DrawBridge—Leveraging Software-Defined Networking for DDoS Defense

University of Oregon

Center for Cyber Security and Privacy (CCSP)

Jun Li, **Mingwei Zhang,** Lumin Shi, Devkishen Sisodia, Elizabeth Fuller,
Peter Reiher (UCLA)

UNIVERSITY
OF OREGON

CCSP@UO

UCLA

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Problem Statement

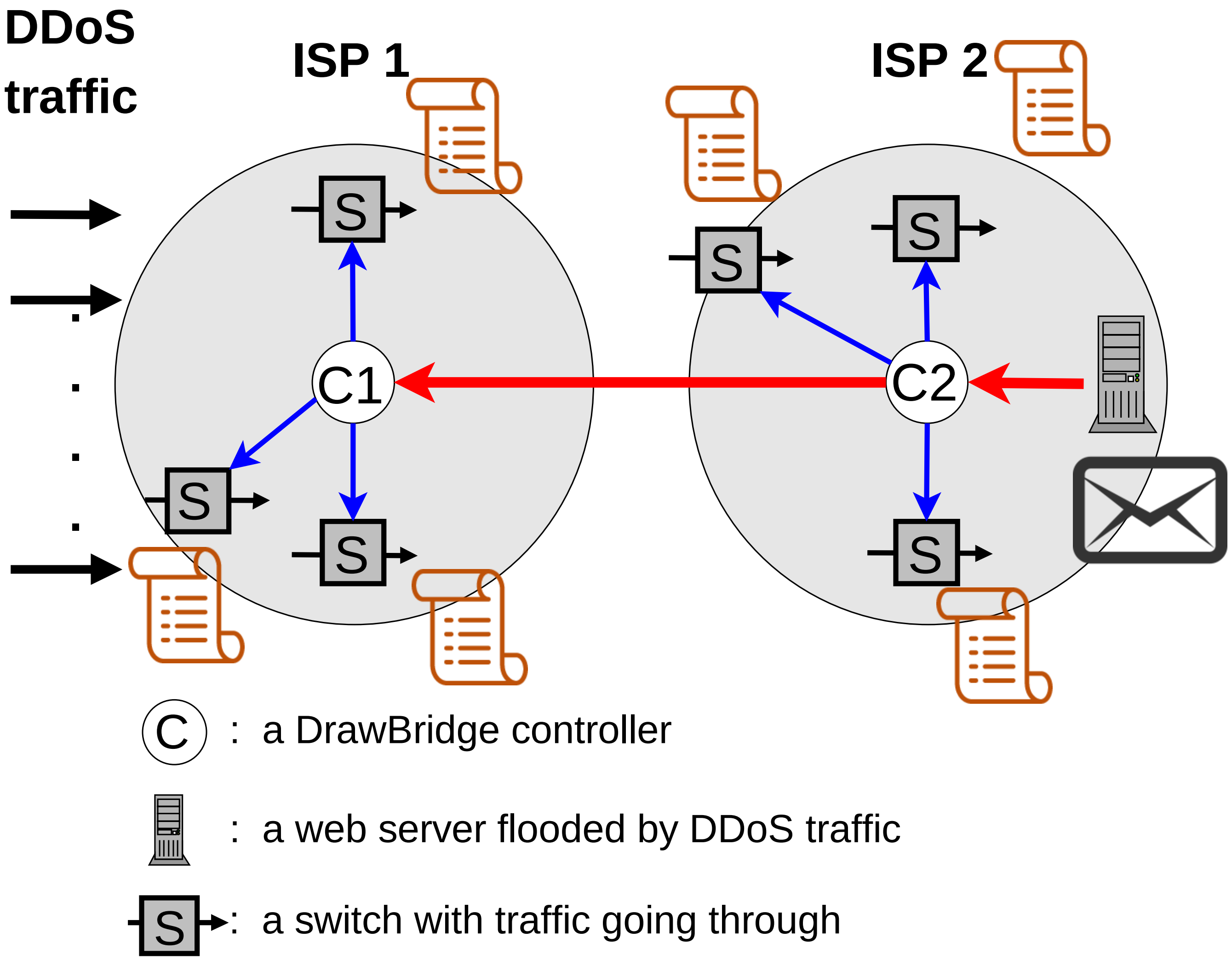
- Distributed denial-of-service (DDoS) attacks cause serious damage to network-based services and their users.
- DDoS attacks are performed by sending large volumes of garbage packets to their targets.
- Small- and medium-sized organizations lack the resources to withstand a very large DDoS attack.
- The end users have the best knowledge of which packets they want and which should be dropped.
- But the ISPs are the ones who might be able to drop the DDoS packets.
- **The dilemma – how do we effectively get the customer knowledge to the ISPs who can act on it?**

Basic Idea of DrawBridge

- Our solution, DrawBridge, enables users to inform ISPs how to handle DDoS attacks.
- Drawbridge is based on Software-Defined Networking (SDN)
  - SDN is perfectly well-suited for traffic handling tasks—including filtering traffic meeting specific rules or criteria
- Drawbridge will change the current paradigm of traffic engineering performed by ISPs.
- DrawBridge enables the propagation of the DDoS filtering rules from customers to ISPs and between ISPs.

Leveraging SDN

- Users, end hosts, or ISPs can subscribe to the Drawbridge service that an ISP's controller provides.
- On attack, the customer sends traffic filtering rules to the controller.
- The controller verifies and processes the traffic engineering rules.
- And deploys the rules at well-chosen Drawbridge switches or upstream ISPs to filter the DDoS traffic.


DDoS traffic
ISP 1
ISP 2
S
S
S
S
S
S
S
C1
C2
C
: a DrawBridge controller
: a web server flooded by DDoS traffic
S
: a switch with traffic going through

Current Research Topics

- Identification of the best strategies for ISP collaboration
- Discovery of best locations for deploying DDoS filtering rules
- Optimization of rule space throughout DrawBridge nodes
- Incentive of ISPs to run DrawBridge

Conclusion

- This project allows the traffic recipients who are hurt by DDoS attacks to play an active role in responding to them.
    - They can choose exactly what they do and do not want receive.
- Drawbridge changes the current paradigm of traffic engineering performed by ISPs, enabling end hosts or downstream ISPs to express their needs and enabling ISPs to make informed traffic engineering decisions.
- DrawBridge enables active AS-level collaboration on DDoS defense, and can potentially stop the DDoS traffic close to the attack sources.

Contact Us

- We seek the interests and collaboration from NANOG attendants on this project, including testing and deploying DrawBridge.

Jun Li
University of Oregon
netsec@cs.uoregon.edu
541.346.4424
Twitter: @ccspuo

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