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| Student Name | | Warren Ikin | Student Number | 453480833 | |
| Unit Code/s & Name/s | | ICTCLD507 Build and deploy resources on cloud platforms  ICTCLD508 Manage infrastructure in cloud environments | | | |
| Cluster Name  *If applicable* | | Cloud Infrastructure | | | |
| Assessment Type | | Case Study  Assignment  Project  Other *(specify)* | | | |
| Assessment Name | | Project Proposal | Assessment Task No. | | 2 of 3 |
| Assessment Due Date | |  | Date Submitted | 30/09/2022 | |
| Assessor Name | |  | | | |
| **Student Declaration:** I declare that this assessment is my own work. Any ideas and comments made by other people have been acknowledged as references. I understand that if this statement is found to be false, it will be regarded as misconduct and will be subject to disciplinary action as outlined in the TAFE Queensland Student Rules. I understand that by emailing or submitting this assessment electronically, I agree to this Declaration in lieu of a written signature. | | | | | |
| Student Signature | Icon  Description automatically generated | | Date | 30/09/2022 | |
| **PRIVACY DISCLAIMER:** TAFE Queensland is collecting your personal information for assessment purposes. The information will only be accessed by authorised employees of TAFE Queensland. Some of this information may be given to the Australian Skills Quality Authority (ASQA) or its successor and/or TAFE Queensland for audit and/or reporting purposes. Your information will not be given to any other person or agency unless you have given us written permission or we are required by law. | | | | | |

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| Instructions to Student | General Instructions:  This is a written assessment. The students are required to refer to the Scenario given in this document, understand the business needs, policies, technical and other requirements first. Then use the template *ICTCLD507\_508\_AT2\_Project proposal template\_LHO\_TQM\_v1.docx* provided in Connect to prepare a project proposal for the company mentioned in the scenario. Further instructions are given after the scenario.  The answers required for these tasks shall be written in plain English, using language that is understandable by a person of a technical level suitable for the case study.  Materials to be Supplied:  For the student to successfully complete this assessment they will need to acquire:   * A computer system installed with a current desktop operating system with appropriate internet browser, and office suite able to save in Microsoft Word .docx format, and current industry standard file formats * Internet access * Project proposal template     Work, Health and Safety:  TAFE Queensland student rules are designed to ensure that learners are aware of their rights as well as their responsibilities. All learners are encouraged to familiarise themselves with the [TAFE Queensland student rules](http://tafeqld.edu.au/current-students/student-rules/)[[1]](#footnote-1), specifically as they relate to progress of study and assessment guidelines.  Assessment Criteria:  To achieve a satisfactory result, your assessor will be looking for your ability to demonstrate the following key skills/tasks/knowledge to an acceptable industry standard:   * deploy and configure at least 6 of the following different types of cloud resources, including but not limited to: * virtual machines * container services * load balancers and autoscaling * serverless functions * API gateways * block or object storage * managed databases * DNS * content delivery networks * use cloud management console, cloud software development kits or command line tools * develop and execute test plans and demonstrate successful task completion * consider procedural improvements to produce repeatable and automated deployments by reducing manual processes * monitor and manage inventory, changes and lifecycle of at least one cloud resource * use cloud management console, cloud software development kits or command line tools * collect and analyse cloud and system data and adjust resources accordingly * summarise ways system operations in cloud environments can be automated to minimise manual intervention |
| Submission details | Insert your details on page 1 and sign the Student Declaration. Include this template with your submission.  **Due:** Week 6 as per the unit study guide  Insert your details on page 1 and sign the Student Declaration. Include this form with your submission.  Submit the listed files below as per the instructions in the Connect online learning system stated on the Assessment Task 2 page.  You are to submit the following files:  *ICTCLD507\_ICTCLD508\_AT2\_Report\_yourname.docx*  Assessment to be submitted via:   * TAFE Queensland Learning Management System (Connect): [*https://connect.tafeqld.edu.au/d2l/login*](https://connect.tafeqld.edu.au/d2l/login) * Username; 9 digit student number * For password resets go to: [*https://passwordreset.tafeqld.edu.au/default.aspx*](https://passwordreset.tafeqld.edu.au/default.aspx) |
| Instructions for the Assessor | Student will require:   * Computer applications currently used in industry * Support resources, including online, manuals and training booklets * A computer system with a suitable current OS and access to the internet * information and data sources required to design and implement cloud infrastructure * specific requirements and industry standards, organisational procedures and legislative requirements, including business and functionality requirements as well as retention/lifecycle business policy, as required * retention/lifecycle policy example as it relates to managing cloud infrastructure * data to gather information from to determine output and user requirements, including user access and business protocols   **Work, Health and Safety:**  TAFE Queensland student rules are designed to ensure that learners are aware of their rights as well as their responsibilities. All learners are encouraged to familiarise themselves with the [TAFE Queensland student rules](http://tafeqld.edu.au/current-students/student-rules/)[[2]](#footnote-2), specifically as they relate to progress of study and assessment guidelines.  **Level of Assistance:**  Staff cannot directly show students answers but guide them to where to go to complete tasks individually. The teacher will make reasonable adjustment for students, as and when appropriate, after consultation with the Disability and Counselling team.  **Assessment Criteria:**  See Marking Criteria on Connect  Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards. |
| Note to Student | An overview of all Assessment Tasks relevant to this unit is located in the Unit Study Guide. |

