

Smart Intent Guarantee based on Closed-loop in R10

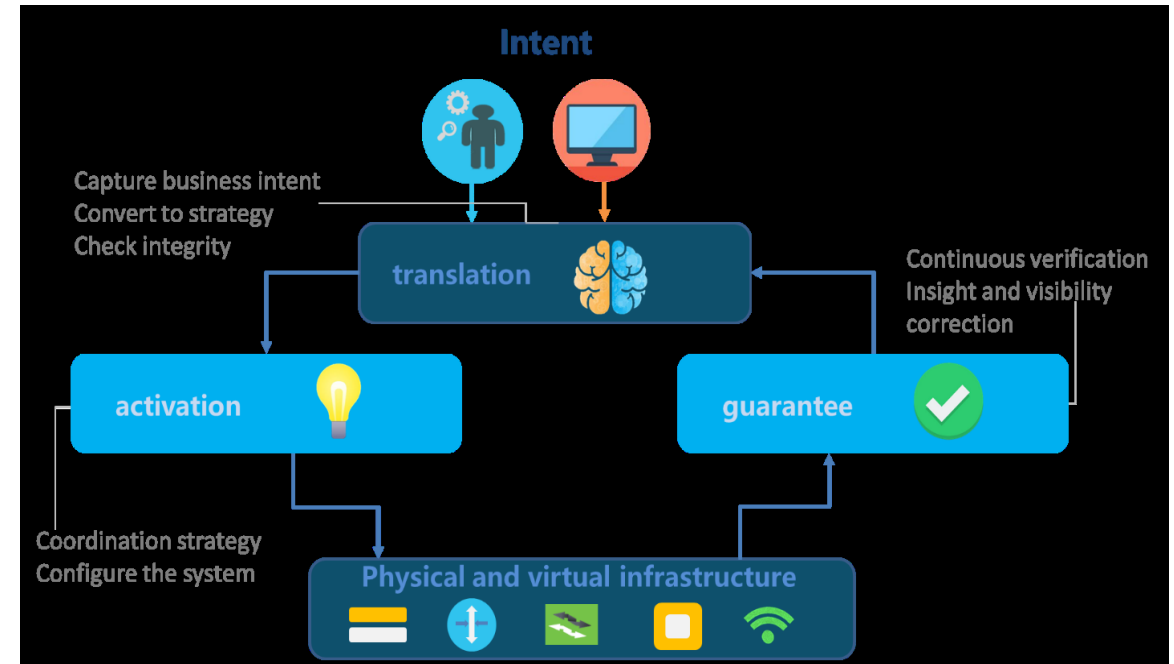
Requirements Subcommittee Review
6th Dec, 2021

China Telecom, Huawei, CMCC

Dong Wang (wangd5@chinatelecom.cn), Henry Yu, Keguang He

1.1 Introduction of Intent-based Network

- ◆ Intent-based network (IBN) is a **self-driving network** that uses **decoupling network control logic** and **closed-loop orchestration techniques** to automate application intents.
- ◆ An IBN is an intelligent network, which can **automatically convert, verify, deploy, configure, and optimize** itself to achieve target network state according to the **intent** of the operators, and can automatically solve abnormal events to ensure the network reliability.



A High-level Framework of Intent-Based Network

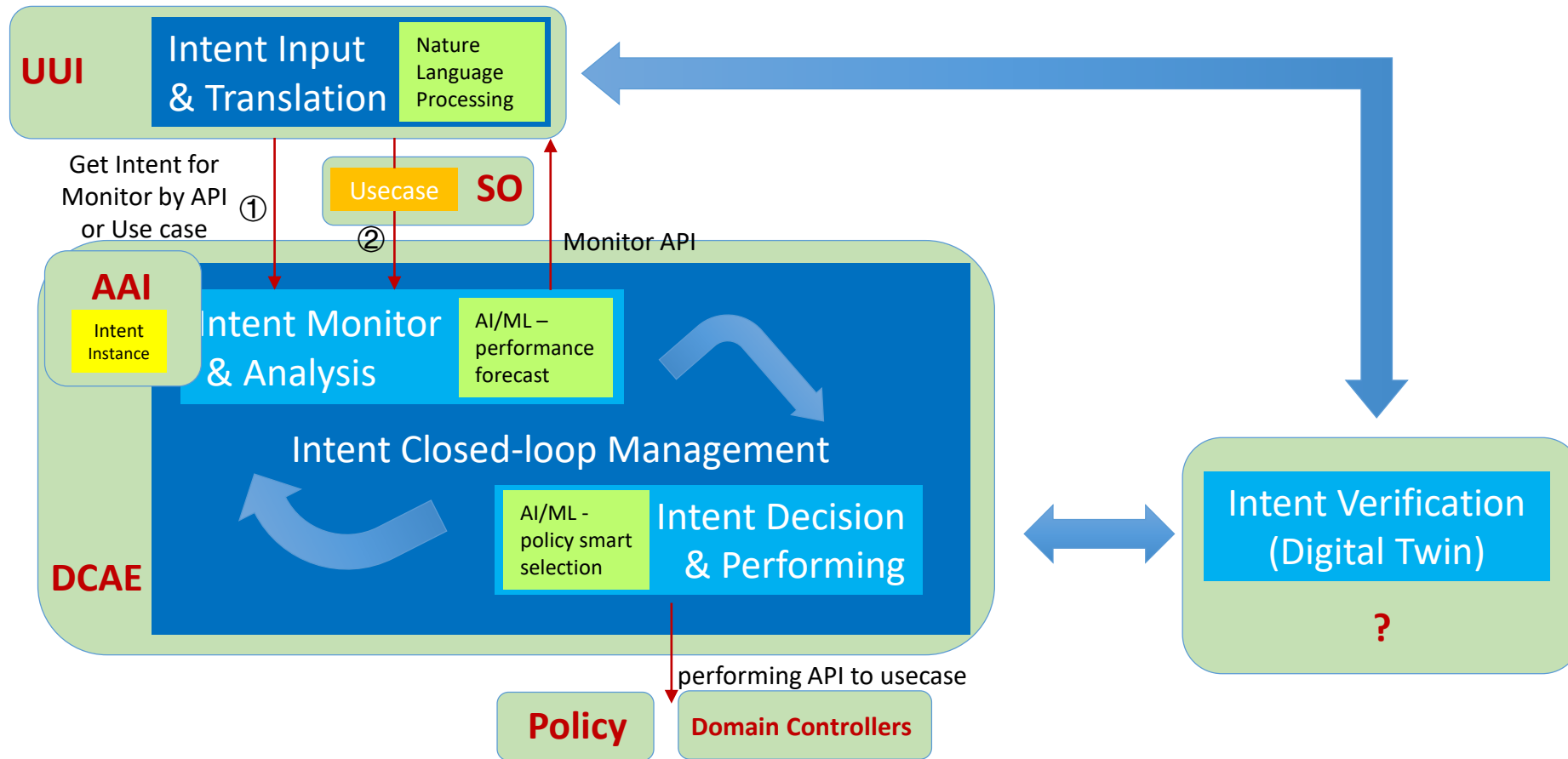
Ref: ITU-T "Scenarios and Requirements of Intent-Based Network for Network Evolution"

