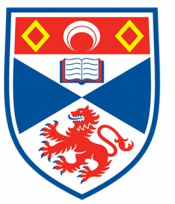
End-to-End Networking with ILNP

DEMONSTRATION



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Our thanks to
RStor.io https://rstor.io/

for sponsoring this attendance at IETF104.

Addresses and interfaces

```
system@ilnp-test-00:~$ ifconfig eno1
eno1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 138.251.30.200  netmask 255.255.255.192  broadcast 138.251.30.255
        inet6 2001:630:35::200  prefixlen 56  scopeid 0x0<global>
        inet6 fe80::12c3:7bff:fe9e:1f0d  prefixlen 64  scopeid 0x20<link>
        ether 10:c3:7b:9e:1f:0d  txqueuelen 1000  (Ethernet)
        RX packets 1392657  bytes 171061587 (171.0 MB)
        RX errors 0  dropped 172169  overruns 0  frame 0
        TX packets 776378  bytes 136654615 (136.6 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 20  memory 0xf7c00000-f7c20000

system@ilnp-test-00:~$
```

Addressing and naming

Protocol layer	IP	ILNP
Application	FQDN / **IP address** / App.	FQDN / App.
Transport	**IP address** (+ port number)	**Node Identifier (NID)** (+ port number)
Network	**IP address**	**Locator (L64)**
(interface)	**IP address**	(dynamic binding to L64)

Transport / Application session is tied to a specific interface.

Transport (or Application) session is bound only to NID, NID has dynamic binding to L64.

App.	Application-specific naming/addressing
FQDN	Fully Qualified Domain Name
NID	Node Identifier (for ILNP)
L64	Locator (for ILNP)

ILNP – new namespaces

Locator (L64)

- Topologically significant
- Used for routing
- **Not** used in transport state

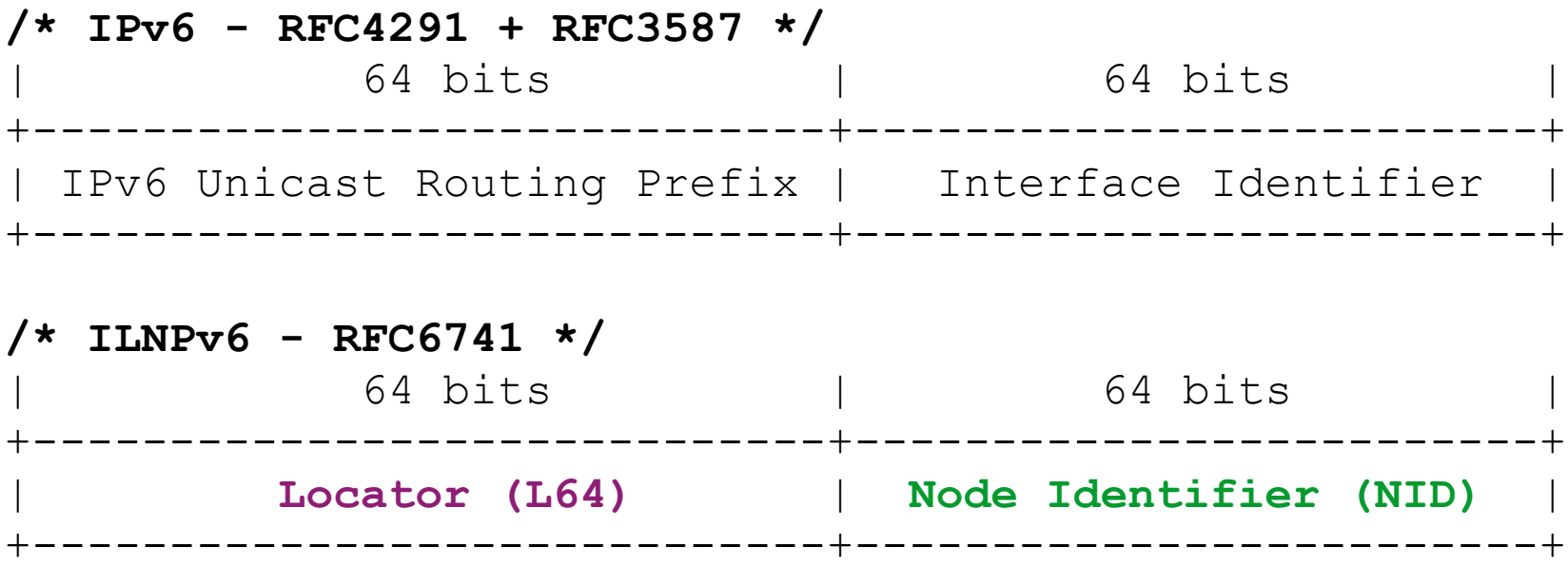
Node Identifier (NID)

