Name: _____ Date: _____ Score: _____

Mullvad Speed Test

Evaluating Mullvad VPN connection performance including throughput benchmarking, SOCKS5 proxy optimization, WireGuard vs OpenVPN speed comparisons, and latency reduction techniques.

MULLVAD SPEED TEST LEARNING OVERVIEW

LEARNER
STUDENT STATUS
Network Defender Track

SECURE
CONNECTION STATUS
Shielding data packets

ON
LEAK PROTECTION
DNS & IPv6 leak protection

Welcome! This activity packet guides you through Mullvad's speed performance. You will explore WireGuard-only throughput, 10 and 20 Gbps server links, and split tunneling latency controls.

WORKSHEET CHECKPOINTS

- [ ] **Part 1-4: Master VPN and network security configurations.**
- [ ] **Part 5-7: Solve crossword & word search puzzles.**
- [ ] **Part 8-9: Solve case studies & cipher challenge.**
- [ ] **Part 10: Review basic & advanced FAQ pages.**
- [ ] **Part 11: Explore 10 interesting real-world facts.**
- [ ] **Bonus: Think Fast challenge.**

Open the VPN.com Best VPNs Guide

URL: https://www.vpn.com/vpn/mullvad/speed-test/

Your Mullvad Speed Learning Roadmap

- Analyze the technical architecture and configuration rules of Mullvad Speed Test.
- Configure client settings to prevent IP, DNS, and WebRTC traffic leaks.
- Compare custom pricing, trial, and performance features against standard models.

MULLVAD SPEED GUIDE INSTRUCTIONS

Answer the multiple choice and true/false questions, complete the fill-in-the-blank sentences using the word bank, match definitions, and solve the crossword and word search puzzles. Apply your knowledge to throughput optimization and latency controls. Finish with the Bonus Activity: Think Fast.

EVALUATING THROUGHPUT PERFORMANCE & ROUTING LATENCY (INTRODUCTION)

Mullvad delivers high-performance data transfers using WireGuard, now its only protocol, including its own Rust implementation, GotaTun. Servers use 10 or 20 Gbps links, and the app supports custom MTU size settings.

READ EACH CHECKPOINT CAREFULLY AND SELECT OR WRITE THE CORRECT RESPONSE.

Checkpoint 1: Multiple Choice Challenge

1. Which protocol does the Mullvad app now use for all connections?

- A) OpenVPN TCP
- B) OpenVPN UDP
- C) WireGuard
- D) SOCKS5 Proxy

2. What is the primary factor limiting VPN speed over long distances?

- A) RAM Usage
- B) Network Latency
- C) Socks5 Proxy
- D) Browser Extension

3. How does split tunneling improve overall local network speed?

- A) By Compressing Data
- B) Excludes Heavy Apps
- C) Rotates Keys
- D) Enables Kill Switch

4. What did Mullvad do with its port forwarding in 2023?

- A) Moved to UPnP
- B) Removed the feature
- C) Added Multihop
- D) OpenVPN only

5. Which overhead from encryption slightly reduces line speed?

- A) IP Packet Overhead
- B) Storage Cache Logs
- C) RAM Log Writes
- D) CPU Core Sleep

Checkpoint 2: True or False Challenge

6 Question 6

6. Mullvad places a maximum bandwidth throttle cap on free users.

○ True ○ False

7 Question 7

7. WireGuard uses fewer CPU resources than OpenVPN during transfers.

○ True ○ False

8 Question 8

8. Multihop routing increases throughput speeds by doubling bandwidth.

○ True ○ False

9 Question 9

9. ISP throttling can sometimes be bypassed using Mullvad tunnels.

○ True ○ False

10 Question 10

10. Higher latency ping metrics indicate faster data round-trip times.

○ True ○ False

Checkpoint 3: Key Term Insertion

Read each sentence below and fill in the blank with the correct term from the Word Bank.

1. The total volume of data processed per second is the _____ metric.
2. Network response delay is measured as the round-trip _____ value.
3. High-performance connections are established using the modern _____ protocol.
4. Encryption headers add structure to packets, creating unavoidable _____ limits.
5. VPN encryption can prevent local line speed drops caused by _____ rules.
6. Chaining server locations via double routing is known as _____ usage.
7. Browsers can exit through a fixed IP using Mullvad's _____ proxy.
8. Mullvad servers use 10 or 20 Gbps links to offer high _____ .

