

Identifier Locator Addressing with IPv6

draft-herbert-intarea-ila

IETF 100

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Introduction

- ILA is an identifier/locator split protocol
- Use cases
 - Data center virtualization -- e.g. address per task
 - Mobile networks -- e.g. UE mobility
- Properties
 - Address translation, not encapsulation
 - No processing beyond IP header
 - Checksum neutral mapping to preserve L4 csums
 - Run at end host *or* in network router

Draft update

- **draft-herbert-intarea-ila-00** (previously draft-herbert-nvo3-04)
- Clarified identifier format as being optional, identifiers are natively 64 bits in ILA
- Add non-local address identifier type
- Description of mobility networks use case
- Relax requirement for exactly 64/64 split

What “more” is needed?

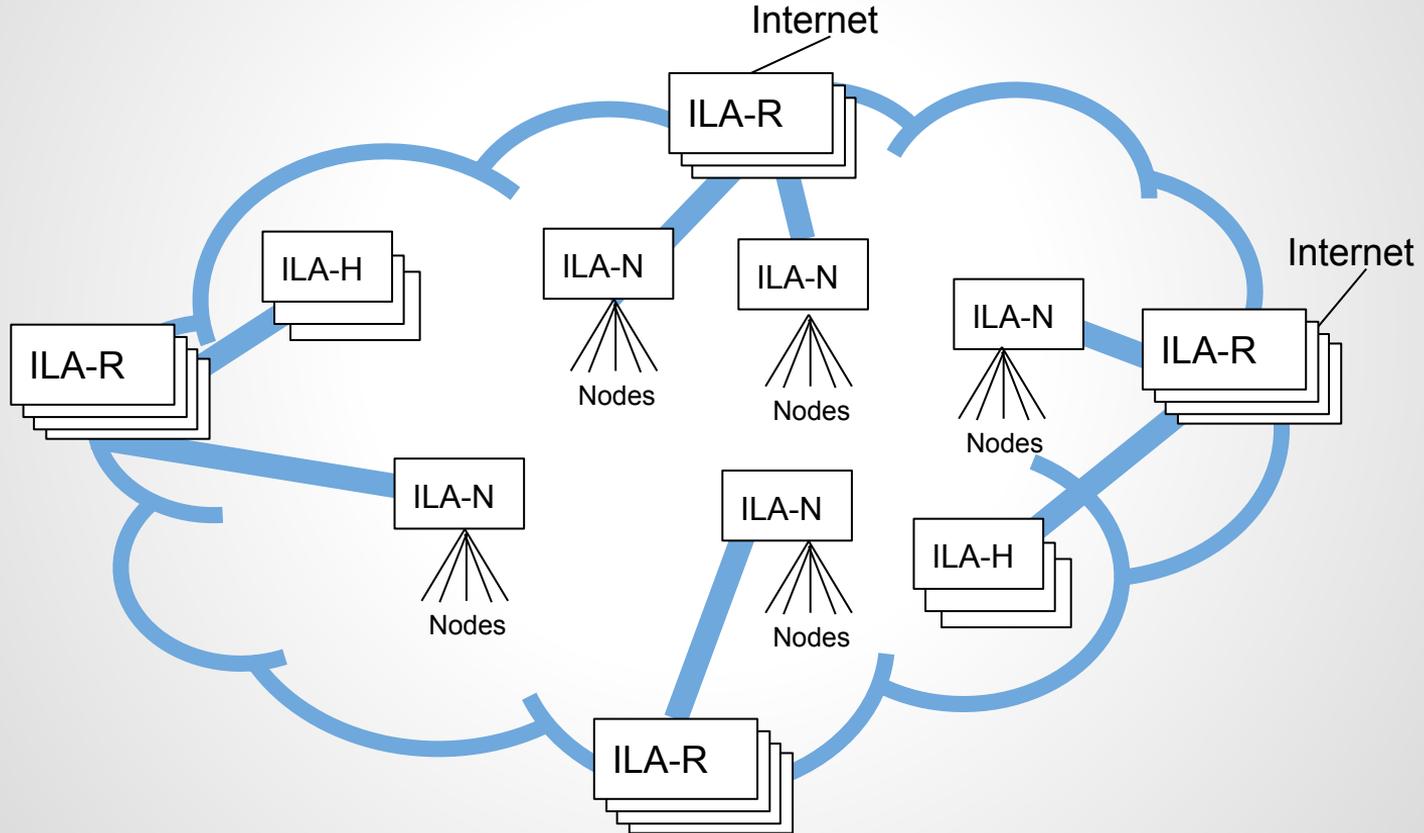
Suresh (AD) asked at IETF 98

- Clarify use cases and reference architecture
- Addressing models and privacy
- Control plane
- “Running code”
- Deployment

