

1. With how many computers has your laptop exchanged data?
(distinct servers; think about types of servers and kinds of interactions)

2. How many devices do you have connected to the Internet:
 - (a) in your possession right now?
 - (b) in your dorm room, apartment, or house?

3. Consider a 1 Gbit/s ethernet link.
 - (a) Assuming 128Kb/s MP3 encoding, how many real-time MP3 encodings can share the ethernet link?

 - (b) How long to download a 3 minute, 128Kb/s encoded MP3 file at the full rate of the 1 Gbit/s link?

 - (c) Assuming data travels over the cable at $0.6c$ (where c is the speed of light at $c = 3 \times 10^8 \text{m/s}$), how long does it take for the first bit of a song to travel across a 4,000 kilometer length of cable?

 - (d) A real-time compressed 1080p HDTV video requires 36Mb/s. How many such encodings can the same ethernet link support?

4. Assuming a cable that can accommodate 1 Gbit/s ethernet links costs \$0.60/meter, how much does the cabling cost for a 4,000 kilometer run (e.g., Philadelphia to San Francisco)?