VOCABULARY WORD BANK

BANDWIDTH LATENCY MULTIHOP OVERHEAD SOCKS5 THROTTLING THROUGHPUT WIREGUARD

Write your answers here:

1.
2.
3.
4.
5.
6.
7.
8.

Checkpoint 4: VPN & Network Concept Match

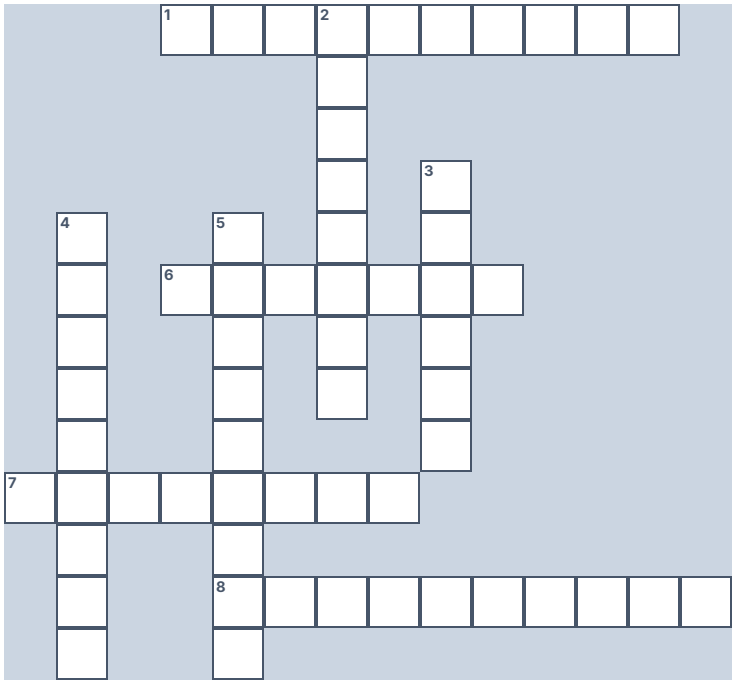
DEFINITION MATCHING

Match each vocabulary term on the left with its correct definition on the right by writing the corresponding letter (A-H) in the fillable input box.

☐	1. THROUGHPUT	A	The round-trip packet transmission time measured in milliseconds.
☐	2. LATENCY	B	The volume of data successfully transmitted per second.
☐	3. WIREGUARD	C	Deliberate network speed reduction enforced by service providers.
☐	4. OVERHEAD	D	Data transfer capacity; Mullvad servers use 10-20 Gbps links.
☐	5. THROTTLING	E	A proxy on Mullvad servers giving apps a fixed exit IP.
☐	6. MULTIHOP	F	A streamlined secure tunnel protocol optimized for throughput.
☐	7. SOCKS5	G	Additional data added to packets for encryption and routing.
☐	8. BANDWIDTH	H	Routing traffic through two VPN nodes, increasing latency.

Checkpoint 5: Crossword Puzzle

Solve the crossword puzzle by typing letters into the active white boxes. The numbers correspond to the clues below.



ACROSS CLUES

1. The volume of data successfully transmitted per second (10)

6. The round-trip packet transmission time measured in milliseconds (7)

7. Routing traffic through two VPN nodes, increasing latency (8)

8. Deliberate network speed reduction enforced by service providers (10)

DOWN CLUES

2. Additional data added to packets for encryption and routing (8)

3. A proxy on Mullvad servers giving apps a fixed exit IP (6)

4. A streamlined secure tunnel protocol optimized for throughput (9)

5. Data transfer capacity; Mullvad servers use 10-20 Gbps links (9)

Checkpoint 5 Alternative: Accessible Crossword Clues

Screen-reader and keyboard users can type the crossword answers directly in the text fields below.

ACROSS CLUES

1 Across: The volume of data successfully transmitted per second (10 letters):

6 Across: The round-trip packet transmission time measured in milliseconds (7 letters):

7 Across: Routing traffic through two VPN nodes, increasing latency (8 letters):

8 Across: Deliberate network speed reduction enforced by service providers (10 letters):

DOWN CLUES

2 Down: Additional data added to packets for encryption and routing (8 letters):

3 Down: A proxy on Mullvad servers giving apps a fixed exit IP (6 letters):

4 Down: A streamlined secure tunnel protocol optimized for throughput (9 letters):

5 Down: Data transfer capacity; Mullvad servers use 10-20 Gbps links (9 letters):

Checkpoint 6: Hidden Word Search

Find the 8 key vocabulary terms hidden in the grid below. Words can be horizontal, vertical, or diagonal.

