IETF-120 I2INF Side Meeting

Interface to In-Network Functions (I2INF): Framework

(draft-jeong-opsawg-i2inf-framework-00)

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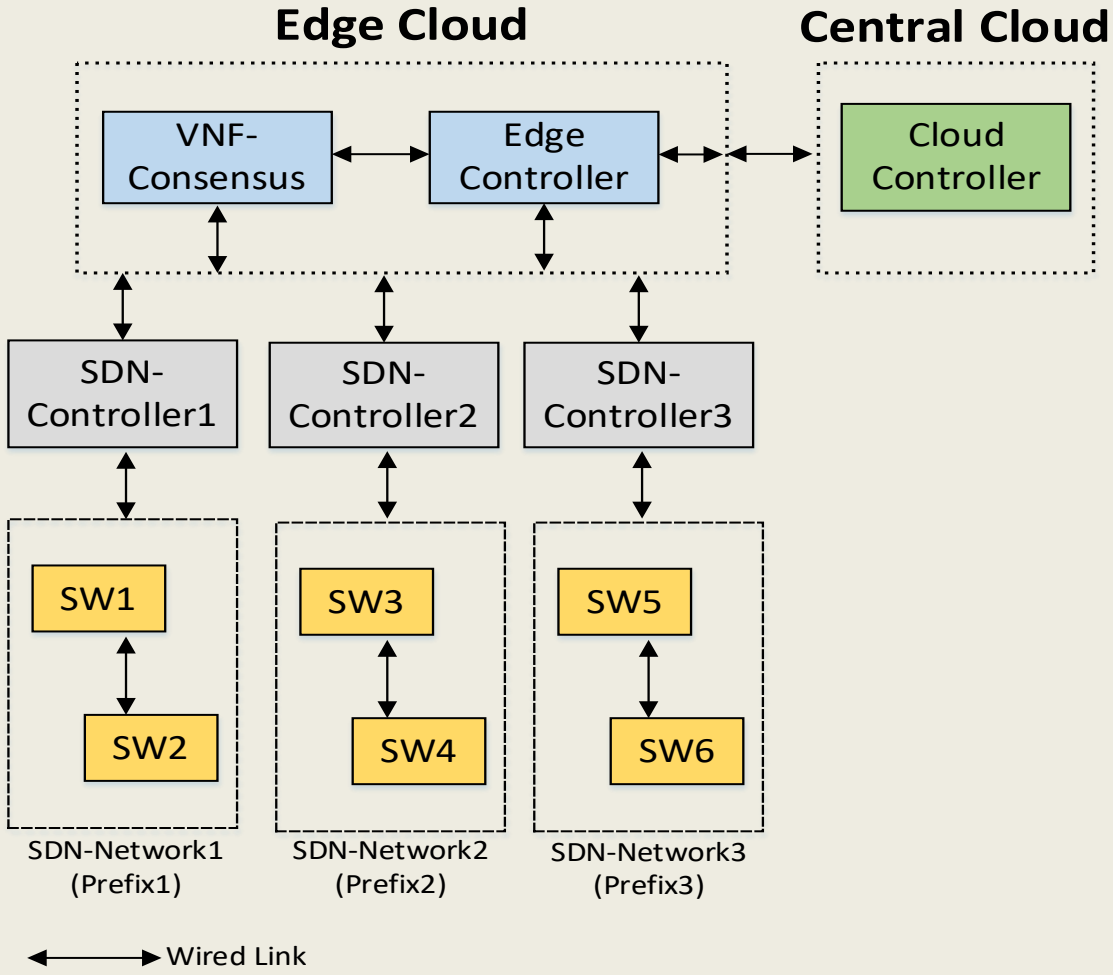
Motivation of this Draft

- draft-jeong-opsawg-i2inf-problem-statement-00
  - The draft defines a framework for managing and configuring for Interface to In-Network Functions.
    - In-Network Functions (INF) include Network Functions (NFs) and Application Functions (AFs).

- Main Contents of this Draft
  - In-Network Functions (INFs)
  - Framework Components
  - Interfaces in the I2INF

I2INF Framework for INF Management:
(e.g., VNF-Consensus, Failure Detector, and Reliable Broadcast)

- This framework shows a VNF-Consensus Architecture in an Edge Cloud for the I2INF framework to synchonize the SDN Controllers for flow table information in the same Edge Cloud .