1.2 Outputs about IBN in Standardization Organizations

Organizations	Standards	Remarks
3GPP SA5	<ul style="list-style-type: none"> ◆ TR 28.812 Telecommunication management; Study on scenarios for Intent driven management services for mobile networks ◆ TS 28.312 Management and orchestration; Intent driven management services for mobile networks 	TS 28.312 has been approved to transfer from TR 28.812
ITU-T*	◆ 476-WP3 Scenarios and Requirements of Intent-Based Network for Network Evolution	
ETSI ENI*	◆ ENI-0013 Intent Aware Network Autonomicity	
IETF	<ul style="list-style-type: none"> ① Intent-Based Networking - Concepts and Overview ② Intent-Based Networking - Concepts and Definitions ③ Intent Classification ④ Transport Slice Intent ⑤ Service Assurance for Intent-based Networking Architecture ⑥ Interconnection Intents ⑦ YANG models for VN/TE Performance Monitoring Telemetry and Scaling Intent Autonomicity 	7 drafts have been published online
CCSA*	◆ 2015B58 Network Intelligent Capability Enhancement for SDN/NFV: Study of Key Technologies of Intent Network	

* Led by China Telecom

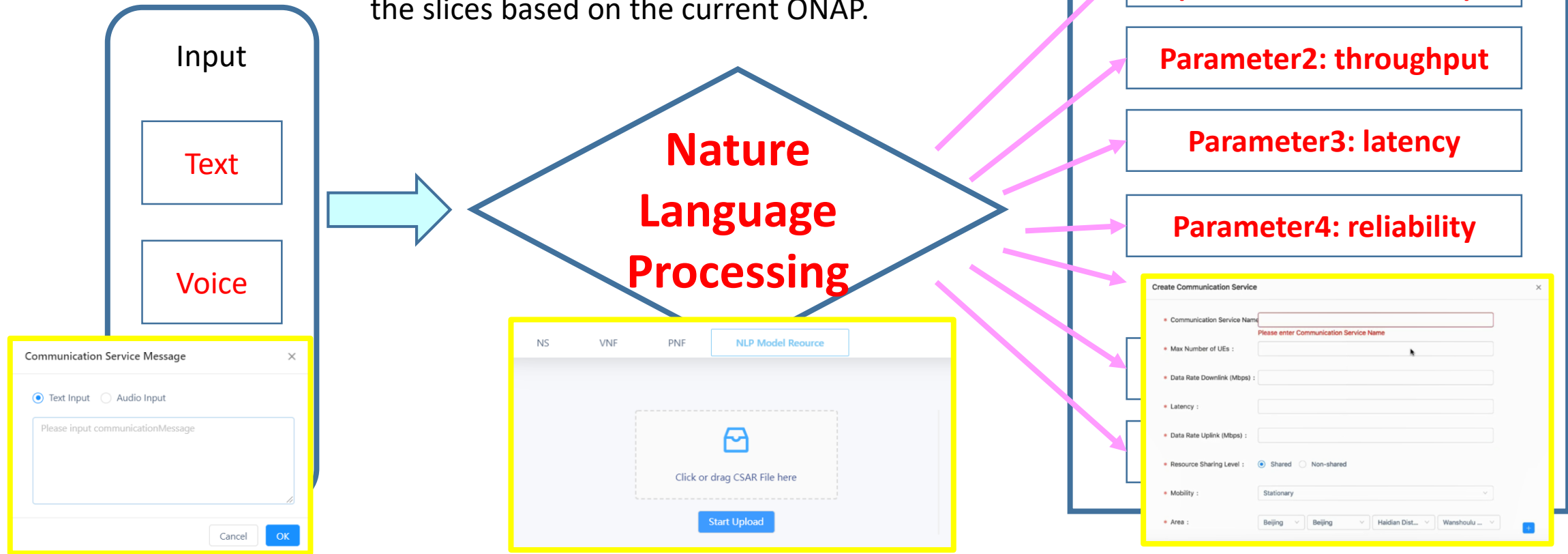
2. Minimum IBN Model based on ONAP projects



