

**ASSIGNMENT/ TUGASAN**

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**CBCN4103  
INTRODUCTION TO NETWORKING  
MAY 2025**

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***SPECIFIC INSTRUCTION / ARAHAN KHUSUS***

1. Answer in **ENGLISH**.
2. Number of words: **2500 – 3000 words excluding** references.
3. Submit your assignment **ONCE** only in a **SINGLE** file.
4. Submit your assignment **ONLINE**.
5. Submission date:
6. This assignment accounts for **60%** of the total marks for the course.

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## **ASSIGNMENT QUESTION**

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### **PURPOSE**

Identify the appropriate technologies, infrastructures and services for an optimum network environment based on a specific situation.

### **REQUIREMENT**

Crisis Guard Technologies (CGT) is a premier disaster recovery site provider in Malaysia. CGT leverages advanced technology to deliver robust and secure disaster recovery solutions for businesses across the nation. As a leading provider in the industry, they take pride in offering reliable and efficient services that ensure business continuity during unexpected disruptions. At the core of CGT's operations is a state-of-the-art, cloud-based disaster recovery infrastructure. They operate multiple recovery sites strategically located throughout Malaysia to guarantee rapid response, reliability, and scalability for their clients. This distributed approach minimises downtime, providing businesses with peace of mind and ensuring uninterrupted operations even in the face of disaster.

Due to its successful disaster recovery solutions, a huge number of demands have been coming from clients in the other TEN South East Asia countries. The management of CGT has decided to expand its service in Malaysia to reach up to the TEN South East Asia countries. As the Senior Network Engineer in CGT, you are tasked with upgrading the existing network infrastructure for CGT.

- Describe THREE aspects of the EXISTING HQ's network infrastructure in Selangor (TEN floors). Examples of these aspects are (but not restricted to):
  - a. Topologies (e.g. bus, star, ring) used with scenarios explanation
  - b. Networking devices (e.g. bridge, switch, AP, router, gateway) used with scenarios explanation
  - c. Communication media (e.g. coaxial cable, UTP, STP, fibre optics, WiFi) used with scenarios explanation
- Describe THREE aspects of the EXISTING disaster recovery site (only ONE disaster recovery site to be discussed). Examples of these aspects are (but not restricted to):

- a. Network architecture (e.g. arrangement of network devices and how they are interconnected) used with scenarios explanation
- b. Load balancing (e.g. traffic distribution, types, redundancy) used with scenarios explanation
- c. Network monitoring (e.g. traffic analysis, performance monitoring, alerts and notifications) used with scenarios explanation
- Propose THREE upgrading solutions for the HQ (TEN floors). Your proposal MUST be based on upgrading the existing HQ network infrastructure you have discussed above. Provide detail justifications for your proposal with scenarios explanation.
- Propose THREE upgrading solutions for the disaster recovery site (only ONE disaster recovery site to be discussed). Your proposal MUST be based on upgrading the existing disaster recovery site network infrastructure you have discussed above. Provide detailed justifications for your proposal with scenarios explanation.
- Propose THREE solutions for the WAN network infrastructure of the organisation, whereby the HQ and TEN disaster recovery sites from each country in South East Asia are to be connected together. Provide detail justifications for your proposal with scenarios explanation. Example of proposed solutions are (but not restricted to):
  - a. Network optimisation (e.g. compression, caching, optimisation protocol)
  - b. Connections (e.g. broadband, SONET, MPLS)
  - c. Security measures (e.g. firewalls, IDS, encryption, VPN)

You are also required to provide network diagrams and IP addressing scheme using any software for creating a network diagram (Do NOT use Microsoft Word, Microsoft Excel and Microsoft PowerPoint. Suggestions: Network Notepad, CADE, Dia and Diagram Designer).

- Provide an IP addressing scheme using subnetting. You may use any private IP address class (10.0.0.0 to 10.255.255.255, 172.16.0.0 to 172.31.255.255 or 192.168.0.0 to 192.168.255.255). IP addressing schemes using subnetting should be provided for the:
  - a. HQ with TEN floors. Each floor is to have its own subnet. Provide network address, broadcast address and the range of usable IP address for each floor.
  - b. Only ONE disaster recovery site with a minimum of TWENTY hosts per subnet. Create a minimum of TEN subnets. Provide network address, broadcast address and the range of usable IP address for each subnet.