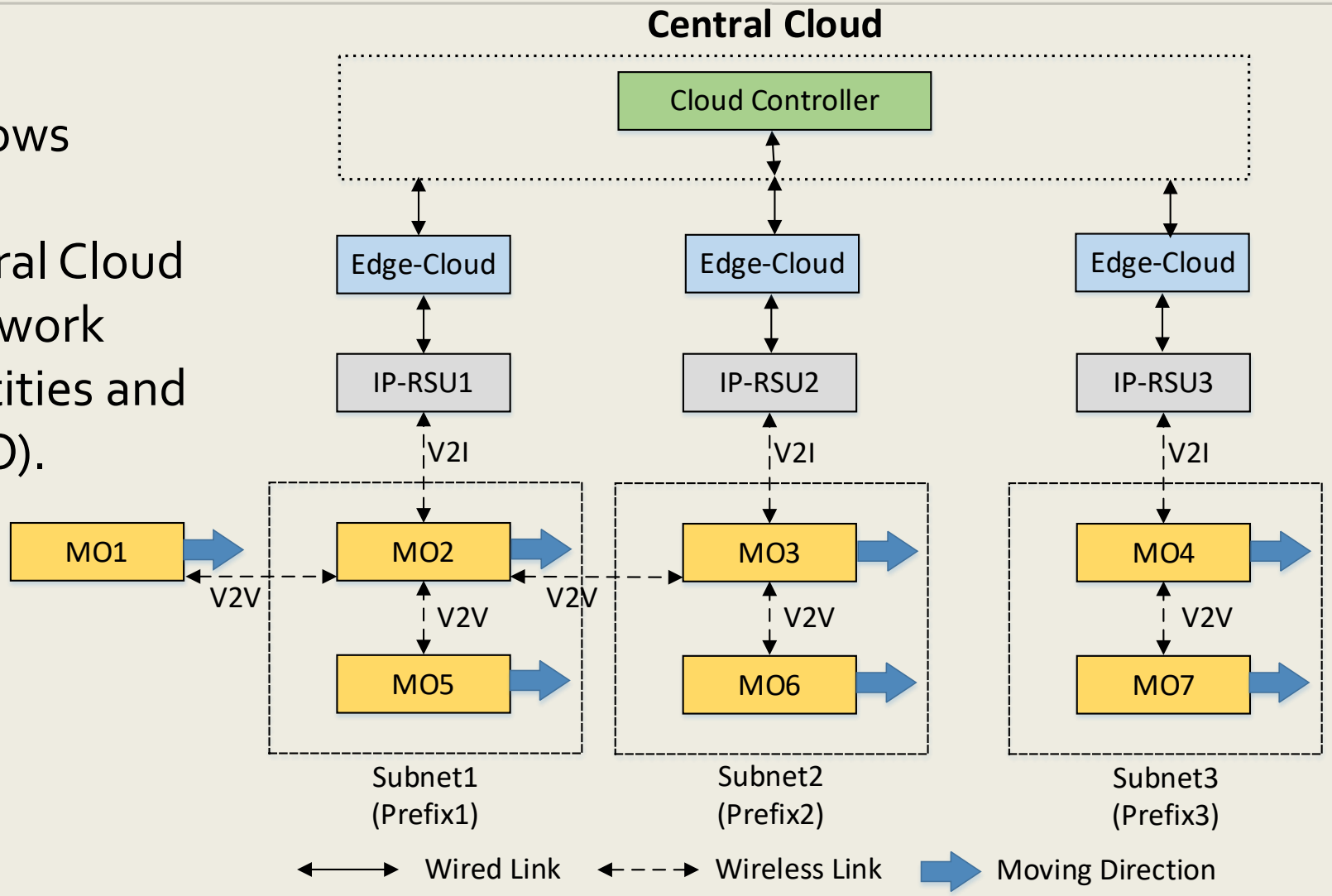


VNF: Virtual Network Function
SW: Switch

VNF-Consensus Architecture in Edge Cloud for I2INF Framework

I2INF Framework for INF Management
(e.g., Mobile Objects (MOs) like Software-Defined Vehicles)

- This framework shows Wireless and Wired Networks in a Central Cloud for the I2INF framework having network entities and Mobile Objects (MO).

