Demo: BGP Path Hijacking

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Goals of the Assignment

- Understand how BGP path hijacking attacks might happen in the real world.

- Give students a hands-on experience, and a platform to explore beyond the primary goal.

Outline

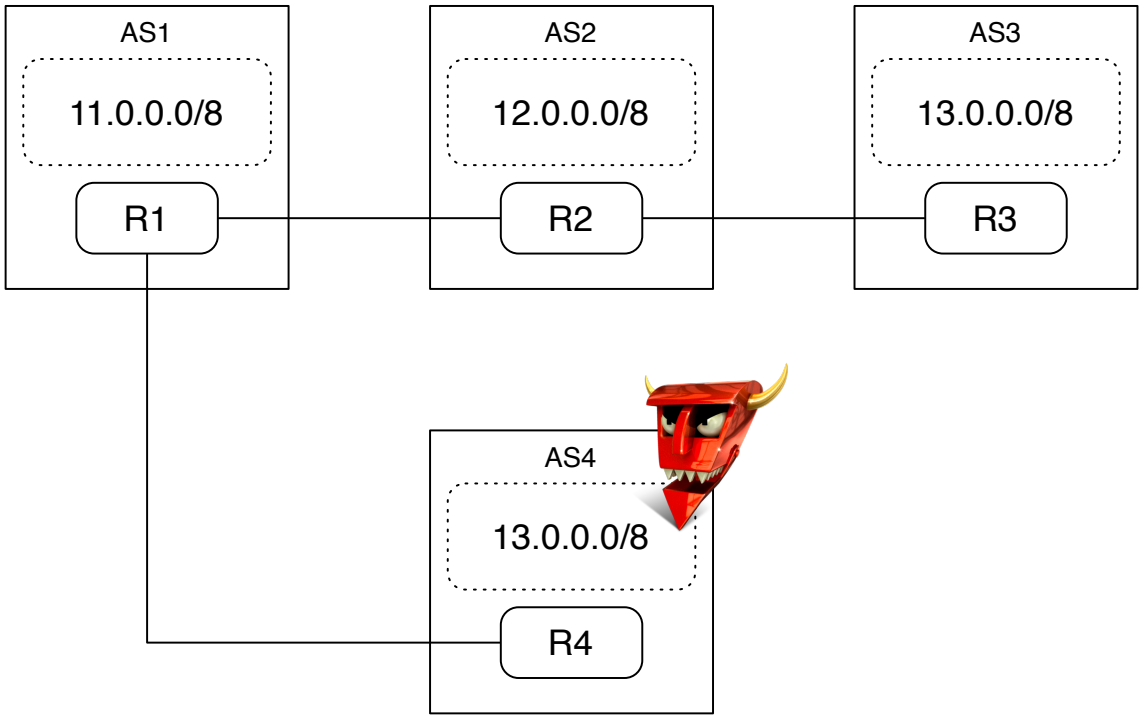
- Why is Mininet helpful?
- Assignment walk through
- Behind the scenes

Why is Mininet helpful?

- Easy to setup the environment
  - No need for expensive routers or VMs.
  - No need to simulate BGP protocol. Use production-quality software!
  - Explore various parameter tweaks readily.
- Easy to access state information
  - `cat /path/to/logfiles`
  - `tcpdump`
- Easy to distribute the assignment
  - `git clone ssh://git@bitbucket.org/jvimal/bgp.git`

Assignment Walk Through

- Step 1: Set up the environment on Mininet



Assignment Walk Through

- Step 2: Start R1, R2, R3. Log into R1's routing daemon.

Assignment Walk Through

- Step 3: Peek into R1's routing entries.

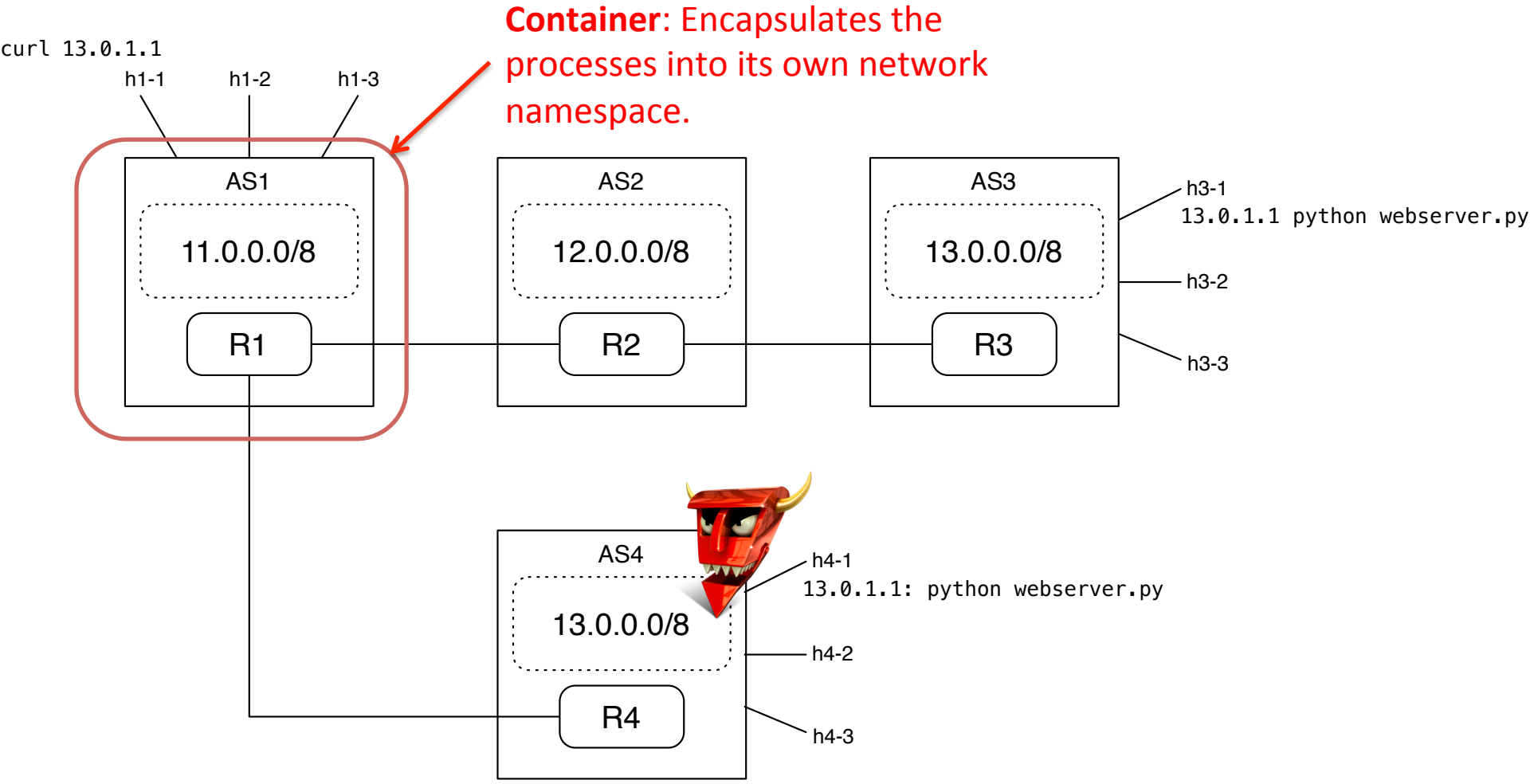
- Step 4: Start browsing a 13.0.0.0/8 website at AS1 in a loop.