- **Not** topologically significant
- **Not** used for routing
- Used in transport state

RFCs 6740 – 6748 (Experimental)

from the IRTF Routing Research Group (RRG now concluded)
see RFC6115

ILNP: Identifier Locator Vector (I-LV)

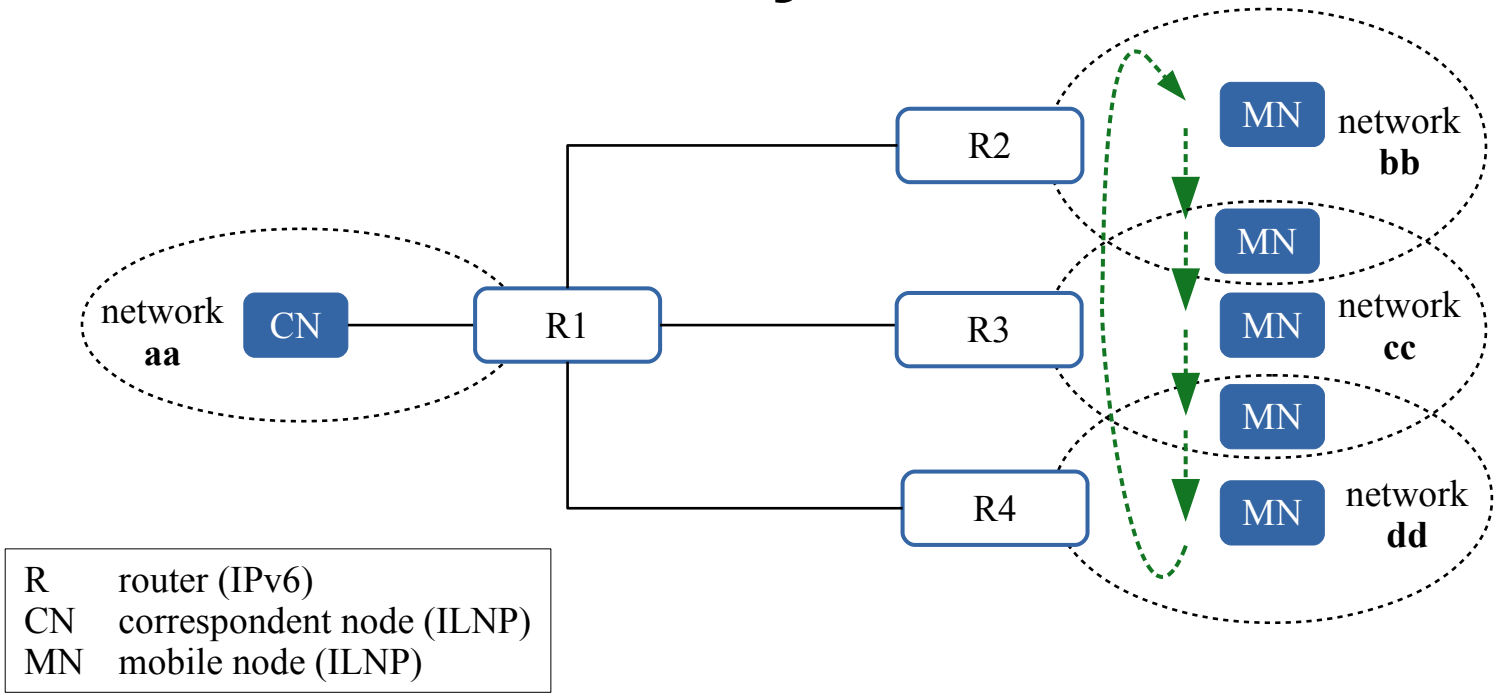


Mobility-Multihoming Duality

- Multihoming:
  - Node bound to multiple networks.
  - NID bound to multiple L64 values.
- Mobility:
  - Move from one network to another.
  - Handoff from one network to another.
- **ILNP: network layer soft handoff through multihoming.**

End-to-end mobility: demo

Mobility without proxies, tunnels, "anchors". Across an IPv6 network.