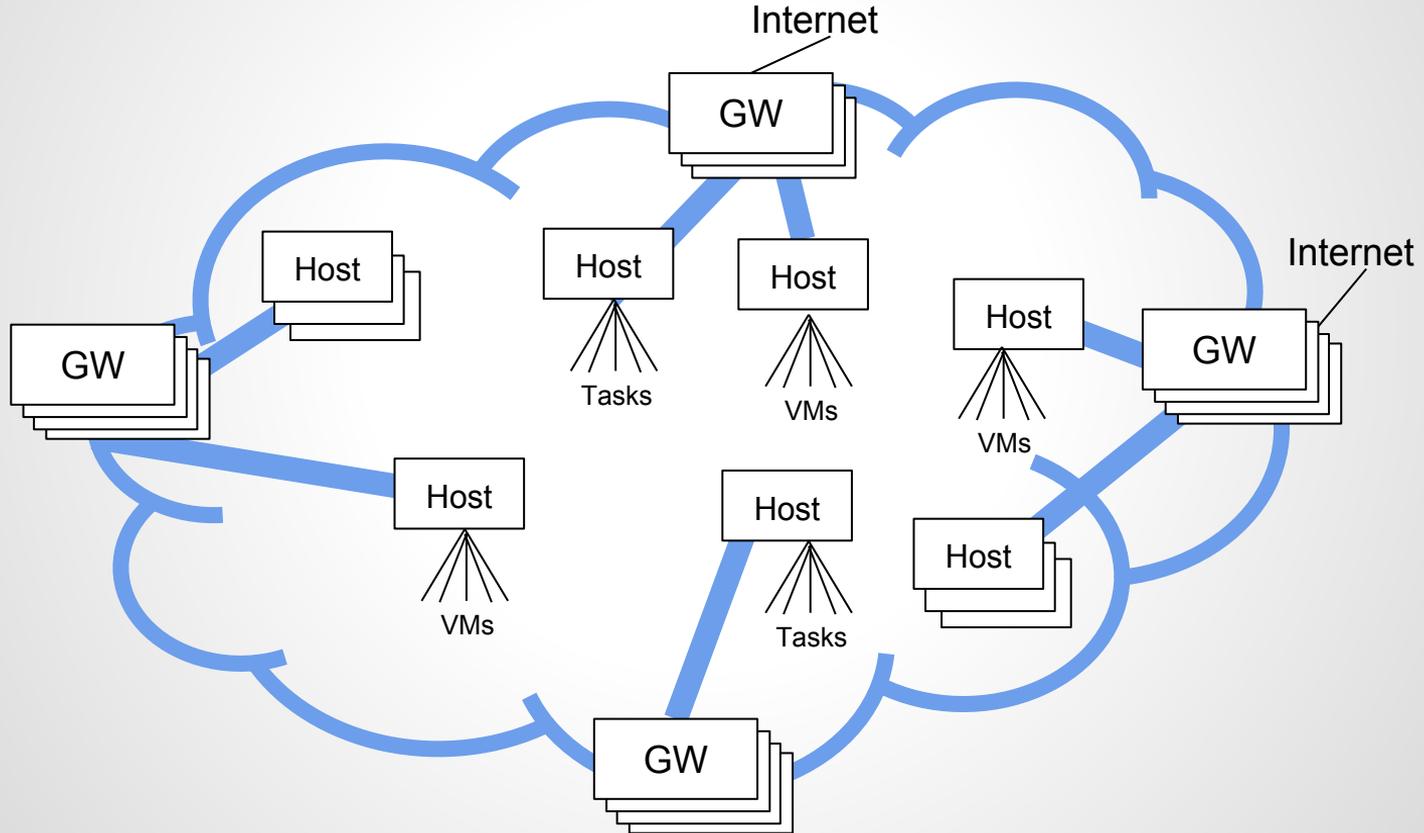
Use cases

USE CASE	SUB CASE	DESCRIPTION	SCALING # NODES of addressed nodes	RATE OF MAP UPDATE (per s)
Datacenter	DC task virtualization	Assign every task an IP address	10's of millions to potentially billions	1000's
	DC virtualization	Assign everything an IP address	Up to 10's of billions	Millions
	Multi tenant virtualization	VNID + Vaddr (VMs)	10's of millions	1000's
Mobility & IoT	Mobile networks	Every UE has identifier or prefix	10's of millions to 10s of billions	Millions
	IoT	Low powered devices	Millions to hundreds of billions	Millions

