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**Introduction**

Welcome to the Assessor Marking Guide for *ICTNWK541 Configure, verify and troubleshoot WAN links*. This Marking Guide provides you with assessment tasks, checklists and marking guidance. It also provides advice on delivering the assessment for this unit.

This document is one of a suite of resources which has been developed by RTO Works to support you in delivering assessment for units of competency from the Information and Communications Technology Training Package.

Please ensure that you read this guide in conjunction with the *IT Works Assessor User Guide.*

**Supporting resources**

A number of documents have been provided with this Marking Guide to support assessors and students.

**For the assessor**

* *IT Works Assessor User Guide*: The Assessor User Guide provides important information for assessors relating to the delivery of quality assessment.
* *Assessment Mapping*: A mapping guide is included as a separate document to show how each assessment task maps to the unit of competency. You will find the assessment mapping in the ICTNWK541 Mapping folder.
* *Supporting resources*: Supporting resources include templates and checklists which can be used when preparing for and marking assessment tasks. You will find the supporting resources in the ICTNWK541 Assessor Resources folder. For this unit, the supporting assessor resources comprise:
  + *Project Portfolio Assessor* (Assessment Task 2)
  + *Security Policy* (Assessment Task 2).

**For the student**

* *IT Works Student User Guide*: The Student User Guide provides important information for students relating to completing training, work placements and assessment.
* *Student Assessment Tasks*: The Student Assessment Tasks include the tasks as well as guidance about how to complete each assessment. Submission information and relevant forms are also included. The Student Assessment Tasks for this unit can be found in the ICTNWK541 Assessment folder.
* *Supporting resources*: Supporting resources include templates, journals, workbooks and portfolios which can be used by the student to support them in providing evidence of their competence. You will find supporting resources in the ICTNWK541 Student Resources folder. Please ensure that students receive these documents before they begin their assessment tasks. For this unit, the supporting resources for students comprise:
  + *Project Portfolio Template* (Assessment Task 2)
  + *Security Policy* (Assessment Task 2).

**Assessing this unit**

*ICTNWK541 Configure, verify and troubleshoot WAN links* describes the skills and knowledge required to use required tools, equipment, software and protocols to install, operate and troubleshoot switches and routers in a medium-size enterprise network.

It applies to individuals who are employed in desk technician and network support technician roles.

For students to be assessed as competent, they must successfully complete two assessment tasks:

* Assessment Task 1: Knowledge questions – Students must answer all questions correctly.
* Assessment Task 2: Project – Students must work through a range of activities and complete a Project Portfolio.

**Assessment Task 1: Knowledge Questions**

**Information for assessors**

Knowledge questions are designed to help the student demonstrate the knowledge which they have acquired during the unit. Ensure that you:

* review the advice to assessors regarding administering knowledge questions in the *IT Works Assessor User Guide*
* provide students with a due date for assessment
* provide submission guidelines to students
* follow your organisation’s policies and procedures
* refer to your organisation’s Training and Assessment Strategy
* provide written feedback to each student
* provide resubmission guidance to students (including a timeline) who do not complete the task satisfactorily
* complete the Assessment Task 1 Checklist which can be found at the end of this task
* complete the Final Results Record which can be found at the end of this Assessor Marking Guide.

|  | **Assessment delivery information**  Assessment delivery information which has been contextualised to your RTO’s student cohort can be found in Appendix A of the *IT Works Assessor User Guide*.Use this information to advise students of:   * where this task should be completed * the maximum time allowed for completing this assessment task * whether or not this task is open-book.   *Note*: Students should complete and submit an assessment cover sheet with their work. A template is provided in Appendix C of the Assessor User Guide. |
| --- | --- |

**Information for students**

Knowledge questions are designed to help you demonstrate the knowledge which you have acquired during the learning phase of this unit. Ensure that you:

* review the advice to students regarding answering knowledge questions in the *IT Works Student User Guide*
* comply with the due date for assessment which your assessor will provide
* adhere with your RTO’s submission guidelines
* answer all questions completely and correctly
* submit work which is original and, where necessary, properly referenced
* submit a completed cover sheet with your work
* avoid sharing your answers with other students.

