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**Internal Assessment Resource**

**Digital Technologies & Hangarau Matihiko Level 2**

This resource supports assessment against Achievement Standard 918951

**Standard title:**  Use advanced techniques to develop a network

**Credits:** 4

**Resource title:** LAN PARTY in the House!

**Resource reference:** Digital Technologies & Hangarau Matihiko2.6A

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| This resource:   * Clarifies the requirements of the achievement standard * Supports good assessment practice * Should be subjected to the school’s usual assessment quality assurance process * Should be modified to make the context relevant to students in their school/kura environment and ensure that submitted evidence is authentic |

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| Date version published by Ministry of Education | December 2018 Version 1  To support internal assessment from 2019 |
| Authenticity of evidence | Teachers/kaiako must manage authenticity for any assessment from a public source, because students may have access to the assessment schedule or student exemplar material.  Using this assessment resource without modification may mean that students’ work is not authentic. The teacher may need to change figures, measurements or data sources or set a different context or topic to be investigated or a different text to read or perform. |

*1Achievement Standard 91895 is derived from both The New Zealand Curriculum and Te Marautanga o Aotearoa.*

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**Teacher/Kaiako guidelines**

The following guidelines are supplied to enable teachers/kaiako to carry out valid and consistent assessment using this internal assessment resource.

Teachers/kaiako need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing students/ākonga against it.

**Context/Te Horopaki**

The assessment activity requires students to build a refined gaming network using advanced techniques.

To set up a gaming network for local gaming you will need a network switch/hub, some Ethernet cables, and each computer must have a network adapter.

There is the discussion about playing LAN games via wireless and students can discuss and propose options to deal with this. They will probably agree that network performance and the least amount of lag is more important.

Most of the gear in this assessment task can be easily sourced from equipment redundant at school or at very low cost from outside sources.

Students will be able to make some informed decisions with regard to hubs and switches for a gaming LAN, e.g. inspecting the data packets and conservation of network bandwidth.

Students will need to make a decision about configurations e.g. DHCP or hard setting an IP, IPX or TCP/IP. Set up the game server and client machines.

If teacher/students wanted to extend the task they could connect to an online game, but this may involve permissions through your network admin at school.

This assessment has been developed to work as a standalone but could also be used in a mixed class setting. For example: Students could build and configure standalone machines (Level 1), create a Network (Level 2), and use a Raspberry Pi to monitor the LAN (Level 3).

This assessment is about students’ ability to use tools and techniques and their understanding. Students can access help.

Note: This assessment determines their ability to know the how and why of what they are doing, not their ability to follow an internet tutorial.

This task will allow students to investigate, select, install (hardware components and software) and then configure and troubleshoot the outcome. In this assessment, the outcome is to set up and configure a LAN with a set number of client machines.

For this particular assessment you will need:

**Basic Hardware selection:**

Router/switch/hub

PC’s/Laptops (number depends on port access)

Cabling

Network Cards (to be configured)

Power equipment (liaise with your Network or Electrical safety technicians)

A game server PC

**Basic Software selections:**

Configuration files

Check to see if the games you want to play support LAN play

Licensing considerations

D-LAN (shared files software)

**Basic configurations:**

Creating and accessing shared folders

Network monitoring

Enabling and disabling adaptors

Network Stack order

Connectivity verification

**Conditions/Ngā Tikanga**

It is recommended that students should have at least two identified checkpoints with their teacher as they work through this assessment activity to ensure they have an opportunity to ask questions and gather feedback.

Conditions of Assessment related to this achievement standard can be found at <http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>

**Resource requirements/Ngā Rauemi**

Students will need access to the web, digital devices and information from a variety of sources, such as: current or historical news articles or stories, and/or notes from textbooks, radio segments. Community contacts and relevant industry/businesses could also be used as a reference source.

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**Student/Akonga instructions**

**Introduction/Kupu Arataki**

This assessment activity requires you to use advanced tools and techniques and your understanding to develop a LAN for network gaming.

This is not an online game network. This is a standalone offline LAN.

You can access help and are encouraged to do so. This assessment is about your ability to show the how and why of what you are doing, not your ability to follow an internet tutorial. Following a tutorial will not meet the requirements of the standard. The standard is assessing the application of knowledge and skills, not just a completed outcome.

Teacher note: Insert due dates and timeframes/milestones

**Information before you start**

This is not an online game network. This is a standalone offline LAN. This means it must have a game server set up and running for at least two or more client machines.

You are to develop a LAN gaming network that can connect to a server running a game.

You will be expected to install and configure a range of protocols and software to create a system that is fit for purpose.

You will be provided with some hardware to create a basic LAN (e.g. 2-3 player or more depending on resources and rooming).

Things to think about as you proceed.

* How will you make software and hardware selections to develop your outcome?
* How will you show that you were able to use appropriate tools, procedures and protocols to install and configure hardware, software and peripherals?
* How will you show that you were able to diagnose, test and troubleshoot your hardware and software throughout your development process?
* How will you clearly demonstrate throughout your development process that you have an understanding of relevant tools, procedures and protocols?
* How will you show that you explained and addressed the relevant implications of the outcome?

You will need to be familiar with the hardware and software and will need to be able to link this into some wider infrastructure knowledge so you can justify your decision making.

There are a number of procedures you will need to think about in order to configure, test, diagnose, and troubleshoot to resolve any faults you meet in this project such as:

* Configuring and setting up the game server
* Configuring switch/hub/router
* Configuring and testing network connectivity
* Installing appropriate software to test the system.

You can present this information in a variety of ways, but it does need to be recorded and evidenced. It is important you regularly check in with your teacher to demonstrate your learning.

You are going to be assessed on your ability to:

* show an understanding of the parts and components selected
* install, test and configure your selected hardware
* install, test and configure your selected software
* show how you have explained and addressed relevant implications and met end-user requirements
* show accuracy with using tools, procedures and protocols to refine your project
* explain the what, why and how of your LAN (e.g. the purpose and function of the parts of components)
* ensure your outcome is fit for purpose by justifying your selections.

You may work with others to help generate ideas and develop those ideas. However, you will be expected to show your own thinking and evidence of how you discussed and combined ideas together to write and submit your own assessment evidence.

**Task/Hei Mahi**

You are required to build a standalone offline gaming network.

You will need to:

1. Record your development process undertaken (e.g. photos, notes, printscreens etc.) of the stages as you move through and clearly annotate to show you accurately using
   * 1. tools, procedures and protocols and the improvements or refinements made throughout your gaming network
     2. appropriate testing procedures, diagnosing and troubleshooting to identify and resolve setup and configuration errors.
2. Investigate and explain the parts and components and their purpose and function (both hardware and software) to be used for the gaming network.
3. Explain and address at least three relevant implications of the network and link these implications to your gaming network outcome. These could be accessibility, intellectual property considerations and end-user requirements, for example, although you may select other ones that you determined were relevant.
4. Test your selected parts and components (both hardware and software) and identify and resolve setup and configuration errors to ensure that the network outcome
   * functions as intended
   * is reliable
   * is accurately constructed and meets end-user requirements

You should document the tests you performed, and any modifications because of those tests.

1. Use information gained from your testing procedures, diagnosing and troubleshooting to inform further development and improve the quality of the gaming network.
2. Justify your choice of parts and components (hardware and software) selections.

