

# IETF-120 I2INF Side Meeting

## Interface to In-Network Functions (I2INF): Framework

([draft-jeong-opsawg-i2inf-framework-00](#))

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**Jaehoon Paul Jeong, Yiwen Shen, Yoseop Ahn, Younghan Kim, and  
Elias P. Duarte Jr.**

**Email:** {pauljeong, chrisshen, ahnjs124}@skku.edu, younghak@ssu.ac.kr,  
elias@inf.ufpr.br



# Motivation of this Draft

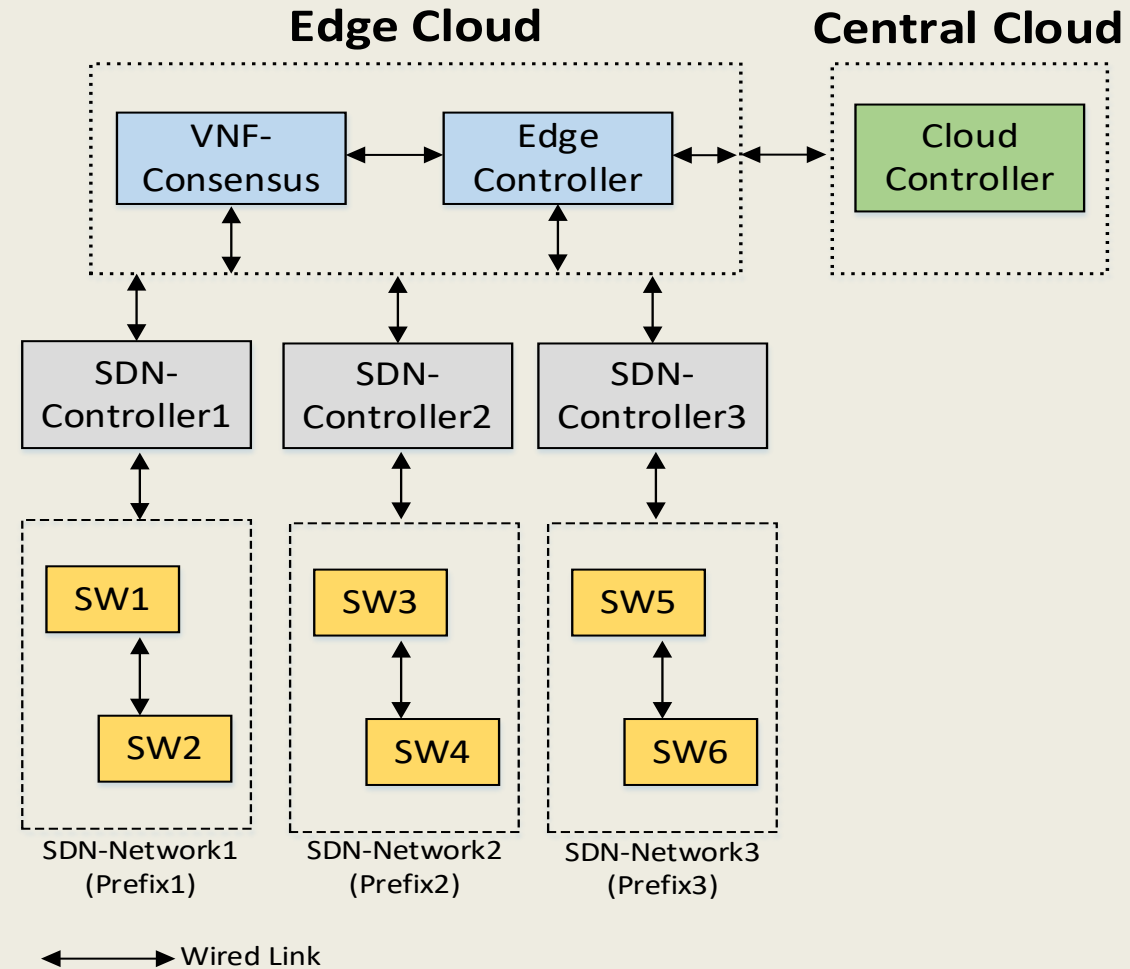


- ❑ draft-jeong-opsawg-izinf-framework-00
  - ▣ The draft defines a framework for managing and configuring for Interface to In-Network Functions which are essential for various network environments like NFV and SDN.
    - ▣ In-Network Functions (INF) include Network Functions (NFs) and Application Functions (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 synchronize the SDN Controllers for flow table information in the same Edge Cloud .



