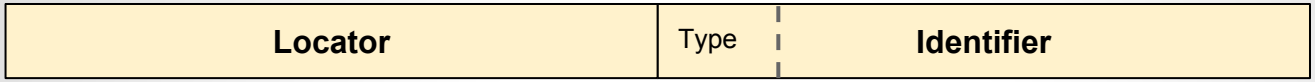
Identifier Locator Addressing with IPv6

Network virtualization without encapsulation

draft-herbert-nvo3-ila-02

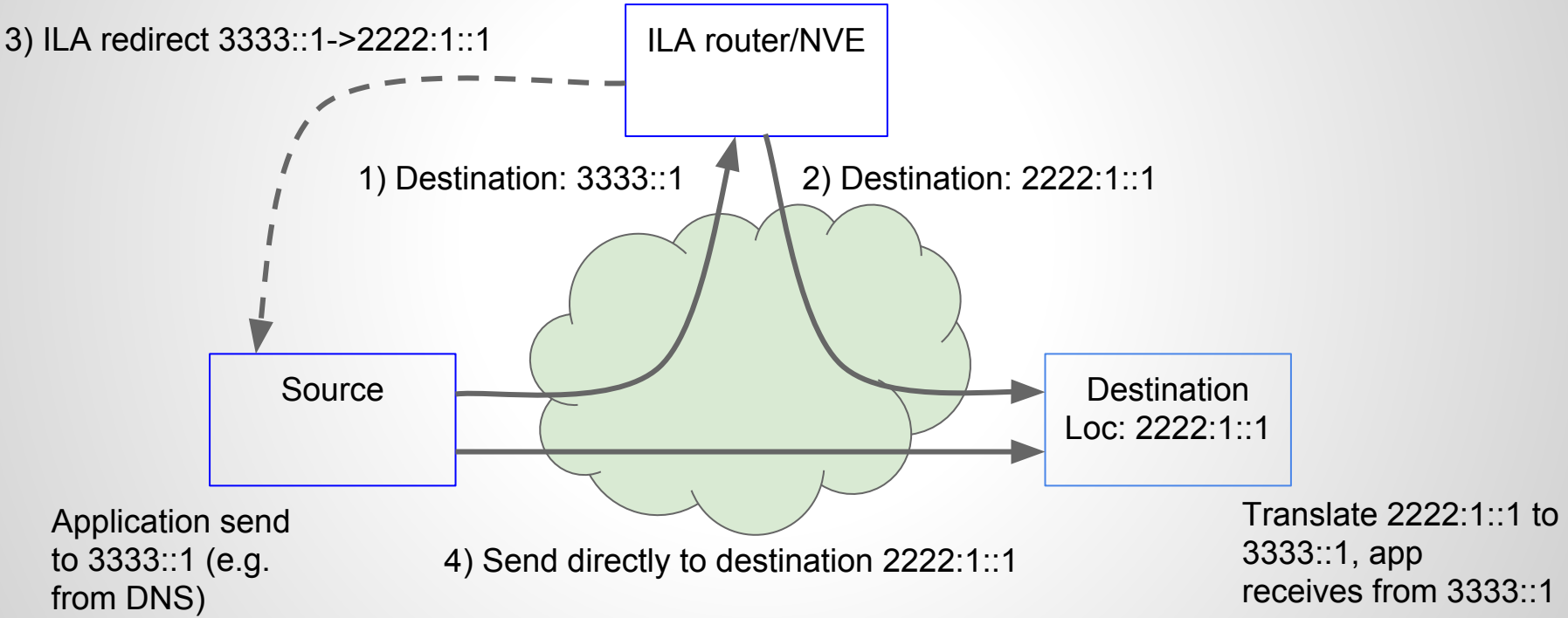
Tom Herbert <tom@herbertland.com>

Address split



- Locator
  - 64 bits identifier of physical hosts
  - Routable
  - Not used as connection endpoint
- Identifier
  - 64 bit logical endpoint address of virtual node
  - Routable to an translator (NVE)
  - Used as connection endpoint
  - Typed to allow different modes

Flow example



ILA use cases

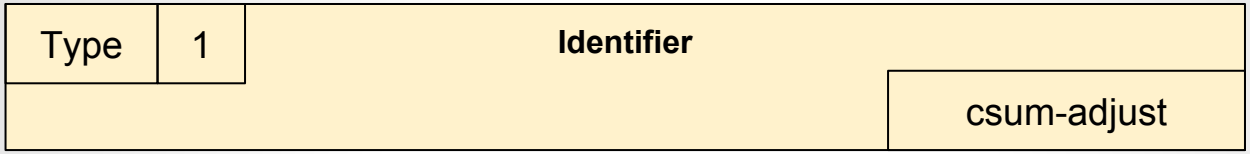
USE CASE	DESCRIPTION	SCALING # NODES	RATE OF MAP UPDATE
DC task virtualization*	Assign every task an IP address	10's of millions	1000's
DC virtualization	Assign "everything" and IP address	Up to 10's of billions	Millions
Multi tenant virtualization	VNID + Vaddr (VMs)	10's of millions	1000's
5G mobility	Every UE has identfiier	Billions maybe more	Millions

* Currently being deployed

Advantages of ILA

- Not encapsulation
  - No on the wire overhead
  - No MTU, UDP checksum, or other tunneling issues
- No changes to transport layer
  - Checksum neutral translation
  - Application, DNS only deal with untranslated globally router addresses
- Open source implemenation
  - Linux host side implemenation
  - ILA router in XDP, VPP

Checksum neutral mapping



- Like RFC6296
- Good csum on wire without needing to access L4 headers
- Use low order 16 bits in identifier as a checksum adjustment value (SIR->ILA)
  - csum-adjust += csum_diff(SIR-prefix - locator)
- Reverse operation going ILA->SIR

Status

- Deploying for task virtualization @FB
- ILA router
  - BPF/XDP program being developed
  - VPP program at hackathon IETF 96
- Control plane
  - BGP initially
  - Resolution/redirect protocol for ILA hosts

IETF interactions

- Presenting @5gangip BOF
- ILA/VPP hackathon event
- Hyper Scale Address Management initiative
- Identifier-locator BOF?
- ILA (data plane or control plane) in nvo3 or other WG?