned to the organisation's strategy and mission. ▷ Build support, enthusiasm and energise people to work together for the accomplishment of team goals. ▷ Use the agenda and perspectives of others to establish mutually beneficial objectives. ▷ Take responsibility for the accomplishment of team goals. ▷ Remove obstacles to team success. ▷ Give recognition and credit to people who have contributed to team success. ▷ Keep the organisation's overall priorities at the top of own team's priorities. ▷ Take specific steps to keep morale and levels of performance high during times of intense work pressure.
Expert	▷ Build and expand networks and coalitions, to achieve strategic goals. ▷ Network both internally and externally to accomplish goals. ▷ Understand implications of outcomes of committees and ensure relevant actions are taken within own department/organisation. ▷ Use networks and relations to achieve results and influence strategic outcomes. ▷ Defuse high-tension situations, if they arise. ▷ Use negotiation to develop mutually agreeable outcomes with people at all levels.

Soft Skills Competency	Work Management
Competency Description	Establish a course of action for self-and/or others to accomplish a specific goal. Effectively plan, schedule, prioritise and control activities; identify, integrate and orchestrate resources (people, material, information, budget, and/or time) to accomplish goals. Prioritise work according to the organisation's goals, not just formal position responsibilities; manage own time effectively.
Basic	▷ Set priorities with an appropriate sense of what is most important. ▷ Manage time effectively to accomplish what needs to get done. ▷ Always know the status of own work. ▷ Participate in planning sessions that affect own team.
Intermediate	▷ Plan and implement moderately complex activities/projects. ▷ Clearly define objectives and translate them into workable activities. ▷ Plan with a realistic sense of the time and resource demands involved maintaining awareness of the interrelationships between own and other activities/project. ▷ Anticipate potential obstacles and their impact on the accomplishment of goals and timelines. ▷ Use time and resources effectively to accomplish desired results. ▷ Monitor and track progress to ensure delivery of all planned commitments, and keep the appropriate people informed.
Advanced	▷ Plan and implement complex activities/projects. ▷ Maintain a keen awareness of the interrelationships among various components of large-scale activities/projects. ▷ Allocate time and resources as required when faced with multiple demands and competing priorities. ▷ Consider the financial implications before finalising activity/project plans. ▷ Actively monitor costs incurred against budget and make adjustments to plans as necessary.
Expert	▷ Plan and lead the most complex and difficult activities/projects. ▷ Make sound business decisions when faced with complex and contradictory alternatives. ▷ Skilfully lead and coordinate the work of multiple, diverse teams; facilitate optimal cooperation among those teams takes quick and decisive action to remove obstacles to overall success. ▷ Re-engineer or create new business processes and systems to provide the highest quality services. ▷ Regularly review service strategy, identifying ways to provide better services to clients. ▷ Build organisation-wide support and champions provision of high-quality service to clients. ▷ Take highly visible action to underscore organisations commitment and determination for providing highest quality service to all clients.

Annex 1: Brunei Darussalam Qualifications Framework (BDQF)

BDQF Levels	Schools Sector Qualifications	Technical and Vocational Education Sector Qualifications	Higher Education Sector Qualifications
8			Doctoral Degree
7			▷ Master's Degree ▷ Post Graduate Diploma ▷ Post Graduate Certificate
6			▷ Bachelor's Degree
5		▷ Advanced Diploma ▷ Higher National Diploma (HND)	▷ Foundation Degree ▷ Advanced Diploma ▷ Higher National Diploma (HND)
4	▷ GCE "A" Level ▷ IGCSE "A" Level ▷ IB Diploma ▷ STPU	▷ Diploma ▷ Higher National ▷ Technical Education Certificate (HNTec)	
3	▷ GCE "O" Level (Grades A–C) ▷ IGCSE and GCSE "O" Level (Grade A* - C) ▷ SPU (Grades A-C) ▷ BTEC level 2 Diploma	▷ Skills Certificate 3 (SC3) ▷ National Technical Education Certificate (NTec)	
2	▷ GCE "O" Level (Grades D-E) ▷ IGCSE "O" Level (Grade D-E) ▷ SPU (grades D) ▷ BTEC Level 2 Extended Certificate	▷ Skills Certificate 2 (SC2) ▷ Industrial Skills Qualifications (ISQ)	
1	▷ BTEC Level Introductory Certificate	▷ Skills Certificate 1 (SC1)	

Source: Brunei Darussalam Qualifications Framework, Ministry of Education (bdnac.moe.gov.bn)

Annex 2: Manpower Industry Steering Committee Working Group for ICT Sector (MISC-WG ICT)

With the consent of His Majesty Sultan Haji Hassanal Bolkiah Mu'izzaddin Waddaulah ibni Al-Marhum Sultan Haji Omar 'Ali Saifuddien Sa'adul Khairi Waddien, Sultan and Yang Di-Pertuan of Brunei Darussalam, the Manpower Industry Steering Committee (MISC) has been established under the Manpower Planning and Employment Council (MPEC) at the Prime Minister's Office.

