T Level Technical Qualification in Digital Support Services

Occupational specialism assessment (OSA)

Digital Infrastructure

Assignment 1

Assignment brief

v1.2: Specimen assessment materials
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Contents

About this assignment

Introduction

This assignment is set by NCFE and administered by your provider over 3 days. The times and dates will be specified by NCFE.

The assignment will be completed under supervised conditions.

You must complete all tasks in this assignment independently. You are required to sign a declaration of authenticity to confirm that the work is your own. This is to ensure authenticity and to prevent potential malpractice and maladministration. If any evidence was found not to be your own work, it could impact your overall grade.

Internet access is allowed for task 2 and task 3.

Use the electronic workbook provided to record all your evidence against each task.

Annotations should be made digitally on the floor plans in the workbook.

Ensure all print screens have been labelled with a brief description of what is being shown.

Save your workbook regularly as you work through the assessment.

Submit the workbook as a single .pdf file at the end of the assessment.

Timing

You have 13 hours to complete all tasks within this assignment.

Task 1 = 3 hours (this will be completed in 1 session)

Task 2 = 5 hours (this will be provided after completion of task 1 and be completed in 2 sessions)

Task 3 = 5 hours (this will be provided after completion of task 2 and be completed in 2 sessions)

Individual tasks must be completed within the timescales stated for each task, but it is up to you how long you spend on each part of the task, therefore be careful to manage your time appropriately.

Marks available

Across all assignment 1 tasks: 76 marks.

Details on the marks available are provided in each task.

You should attempt to complete all of the tasks.

Read the instructions provided carefully.

Performance outcomes

Marks will be awarded against the skills and knowledge performance outcomes (POs) as follows:

Task 1

(20 marks)

PO1: Apply procedures and controls to maintain the digital security of an organisation and its data (12 marks)

PO2: Explain, install, configure, test and manage both physical and virtual infrastructure (8 marks)

Task 2

(28 marks)

PO2: Explain, install, configure, test and manage both physical and virtual infrastructure (20 marks)

PO3: Discover, evaluate and apply reliable sources of knowledge (8 marks)

Task 3

(28 marks)

PO1: Apply procedures and controls to maintain the digital security of an organisation and its data (4 marks)

PO2: Explain, install, configure, test and manage both physical and virtual infrastructure (16 marks)

PO3: Discover, evaluate and apply reliable sources of knowledge (8 marks)

Scenario

Willow Technology is a company that specialises in the creative industries developing websites, computer animation, video and some motion capture work.

Willow Technology is currently in the process of moving to a new building. The new building is 2 storeys high and features a range of different rooms, all with unique purposes. The cabling and installation of network ports has already been implemented and you need to add the required hardware that will provide a very robust network.

There are 3 tasks you need to complete to help plan and specify network equipment. As you work through the assignment, more information will be provided regarding the network.

Task 1: planning

Time limit

3 hours

You can use the time how you want, but all parts of the task must be completed within the time limit.

(20 marks)

The building is due to be handed over in 20 working days from the date you begin this assignment. You will then have a further 40 days to install, configure, test and migrate over to the new network. This is a very tight timeframe to cover all the activities required and the new network needs to be in place for go-live after this date, giving a total project duration of 60 days.

Note: A working day is Monday to Friday and any bank holidays are treated as normal working days.

To help you in planning the task, the following additional information has been provided:

- a small test network needs to be developed to verify network compatibility before the new network is implemented
- physical installation and configuration of the live system cannot begin until the building has been handed over
- network cabling will be installed by a third party during the first 5 days after the building has been handed over
- the design and selection of the infrastructure should be carried out in 2 phases: servers and storage, and communication equipment:
    - servers and storage - new servers will need to be selected and data migrated from the old system to the new one. In addition to the servers, a storage solution is required to host the various websites, databases, audio, video and graphics required by the business
    - communication equipment - new switches, wireless infrastructure and CCTV cameras are required to be installed throughout the new building
- 3 days should be allocated for data migration from the old system to the new one with 1 extra day for testing and troubleshooting
- assume 3 days for delivery of any equipment being ordered
- ensure the timings are realistic and that the workload is balanced throughout the project

Instructions for students

The project is currently in the opening phase and requires some initial planning and documentation to be set up before the design and development work commences:

- develop both a project plan **and** Gantt chart for the development of the new network, working within the solution lifecycle
- the implementation will require the installation of equipment - explain the legal requirements that need to be addressed when undertaking the task, including the storing and processing of data, remote access and the handling of equipment
- identify and explain a range of physical and digital security vulnerabilities that could affect the new building and the business - for each vulnerability, identify and justify the countermeasures that could be applied to the building and the network to help mitigate the threat

