Identifier Locator Addressing
ILA

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Goal

Provide seamless mobility for multiple use cases using highly efficient identifier/locator techniques
Use cases

- Mobility
- Data center virtualization
- Network virtualization (multi-tenant)
- Converged network (all three of above)
## Problems

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<th>Applicable Use cases</th>
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<td>Encapsulation is perf. and overhead hit</td>
<td>General problem</td>
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<td>Tunneling considerations</td>
<td>General problem</td>
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<td>Identity tied to location</td>
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<td>Support for “alternate” protocols</td>
<td>Mostly virtualization</td>
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<td>Privacy in addressing</td>
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<td>Mobile anchor points</td>
<td>Mobile</td>
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<td>Low latency application (AR/VR) support</td>
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Addressing and transformations

Standard Identifier Representation (SIR). Address visible to apps

Locator address. Routes packets to physical location of logical node

SIR prefix | Identifier
---|---

Transform destination for transit across an underlay network

SIR prefix | Identifier
---|---

Locator | Identifier
---|---

Reverse transformation to deliver or forward to application

SIR prefix | Identifier
---|---
Salient properties of ILA

- Identifier/locator split
- Performs address transformation (not NAT)
- No wire overhead (no encap or EH)
- Contained within network layer
- Transparent to the endpoints and network
Scope

● Data plane
  ○ Process of transformation
  ○ Checksum neutral
  ○ Address encodings

● Control plane
  ○ Mapping system (identifier to locator mappings)
  ○ Manage by standalone protocols
  ○ Leverage existing 3GPP control plane
Limitations

- ILA is IPv6 only
- ILA is not extensible
- Complexity of data plane vs. control plane
- Does not naturally support multicast
- ICMP error handling needs consideration
Considerations

- Scalability
- Security
- Privacy
- DOSability
Scalability aspects

- Number of mappings in the system
- Rate of update to mappings
- Throughput dataplane
- Managing state in a mapping system
- Mapping caches
Security aspects

- Mapping system contains sensitive PII
  - Identity: IP address to device (user for personal dev)
  - Geo-location: of device and hence possibly user

- Mapping system needs to be secure
  - Secure control protocols
  - Limit visibility of data (no global mapping system)
  - Law enforcement considerations

- Interdomain solutions
Privacy aspects

- Privacy in addressing
  - Privacy issue with prefix assignment
    (draft-herbert-prefix-address-privacy)
  - Privacy vs. scalability

- Locator privacy
  - Location likely implies location
  - Third parties can’t see such locators
DOSability

- Mapping cache
  - Potential target
  - Cache driven by a third party
  - Need quantitative explanation for an DOS mitigation
Virtualization use case

- **Datacenter virtualization**
  - Every task gets its own IP address
  - Eventually *everything* gets an address
  - Everything is mobile or location independent
  - Performance is critical

- **Network virtualization**
  - Like datacenter virtualization
  - Tenant isolation
  - Common services (with resorting to NAT)
Thank you!
References

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