

Deep Dive into IPv6 Extension Header Testing: Framework

IETF 115

draft-elkins-v6ops-eh-deepdive-fw

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Agenda

- Background of problem
- Topologies
- Diagnostic Framework

Background

- Some studies claim huge packet drops with IPv6 Extension headers on the Internet
- When tested with PDM EH on standalone servers, we saw success across multiple sites on multiple continents
- Why are we seeing different results?

Sending Destination Options (and Fragment) EHs

1. FTP Toronto to Warsaw - worked
2. FTP Toronto to Seattle - worked
3. FTP Toronto to Mumbai - worked
4. FTP Toronto to Melbourne - worked
5. FTP Toronto to Frankfurt – worked

(Quite a few others also!)

Why Different Results?

Is it:

- Difference in networking topology?
- Standalone servers/ VMs / CDN?
- Difference in type of IPv6 EH?
- Difference in size of IPv6 EH?
- Difference in data encoded in IPv6 EH?
- Difference in how IPv6 packet are generated?
- Difference in cadence of IPv6 packet?
- Something else?

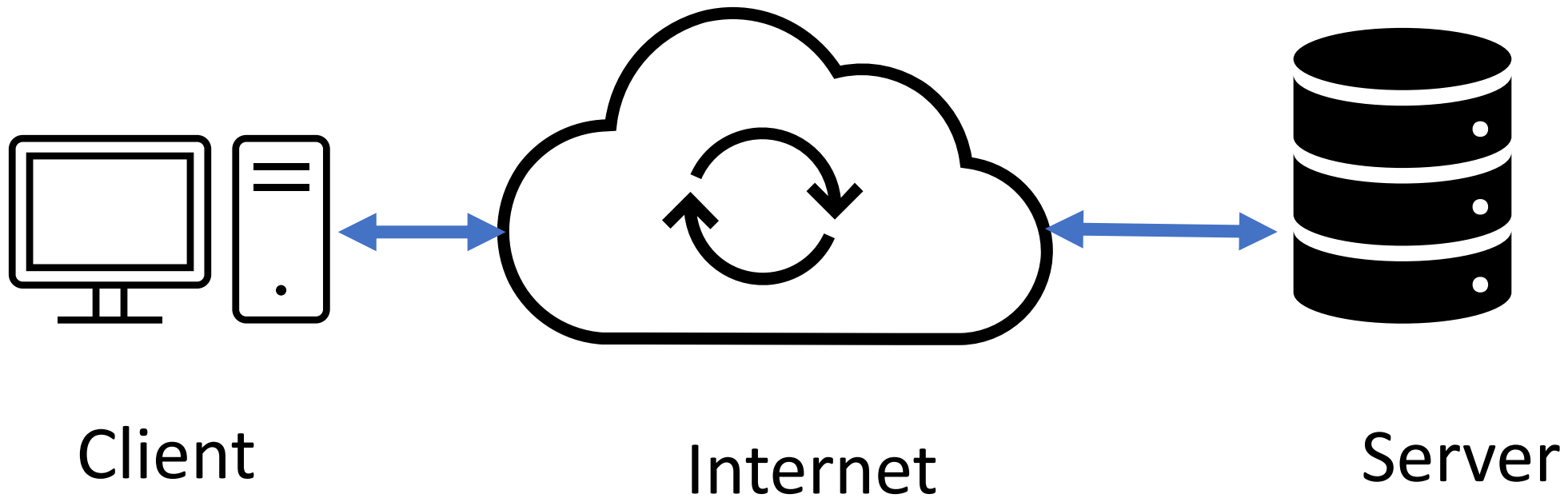
Task Ahead of Us

1. We need to develop clear testing methodologies for various network topologies
2. The methodology should make it possible to try to understand why the packet dropped
 - Could be completely unrelated to the presence of IPv6 EH! (Ex. a bug)
 - But where and why?
 - IPv6 itself may be disabled behind CDN
 - The frequency of packets could be considered as DDoS
 - Many other reasons...

