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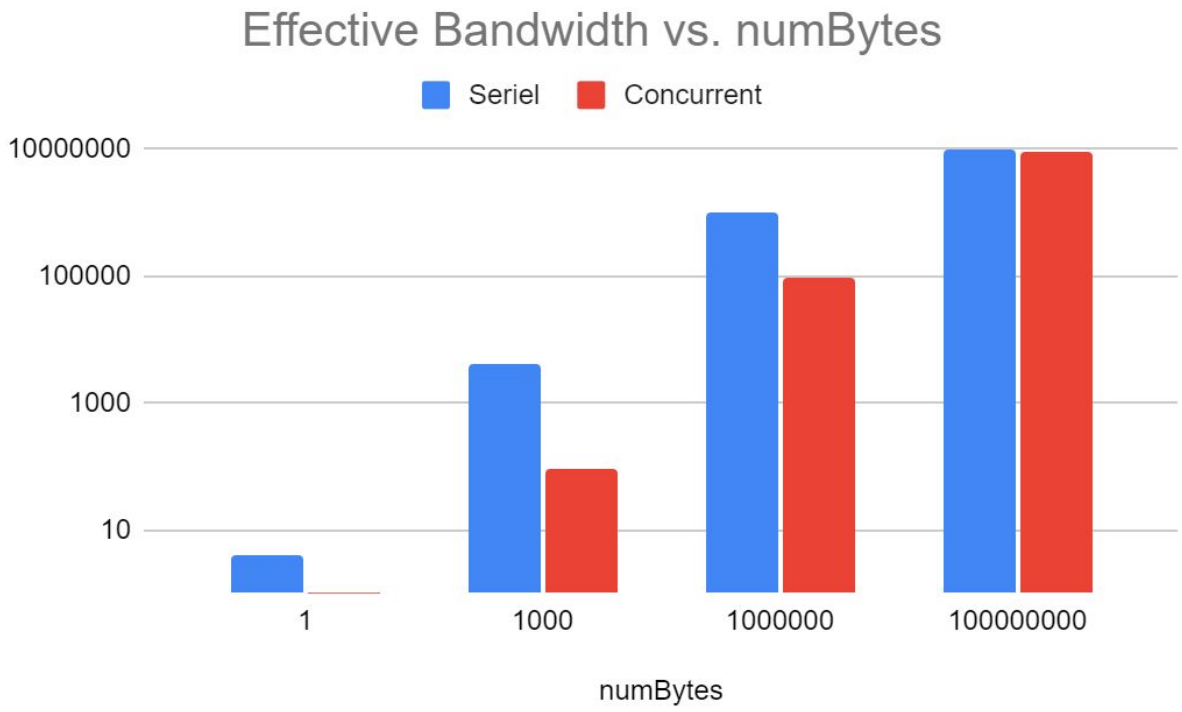
Regions: Oregon (Server), Ireland (Client)




*Q1. For the data from the serial experiment, how was the effective bandwidth affected by the size of numBytes?*

As more data is requested, our effective bandwidth is higher.

*Q2. Using the data from only the Serial experiment, estimate the bandwidth between your client and your server. Now incorporate the data from your Latency experiment to increase the accuracy of your bandwidth estimate. Describe how data from the Latency experiment improves accuracy*

Our 1 byte of data effective bandwidth was very low, but that at that point we would mostly be measuring latency. As we increased the bytes sent, our bandwidth consistently grew higher, so our most accurate bandwidth would be with the most bytes sent, 100 million, to account for the propagation delay. Our bandwidth for that was about 10,000,000 bytes per second, or **10 MBps** Our round-trip latency when running `ping` on the linux AWS servers was consistent at 118 ms for long periods of time, which is our propagation + transmit + queue times. We can then estimate our bandwidth to be around **100 Mbps, or 12.5 MBps**, as it takes about .9 seconds for

10 MB or 1,000,000 bytes. We can also subtract our latency from the time of our experiments of different bytes to estimate a more accurate bandwidth.

**10 MB Object**

| | Latency: 1 ms | Latency: 100 ms |
|---|---|---|
| Bandwidth: 1 Mbps | 80.001 s | 80.1 s |
| Bandwidth: 100 Mbps | .801 s | .9 s |

*Q3. How did the data from the Serial experiment compare from the Concurrent experiment? Similar? Dissimilar? Explain these results as best you can.*

The concurrent experiment takes the time of the longest request, as all the requests are run in parallel. Because of this, the time taken was always the same as a serial request with 100 million bytes.

*Q4. After carrying out these experiments, what is something that you learned about performance and networked applications?*

We learned a lot about http routes and how to pass parameters to them. We learned about bandwidth and how it is affected by different amounts of data, especially at a large scale.

*Q5. After carrying out these experiments, what is one (or more) unanswered question(s) you still have about network performance?*

Is there a lot of latency or overhead for converting a DNS to an IP address?

What is more often preferred in real world scenarios, serial or concurrent?