- Description of the network diagram software
  - a. Detailed description of the network diagram software used
  - b. Screenshots and explanation of the steps in creating the network diagrams using the software (minimum THREE steps)
  - c. Network diagram for the HQ (minimum TEN floors)
  - d. Network diagram for the data centre (only ONE data centre with a minimum of TEN subnets)
  - e. Network diagram for the connections between the HQ and TEN data centres from each country in South East Asia

These network diagrams **MUST** be your own work (do NOT copy from any sources). Attach these diagrams in your report.

Please refer to the rubrics for all the needed requirements. Use the rubrics to format your report (e.g. headers, sub headers).

**Total: 60 marks]**

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***END OF PAGE***

## ASSIGNMENT RUBRICS

## CBCN4103 INTRODUCTION TO NETWORKING

*QN/ *NS	CLO	Criteria	Weight	Excellent	Good	Fair	Poor	Unsatisfactory	Max Marks
				4	3	2	1	0	
1	2	Describe THREE aspects of the EXISTING HQ's network infrastructure in Selangor (TEN floors). Examples of these aspects are (but not restricted to): <ul style="list-style-type: none"> <li>• Topologies (e.g. bus, star, ring) used with scenarios explanation</li> <li>• Networking devices (e.g. bridge, switch, AP, router, gateway) used with scenarios explanation</li> <li>• Communication media (e.g. coaxial cable, UTP, STP, fibre optics, WiFi) used with scenarios explanation</li> </ul>	1.5	Provided introduction that clearly met the details of the criteria.	Provided introduction that mostly met the details of the criteria, but it can be improved further.	Provided introduction that basically/ minimally met the details of the criteria.	Provided introduction that poorly met the details of the criteria.	No introduction was given.	6
1	2	Describe THREE aspects of the EXISTING disaster recovery site (only ONE disaster recovery site to be discussed). Examples of these aspects are (but not restricted to): <ul style="list-style-type: none"> <li>• Network architecture (e.g. arrangement of network devices and how they are interconnected) used with scenarios explanation</li> <li>• Load balancing (e.g. traffic distribution, types, redundancy) used with scenarios explanation</li> <li>• Network monitoring (e.g. traffic analysis, performance monitoring, alerts and notifications) used with scenarios explanation</li> </ul>	1.5	Provided answers that clearly met the details of the criteria.	Provided answers that mostly met the details of the criteria, but it can be improved further.	Provided answers that basically/ minimally met the details of the criteria.	Provided answers that poorly met the details of the criteria.	No answer was given.	6
1	2	Propose THREE upgrading solutions for the HQ (TEN floors). Your proposal MUST be based on upgrading the existing HQ	1.5	Provided answers that clearly met the details of the criteria.	Provided answers that mostly met the details of the criteria	Provided answers that basically/	Provided answers that poorly met the	No answer was given.	6

		network infrastructure you have discussed above. Provide detail justifications for your proposal with scenario explanations.			but it can be improved further.	minimally met the details of the criteria.	details of the criteria.		
1	2	Propose THREE upgrading solutions for the disaster recovery site (only ONE disaster recovery site to be discussed). Your proposal MUST be based on upgrading the existing disaster recovery site network infrastructure you have discussed above. Provide detailed justifications for your proposal with scenario explanations.	1.5	Provided answers that clearly met the details of the criteria.	Provided answers that mostly met the details of the criteria but it can be improved further.	Provided answers that basically/ minimally met the details of the criteria.	Provided answers that poorly met the details of the criteria.	No answer was given.	6
1	2	Propose THREE solutions for the WAN network infrastructure of the organisation, where by the HQ and TEN disaster recovery sites from each country in South East Asia are to be connected together. Provide detail justifications for your proposal with scenario explanations. Example of proposed solutions are (but not restricted to): <ul style="list-style-type: none"> <li>• Network optimisation (e.g. compression, caching, optimisation protocol)</li> <li>• Connections (e.g. broadband, SONET, MPLS)</li> <li>• Security measures (e.g. firewalls, IDS, encryption, VPN)</li> </ul>	2.0	Provided answers that clearly met the details of the criteria.	Provided answers that mostly met the details of the criteria but it can be improved further.	Provided answers that basically/ minimally met the details of the criteria.	Provided answers that poorly met the details of the criteria.	No answer was given.	8
1	2	Provide an IP addressing scheme using subnetting. You may use any private IP address class (10.0.0.0 to 10.255.255.255, 172.16.0.0 to 172.31.255.255 or 192.168.0.0 to 192.168.255.255). IP addressing schemes using subnetting should be provided for the:	2.0	Provided answers that clearly met the details of the criteria.	Provided answers that mostly met the details of the criteria but it can be improved further.	Provided answers that basically/ minimally met the details of the criteria.	Provided answers that poorly met the details of the criteria.	No answer was given.	8

