 Computer Science and Creative Technologies

**Coursework or Assessment Specification**

## Module Details

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| **Module Code** | UFCFCU-30-1 |
| **Module Title** | Operating Systems and Architecture |
| **Module Leader** | Andrew Cracknell |
| **Module Tutors** | Andrew Cracknell |
| **Year** | 2021 |
| **Component/Element Number** | 2 |
| **Total number of assessments for this module** | 2 |
| **Weighting** | 50% |
| **Total Assignment Time** | 4 weeks |
| **Element Description** | Report |

## Dates

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| --- | --- |
| **Date issued to students** | 18 October 2021 |
| **Date to be returned to students** | 29 November 2021 |
| **Submission Date** | 15 November 2021 |
| **Submission Place** | Blackboard |
| **Submission Time** | 16:00 |
| **Submission Notes** | If you anticipate difficulty in meeting the submission date or time contact the module leader immediately |

## Feedback

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| **Feedback provision will be:** | partly given prior to submission during the classroom sessions, and finally when retuning the submission. |

# Contents

[Module Details 1](#_Toc52732373)

[Dates 1](#_Toc52732374)

[Feedback 1](#_Toc52732375)

[Contents 2](#_Toc52732376)

[Section 1: Overview of Assessment 3](#_Toc52732377)

[Section 2: Task Specification 3](#_Toc52732378)

[Section 3: Deliverables 4](#_Toc52732379)

[Section 4: Marking Criteria 5](#_Toc52732380)

[Section 5: Feedback mechanisms 6](#_Toc52732381)

# Section 1: Overview of Assessment

This assignment assesses the following module learning outcomes:

In component B of assessment, the students will report on a practical task that they have carried out. During classroom sessions, the students will build a system consisting of a hypervisor, virtual client and virtual server. They will establish a client/server system and test functionality. They will write a report illustrating how their system has met the design requirement and how it operates with reference to detailed operating system functions.

The students report on their work in order to demonstrate their design thinking. The emphasis is on design in order to help them avoid a "build it and then fix it" mentality.

The assignment is worth ***50%*** of the overall mark for the module.

The assignment requires you to:

* Review and analyse a requirement
* Provide a design solution
* Explain the design choices made with reference to the operating system functions
* Implement the design
* Devise a test plan
* Test functionality and report all issues
* Evaluate the success of the implementation with respect to the requirement

The assignment is described in more detail in section 2.

This is an individual assignment. Working on this assignment will help you to understand how requirements are practically implemented using a development process. It also shows how theory and concepts are translated to physical operations.

If you have questions about this assignment, please raise them with the module leader.

# Section 2: Task Specification

You are a consultant specialising in client and server systems for small and medium enterprises that require IT Support.

A client has requested a fully researched recommendation for upgrading their main office and back-up systems. They are concerned about ransomware threats.

In initial investigation you have found that their current configuration consists of 2 Windows 2012 servers. Backups were made to a disk on one of the servers. The desktop systems are Windows 8.

Your initial recommendation to the current management was to upgrade all the OS and purchase 2 new servers, one to virtualise the existing servers and one for storage/backups to be in a branch office.

The response was sceptical, but they have asked for a detailed report and a simulated test of your specification. You have decided to demonstrate the complete system in a virtual environment prior to any purchasing decisions.

Your report should have a word count of 3,000 (plus or minus 10%). Your word count must be given on the front page of your submission. See the UWE word count policy here: <https://www2.uwe.ac.uk/services/Marketing/students/Student%20advice/Word_count_policy_2012.pdf>

Your report should contain the following sections:

1. A review and analysis of the requirements
   * The servers are running Windows Server 2012
   * Clients are running Windows 8
   * Backups must be automated from the main servers to the backup server
   * Clients must be able to connect to any application, service or data on the main servers (prior to setting access controls)
   * Administrator rights and encryption controls for backups must be applied
2. Provide a design solution
   * What physical hardware will be required?
   * What is your choice of hypervisor – type 1 or 2?
   * How resilient is your solution to ransomware?
3. Explain the design choices made with reference to the operating system functions
   * How is access to the physical hardware controlled?
   * How are the VMs backed up?
   * How are the operating systems prevented from interfering with each other?
4. Implement the design
   * You need to demonstrate the virtual system with two guest operating systems, a backup server and a client
5. Devise a test plan
   * Tests should demonstrate that the requirements have been met and the required functionality is covered
6. Test functionality and report all issues
   * Tests should be recorded as pass or fail. All fails must be described and their cause and resolution recorded. The test must then be rerun for a pass.
7. Evaluate the success of the implementation with respect to the requirement
   * State how the simulated system and explanations will convince the client to virtualise.

# Section 3: Deliverables

Your submission should be a Microsoft Word document which includes this assessment specification at the beginning. Clearly add your full name and student number to the document header and the file name.

# Section 4: Marking Criteria

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-84 | 85-100 | Mark & Advice for Improvement |
| **Requirements analysis and design solution**  **(20%)** | Superficial analysis, unrealistic hardware specification, few advantages given | Some analysis, poor choice of hardware, limited advantages | Adequate analysis and hardware choice, key advantages stated | Good analysis justifying hardware choices. Good range of advantages | Good analysis justifying hardware and hypervisor choices. Good range of advantages | Justified choice of hypervisor and hardware based on detailed analysis. Well-argued advantages | Justified choice of hypervisor and hardware based on detailed analysis. Well-argued advantages specific to the scenario |  |
| **Design choices**  **(30%)** | Poor explanation of virtualisation | Some aspects of virtualisation explained | Basic explanations of virtualisation | Good explanation of virtualisation with reference to basic operating system functions | Excellent explanation of virtualisation with reference to basic operating system functions | Excellent explanation of virtualisation with reference to detailed operating system functions | Complete explanations of essential virtualisation operations at a detailed level with specific examples relevant to the scenario |  |
| **Implementation**  **(30%)** | The system does not operate | Some operation of the system is possible | At least one virtual machine with an OS allows basic communication with a client | Two virtual machines with an OS allow basic communication with a client | The client can access the internet and applications on either OS. Backup and restore of VMs works | The client can access the internet and only authorised files and applications on either OS.  Backup and restore of VMs works | Several users can access the internet and only authorised files and applications on either OS. Backup and restore of VMs works. |  |
| **Test and evaluation**  **(20%)** | No test plan or evaluation | Poor test coverage and documentation | Basic functionality tested | Good coverage but the evaluation is superficial | Well documented test plan and results with good evaluation | Convincing evaluation backed by evidence. An excellent test plan. | Convincing evaluation with additional recommendations. An excellent test plan. |  |

# Section 5: Feedback mechanisms

Sufficient time has been allocated in the classroom for the design to be implemented. During these sessions you can request assistance with any issues that are not directly related to your design.

Feedback will be given during the sessions on your implementation. This will ensure you have the opportunity to maximise the use of the classroom resources in developing your solution.

You will not receive feedback on any of the other sections until after the whole assignment has been marked and returned to you. The feedback will added to the returned submission.