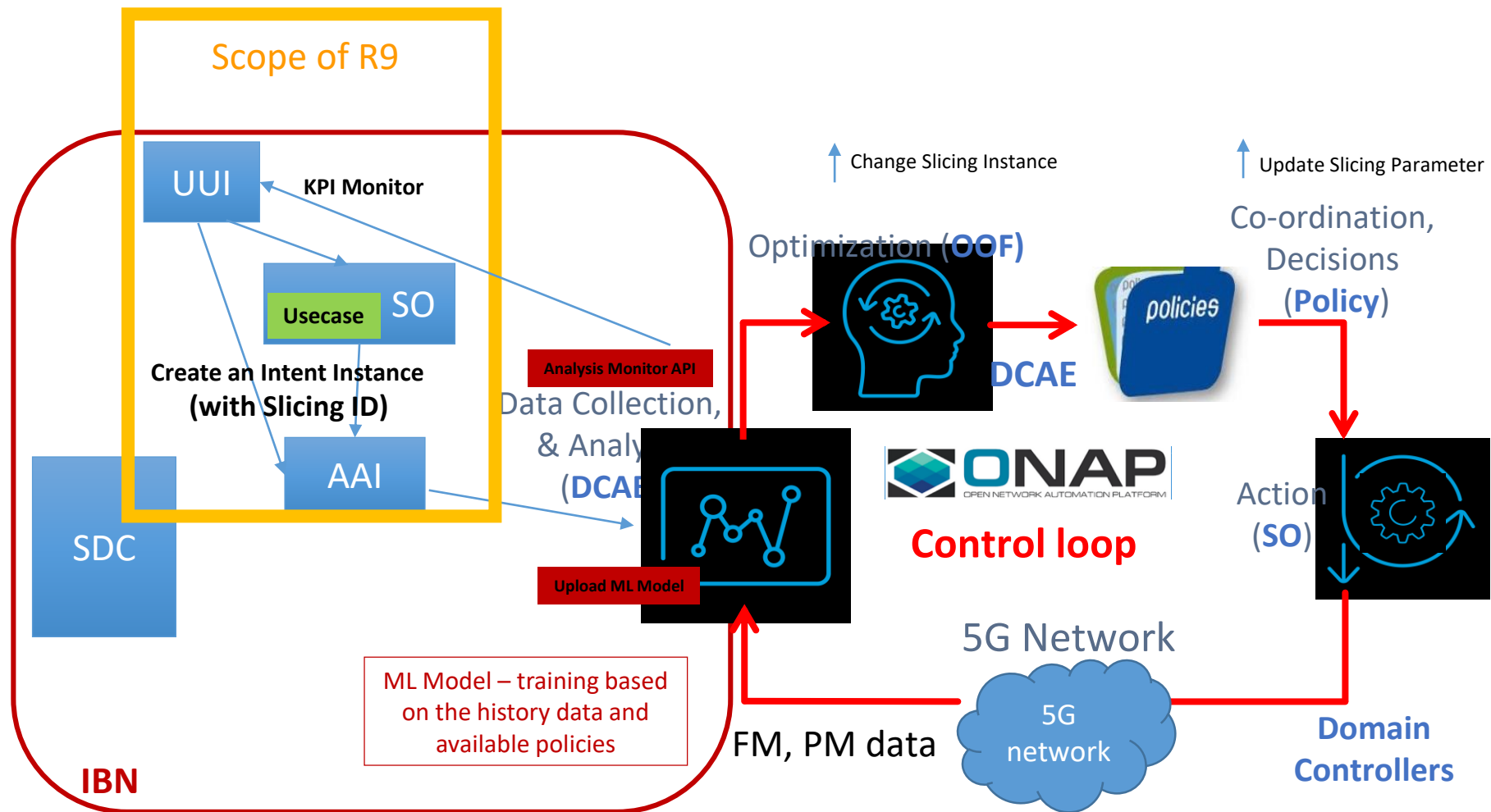
2.1 IBN proposal in ONAP Release H (R8)

UUI

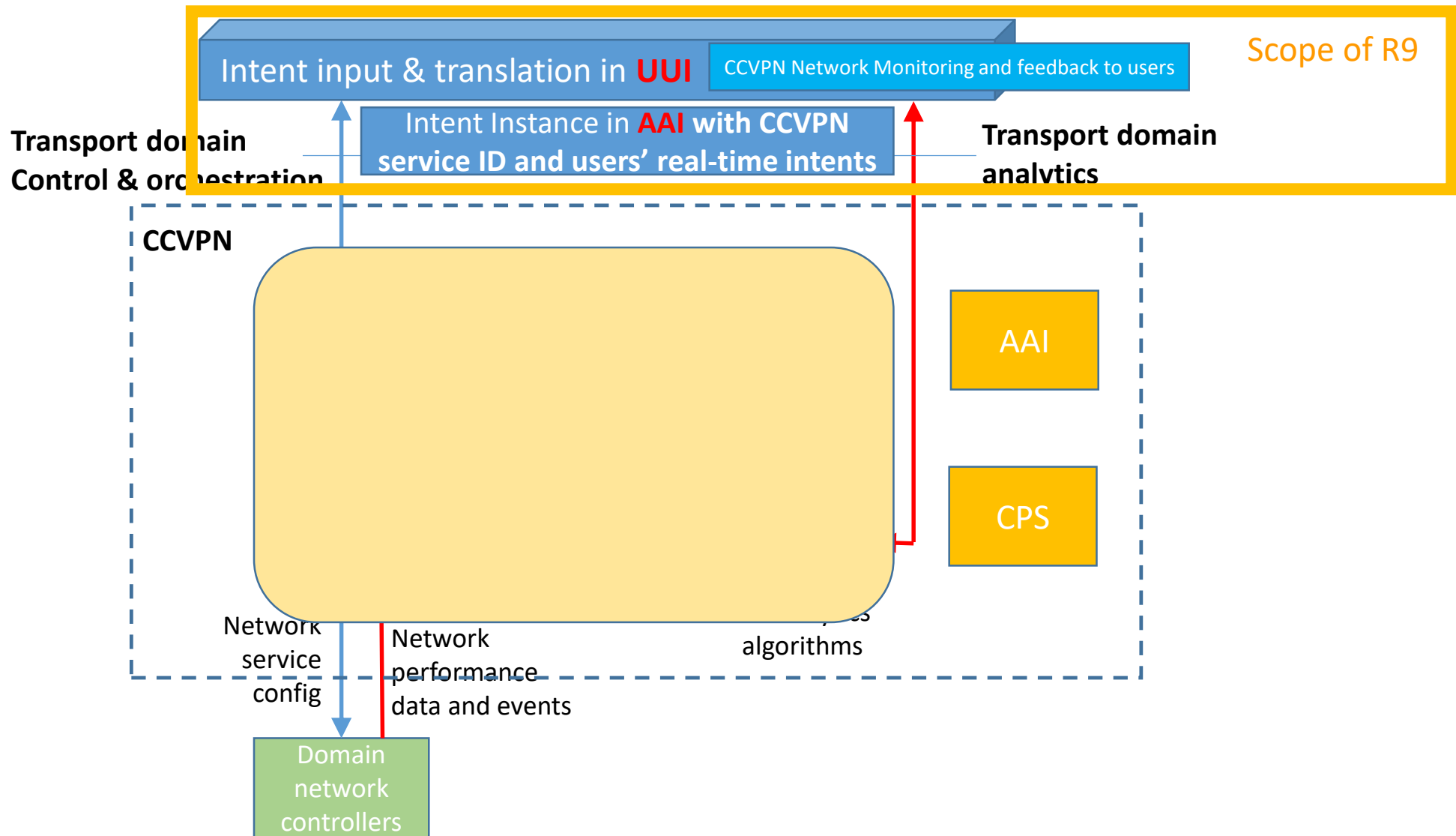
Target of R8: translate from the human inputs to the slice parameters based on NLP in UUI, and then run the slices based on the current ONAP.