- annotate any physical countermeasures on the floor plans in the workbook – a copy of each floor plan is also provided at the end of this assignment brief

You will have access to the following equipment:

- word processing software
- project planning software

Evidence required for submission to NCFE

The following evidence should be recorded in the workbook:

- project plan **and** Gantt chart showing critical path, with activities and suitable timeframes following the solution lifecycle
- explanation of legal requirements when working with equipment
- written account of the physical and the digital threats and security countermeasures applied
- annotated floor plans with physical security measures shown

Task 2: design - servers and storage

Time limit

5 hours

You can use the time how you want, but all parts of the task must be completed within the time limit.

You are advised to spend approximately 1 hour on the research element of the task.

Internet access is permitted but must only be used for the purposes of research and information gathering as required by the task, for example viewing manufacturer websites and technology review sites.

At the end of this task you will be required to submit your browsing history to verify the sources used.

(28 marks)

As part of the move to the new building, the selection and arrangement of the servers and subsequent storage solution needs to be addressed. Use the following requirements to help shape your implementation:

- the network will need to support 30 wired desktop computers and a further 20 wireless devices, plus an additional 15 remote access clients
- an initial 60TB of shared storage should be provided for the file servers and this figure should be able to double over the next 3 years - most of the file storage will be for the various 3D models, videos, images and sound files developed during the day-to-day business activities
- reliability and redundancy should be built into the servers
- performance is crucial for the web server and corresponding database servers as they will be used for customer testing during development

Instructions for students

Create the technical proposal for the servers, roles, storage and operating systems. The following information and diagram are required for both the customer's review and your line manager's sign-off:

- the roles and applications the business will require on the servers, including hardware and software system requirements
- a justified approach to architecting the servers for example physical, virtual, containers or hybrid, with a focus on resilience and performance
- details on the servers, storage and operating system required, with justification
- a server diagram that shows how the servers will be arranged with the roles and applications using a suitable tool, for example Visio or Packet Tracer
- when selecting vendors and equipment, evaluate the sources of information you use to inform and back up your selection process
- consider the reliability, validity, bias and accuracy of the sources you have used

You will have access to the following equipment:

- internet
- word processing software
- diagram software

Evidence required for submission to NCFE

The following evidence should be recorded in the workbook:

- diagram of the physical server organisation, showing roles and connectivity information with storage
- technical documentation covering the servers, configuration, storage and operating system specifications with rationale
- print screens of all online sources used clearly showing the URL - the print screens must be accompanied by your written evaluation of the sources

Task 3: design - communication equipment

Time limit

5 hours

You can use the time how you want, but all parts of the task must be completed within the time limit.

You are advised to spend approximately 1 hour on the research element of the task.

Internet access is permitted but must only be used for the purposes of research and information gathering as required by the task, for example viewing manufacturer websites and technology review sites.

At the end of this task you will be required to submit your browsing history to verify the sources used.

(28 marks)

The final part of the move into the building is the planning and design process for the installation of the switches, WiFi and CCTV. Use the following requirements to help shape your implementation:

- the wireless network needs to be secured and should prevent access to data stored on the main network
- the network should be able to expand over time as more wireless demand is required and additional wired ports might be required
- the placement and specification of switches and WiFi equipment should have reliability, organisation and redundancy built into the approach
- the 360° IP cameras should be on a private and secure network and placed in the following locations:
    - one in the lobby
    - one covering the server room
    - one placed in the dining room

Note: You can choose how the cameras are integrated into the network.

- a separate NAS device must also be included to cover the storage of the video footage on the network for 2 weeks

Guide: 10GB of storage is required for all 3 cameras per day. This means 140GB of total storage for the 2 weeks.

- the emphasis should be on security, resilience and performance

Instructions for students

Create the second part of the technical proposal for the remaining elements of network infrastructure covering the switches, access points, IP cameras and NAS drive. The following information needs to be provided to the customer and your line manager:

- annotated floor plans showing the physical placement of switches, WiFi infrastructure, IP cameras and the NAS using a suitable tool, for example Visio or Packet Tracer

Note: The floor plans for both the first floor and ground floor show the position of the planned network ports and ceiling mounted cable trays. The installation of the cables will be handled by another company; however, they do require the details on where the physical network devices will be placed and interconnected.

- justify the infrastructure selected for the problem focusing on security, manageability and upgradeability against the following **3** areas:

- switching
- WiFi
- IP cameras and storage

Note: Internet routing and the use of firewalls are **not** required for this task.