|  | **Assessment information**  Information about how you should complete this assessment can be found in Appendix A of the *IT Works Student User Guide*.Refer to the appendix for information on:   * where this task should be completed * the maximum time allowed for completing this assessment task * whether or not this task is open-book.   *Note*: You must complete and submit an assessment cover sheet with your work. A template is provided in Appendix C of the Student User Guide. However, if your RTO has provided you with an assessment cover sheet, please ensure that you use that. |
| --- | --- |

**Questions**

Provide answers to all of the questions below:

1. Explain how internet protocol version 6 (IPv6) works and a brief outline of what you need to do to configure it.

The student must explain how internet protocol version 6 (IPv6) works and a brief outline of what you need to do to configure it. Their response may include but is not limited to:

Internet protocol version 6 (IPv6) is a protocol standard developed by Internet Engineering Task Force (IEWTF). It is a 128-bit address with three addressing methods:

* Unicast (identifies a single network interface)
* Multicast (used by multiple hosts)
* Anycast (assigned to a group of interfaces)

Internet protocol version 6 (IPv6) addressing replaces IPv4, an internet protocol identifying devices across the internet so they can be located (it provides unique IP addresses necessary for internet-enabled devices to communicate).

To configure you need to assign addresses to individual device interfaces. This will be dependent upon the vendor specifications. The following article is an example of Cisco connectivity.

1. Outline the purpose of Access Control Lists (ACLs).

The student must outline the purpose of ACLs. Their response may include but is not limited to:

Access control lists (ACLs) are rules specifying which users or systems can access resources. They can be implemented for routers and switches to act as filters, managing which traffic is allowed to access the network.

1. Explain how router command line interfaces (CLI) are configured.

The student must explain how router command line interfaces (CLI) are configured. Their response may include but is not limited to:

As the CLI is an interface, based on text, the user will type in configuration commands and use show commands to get the output from the router or switch.

1. Explain the purpose of router debug commands.

The student must explain the purpose of router debug commands. Their response may include but is not limited to:

Debug commands can give information about the traffic generated and received by the router and therefore be used to troubleshoot problems.

1. Complete the table below listing two WAN installation issues that could arise and a solution for each.

The student must complete the table below listing two WAN installation issues that could arise and a solution for each. Their response may include but is not limited to:

| **Type of issue that can be encountered with installing WAN links** | **Solution** |
| --- | --- |
| Lack of security | Increase security measures |
| Insufficient bandwidth | Traffic management |

1. Explain why it is important to important to understand strategic objectives and operational activities in relation to installing, configuring and testing WAN links.

The student must explain why it is important to important to understand strategic objectives and operational activities in relation to installing, configuring and testing WAN links. Their response may include but is not limited to:

It is important to understand strategic objectives and operational activities in relation to installing, configuring and testing WAN links because strategic objectives and operational activities give insights into what the organisation wishes to achieve in terms of its ICT network infrastructure, and this must then be translated into WAN links that achieve this.

**Assessment Task 1: Checklist**

| Student’s name: | | | | |
| --- | --- | --- | --- | --- |
| Did the student provide a sufficient and clear answer that addresses the suggested answer for the following? | Completed successfully? | | Comments | |
| Yes | No |  | |
| Question 1 |  |  |  | |
| Question 2 |  |  |  | |
| Question 3 |  |  |  | |
| Question 4 |  |  |  | |
| Question 5 |  |  |  | |
| Question 6 |  |  |  | |
| Task outcome: | * Satisfactory | | | * Not satisfactory |
| Assessor signature: |  | | | |
| Assessor name: |  | | | |
| Date: |  | | | |

**Assessment Task 2: Project Portfolio**

**Information for assessors**

In this task, students are required to demonstrate their skills and knowledge by working through a number of activities and completing and submitting a Project Portfolio.

You will also observe students participating in interactions. This can be in person or via a video recording.