U S T E L J B O A B C P X L K
Y K X T K D Q V M J M D I N N
G K Q P G M M E Q R U S T T G
N 5 C S Q O H R S B L W D S Z
I S V C Z T W H F K T H Z W D
L K N D Q H X E P C I U B I A
T C Z N D R K A B A H D O R D
T O F H I O D D A L O R Q E M
O S E I R U Z S N A P F Q G V
R F A A Q G O N D T P T X U Q
H K R U S H D N W E Y B F A S
T X W J A P R Z I N Y Y L R G
I M R J M U L T D C O H Q D Q
H Z A O V T G U T Y B Y R Y B
H L Z G J O P N H W C M Z Y G

VOCABULARY WORD LIST

THROUGHPUT LATENCY WIREGUARD OVERHEAD THROTTLING MULTIHOP SOCKS5 BANDWIDTH

Checkpoint 6 Alternative: Accessible Vocabulary Matching

Match each of the 8 vocabulary terms from the Word Search to its correct definition by writing the letter (A-H) in the blank space.

VOCABULARY TERMS

- **A. THROUGHPUT**
- **B. LATENCY**
- **C. WIREGUARD**
- **D. OVERHEAD**
- **E. THROTTLING**
- **F. MULTIHOP**
- **G. SOCKS5**
- **H. BANDWIDTH**

DEFINITIONS & MATCH FIELDS

1. Routing traffic through two VPN nodes, increasing latency.
2. Data transfer capacity; Mullvad servers use 10-20 Gbps links.
3. A proxy on Mullvad servers giving apps a fixed exit IP.
4. The volume of data successfully transmitted per second.
5. A streamlined secure tunnel protocol optimized for throughput.
6. Additional data added to packets for encryption and routing.
7. Deliberate network speed reduction enforced by service providers.
8. The round-trip packet transmission time measured in milliseconds.

Checkpoint 7: Scrambled Word Challenge

Unscramble the letters below to reveal key Virtual Private Network (VPN) concepts and terms. Write your answers in the input boxes provided.

1. UHGUHTPTOR
2. DWREIUAGR
3. TTNLHTGOIR
4. 5KCSSO
5. NYETLCA
6. ADREOHVE
7. MPIHOUTL
8. HWTBDAIDN

Bonus Activity: Think Fast

3 ITEMS FROM EACH CATEGORY. FIRST PERSON TO COMPLETE THE LIST WINS.

1	Units for measuring internet speed			
2	Tips for getting a lower ping			
3	Words related to speed			
4	VPN services other than Mullvad			
5	Things Mullvad can hide from your network			
6	Things that can slow a VPN down			
7	Activities that need high speed			
8	Ways to test your internet speed			
9	Things you do online every day			
10	Features you look for in Mullvad			
11	Games or apps that need low latency			
12	Countries where you'd want Mullvad servers			
13	VPN protocols you know			
14	Things you do when a video stutters			
15	Questions for Mullvad customer support			

Checkpoint 8: VPN & Network Case Studies

Apply the concepts you have learned to solve the real-world scenarios below.

CASE STUDY 1: THROUGHPUT OPTIMIZATION ANALYSIS

👷

Scenario: A video editing studio experiences slow upload speeds when uploading raw files via VPN.

Discussion Question: What troubleshooting step should they take in the Mullvad settings?

CASE STUDY 2: GAMING LATENCY MITIGATION

👷

Scenario: A competitive gamer experiences rubberbanding and high ping when connected to the VPN.

Discussion Question: What server selection rule should they follow to reduce latency?

Checkpoint 9: Decrypting the Cipher

A network engineer secures routing channels and client tunnels. Use the Letter-to-Number key below to decrypt the message by writing the matching letters in the blank spaces.