The establishment of the committee will support the MPEC's vision to have an effective manpower planning aligned to employability, by focussing on gainful and sustainable jobs, increasing localisation and reducing unemployment in the Sultanate.

The MISC was set up as a platform for collaboration between industries, regulators as well as education and training institutions in ensuring alignment to the sectoral manpower demands by supplying the right people, at the right number and at the right time.

As a start, the MISC will focus on five industrial sectors which are Energy, Construction, ICT, Marine, and Hospitality and Tourism, at which Sectoral MISC Working Groups (MISC-WG) have been set up and are led by industry players and regulators.

The MISC-WG has three components, namely:

Workforce Development Planning Group (WDPG)

- To focus on the type and number of jobs demanded by MISC sector.
- To identify the critical occupation that is demanded by the industry.

Competency Development Technical Group (CDTG)

- To work with industry to co-develop curriculum and programme that align with the industry's standards and requirement.
- To propose a National Competency Framework (NCF) in alignment to the industry requirements.

Accreditation and Assurance

- To approve standards and accredit programmes / courses endorsed by the MISC.

MISC-WG ICT was set up in August 2020 with expected deliverables as follows:

- Consolidation of manpower demands within the ICT industry in the upcoming 5 years;
- Identification of critical occupations;
- Identification of skill and competency gaps; and
- Development of competencies standards and training programmes.

The Brunei ICT Industry Competency Framework (BIICF) is one of the deliverables of MISC-WG ICT.

Co-Leads

Ir. Haji Jailani bin Haji Buntar
Chief Executive, Authority for Info-communications Technology Industry for Brunei Darussalam (AITI)

Sheikh Haji Abas bin Sheikh Mohamad
Infocom Federation Brunei (IFB) Honourary Advisor

Former Chairman of IFB
As Former Co-Lead of MISC-WG ICT
(June 2020 – March 2022)

Pengiran Sarimah binti Pengiran Haji Abdul Latiff
Chairman, Infocom Federation Brunei (IFB)
(May 2022 – Present)

Members

Workforce Development Planning Group (WDPG)

Mazriyani binti Haji Abd Ghani
Director, E-Government National Centre (EGNC), Ministry of Transport and Infocommunications

Dayangku Siti Saihalina binti Pengiran Haji Md Daud
Assistant Director, Department of Community Development (JAPEM), Ministry of Culture, Youth and Sports

Dayangku Nurul Ihsan binti Pengiran Damit
Senior Human Resource Development Officer, MPEC Secretariat

Radin Sufri bin Radin Basiuni
CEO DataStream Technologies Sdn Bhd (DST)

Haslina binti Haji Taib
CEO, Dynamik Technologies Sdn Bhd

Suzannawati binti Haji Suharju
CEO, Imagine Sdn Bhd

Shamsul Bahri bin Haji Kamis
CEO, IT Protective Security Services Sdn Bhd (ITPSS)

Hajah Nurul Haniah binti Haji Jaafar
CEO, Progresif Sdn Bhd

Dr. Steffen Oehler
CEO, Unified National Networks (UNN)

Adi Shamsul bin Haji Sabli
CIO, Bank Islam Brunei Darussalam (BIBD)

Haji Roslie bin Haji Bakar
Head of Capability and Governance, Brunei Shell Petroleum (BSP)

Pengiran Yusrian bin Pengiran Haji Mohammad
CEO, Alif Technologies Sdn Bhd

Dr. Yong Chee Tuan
Vice Chairman and CEO, Yi Ecomodern Solutions Sdn Bhd

Competency Development Technical Group (CDTG)

Rosimah Sumaimah binti Matassim
Head, Brunei Darussalam National Accreditation Council (BDNAC) - Ad-Hoc Member

Fauziah binti Haji Mohd Salleh
Deputy Director, Youth Development Centre, Ministry of Culture, Youth and Sports

Pengiran Dr Emeroylariffion bin Pengiran Haji Abas
Assistant Professor, Faculty of Intergrated Technologies and Deputy Director Office of AVC (Innovation and Enterprise), Universiti Brunei Darussalam (UBD)

Dr. Haji Mohammad Saiful bin Haji Omar
Dean, School of Computing and Informatics, Universiti Teknologi Brunei (UTB)

Mohammad Hamdani bin Mustapa
Head, School of ICT, Politeknik Brunei (PB)