2.2.1 IBN Support in E2E Slicing Closed-loop (R9)

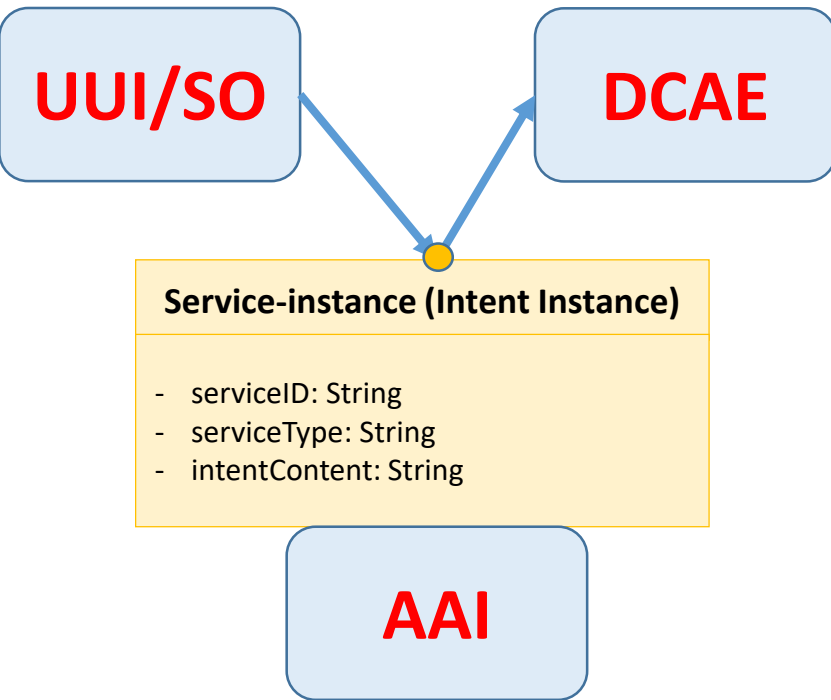


2.2.2 IBN support CCVPN (R9)



2.3 Intent Instance in AAI (R9)

Functions: Intent Instance is created to save the users' **real-time intent** (network parameters) and connected service ID (CCVPN service ID / E2E Slicing CSI ID) in AAI.



serviceType: 'CCVPN', 'E2ESlicing'

Intent Instance Applied in AAI:

1. Intent Instance is created to save the users' real-time intent, therefore, the most appropriate position to create it is Active and Available Inventory. The other records related to the intents are not real-time, which are saved in the independent database in UI, and will be saved in CPS in further releases.
2. The target of Intent-based Network is developed to support multiple usecase services, so it is not a sub-node of any usecase in AAI. And the IBN will be expect to provide unawares service to users. Multiple usecases services could be changed by IBN instead of the users, so it should be an independent node in AAI.
3. DCAE keeps calling the intent for monitoring. It is the best solution to call intent from AAI rather than other projects.

3. REQ-XXX Smart Intent Guarantee based on Closed-loop in R10

The new network applications, like E2E Slicing and CCVPN, provide different SLA services to customers. In this REQ, a scenario of intent guarantee is proposed to support the SLA requirements of users in run-time, as well as updating users' intents. In R10, the closed-loop will be developed to support the smart Intent E2E Slicing and CCVPN.

Key Contacts - Dong Wang (China Telecom), Henry Yu (Huawei), Keguang He(CMCC)

Executive Summary - Intent-based network (IBN) is a self-driving network that uses decoupling network control logic and closed-loop orchestration techniques to automate application intents. An IBN is an intelligent network, which can automatically convert, verify, deploy, configure, and optimize itself to achieve target network state according to the intent of the operators, and can automatically solve abnormal events to ensure the network reliability. In R10, a Feature of intent guarantee based on closed-loop is proposed to support the use cases of both CCVPN and E2E Slicing.

Business Impact - It is a challenging problem to guarantee the users' intents in run-time. The REQ of intent-based network provides a scenario of users' intent guarantee and interacting.

Business Markets - This REQ provides a novel solution to support the SLA service.

1. A users' intent instance is proposed to monitor and analysis the network in run-time to satisfy the users' SLA service.
2. The users' intents are updated in run-time based on the network situation and the interaction with users.

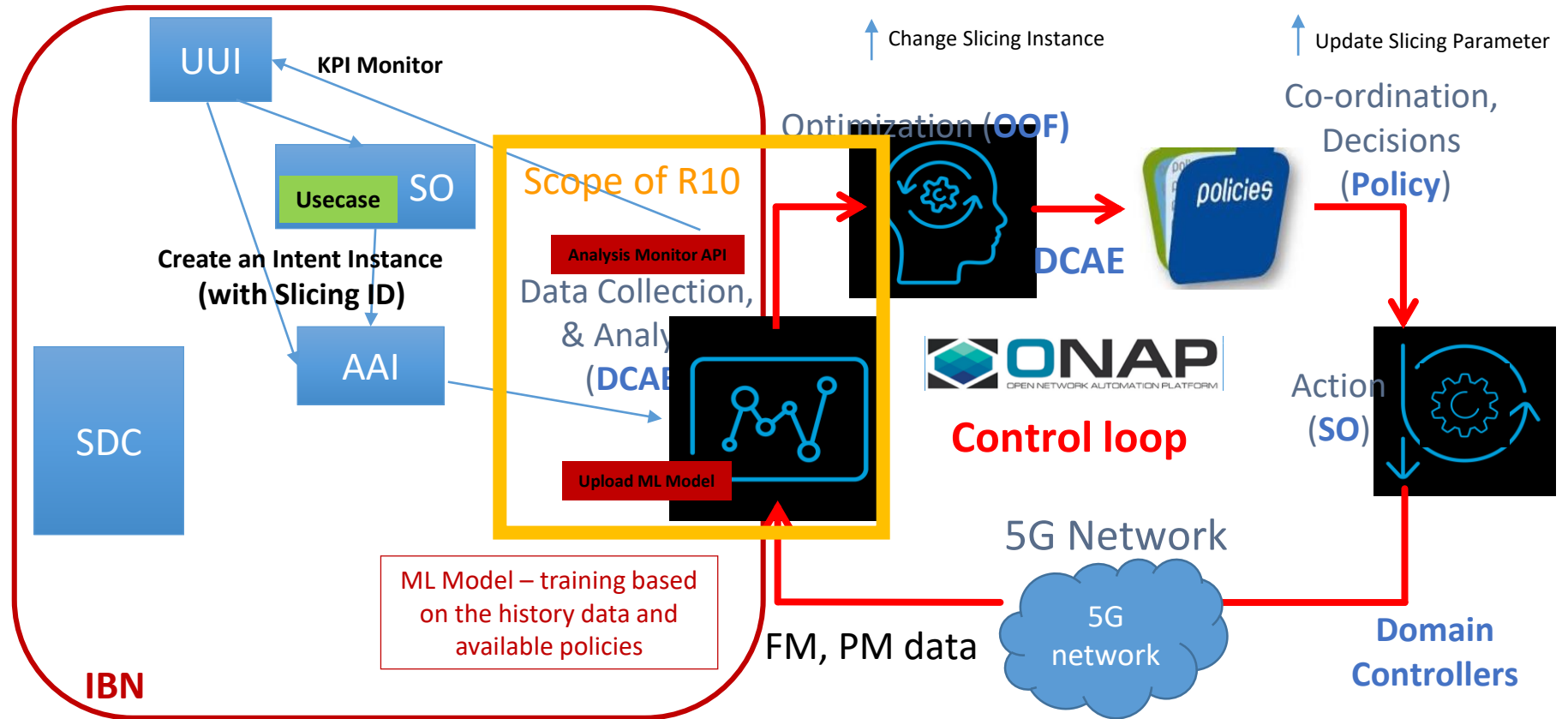
Funding/Financial Impacts - This function will provide more SLA services to increase the income of operators based on the current networks with few investments.

