

Locator/ID Separation Protocol

LISP – A Brief Overview

4 May 2011

Darrel Lewis, Cisco

Job Snijders, InTouch

Agenda

1. LISP Overview
2. LISP Use Cases
3. LISP Summary
4. References

LISP Overview

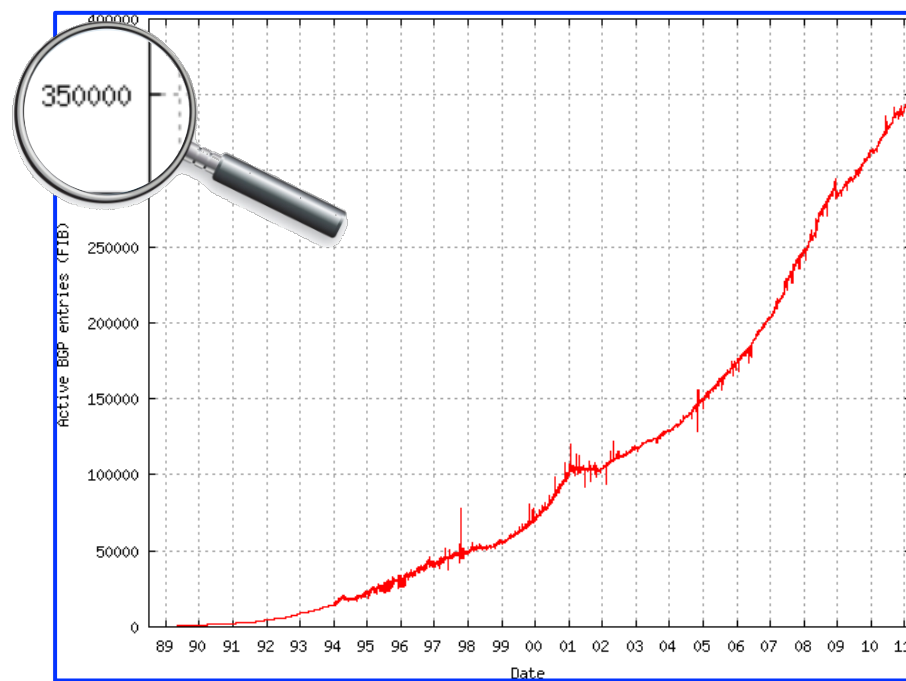
- Loc/ID overload leads to Internet scaling issues

Why do 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 a concern?

- Routers require expensive memory to hold the Internet Routing Table in the forwarding plane
- While your router may have enough memory now, the lifetime gear in the network can be 7 years or more...
- Replacing equipment for the wrong reason (to hold the routing table); replacement should be to implement new features and bandwidth requirements



“ ... 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

IP encapsulation scheme

- Decouples host **IDENTITY** and **LOCATION**
- Dynamic **IDENTITY**-to-**LOCATION** mapping resolution
- Address Family agnostic day-one

IPv4-in-IPv4, IPv4-in-IPv6, IPv6-in-IPv4, IPv6-in-IPv6

Minimal Deployment Impact

- No changes to end systems or core
- Minimal changes to edge devices

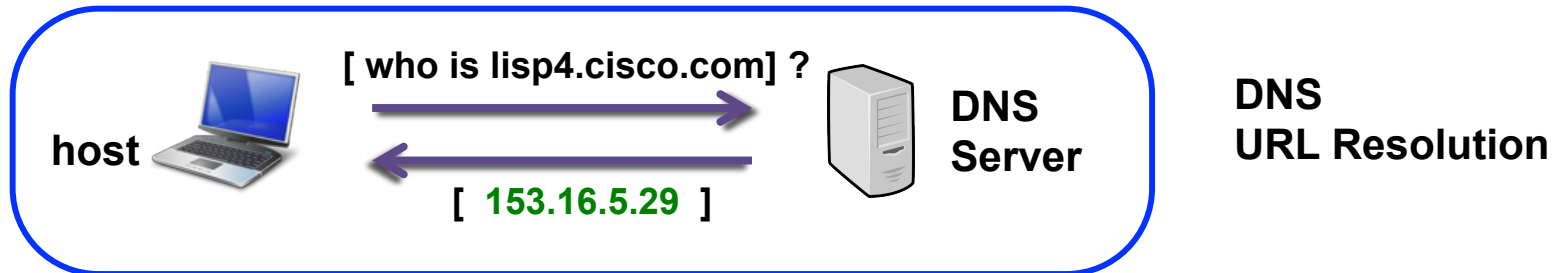
Incrementally deployable

- LISP-to-LISP and LISP-to-non-LISP considered day-one

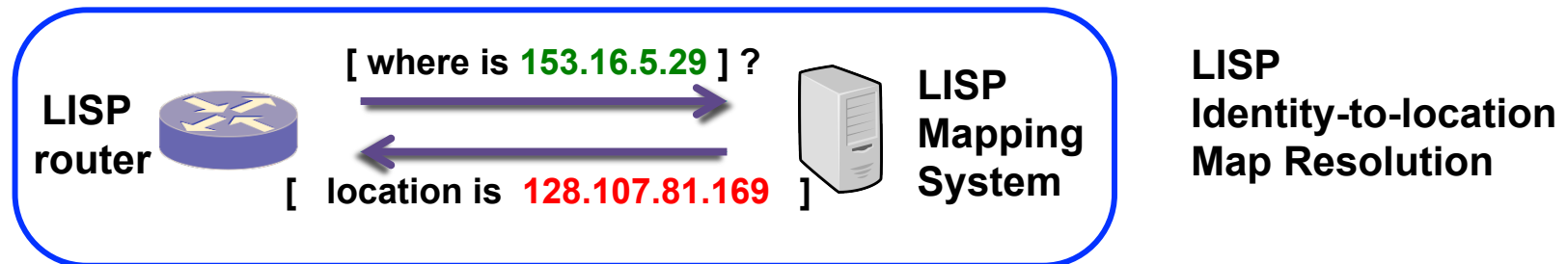
LISP Overview

LISP Map Lookup is analogous to a DNS lookup

- DNS resolves IP addresses for URLs



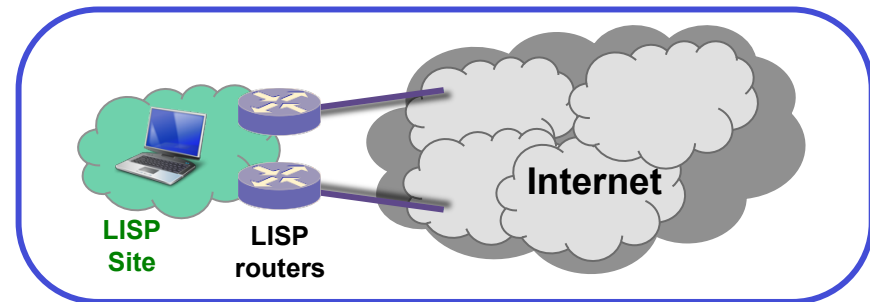
- LISP resolves locators for queried identities



LISP Uses Cases

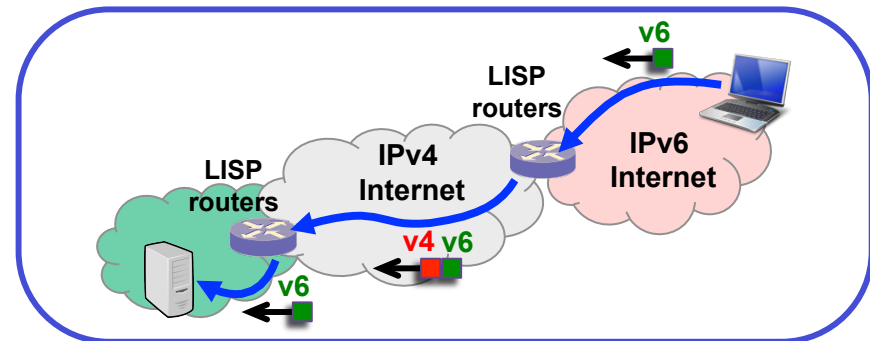
Efficient Multi-Homing

- IP Portability
- Ingress Traffic Engineering without BGP



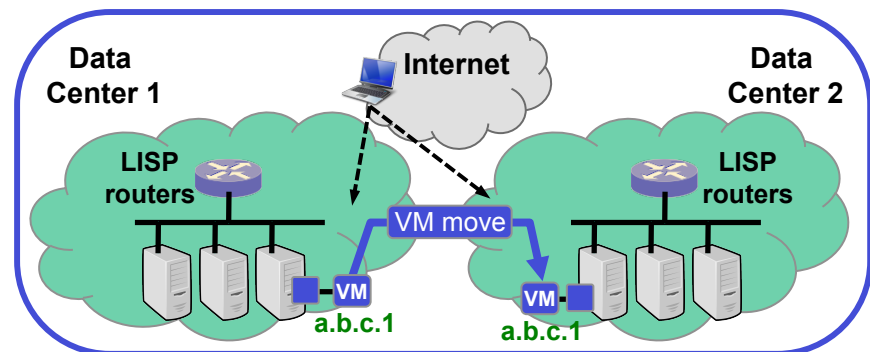
IPv6 Transition Support

- v6-over-v4
- v4-over-v6



VPNs and Segmentation

- Over-the-top
- Multi-tenancy



Efficient Multi Homing

Needs:

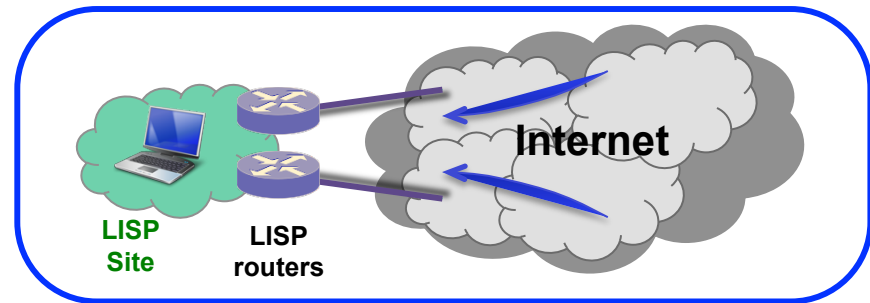
- Site connectivity to multiple providers
- Low OpEx/CapEx

LISP Solution:

- LISP provides a streamlined solution for handling multi-provider connectivity and policy without BGP complexity

Benefits:

- Multi-homing across different providers
- Simple policy management
- Ingress Traffic Engineering
 - (without de-aggregation!)



IPv6 Transition Support

Needs:

- Rapid IPv6 Deployment
- Minimal Infrastructure disruption

LISP Solution:

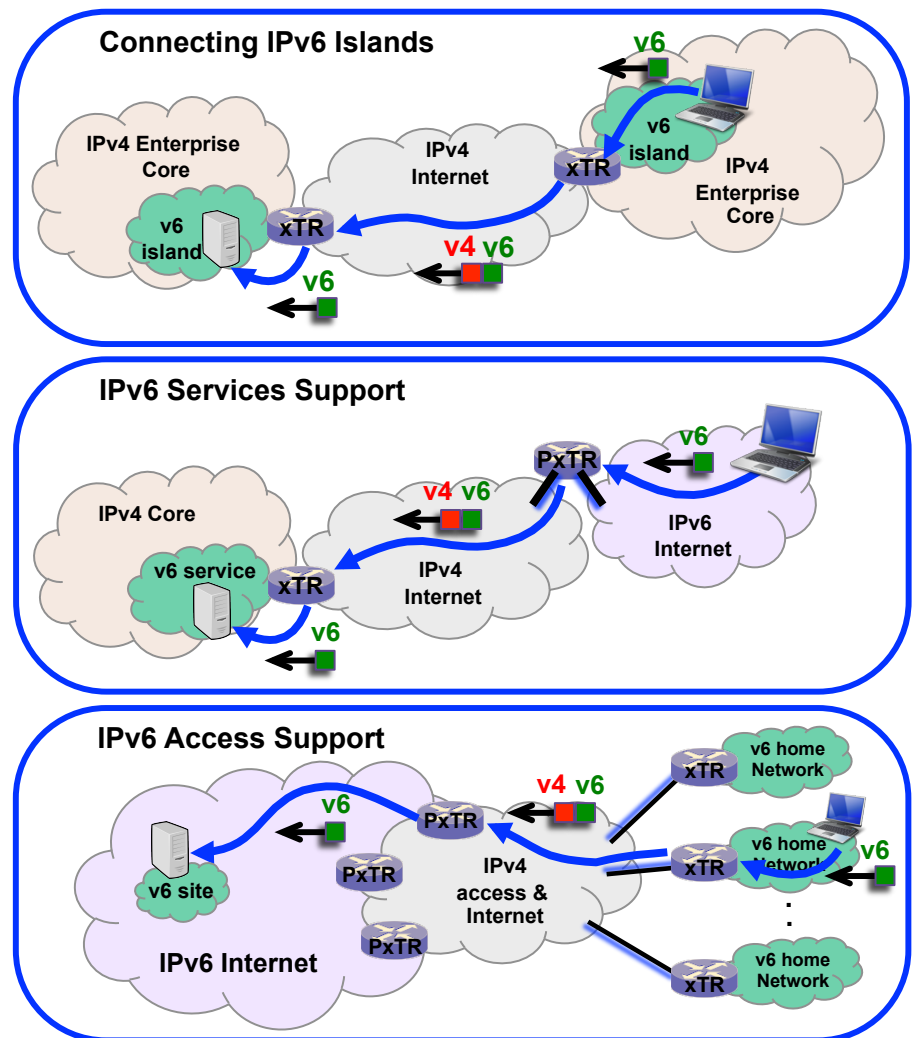
- LISP encapsulation is Address Family agnostic

IPv6 interconnected over IPv4 core

IPv4 interconnected over IPv6 core

Benefits:

- Accelerated IPv6 adoption
- Minimal added configurations
- No core network changes
- Can be used as a transitional or permanent solution



VPNs and Segmentation

Needs:

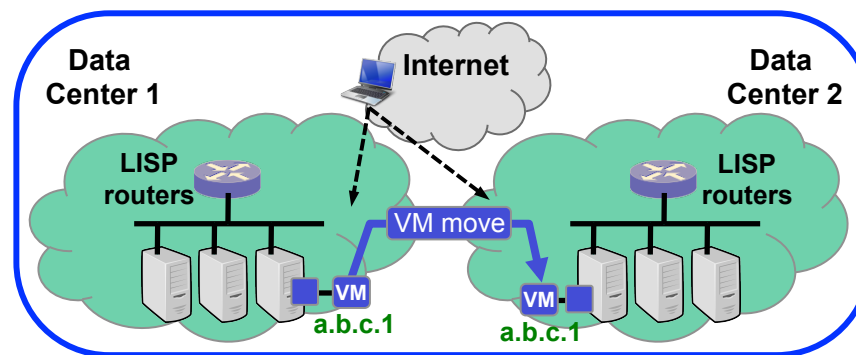
- High scale VPNs, supporting both IPv4 and IPv6

LISP Solution:

- LISP Instance ID for 'over the top' VPNs
- Supports complex topologies, including multihomed branches, partial mesh etc.

Benefits:

- Direct Path (no triangulation)
- No dynamic routing to sites
- IPv4/IPv6 Support
- No CE-PE Coordination
- LISP Mapping System allows high scalability



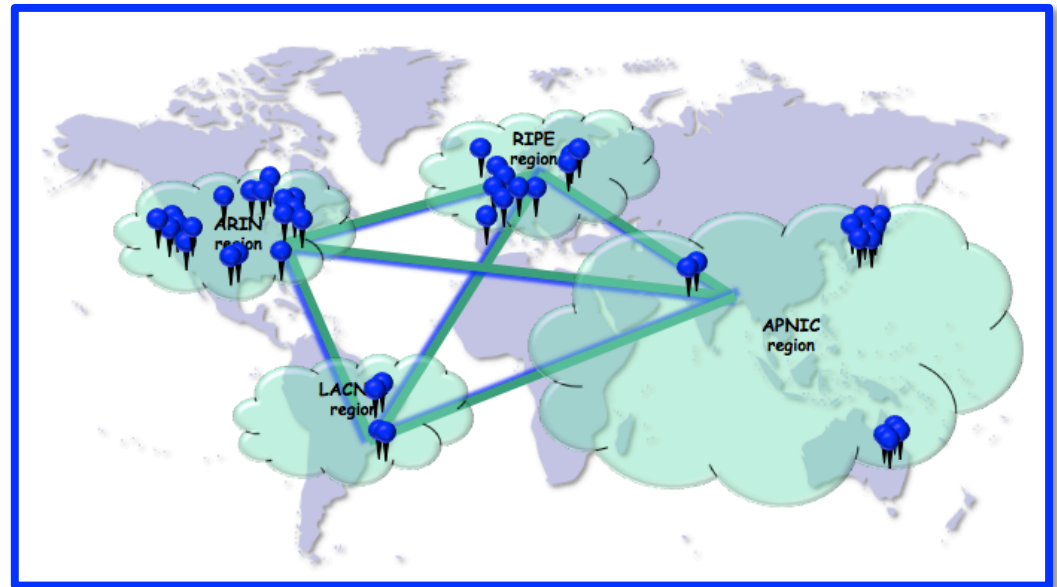
LISP Global Pilot Network





Cisco-operated

- ~ 4 years operational
- > 110+ sites, 18 countries

Nine implementations

- Cisco: IOS, IOS-XE, NX-OS
- FreeBSD: OpenLISP
- Two Linux implementations
- Android implementation
- Two other router vendors



Company	IPv4 Sites	IPv6 Sites
	http://www.lisp4.net http://lisp.cisco.com	http://www.lisp6.net http://lisp.cisco.com
		http://www.lisp6.facebook.com
		http://www6.eudora.com http://myvpn6.qualcomm.com
	http://www.lisp.intouch.eu/	http://www.lisp.intouch.eu/

LISP IETF efforts

IETF LISP WG: <http://tools.ietf.org/wg/lisp/>

Draft	Current Status	Next Steps/Target
LISP base protocol (draft-ietf-lisp-12)	WG Document Submitted: 04/26/2011	WG Last Call now...
LISP+ALT (draft-ietf-lisp-alt-06)	WG Document Submitted: 03/04/2011	WG Last Call now...
LISP Interworking (draft-ietf-lisp-interworking-01)	WG Document Submitted: 08/26/2010	WG Last Call now...
LISP Map Server (draft-ietf-lisp-ms-07)	WG Document Submitted: 03/13/2011	WG Last Call now...
LISP Multicast (draft-ietf-lisp-multicast-05)	WG Document Submitted: 04/05/2011	WG Last Call now...
LISP Internet Groper (draft-ietf-lisp-lig-02)	WG Document Submitted: 04/05/2011	Several implementations available (including open source)
LISP Mobile Node (draft-meyer-lisp-mn-04)	Not WG Document Submitted: 10/25/2010	Three prototype implementations underway
LISP Canonical Address Format (draft-farinacci-lisp-lcaf-04)	Proposed for WG adoption Submitted: 10/14/2010	-04 update
LISP MIB (draft-ietf-lisp-mib-01)	WG Document Submitted: 03/14/2011	-01 update sent to WG list

LISP Summary

LISP creates a **level of indirection** that separates **End Site** addresses from **Location** address to resolve Internet scaling issues

LISP requires no host changes, minimal CPE changes, and adds some infrastructure components to the core

LISP enables other “interesting” functionality such as, simplified multi-homing with ingress traffic engineering without the need for BGP, and address family traversal with segmentation.

LISP is an open standard (no Cisco IPR)

References

LISP Information

- IETF LISP WG <http://tools.ietf.org/wg/lisp/>
- LISP Beta Network <http://www.lisp4.net> <http://www.lisp6.net>
- Cisco LISP Site <http://lisp4.cisco.com> <http://lisp6.cisco.com>

Mailing Lists

- IETF LISP WG lisp@ietf.org
- LISP Interest lisp-interest@puck.nether.net
- Cisco LISP Questions lisp-support@cisco.com