Muhd Sahrudi Iswandi bin Hashim
Senior Education Officer (Technical) / Director of IT Services, Institute of Brunei Technical Education (IBTE)

Arjuna Ranasinghe
Director, Tech One Global

Muhd Nur Aiman bin Haji Minorhadi
CEO, GroMinda Sdn Bhd

Salwana binti Haji Awang
CEO, HADTech College Sdn Bhd

Pengiran Mohd Khairi bin Pengiran Haji Metussin
CEO, Mindplus Education Sdn Bhd

Muhammad Shukri bin Damit
Head of Information and Communication Technology, Mix Media Works (MMW) Creative

Agus Muslim
CEO, Nextacloud Technologies Sdn Bhd

Danial Mahmud
Co-Founder, Think-Axis Solutions

Annex 3: Brunei ICT Industry Competency Framework Working Group (BIICF WG)

Chairperson

Julianah binti Haji Ali Ahmad
Deputy Chief Executive, Development, Authority for Info-communications Technology Industry for Brunei Darussalam (AITI)

Members

Hajah Ilyasuriani binti DP Haji Hamdani
System Manager, E-Government National Centre (EGNC), Ministry of Transport and Infocommunications

Mohd Fadhil bin Haji Abd Kadir
Team Manager, Technology Delivery and Support, Darussalam Enterprise (DARe)

Pengiran Dr Emeroylariffion bin Pengiran Haji Abas
Assistant Professor, Faculty of Intergrated Technologies and Deputy Director Office of AVC (Innovation and Enterprise), Universiti Brunei Darussalam (UBD)

Dr. Haji Mohammad Saiful bin Haji Omar
Dean, School of Computing and Informatics, Universiti Teknologi Brunei (UTB)

Mohammad Hamdani bin Mustapa
Head, School of ICT, Politeknik Brunei (PB)

Muhd Sahrudi Iswandi bin Hashim
Senior Education Officer (Technical) / Director of IT Services, Institute of Brunei Technical Education (IBTE)

Suhaila binti Haji Kabri
Lead for BIICF Sub-Sector for Telecommunications and Network
Learning and Development Manager, HR, Unified National Networks (UNN)

Keith Chung Chir Lim
Manager, IT Architecture and Strategy, Unified National Networks (UNN)

Mohd Hilmi Shah bin Mohd Sahri
Lead for BIICF Sub-Sector for IT Services
Manager, Enterprise Cloud and Computing, Imagine Sdn Bhd

Lily Tan
Manager, Innovation, Imagine Sdn Bhd

William Lai Tze Hong
Lead for BIICF Sub-Sector for Project Management
Head of Operations, Dynamik Technologies Sdn Bhd

Mohamad Azad Zaki bin Haji Mohd Tahir
Senior Operation Officer, Head of Digital Forensic, ITPSS

Pengiran Mohd Khairi bin Pengiran Haji Metussin
Lead for BIICF Sub-Sector for Applications and Solutions Development
CEO, Mindplus Education Sdn Bhd

Muhd Nur Aiman bin Haji Minorhadi
CEO, GroMinda Group

Mohammad Yazdi bin Yahya
Lead for BIICF Sub-Sector for Digital Media
Director of Human Capital, Progresif Sdn Bhd

Arjuna Ranasinghe
Lead for BIICF Sub-Sector for ICT Security
Director, Tech One Global

Abd Rahman Mohammed Yoonus
Lead for BIICF Sub-Sector for Data and Artificial Intelligence
Co-Founder and CTO, Think-Axis Solutions

Joshua Lew
Account Director and Co-Partner, Hoco Agency

Wong Teck Sion
Head of Technical, Network Integrity Assurance Technologies Sdn Bhd (NiAT)

Secretariat

Norshahrul Nizam bin Othman
Assistant Chief Executive, Industry Development Group, Authority for Info-communications Technology Industry of Brunei Darussalam (AITI)

Hajah Farihah binti Haji Md Said
Senior Manager, Digital Capacity Development, Industry Development Group, Authority for Info-communications Technology Industry of Brunei Darussalam (AITI)

Pg Asrin Arbi bin Pg DP Haji Sharifuddin
Manager, Digital Capacity Development, Industry Development Group, Authority for Info-communications Technology Industry of Brunei Darussalam (AITI)

Umi Kalshum binti Suhaimi
Assistant Manager, Digital Capacity Development, Industry Development Group, Authority for Info-communications Technology Industry of Brunei Darussalam (AITI)

Principal Consultants

Rhymin and Partners, Brunei Darussalam

- Sairul Rhymin C.A. Mohamed
- Ahmad Raji Yaakub
- Muhammad Imran Kunalan Abdullah