# **SQA assessment coversheet**

**Please attach these pages to the front of your assessment.**

|  |  |
| --- | --- |
| Programme title | HND Computer Science |
| Unit number | H16S35 |
| Unit title | Managing a Web Server |
| Learning outcome number | 1 |
| Learning outcome title | Report |
| Word count | Min 500 words. Actual Word count: 1308 |
| Student ID | 21010093 |
| Student Name | Calum Lindsay |
| Date submitted | 17/11/2021 |

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| --- | --- |
| **Checklist** [**Note:** a checklist must be provided. The following questions are examples, you may use your own questions.] | a[[1]](#footnote-1) |
| My answer explicitly addresses the topics | a |
| Citations in the text use the Harvard referencing system | a |
| A bibliography is provided | a |
| All cited sources are listed alphabetically and in full in the bibliography | a |
| I have spell checked and proof read my submission | a |
| Word count is within 10% of the target length | Min 500 |
| File saved as a Word (.docx) or rich text file (.rtfx) with the filename format  ‘Student number\_unit initials\_LO number’ | a |
| I have completed all required sections of the coversheet | a |

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* **Frivolous content** — producing content that is unrelated to the assessment.
* **Offensive content** — content in assessment materials that includes vulgarity and swearing that is outwith the context of the assessment, or any material that is discriminatory in nature.
* **Plagiarism** — failure to acknowledge sources properly and/or the submission of another person’s work as if it were the candidate’s own.
* **Breaching the security of assessment materials** in a way which threatens the integrity of any exam or assessment.

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Students are responsible for ensuring the work they submit is their own and complies with the ASQR and Malpractice Policy. If you have any queries you should contact your unit lecturer or Personal Academic Tutor (PAT) before submitting your assessment.

Please note that any case of suspected malpractice will be investigated according to current UHI Academic Standards and Quality Regulations (ASQR).

|  |  |
| --- | --- |
| In submitting this work, I confirm that I have read and understood UHI ASQR and malpractice policy and am aware of the possible penalties. | a |

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| --- | --- |
| **Originality checker (to be completed if Turnitin is used)** | **P [[2]](#footnote-2)** |
| I confirm that I received information about the use of Turnitin and was directed to Turnitin training | N/A |
| I understand that this assignment will be submitted to Turnitin for originality checking | N/A |

**It is highly recommended that the following questions about next steps are included in all coversheets**

|  |
| --- |
| **If you have received feedback/feedforward from coursework or an assignment for this unit/module/course, state the next steps**  You can either cut and paste these from previous assignment / coursework feedback, or pick some elements that you have decided you would like to work on |
|  |
| **If you have received feedback/feedforward from coursework or an assignment for this unit/module/course, state what you have done to address the next steps** |
|  |

# Assessment task 1 - Outcome covered 1

### Assessment task instructions

Atlas Co is a company providing web design and hosting solutions to clients. They are a reseller of hosting using cloud based hosting companies. This has minimised the hosting cost for the company and allowed them to grow to a reasonable size. They now have a number of clients who had specific security concerns when using a company that did not have control over its own web servers.

**Client one** provides electronic document services and needs a means to secure the access to these documents on the internet.

**Client two** are in the process of redesigning their website and will need a dynamic site capable of supporting a server side scripting language and an appropriate database.

Atlas Co management have also asked for a **content management system (CMS)** that will be used as their **intranet**. This will be used to hold sensitive client information and managerial documentation. Access to the intranet should be made available through a **secure** internet link.

The new server must be capable of providing server statistics and logging of web usage. The clients would be sent these statistics files for analysis using third party tools.

Atlas Co has requested a telecoms company to provide a fast fibre optic internet connection. They are now at the stage of setting up their own web server. They will use this web server to host their own **secure intranet** and also provide secure hosting features for their clients.

You have been approached to provide a short report analysing and evaluating the requirements for running a web server.

