ROBERT GORDON UNIVERSITY ABERDEEN

CMM707

Academic Year	**2025**
Semester	**3 (REFDEF)**
Module Number	**CMM707**
Module Title	**Cloud Computing**
Assessment Method	**Coursework**
Deadline (time and date)	**30/11/2025, 11:00 PM IST - For the report 01/12/2025, 6:00 PM onwards Viva will commence**
Submission	**Assessment Dropbox in the Module Study Area in CampusMoodle.**
Word Limit (see Assessment Word Limit Statement)	**Not more than 2000 words (Including images, references)**
Module Co-ordinator	**Lasitha Petthawadu (Module Leader) & Semini Perera**

What knowledge and/or skills will I develop by undertaking the assessment?

Fundamental theoretical and practical knowledge on Cloud computing starting from the foundational aspects of the subject area.

- You would be able to differentiate different approaches to migrating and deploying applications on the cloud.
- Understand compute related services both server based and serverless such as AWS EC2, AWS Lambda.
- Understand data related services ranging from Object storage to block storage services such as AWS S3, AWS EBS.
- Understanding of databases and DBMS solutions available on the cloud such as relational, Non relational.
- Understanding of Cloud Design Patterns and Principles.
- Practically understand the implementation of non functional aspects such as scalability, availability on cloud environments using load balancers, auto scaling groups.
- Introduction to cloud containerization and working with Docker.
- Detailed introduction to container orchestration on Kubernetes.
- Introduction to Microservices & the difference between monolithic architectures vs microservices.

What knowledge and/or skills will I develop by undertaking the assessment?

- Understanding and implementation of containerization in microservices architecture

On successful completion of the assessment students will be able to achieve the following Learning Outcomes:

1. Compare the operational concepts, implementation and performance issues of cloud computing systems, and the relative merits and suitability of each for complex data-intensive applications..
2. Critically appraise different cloud computing models, namely, infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS)
3. Evaluate design choices when solving real-world cloud computing problems by analysing and contrasting different cloud computing solutions.
4. Integrate software components in novel ways to architect and develop cloud-based applications solutions for an enterprise
5. Security and ethics of cloud computing with public cloud solutions, Legal implications of off-premise hosted data, impact on society implications and benefits

Please also refer to the Module Descriptor, available from the module Moodle study area.

What is expected of me in this assessment?

Task(s) - content

This coursework aims to validate the theoretical and the practical aspects discussed during the labs and the lectures of this module.

Case Study

Plot Listing (https://templatemo.com/live/templatemo_564_plot_listing) is an online real estate platform that lists plots and properties for sale and rent. They have designed the frontend, and you are required to support them to deploy this frontend alongside an API to analyze their website activity and present this data on a visualization dashboard.

You are tasked with designing a microservice architecture that will run on a Kubernetes cluster. Your solution should take into account the following attributes:

- Scalable
- Secure
- Fault-Tolerant
- Affordable

What is expected of me in this assessment?

Solution Requirements:

1. Deployment of the Frontend
   Your frontend application should be deployed within the Kubernetes cluster and served as a single endpoint.

2. Microservices Design
   The architecture should be divided into multiple microservices, including but not limited to:

   - Listing Service
     Stores and updates property details such as Plot ID, Location, Category (Sale/Rent), Price, and Availability.

   - Analytics Service
     Integrates with PostHog to capture which property/plot pages were visited and user interactions on the platform.

   - Inquiry Service
     Saves all customer inquiries about listings, including Plot ID, user details, and inquiry message.

3. Saving Transactional Data
   Your Listing Service and Inquiry Service APIs should save data on a Relational DB (can be anything of your choice). It is not mandatory to integrate these services with the frontend web app.

4. Capturing Web Analytics
   You have to capture three types of web analytics (Page Views, Clicks, Scroll Depth, time on page, session duration, or anything else) and push them to PostHog through the Web frontend.

5. Visualization of Analytics

   - Data Visualization: Utilize AWS QuickSight to create real-time, interactive dashboards for visualizing the data captured through PostHog.

6. Observability
   Deploy observability infrastructure within the Kubernetes cluster to monitor the health, performance, and availability of all services.