Students will need access to:

* a suitable place to complete activities that replicates an ICT environment, computers including software that can be used to install and operate small enterprise branch networks and end user devices to test networks on
* network design documentation and policies and procedures pertaining to the installation and operation of a network
* small enterprise routers and switches and associated equipment specifications
* their *Student Assessment Tasks*
* their learning resources and other information for reference
* *Project Portfolio* template
* *Security Policy.*

Ensure that you:

* review the advice to assessors regarding administering practical assessment in the *IT Works Assessor User Guide*
* provide students with a due date for assessment
* follow your organisation’s policies and procedures
* refer to your organisation’s Training and Assessment Strategy
* provide written feedback to each student
* provide resubmission guidance to students (including a timeline) who do not complete the task satisfactorily
* complete the Assessment Task 2 Checklist which can be found at the end of this task
* complete the Final Results Record which can be found at the end of this Assessor Marking Guide.

|  | **Assessment delivery information** |
| --- | --- |
| Assessment delivery information which has been contextualised to your RTO’s student cohort can be found in Appendix A of the *IT Works Assessor User Guide*.Use this information to advise students of:   * where this task should be completed * the maximum time allowed for completing this assessment task * whether or not this task is open-book.   *Note*: Students should complete and submit an assessment cover sheet with their work. A template is provided in Appendix C of the Assessor User Guide but you should refer to your organisation’s policies and procedures.   * Students must submit:   + a completed *Project Portfolio*. |

**Information for students**

In this task, you are required to demonstrate your skills and knowledge by working through a number of activities and completing and submitting a Project Portfolio.

You will need access to:

* a suitable place to complete activities that replicates an ICT environment, computers including software that can be used to install and operate small enterprise branch networks and end user devices to test networks on
* network design documentation and policies and procedures pertaining to the installation and operation of a network
* small enterprise routers and switches and associated equipment specifications
* your learning resources and other information for reference
* *Project Portfolio* template
* *Security Policy.*

Ensure that you:

* review the advice to students regarding responding to written tasks in the *IT Works Student User Guide*
* comply with the due date for assessment which your assessor will provide
* adhere with your RTO’s submission guidelines
* answer all questions completely and correctly
* submit work which is original and, where necessary, properly referenced
* submit a completed cover sheet with your work
* avoid sharing your answers with other students.

|  | **Assessment information** |
| --- | --- |
| Information about how you should complete this assessment can be found in Appendix A of the *IT Works Student User Guide*.Refer to the appendix for information on:   * where this task should be completed * how your assessment should be submitted.   *Note*: You must complete and submit an assessment cover sheet with your work. A template is provided in Appendix B of the Student User Guide. However, if your RTO has provided you with an assessment cover sheet, please ensure that you use that. |

**Activities**

Complete the following activities:

1. Carefully read the following:

| Atom | This assessment task requires you to install, configure and test Wide Area Networks (WAN) links on two occasions.  You can complete this project using information provided by your trainer and assessor or based on an organisation that you are familiar with or working for.  If you choose to complete the project based on a business of your choice, it is important that you can access a site where WAN links can be installed, configured and tested and network design documentation and policies and procedures pertaining to the installation and operation of a network. You must also be able to access computers including software that can be used to install and operate small enterprise branch networks and end user devices to test networks on. Speak to your assessor to get approval if you want to base this on an organisation of your choice. |
| --- | --- |
|  | You will be collecting evidence for this unit in a *Project Portfolio*. The steps you need to take are outlined below. Before you begin, complete page 4 of your *Project Portfolio*. |
|  | Assessor: this task will be best completed using network simulated software due to the impracticality of installing, configuring and testing WAN links on two occasions. So that students can complete this task you are to provide students with two different network designs, as well as requirements relating to configuring, verifying and troubleshooting WAN links and IP services for two different networks i.e. to meet the requirement to do this on two occasions. You can also vary your designs across different cohorts of students if you wish. Provide students with access to the network simulated software so that they can complete this task. Please note that a Security Policy is included in the supporting resources. This is to be used as the overall guidance for security by students completing this for the simulated network designs. You may also replace this with another security policy if desired. Make sure this is provided to students.  Where the student elects to install, configure and test WAN links for an organisation of their choice, check that the project is suitable and that they can access all the information they need. |

1. Preparation.

| Person eating | You are to plan for and prepare to install two different medium enterprise Wide Area Network (WAN) links. This will involve:   * Reviewing and reporting on network design documentation to confirm the existing network infrastructure in place. * Outlining legal and regulatory responsibilities associated with configuring, verifying and troubleshooting WAN links and IP services. * Analysing and reporting on security protocol requirements based on the existing network and associated equipment and WAN links to be added. * Developing and documenting installation plans including details prioritised tasks and contingency arrangements. * Obtaining sign off for your installation plan from your assessor.   Submit your completed Project Portfolio Section 1 to your assessor to obtain sign off for your installation plan and confirmation that you can proceed to the next activities based on your plan.  Assessor: the student needs to obtain your sign off to proceed to the next section based on the work they have completed. Provide feedback on the work they have completed on Section 1 and any adjustments to be made if required. This would be in writing preferably. Give the student approval to proceed to Section 2 once you have provided sign off. |
| --- | --- |