LETTER-TO-NUMBER ENCRYPTION KEY

A=1 B=2 C=3 D=4 E=5 F=6 G=7 H=8 I=9 J=10 K=11 L=12 M=13

N=14 O=15 P=16 Q=17 R=18 S=19 T=20 U=21 V=22 W=23 X=24 Y=25 Z=26

23	9	18	5	7	21	1	18	4		20	21	14	14	5	12	19
4	5	12	9	22	5	18		13	1	24	9	13	21	13		4	1	20	1
	20	8	18	15	21	7	8	16	21	20		19	16	5	5	4			

Decoded message:

TIP: EACH NUMBER REPRESENTS THE POSITION OF THAT LETTER IN THE ALPHABET (E.G. 1 = A, 2 = B, 26 = Z).

Checkpoint 10: Basic VPN FAQs (Part A)

Review the most common questions and answers regarding Virtual Private Networks (VPNs) and tunneling.

Q1: Does Mullvad throttle speeds?

No, Mullvad provides completely uncapped and unthrottled speeds to all users.

Q2: Which is faster, WireGuard or OpenVPN?

WireGuard is generally faster, and it is now the only protocol that Mullvad offers. [1]

Q3: What affects VPN speed?

Server distance, local line quality, network congestion, and router hardware capacity.

Q4: Does Mullvad support port forwarding?

Mullvad removed port forwarding in 2023 after it was abused to host malicious services. [2]

Q5: How does distance affect latency?

The physical distance data must travel to the server directly increases round-trip ping time.

Checkpoint 10: Basic VPN FAQs (Part B)

Review the most common questions and answers regarding Virtual Private Networks (VPNs) and tunneling.

Q6: Can I use Mullvad for gaming?

Yes, choosing a nearby server with low ping helps keep your gaming connection stable.

Q7: Does encryption slow down speed?

Encryption adds slight packet overhead, which can reduce throughput somewhat, depending on hardware.

Q8: How can I speed up Mullvad?

Select a closer server, use an Ethernet cable, or turn off multihop or obfuscation. [6]

Q9: Does multihop affect speed?

Yes, multihop routes traffic through two servers, which increases latency and reduces speed. [9]

Q10: What is MTU in Mullvad?

Maximum Transmission Unit; optimizing MTU prevents packet fragmentation speed drops.

Checkpoint 10: Advanced VPN FAQs (Part C)

Explore advanced technical aspects of VPN tunneling protocols, mobile client integrations, and enterprise deployment.

Q1: Why is UDP-over-TCP mode slower?

Wrapping WireGuard in TCP adds acknowledgements and retransmissions, which adds overhead.

Q2: What is Mullvad's SOCKS5 proxy for?

It gives browsers and apps a fixed exit IP inside the tunnel and can reduce CAPTCHAs; it only works when connected. [4]

Q3: What is the speed impact of obfuscation?

Shadowsocks or QUIC add overhead that can lower throughput; LWO is built to add very little. [8]

Q4: Why do Mullvad servers run from RAM?

Nothing is kept on disk, and every reboot starts a fresh, fully patched OS with no logs. [5]

Q5: Why does my connection drop occasionally?

It could be due to MTU mismatches or local router security rules blocking UDP packets.

Checkpoint 10: Advanced VPN FAQs (Part D)

Explore advanced technical aspects of VPN tunneling protocols, mobile client integrations, and enterprise deployment.

Q6: How does CPU power affect VPN speed?

Older routers or computers may struggle to encrypt data fast enough, bottle-necking speeds.

Q7: What is bandwidth throttling?

It is the intentional slowing of internet speed by ISPs; Mullvad bypasses it via encryption.

Q8: Is Mullvad's server network 10 Gbps?

Most listed servers use 10 Gbps links, and some use 20 Gbps (as of September 2026). [3]

Q9: How does split tunneling affect utility?

It lets high-bandwidth local apps run outside the VPN while keeping browser traffic secure.

Q10: Does IPv6 routing slow connections?

No, Mullvad implements optimized native dual-stack IPv4/IPv6 routing to keep performance high.

Part 11: 10 Real-World VPN Facts & Insights

Review real-world facts regarding VPN encryption speeds, protocol audits, mobile connectivity, and enterprise remote work.

