

OSPF extension for 5G Edge Computing Service

draft-dunbar-lsr-5g-edge-compute-ospf-ext-02

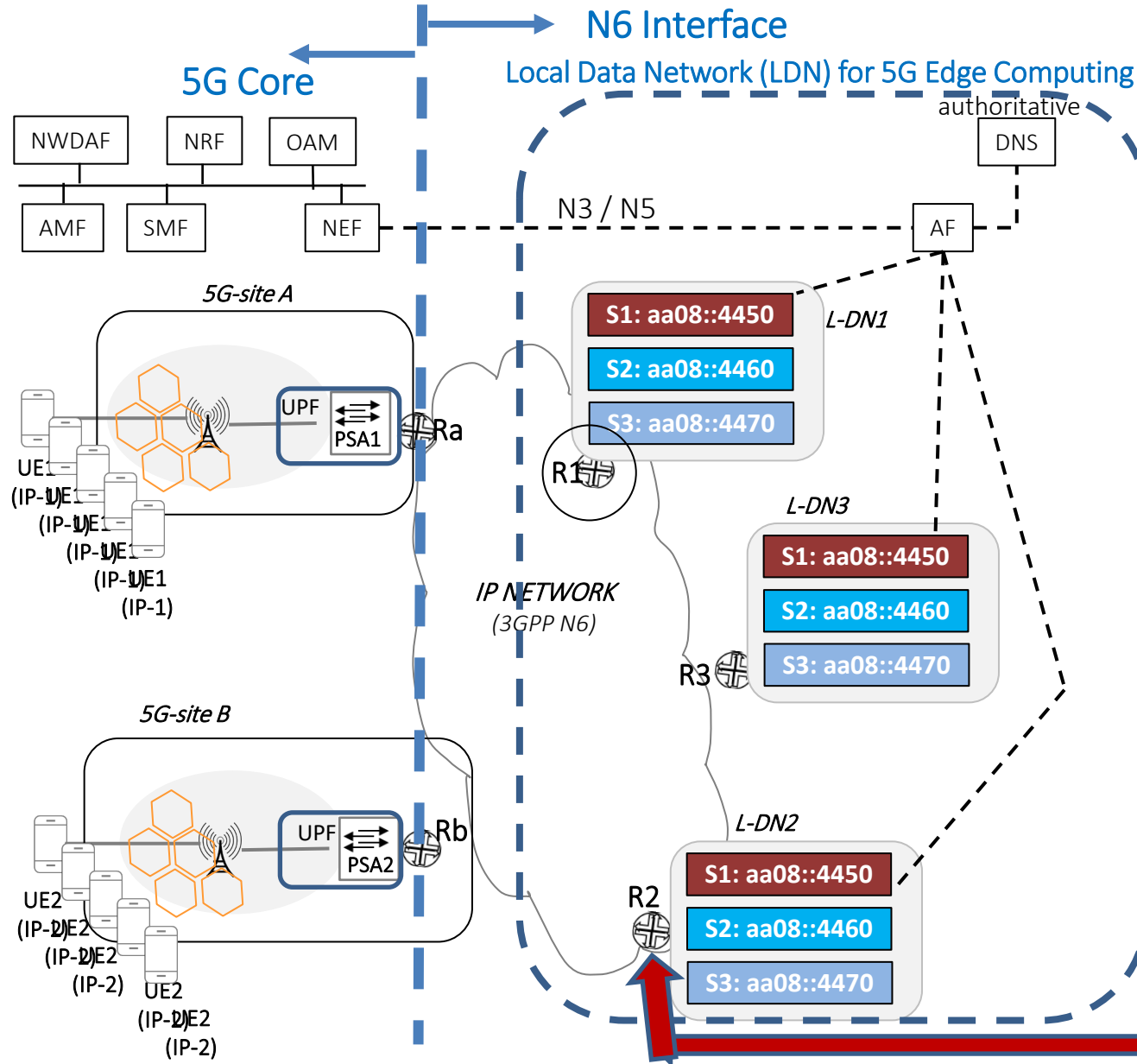
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March 2021

5G Edge Computing (3GPP TR23.748)



One Application has multiple Application Servers located in Edge Computing DCs

Use Cases:

- Unmanned Aerial Vehicles (Drones) <-> Controller, Traffic Management, and App Servers [3GPP TR22.829]
- Virtual concert
- Virtual Interactive Conference
- Computing (e.g. the encoding, video stitching, compressing, etc.) processed by the servers in the edge DCs

Network Assumption:

All the servers are directly attached to the egress routers, The servers and the egress routers are co-located. May have a layer of Virtual Switch or ToR between the egress routers and the servers

ANYCAST in 5G EC

Benefits of ANYCAST

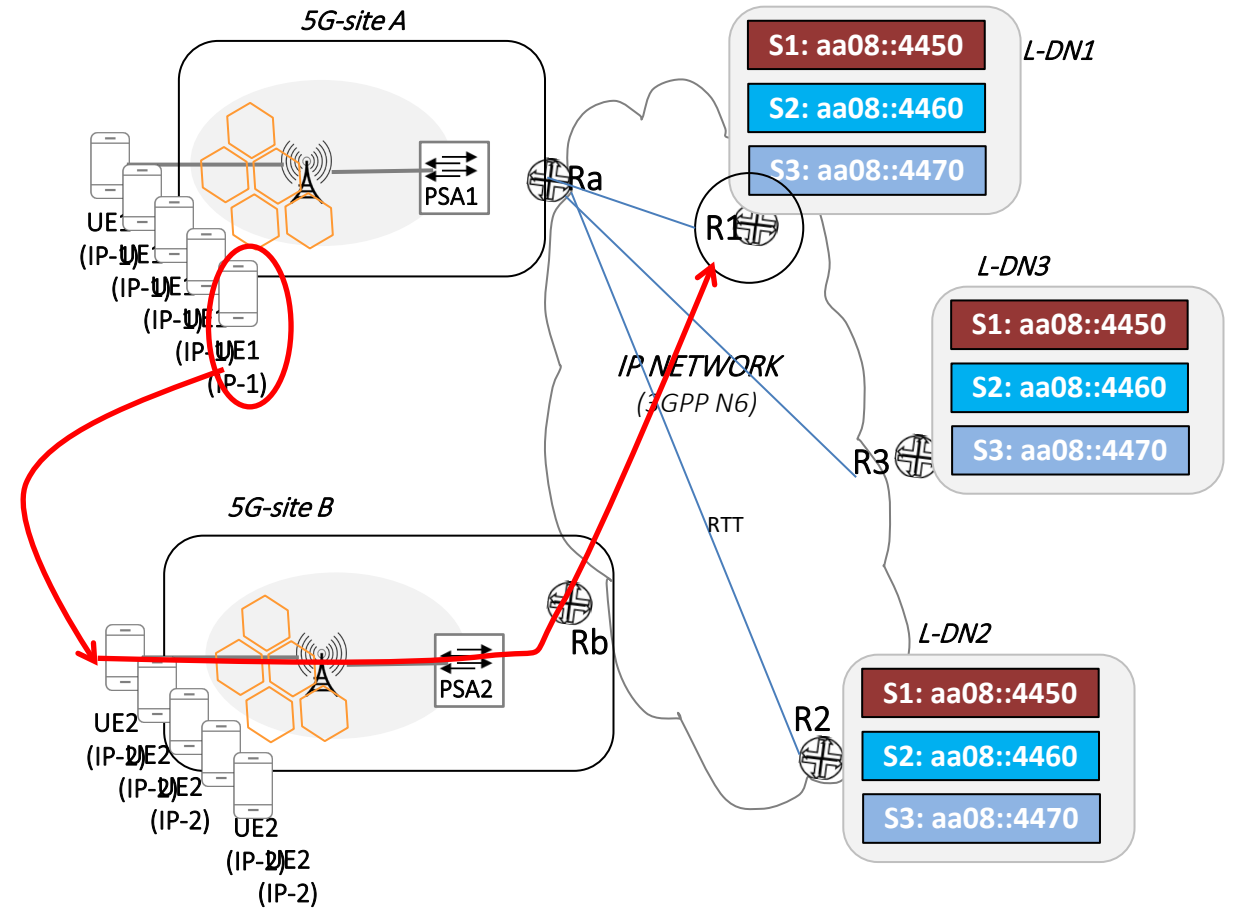
- Leverages the network layer,
- Eliminates the single point of failure and bottleneck at the DNS resolvers and application layer load balancer
- Avoid stale cache of some UEs

Problems of ANYCAST in 5G EC

- Small differences in routing distance to edge servers
- Unbalanced ANYCAST distributions due to UE mobility
- Server relocation, over utilization, etc.