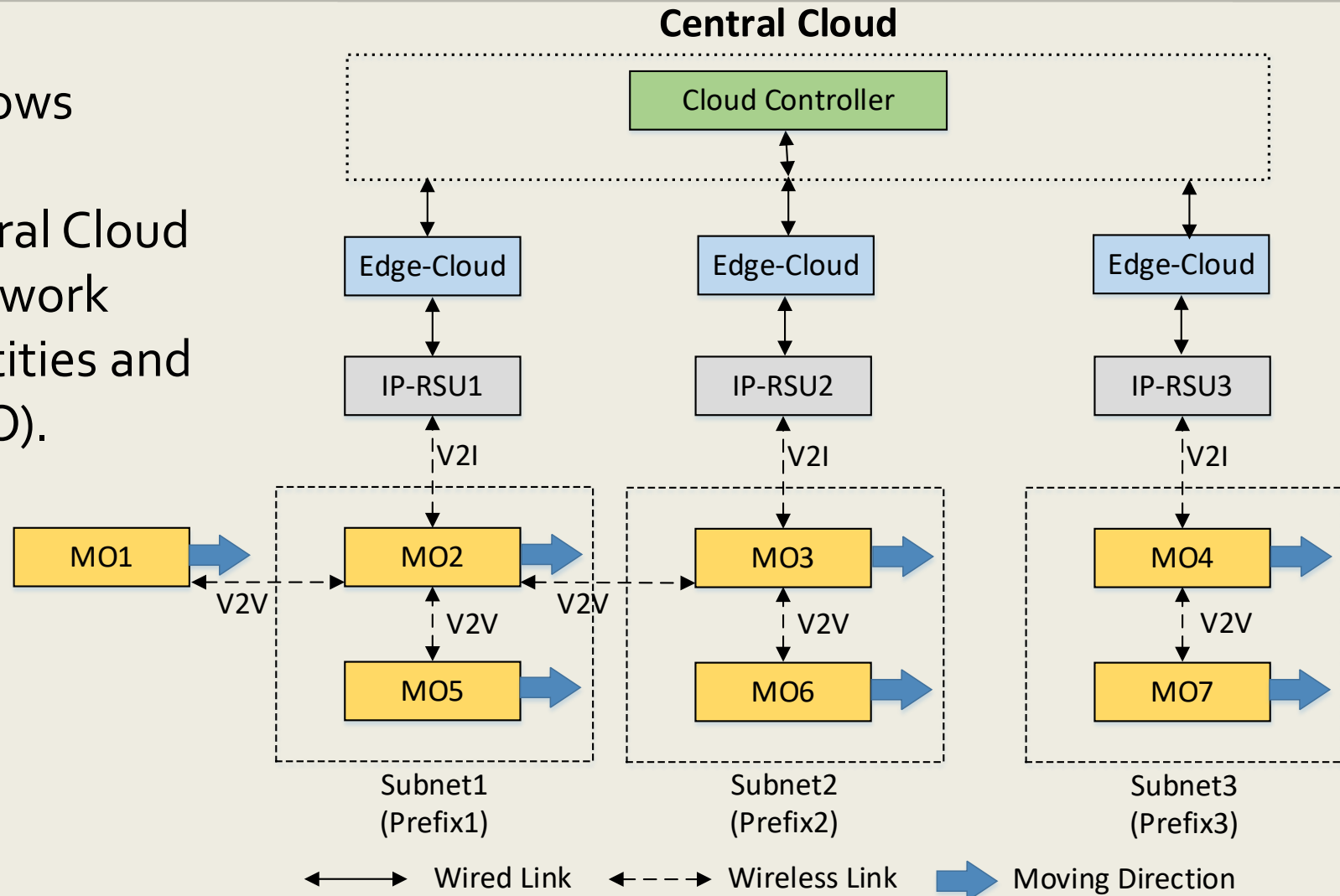
**VNF:** Virtual Network Function  
**SW:** Switch