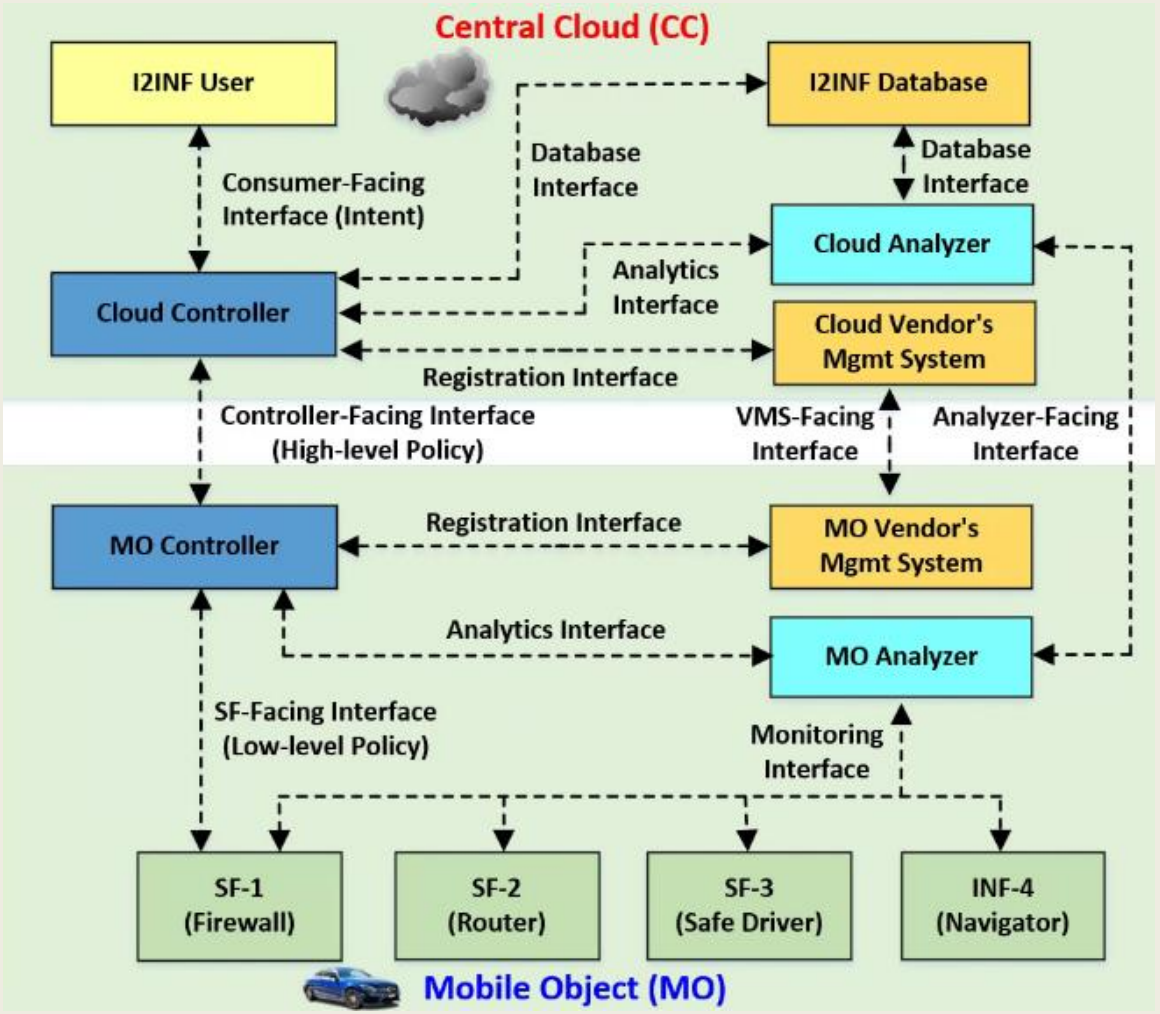


Wireless and Wired Networks in Central Cloud for I2INF Framework

IP-RSU: IP Road-Side Unit
MO: Mobile Object

I2INF Framework for INF Management
(In-Network Functions for Mobile Object and Edge Cloud)

