NJEDge.Net LISP Architecture

Jim Stankiewicz
stank@njedge.net

Michael Kowal
mikowal@cisco.com
LISP Overview

IP addressing overloads location and identity – leading to Internet scaling issues

- Why current IP semantics cause scaling issues?
  - Overloaded IP address semantic makes efficient routing impossible
  - Today, “addressing follows topology,” which limits route aggregation compactness
  - IPv6 does not fix this

- Why are route scaling issues bad?
  - Routers require expensive memory to hold Internet Routing Table in forwarding plane
  - It’s expensive for network builders/operators
  - Replacing equipment for the wrong reason (to hold the routing table); replacement should be to implement new features

“... routing scalability is the most important problem facing the Internet today and must be solved ...”

Internet Architecture Board (IAB)
October 2006 Workshop (written as RFC 4984)
LISP Overview

LISP creates a Level of indirection with two namespaces: **EID** and **RLOC**

- **EID (Endpoint Identifier)** is the IP address of a host – just as it is today
- **RLOC (Routing Locator)** is the IP address of the LISP router for the host
- **EID-to-RLOC mapping** is the distributed architecture that maps EIDs to RLOCs
  - Analogous to a DNS Lookup

- Network-based solution
- No host changes
- Minimal configuration
- Incrementally deployable
- Support for mobility
- Address Family agnostic
- Uses Pull vs. Push Routing
- Open Standard
NJEDge.Net Overview

NJ’s Research and Education Network Since 2000
NJEDge.Net LISP Deployment

- LISP Briefing (June 2011)
- CPOC (Aug 2011)
- Deploy and Test LISP in Production Environment
- First LISP-Production Member (December 2011)
NJEdge LISP Architecture
Transition #1

- Member peered with NJEDge and Provider X via BGP
- Tuning BGP to properly balance Ingress Traffic Flows was Challenging
  - Member owned 16 x /24s
Transition #1

- Configure Member for LISP
  - Remove BGP
  - Add Two Default routes
- Proxy Router attracts Ingress Traffic destined to Member and load balances towards the member.

Benefits:
- No BGP Configuration to Manage
- Guaranteed Ingress Traffic Load Balancing
Transition #2

- Local, Non-Member Member peers with Provider X & Y via BGP
- Tuning BGP to properly balance Ingress Traffic Flows was Challenging
Transition #2

- Configure Member for LISP; remove BGP and add two Default routes (one per provider)
- Proxy Router attracts Ingress Traffic destined to Member and load balances across both of the Member’s Router interfaces.
Transition #3

- Post-Transition, Member had budget to upgrade elderly Edge Router
- Since LISP only “pulls” routing information, smaller memory requirements allow for inexpensive future router purchase.
Transition #3

Original Budget: $28K (estimated)

Alternative: $17K (estimated)

Assume Hardware Life: 5-7 years

Savings: ~$11K
Next Steps

• Waitlist of 12 Members to be transitioned
• Use LISP VM-Mobility to solve Disaster Recovery initiatives.
LISP VM-Mobility

Multi-Tenant Network

Multi-Tenant Compute

LISP Updates VM-Move Across Subnets

Data Center 1

Data Center 2

Internet

LISP routers

VM

VM move

a.b.c.1

a.b.c.1