**Assessment schedule/Mahere Aromatawai: Digital Technologies & Hangarau Matihiko 91895 – LAN PARTY in the House!**

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| **Evidence/Judgements for Achievement/Paetae** | **Evidence/Judgements for Achievement with Merit/Kaiaka** | **Evidence/Judgements for Achievement with Excellence/Kairangi** |
| Use advanced techniques to develop a network.  The student has:   * used appropriate tools, procedures and protocols to install and configure hardware (including Peripherals) and software   **For example (partial evidence):**  *“I connected the server to the switch, and the clients to the switch. I then drew a diagram of the possible topology with IP and gateways. I then configured the IP addresses for the server and the clients.”*   * undertaken a range of appropriate testing procedures, diagnosing and troubleshooting to identify and resolve setup and configuration errors   **For example (partial evidence):**  *“I set-up the server but could not connect to it via a switch. I unplugged the switch and plugged it in again. As a first step, this is a simple troubleshoot, that can often be overlooked."*  *“Everyone was connected to the same network, but I still cannot connect. I used ipconfig to check the IP which was set for my home network. I then changed the IP address to the correct one for this network, ie 10.1.1.10 needed to be 192.168.0.4.”*   * investigated the parts and components (hardware and software) to be used   **For example (partial evidence):**  *“I looked at a number of network hubs and switches. I chose Netgear as it's very easy to set up compared to Linksys but there have been confirmed security issues with them.”*  *“The network cable that was used to plug into the port had been lying around. When tested with a network cable tester it was found to not work properly as the cable had been damaged.”*   * explained relevant implications   **For example (partial evidence):**  *"I will need to ensure that any games loaded on to my LAN are licensed to use. This is because the software has been developed by commercial providers that get income from that software so therefore hold the intellectual property rights …"*  *"Any games we put on our server need to meet the rules of the age range of the user. This is because we don’t want to expose minors to….”*  *The examples above are indicative samples only* | Use advanced techniques to develop an informed network.  The student has:   * used information gained from testing procedures, diagnosing and troubleshooting to inform further development and improve the quality of the specified network   **For example (partial evidence):**  *"After configuring and testing the LAN I wanted to analyse my network performance."*  The student downloaded Wireshark and started to investigate different packet types, e.g. *"In Wireshark I went to Analyze --> Expert Info.*  *I saw there were a high number of errors and warnings… after troubleshooting I reran the capture and found my error count had decreased a lot."*  *“It was found that the computer was finding the home wireless signal and that the network card had been disabled to allow the use of the wired connection.”*   * explained the purpose and function of the parts and components (hardware and software)   **For example (partial evidence):**  *"Part of the LAN is using a switch or a hub to organise traffic. A switch is a computer networking device that connects devices together on a computer network by using packet switching to receive, process, and forward data to the destination device and the purpose of a switch on my gaming network is to... A hub is…. and the hub is used for… etc."*   * addressed relevant implications   **For example (partial evidence):**  *“I wanted to set up proprietary gaming software on the LAN, but we didn’t have the licence. My friends had licences that were not legit on their machines, and I refused to use them to test the game LAN as they were not legitimate copies. Instead, I used a simple open source game. Intellectual property is an implication I considered because…”*  *“The game that we were going to play was R18 and we are not old enough to be able to play that game legally. This was addressed by us choosing a game that was at least an M rating or R16 rated. There was some confusion over this because of the American and NZ rating systems, but after research we found that M rating is actually age 17+ so we changed again to make it R16.”*  *The examples above are indicative samples only* | Use advanced techniques to develop a refined network.  The student has:   * accurately used tools, procedures and protocols to ensure the outcome meets end-user requirements * justified the choice of parts and components (hardware and software).   **For example (partial evidence):**  *“The teacher could observe the student configuring the server setup, and question the student on what they were doing, and why. They can ask detailed questions to test the knowledge of the students from a bank of questions.*  *The teacher could also query the students on particular selections.*  *For example:*  *“Why did you use this particular component?*  *“... unlike hubs, network switches are capable of inspecting the data packets as they are received, determining the source and destination device of that packet, and forwarding that packet appropriately. By delivering messages only to the connected device that it was intended for, network switches conserve network bandwidth and offer generally better performance than hubs.”*  *“The server folder setup was for read only, this meant that if one of the client computers had a virus that it would affect the server computer and not be shared to the other client computers.”*  *“The setup was for cable, rather than wireless, as cable is able to put through 100mbps to 1000mbps based upon the specification on the switch. This allows for better performance and reduced ping.”*  *Alternatively, the teacher could have students face a dragons den of other students where they ask a series of questions to test the knowledge of the students/group of students. This could be annotated or filmed for evidence.*  *The examples above are indicative samples only* |

Final grades will be decided using professional judgement based on a holistic examination of the evidence provided against the criteria in the achievement standard