COM7013

Network Security

Portfolio

Date for Submission: Please refer to the timetable on ilearn

(The submission portal on ilearn will close at 14:00 UK time on the date of submission)

Assignment Brief

As part of the formal assessment for the programme you are required to submit a **Network Security** assignment. Please refer to your Student Handbook for full details of the programme assessment scheme and general information on preparing and submitting assignments.

Learning Outcomes:

After completing the module, you should be able to:

1. Select and deploy appropriate network defence tools, mechanisms, protocols and methodologies against adaptive attack vectors in existing and emerging network architectures.

2. Critically evaluate security technology components that can address security issues in the context of creating resilient network architecture solutions.

3. Evaluate own network security engineering skills in relation to industry requirements

Graduate Attributes:
Contextually Innovative

4. Identify and solve novel and complex problems related to aims and desired outcomes. Critically evaluate and reflect on the approaches and solutions identifying and embedding possibilities for originality or creativity.

All learning outcomes must be met to pass the module.

Guidance

Your assignment should include: a title page containing your student number, the module name, the submission deadline and the exact word count of your submitted document; the appendices if relevant; and a reference list in (see referencing section for more information). You should address all the elements of the assignment task listed below. Please note that tutors will use the assessment criteria set out below in assessing your work.

You must not include your name in your submission because Arden University operates anonymous marking, which means that markers should not be aware of the identity of the student. However, please do not forget to include your STU number.

Maximum word count: 3000 words

Please refer to the full word count policy which can be found in the Student Policies section here: Arden University | Regulatory Framework.

Please note the following: Students are required to indicate the exact word count on the title page of the assessment.

The word count includes everything in the main body of the assessment (including in text citations and references). The word count excludes ***numerical data in tables***, ***figures, diagrams, footnotes, reference list and appendices. ALL other printed words ARE included in the word count.***

Please note that exceeding the word count by over 10% will result in a 10-percentage point deduction.

Assignment Task

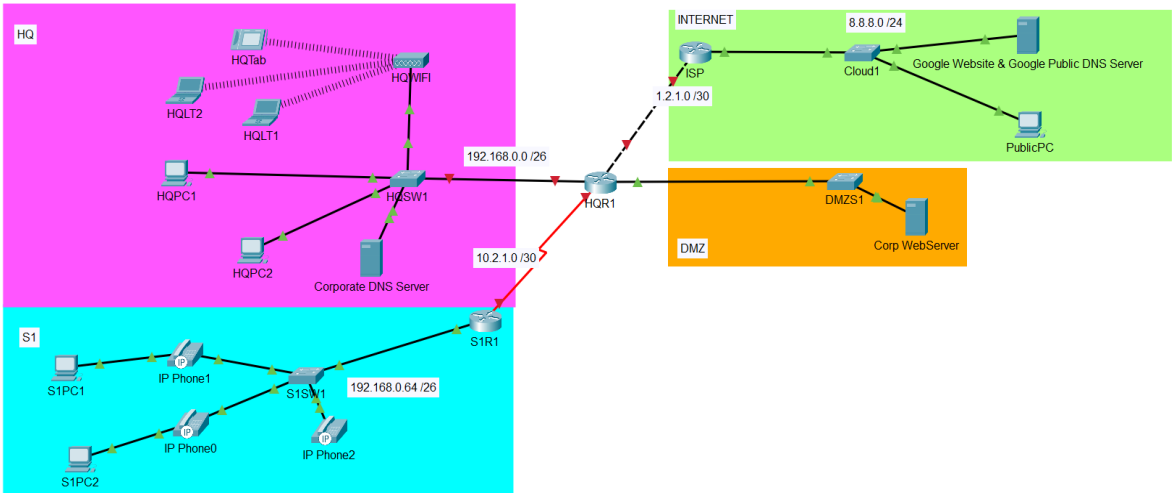
Your manager has just returned from a conference on network security and has asked you to investigate the organisational network security posture.

The current network consists of a 2-site design consisting of a Head Office (HQ) and a separate site (S1). The locations are currently interconnected via point to point leased lines. HQ also has a single-homed connection to the Internet and a separate subnet for public access to the Corp WebSite.

Please use this Packet Tracer File:

PoC Company Network [3503].pkt

The current network topology can be accessed in the above packet tracer file and can be seen below:



Your company is looking to expand and open a new site (S2) which will initially contain Sales, Finance and HR teams. Initial staff numbers can be seen below:

Department	Number of staff
Finance	6
HR	12
Sales	20

Table 1: Staff in departments

HQR1 has recently suffered from lost and corrupt configuration which is currently been investigated as a possible security breach.

You have been tasked to build a PoC network design for the new LAN topology and also reconfigure the original network, within its current design, to minimise vulnerabilities taking into consideration current guidance from CISA Securing Network Infrastructure Devices | CISA.

Below are the security requirements:

New LAN

- All department traffic should be isolated from each other.
- Security best practices applied at Layer 2.
- Sales should not be allowed to access the Finance network.
- Secure network for management of switches, only accessible by the IT devices in HQ.
- All network devices should be secured following best practices.
- Access to the Internet for Sales only
- Resilient links where appropriate

Site to Site Networks

- Implement appropriate security controls at Layer 3.