1. VPN INSIGHT
Mullvad says it does not cap bandwidth or throttle connections.

2. VPN INSIGHT
Mullvad is rolling out GotaTun, its own Rust-based WireGuard engine, during 2026. [7]

3. VPN INSIGHT
Network latency is determined by the speed of light traveling through fiber-optic cables.

4. VPN INSIGHT
Mullvad's servers use 10 Gbps or 20 Gbps links (as of September 2026). [3]

5. VPN INSIGHT
Encryption processing on low-powered routers can restrict overall VPN throughput.

6. VPN INSIGHT
Setting MTU incorrectly causes packet fragmentation, dropping connection speeds.

7. VPN INSIGHT
Multihop routing doubles encryption processing, increasing latency on all pings.

8. VPN INSIGHT
Local DNS resolvers on Mullvad nodes speed up host lookup query times.

9. VPN INSIGHT
ISP bandwidth throttling is neutralized by encrypting network packet headers.

10. VPN INSIGHT
SOCKS5 proxies on Mullvad servers give apps one stable exit IP inside the tunnel. [4]

Technical References & Sources

The study guide and interactive puzzles are compiled from global technical standards, specifications, and regulatory frameworks.

SCHOLARLY & INDUSTRY REFERENCES

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[12] WireGuard. (n.d.). WireGuard: fast, modern, secure VPN tunnel.
https://www.wireguard.com/

Answer Key: Checkpoint 1 - Multiple Choice

1 Question 1

Correct Answer: C

TEACHING NOTE

Mullvad removed OpenVPN on 15 January 2026, so every connection now uses WireGuard.

2 Question 2

Correct Answer: B

TEACHING NOTE

What is the primary factor limiting VPN speed over long distances? → Network Latency

3 Question 3

Correct Answer: B

TEACHING NOTE

How does split tunneling improve overall local network speed? → Excludes Heavy Apps

4 Question 4

Correct Answer: B

TEACHING NOTE

Mullvad removed port forwarding in May 2023 because it was abused to host malicious services. [2]

5 Question 5

Correct Answer: A

TEACHING NOTE

Which overhead from encryption slightly reduces line speed? → IP Packet Overhead

Answer Key: Checkpoint 2 - True or False

6 Question 6

Correct Answer: False

TEACHING NOTE

False: Mullvad has no free tier, and paid users are not given a bandwidth cap.

7 Question 7

Correct Answer: True

TEACHING NOTE

WireGuard uses fewer CPU resources than OpenVPN during transfers.

8 Question 8

Correct Answer: False

TEACHING NOTE

False: multihop sends traffic through two servers, which adds latency rather than doubling speed. [9]

9 Question 9

Correct Answer: True

TEACHING NOTE

ISP throttling can sometimes be bypassed using Mullvad tunnels.

10 Question 10

Correct Answer: False

TEACHING NOTE

False: higher latency means a slower round trip; lower ping is better.

Vocabulary Keys & Grading Rubric

Instructor Grading Rubric: Award 1 point for each correct matching (8 points total) and context term (8 points total).

CHECKPOINT 4: CONCEPT MATCH KEY

B 1. THROUGHPUT	A 2. LATENCY	F 3. WIREGUARD	G 4. OVERHEAD
C 5. THROTTLING	H 6. MULTIHOP	E 7. SOCKS5	D 8. BANDWIDTH

CHECKPOINT 3: KEY TERM KEY

1 THROUGHPUT	2 LATENCY	3 WIREGUARD	4 OVERHEAD
5 THROTTLING	6 MULTIHOP	7 SOCKS5	8 BANDWIDTH

CHECKPOINT 6 ALTERNATIVE: VOCABULARY MATCH KEY

1 F – MULTIHOP	2 H – BANDWIDTH	3 G – SOCKS5	4 A – THROUGHPUT
5 C – WIREGUARD	6 D – OVERHEAD	7 E – THROTTLING	8 B – LATENCY

DISCUSSION NOTES FOR INSTRUCTORS

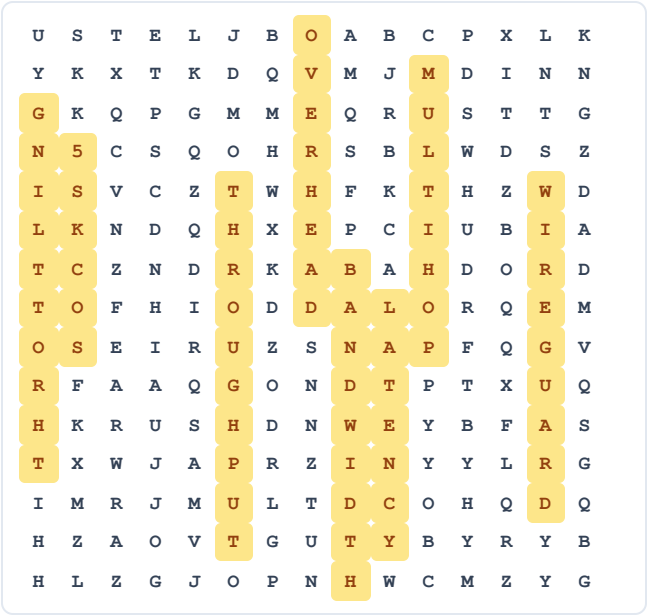
Key Terms:
Check that students can explain THROUGHPUT, LATENCY and WIREGUARD in their own words and give an example of each.