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| Scenario-01 | Scenario |
| ABC Banking Corp. is a leading financial organization operating in Australia for more than 40 years. It has branch offices in all major cities in Australia as well as in remote cities across most states. Currently the companies’ main data centre is in an undisclosed site in Brisbane and is operated by its IT staff located on-site and in the Brisbane branch office.  Due to the significant costs in maintaining a data centre, its staff and the increasing security risks, ABC Banking Corp. is looking at a hybrid solution and to move its critical infrastructure to the cloud, by this move, the bank is expecting to reduce its operational costs and to provide reliable services to its customers. The bank has hired a consultant cloud architect to recommend an initial design for the prospective move.  The consultant Cloud Architect, after studying the requirements of the bank has come up with the following architecture.  **Proposed Architecture**  The architecture is built by using services that are validated for Financial Services on the Cloud. The combined configuration of these services will implement the following principles:  **Layered security:** To prevent the compromise of a service from a single point of attack, the Cloud infrastructure must provide multiple redundant layers of security.  **Least privileges:** no individual should be given enough privileges to misuse a system. Give people the minimum required authorizations to complete their activities.  **Data privacy:** protect data from unauthorized disclosure, modification, and destruction.  **Security assurance:** controls must be configured securely by default through automation and checked continuously for compliance to provide continued controls assurance.  **Auditing:** enable traceability through the logging, monitoring, alerting, and collection of audit information in real time.  **Resilience:** availability of services and data are critical to the operation of business applications. Incorporate multiple levels of resilience to maintain cloud services even after multiple component failures.  **Integrity:** follow secure development and operations processes and ensure software integrity through automation.  The following diagram shows the proposed architecture that incorporates the above principles. It includes two Virtual Private Clouds (VPCs), one for the management services and the other for the actual workloads. The virtual servers within the VPCs are secured by their own Security Groups (SGs) and the Access Control Lists (ACLs) of the subnet. Each VPCs have their own private Load Balancer (LB) and are directly linked to the branch offices. They also support VPN connections to remote sites or to the branch office as a backup. | |