Organization Mgmt, Sales Strategies -*There is no additional organizational management or sales strategies for this requirement outside of a service providers "normal" ONAP deployment and its attendant organizational resources from a service provider.*

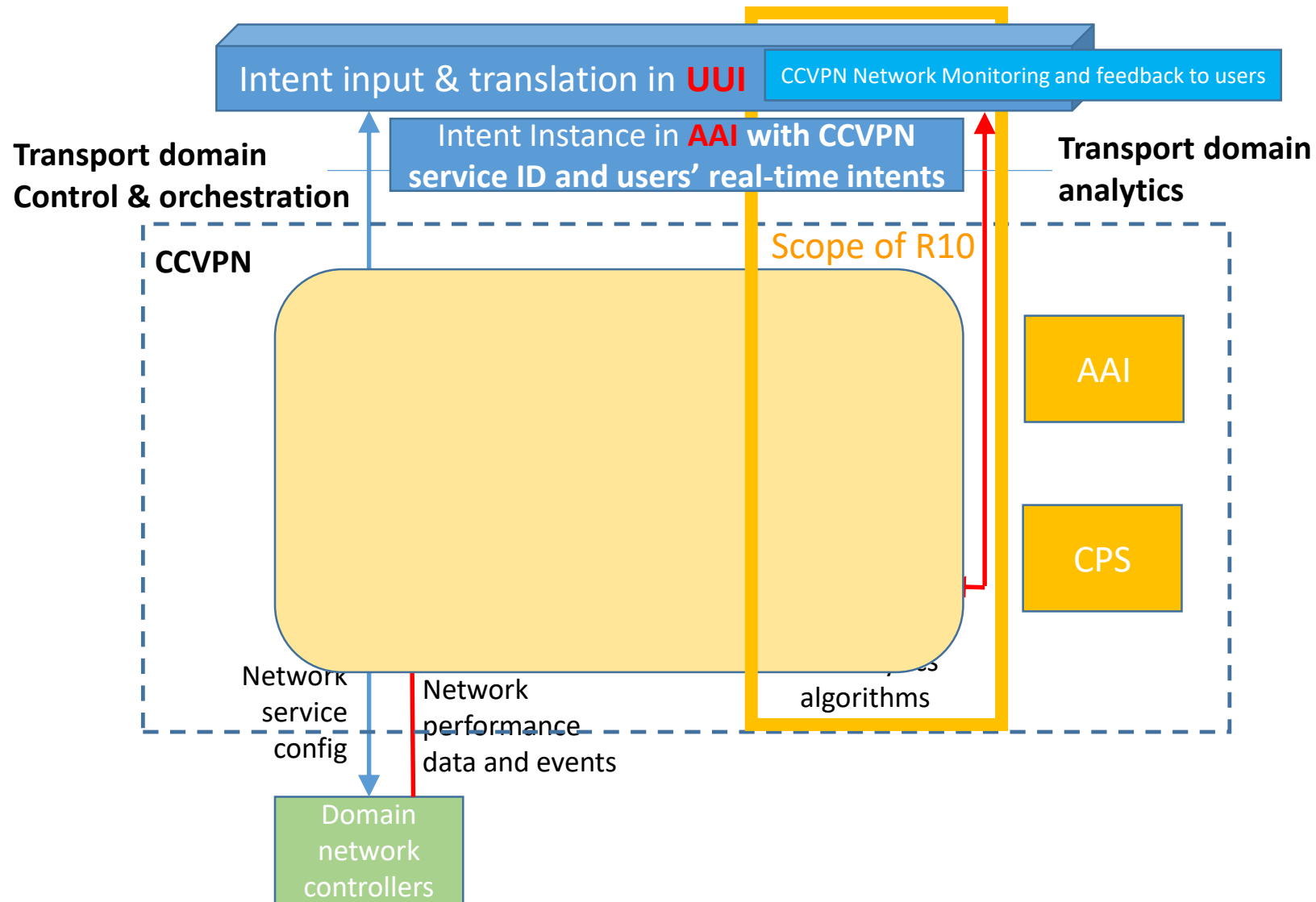
3.1 REQ-XXX Smart Intent Guarantee by Closed-loop

Key Features:

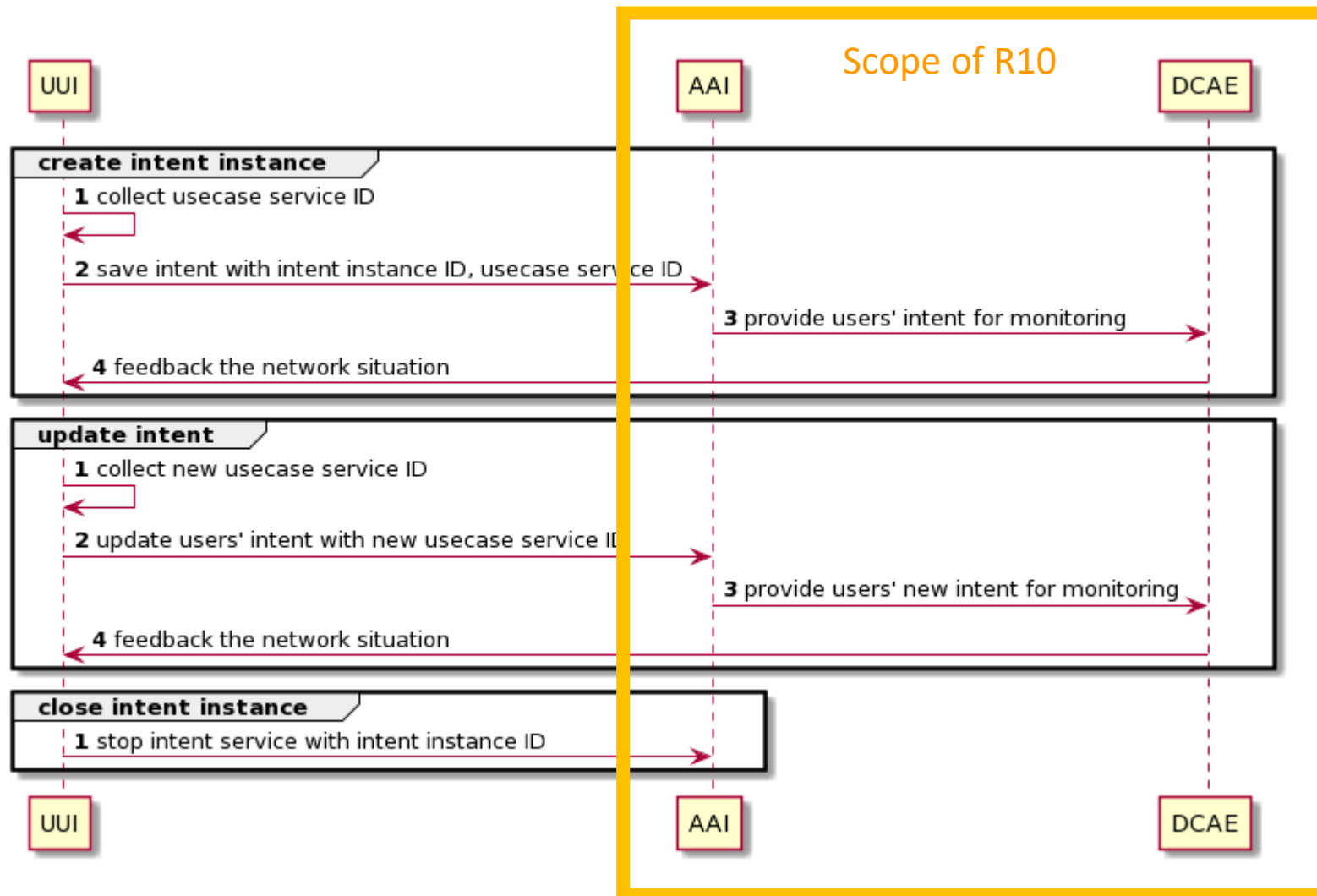
1. Based on the current closed-loop and KPI monitoring of E2E Slicing (and CCVPN), provide the real-time intent collection service to DCAE.
2. Provide AI model upload in DCAE for network performance monitoring and analysis.
3. End-to-end test of Intent Guarantee based on E2E Slicing (and CCVPN) usecase.