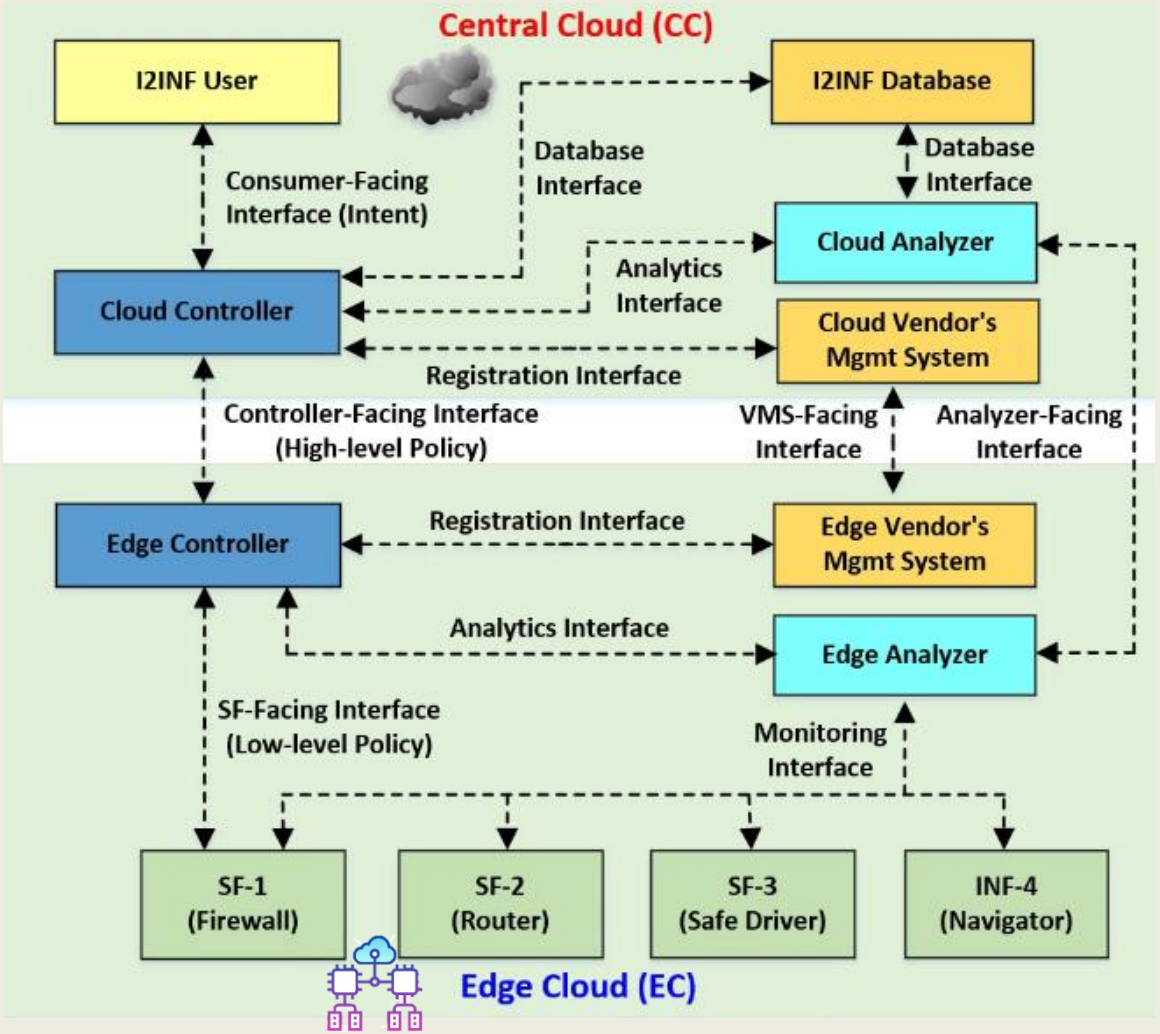
- For the automatic network configuration of MOs, an intent-based management is required between the central cloud and Mos.
- This framework shows an I2INF framework as an IBS for an MO. The framework consists of a Central Cloud and an MO.



