SECURE NETWORKING LESSON

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INTRODUCTION TO NETWORKING AND ETHICAL CONSIDERATION

Name:_____ Date:_____ Team:_____

OSI MODEL

YOUR DREAM COLLEGE!

Figure 1[i] Picture of Moving Van Truck with "IP Moving VAN" written on side of truck.

Congratulations! You have been accepted to your dream college!

This dream school happens to be 800 mi from your home. This is completely fine, though. You just need a plan! That is the purpose of this lab.

KEY DETAILS

You are going to fly to get there, but you will be using the IP MOVING VAN for your supplies.

The college recommends that you use the IP MOVING TRUCK Company because they guarantee delivery.

Your dorm room has a bathroom, bedroom, and common living area.

- You will need to put all of your supplies into boxes. The supplies need to fit into the box or you will need a new box.
- Each truck can hold two boxes and trucks cannot all leave at the same time. Trucks will leave every hour and drive at a rate of 60 miles per hour.
- You have plenty of boxes and they are labeled: "BATHROOM", "BEDROOM", and "COMMON ROOM".

Against the college's recommendation, you elect to send your photos using First Class Mail.

The envelopes, along with cutouts of your supplies and boxes are provided. Use the cutouts and a spare piece of paper to come up with a plan.

PART 1: WRITE DOWN THE KEY RESULTS OF YOUR PLAN HERE:

1) How many boxes will you need?

2) How many trucks will you need?

3) What is the expected arrival time of the last box if you leave at 12:00 (noon) tomorrow?

PART 2: CREATE AT TABLE

Create a table that shows the truck number (based on the order the trucks leave) and what each truck will be carrying. Use a separate piece of paper for this table.

PART 3: NOW, YOU ARE ABOUT TO SEND THESE TRUCKS AND ENVELOPES ON THEIR WAY…

Get an EVENT CARD.

a. What event happened? (Hint: Written in caps.) _____

b. How did this event impact your trip? Reflect.

c. After this event, how many boxes will you need? _____

d. After this event, how many trucks will you need? _____

e. What is your new estimated arrival time? _____

PART 4: ORGANIZE RESULTS

This will take teamwork. Follow directions to share results with your teammates.
Your goal is a completed table below:

Event Number	Event	Number of Trucks	Amount of Time *before Event* (hours)	Amount of Time *after Event* (hours)
1	TRUCK PAYLOAD CHANGE			
2	TRUCK PAYLOAD CHANGE			
3	ROUTE CHANGES			
4	ENVELOPES NEVER ARRIVED			
5	MISSING ONE BOX			
6	BOX PAYLOAD CHANGE			

PART 5: CONSIDER RESULTS

In terms of TIME:

   a. Which event had the most dramatic impact on time it took for our boxes to arrive?

   b. Which had the least effect?

   c. Choose one of these. Why do you think this effect impacted time as much as it did?

In terms of NUMBER OF TRUCKS:

    a. Which event had the most dramatic impact on the number of trucks required to send your boxes?

    b. Which had the least effect?

    c. Choose one of these. Why do you think this effect impacted the number of trucks as much as it did?

Now, we will start to get closer to how and what this is modeling. For the next part, you may want a calculator. You are going to do some calculations that are important for anyone understanding how a network is performing, that is the bit rate.

PART 6: COMPARING EFFICIENCIES

As you know, moving requires time. There is the time to pack (put items in all those boxes before putting them onto the truck and there is the time to unpack (put the items in the correct rooms).

A few more assumptions:

- Assume that when the IP Moving Van dropped off all of your items, they left them in the Common Room. As long as they got the boxes to your room, they fulfilled their end of the deal.
- Assume that it took you 3 hours to pack. Since the boxes were labeled, unpacking only took 2 hours.
- Assuming that each box is equivalent to 1500 bytes of data, fill out the following table for your event.
- Get results from other groups like you did in Part IV.

