Autonomic setup of fog monitoring agents

draft-bernardos-anima-fog-monitoring-04

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Online, ANIMA WG, 2021-07-26
Motivation for this presentation

• We did a first presentation already at IETF 105, 2 years ago
  – We received some feedback from Michael
• We would like to resume this effort now, under the charter item:
  – “The scope of possible work items are (additional works are subject to extra approval from the responsible AD): […]
    • Generic use cases of Autonomic Network and new GRASP extensions/options for them […]”
  – Goal of today’s presentation is to present again what we did in the draft and see if there is interest in the WG to explore this further
Fog computing

• Virtualization is now present in all domains of E2E networking
• The edge virtualization substrate has been largely assumed to be fixed or stationary
  – But it is now being extended to scenarios where the edge computing substrate is on the move, distributed further down the edge, and even integrating resources from different stakeholders → the fog
• Functions might be organized in service function chains (SFCs), hosted on resources that are inherently heterogeneous, volatile and mobile
  – This calls for new orchestration solutions able to cope with dynamic changes in runtime or even ahead of time
Problem statement
Fog monitoring platform (I)

• Fog environments differ from data-center ones on three key aspects:
  – heterogeneity, volatility and mobility

• We propose a monitoring framework, based on 2 components:
  – Fog agents running at each node, responsible for sending information to a fog monitoring controller
  – A fog monitoring controller, interacting with orchestration logic to coordinate and trigger orchestration events
Fog monitoring platform (II)

Orchestrator (NFVO)

Fog/Edge

fog node A

fog node B

fog node C

VIM

fog agent

Fog monitoring controller

Autonomic setup of fog monitoring agents
Autonomic setup of fog monitoring framework

Fog nodes A and B bootstrap

- Multicast discovery (fog_node_ID, scope)
- Unicast advertisement message (ID, fog_scope)
- Unicast advertisement message (ID, fog_scope)
- Unicast registration message (ID, fog_node_ID, fog_scope, capabilities)
- Unicast registration message (ID, fog_node_ID, fog_scope, capabilities)

Fog nodes A and B registered

- Multicast discovery (fog_node_ID, scope)
- Unicast advertisement message (ID, fog_scope)
- Unicast registration message (ID, fog_node_ID, fog_scope, capabilities)

Fog node C bootstraps

- Multicast discovery (fog_node_ID, scope)
- Unicast advertisement message (ID, fog_scope)
- Unicast registration message (ID, fog_node_ID, fog_scope, capabilities)

Fog node C registered

- An instance of fog monitoring controller is running

Orchestrator (NFVO)  Fog monitoring controller

fog node A  fog node B  fog node C

VIM  fog agent  VIM  fog agent  VIM  fog agent

Unicast advertisement message (ID, fog_scope)

Unicast registration message (ID, fog_node_ID, fog_scope, capabilities)
Use of GRASP

- **M_DISCOVERY** messages are used, with new objectives and objective options:
  - **FOGNODERADIO**: used to specify a given type of radio technology, e.g., WiFi (version), D2D, LTE, 5G, Bluetooth (version), etc.
  - **FOGNODECONNECTIVITY**: used to specify a given type of connectivity, e.g., layer-2, IPv4, IPv6.
  - **FOGNODEVIRTUALIZATION**: used to specify a given type of virtualization supported by the node where the agent runs. Examples are: hypervisor (type), container, micro-kernel, baremetal, etc.
  - **FOGNODEDOMAIN**: used to specify the domain/owner of the node. This is useful to support operation of multiple domains/operators simultaneously on the same fog network.
- Different multicast scopes defined, i.e.: All-resources of a given manufacturer, of a given type, of a given administrative domain, of a given user, etc.
Next steps

• Is this use case of interest to ANIMA WG?

• Provide feedback to authors about the draft