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": "XXXXXXXXXXXXXXXXXXX",
        "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!