3.2 IBN support CCVPN (R10)

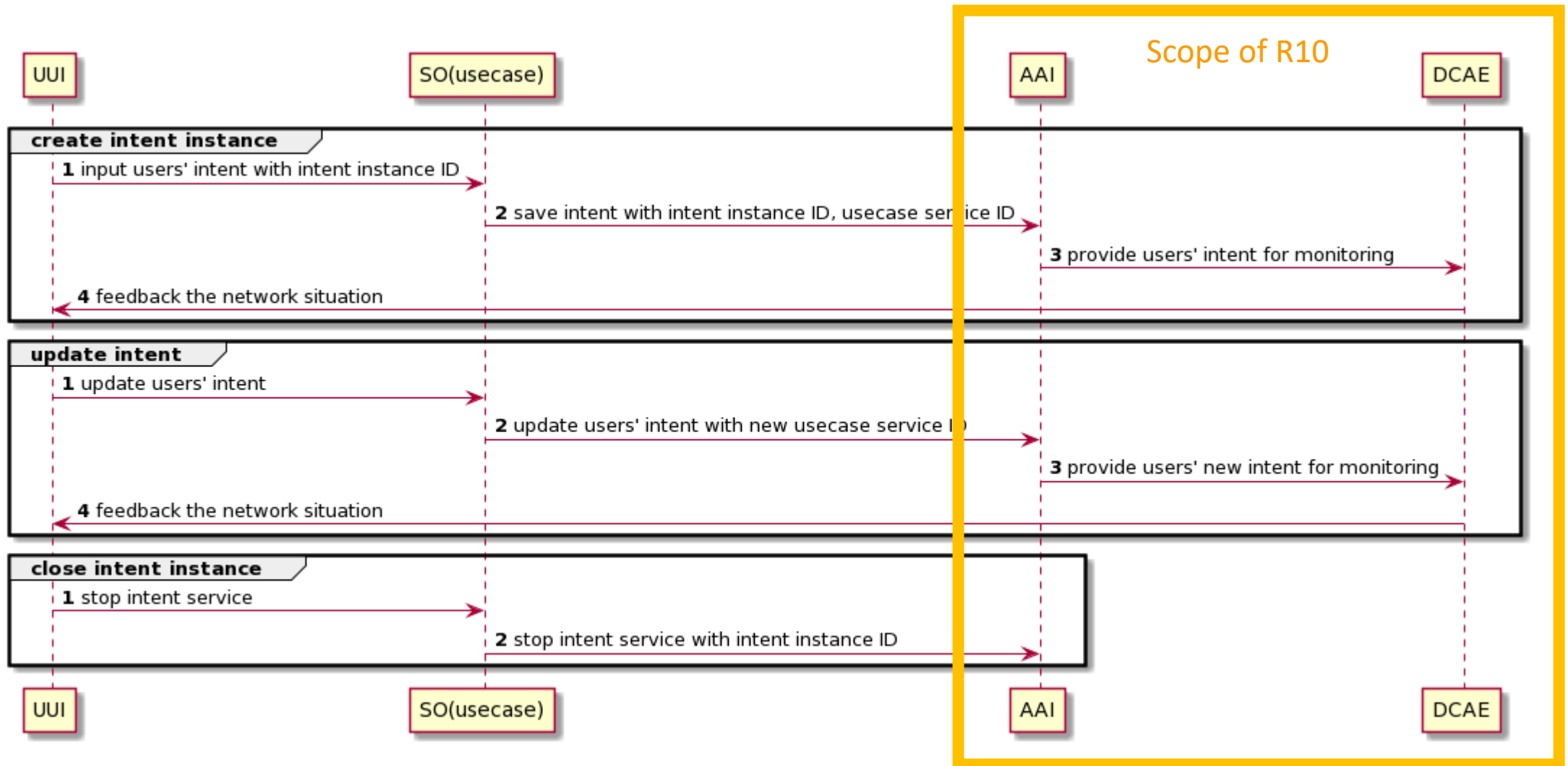


3.3.1 Intent Instance Management by IBN



*1. the usecase service ID, include the service instance ID of CCVPN and CSI ID of E2E Slicing, are collected in UUI after creating a new service.

3.3.2 Intent Instance Management by IBN



4. Projects Impact

Project	Impact	Notes
UUI	Enhance intent monitoring functions for both E2E Slicing and CCVPN	
AAI	Provide an API for DCAE to collect users' real-time intent saved in the intent instance	
DCAE	Closed-loop monitor based on users' real-time intent	

5. DCAE Impact

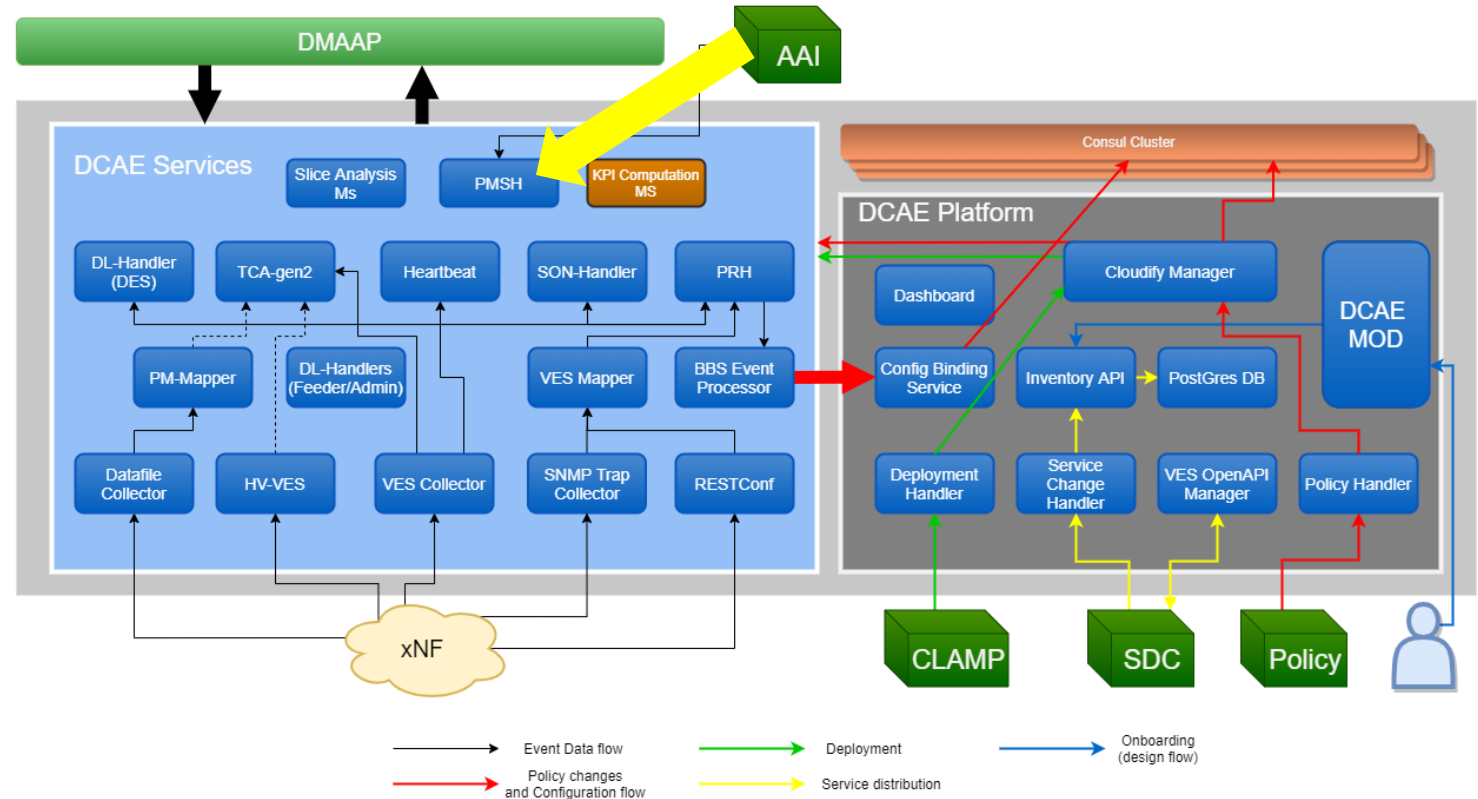
Development plan:

1. Deploy a demo of closed-loop ref. E2E Slicing Intelligent Slicing flow (Guilin Release)

<https://wiki.onap.org/display/DW/Intelligent+Slicing+flow>

2. Test the API between AAI and DCAE Services (like PMSH) to push the users' real-time intent

DCAE Architecture (Honolulu)





Network Services without Perception for Users based on IBN

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1. E2E Slicing smart create page based on IBN (R8)

The screenshot displays the ONAP user interface. On the left is a dark sidebar with a navigation menu. The 'Services' section is highlighted in green, and '5G Slicing Management' is selected and highlighted with a red box. The main content area shows the 'Communication Service' page, with the title 'Communication Service' highlighted in a red box. Below the title are tabs for 'Slicing Task Management' and 'Slicing Resource Management'. A 'Smart Create' button is highlighted in a red box. A modal dialog box titled 'Communication Service Message' is open in the center, with the 'Text Input' radio button selected and highlighted in a red box. The dialog contains a text input field with the placeholder text 'Please input communicationMessage' and 'Cancel' and 'OK' buttons at the bottom.