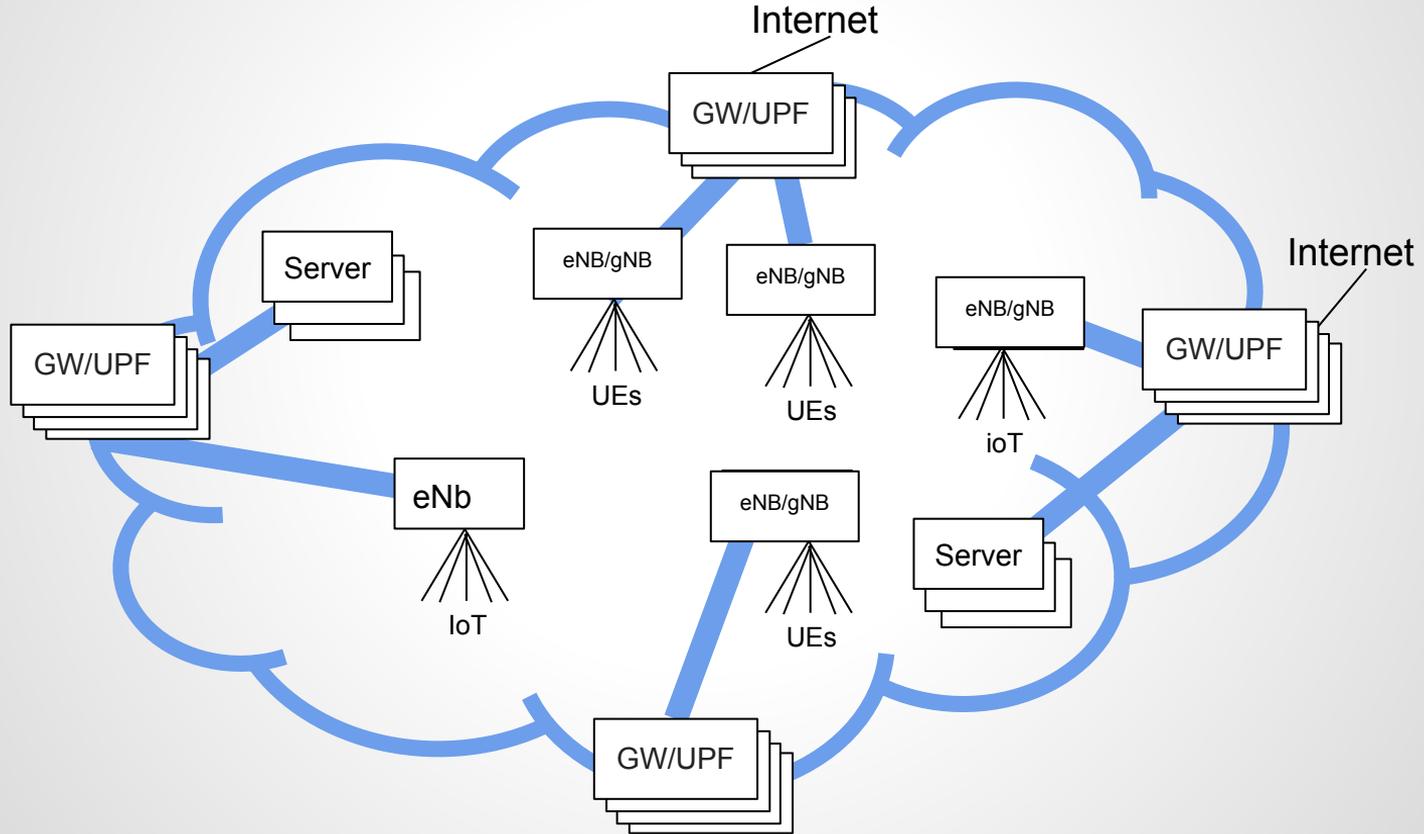
Reference topology



Example datacenter topology



Example mobile network topology



Addressing modes

- Singleton addresses (e.g. from DHCPv6)
 - Identifier uniquely identifies object in domain
 - Allows single use addresses for cnxs (for privacy)
- /64 assignment (e.g. via SLAAC)
 - Encode relative index in locator (lower 64 bits is IID)
 - Locator + index => assigned prefix
- Non-local address
 - Map arbitrary addresses to identifier
 - Roaming as an example

Control plane

- Mapping system *is* a key/value store