Factors in selecting ANYCAST Server in 5G EC

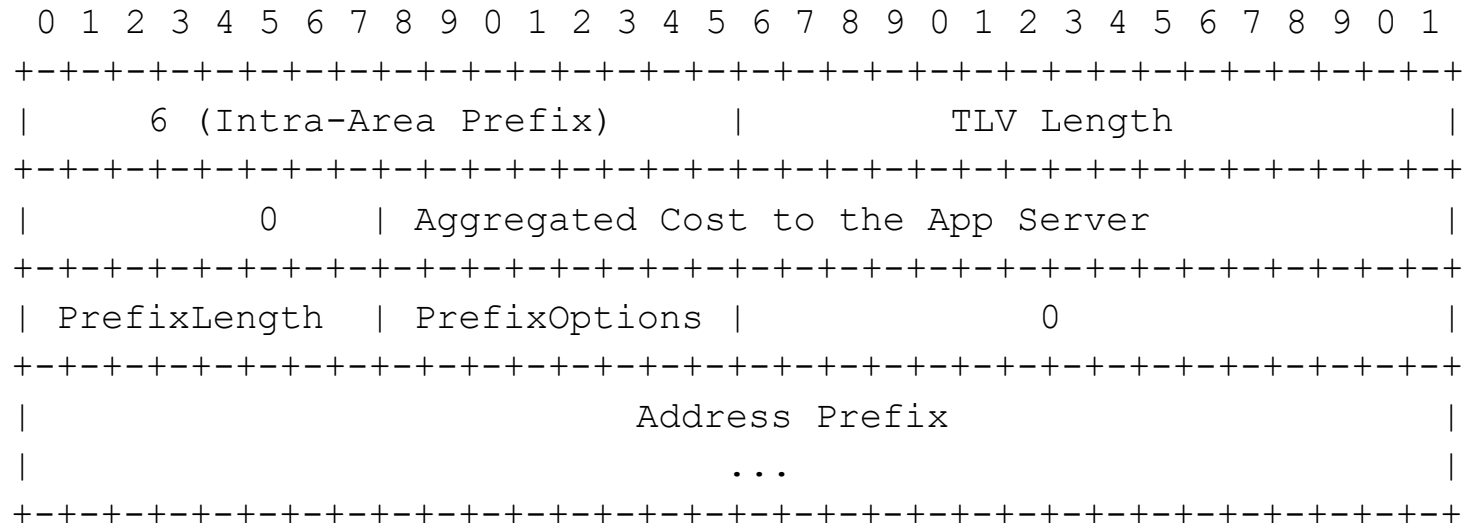
- RTT to “app.net” ANYCAST S1:
 - List of {
 - R1: RTT value
 - R2: RTT value
 - R3: RTT value}
- Capacity
- Site Preference