1. Configuration of WAN links and IP services.

| Person eating | You are to configure WAN links and IP services for the two different medium enterprise Wide Area Networks. This will involve:   * Implementing the WAN connection method as per the installation plans you have developed for each network. * Configuring and verifying the required serial WAN configuration and WAN protocols. Do this by following vendor specifications as relevant to the software you are using. * Configuring the required virtual private network (VPN) for each different medium enterprise Wide Area Network and site-to-site technology. Do this by following vendor specifications as relevant to the software you are using. * Configuring an ASDL connection as per the installation plans you have developed for each network. * Configuring, implementing and DHCP router. Do this by following vendor specifications as relevant to the software you are using. * Configuring and verifying IPv6 on both network systems. Do this by following vendor specifications as relevant to the software you are using. * Configuring and verifying NAT requirements as per the installation plans you have developed for each network.   Complete Section 2 of your Portfolio. |
| --- | --- |
|  | Assessor: see Project Portfolio Assessor Section 2 for guidance with marking. |

1. Network security.

| Person eating | You are to secure each network using router services. This will involve:   * Configure and apply ACLs according to network filtering requirements and as per the as per the installation plans you have developed for each network. * Securing access to the network router as per the installation plans you have you have developed for each network.   Complete Section 3 of your Portfolio. |
| --- | --- |
|  | Assessor: see Project Portfolio Assessor Section 3 for guidance with marking. |

1. Troubleshoot WAN links.

| Person eating | You are to troubleshoot WAN links for the two different medium enterprise Wide Area Networks. This will involve:   * Testing the WAN implementation links as per the installation plans you have you have developed for each network. * Checking whether the WAN links and work as per the installation plan service expectations. * Responding to and rectifying WAN implementation issues that you identify through the testing process. * Documenting the test results, as well as how you rectified issues.   Work on Section 4 of your Portfolio. |
| --- | --- |
|  | Assessor: see Project Portfolio Assessor Section 4 for guidance with marking noting it should be marked in full after the meeting and after the student has documented the feedback received. |

1. WAN links presentation.

| Chat | You are also to prepare a short presentation about the work that you have completed for each network that can be presented to a team for feedback. If you are completing this in your RTO, this will be to a small group of students organised by your assessor. If you are completing this based on your own business, it can be a presentation to your team at work or you can also present it to a small group of students.  Your presentation should be for approximately 10 – 15 minutes and you may choose how you present it e.g., using PowerPoints.  Provide your presentation to your team about the work you have completed. Make sure you provide your team the opportunity to provide feedback. Following the presentation, you will document the feedback in your Portfolio, as well as your response.  During the presentation, you are to use oral communication skills including:   * speaking clearly and concisely * using terminology that both technical and non-technical people can understand. * asking questions and using active listening techniques to confirm participant’s understanding of the information provided. * responding to questions as required. |
| --- | --- |
|  | This can either be viewed in person by your assessor or you may like to video record the session for your assessor to watch later. Your assessor can provide you with more details at this step. Make sure you follow the instructions above and meet the timeframes allocated.  Complete Section 4 of your Portfolio following the meeting i.e. by including the feedback you received. |
|  | Assessor: This may be held in person or online depending on the mode of delivery. Organise a date and time for each student’s presentation. If the student is completing this assessment for their own business, check if they will present their work to their team or the student group. If it is for their own team, ask them to make a recording and provide it to you so that you can assess it.  Ensure that each student knows they have a space of 10 - 15 minutes to present their work. Regarding feedback, encourage all students participating in the presentation to give feedback about the work the student presents. As other students are also completing this assessment, they will be able to provide meaningful feedback. Make sure that at least one item of feedback is provided so that the student can include this feedback in their portfolio and respond to it e.g., a way of increasing security.  You may view this in person or watch a recording. If any students did not satisfactorily participate as per the instructions above and the guidance in the checklist then they will need to redo this prior to proceeding to the next steps. |