- Need database features-- security, ACLs, replication, availability, pub/sub, etc.
- Use database in lieu of routing protocol
 - Distributed KV database (NoSQL for instance)
 - Precedence in SDN routing protocols
 - Open/R (also candidate for integration)

“Running code”

- Code

- ILA in Linux (recent fixes, don't require ident format)
- ILA router in XDP, DPDK/VPP (Hackathon IETF 97)
- Soon to open source reference control daemons

- Deployment

- Facebook: ILA virtual addresses (mobile) replace VIP injection

- Mobility

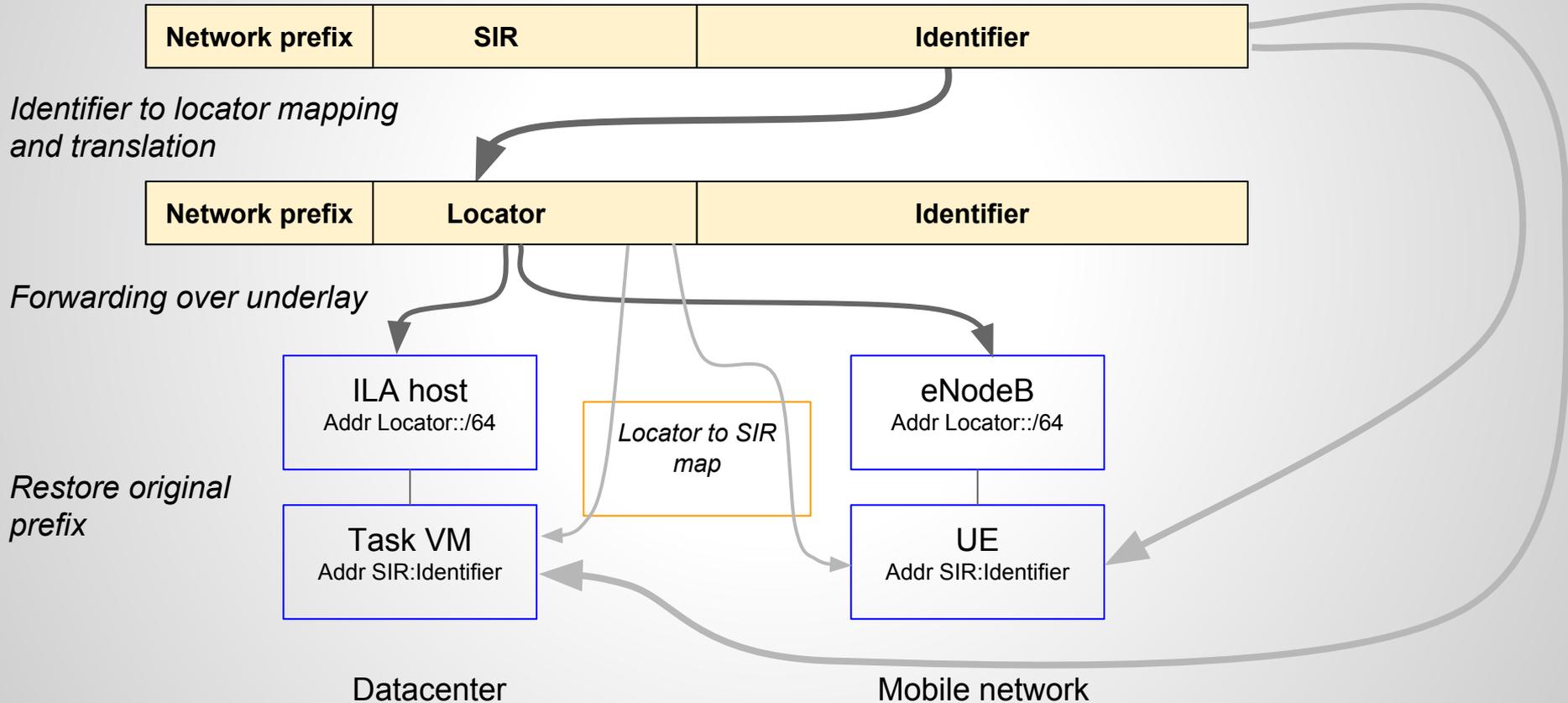
- WIP in progress as replacement for GTP-U