Network Perimeter

- All traffic entering the Corporate network should be secured.
- Public traffic should only be able to access the CorpWeb Server.
- All Internet traffic is via HQ

Part 1: Project

Within the constraints of the current topology create a network design to demonstrate a solution in the selection and configuration of network security controls and measures for the above scenario.

- New Secure LAN Design
    - Within the given packet tracer file, implement an appropriate secure LAN design for the new office (S2) taking into consideration the security requirements detailed above.
- Secure Current Network
    - Within the given packet tracer file, without changing the underlying topology reconfigure the original network devices for HQ and S1 to take into consideration any incorrect configuration and security requirements detailed above.

Create appropriate documentation that records the security controls implemented, including models of secure configuration of the components and devices. This should also include screenshots of the tests undertaken to validate security controls. Include this as Appendix A in the Part 2 Technical report

(1800 Words Equivalent)
(60 Marks)
(LOs: LO1, LO4)

Part 2: Technical Report

Write a report containing a critical appraisal of the solution given in Part 1 evaluated against both current and emerging network attack vectors and the changing threat landscape. The report should:

- defend the security controls, protocols, countermeasures and design technique recommendations and implications for development within these areas.
- formulate an optimal solution if the limitations of the current topology and PoC software were removed with regards to the threat landscapes identified and modelled.
- acknowledge any financial implications for each of the above but it is not expected that detailed financial information is provided
- Give a reflective evaluation of the implications of conducting this investigation and development for your learning on this programme

(1200 Words)
(40 Marks)
(LOs: LO2, LO3)

Your final submission should include a completed packet tracer file and a report.

Ensure to evidence the use of security models, frameworks, standards and other relevant sources to support your argument throughout the entire assessment. These should not only be from the module but your own research and documented using the AU Harvard system.

End of Questions

Formative Feedback

You have the opportunity to submit a draft report to receive formative feedback.

The feedback is designed to help you develop areas of your work and it helps you develop your skills as an independent learner.

If you are a distance learning student, you should submit your work, by email, to your tutor, no later than 2 weeks before the actual submission deadline. If you are a blended learning student, your tutor will give you a deadline for formative feedback and further details.

Formative feedback will not be given to work submitted after the above date or the date specified by your tutor - if a blended learning student.

Referencing Guidance

You **MUST** underpin your analysis and evaluation of the key issues with appropriate and wide ranging academic research and ensure this is referenced using the AU Harvard system(s).

Follow this link to find the referencing guides for your subject: Arden Library

Submission Guidance

Assignments submitted late will not be accepted and will be marked as a 0% fail.

Your assessment can be submitted as a single Word (MS Word) or PDF file, or, as multiple files.

If you chose to submit multiple files, you must name each document as the question/part you are answering along with your student number ie Q1 Section A STUXXXX. **If you wish to overwrite your submission or one of your submissions, you must ensure that your new submission is named exactly the same as the previous in order for the system to overwrite it.**

You must ensure that the submitted assignment is all your own work and that all sources used are correctly attributed. Penalties apply to assignments which show evidence of academic unfair practice. (See the Student Handbook which is available on the A-Z key information on iLearn.)

Assessment Criteria (Learning objectives covered – all.

Level 7 is characterised by an expectation of students' expertise in their specialism. Students are semi-autonomous, demonstrating independence in the negotiation of assessment tasks (including the major project) and the ability to evaluate, challenge, modify and develop theory and practice. Students are expected to demonstrate an ability to isolate and focus on the significant features of problems and to offer synthetic and coherent solutions, with some students producing original or innovative work in their specialism that is potentially worthy of publication by Arden University. A clear appreciation of ethical considerations (as appropriate) is also a prerequisite.		
Grade	**Mark Bands**	**Generic Assessment Criteria**
Distinction	80%+	Outstanding analysis of key issues and concepts/. Outstanding development of conceptual structures and argument, making consistent use of scholarly conventions. Outstanding *research skills, independence of thought, an extremely high level of intellectual rigour and consistency, exceptional expressive / professional skills, and outstanding creativity and originality.* Outstanding *academic/intellectual skills. Work pushes the boundaries of the discipline and* demonstrates an awareness of relevant ethical considerations. *Work may be considered for publication by Arden university*.
	70-79%	Excellent analysis of key issues and concepts/. Excellent development of conceptual structures and argument, making consistent use of scholarly conventions. *Excellent research skills, independence of thought, an extremely high level of intellectual rigour and consistency, exceptional expressive / professional skills, and substantial creativity and originality.* *Excellent academic/intellectual skills. Work pushes the boundaries of the discipline and* demonstrates an awareness of relevant ethical considerations. *Work may be considered for publication by Arden university*..
Merit	60-69%	Very good level of competence demonstrated. High level of theory application. Very good analysis of key issues and concepts. Development of conceptual structures and argument making consistent use of scholarly conventions. Some evidence of original thought and a general awareness of relevant ethical considerations.
Pass	55-59%	A good performance. A good knowledge of key issues and concepts. Fairly descriptive, with some analysis of existing scholarly material, and some argument development. Limited evidence of original thought. Some awareness of relevant ethical considerations. Good professional skills (where appropriate).
Pass	50-54%	A satisfactory performance. Basic knowledge of key issues and concepts. Generally descriptive, with restricted analysis of existing scholarly material and little argument development. Use of scholarly conventions inconsistent. The work lacks original thought. Limited awareness of relevant ethical considerations. Satisfactory professional skills (where appropriate).
Marginal Fail	40-49%	*Limited research skills impede use of learning resources and problem solving. Significant problems with* structure/accuracy in expression. *Very weak a*cademic professional skills*. Limited use of scholarly conventions.* Errors in expression and the work may lack structure

