Intent Framework and Intent Modeling

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Intent Framework and Intent Modeling in R8

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Executive Summary - In R7, Intent technology was proposed as a proof-of-concept (REQ-329). It can be viewed as one of most promising solutions for towards autonomous network. This requirement propose to enhance ONAP with intent framework, which may contains intent translation, intent execution and intent decision etc. We would like to provide more POCs around it, and propose to be one of ONAP component or sub-component in the future. In R8, the requirement will provide the internal reference architecture and interacting with other ONAP components, and also introduce intent modeling for specific use cases.

Business Impact - It is a valuable business function that can furthermore reduce the operation expense in terms of automation management.

Business Markets - All operators and service providers that want to use ONAP for network management.

Funding/Financial Impacts - Reduction in operations expense from using procedural while complex operations to using intent-driven declarative operations.

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

Outline

- Background
  - 3GPP IDMS
  - Guilin Intent POC
- Intent Framework Architecture
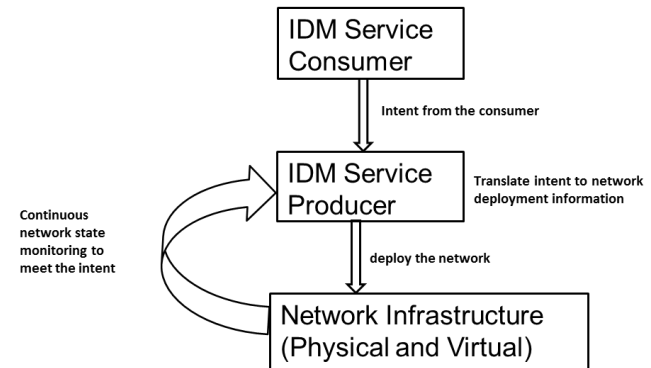- PoC use case in H
- Roadmap

Background: 3GPP IDMS

- Intent technology can reduce the complexity of management without getting into the intricate detail of the underlying network infrastructure, and contribute to efficient network management.

- "Intent" in SDO, 3GPP 28.812, Intent driven Management Service (Intent driven MnS).
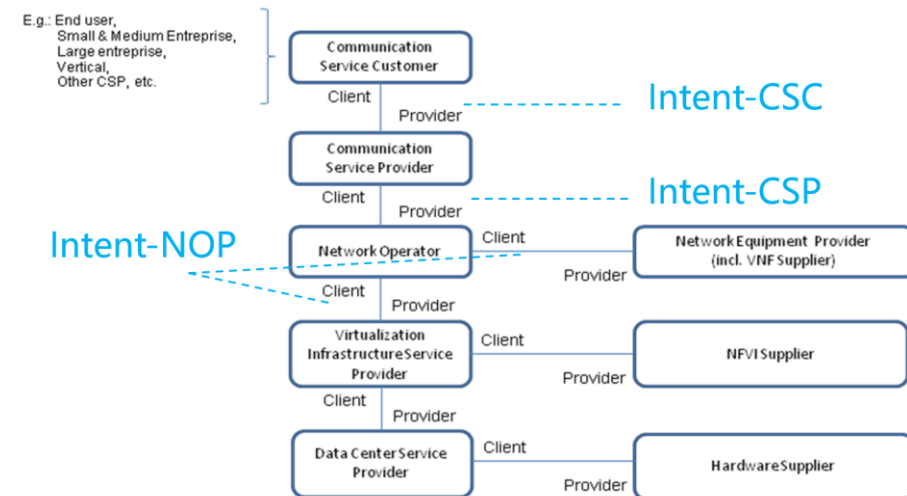

An example of using Intent driven management service for network provisioning

Intent-CSC: enables Communication Service Consumer (CSC) to provide what CSC would like to do for the communication service management without knowing how to do.

Intent-CSP: enables Communication Service provider (CSP) to express an intent about what CSP would like to achieve in the network management without knowing how to do.

Intent-NOP: enables Network Operator (NOP) to provide what NOP would like to do for the network resource management without knowing how to do.

Concept for utilization of intent [3GPP 28.812]

- Intent technology was first proposed into ONAP as a IBN POC in Guilin release.
- Guilin IBN PoC: A vertical industry use case (Smart Warehouse Management)

Assumptions/Pre-conditions:

1. Assisted business system provided business model, such as the capability of AGVs' output volume.

2. Network has been already deployed. Some network resources were configured. In this PoC, two base stations are deployed in Warehouse-F, and each base station had three cells. Two and one cell was activated there.