The company requires specific information on **5** of the following topics.   
It is mandatory that you produce approximately 100-150 words for **each** topic below:

* **Operating system requirements** eg
  + Operating System Vendor and Version
  + Difference between Operating System vendor/versions
  + any other valid point relating to Operating System
* **All additional features the clients require that have been identified in the brief**
* **All security issues that would need to be solved** eg
  + Certificates, File security, encryption, etc

You must also choose **TWO** topics from the list below to add to your report:

* **Hardware requirements** eg
  + Specification of hardware to run the web server
* **Database integration options**
* **Appropriate scripting languages**
* **Multiple site hosting capabilities**

The complete report that you write for this Outcome must be approximately 500 words long (minimum).

# Assessment 1 report - pointers

Report needs to be a minimum 500 words covering **5** bullet points from below, **the first 3, then any other 2**.  
Written in own words, using internet/reference material. Reference any websites you use to source information.

## Discuss these 3 points

* Discuss different common Server Operating Platforms
  + Microsoft Server latest version/s
  + Linux OS version/s
  + What’s their main differences/short comparison ie what features are different between OS versions? (Guidelines indicate to mention at least one difference).
* Additional features the clients require that have been identified in the brief
  + Read the assessment story
  + Summarise the requirements
* Security Issues that need to be solved
  + What security has been requested/by whom? Certificates, encryption, password protection ?

## Select any 2 from the following:

* Hardware requirements
  + Minimum / Recommended hardware specification to run the/a web server
* Database integration
  + What database system has/can be installed (mention what is the latest version of database server) and used to meet the web server/client requirements.
* Scripting Languages
  + Discuss what scripting languages (mention what is the latest version) can be configured for use with the web server
* Multiple site hosting
  + Explain how multi-site hosting can be accomplished on the web server.

**An analysis of requirements to run a web server**

There are multiple Operating Systems available that can operate as a web hosting platform. We will take 3 of the most popular and compare them:

Microsoft Windows Server 2022:

* Since Windows Server is owned and maintained by Microsoft and is not an open-source project you will get customer support with your purchase and so solving issues related to the operating system could be much easier and faster.
* A standard licence costs $1069 where if you chose an open-source solution it would be free  
  (Microsoft 2021).
* Hardware Requirements (Microsoft 16/08/2021).
  + 1.4 GHz x64 processor (Microsoft recommends using a tool called Coreinfo to check that the CPU has all required capabilities: CMPXCHG16b, LAHF/SAHF, PrefetchW, etc)
  + 512 MB RAM (2GB for Desktop Experience installation)
  + 32GB backing storage (absolute minimum more is recommended)
  + Minimum 1 Gigabit ethernet adapter.

Ubuntu Server 20.04 LTS:

* Ubuntu is one of the most widely used Linux distributions and has been around a long time and as such it has regular updates and a strong developer community producing regular updates and security fixes.
* It’s completely free! However, they do offer a Subscription service if you wish to get help and support.
* Hardware Requirements (Canonical 2021)
  + 1 GHz or better
  + 1 GB RAM
  + 2.5GB Backing storage

OpenSUSE Leap 15.3:

* OpenSUSE is a Linux distribution specifically aimed at “makers, sysadmins and developers” as well as normal desktop users.
* It’s completely free! OpenSUSE provide a “Premium IT Support” service for a Subscription fee similarly to Ubuntu.
* Hardware Requirements (OpenSUSE contributors 2021)
  + 2GHz dual core processor or better.
  + 2GB RAM (more recommended).
  + Over 40GB backing storage recommended.

I believe that OpenSUSE would be the best Operating System to use out of the options I have presented as it is free but still allows a subscription for technical support to be picked up later if required and it is primarily designed for makers, sysadmins, and developers and this suits our use case very well. It does have the highest Hardware requirements, but these requirements are still extremely low by modern standards.