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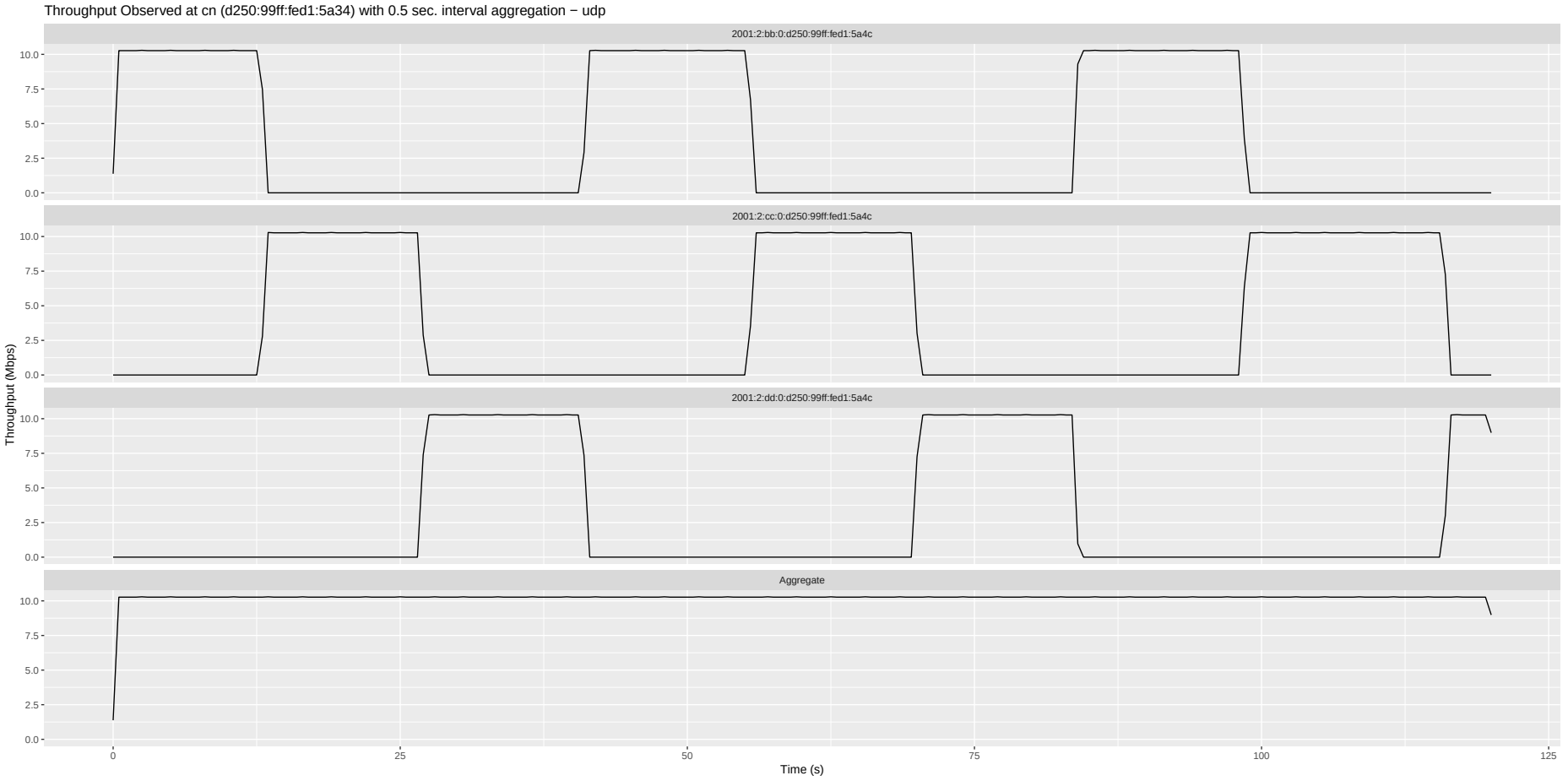
UDP throughput as seen at CN



Come and see the demo
at the
Hackdemo Happy Hour!

