

Enhancing Anonymity Network Resilience against Pervasive Internet Attacks

Challenge:

- Anonymity/censorship is an arms race, with attackers developing persistent attacks aimed at privacy-enhancing technologies
- Adversary does not need to disrupt anonymity systems, just make them unpleasant to use
- Anonymity systems rely on the Internet, and inherit its vulnerabilities. Attacking the Internet to attack Tor is a serious threat.

Solution:

Increase resilience of anonymity systems to resource exhaustion and infrastructure attacks by:

- examining performance-based resource attacks;
- studying how control-plane routing attacks harms anonymity; develop defenses; and
- analyzing the impact of human mobility on anonymity

Research thrust: Understand use of control-plane attacks to attack Tor

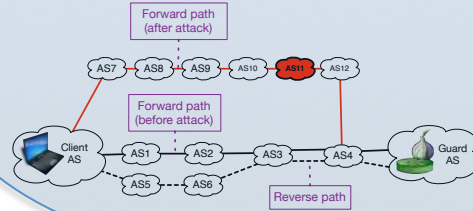


Table 8: Comparison of exit traffic distribution

Traffic Class	2008 [23]	2010 [8]	This Work
Comms			
HTTP/S	96.51%	70.40%	88%
Interactive	0.08%	1.72%	0%
Other	3.41%	27.88%	11%
Bytes			
HTTP/S	59.52%	41.81%	91%
Interactive	0.23%	0.26%	0%
Other	51.82%	57.92%	24%

Research thrust:
Safely measure Tor



Research thrust:
Understand impacts of human mobility

Scientific Impact:

- Development of techniques for privately measuring usage of anonymity system (with formal privacy guarantees)
- Better understanding of the relationship between overlays (e.g., Tor) and underlay (Internet); measured impact of routing attacks against anonymity systems
- First major study of how human mobility affects security and privacy of anonymity networks

Broader Impact:

- Private communication is a requisite for individuals seeking to freely access and disseminate information
- Research activities enhance users' privacy by considering new threats against anonymity networks
- Tor Project, Inc. is collaborator and Transition to Practice partner – research results will affect millions of Tor users
- Research components being added to coursework at Georgetown University

CNS-1527401: TWC: TTP Option: Small: Collaborative: Enhancing Anonymity Network Resilience against Pervasive Internet Attacks

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