Autonomic Prefix Management in Large-scale Networks

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draft-jiang-anima-prefix-management

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Motivation

- To validate the application and reusability of Anima components

- In large networks, prefix management still depends on human planning. Management of IPv6 prefixes is rigid and static after initial planning.

- The autonomic networking mechanism is to dynamically and autonomically manage IPv6 address space in large-scale networks

- Ideally, administrators just configure a single IPv6 prefix for the whole network and the initial prefix length for each device role.

Auto Prefix Management

- A prefix requesting device that needs new or more address space

  - It firstly discover the peer devices that may be able to provide extra address space by sending out Generic Autonomic Signaling Protocol (GRASP) [draft-ietf-anima-grasp] discovery message that contains a Prefix Objective option

  - Then obtain or negotiation a prefix allocation with discovered device also through GRASP

- With in a single administrative domain, the network operator could manage all their devices with a given role set

  - A prefix management Intent, which contains all mapping information of device roles and their default prefix length, should be flooded

  - Intent flooding mechanism is currently missing, and some related work has been done in "Information Distribution over GRASP" [draft-liu-anima-grasp-distribution]

- Discovery, negotiation & flooding messages should go through Autonomic Control Plane ACP [draft-ietf-anima-autonomic-control-plane]

Prefix Management Intent in CBOR

```
{"autonomic_intent":
 [
   {"model_version": "1.0"},
   {"intent_type": "Network management"},
   {"autonomic_domain": "Customer_X_intranet"},
   {"intent_name": "Prefix management"},
   {"intent_version": 73},
   {"Timestamp": "20150606 00:00:00"},
   {"Lifetime": "Permanent"},
   {"signature": "XXXXXXXXXXXXXXXXXXXX"},
   {"content":
   [
     {"role": [{"role_name": "RSG"},
       {"role_characteristic":
         [{"prefix_length": "34"}]}
       ]},
     {"role": [{"role_name": "ASG"},
       {"role_characteristic":
         [{"prefix_length": "44"}]}
       ]},
     {"role": [{"role_name": "CSG"},
       {"role_characteristic":
         [{"prefix_length": "56"}]}
       ]}
   ]
   }
```

In this example, the prefix length of
- Radio Network Controller Site Gateway (RSG) is 34
- Aggregation Site Gateway (ASG): 44
- Cell Site Gateway (CSG): 56

Whether this should be named "Intent" is another discussion, out of scope for this document

Comments are welcomed!

Thank You!