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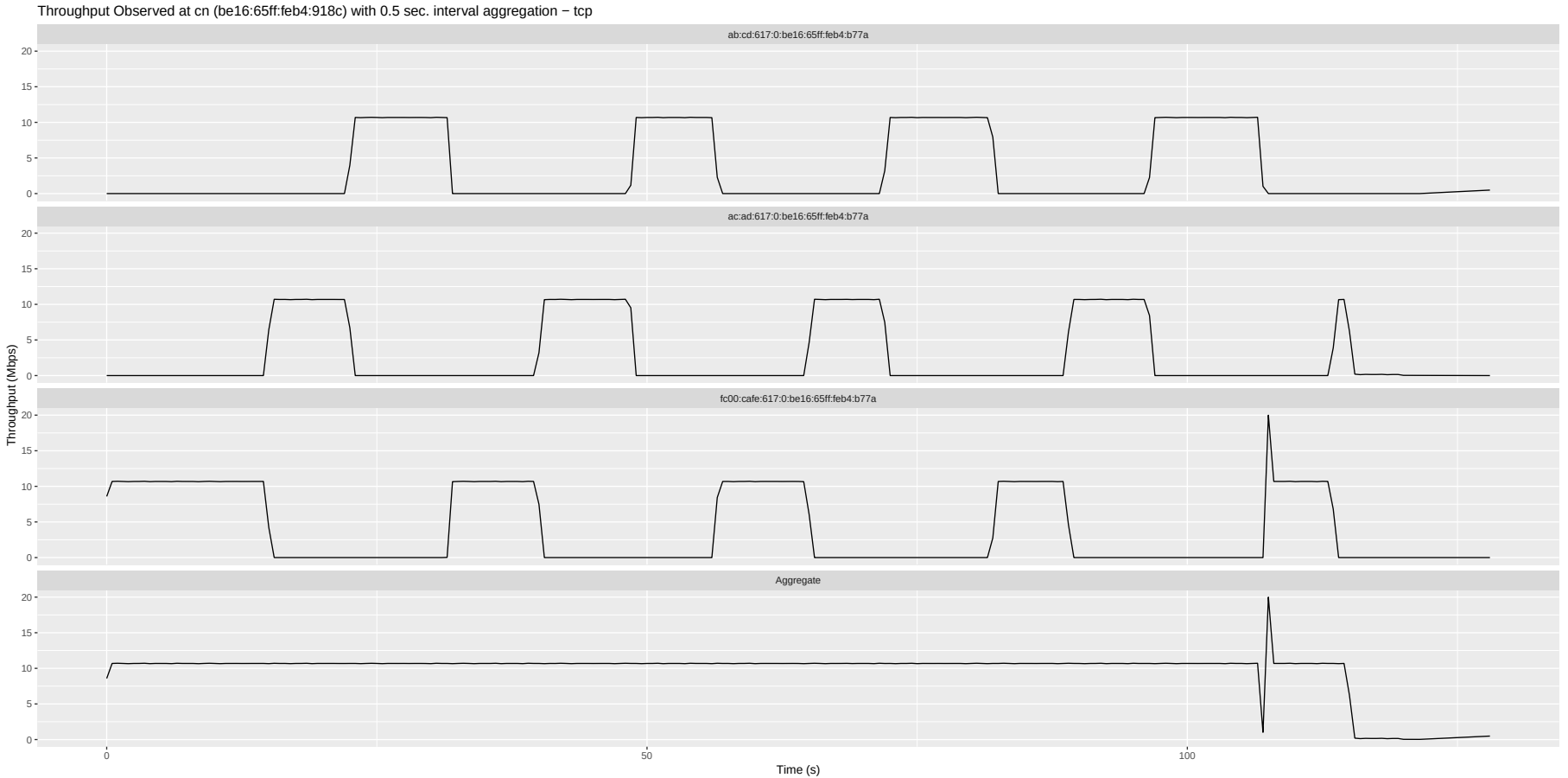
