

PATHspider

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measurement and architecture for a middleboxed internet

measurement

architecture

experimentation

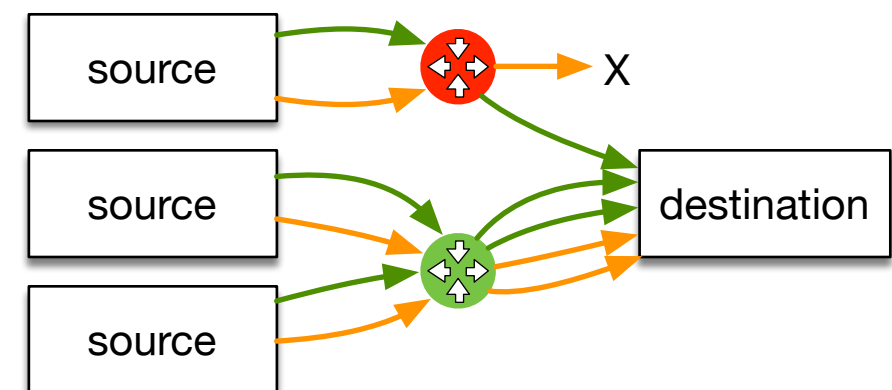
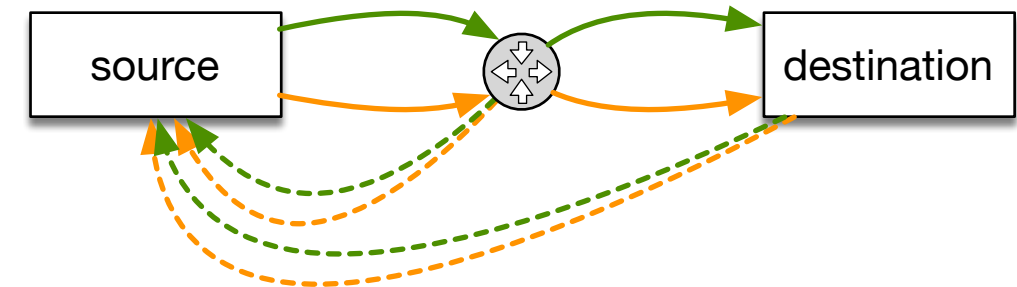
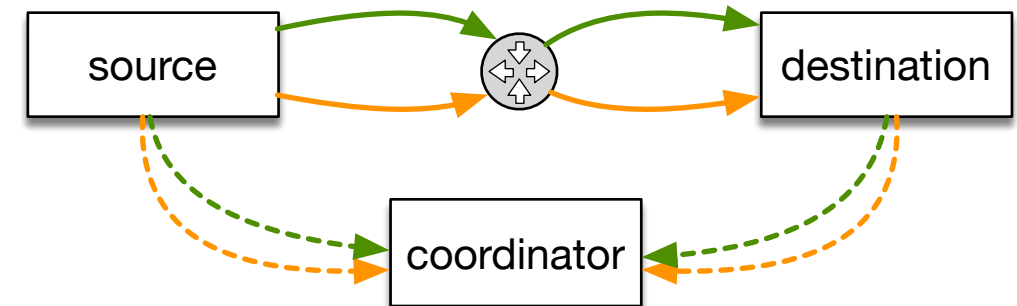
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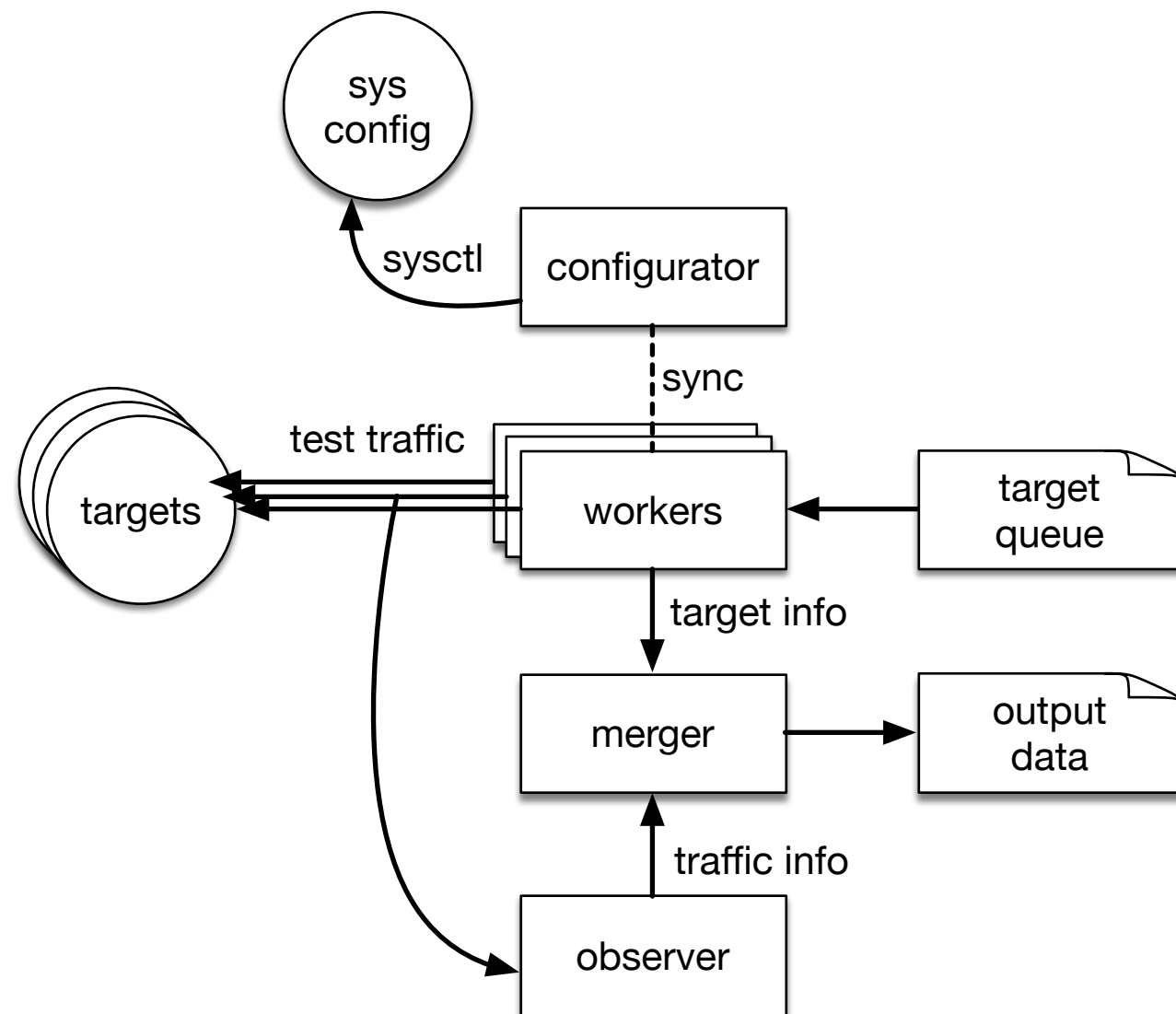
Background: Active Measurement of Path Transparency

- 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.