3. The capability of max UE connections of each cell was configured in CMDB.

Guilin Intent PoC summary:

1. Framework can do intent management at different levels, Intent-CSC and Intent-CSP level.

2. During Intent-CSP processing, Intent framework translate network intent into the configuration management operations, which is provided by CDS.

3. Intent framework was a standalone component as a whole service.
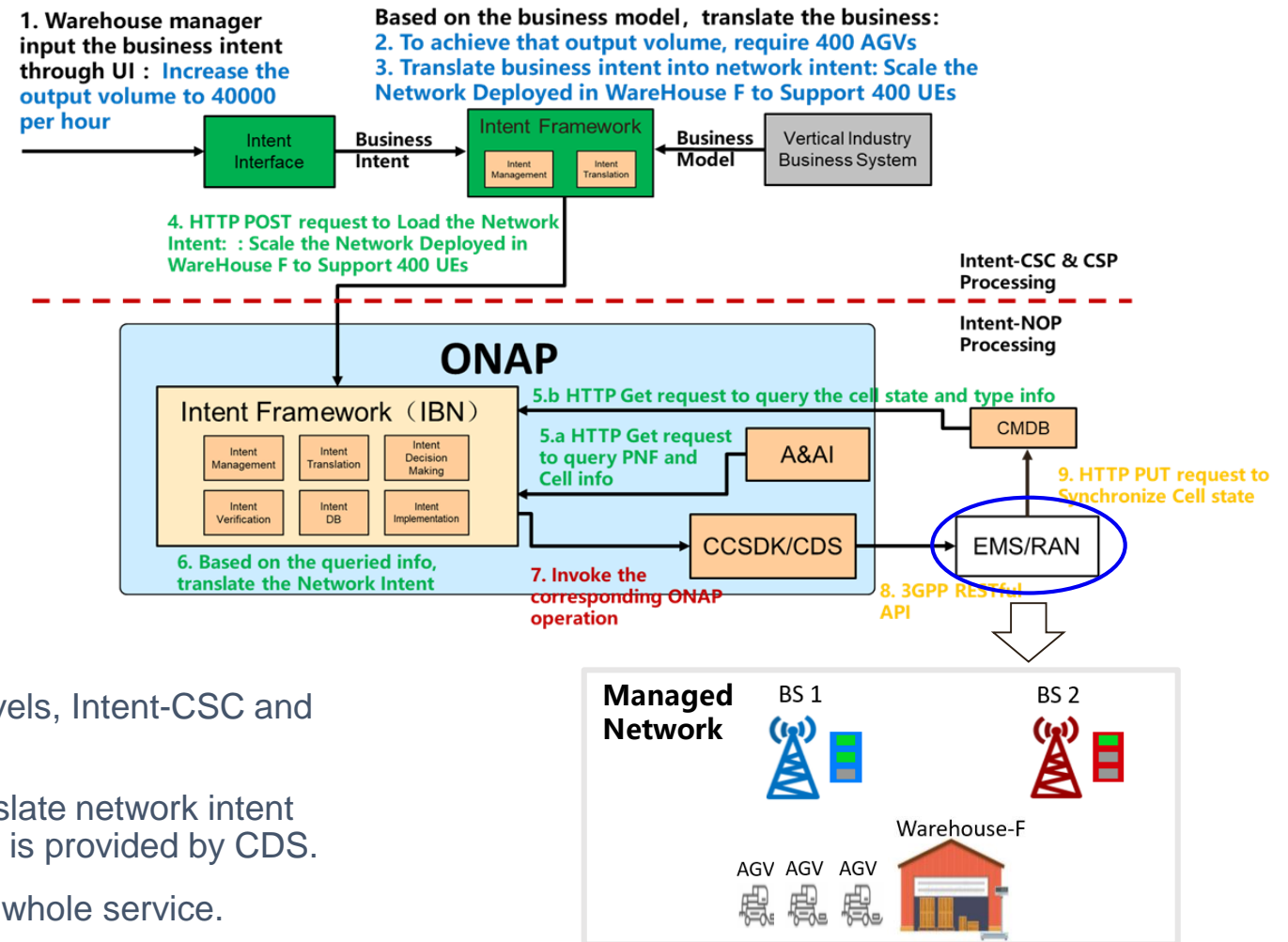
Intent Framework Architecture

- Intent framework is a system that helps to implement and operate networks that can improve network availability and agility.