7. CI/CD Pipeline
   Plot Listing requires automated service build and deployment of the solution using a CI/CD pipeline, maintaining 100% uptime using a rolling deployment strategy. After every deployment, automatically run integration tests to verify functionality. Additionally, run the same integration test suite periodically to ensure ongoing reliability.

Task(s) - format

What is expected of me in this assessment?

Students are tasked to write a report to describe the designed solution.

1. The report needs to be in the format of a PDF file.
2. Students should include the solution architecture diagram and the deployment architecture diagram into the report. In the solution diagram the student has to highlight the request flows and the data flows. **[LO1]**
3. Include a highlight on security and ethics challenges that might arise during the implementation of the Plot Listing platform. **[LO1]**
4. Include the CI/CD pipeline designs diagrams and CI/CD process descriptions into the same report under CI/CD process section. Highlight security and ethics challenges of this cloud solution. **[LO1][LO2][LO3][LSEPI]**
5. Implement the services and frontend and create Kubernetes artefacts required to deploy the designed solution into a Kubernetes cluster. **[LO4]**
6. Implement a CI/CD pipeline to deploy the created solution. This pipeline should be able deploy the artefacts to the production environment following the Blue-Green model. **[LO4]**
7. The report should consist of scripts used to deploy the CI/CD pipeline. [**LO4]**
8. Create a simple test suite to automatically test the solution. Implement the test automation. **[LO4]**
9. Create a simple runbook with the steps to deploy the designed solution and test it. Students have to include this runbook in the final report. **[LO4]**
10. Have PostHog deployed and captured the web analytics.
11. Use AWS Quicksight to visualise the web analytics data

Remark: You are not allowed to have a local Kubernetes cluster or any local setup and need to utilize a cloud cluster. At the time of the viva, you should have a demonstrable solution on any cloud platform of choice (eg: AWS, MS Azure, etc.)

Failing to attend the viva session would result in the coursework being graded as F.

How will I be graded?

A grade will be provided for each criterion on the feedback grid which is specific to the assessment. The overall grade for the assessment will be calculated using the algorithm below.

A	At least 75% of the feedback grid to be at Grade A, at least 100% of the feedback grid to be at Grade B or better

How will I be graded?	
B	At least 75% of the feedback grid to be at Grade B or better, at least 100% of the feedback grid to be at Grade C or better
C	At least 75% of the feedback grid to be at Grade C or better, and at least 100% of the feedback grid to be at Grade D or better.
D	At least 75% of the feedback grid to be at Grade D or better, and at least 100% of the feedback grid to be at Grade E or better
E	At least 100% of the feedback grid to be at Grade E or better.
F	Failing to achieve at least 100% of the feedback grid to be at Grade E or better or not attending the scheduled viva session.
NS	Non-submission.

ROBERT GORDON UNIVERSITY ABERDEEN

Feedback grid

GRADE	A	B	C	D	E	F
DEFINITION / CRITERIA (WEIGHTING)	**EXCELLENT** Outstanding Performance	**COMMENDABLE/VERY GOOD** Meritorious Performance	**GOOD** Highly Competent Performance	**SATISFACTORY** Competent Performance	**BORDERLINE FAIL**	**UNSATISFACTORY** Fail
Participation for the viva **Weight 1**	Student has participated on time, is ready with the demonstration.	Student participated for the viva on time but took time to start his demonstration due to hardware/software, online screen sharing issues.	Student has participated for the viva late and was ready with the demonstration.	Student was late for the viva and was not ready to demonstrate and took time after being late as well.	Student rescheduled the viva at the last moment without prior notice. and joined late on the rescheduled date or had trouble starting the demonstration on time	Student did not participate to the viva on the scheduled date
Identifying Web Analytics **Weight 1**	The Student has managed to identify 3 or more than 3 analytics that are relevant to the coursework expectation, and justifies them accurately.	Student has managed to identify 3 or more than 3 analytics and manages or attempts to give a reasonable justification	The student has identified 3 analytics which are relevant to the coursework expectations but fails to justify the relevance of them to the coursework expectation	The student has identified 3 analytics out of which at least one metric is not relevant to the coursework expectations and has failed to justify	The Student has identified less than 3 analytics.	The student has failed to identify any analytics.
Report Outline **Weight 2**	The student has clearly organised and outlined the report, meeting all the delivery criteria	The overall report outline is achieved but the student has made minor errors in the main sections of the report.	The Student has missed 25% of the main outcomes outlined as	The Student has missed 50% of the main outcomes outlined as	The Student has missed 75% of the main outcomes outlined as	The Student has missed 90% of the required content assessed in the report.