- when selecting vendors and equipment, evaluate the sources of information you use to inform and back up your selection process
- consider the reliability, validity, bias and accuracy of the sources you have used

You will have access to the following equipment:

- internet
- word processing software
- diagram software

Evidence required for submission to NCFE

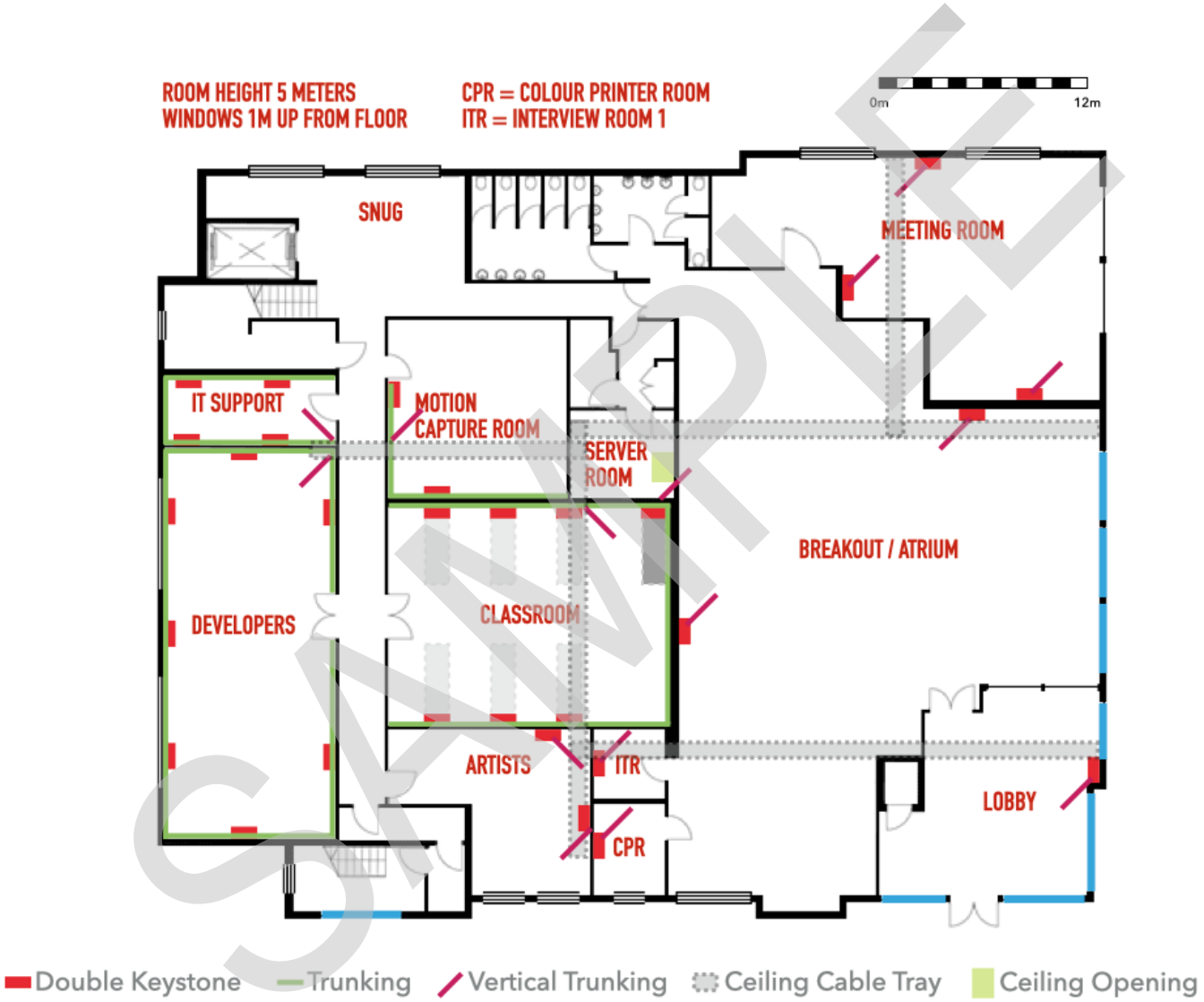
The following evidence should be recorded in the workbook:

- annotated floor plans showing the placement of the infrastructure

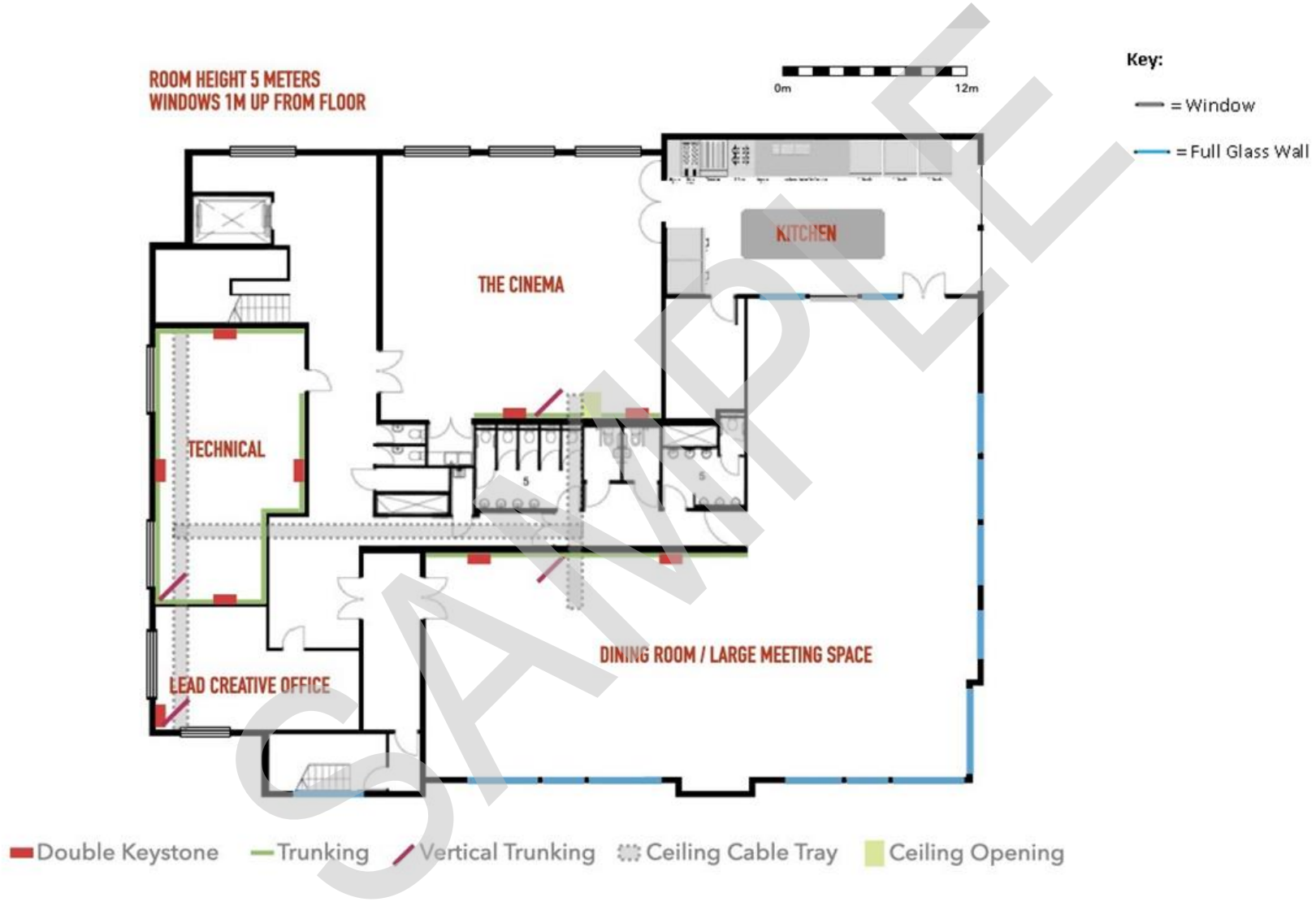
Note: This can be one floor plan showing all elements, or separate floor plans focusing on different infrastructure elements

- technical documentation covering the switches, wireless infrastructure, specifications, configuration and placement with rationale
- justification for your approach to the problem which considers security, manageability and upgradeability
- print screens of all online sources used clearly showing the URL - the print screens must be accompanied by your written evaluation of the sources

Floor plan: ground floor



Floor plan: first floor



Document information

The T Level Technical Qualification is a qualification approved and managed by the Institute for Apprenticeships and Technical Education.

Owner: Head of Assessment Design

Change History Record

Version	Description of change	Approval	Date of Issue
v1.0	Post approval, updated for publication.		December 2020
v1.1	Branding and formatting final updates. NCFE rebrand.		September 2021
v1.2	Sample added as a watermark	November 2023	17 November 2023