Assignment Walk Through

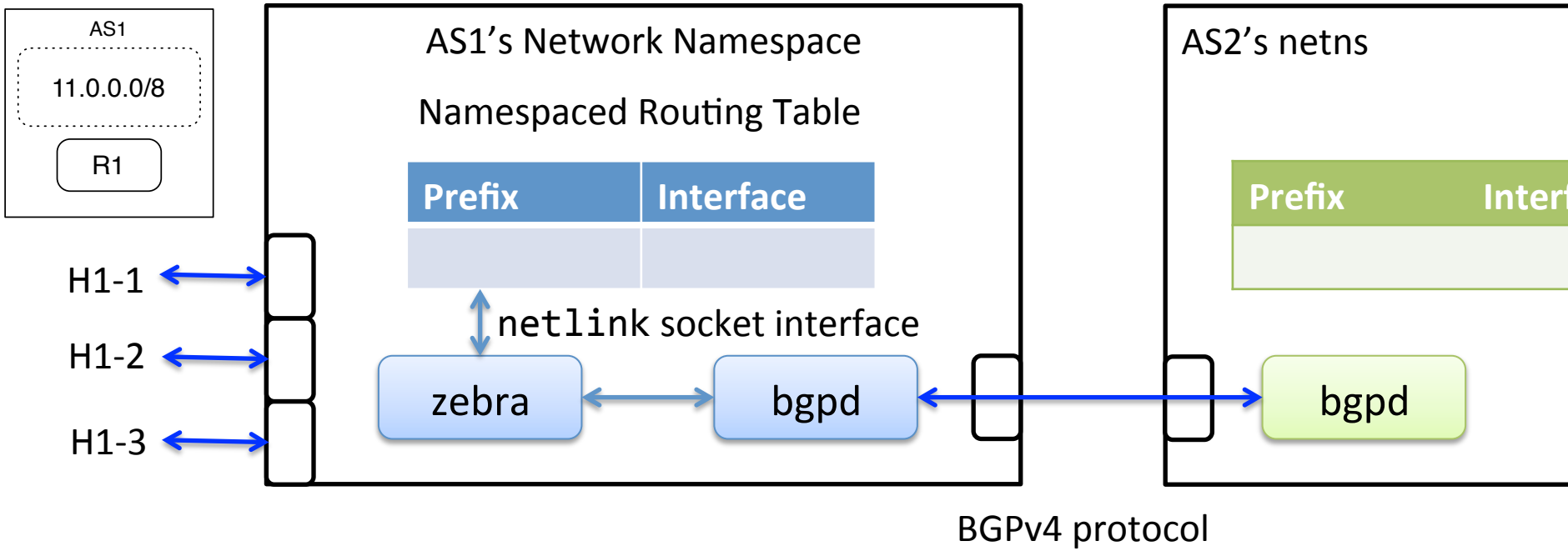
- Step 5: Start the rogue AS.
  - Wait for convergence.
  - Watch what happens to website browsing loop.
  - Check the routing information base in R1.

- Step 6: Stop the rogue AS.

Behind the Scenes: Network Namespace (Isolation)



Behind the Scenes: Quagga Routing Suite



- Configure static IP addresses for AS1, AS2, etc. and set up static routing entries.
- Configure bgpd's peers inside each AS.
- Set up zebra to program Linux Kernel's routing entries (no need for OpenV*Switch*).

Things to try out

- Try tcpdump on BGPv4 messages
- Try larger topologies and plot BGP convergence times
- Replay BGP updates in Internet (RIPE data) and the entire Internet2 (dataset available online)
- Try other kinds of attacks (announcing more specific prefix with a larger path)