

Intent Distribution for Autonomic Networking

(draft-liu-anima-intent-distribution-00)

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Introduction

- Intent Distribution is considered as one of the common control and management functions of an autonomic network
 - [RFC7575] (Autonomic Networking: Definitions and Design Goals)
 - [behringer-anima-reference-model]
- Not in current charter, but should be a necessary component
- This draft contains:
 - Analysis of generic Intent Distribution requirements and bearing protocol requirements
 - A specific solution based on Anima Signaling Protocol (GRASP)

Generic Requirements

- Distributed to the whole domain
- De-coupling of Intent Content and Bearing Protocol
- Avoiding signaling storm
- Arbitrary Intent injecting point (Optional)
- Conflict handling (Optional)

Bearing Protocol Requirements

- **Distribution approaches**

- Point-to-Point
- Multicast (on-link)
- Flooding (multi-hops)

- **Messaging**

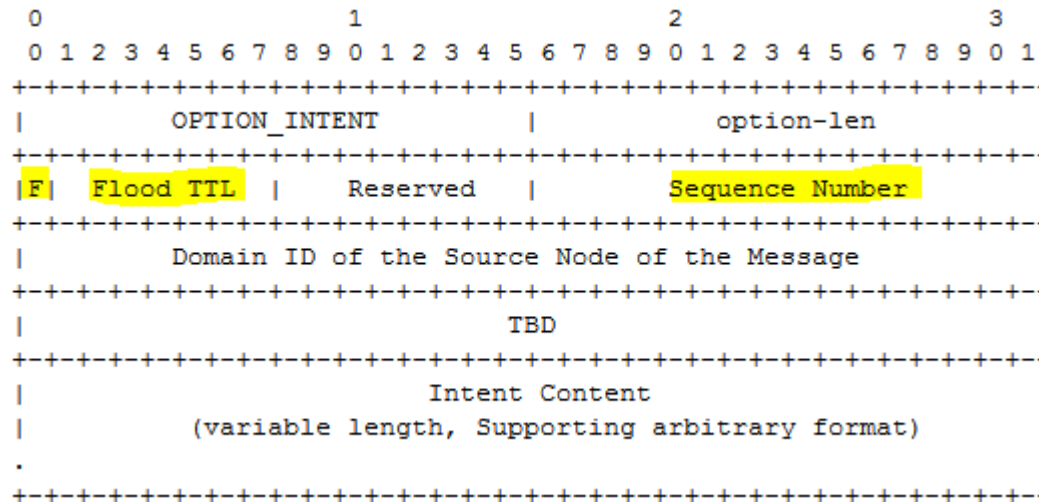
- Request-Response
 - Mostly for Point-to-Point distribution
- Unsolicited advertisement
 - Mostly for on-link multicast and flooding
 - For flooding, two alternatives:
 - ASAs interpret the Intent content and translation the flooding into hop-by-hop point-to-point communications (e.g. Synchronization in GRASP)
 - Dedicated “Unsolicited advertisement” messaging

- **Fragmentation Consideration**

- when an intent packet needs to be split, it might need to be split into fragments each of which could be interpreted individually

Extension to GRASP 1/3

- Intent Option



- F (flooding) flag: indicating the intent needs to be flooded or not
- Flood (hop)TTL: limiting the hops that an Intent message could travel
- Sequence number: to uniquely identify an intent option

Extension to GRASP 2/3

- Initiating Node behavior
 - If it is NOT a flooding intent, the “Intent Distribution ASA” generates the Intent Option and calls the GRASP module to send the Intent Option in a unicast message (e.g. Request Message or Sync message)
 - If it is a flooding intent, the ASA calls the GRASP module to multicast the message to all it's neighbors (e.g. through a Discovery Message)
- Receiving Node behavior
 - The GRASP module extracts the Intent Option and handle it up to the “Intent Distribution ASA”.
 - If it is NOT a flooding intent, the ASA calls the GRASP module to response a Negotiation-Ending message with a Accept Option
 - If it is a flooding intent, the node multicast the option again to all it's neighbors.

Extension to GRASP 3/3

- Flooding control
 - Loop Avoidance
 - Every node maintains a flooding state table which stores each interface's record that whether a specific intent option had been received or sent from it.
 - The option identification could be the combination of the Sequence Number and Node ID in the Intent Option.
 - The node **MUST NOT** send a flooding Intent Option message to the interfaces that had received or sent the same Intent Option.
 - Flooding TTL
 - To guarantee the packet would not travel in a infinite loop in the network.

(Note: this might also apply to multi-hop discovery in GRASP)

Next Steps

- Open to discuss the requirements whether they are sufficient or necessary
- Open to discuss the solution

Your comments are welcomed and appreciated!

Comments?

Thank you!

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