Computer Networks 22/23

Homework 2

Problem 1 (50%)

A company has X PB of data it wants to move from Ljubljana to Koper.* It decides to use the Amazon Snowmobile, pictured below, as the communication channel. The Snowmobile needs to travel a road of 107 km with a speed of 80 km/h, and can carry all of the data in one go.

a) Find the data rate and latency of the (one-time) data transmission via Snowmobile.
b) How much time in months would sending the data via a 40 Gb/s fiber optic cable take? What is the latency of sending a single bit over the cable, assuming the signal travels at $2/3$ the speed of light in vacuum? Assume the road and the cable have the same length.

Figure 1. Amazon Snowmobile

*Let X be the last two digits of your student ID; include the ID in your homework.

Some unit conversions:

- 1 h = 3600 s
- 1 month ≈ 2 600 000 s

Problem 2 (50%)

Find the latency, from first bit sent to last bit received, of sending a 2000 bit packet over a 10 Mbps link with two switching elements between the sender and the receiver. Both switching elements implement cut-through switching and forward a packet after readings its first 100 bits. Assume each section of the link introduces a propagation delay of 20 μs.