Next steps

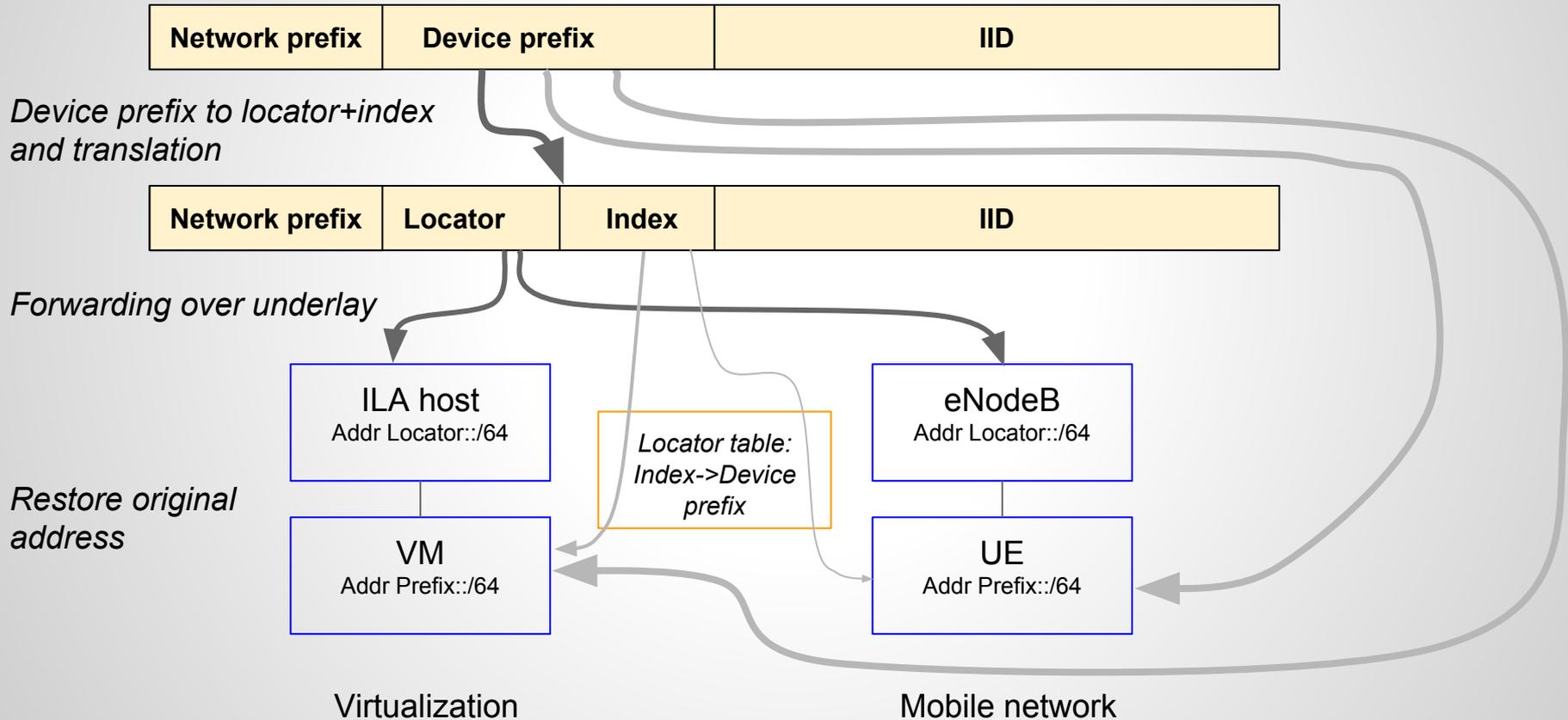
Request ILA to be take up as WG item in
int-area

Thank you!

