

# **Autonomic Network Intent and Format**

**draft-du-anima-an-intent-02**

Zongpeng Du

Sheng Jiang

Jéferson Campos Nobre

Laurent Ciavaglia

# Main Updates of Version 2

- To better clarify the concept of intent, add the content concept section (Section 3.1), and also more use cases (Section 3.3.1 & 3.3.2)
  - 3.1. Concept of Autonomic Network Intent
  - 3.3.1. High-Level Policy Intent
  - 3.3.2. Network-Level Parameter Intent
- Add some sections, which are considered related, but the contents are TBD
  - 3.4. Distribution of Autonomic Network Intent
  - 3.5. Interpretation of Autonomic Network Intent
  - 3.6. Management of Autonomic Network Intent

# Intent Definition

- Intent: *"An abstract, high level policy used to operate the network"* (quoted from [[I-D. behringer-anima-reference-model]])
  - Different from the NMS method, no need to configure every node directly
- The main question: Whether we should consider the use case in [I-D.jiang-anima-prefix-management] as an intent?
  - The use case: It is suggested that the prefix lengths for the CSG, ASG, RSG (different roles in IPRAN) should be assigned as an "intent"

# Exploration of the Concept of Intent

- In current version of the Draft, the answer is “Yes”
  - If not?
    - Definition of another concept → configuration needed for the autonomic network
- Concept of Intent extended to include “High-level policy” and “Network-Level Parameter”
  - Different kinds of intent → different abstraction levels
  - Different parts of intent can belong to different kinds of intent
- Open questions:
  - Are there any configuration parameters of an anima network outside intents?
  - Or can we agree there are different kinds of intents?
  - Need we define "hierarchy" for intents?

# High-Level Policy Intent Examples

## Use case one

- Autonomic Network of Operator A composed of Autonomic Function Agents such as load balancing (LB\_AFA) and energy saving (ES\_AFA)
- Operator A wants to limit the proportion of links loaded over a certain threshold → definition of an Intent to activate load balancing if the load is superior to 0.6 on more than 30% of the links
  - Meanwhile, operator A wants different load balancing policies per (technology, administrative, topology) domain
  - E.g., metropolitan network domain and a core network domain
  - For the core network domain → Operator A applies the previously defined intent
  - For the metropolitan network domain → Operator A defines an Intent to minimize the link load variance

# High-Level Policy Intent Examples

## Use case two

- "Arranging VM guest distribution"
  - The autonomic network is supposed to be able to monitor the CPU/power utilization on each host machine and control the status of each host machine (e.g. turn on/off)
  - The operator may have intents
    - "there should be enough hosts to keep CPU utilization less than 70%",
    - "there are few enough hosts powered so that electricity isn't wasted"

# Network-Level Parameter Intent Examples

## Use case three

- When bootstrapping, the new device needs to know some basic parameters about the autonomic domain to complete the process
- To reduce the complexity of bootstrapping, they are perhaps not need to be encrypted
- They can be treated as "bootstrapping intent" as a special kind of intent

# Network-Level Parameter Intent Examples

## Use case four

- Assuming we need an autonomous network to run and connect to Internet, an IP prefix is needed for the whole autonomous domain in the data plane
- Devices in the autonomous domain can configure themselves after the human operator has notified the IP prefix for this autonomous network
- Configuring every device's IP address manually not considered a good way in autonomous network

# Network-Level Parameter Intent Examples

## Use case five

- Configuring the routing protocol in the autonomic network directly by the operator
  - E.g., ISIS or OSPF

# Network-Level Parameter Intent Examples

## Use case six

- Prefix management draft [[I-D.jiang-anima-prefix-management](#)]
  - Prefix lengths for the CSG, ASG, RSG (different roles in IPRAN) should be assigned as an "intent"

# Comparison of the Two Kinds of Intents

- Abstract level → Autonomic network intent is divided to two kinds
  - High-Level Policy Intent
    - Multiple Autonomic Function Agents may be involved in the implementation
    - Interpretation by a policy continuum to low level commands that the device can understand
    - Detailed realization of the translation → out of scope of this draft
  - Network-Level Parameter Intent
    - Network-level parameters configured by the network operator for a specific autonomic function
    - Distributed in the autonomic domain to influence the detail configurations on each autonomic node
    - Mostly for establishing network infrastructure
      - They are likely only needed to be configured once, and rarely changed
    - Coordination with others parameters not needed most of the times

# Other Considerations

- ANIMA first focus → interpretable and implementable intent
  - Obviously, “Network-level Parameters” intent simpler to be realized
- Some related topics
  - 3.4. Distribution of Autonomic Network Intent
    - e.g., Who are the sources and recipients of the intent?
  - 3.5. Interpretation of Autonomic Network Intent
    - e.g., How the AFAs receive, understand and react to an intent?
  - 3.6. Management of Autonomic Network Intent
    - e.g., When/on which triggers are intents generated, updated? How the domain(s) are defined and recognized (if I am an AFA, how do I know I am part of domain x, y or z...?).

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Thank you. Questions?

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