University of Sunderland School of Computer Science

CETM67 - Software Platforms, Infrastructure and Deployment

Assignment 1 of 2 - 60% of the summative value of the module

Extract from the module descriptor - The apprentice will design, develop and present a microservices architecture , which evidences a thorough understanding of cloud platforms and their associated services e.g. Servers, Operating Systems, Virtual Machines, Networks, and Storage, development tools, business intelligence (BI) services and database management systems. The assessment will include a demonstration (approximately 20 minutes) and an upload of the source code/configuration files to a stated repository such as Github (ensure GitHub repositories are *Private*).

Assignment 1 of 2: Microservices Architecture and demo

The assessment covers learning outcomes **3** and **4**:

3: Achieve advanced knowledge of cloud platforms and their associated services e.g. Servers, Operating Systems, Virtual Machines, Networks, and Storage, development tools, business intelligence (BI) services and database management systems.

4: Design and implement a microservices architecture using RESTful APIs

The detail in the learning outcomes should be reflected in the deliverable for the assignment.

Scenario

The adoption of a microservices architecture will enable you to take advantage of different technologies in the cloud to provide benefits including the following: Partial Deployment, Horizontal Scaling and No Single Point of Failure.

In order to achieve this you will utilise cloud technologies such as virtualised servers, NoSQL and object databases/data stores and serverless technology. You will decide and design the architecture required to achieve this and implement it using cloud technologies such as EC2, S3, DynamoDB and Lambda functions.

Important Information

You are required to submit your work within the bounds of the University Infringement of Assessment Regulations (see your Programme Guide). Plagiarism, paraphrasing and downloading large amounts of information from external sources, will not be tolerated and will be dealt with severely. Although you should make full use of any source material, which would normally be an occasional sentence and/or paragraph (referenced) followed by your own critical analysis/evaluation. You will receive no marks for work that is not your own. Your work may be subject to checks for originality which can include use of an electronic plagiarism detection service. Where you are asked to submit an individual piece of work, the work must be entirely your own. The safety of your assessments is your responsibility.

You must not permit another student access to your work. Where referencing is required, unless otherwise stated, the Harvard referencing style is to be used.

Maximum hours it should take to complete: 72hrs

Assignment Specification

Design and implement a microservices architecture using RESTful APIs and other services to demonstrate your understanding of cloud technologies and concepts e.g. High availability, Load balancing, Auto Scaling and Serverless.

Deliverables:

The following elements constitute the deliverables in this assignment:

1. **Microservices Architecture diagram** showing all services and interactions (**per service**) including:
    - Content Delivery
    - API Layer
    - Application Layer
    - Persistency Layer

2. A **minimum of 2 microservices** (dependant on application type) examples below:
    - Recommendation service
    - Mock payments service
    - Search service
    - User upload service
    - Order service
    - User review service
    - Inventory service
    - Authentication service
    - Storage service
    - File conversion service

3. **Presentation/demo** (**20 minutes**) that evidences:
    - Rationale behind architecture choices e.g. servers or serverless, Relational DB or Non-relational
    - Explanation of individual technology components used in each service e.g. What is EC2, advantages/disadvantages etc
    - Contract testing/API documentation e.g. Swagger file
    - Services in action (demo of each service)
    - Lessons learned

Hand-in date and feedback due date:

The hand-in date for this assignment is **23:59PM on 25/06/2021** with marked results due back to learner by **23/07/2021**

Assessment Criteria

Criteria for Assessing software system – these indicate the level of academic work that will be assessed in the relevant part of the assessment requirements.

Criteria	Fail (up to10)	Fail (up to 39)	Pass (up to 50)	Pass (up to 59)	Merit (up to 69)	Distinction (up to 79)	Distinction (up to 89)	Distinction (up to 100)
Microservices architecture diagram. (20%)	No microservices architecture diagram submitted or irrelevant files submitted.	A basic diagram of an individual microservice.	A basic diagram of each individual microservice - minimum of 2.	A basic diagram (with basic visuals) of each individual microservice - minimum of 2.	A moderately detailed diagram (with adequate use of visuals) of each individual microservice - minimum of 3.	A comprehensive, detailed, diagram (with adequate use of visuals) of each individual microservice - minimum of 4.	A comprehensive, detailed diagram (with good use of visuals) of each individual microservice - minimum of 4.	A comprehensive, detailed and visually pleasing diagram of each individual microservice (> 4).
Microservices architecture. (50%)	No evidence of a microservices architecture having been created.	< 2 microservice s that don't function either independently or as part of a distributed system with some source code and config files evidenced.	2 microservices that work independently but not as part of a fully distributed system with some source code and config files evidenced.	2 microservices that work independently and as part of a fully distributed system with all source code and config files evidenced.	3 microservices that work both independently and as part of a distributed system with all source code and config files evidenced.	4 microservices that work both independently and as part of a distributed system with some source code and config files evidenced.	4 microservices that work both independently and as part of a distributed system with all source code and config files evidenced.	> 4 microservices that work both independently and as part of a distributed system with all source code and config files evidenced.
Microservices architecture demonstration. (30%)	No demonstration of a microservices architecture.	A demonstration of a microservices architecture that provides no answers to reviewer's questions.	A demonstration of a microservices architecture that struggles to answer most questions.	A demonstration of a microservices architecture that addresses one or two questions of reviewer in full.	A coherent, visually pleasing and logically presented demonstration of a microservices architecture that addresses some questions of reviewer in full.	A coherent and logically presented demonstration of a microservices architecture that addresses most questions of reviewer in full.	A coherent, visually pleasing and logically presented demonstration of a microservices architecture that addresses most questions of reviewer in full.	A coherent, visually pleasing and logically presented demonstration of a microservices architecture that addresses all questions of reviewer in full.