PATHspider

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mami

measurement and architecture for a middleboxed internet

measurement | architecture | experimentation

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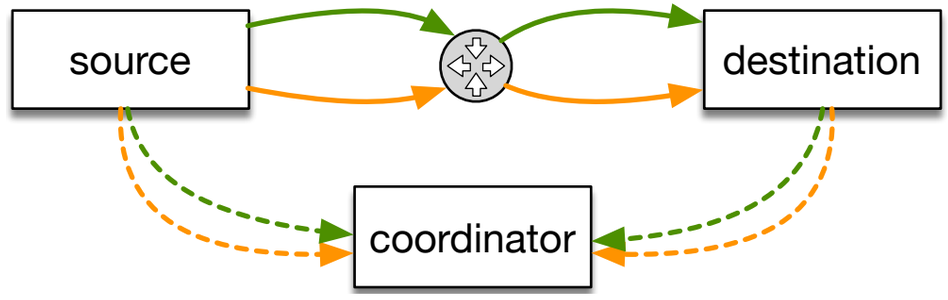
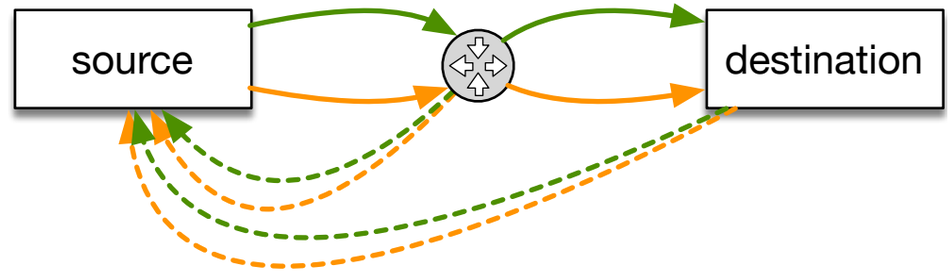
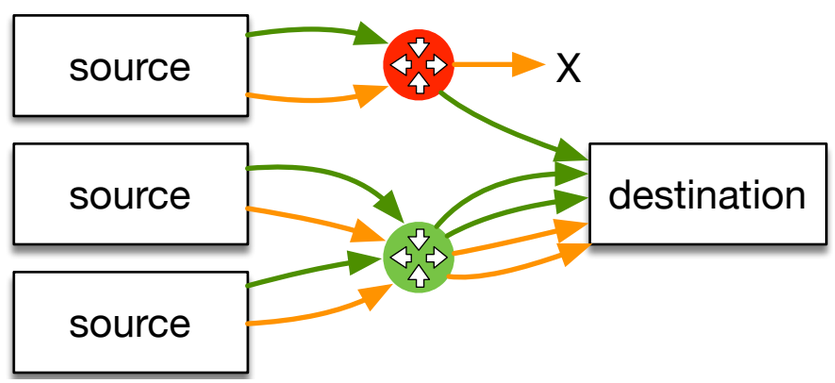
Background: Active Measurement of Path Transparency

