Research Spotlight Forum

8.6.19 Cybersecurity

Internet Telescopy: Measuring the Whole Internet, Everywhere, All the Time

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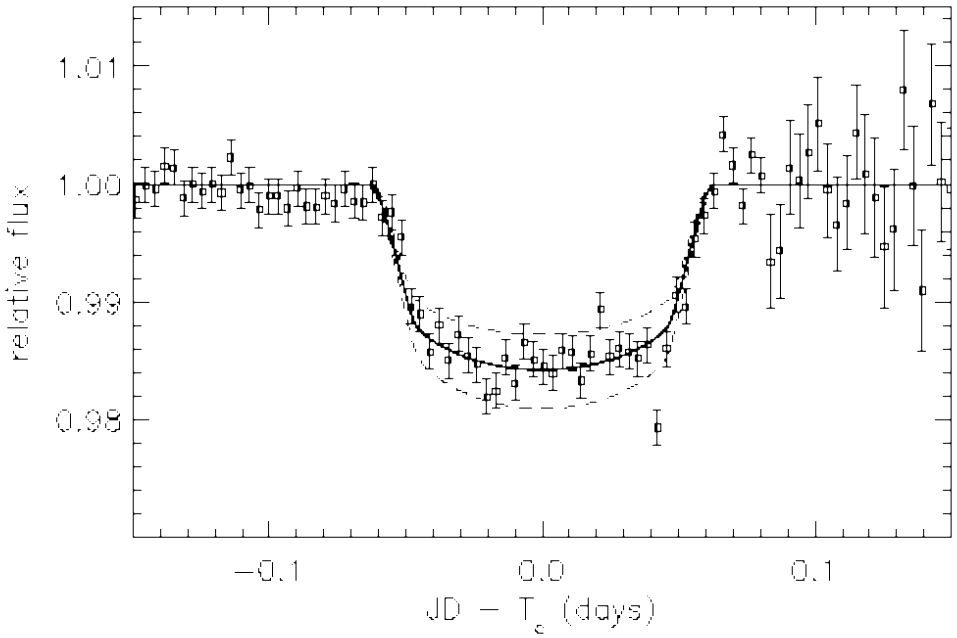
“What if we had a Telescope for the Internet?”

Problem: We have limited vantage points from which to monitor the Internet, but we want to watch all of it!

Idea: Internet Telescopy via robust side-channel monitoring

- Think of how we find planets around remote stars.
- We can’t see them directly, but we can see their side effects on the state of the Universe
- Can we use the same idea to “view” hidden parts of the Internet?



Side-Channel Monitoring of the Internet

Network connections that don't pass by you still impact state you can detect or probe – if you know where to look

- Estimate round-trip times between arbitrary hosts
- Indirectly detect routing and filtering rules
- Infer complex network topology features (e.g. software-defined networks)

This is a highly compute, storage, and network-intensive prospect.

- We need the Internet-equivalent of Hubble
- And all of the analysis to go with it
- Large-scale network (10G+), compute (thousands of cores), and storage systems (0.5PB of storage) at CARC used onthe project
- Working on a range of upgrades to support future work