Case Studies:
Ask students to support their recommendations with facts from the worksheet rather than assumptions.

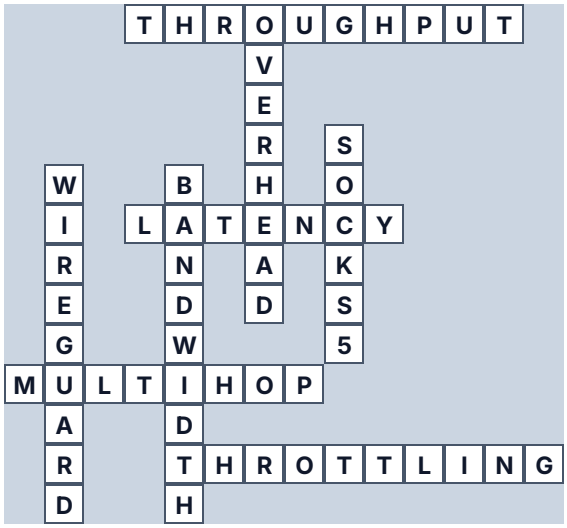
Source Evaluation:
Have students verify at least one claim against the worksheet references, and discuss why figures, prices and rules can change over time.

Puzzles Keys & Instructor Notes

WORD SEARCH SOLUTION



CROSSWORD SOLUTION



INSTRUCTOR GUIDE FOR CROSSWORD SOLUTIONS

ACROSS CLUES

1 Across: THROUGHPUT The volume of data successfully transmitted per second (10 letters)

6 Across: LATENCY The round-trip packet transmission time measured in milliseconds (7 letters)

7 Across: MULTIHOP Routing traffic through two VPN nodes, increasing latency (8 letters)

8 Across: THROTTLING Deliberate network speed reduction enforced by service providers (10 letters)

DOWN CLUES

2 Down: OVERHEAD Additional data added to packets for encryption and routing (8 letters)

3 Down: SOCKS5 A proxy on Mullvad servers giving apps a fixed exit IP (6 letters)

4 Down: WIREGUARD A streamlined secure tunnel protocol optimized for throughput (9 letters)

5 Down: BANDWIDTH Data transfer capacity; Mullvad servers use 10-20 Gbps links (9 letters)

Scrambled Words & Cipher Solution Key

Grading key for the vocabulary word unscramble activity and Secret Cipher Challenge.

WORD UNSCRAMBLE KEY

1. UHGUHTPTOR	THROUGHPUT	5. NYETLCA	LATENCY
2. DWREIUAGR	WIREGUARD	6. ADREOHVE	OVERHEAD
3. TTNLHTGOIR	THROTTLING	7. MPIHOUTL	MULTIHOP
4. 5KCSSO	SOCKS5	8. HWTBDAIDN	BANDWIDTH

SECRET CIPHER CHALLENGE KEY

"WIREGUARD TUNNELS DELIVER MAXIMUM DATA THROUGHPUT SPEED"

Case Studies Solution Key

A CASE STUDY 1: THROUGHPUT OPTIMIZATION ANALYSIS

Instructor Solution

GRADING GUIDELINE

Student answers should cover the following points:

- Scenario Analysis: A video editing studio experiences slow upload speeds when uploading raw files via VPN.
- Recommended Strategy & Solution: Adjust the MTU size to reduce fragmentation and disable multihop or obfuscation.

B CASE STUDY 2: GAMING LATENCY MITIGATION

Instructor Solution

GRADING GUIDELINE

Student answers should cover the following points:

- Scenario Analysis: A competitive gamer experiences rubberbanding and high ping when connected to the VPN.
- Recommended Strategy & Solution: Select the server physically closest to the game host location.