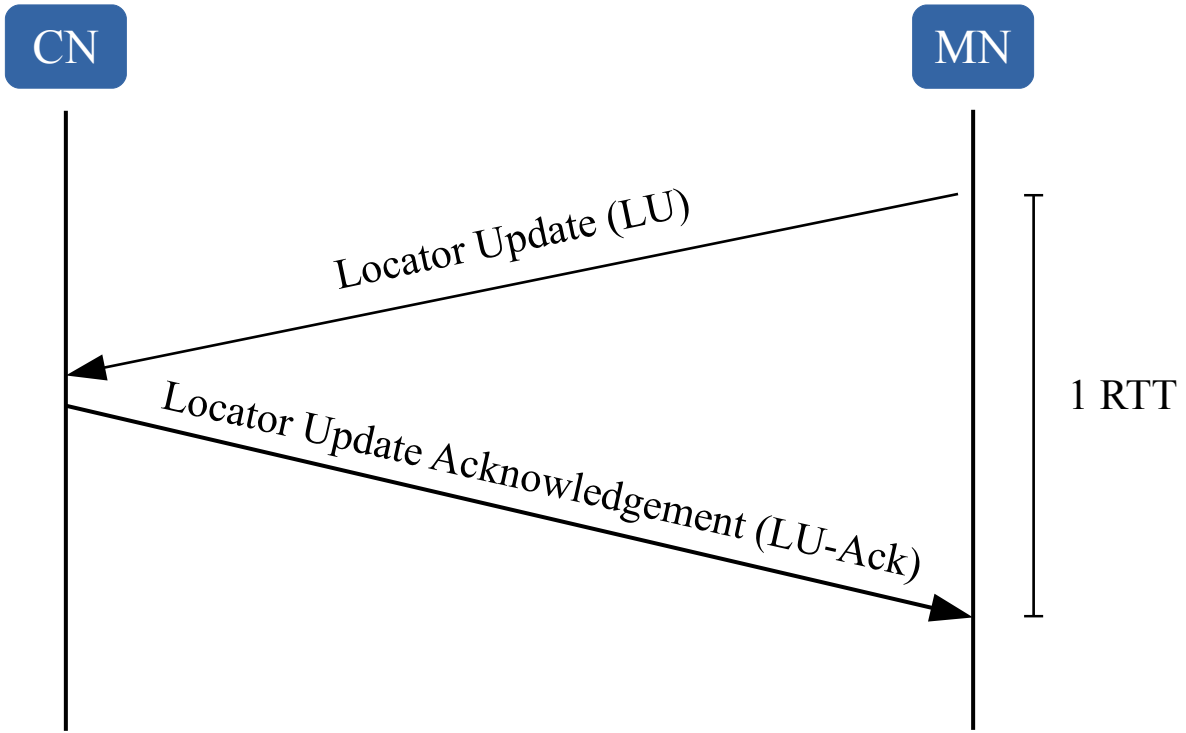
TCP throughput (lab, debugging)

