BGP Mux Experiment Plan

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1 Experiment Objectives

The GTNoise lab in College of Computing at Georgia Institute of Technology, in collaboration with Flux Lab at Department of Computer Science in The University of Utah and the Department of Computer Science at the University of Wisconsin, is conducting an experiment that involves advertising BGP routes to the global Internet using numbered resource allocations (i.e., AS numbers and IP address space) from ARIN.

The experiment will deploy and evaluate the BGP Mux. BGP Mux provides one-stop-shop for peering for clients, such as virtual networks. Virtual networks establish BGP sessions with BGP Mux to receive BGP updates and traffic from upstream ISPs. Upstream ISPs establish only one session and a contract with BGP Mux and are protected from the transient sessions that BGP Mux clients may introduce.

2 Experiment Plan

After obtaining an AS number and a /23 address block, a router with BGP Mux functionality will initially be deployed in two locations with one peering session in each.

- Georgia Institute of Technology, Atlanta, GA. The BGP session will be established with Georgia Institute of Technology - AS 2637.
- Seattle Internet Exchange, Westin Hotel, Seattle, WA. The BGP session will be established with PSG AS 3130.

We will split the IP address allocation into two parts (/24) and allocate them to two virtual networks running in Emulab facility and controlled entirely by BGP Mux researchers. We are also working towards

To test BGP Mux's functions, we will perform following initial set of tests:

1. Announce the prefix though BGP session to BGP Mux.
   - Verify basic connectivity for incoming and outgoing traffic.
   - Verify that private AS numbers are removed from the updates to the Internet.
2. Announce the prefix with AS prepend information.
   - Verify that AS prepend with private AS numbers is translated to AS prepend with public ASN.
   - Verify that most of the traffic converges to a BGP Mux router with shorter prepend.
3. Disable session to one of the BGP Mux routers.
   - Verify proper route withdrawal from the Internet.
   - Showcase the use of BGP Mux in SIGCOMM'09 and NSDI'10 conferences.
4. Use BGP Mux routers together with various virtual network applications.

3 Experiment Practices

People conducting the experiment have enough experience to operate BGP protocol in a safe and non-disruptive manner. Lead project investigator, professor Nick Feamster, is well established researcher in computer networks and did his Ph.D thesis on BGP configuration automation tools. Lead developer Vytautas Valancius has extensive work experience in service provider networks and is certified with Cisco CCIE certification number #14359.

To preserve the stability of the Internet, we will follow the following practices:

1. We will drop all updates going to our upstream providers. Only the prefixes allocated to BGP Mux will be allowed to go though.
2. We will drop all updates coming from virtual network clients. Only the prefixes allocated to BGP Mux will be allowed to get in.
3. We will remove private AS information from our virtual network clients.
4. We will enable BGP session dampening to prevent virtual networks from announcing the prefixes often.

4 Technical Coordination

The experiment is conducted by Vytautas Valancius and supervised by professor Nick Feamster. We will maintain a 24/7 technical support line (POC handle VVA21-ARIN). The experiment is coordinated with our upstreams:

- Ron Hutchins in Georgia Institute of Technology (POC handle RH129-ARIN), and
- Randy Bush in PSG (POC handle RB366-ARIN)

Vytautas Valancius and Nick Feamster are the points of contact for all inquiries and complaints for traffic and incidents relating to BGP Mux.

5 Experiment Outcome

Experiment outcome is going to be published as a poster in SIGCOMM'09 conference and as a paper in NSDI'10 conference. Aside from publications, we will allow researchers to connect to BGP Mux and test their applications inside virtual networks, subject to the strict filtering guidelines we described above. BGP Mux will prevent the upstream providers from having to configure explicit connections to all such downstream virtual networks.

6 Concluding the Experiment

The validation phase of the experiment will conclude with NSDI 2010 conference which will commence in April 2010. If the service provided by BGP Mux is popular in the research community, we will request an extension for our experimental ARIN resource allocation or transition to a non-experimental allocation.