

**Level 4 Diploma in Computing**

Ofqual Number: 600/0406/X Quartz ID: 1053

**Level 4 Diploma in Computing (with Business Management)**

Ofqual Number: 600/0406/X Quartz ID: 1054

**Applied Skills Certificate in Computing**

Quartz ID: 1001

Paper ID: 1105-1

# Computer Networks

Global Assignment

**WeBuyAnyVehicle**

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**Important notes**

- Please refer to the *Assignment Presentation Requirements* for advice on how to set out your assignment. These can be found on the NCC Education website. Hover over 'About Us' on the main menu and then navigate to 'Policies and Procedures' then scroll to the 'Student Support' area.
- You **must** read the NCC Education document *Academic Misconduct Policy* and ensure that you acknowledge all the sources that you use in your work. These documents are available on the NCC Education website. Hover over 'About Us' on the main menu and then navigate to 'Policies and Procedures' then scroll to the 'Student Support' area.
- You **must** complete the *Statement and Confirmation of Own Work*. The form is available on the NCC Education website. Hover over 'About Us' on the main menu and then navigate to 'Policies and Procedures' then scroll to the 'Student Support' area.
- **Please make a note of the recommended word count as stated in the brief. The maximum word count limit is the recommended work count plus 10% leeway. Submissions which exceed the maximum word count limit will be marked only up to the maximum word count limit. Any text that exceeds the maximum word count limit will not be marked. You must follow the note on word count as stated in the Submission Requirements section of the brief.**
- You must submit a paper copy and digital copy (on disk or similarly acceptable medium). Media containing viruses, or media that cannot be run directly, will result in a fail grade being awarded for this assessment.
- All electronic media will be checked for plagiarism.

## Introduction

This assignment enables you to demonstrate your knowledge and understanding of computer networks. You are required to produce a document. You are advised to start work on the assignment at an early stage during the unit.

Some aspects of this assignment will require you to research real components that are currently available in the marketplace. Furthermore, you will also be asked to make judgements about what is best for a particular scenario. Please note that there is not always one right answer. However, you will need to justify your reasons for any choices you make to get high marks.

You are **NOT** required to design a complete network. You are required to detail the specifics covered by the task list shown below.

## Scenario

WeBuyAnyVehicle is a national car dealership that has its headquarters located in Manchester, England.

The company has seen continued growth and is looking to reinvest in its network infrastructure as it plans to move to a new office in 2024.

The company employs over 200 employees with over 100 associate employees who are working remotely.

The new office is based in a shared building with each floor allocated to each business. The contract allows the business to make adjustments to the environment to suit its needs. However, an additional £15,000 security bond is needed to prevent loss to the landlord when the tenant exits if modifications are extreme.

The business has asked that you make assumptions in your design to allow scalability without needing to interfere with the configuration. There is an expectation to have at least an extra 10% on each network to allow for staff number growth.

The company is looking to use wireless technologies as much as possible to avoid having to install fixed cabling. The managing director is keen to keep the office environment fluid by using hot desk spaces where possible instead of fixed desks and offices. Hot Desking is used by the business to share a single workspace with multiple employees where they can simply reserve desks for just the times they will require them.

All employees are issued with a Microsoft Surface device. Many of the Surfaces are now quite old but have wireless capability up to Wi-Fi 5 or 'AC' as standard allowing them to connect to the Wi-Fi. Some office staff are complaining of the speed of transferring larger video files. However, this is not seen as a priority to resolve.

The office has a central file server set up with a version of Windows Server 2012 which no longer has active support and security support will cease by the end of 2023. The IT team has identified this as a serious risk and is considering either a server upgrade or migration to an Office365/ cloud solution.

As part of the move to the new office, the IT team are looking to harden the network as much as possible given the rise in malicious attacks on organisations.