Event Number	Event	Total number of bytes	Latency = Total amount of time (hours)	Bit Rate = amount of data carried over time (number of bytes per hour)
1	TRUCK PAYLOAD CHANGE			
2	TRUCK PAYLOAD CHANGE			
3	ROUTE CHANGES			
4	ENVELOPES NEVER ARRIVED			
5	MISSING ONE BOX			
6	BOX PAYLOAD CHANGE			

In terms of TIME:

a. Which event had the most dramatic impact on time it took for our boxes to arrive?

b. Which had the least effect?

c. Choose one of these. Why do you think this effect impacted time as much as it did?

PART 7: WHAT DOES THIS HAVE TO DO WITH THE INTERNET?

You may have thought that our approach to moving across the country was pretty silly. In reality, this approach has a lot in common with how the Internet works every day to send us the data that we love!

- What are two things that these two models have in common?

- This was a model, or abstraction of how the internet transmits data! With any abstraction, some information is lost to make a point about how everything is really connected. Now, fill in the table to help you understand how this was an abstraction of the Internet:
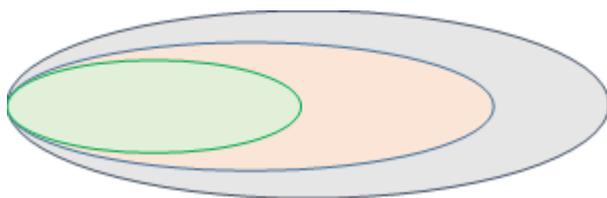
IP TRUCK	THE INTERNET

PART 8: INTERRELATIONSHIPS

Hopefully, you can tell that each of these pieces are interrelated! One take on this is to notice that the items (data) is in the boxes, the boxes are in the truck, and the truck travels on the road.
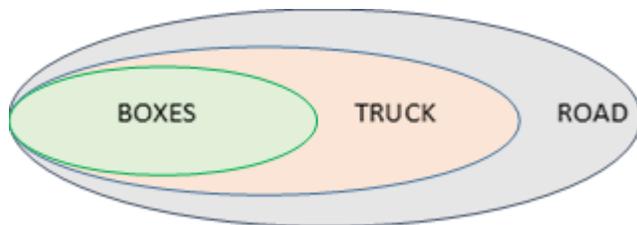
- What does this look like in terms of internet vocabulary words (Ethernet, TCP, IP)?

PART 9: PORTS

Recall that boxes were labeled with rooms. In reality, rooms are ports. These ports are logical. They do help servers to know which application to send your communication to for processing. Like shampoo belongs in the bathroom, certain port numbers are well known. For example, unencrypted TCP communications would say they were intended for "Port 80" while encrypted TCP communications would be "Port 443".

PART 10: MODES OF TRANSPORTATIONS

Thinking back to our activity, recall that there were two ways to send information across the country. These were by first class mail or by the IP Moving Van. Remember that you used the envelopes to send your photos.

PART 11: ORDER MATTERS

Hopefully, you can also tell that the order of processing really mattered!

- What are the steps that you needed to follow to move your items into your new dorm room?

STEP NUMBER	ACTION ON THIS STEP
1	Put items that you want to pack into pile
2	Make boxes
3	Sort items into one of three boxes, depending on where they are going: "BATHROOM", "COMMON ROOM", or "BEDROOM".
4	
5	
6	
7	You have your items where they are supposed to be in your dorm room. Your room is looking pretty amazing!

How data travels on the internet is often appreciated from the opposite direction because, most of the time, you are the consumer of data when using the internet. You do not usually care much about how it is packaged and sent to you.

The following is a theoretical model to help you appreciate how data is processed in layers and to diagnose problems. An IT professional often refers to problems in terms of their layer number, so committing these to memory is a good idea!

Open System Interconnection Reference Model (OSI Model) – a guide to data flow on the internet.

Layer Number	Layer Name	Purpose of Layer	Protocol	Key Question

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[i] Figure1 ©Clip Art Library. Non-Commerical use only.