# 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).



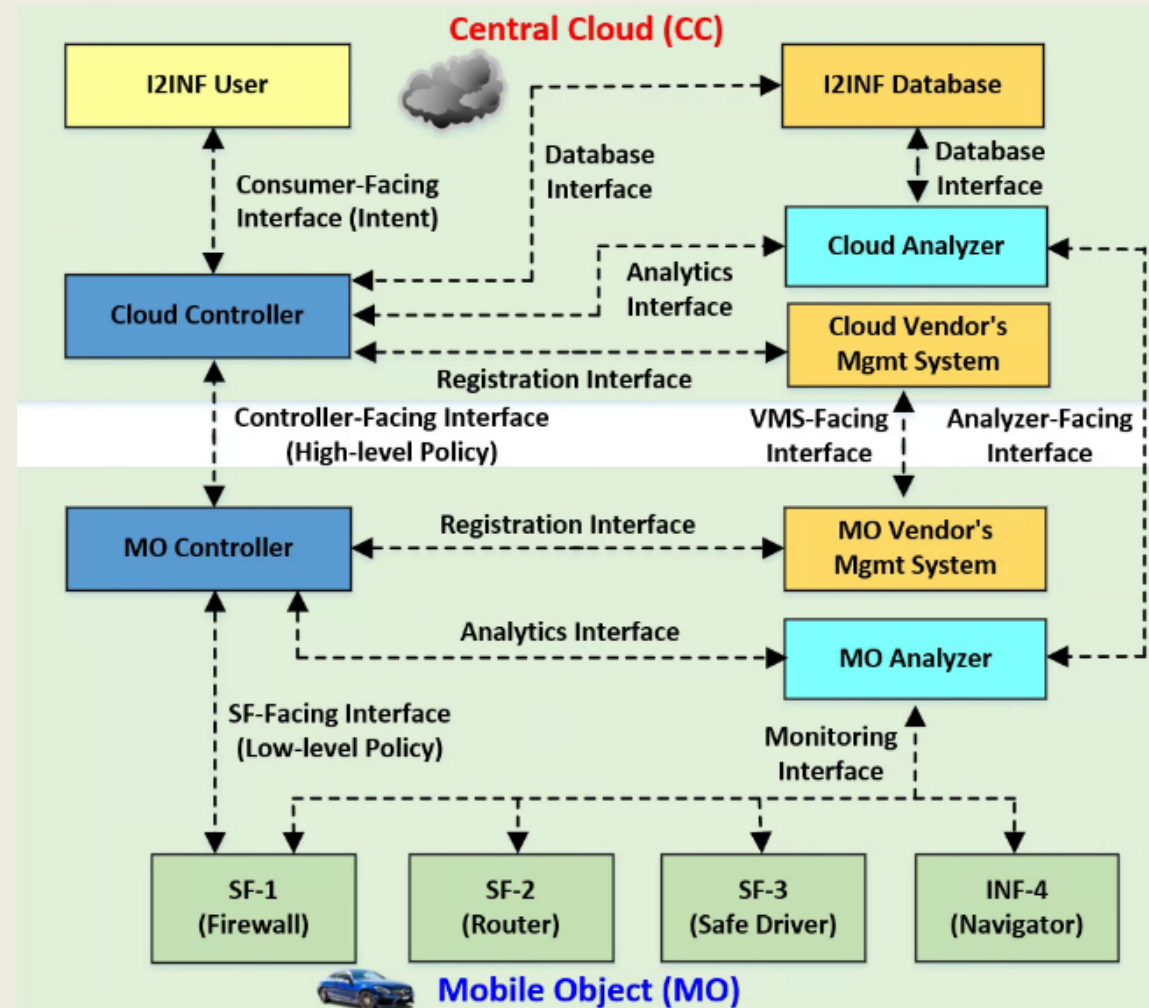
**IP-RSU:** IP Road-Side Unit  
**MO:** Mobile Object