		<ul style="list-style-type: none"> <li>• HQ with TEN floors. Each floor is to have its own subnet. Provide network address, broadcast address and the range of usable IP address for each floor.</li> <li>• ONE disaster recovery site with a minimum of TWENTY hosts per subnet. Create a minimum of TEN subnets. Provide network address, broadcast address and the range of usable IP address for each subnet.</li> </ul>							
1	2	<p>Description of the network diagram software</p> <ul style="list-style-type: none"> <li>• Detailed description of the network diagram software used</li> <li>• Screenshots and explanation of the steps in creating the network diagrams using the software (minimum THREE steps)</li> <li>• Network diagram for the HQ (minimum FIVE floors)</li> <li>• Network diagram for the data centre (only ONE data centre with a minimum of TEN floors)</li> <li>• Network diagram for the connections between the HQ and TEN data centres from each country in South East Asia</li> </ul>	2.5	Provided answers that clearly met the details of the criteria.	Provided answers that mostly met the details of the criteria but it can be improved further.	Provided answers that basically/ minimally met the details of the criteria.	Provided answers that poorly met the details of the criteria.	No answer was given.	10
1	3	<p>(Rubric for Network Diagram)</p> <p>Autonomy &amp; engagement</p> <ul style="list-style-type: none"> <li>• Independent in doing tasks</li> <li>• Engagement, focus, and confidence in carrying out tasks.</li> </ul>	1.0	Shows excellent understanding of experiments procedure and theory taught. Shows excellent performance with unusual energy, is very focused, shows confidence and	Shows good understanding of experiments procedure and theory taught. Shows good performance with confident, energy and commitment.	Show fair understanding of experiments procedure and theory taught. Performs with fair energy, focus and commitment.	Show minimal understanding of experiments procedure and theory taught. Performs with minimal energy, focus and commitment.	Shows no understanding of experiments procedure and theory taught. Performs with little energy, focus and no commitment -needs support.	4

				full commitment.					
1	3	(Rubric for Network Diagram) Readability, consistency, and naming • Configuration style, easy to read and maintain. Consistent and non-verbose naming.	0.5	Shows excellent display of readability, consistency, and naming.	Shows good display of readability, consistency, and naming.	Show fair display of readability, consistency, and naming.	Show minimal display of readability, consistency, and naming.	Shows no display of readability, consistency, and naming.	2
1	3	(Rubric for Network Diagram) Design, structure, and efficiency: • Configurations are clear, logical and used correctly. Most appropriate technologies are implemented.	0.5	Shows excellent display of design, structure, and efficiency.	Shows good display of design, structure, and efficiency.	Show fair display of design, structure, and efficiency.	Show minimal display of design, structure, and efficiency.	Shows no display of design, structure, and efficiency.	2
1	3	(Rubric for Network Diagram) Correctness of the network design and IP addressing scheme using subnets • Design correctly solves problem and exceeds problem specifications.	0.5	Shows excellent display of simulation output correctness.	Shows good display of simulation output correctness.	Show fair display of simulation output correctness.	Show minimal display of simulation output correctness.	Shows no display of simulation output correctness.	2
Total			15						60

\*QN = Question Number