A Framework for Interface to In-Network Functions for Mobile Object

I2INF Framework for INF Management
(In-Network Functions for Mobile Object and Edge Cloud)

- For the automatic network configuration of Edge Cloud, an intent-based management is required between the central cloud and Edge Cloud.
- This framework shows an I2INF framework as an IBS for an Edge Cloud. The framework consists of a Central Cloud and an Edge Cloud.



A Framework for Interface to In-Network Functions for Edge Cloud

I2INF Framework for INF Management

- A Central Cloud (CC) consists of the components below:
  - **I2INF User**

    It is the software (e.g., web-browser-based user interface) used by I2INF administrators to deliver network intents to MO controllers and edge controlller.
  - **Cloud Controller**

    It is a component that controls and manages other system components of the central cloud.

I2INF Framework for INF Management

- A Central Cloud (CC) consists of the components below:
  - **I2INF Database**

    It is a database for managing MOs and ECs, including network and security configuration and status of MOs and ECs.
  - **Cloud Analyzer**

    It gathers and evaluates monitoring data from MO Analyzers and Edge Analyzers to ensure the functionality and performance of SFs

I2INF Framework for INF Management

- An IBS in an MO (or EC) is composed of components below:
  - **MO Controller (or Edge Controller)**

    It is a component that controls and manages other components of the MO framework (or EC framework)
  - **Vendor's Management System**

    It provides an image of a virtualized SF for MO services (or EC services) and registers the function and access information of the SF with MO Controller

I2INF Framework for INF Management

- An IBS in an MO (or EC) is composed of components below:
  - **MO Analyzer (or Edge Analyzer)**

    It is a component that collects monitoring data from SFs of MOs (or ECs) and analyzes these data to confirm the activity and performance of SFs.
  - **Service Function (SF)**

    It is a component that refers to a virtual network function (VNF), cloud native network function (CNF), or physical network function (PNF) for a specific service.

Interfaces in the I2INF

- **The interfaces in the I2INF is composed as below:**
  - **Consumer-Facing Interface**

    It is an interface between I2INF User and Cloud Controller for conveying intents.
  - **Controller-Facing Interface**

    It is an interface between Cloud Controller and MO Controller (or Edge Controller) for high-level policy delivery with translated intents.
  - **SF-Facing Interface**

    It is an interface between MO Controller (or Edge Controller) and SF for the delivery of a translated lower-level policy.

Interfaces in the I2INF

- **The interfaces in the I2INF is composed as below:**
  - **Registration Interface**

    It is an interface used to transfer SF capabilities and access information for registration to either Cloud Controller or MO/Edge Controller.
  - **Monitoring Interface**

    It is an interface between the SF and the MO/Edge Analyzer used to collect the SF's monitoring data
  - **Analytics Interface**

    It is an interface for delivering policy reconfiguration or feedback as a result of analyzing SF monitoring data.

Interfaces in the I2INF

- **The interfaces in the I2INF is composed as below:**
  - **Analyzer-Facing Interface**

    It is an interface between MO Analyzer (or Edge Analyzer) and Cloud Analyzer for the exchange of security, network, and system-related analysis of SFs.
  - **VMS-Facing Interface**

    It is an interface between Cloud VMS and MO VMS (or Edge VMS) to exchange SF container images with SF feature information.
  - **Database Interface**

    It is an interface for exchanging data in an I2INF database. It is an interface between I2INF Database and Cloud Controller, or between I2INF Database and Cloud Analyzer.

Conclusion

- This document proposes an I2INF framework as an IBS for both MOs and ECs.
- Through this Itent-Based system, the SFs (i.e., NFs and AFs) in the MOs and ECs can be better configured and managed.
- Base on the proposed framework, both virtualized NFs and AFs can be efficiently orchestrated for agile resource re-configurations and flexible updates.

Next Steps

- This draft will include use cases for I2INF as follows:
  - A Use Case of I2INF for Edge Cloud
  - A Use Case of I2INF for Mobile Object
- I2INF Group will prepare a Non-WG-Forming BoF in the IETF 121 in Dublin.
- If I2INF Group will prepare IETF-121 Hackathon Project to clarify the I2INF Framework.