

*Programme Code: TU856 (DT228),
TU857 (DT211C),
TU858 (DT282)
Module Code: CMPU 3007*

TECHNOLOGICAL UNIVERSITY DUBLIN

Grangegorman

TU856 - BSc. (Honours) Degree in Computer Science
TU857 - BSc. (Honours) Degree in Computer Science (Infrastructure)
TU858 - BSc. (Honours) Degree in Computer Science

Year 3

SEMESTER 1 EXAMINATION 2023/24

CMPU 3007 Cloud Computing

Internal Examiner(s):

Paul Laird
Dr. Paul Doyle

External Examiner(s):

Sanita Tifenale
Dr. Charles Markham

Instructions To Candidates:

Answer all questions

Exam Duration:

2 hours

1

(a) Describe how the use of virtualisation can improve operational efficiency and reliability.
(10 marks)

(b)

i. Explain in your own words the concept of Infrastructure-as-a-Service (IaaS), noting differences from Platform-as-a-Service?
(6 marks)

ii. Explain the role of containerisation in deployment of Platform-as-a-Service and outline the benefits this strategy provides.
(5 marks)

iii. What advantages for the customer does *Platform-as-a-Service* have over conventional software development processes deploying to Infrastructure-as-a-Service?
(5 marks)

iv. How can potential issues relating to privacy and data residency, data migration, reliability or vendor lock-in, which may emerge in relation to cloud deployments be mitigated?
(6 marks)

(c)

i. Describe how DevOps methods can be extended from code to the platforms on which applications execute
(6 marks)

Explain the impact on:

ii. Reliability
(3 marks)

iii. Security
(3 marks)

iv. Ability to reason about and debug problems.
(3 marks)

v. Scalability
(3 marks)

2

(a) Outline the steps involved in setting up a continuous delivery / continuous deployment pipeline in a cloud computing environment

(10 marks)

(b) Open source projects, standards and interoperability considerations have transformed software procurement decisions over the last two decades, with interoperability extending to common virtual machine image formats being exportable and importable across many cloud providers. Provide two examples illustrating the extent to which cloud providers still *lock in* customers, and how the use of Openstack-based cloud service providers can alleviate this problem

(8 marks)

(c) Discuss whether Openstack use brings any other benefits, and also whether it has any drawbacks

(7 marks)

3

(a) Outline the key trade-offs involved in deploying to hybrid cloud environments versus public or private cloud, noting advantages of each deployment model.

(10 marks)

(b) Security is often a concern in migrating to the cloud, whether justified or not. Briefly illustrate five key security concerns relevant to the deployment of resources to the cloud, identifying whether they are introduced by the cloud, highlighted by the cloud, or mitigated by appropriate cloud configurations.

(5*3=15 marks)