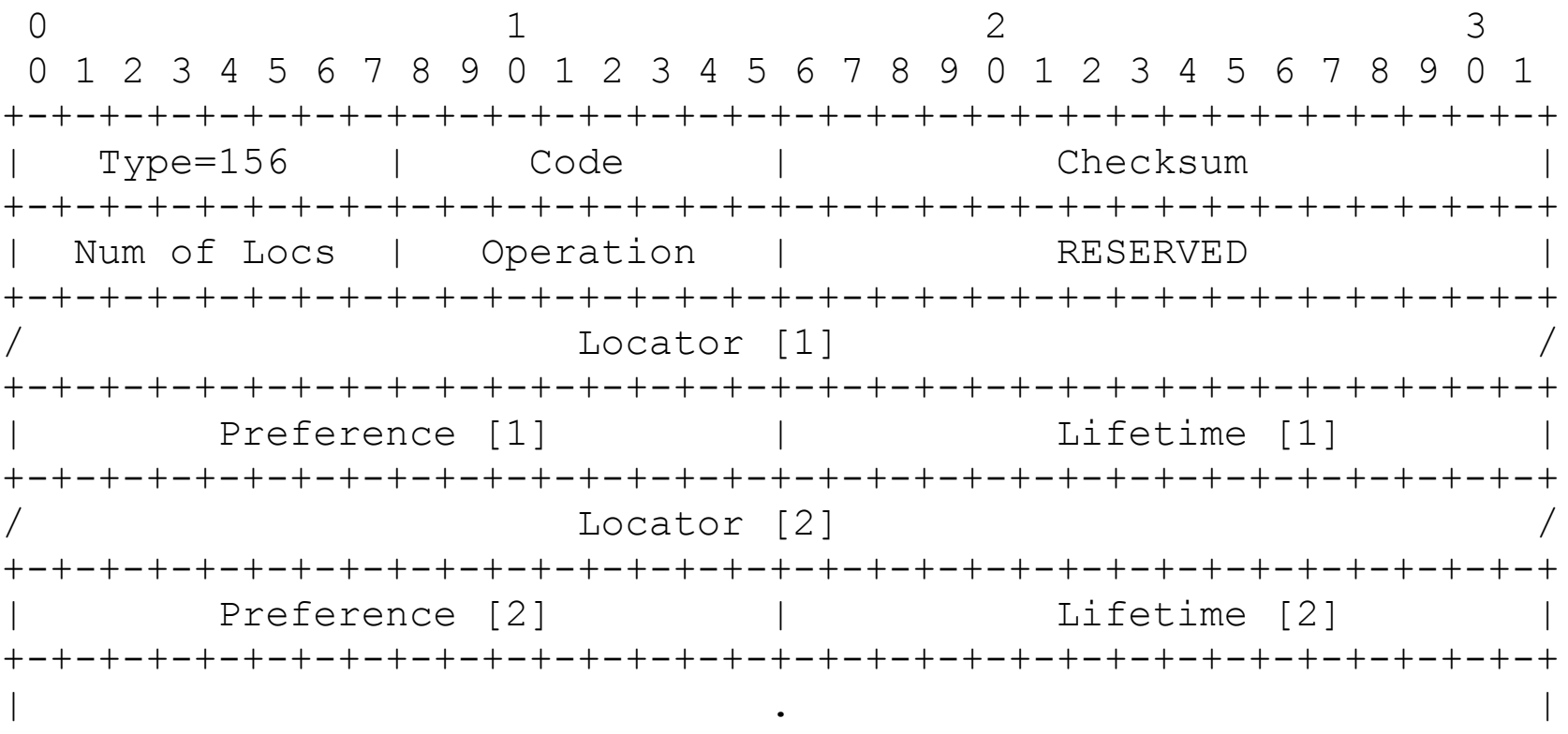


Locator Update handshake



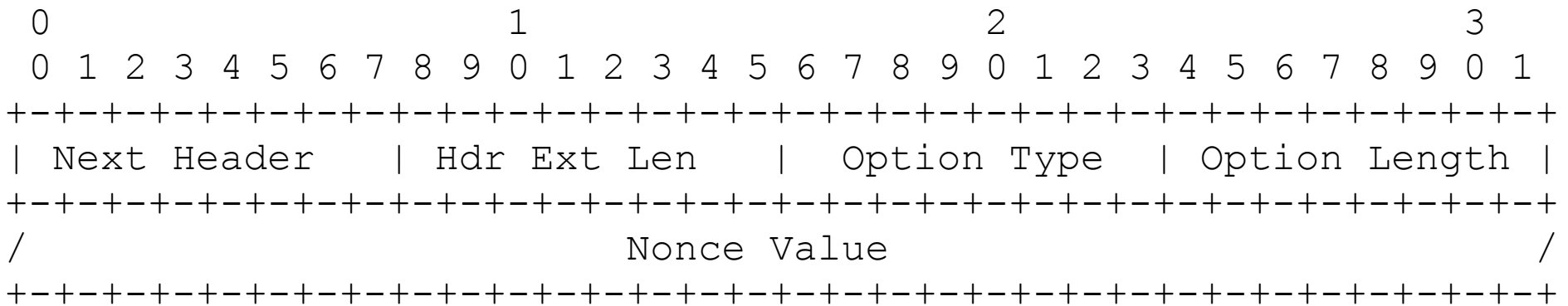
ILNP: Locator Update Message

/* ILNPv6 (ICMPv6) - RFC6743 */



ILNP: Nonce Header (Dst. Option)

/* ILNPv6 – RFC6744 */



Option Type: 0x8b
Option Length: 4 or or 12 bytes
Nonce Value: 32 or 96 bits