# 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.

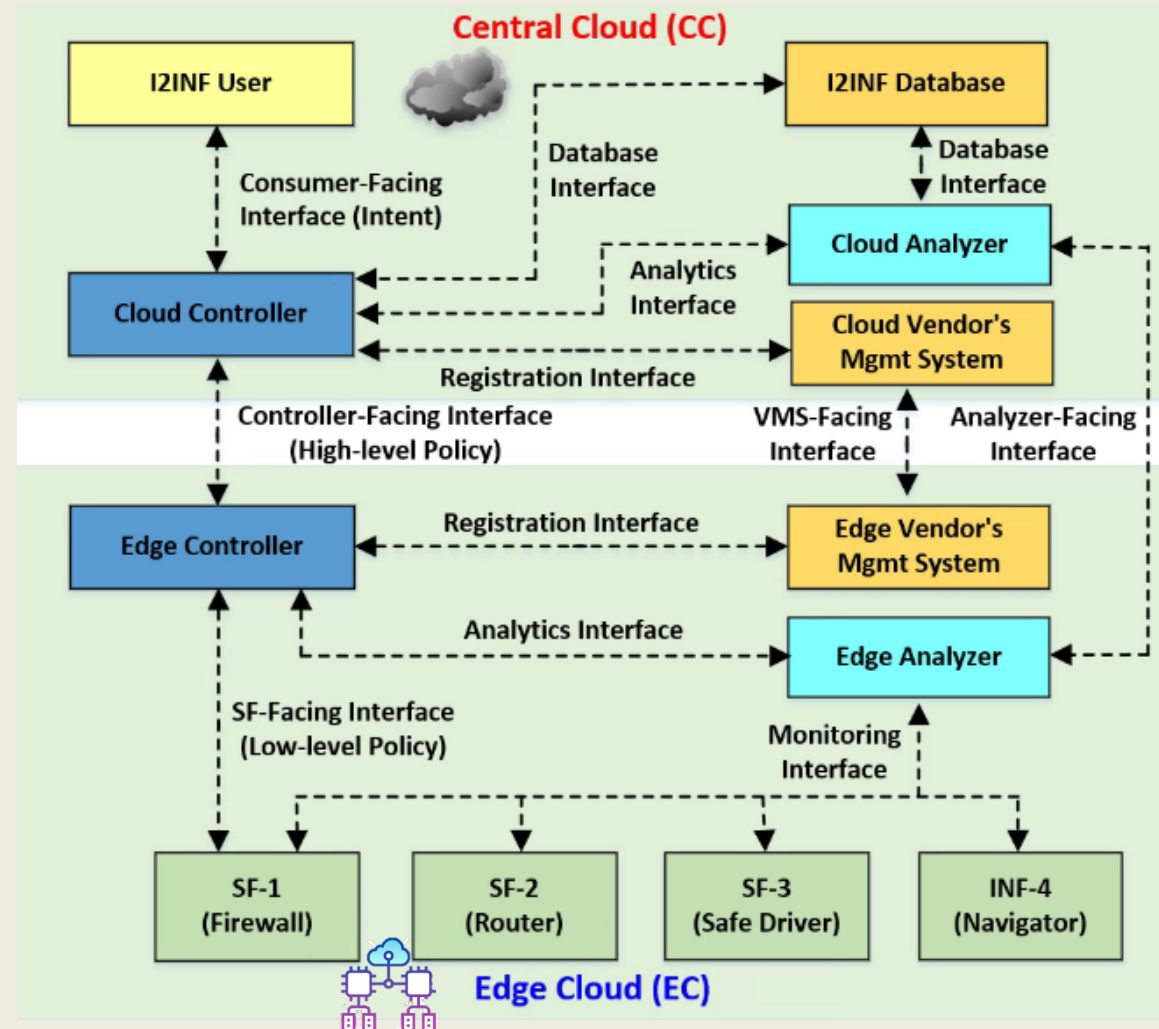




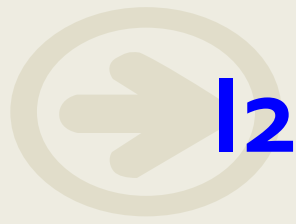
# I2INF Framework for INF Management

## (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

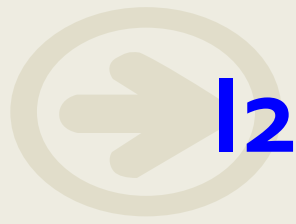
□ A Central Cloud (CC) consists of the components below:

▣ **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 controller.

▣ **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:

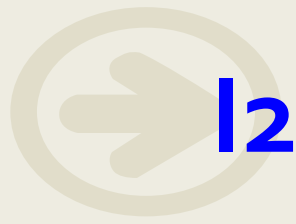
❑ **I2INF Database**

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

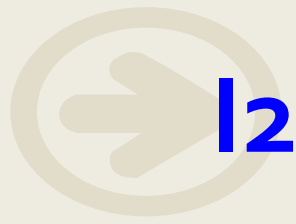
❑ An IBS in an MO (or EC) is composed of components below:

❑ **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.