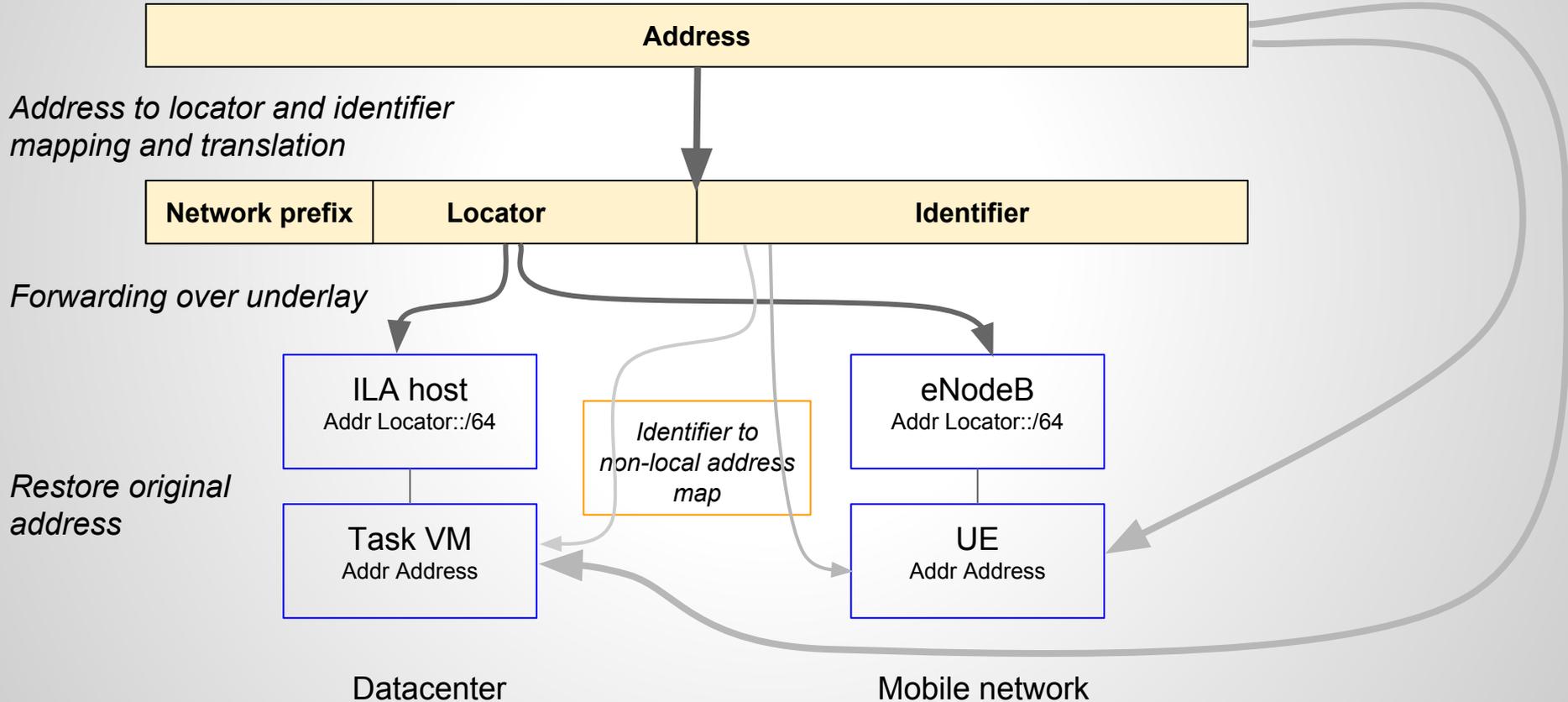
Singleton addressing in ILA



/64 addressing in ILA



Non-local addressing in ILA



Privacy in addressing

- Goals

- No correlating two addresses as being same host
- No inferring accurate location just given address
- LEA, legal intercept considerations

- Privacy addresses (RFC4941) is “weak”

- Effect of periodic rand. prefix rotation not quantifiable
- See recent thread 6man about unique prefixes

- ILA

- Single use address as an option
- Minimal topology present in externally visible addrs