Maximizing Quality of Internet Service

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Reiterating an old lesson:

In order to optimize the performance and profitability of Internet transit provision, users must be incentivized to select services reachable through peering, rather than through transit.
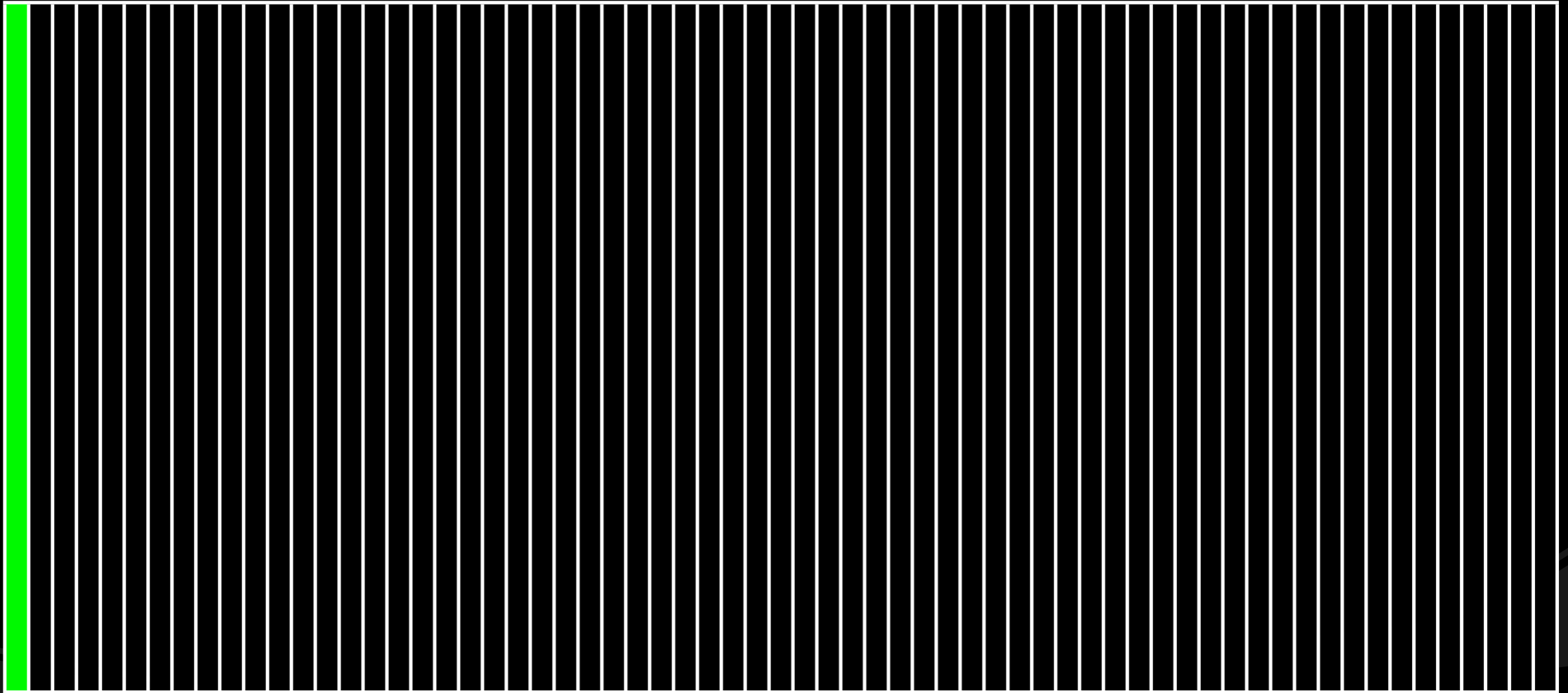
Therefore, peering circuits must be larger than transit circuits, even if that means that they operate at much lower utilization.

1bps utilization of a 1bps circuit, 100% full, 1 second

Average 1 second to completion

1bps utilization of a 10bps circuit, 10% full, 1 second

Average 0.1 seconds to completion

1bps utilization of a 10bps circuit, 100% full, 1 second
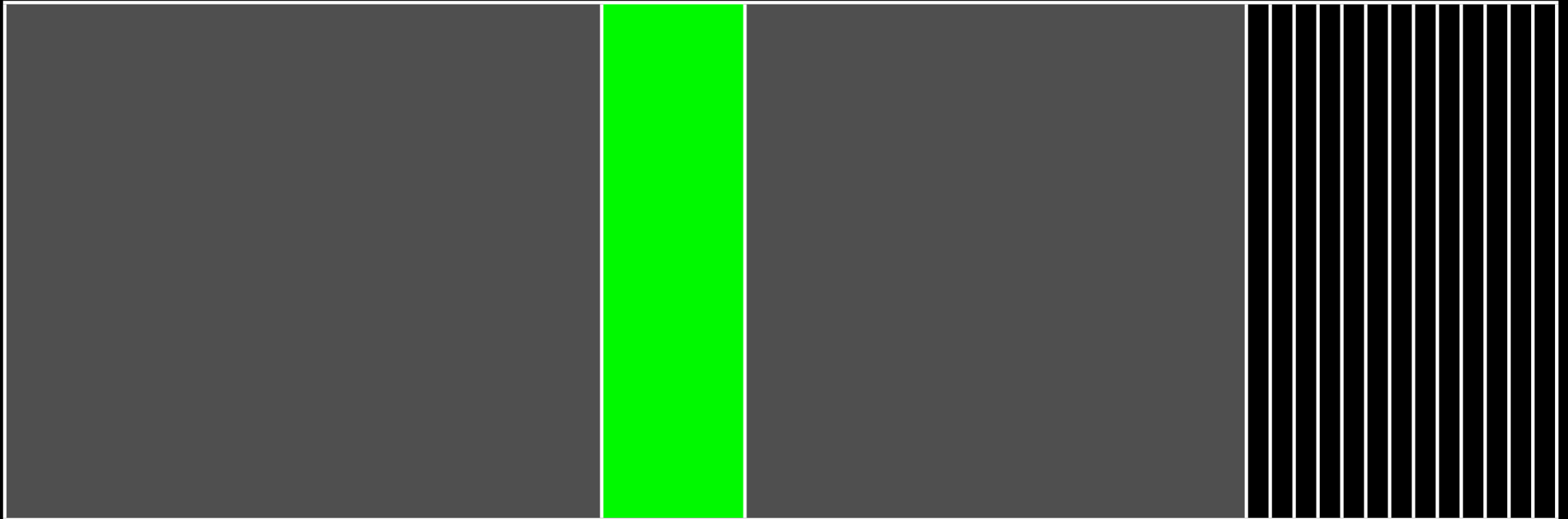
Average 0.55 seconds to completion

Flawed Logic:

10% of our traffic can be offloaded at a local Internet exchange. Therefore we need a circuit to the exchange that's one tenth as large as our transit circuit.

8bps utilization of 10bps and 100bps circuits, 80% full, 1 second

Average 0.48 seconds to completion

Average 0.8 seconds to completion

This Discourages Users

Users will always select services available over the largest-capacity circuit, not the least-utilized circuit, because that choice minimizes their wait-to-completion.

The Lesson to ISPs:

Be sure that your largest circuit corresponds with your lowest cost path.

If 10% of the traffic in a well-engineered network is going to an IXP, the circuit it flows over will be more than 90% empty.

That's not a problem.

IXPs Improve Quality

...but only if networks are engineered to align users' incentives with operators' costs.

Thanks, and Questions?

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