CET237 - Programming Virtual Networks

Assignment 1

1. Specification

This assignment is weighted at 40% of the overall module and will be marked out of 100.

You are expected to commit approximately 14 hours to this assignment.

1.1. Learning Outcomes

LO1.	A comprehensive understanding of the essential core network protocols and technologies that are involved in the development of virtualised solutions.
LO2.	Knowledge of the processes that are involved in the design and implementation of virtual network based environments.
LO4.	The ability to use appropriate programming languages to enhance the functionality and reliability of a virtual network based environment.

1.2. Deliverables & Deadlines

A technical report submitted via Canvas.	**Friday 31st March 2023** **13:59 pm**

2. Important Information

All work is to be completed individually, except where explicitly stated, and you will only be able to receive MARKS for your own work. You are responsible for the security and integrity of your own files, and you must not permit others access to your assignment work. Plagiarism or paraphrasing without due accreditation will be dealt with severely as set out in the University Infringement of Assessment Regulations and detailed in the Programme Handbook. Where referencing is required, unless otherwise stated, the Harvard referencing system must be used.

You are expected to submit work in the file formats requested. Submitting links to files saved elsewhere on the cloud will not be considered and will result in a zero mark – the actual files must be loaded to Canvas and readily available to the assessor. After uploading and submitting your files, you must check that you can also retrieve and open them. It is your responsibility to ensure files are not corrupted at the time of submission and to report any issues immediately to the help desk, copying in your lecturer and to seek alternative arrangements when required.

3. Scenario

You have been hired as a DevOps engineer by a Smart Comp a small business that requires a virtualized network solution to support its growing IT infrastructure. The company currently has 60 employees and is expanding its operations to three locations, i.e., London, Edinburgh, and Cardiff. Each location has 20 employees. Each location has a manger which will be sharing resources with the other line mangers and the rest of the employees in the location. The company has requested that you design and implement a virtualized network solution that will enable them to share resources and collaborate more efficiently across different locations and departments. Your task is to design and implement a virtualized network solution for the company.

4. Tasks

Write a technical report showing all the steps to do the following tasks

Task 1: Create a virtual network for each location.

Task 2: Create a virtual network only for the mangers.

Task 3: Create a docker file for a manager and an employee.

Task 4: Deploy the containers.

Task 5: Check that the containers are connected to the virtual networks.

Task 6: Create an Alpine container and name it *StudentID_ip_inspector* (you must change the name and use your student ID number instead of *StudentID)*

Task 7: Attach the *StudentID* container to the VM bridge network.

Task 8: Check that the networks and containers have been implemented correctly then Ping the other containers using their IP addresses and names.

Task 9: Upload the *StudentID container* to Docker hub and make it publicly available.

Task 10: Write a technical report showing all the steps.

5. Marking Criteria

Sections	Novice 0 – 20%	Beginner 21 – 40%	Competent 41 – 60%	Proficient 61 – 80%	Expert 81 – 100%
Creating the virtual networks	Not done or wrong scenario was implemented.	An attempt to create the scenario was done. However, several errors in the implementation have been made.	The scenario was implemented, however, a couple of errors in the implementation have been done.	The scenario was implemented; however, the documentation can be improved.	The scenario was implemented, with excellent documentation.
15 MARKS	*0-2 MARKS*	*3-5 MARKS*	*6-8 MARKS*	*9-11 MARKS*	*12-15 MARKS*
Creating the containers using Docker files and writing a step-by-step description	Docker file may have been presented but fail to describe it or severely limited.	A Docker file has been described but there is insufficient detail or errors to allow a developer to implement this without more information.	A Docker file has been described but there may be insufficient detail or some ambiguity that may make it difficult to implement. Images may be used but may be lacking.	A good description of the docker file. A detailed documentation is done. There may be some ambiguity that developers would have questions over.	A detailed explanation of the Docker file. With a clear description of each line. There is little to no ambiguity – a developer would understand what is to be implemented.
30 MARKS	*0-5 MARKS*	*6-11 MARKS*	*12-17 MARKS*	*18-23 MARKS*	*24-30 MARKS*
Network inspection	Not done or wrong attempt.	An attempt to investigate the scenario was done. However, several errors in the implementation have been made.	The inspect was only done for one of the containers.	The inspection has been done using either the IPs or names.	The inspection has been done professionally using shell script.
20 MARKS	*0-4 MARKS*	*4-8 MARKS*	*8-12 MARKS*	*12 - 16 MARKS*	*16-20 MARKS*

Sections	Novice 0 – 20%	Beginner 21 – 40%	Competent 41 – 60%	Proficient 61 – 80%	Expert 81 – 100%
Creating a backup using Docker hub	Not done	Docker Hub account created but no backup was done	Docker Hub account created, and a backup was done, but not for the correct container	Docker Hub account created, and a backup was done, but for the correct container, but no documentation was done	Docker Hub account created but a backup was done for the correct container, and a professional documentation was done
10 MARKS	*0-2 MARKS*	*2-4 MARKS*	*4-6 MARKS*	*6-8 MARKS*	*8-10 MARKS*
Report Overview: Title, Introduction, Description, and Conclusion.	Introductory sections attempt to provide a brief overview of the network. Some sections may be missing or there is a lack of detail.	Introductory sections broadly cover the details of the system. Some sections may be lacking in detail, unclear or missing.	Introductory sections plainly cover the details the system. Some sections may be lacking further depth or be less than concise.	Introductory sections clearly articulate details of the system.	Introductory sections clearly and concisely articulate details of the code in a professional manner.
25 MARKS	*0-5 MARKS*	*5-10 MARKS*	*10-15 MARKS*	*15-20 MARKS*	*20-25 MARKS*