		overall
	39% and below	A poor performance in which there are substantial gaps in knowledge and understanding, underpinning theory and ethical considerations. *Little evidence of research skills, use of learning resources and problem solving. Major problems with* structure/ accuracy in expression. Professional skills not present. *Very weak a*cademic professional skills*. No evidence of use of scholarly conventions.*

Marking Rubric

Part 1: Project (60 Marks)

Assessment Criteria Section	Outstanding 80% and above	Excellent 70 – 79%	Good 60 - 69%	Pass 50 – 59%	Insufficient 40 – 49%	Incomplete <39%
New LAN Design (40%) • Build a network to security specifications. • Consideration of industry best practices.	Demonstrates an exceptional understanding of Network Security design principles, security controls and industry best practices clearly and accurately applied.	Demonstrates an excellent understanding of Network Security design principles, accurately applied.	Demonstrates a good understanding of Network Security design principles, with minimal issues around accuracy or clarity.	Demonstrates an acceptable understanding of Network Security design principles, with a number of issues around accuracy or clarity.	Insufficient demonstration of an appropriate understanding of Network Security design principles.	Largely incomplete elements, or not clearly related to Network Security design principles
Current Network Security (40%). • Apply network security solutions to existing network configuration • Evidence of industry best practices	Demonstrates an exceptional understanding of Network Security techniques and configuration and related best practices are clearly applied at a professional level.	Demonstrates an excellent understanding of Network Security techniques and configuration and related best practices are applied at a very high level	Demonstrates a good understanding of Network Security techniques and configuration and related best practices are applied to a very good level with minimal issues around accuracy or clarity.	Demonstrates an acceptable understanding of Network Security configuration but with a number of issues around configuration and the application of best practice.	Insufficient demonstration of an appropriate understanding of Network Security, configuration or best practice.	Largely incomplete elements, or not clearly related to Network Security configuration
Documentation (20%) • Documentation of security technology components, protocols and design choices. • Validation that controls protect against attack vectors.	Demonstrates an exceptional understanding of Network Security documentation and testing, clearly and accurately applied at a professional level	Demonstrates an excellent understanding of Network Security documentation and testing, accurately applied at a very high level.	Demonstrates a very good understanding of Network Security documentation and testing, with minimal issues around accuracy or clarity.	Demonstrates an acceptable understanding of Network Security documentation and testing, with a number of issues around accuracy or clarity.	Fails to demonstrate an appropriate understanding of Network Security documentation and testing.	No attempt at this element, or not clearly related to Network Security documentation and testing

Part 2: Technical Report (40 Marks)

Assessment Criteria Section	Outstanding 80% and above	Excellent 70 – 79%	Good 60 - 69%	Pass 50 – 59%	Insufficient 40 – 49%	Incomplete <39%
Report (80%) • Defence of chosen solution including an evaluation of limitations and recommendations to improve current network design	Exceptional examination with a strong, well defended argument supported with highly competent conclusions Rigorous and sustained discussions with excellent examples and evidence of research. Excellent thinking, logical and creative with insightful recommendations	Excellent examination with a well-organised argument and competent conclusion Accurate and consistent justifications using a range of examples and research. Very good argument that is articulated clearly with realistic recommendations	Very good examination, in part supported with some argument and conclusions Relevant justifications with an adequate level of examples although with some inconsistencies. Logical with some defence of solution	Evidence of questioning and organisation of argument. There is some evidence of analysis and evaluation, but work is mainly unsupported with an uncritical acceptance of information. Lack of logical development of an argument	Insufficient evidence of argument, with only superficial questioning. Work is entirely or almost entirely unsupported, showing little or no evidence of analysis. Has accepted information uncritically	Incomplete evidence of analysis. Major gaps in knowledge and unsubstantiated opinions.
Reflection on learning development (20%)	An exceptionally detailed reflection, which investigates various skill development pathways and examines a variety of potential actions.	An excellent reflection, which explores relevant development pathways and a number of potential actions.	A good reflection, which skill development and a number of potential actions	A clear reflection, which considers skill development and possible actions	A basic reflection, describing outcomes and development, without clearly considering requirements or describing realistic actions	No clear reflection on investigation outcomes or development