1. Submit your completed *Project Portfolio*.

| Document | Make sure you have completed all sections of your *Project Portfolio*, answered all questions, provided enough detail as indicated and proofread for spelling and grammar as necessary.  Submit to your assessor for marking. |
| --- | --- |
|  | Assessor: see *Project Portfolio Assessor* for guidance with marking. Detailed guidance has been provided for you in all sections. |

**Assessment Task 2: Checklist**

| Student’s name: | | | | | |
| --- | --- | --- | --- | --- | --- |
| Did the student: | | Completed successfully? | | | Comments |
| Yes | No | |  |
| Plan for and prepare to install medium enterprise Wide Area Network (WAN) links including:   * reviewing existing network design documentation and determine and document currency and completeness as per the organisation’s requirements * analysing and documenting the organisation’s security protocol requirements * determining access and security requirements of required tools, equipment, software * developing and documenting installation plans, including details of prioritised tasks and contingency arrangements as per the organisation’s requirements * obtaining installation plan sign off?   As evidenced by the student’s Project Portfolio fulfilling the requirements of Project Portfolio Assessor – Section 1. | |  |  | |  |
| Configure WAN links including:   * determining WAN connection method requirements as per installation plan specifications * configuring and verifying required serial WAN configuration and WAN protocols as per vendor specifications * configuring the required virtual private network (VPN) and site-to-site technology as per vendor specifications * determining and configuring an asymmetric digital subscriber line (ADSL) connection as per installation plan specifications?   As evidenced by the student’s Project Portfolio fulfilling the requirements of Project Portfolio Assessor – Section 2. | |  |  | |  |
| Configure and verify IP services on a router including:   * configuring, implementing and verifying a Dynamic Host Configuration Protocol (DHCP) router operation as per vendor specifications * configuring and verifying internet protocol version 6 (IPv6) addressing following vendor specifications * configuring and verifying the operation of network address translation (NAT) requirements as per installation plan specifications?   As evidenced by the student’s Project Portfolio fulfilling the requirements of Project Portfolio Assessor – Section 2. | |  |  | |  |
| Secure a network using router services including:   * determining the purpose and types of access control lists (ACLs) as per installation plan specifications * configuring and applying ACLs as per network filtering requirements * securing access to the network router as per installation plan specifications?   As evidenced by the student’s Project Portfolio fulfilling the requirements of Project Portfolio Assessor – Section 3. | |  |  | |  |
| Troubleshoot medium enterprise WAN links including:   * testing WAN implementation links and aligning to installation plan service expectations * responding to and then rectifying identified WAN implementation issues * documenting test results and rectification methods as per installation plan specifications * documenting finalised WAN solutions * seeking and responding to feedback from required personnel?   As evidenced by the student’s Project Portfolio fulfilling the requirements of Project Portfolio Assessor – Section 4. | |  |  | |  |
| Demonstrate oral communication skills, including:   * speaking clearly and concisely and using terminology that both technical and non-technical people can understand   You can understand what is said.  All stakeholders understand the information being presented.  Summarises information succinctly.   * asking questions to confirm participant’s understanding of the information provided   Asks relevant questions e.g., is the information I presented clear enough.   * Using active listening skills to confirm participant’s understanding of the information provided   Provides others a chance to speak without interrupting.  Rephrases what has been said.  Asks questions to confirm understanding.   * responding to questions as required?   Responds appropriately.  As evidenced by the student’s presentation as per the instructions for Activity 2.6. | |  |  | |  |
| Task outcome: | * Satisfactory | | | * Not satisfactory | |
| Assessor signature: |  | | | | |
| Assessor name: |  | | | | |
| Date: |  | | | | |

**Final Results Record**

| Student name: |  |
| --- | --- |
| Assessor name: |  |
| Date |  |

**Final assessment results**

| Task | Type | Result | | |
| --- | --- | --- | --- | --- |
| Satisfactory | Unsatisfactory | Did not submit |
| Assessment Task 1 | Knowledge questions | S | U | DNS |
| Assessment Task 2 | Project Portfolio | S | U | DNS |
| Overall unit results |  | C | NYC |  |

**Feedback**

* My performance in this unit has been discussed and explained to me.
* I would like to appeal this assessment decision.

Student signature: Date:

* I hereby certify that this student has been assessed by me and that the assessment has been carried out according to the required assessment procedures.

Assessor signature: Date: