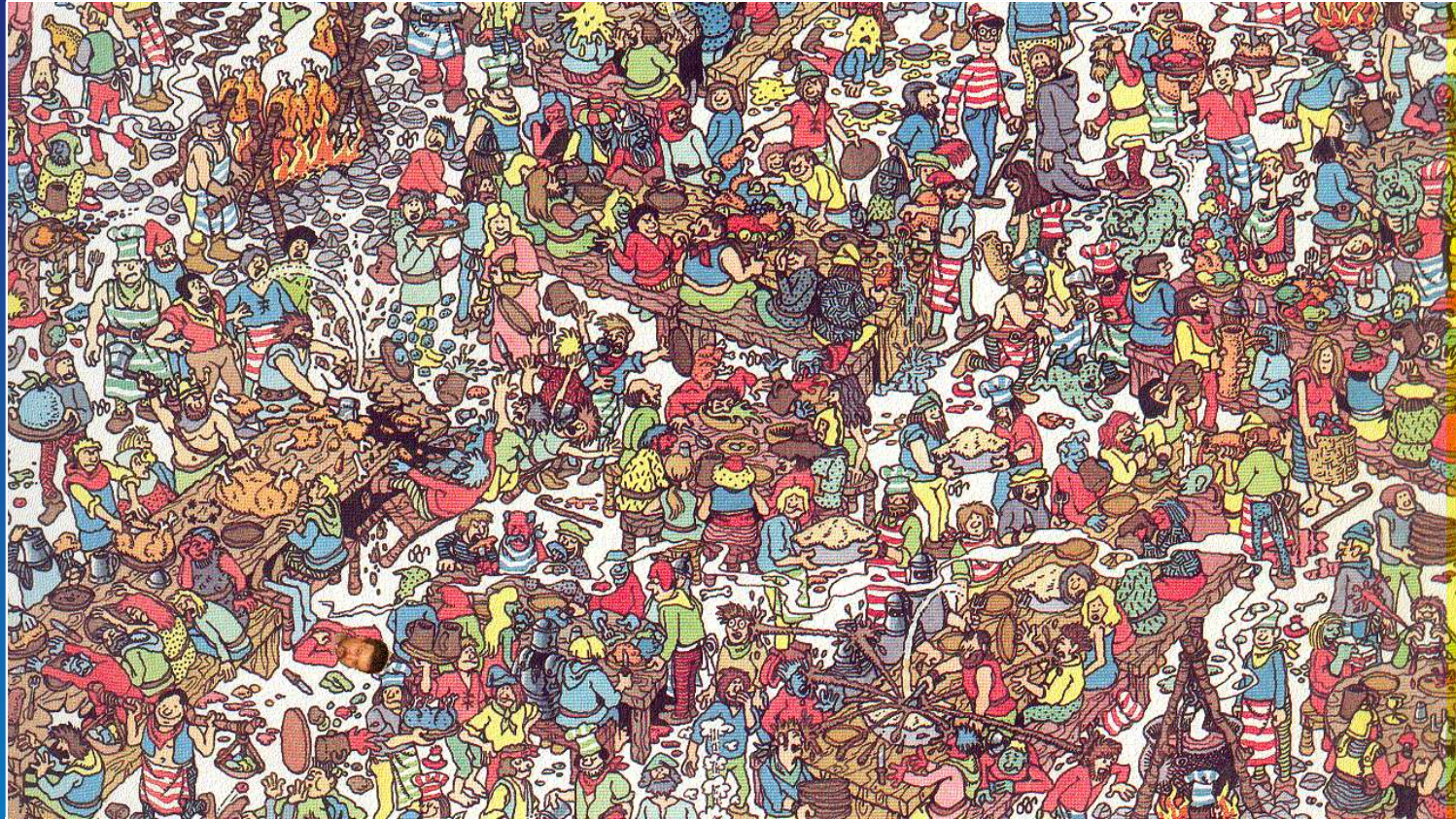


LISP

# Migration zu IPv6 mit LISP

Gerd Pflueger – [gerd@cisco.com](mailto:gerd@cisco.com)



Where is Gerd?



Nürnberg, February 25<sup>th</sup> 2013, 6:30AM

# Gerd at the very present time



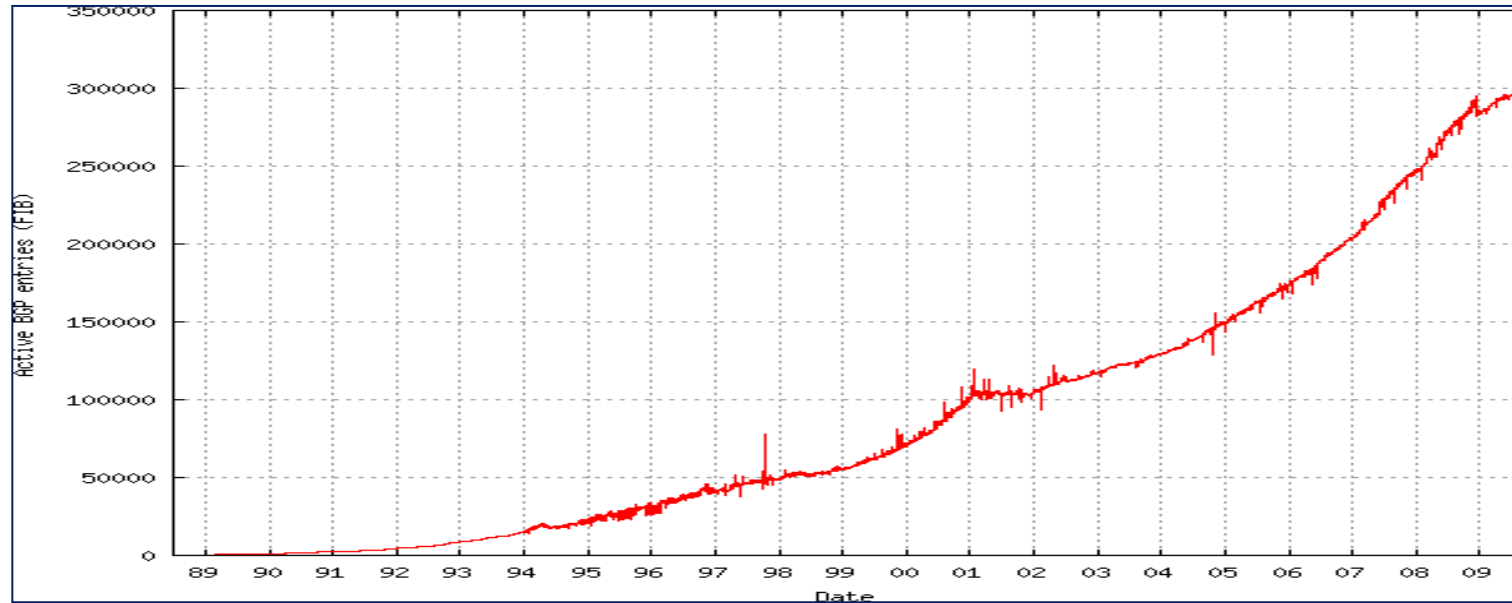
LISP

# Migration zu IPv6 mit LISP

Lukas Krattiger – [lukk@cisco.com](mailto:lukk@cisco.com)

# LISP – A Solution to Real World Problems

- LISP originally conceived to address Internet Scaling

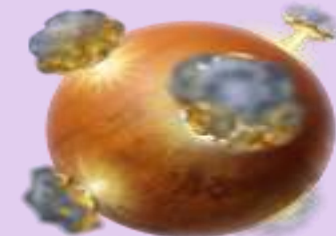


Many customers have been requesting Cisco to look into this issue

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

Attendees of IAB workshop in October 2006  
(written in RFC4984)

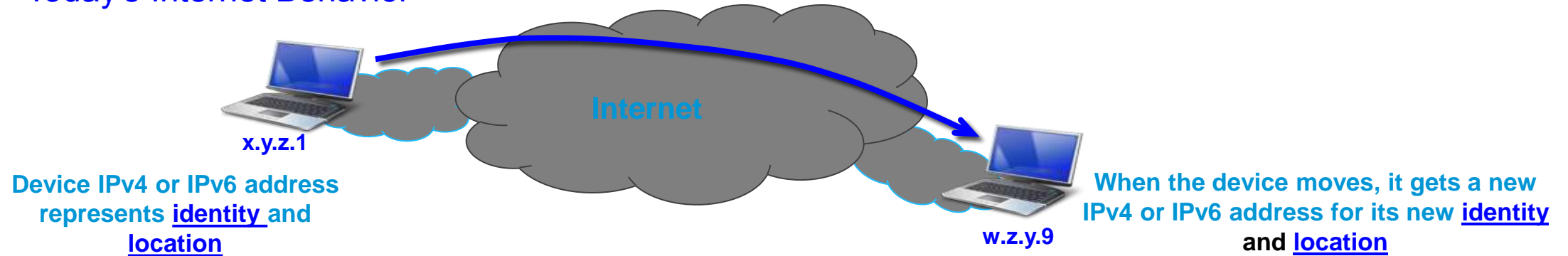
Without LISP



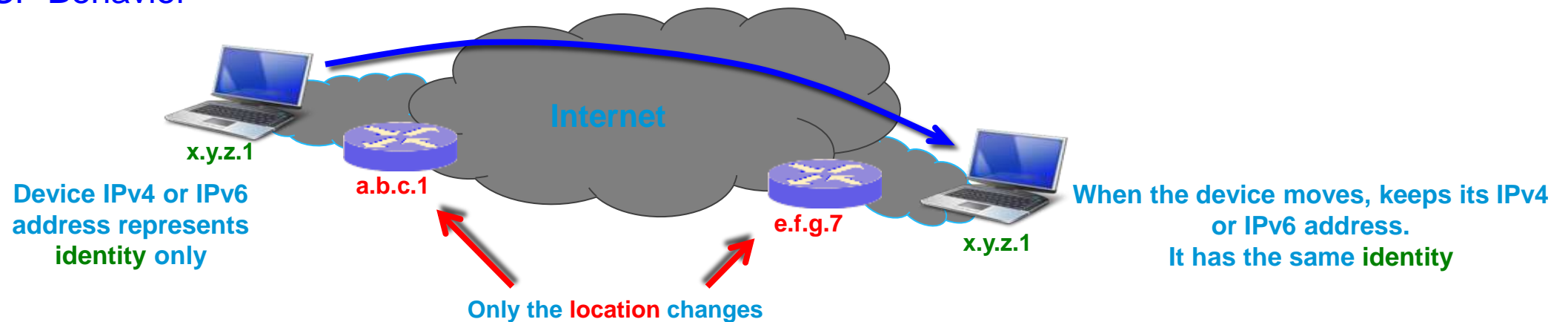
# LISP Overview

Locator/ID split enables other (more important) benefits...

- Today's Internet Behavior



- LISP Behavior



# LISP – A Level of Indirection for IP Addressing

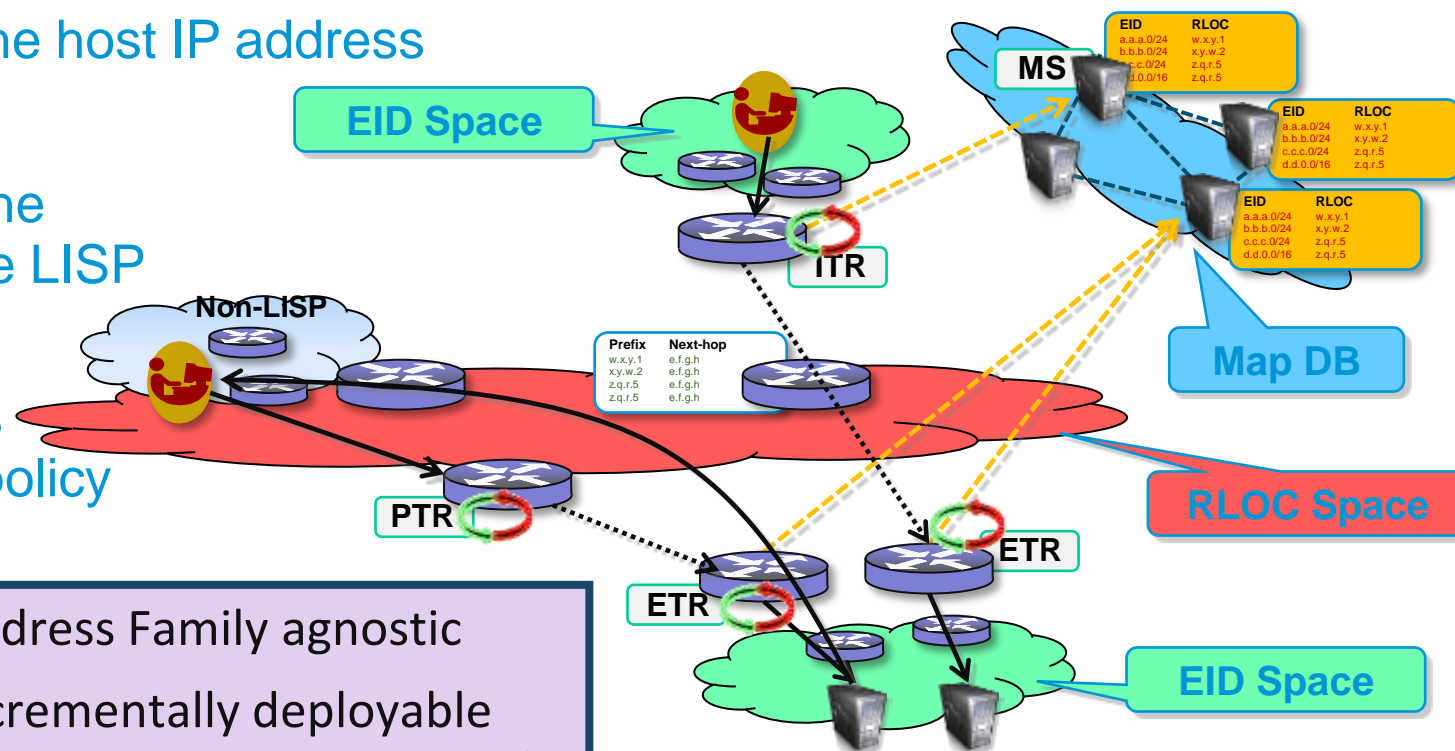
- Creates a “Level of indirection” by using two namespaces – EID and RLOC

- EID (Endpoint Identifier)** is the host IP address

- RLOC (Routing Locator)** is the infrastructure IP address of the LISP router

- Mapping Database (M-DB)** is the distributed database and policy repository

- Network-based solution
- No host changes
- Minimal configuration
- No DNS changes
- Address Family agnostic
- Incrementally deployable (support LISP and non-LISP)
- Support for mobility





# LISP Operations

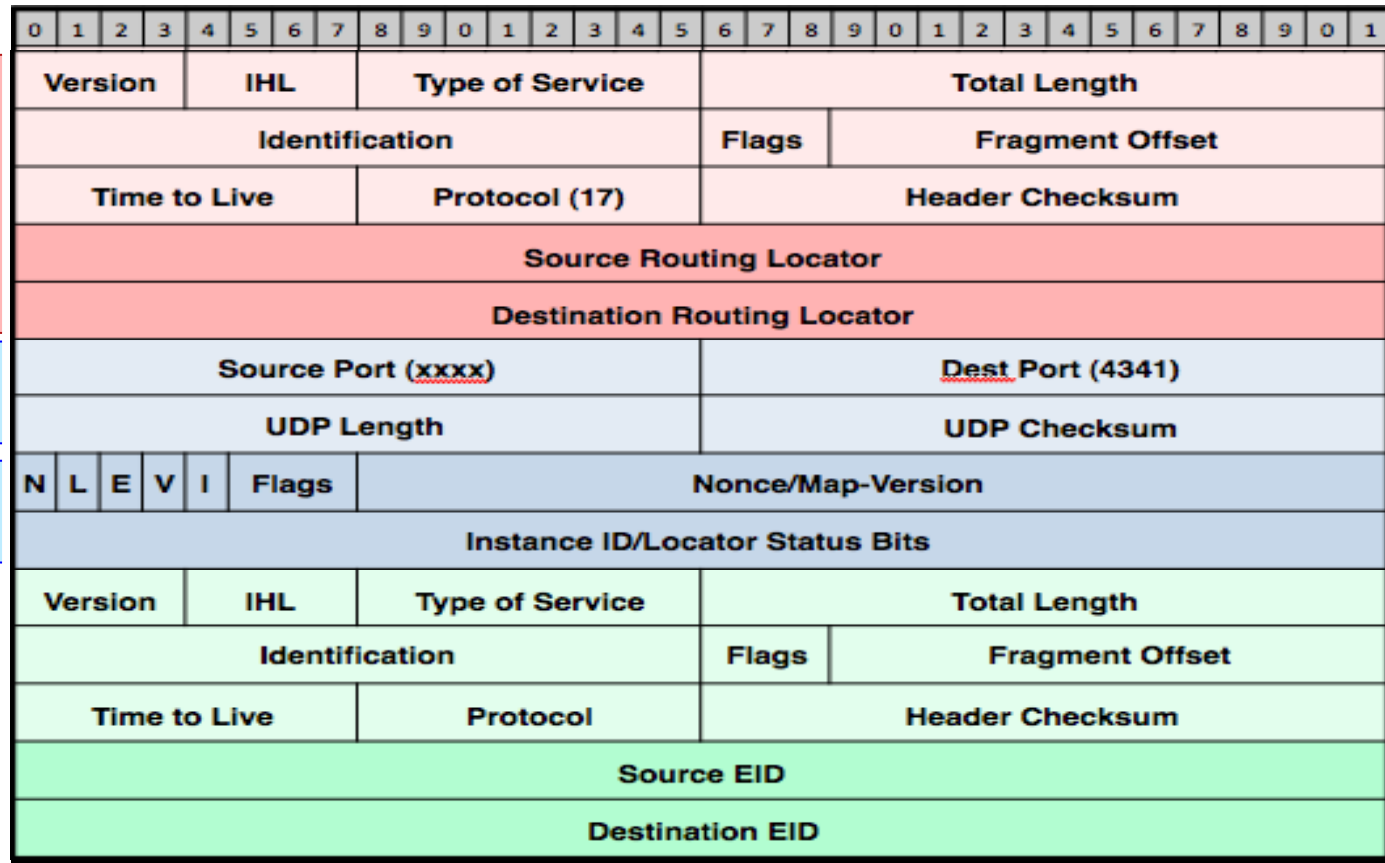
## LISP IPv4 EID/IPv4 RLOC Header Example

IPv4 Outer Header: Router supplies RLOCs

UDP

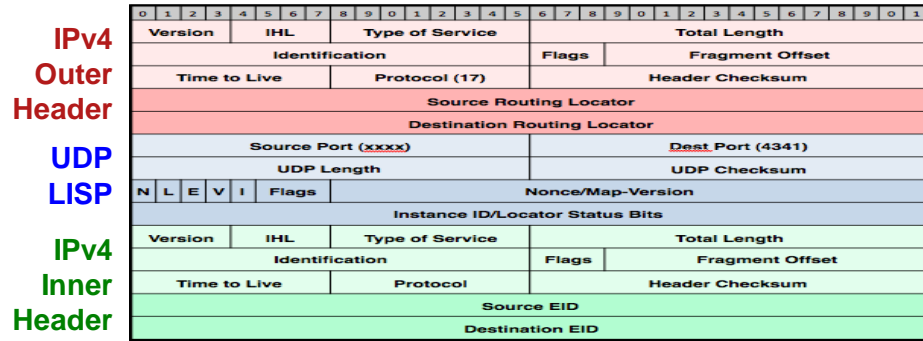
LISP header

IPv4 Inner Header: Host supplies EIDs

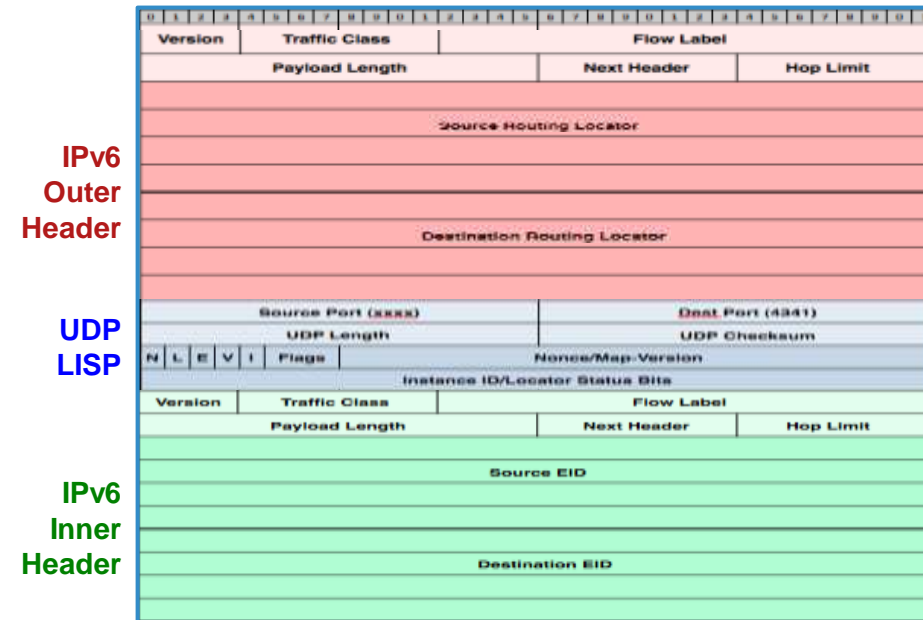


# LISP Operations

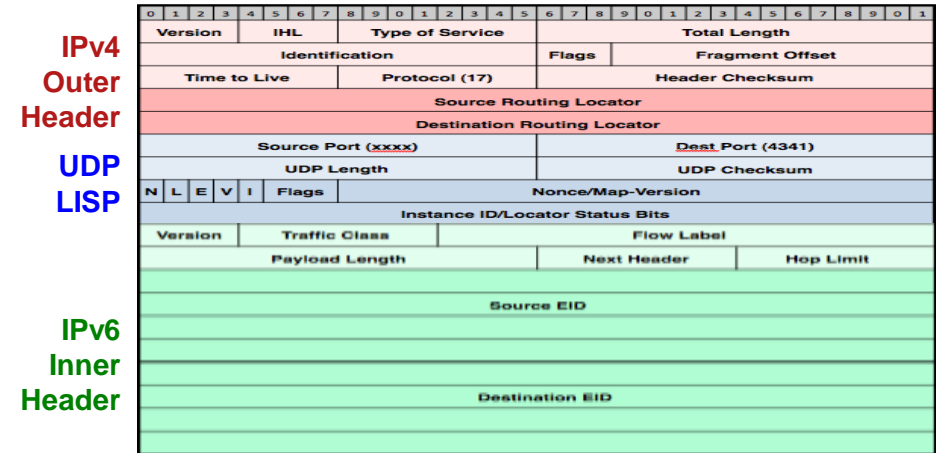
## LISP Encapsulation Combinations – IPv4 and IPv6 Supported



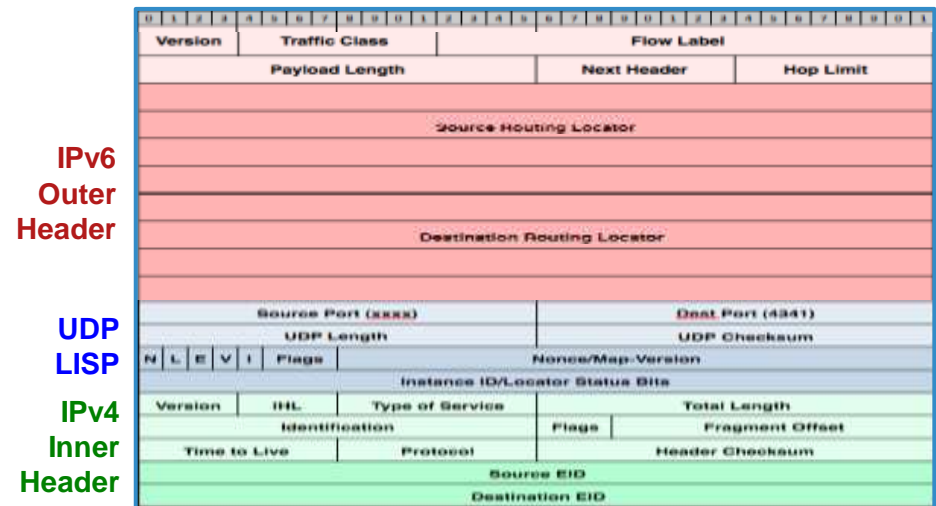
IPv4/IPv4



IPv6/IPv6



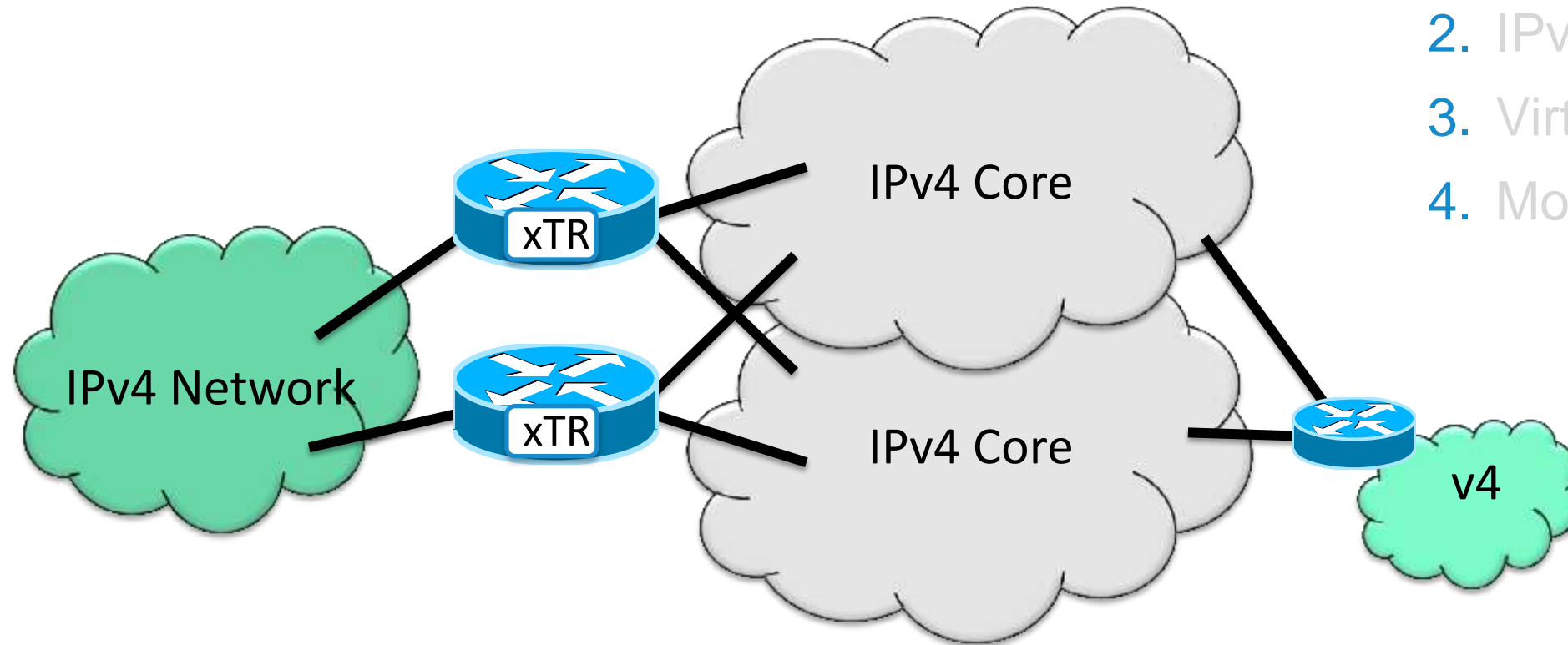
IPv4/IPv6



IPv6/IPv4

# LISP Efficient Multihoming

- Part of the LISP Solution Space...

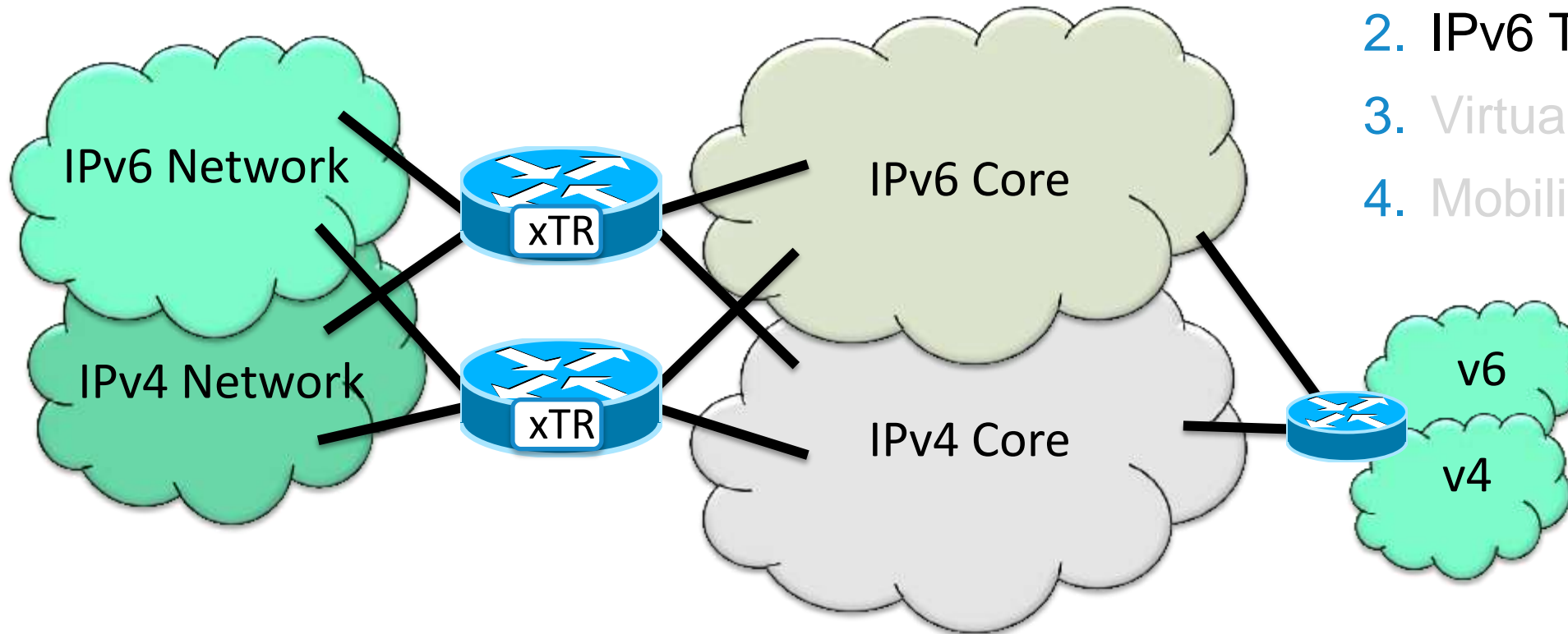


1. Multihoming
2. IPv6 Transition
3. Virtualization/VPN
4. Mobility

**LISP is an Architecture...**

# LISP IPv6 Transition Support

- Part of the LISP Solution Space...

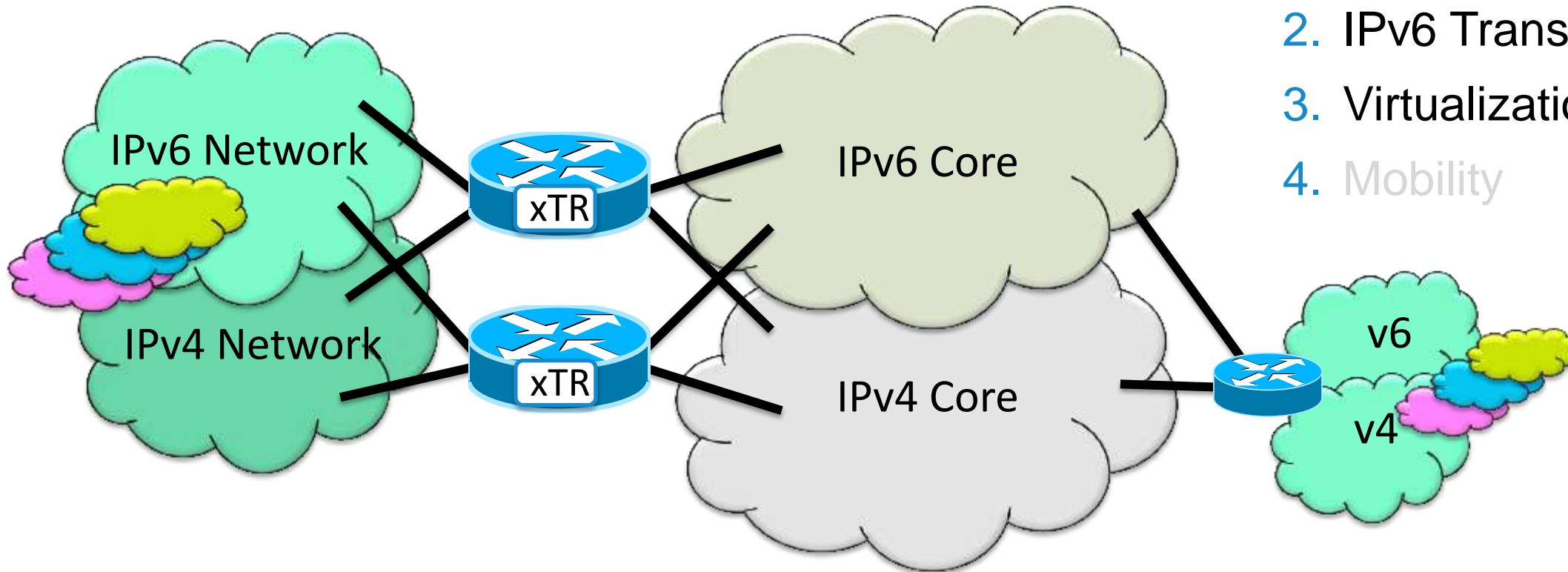


1. Multihoming
2. IPv6 Transition
3. Virtualization/VPN
4. Mobility

**LISP is an Architecture...**

# LISP Virtualization/VPN Support

- Part of the LISP Solution Space...

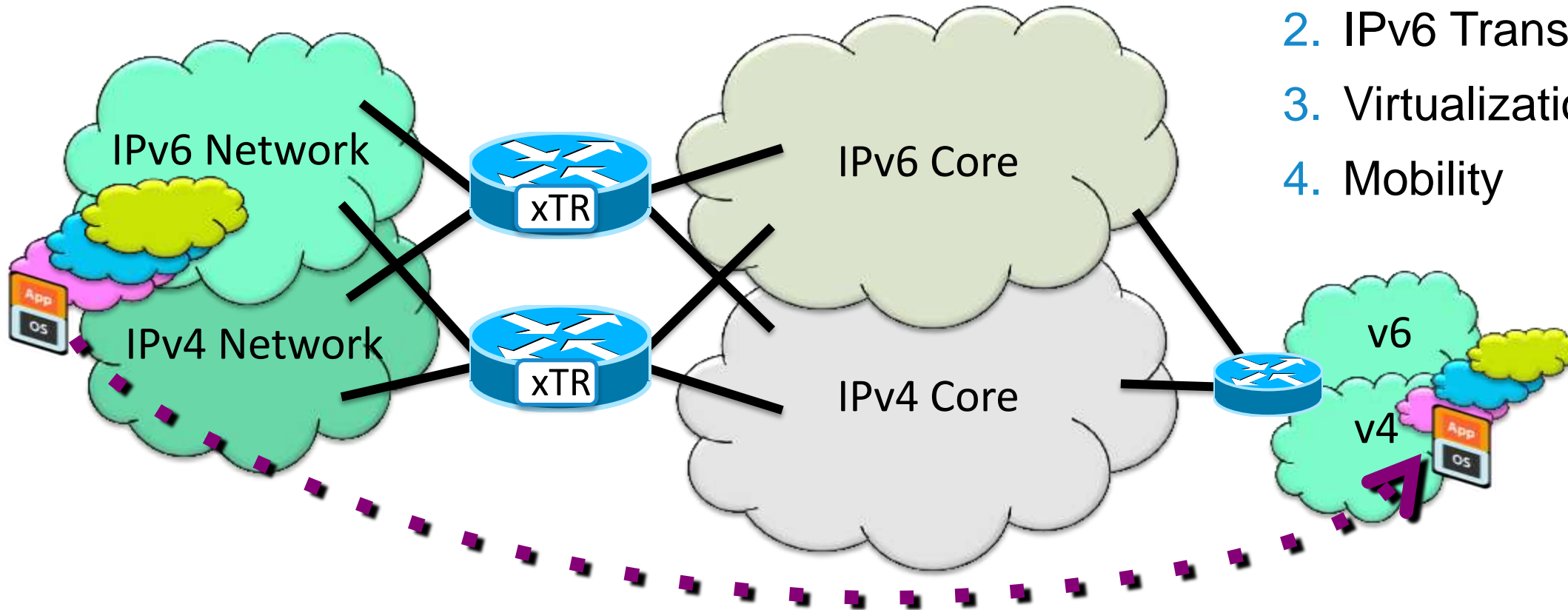


1. Multihoming
2. IPv6 Transition
3. Virtualization/VPN
4. Mobility

**LISP is an Architecture...**

# LISP Host Mobility Support

- Part of the LISP Solution Space...



1. Multihoming
2. IPv6 Transition
3. Virtualization/VPN
4. Mobility

LISP is an Architecture...

# LISP Example IPv6 Use-Cases

## Needs:

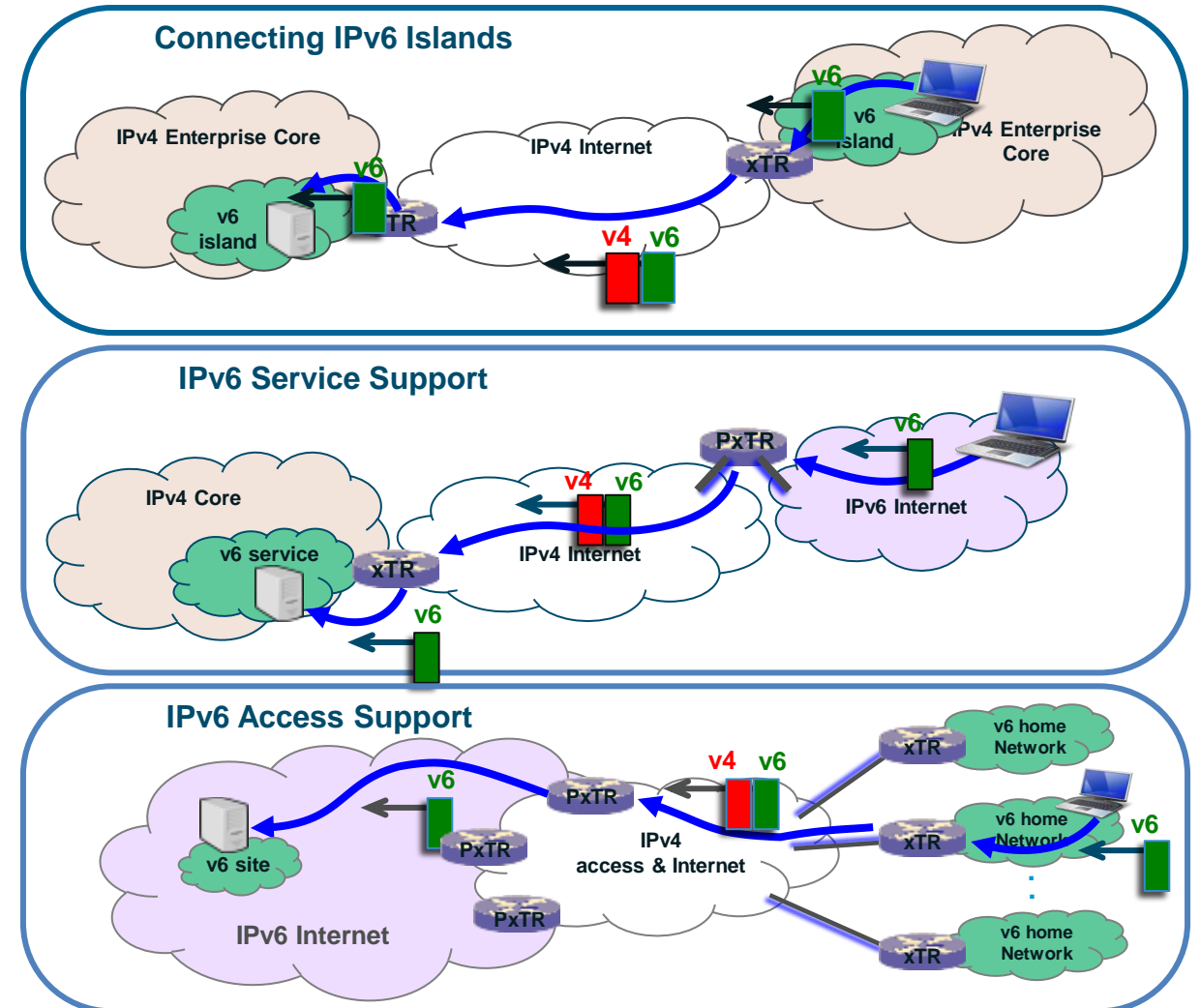
- Rapid IPv6 Deployment
- Minimal Infrastructure disruption

## LISP Solution:

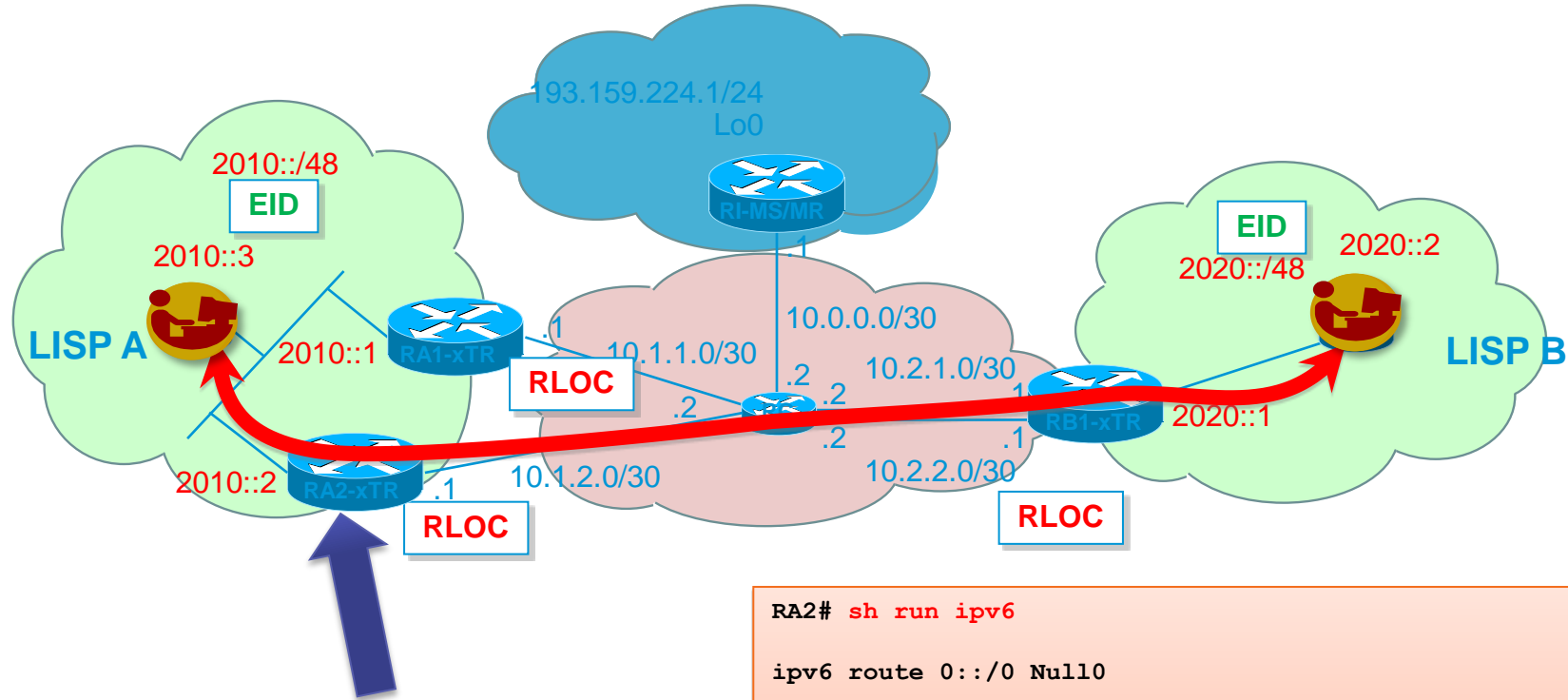
- LISP encapsulation is Address Family agnostic
  - IPv6 interconnected over IPv4 core
  - IPv4 interconnected over IPv6 core

## Benefits:

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



# Uups – a config: IPv6 Over IPv4



```

RA2# sh run ipv6

ipv6 route 0::/0 Null0

interface Ethernet2/2
  ipv6 address 2010::0002/48

RA2# sh run lisp

ip lisp itr-etr
ipv6 lisp itr-etr

ipv6 lisp map-cache 2020::0002/128 10.2.1.1 priority 1 weight 100
    
```



# LISP is here now!

- With real implementation experience!
- With real deployment experience!
- With real customer engagement!
  
- `http://www.lisp4.net & http://www.lisp6.net`
- `http://lisp.cisco.com`
  
- `lisp-support@cisco.com`

# LISP Status

- LISP Deployments - International LISP Beta Network...

- LISP Community Operated:

- More than 5 Years operational...
- More than ~300 Sites, 33 countries...

- Interoperable LISP implementations:

- Cisco

IOS (ISR, ISRG2, 7200) and IOS-XE (ASR1K)

Cisco IOS-XR (CRS3, ASR9K (beta))

Cisco NX-OS (N7K, C200)

- Open Source

FreeBSD: OpenLISP

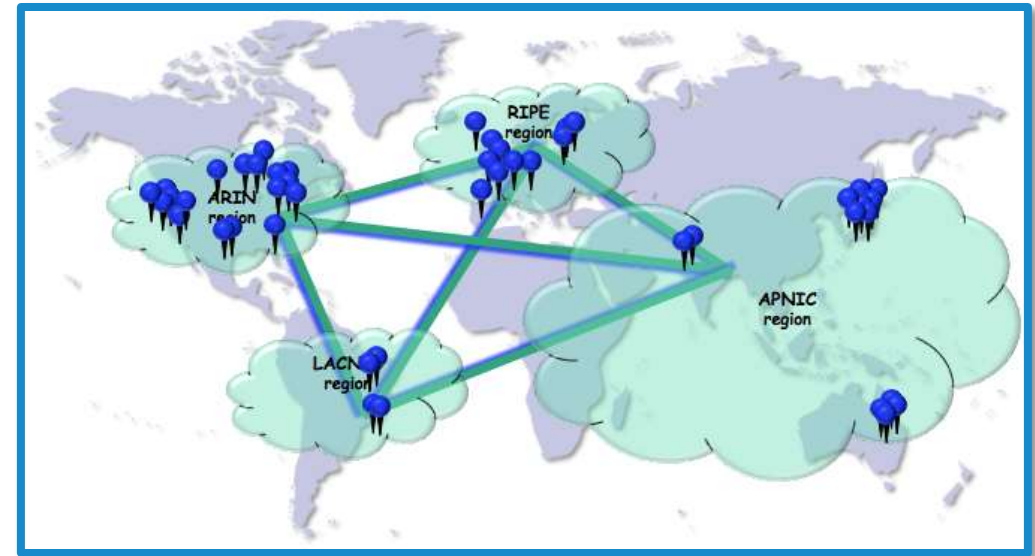
Linux: Aless, LISPmob, OpenWrt

Linux: LISPmob

Android (Gingerbread)

- Furukawa Network Solution Corporation FITELnet-G21

Plus a few others... ;-)



  
<http://lisp.cisco.com>

  
<http://www.lisp.intouch.eu/>

  
<http://vinciconsulting.com/vxnet>

  
<http://lisp.isarnet.net/>

Google Microsoft VeriSign at&t NEW YORK UNIVERSITY  
QUALCOMM SONY  
Lufthansa free verizon NTT NJEdge.Net UCLA  
and more...

# LISP Status

- LISP Software – Available Releases...

## ■ Cisco Releases

**Cisco LISP Releases: <http://lisp.cisco.com>**

- NX-OS since December 2009... Nexus 7000, UCS C200
- IOS since December 2009... ISR, ISRG2, 7200
- IOS-XE since March 2010... ASR1K
- IOS-XR since March 2012... CRS3
- Coming soon... ASR9K (4/2013), Catalyst 6500 (5/2013), and others

## ■ Other Releases

**Other LISP Releases: <http://www.lisp4.net>**

- Furukawa Network Solutions Corp
- FreeBSD :: Open LISP
- Linux :: Aless, LISPmob, OpenWrt (coming soon...)
- Android :: Gingerbread (coming soon...)
- Other vendors... Check the site!

# LISP, yet another RFC!

- RFC 6830 - The Locator/ID Separation Protocol (LISP)
- RFC 6831 - The Locator/ID Separation Protocol (LISP) for Multicast Environments
- RFC 6832 - Interworking between Locator/ID Separation Protocol (LISP) and Non-LISP Sites
- RFC 6833 - Locator/ID Separation Protocol (LISP) Map-Server Interface
- RFC 6834 - Locator/ID Separation Protocol (LISP) Map-Versioning
- RFC 6835 - The Locator/ID Separation Protocol Internet Groper (LIG)
- RFC 6836 - Locator/ID Separation Protocol Alternative Logical Topology (LISP+ALT)

Thank you.

