Anonymous ID

Answer sheet 1 of 2 for the NETMET 2020-2021 midterm exam

Multiple choice questions

M1
M2
M3
M4
M5
M6

Short answer questions

S1

S2

S3

Anonymous ID

Answer sheet 2 of 2 for the NETMET 2020-2021 midterm exam

Multiple choice questions

M7	M9	M11	M13
M8	M10	M12	M14

Short answer questions

S4

S5

S6

S7

NETMET 2020-2021
Midterm exam – 1 December 2020
Duration: 1 hour

Allowed: English dictionary or bilingual dictionary (printed books only, with no written notes)

Not allowed: Documents, computers, pocket calculators, mobile phones, etc.

Answer sheet and anonymous ID

The first sheet of paper in this exam is your answer sheet. It bears an anonymous ID number. This number, recorded on the attendance sheet for the exam, provides the connection between your answer sheet and your identity.

Please do not write your name on the answer sheet.

You will submit only the answer sheet at the end of the exam.

Multiple-choice questions numbered M1, M2, … (1 point each)

The multiple-choice questions each have four possible answers: A, B, C, and D.

A fifth choice X indicates “no answer”. Mark your answers by writing A, B, C, D, or X in the box alongside the question number.

For each multiple-choice question, there is only one correct answer.

- Correct answer = 1 point
- Incorrect answer = ½ a point subtracted
- No answer = 0 (no points gained, none lost either)

Because of the penalty for an incorrect answer, it is not in your interest to make a random guess.

If there is ambiguity, and we cannot tell which answer you have provided, we will need to mark the answer as incorrect.

Short answer questions numbered S1, S2, … (1 point each)

Please use the space provided in which to write your answers to the short answer questions.

Additional remarks

Do not hesitate to raise your hand with any questions you might have. Best wishes for a successful exam!

Multiple choice questions for Answer Sheet 1

M1. Select the answer that captures best practices when conducting measurement studies.

A. Embed contact information in probes.
B. Get user informed consent when possible.
C. Perform risk analysis.
D. All of the above.

M2. We can measure traffic in different granularities, select the ordering from the most detailed to the least detailed granularity.

A. Flow capture > Packet Capture > Interface Counts
B. Packet Capture > Flow capture > Interface Counts
C. Interface Counts > Packet Capture > IP-level packets
D. Interface Counts > Packet Capture > Flow capture

M3. Match the measurement tools to the measurement tasks:

Measurement tools

1. Wireshark
2. Traceroute
3. iPerf

Measurement tasks

a. discovering routes through the network
b. measuring bandwidth
c. analyzing network packets

Answer choices:

A. 1-b, 2-c, 3-a
B. 1-c, 2-a, 3-b
C. 1-a, 2-b, 3-c
D. 1-b, 2-a, 3-c

M4. Which of the following factors influence bulk transfer capacity?

A. Transfer size
B. Cross traffic on the path
C. Congestion on the reverse path
D. All of the above

M5. Identify the correct statement:

A. For packet-pair methods to work, probe rate must be lower than the capacity of the bottleneck link.
B. To estimate available bandwidth with size-delay methods, one must estimate the capacity and the cross-traffic.
C. Self-induced congestion methods identify the available bandwidth by sending a train of probes with rate R. If the delay of probes in the train are similar, then the method infers that the available bandwidth is greater than or equal to R.
D. None of the above.

M6. Packet traces provide the most detailed view of a network's traffic, but they introduce significant measurement overhead. Which of the following tasks requires per packet information?

A. Billing traffic on customer links
B. Detecting denial of service attacks
C. Detecting port scans.
D. None of the above.

Short answer questions for Answer Sheet 1

S1. Measurement techniques can be broadly categorized into two main types: Active and Passive. Provide a brief definition of active and passive measurements, and identify one advantage and one limitation for each measurement technique.

S2. Measuring the capacity of an end-to-end path can be achieved either via flooding or advanced probing methods. Briefly explain how each of these methods can be used to measure the end-to-end capacity of a path, and provide one limitation of each method.

S3. List 3 limitations and 3 benefits of using interface counts for traffic measurements?

Multiple choice questions for Answer Sheet 2

M7. Compare a traceroute conducted at host A towards host B in the internet with a traceroute conducted at host B towards host A. Assume that routing between A and B is symmetric.

A. The traceroute results from B to A are identical to the results from A to B.
B. The traceroute results from B to A are the same as the results from A to B, except that the order is reversed.
C. The traceroute results from B to A might contain completely different addresses than those found in the results from A to B.
D. If a traceroute from A to B is possible, a traceroute from B to A cannot be performed.

M8. Which information does <u>not</u> appear in standard traceroute output.

A. The IP addresses of router interfaces
B. The names of routers
C. RTTs
D. The name of the destination

M9. What variant of BGP will an AS use to propagate, within the AS itself, information about how to reach an advertised destination prefix?

A. eBGP
B. iBGP
C. BGPv1
D. None of the above

M10. How many prefixes (IPv4 and IPv6 combined) are currently being announced in the Internet (order of magnitude)?

A. 100,000
B. 1 million
C. 10 million
D. 100 million

M11. Which value is most likely to be a processing delay in an end-host?

A. 1 nanosecond
B. 1 microsecond
C. 1 millisecond
D. 1 second

M12. Which of the following factors contribute to transmission delay?

A. CSMA/CD backoffs
B. frame size
C. the bandwidth of the transmission medium
D. all of the above

M13. How can we accurately calculate one-way delay?

A. as half of an RTT
B. using synchronized clocks
C. using the ping tool
D. all of the above

M14. What type of packet is used for classic pings?

A. DNS
B. BGP
C. TCP
D. ICMP

Short answer questions for Answer Sheet 2

S4. Give an example of a classic traceroute, with just one probe packet per TTL, through a load balancing router, and show what sort of information might be missing and what sort of incorrect inferences might be made.

S5. Listening to BGP updates does not give us a full picture of changes in inter-domain routing. Name or briefly describe three limits to the information that BGP updates provide.

S6. Regarding propagation delay: It takes light 130 milliseconds to travel a distance of 40,000 kilometers, which is the circumference of Earth. You measure an RTT between a from host A to host B of 130 milliseconds, and you have ruled out any queueing delay. Give at least three reasons why host B might not be exactly halfway around Earth from host A.

S7. Describe: true (“wall clock”) time, clock offset, clock skew, and clock drift.