2. CCVPN smart create page based on IBN (R9)

The screenshot displays the ONAP user interface for the 'Cloud Leased Line' page. The left sidebar contains a navigation menu with the following items: Home, Customer, Services (highlighted), Lifecycle Management, SOTN Eline, 5G Slicing Management, Intent-based Services (highlighted), Package Management, Network Topology, and Monitor. The main content area features a header with 'Cloud Leased Line' (highlighted), 'Intention Library Management', and 'Intention Instance Management'. Below the header, there are two buttons: 'Smart Create' (highlighted) and 'Create'. A table is displayed below the buttons, with the following columns: 'No', 'Communication Service Name', 'Intent Instance ID', 'Status', and 'Operation button'. The table contains a single row with the text 'No data' in the 'Intent Instance ID' column.

No	Communication Service Name	Intent Instance ID	Status	Operation button
		No data		

3. REQ-YYY Network Services without Perception for Users based on IBN

The new network applications, like E2E Slicing and CCVPN, provide different SLA services to customers. In this REQ, a scenario of intent guarantee is proposed to support the SLA requirements of users in run-time, as well as updating users' intents. In R10, Network Services without perception for users based on IBN will be developed to support the E2E Slicing and CCVPN.

Key Contacts - Dong Wang (China Telecom), Henry Yu (Huawei), Keguang He (CMCC)

Executive Summary - Intent-based network (IBN) is a self-driving network that uses decoupling network control logic and closed-loop orchestration techniques to automate application intents. An IBN is an intelligent network, which can automatically convert, verify, deploy, configure, and optimize itself to achieve target network state according to the intent of the operators, and can automatically solve abnormal events to ensure the network reliability. In R10, a Specification of network service without perception for users is proposed in UUI to support the use cases of both CCVPN and E2E Slicing.

Business Impact - It is a challenging problem to acquire the users' intents and provide the satisfied network service in run-time. The REQ of intent-based network provides a scenario of users' intent guarantee and interacting.

Business Markets - This REQ provides a novel solution to support the SLA service.

1. A users' intent instance is proposed to monitor and analysis the network in run-time to satisfy the users' SLA service.
2. The users' intents are updated in run-time based on the network situation and the interaction with users.
3. Multiple network services, like CCVPN and E2E Slicing, can provide satisfied services for users based on their intents. Users will not need to select the network services by hand.

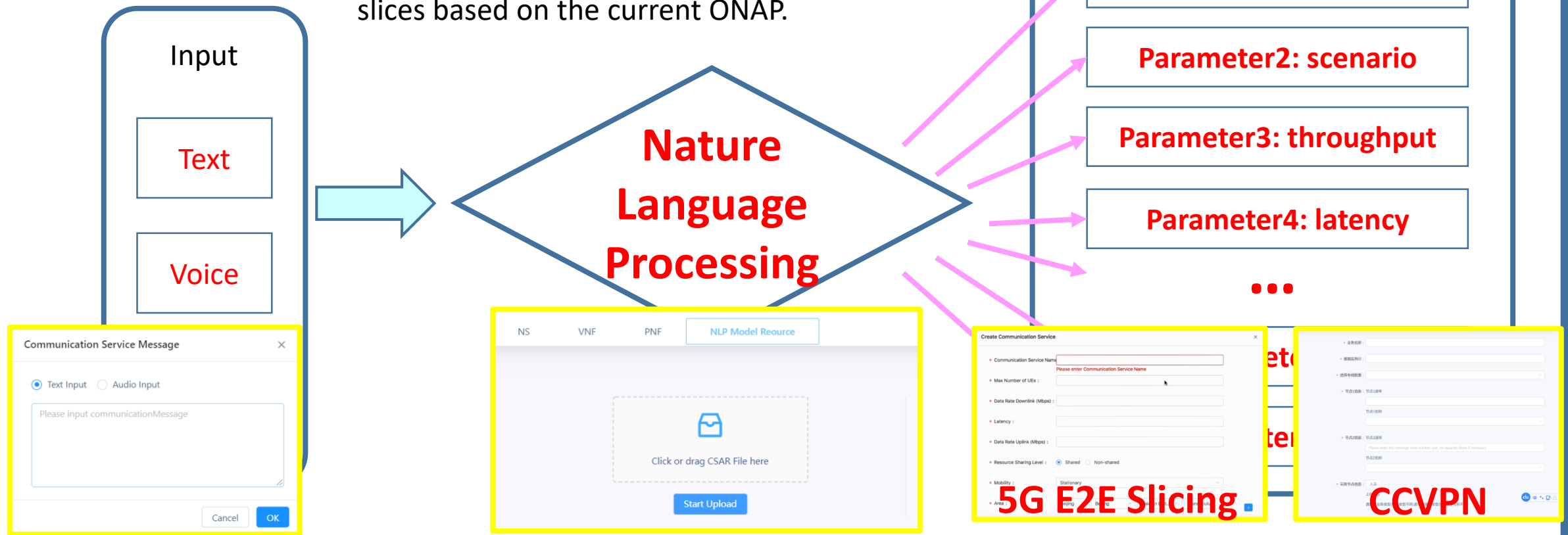
Funding/Financial Impacts - This function will provide more SLA services to increase the income of operators based on the current networks with few investments.

Organization Mgmt, Sales Strategies - *There is no additional organizational management or sales strategies for this requirement outside of a service providers "normal" ONAP deployment and its attendant organizational resources from a service provider.*

3.1 REQ-YYY Network unaware service for users

UUI

Target: translate from the human inputs to the slice parameters based on NLP in UUI, and then run the slices based on the current ONAP.



3.2 Key Features of Network Services without Perception for Users based on IBN

NS VNF PNF **NLP Model Resource**

Click or drag CSAR File here

Start Upload

Uploaded files

No file is uploading.

NO	Name	Size	Upload Time	Status	Type	Opreation
No data						

Key Features (Impact on UII):

1. A common user interface for CCVPN, E2E Slicing and other usecases by intent-based service;
2. A common data set for NLP training;
3. Enhancing the NLP algorithm and model for more accurate intent translation.



ONAP

OPEN NETWORK AUTOMATION PLATFORM

Thanks!