**These requirements are to be used with the tasks below.**

## **Aim**

To demonstrate your understanding of computer networking in the real world. You should produce a report, structured to address the following SIX (6) tasks:

### **Task 1 – Planning a Network – 20 Marks – 600 words**

- a) Explain the term '*Logical Topology*'. You must provide a diagram to illustrate your answer.  
(10 marks)
- b) Discuss what topology would provide the best redundancy should any access points fail. You must provide a diagram to illustrate your answer.  
(10 marks)

### **Task 2 – Network Operating Systems – 20 marks – 600 words**

- a) Explain the term 'Network Operating System' (NOS). In your answer, you must discuss the advantages or disadvantages of using a proprietary NOS or an open-source NOS. You should provide at least THREE (3) advantages or disadvantages. You must also provide TWO (2) named examples of Network Operating Systems.  
(10 marks)
- b) Explain what issues an enterprise network could face if they do not update their NOS once it reaches End of Life (EoL). You should provide a minimum of FIVE (5) issues.  
(10 marks)

### **Task 3 – Design the Network – 20 Marks – 600 words**

Draw a logical network diagram to illustrate a typical network design for an open plan office that must allow access for TWO HUNDRED (200) users.

The network should be wireless where possible and implement technology to ensure smooth working as an employee moves around the office space freely.

IT has asked to have a separate network for the following teams:

- HR and Finance
- Management
- IT

All other users can be connected to a shared presence.

Within the design, you must:

- Label each component in your diagram clearly – IP Scheme with Subnet Mask, Name, interconnection devices etc.
- Allocate suitable IPv4 based IP address schemes (IP Address & Subnet mask) for:
  - A network segment for up to TWO HUNDRED (200) unique IP addresses for each member of staff.
  - A network segment for HR and Finance with THIRTY (30) unique IP addresses for each member of staff.
  - A network segment for Management with TEN (10) unique IP addresses for each member of staff.
  - A network segment for IT with FORTY-FIVE (45) unique IP addresses for each member of staff.
- Identify any interconnection devices needed to allow communication between the above FOUR (4) network segments.
- Identify any security considerations put into place within the design of the network.
- Note any assumptions made by yourself in the network design.

### **Task 4 – VPN – 10 Marks – 300 words**

Explain what a 'VPN' is and how it can be implemented within a network. Discuss FOUR (4) advantages or disadvantages of implementing a VPN for an enterprise with staff working from various locations in the UK.

### **Task 5 – Firewalls – 10 Marks – 300 words**

Explain the difference between a hardware firewall and a software firewall. You should provide FIVE (5) advantages or disadvantages for each firewall.

## Task 6 – Network Recommendation – 20 Marks – 600 words

Using information produced for tasks 1-5, make a recommendation by summarising:

- a) How scalability for growth has been considered in your network design produced in Task 3. You must provide **THREE (3)** recommendations that you would make to ensure the network is future-proofed for a minimum of **FOUR (4)** years.  
(10 marks)
- b) Identify **FIVE (5)** key aspects of your design that will secure the network from common threats. You must identify a minimum of **THREE (3)** threats clearly with some detail of why it is a threat to the network.  
(10 marks)

## Guidance

Consult with your tutor if you are uncertain about any aspect of this assignment.

## Submission requirements

You must submit a word-processed report.

Your report should answer Tasks 1 to 6. The word count for your report is **3000 words**.

### Word Count

The word count for this assignment is **3,000 words**. Pay careful attention to the mark allocation for each task so you don't spend too much time on any **ONE (1)** section.

You **MUST** state the word count in the header of your assignment and declare the number of words on your assignment cover sheet. You **MUST** confirm that you have not exceeded the stipulated word limit by more than 10%.

Any words written beyond the stipulated limit will not be read by the examiners; no marks will be awarded, and no feedback provided for any text beyond the prescribed limit.

In accordance with accepted academic practice, the notion of a word count includes the following without exception:

- All titles or headings that form part of the actual text. This does not include the fly (or cover) page or reference list.
- All words that form the actual essay
- All words forming the titles for figures, tables, and boxes. However, this does not include the text within boxes, tables, or figures themselves.
- All in-text (bracketed) references
- All directly quoted material.

## Candidate checklist

Please use the following checklist to ensure that your work is ready for submission.

Have you read the NCC Education document *Academic Misconduct Policy* and ensured that you have acknowledged all the sources that you have used in your work? ☐

Have you completed the *Statement and Confirmation of Own Work* form and attached it to your assignment? **You must do this.** ☐

Have you ensured that your work has not gone over or under the recommended word count by more than 10%? ☐

Have you ensured that your work does not contain viruses and can be run directly? ☐