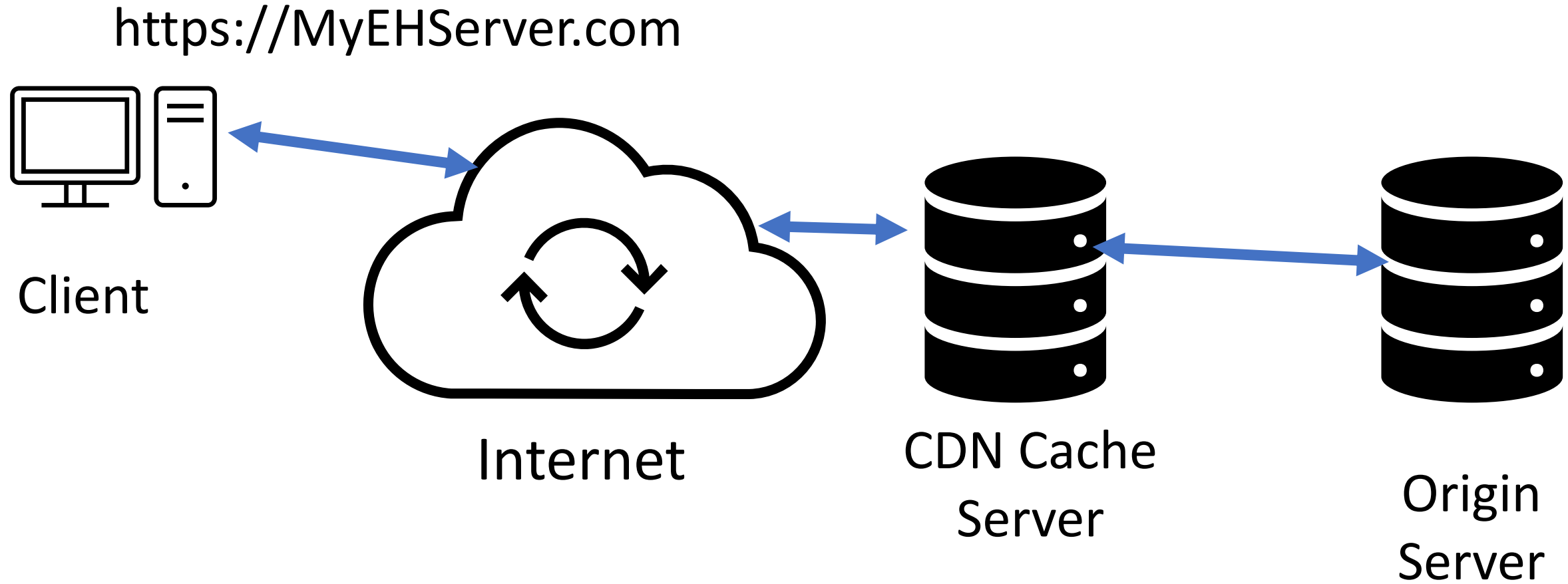
Topologies

- Client – Internet – Server
- Client – Internet – CDN Cache Server – CDN network – Origin Server
 - (Internal to CDN may have multiple more complex topologies)
- Client – Internet – Edge of Cloud Provider – Origin server hosted by cloud provider

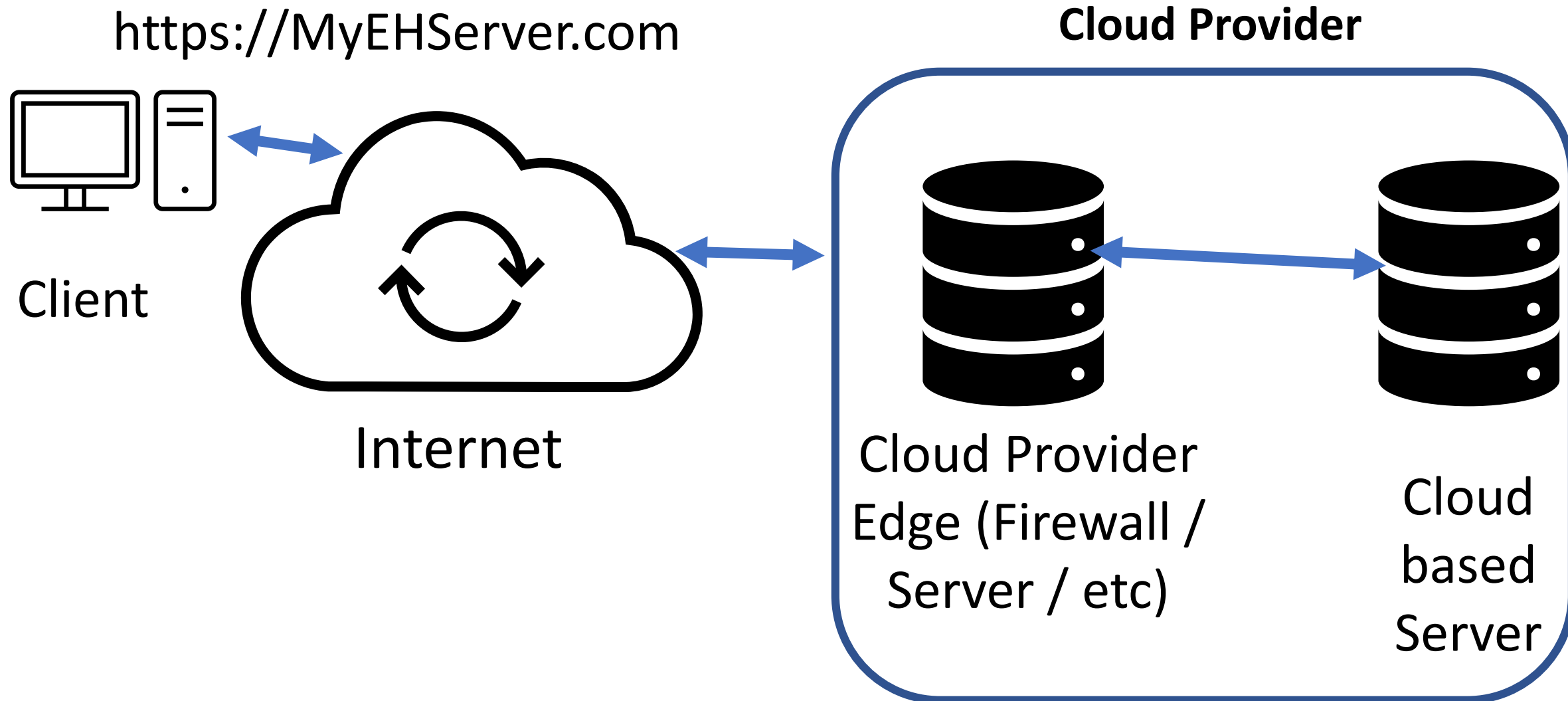
Simplest: Client – Internet -- Server



With CDN Topology



With Cloud Provider Topology



Our Plan

- Deepdive into methodology and testing for EH problem isolation for owned client / server
- Deepdive into methodology and testing for EH problem isolation in a network using a CDN
- Deepdive into methodology and testing for EH problem isolation in a network using cloud

- EH problem isolation for routers
- EH problem isolation for load balancers
- EH problem isolation for proxies
- EH problem isolation for host OSs
- EH problem isolation for transit networks
- EH problem isolation for ISPs (multiple components / networks)

- BCP for EH Permissions, Encryption and Authentication

Comments

- Thoughts???
- Questions???