GRADE	A	B	C	D	E	F
DEFINITION / CRITERIA (WEIGHTING)	**EXCELLENT** Outstanding Performance	**COMMENDABLE/VERY GOOD** Meritorious Performance	**GOOD** Highly Competent Performance	**SATISFACTORY** Competent Performance	**BORDERLINE FAIL**	**UNSATISFACTORY** Fail
	outlined in the assessment content. Adhering to the word count	Not adhering to the word count	expectations of the report.	expectations of the report.	expectations of the report.	
Solution Implementation **Weight 3**	The solution is detailed and the student has covered a broader depth including functional as well as non-functional aspects	The solution implemented covers what is expected as well as tried to cover a broader depth with minor errors that have been highlighted during the viva	The solution implemented covers what is expected but the student has made major errors in one area of the assignment due to lack of understanding or misinterpretation	The solution implemented covers the bare minimum that is expected by the scope of this coursework but student fails to denote understanding of the implementation	The solution is partially functional with a majority of the functional and non-functional requirements not been met	The solution is not functional or is not a workable solution
Demonstration **Weight 1**	The student is able to demonstrate in a clear, understandable manner following an organised logical presentation sequence. The student was able to intuitively answer all the questions raised during the viva	The student is able to demonstrate clearly and was able to completely demonstrate all the requirements. But the student made minor errors during the viva demonstration.	The student was able to demonstrate clearly and was able to completely demonstrate all the requirements but had major	The student demonstrates more than 50% of the functionality but fails in answering questions accurately.	The student failed to demonstrate 50% of the expected functionality.	The student failed to demonstrate more than 75% of the functionality

Coursework received late, without valid reason, will be regarded as a non-submission (NS) and one of your assessment opportunities will be lost.

ROBERT GORDON UNIVERSITY ABERDEEN

What else is important to my assessment?

What is plagiarism?

"Plagiarism is the practice of presenting the thoughts, writings or other output of another or others as original, without acknowledgement of their source(s) at the point of their use in the student's work. All materials including text, data, diagrams or other illustrations used to support a piece of work, whether from a printed publication or from electronic media, should be appropriately identified and referenced and should not normally be copied directly unless as an acknowledged quotation. Text, opinions or ideas translated into the words of the individual student should in all cases acknowledge the original source" (RGU 2022).

What is collusion?

"Collusion is defined as two or more people working together with the intention of deceiving another. Within the academic environment this can occur when students work with others on an assignment, or part of an assignment, that is intended to be completed separately" (RGU 2022).
For further information please see Academic Integrity.

What is the Assessment Word Limit Statement?

It is important that you adhere to the Word Limit specified above. The Assessment Word Limit Statement lists what is included and excluded from the word count, along with the penalty for exceeding the upper limit.

What if I'm unable to submit?

- The University operates a Fit to Sit Policy which means that if you undertake an assessment then you are declaring yourself well enough to do so.
- If you require an extension, you should complete and submit a Coursework Extension Form. This form is available on the RGU Student and Applicant Forms page.
- Further support is available from your Course Leader.

What additional support is available?

- RGU Study Skills provide advice and guidance on academic writing, study skills, maths and statistics and basic IT.
- RGU Library guidance on referencing and citing.
- The Inclusion Centre: Disability & Dyslexia.
- Your Module Coordinator, Course Leader and designated Personal Tutor can also provide support.

What are the University rules on assessment?

The University Regulation 'A4: Assessment and Recommendations of Assessment Boards' sets out important information about assessment and how it is conducted across the University.