Atlas Co and their clients have a few requirements which are summarized here:

* Atlas Co has asked for a content management system to be used as their intranet. There are several content management systems available however some of them do not allow self-hosting and don’t export properly (Wix 2021, SquareSpace 21/09/2021) so are not appropriate for this use case such as Square Space and Wix. The 2 leading systems based on market share that allow self-hosting are WordPress and Joomla. Out of these I would suggest WordPress due to its vastly greater usage over the internet (BuiltWith 31/10/2021) which will make diagnosing issues much easier and faster as it is a lot more likely your issue has been encountered and resolved in the past. Another advantage that comes with heavily used open-source software is that it often has a strong development team behind it and receives security fixes quickly (apache@GitHub 29/10/2021).
* Client one requires secure access to documents on the internet which can be stored on their website and password protected to ensure secure access.
* Client two requires a server-side scripting language and a database. I would suggest using MariaDB as the database as it is created by the original developers of MySQL, guarantees to stay open source, and contains some advanced features not found in other database servers (MariaDB 2021) and PHP7 for the scripting language as it is by far the most used server-side language on the web (W3Techs 09/11/2021) and so again you will have fewer un-patched security vulnerabilities and it will be easier to find information on how to solve common issues.
* The server is required to provide server statistics and logging of web usage which will be sent to the clients for analysis using 3rd party tools. Apache by default keeps track of server statistics and web usage and so this would just be a matter of keeping the clients' logs separate from each other, and the intranet logs and then sending the required logs to the clients for them to analyse as required.

Several security issues have been raised and I will now discuss how these could be solved:

* Client 1 has requested secure access to documents stored on their webserver over the internet. I would suggest using the htpasswd program included with Apache to achieve this as it can be used alongside some Apache config changes to apply a username and password to a folder where these documents could then be stored. It is important that the password file created by htpasswd is not stored within the Web servers URI space as it would be fetchable through a URL link and this would make it much easier to crack the password and gain unauthorized access to the documents ().
* Atlas Co are planning to use their intranet to host sensitive user information and managerial documentation and so they want access to the intranet to be provided through a secure internet link. This can be achieved by enabling https to prevent man-in-the-middle attacks which could result in the leaking of data between the server and connecting pc. To do this we will need an SSL certificate and we will need to change some Apache config files to only allow connections to the intranet over port 443 which is the port used by https.

Consideration must be taken into what the hardware requirements will be beyond the basic requirements of the operating system:

* PHP requires a minimum of a 32-bit CPU and an operating system newer than Windows 2008/Vista which are incredibly old at this point and so we will easily meet these requirements   
  (The PHP Group 2021).
* As stated on MariaDB’s website:
  + “MariaDB doesn’t have minimal hardware requirements per se, or if there was any, it would correspond to pre-2000 machines which don’t exist anymore” (MariaDB 16/04/2016)
* I was unable to find any specific information on Apache2 minimum requirements but from the minimum recommendations of a couple of other companies (Sana Commerce 01/2014, Knowledge Base Systems 11/04/2017) I would estimate the minimum for a server able to deal with 25 concurrent users to be:
  + 2GHz CPU
  + 2GB RAM
  + 40GB disk space

Taking all this information into account I think the Apache 2 requirements (being the highest) could serve as a base but obviously as more users and virtual hosts are added the required hardware specifications would increase dramatically and I would advise purchasing the highest-grade equipment available within the budget that the company is willing to put forward as this enables the greatest ability to expand into the future without further investment into hardware and physical space.

Atlas Co intends to use the server to host multiple sites including their own intranet and their clients' websites. To achieve this a few steps must be taken:

* Each website we want to host would need to have a folder created for it to use as it’s root directory and care must be taken to make sure that the root directory for each website is not within the URI space of any of the other websites to keep them separated.
* The folder that we create for each website to be stored in would need to have its ownership and/or permissions changed so that it can be accessed and edited by the client that it has been created for.
* For each website/virtual host we wish to add to the server we will need to create a config file for Apache to know all the required and optional details about the new virtual host such as:
  + Root directory (where the website is stored)
  + Domain name
  + Error and access log locations
  + Port numbers to allow connections on
  + Additional security such as password protected folders
  + Other host options and settings
* The server will need restarted to apply any of the changes made to the configuration files as it only reads them on start up.

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1. Copy and paste ainto each box to confirm that you have read and agree with the statements. [↑](#footnote-ref-1)
2. Copy and paste **ü**into each box to confirm that you have read and agree with the statements [↑](#footnote-ref-2)