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| Access to the Banks’ cloud infrastructure is to be controlled by multifactor authentication with multiple roles and authorization levels. Access must be centrally managed with the ability to programmatically create new accounts and allocate resources, group accounts to organize workflows, apply policies to accounts or groups for governance, and simplify billing by using a single payment method for all accounts.  Logging and monitoring systems should be capable of providing data and actionable insights to monitor applications, respond to system-side performance changes, and optimize resource utilization. Monitoring and operational data in the form of logs, metrics, and events must be made available and be possible to get a unified view of operational health and gain complete visibility of the resources, applications and services running on the cloud and on-premises. The monitoring system should also be able to detect anomalous behaviour within the environment, set alarms, visualize logs and metrics side-by-side, take automated actions, troubleshoot issues, and discover insights to keep the applications running smoothly.  Auditing facility must enable governance, compliance, and operational and risk auditing of the accounts. Actions taken by a user, a role, or a service must be recorded as events. Events should include actions taken via management consoles, command line interfaces, SDKs and APIs.    © TAFE Queensland |

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| **Non-functional requirements**  The consultant Cloud Architect has identified the following non-functional requirements for ABC Banking Corp.  **Security**  All application systems must implement robust controls over their communication network for these purposes:  Safeguarding data  Tightly controlling access to network devices through management approval and subsequent audits  Disabling remote communications when no business need exists  Logging and monitoring remote access  Securing remote access devices  Using strong authentication and encryption to secure communications  All confidential bank data must be encrypted while in transit on any network or stored on any device on premises, or on a private or public cloud. Confidential bank information, including authentication credentials, must be encrypted while in transit over any public network or wireless network. Key management procedures must be employed that assure the confidentiality, integrity, and availability of cryptographic key material. The use of encryption products must comply with local restrictions and regulations in the relevant country.  **Scalability**  The architecture must be able to support more than hundred thousand customers, over a million transactions per day, and manage assets of more than USD 4 billion. The architecture must not only meet the current requirements but also anticipate the future needs of a dynamic, growth-focused institution. The infrastructure must boost the business, not limit it. It must provide a demonstrated ability to scale and align to the business objectives as the financial institution grows.  **Availability**  ABC Banking Corp. need to operate in a 24 x 7 environment. The infrastructure must be available to the customers whenever they want, wherever they are, and on whatever channel they prefer to interact. Mission-critical applications such as payment processing and other core banking transaction processing require 99.99% availability.  Performance and response times  Some of the application components need a high throughput, low-latency, real-time performance. Examples include card authorizations and transactions, payment transactions, fraud detection, and securities processing.  **Business continuity and disaster recovery**  Application systems must have formal documented recovery plans and tools to identify the resources and specify actions that are required to minimize losses if a disruption occurs to the business unit, its supporting group units, applications, or infrastructure components. |

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| **Backup and offsite storage**  All application systems must have a defined backup policy and associated procedures for backing up data in a scheduled and timely manner. Effective controls must be established to safeguard backed-up data onsite and offsite. They must also ensure that the bank data is securely transferred or transported to and from backup locations and conduct periodic tests to ensure that data can be safely recovered from backup devices.  **Your Role**  As a Senior System Administrator with ABC Banking Corp, Management has requested you prepare a project proposal for the new Cloud solution based on the proposed architecture. Please note that the cloud infrastructure will hold all the critical application and database servers. The existing data center will be used as a warm site with daily data synchronization with the cloud systems. |

## Further Instructions to Students

You are required to use the template provided to write the project proposal. The template has all the instructions and guidelines in red fonts to prepare the proposal. These guidelines (all the red text) must be deleted before submitting the document. The template has the following headings.

**1. Introduction**

**2. Functionalities and resources that can be deployed in Cloud**

**3. Cloud computing resources required**

**4. Capacity Limits of the resources**

**5. Implement Organisational policies in cloud**

**6. Business Purpose and required cloud resources**

**7. Tools used for performing repeatable automated tasks**

**8. Steps required to provision resources**

**9. Test Cloud infrastructure**

**10. New Policies to be implemented**

**End of Assessment**

1. http://tafeqld.edu.au/current-students/student-rules/ [↑](#footnote-ref-1)
2. http://tafeqld.edu.au/current-students/student-rules/ [↑](#footnote-ref-2)