Unified Aggregated Cost

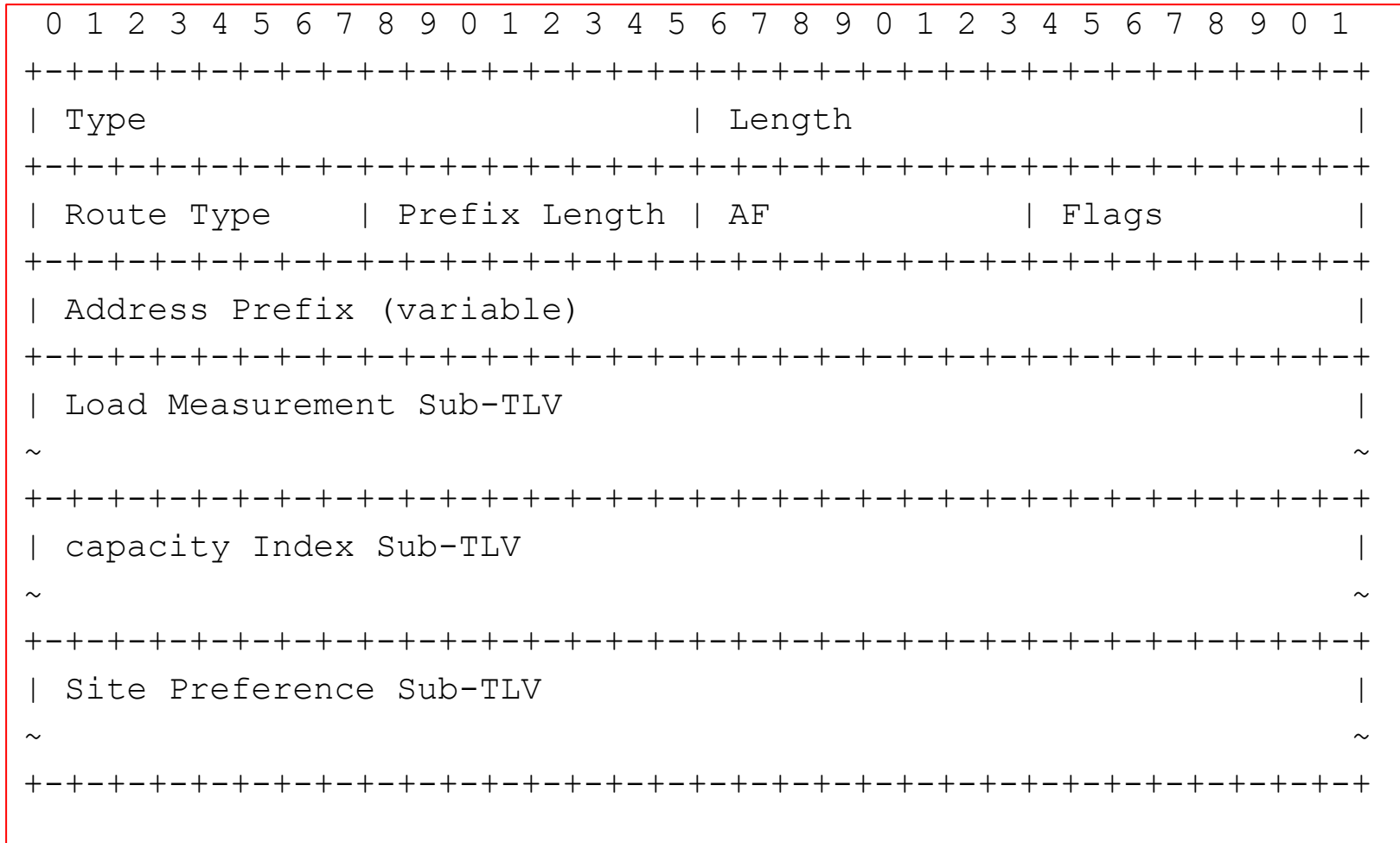
consistent among all egress nodes

- **IPv4:**
 - Encoded in the “Metric” field of the Stub Link LSA [Link type =3] specified by the Section 12.4 of the [RFC2328]
- **IPv6: OSPFv3 LSA to carry the Aggregated Cost**
 - Encoded in the Metric field [the interface cost] of Intra-Area-Prefix-LSA specified by the Section 3.7 of the [RFC5340]