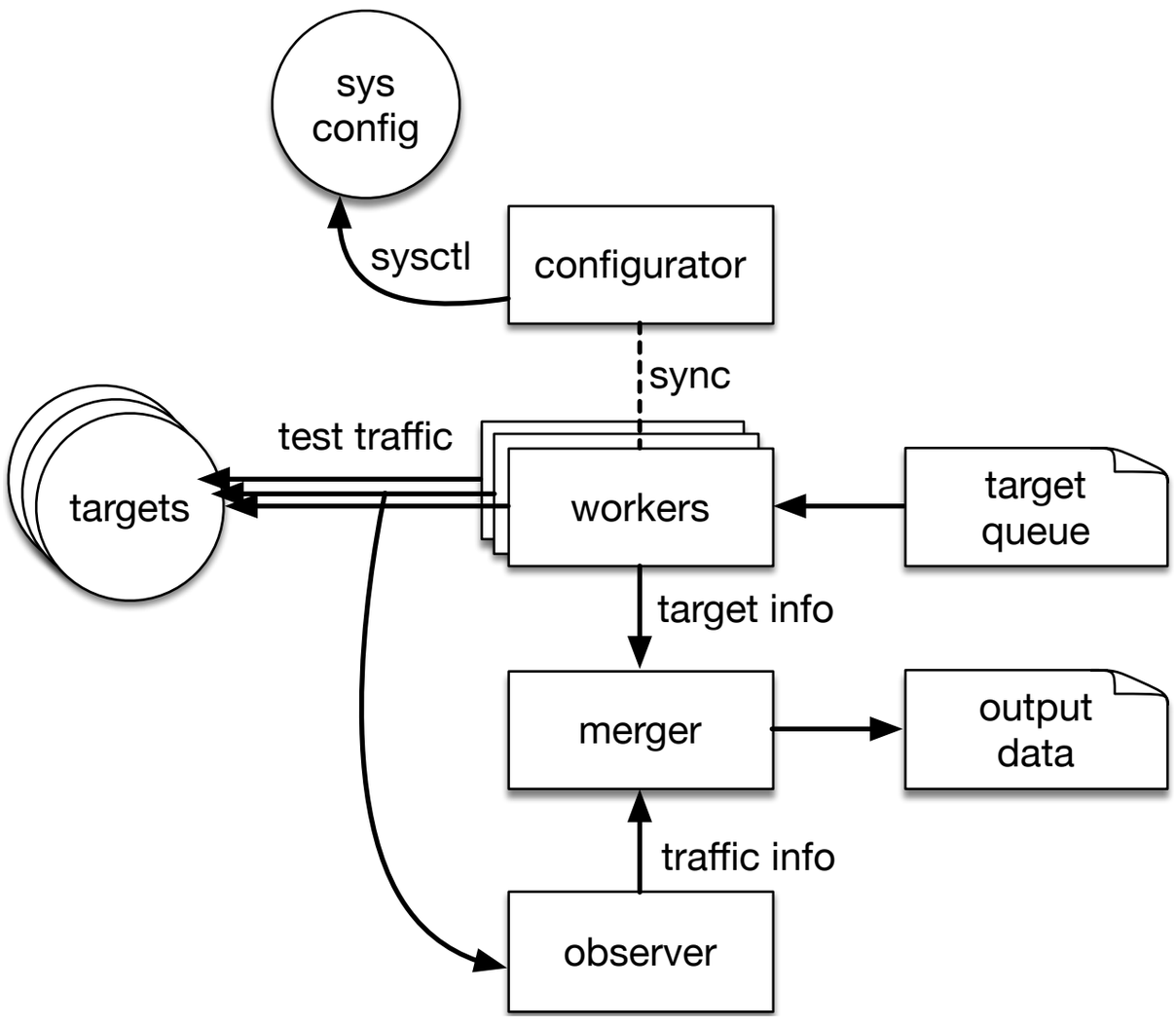
- Basic methodology:
  1. throw a bunch of packets at the Internet
  2. see what happens.
- Ideal: two-ended A/B testing
- Scalable: one-ended A/B testing
- Multiple sources: isolate on-path from near-target impairment
- PATHspider provides a framework for generalizing and scaling this approach.







PATHspider architecture



- Configurator: put system into configuration A or B (e.g. `sysctl`)
- Workers: generate test traffic
- Observer: passively observe test traffic
- Merger: combine information about active measurement with passive observations.

- Plugins allow for customizing traffic generation and observation for each kind of test (ECN, DSCP, TFO, etc.)
- Output fed into Path Transparency Observatory (see upcoming talk)

Current results, future plans

- Explicit Congestion Notification (ECN) to Alexa top 1M websites:

	IPv4	IPv6	all
No ECN connectivity issues	**99.5%**	**99.9%**	**99.5%**
ECN successfully negotiated	**70.0%**	**82.8%**	**70.5%**

- Differentiated Services Codepoint (DSCP): 10.3% of Alexa top 100k have unexpected DSCP values on downstream.

- TCP Fast Open (TFO): 330 IPv4 and 32 IPv6 sites in Alexa top 1M supports TFO (mostly Google). CPE and anti-DDoS sites appear to impair TFO.

- Now in Debian testing (`# apt install pathspider`).
- Next releases include SCTP, UDP-Lite, MP-TCP testing; mPlane integration.