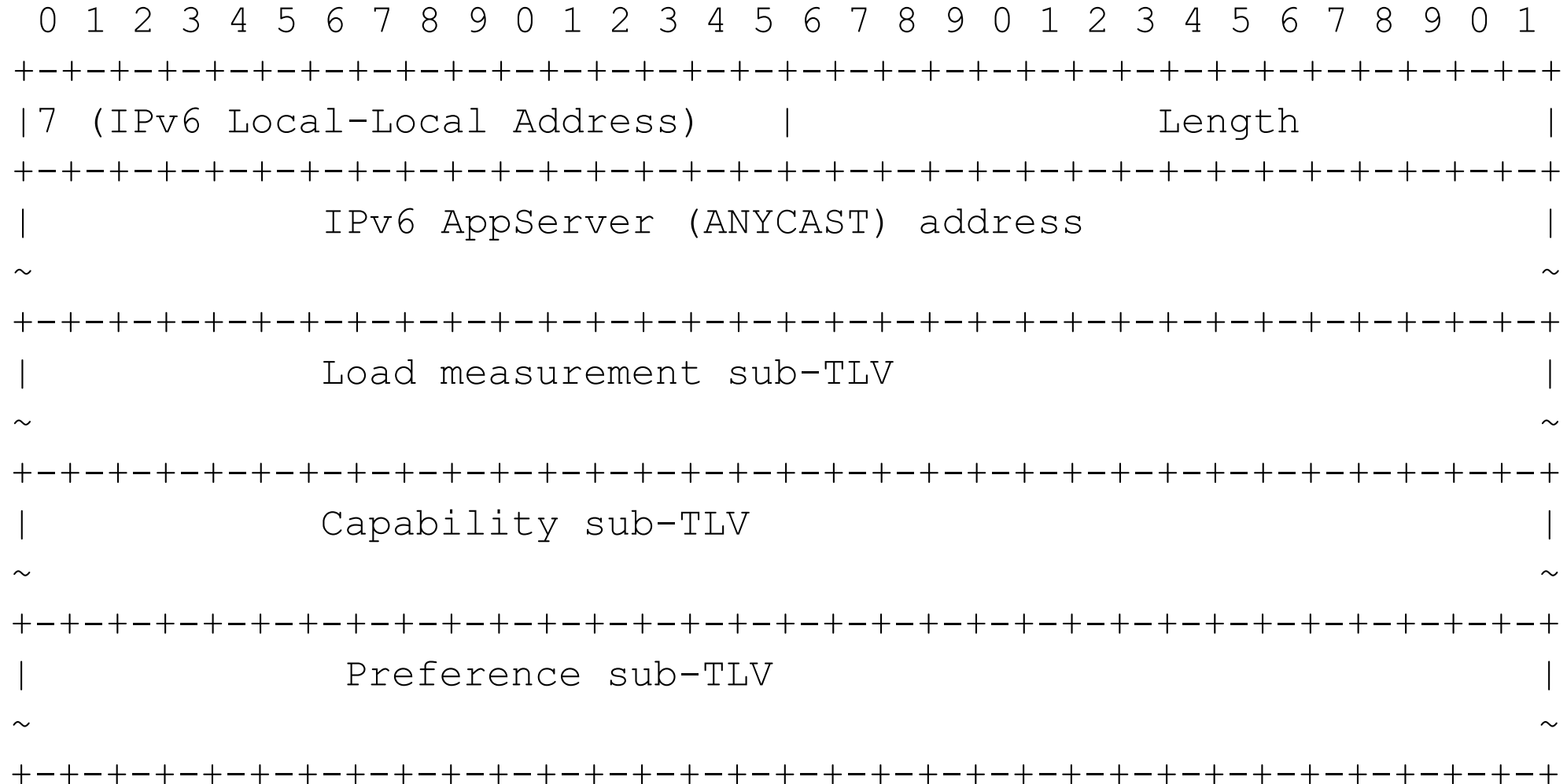


IPv4: the OSPFv2 Extended Prefix Opaque LSA with the extended Prefix TLV to carry the App Metrics sub-TLVs [RFC7684]

For raw measurements:



IPv6: OSPFv3 Extended LSA with the Intra-Area-Prefix Address TLV [RFC8362] to carry the App-Metrics



**We want
your feedback!**



When the optimal
egress router to
an ANYCAST is not
reachable

Using a group of ANYCAST addresses to achieve the Soft Anchoring a flow to one ANYCAST Location

TABLE 1: DNS configuration:

```
// global FQDN: app.net
app.net      172800  IN  A      G-4
app.net      172800  IN  AAAA   G-6

// FQDN: op1.app.net
ldn1.op1.app.net      172800  IN  A      L1
ldn2.op1.app.net      172800  IN  A      L2
ldn3.op1.app.net      172800  IN  A      L3
```

IP ROUTING 2: Route Injection from IP > IP Controller

```
G-4 -> {E1, E2, E3}
L1 -> E1 | {E2, E3} if E1 has failed
L2 -> E2 | {E1, E3} if E2 has failed
L3 -> E3 | {E1, E2} if E3 has failed
```