- It takes a high-level business goal (intent) as input, converts it to the necessary network configurations and applies the network changes via network automation and/or network orchestration. Continuously monitoring the status of the network under control, the system validates in real time that the intent is being met, and can take corrective actions when desired intent is not met.
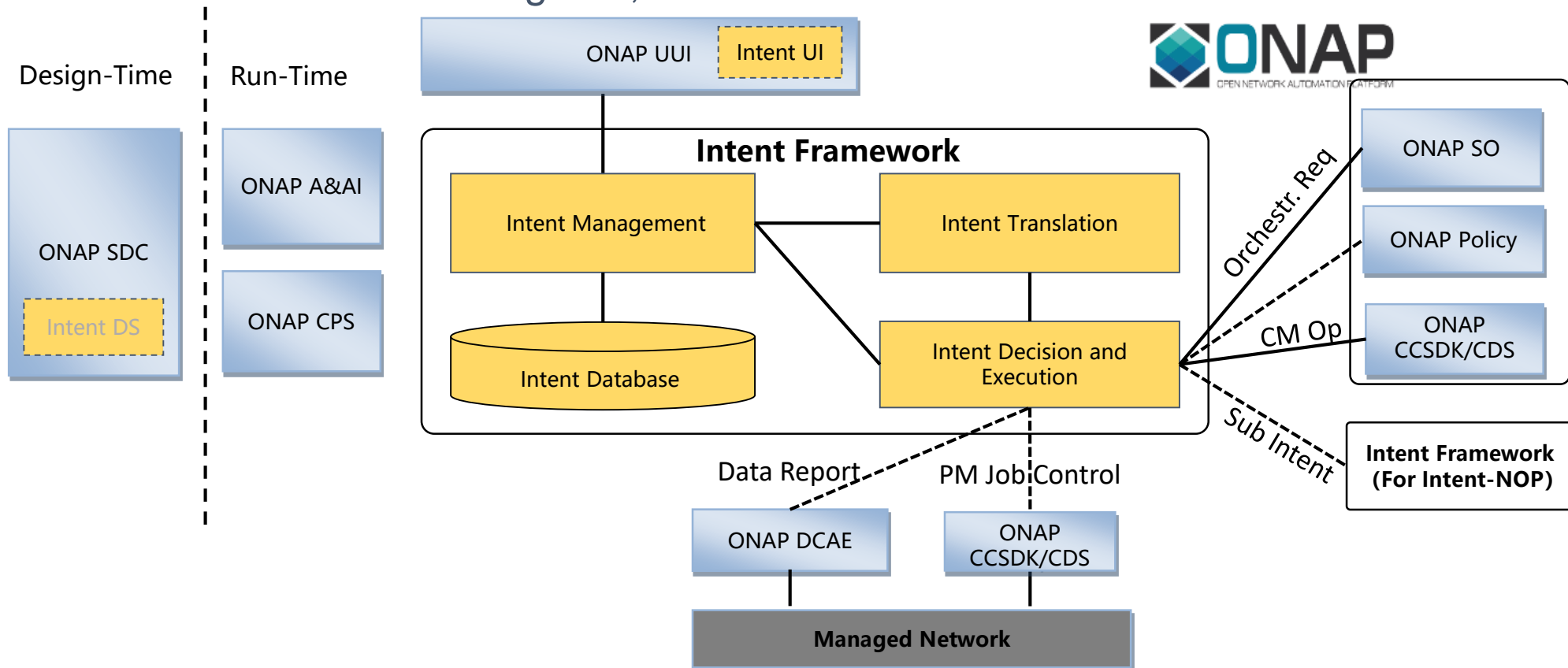
Functional blocks of Intent Framework

- **Intent Framework**
  - Intent Management
    - Providing NBI for consumers, including intent schema and instance management in a general way
  - Intent Translation
    - Translate high-level of abstraction to a more concrete form in order to be validated and processed.
    - The system takes a higher-level business goal (what) as input from end users and converts it to the necessary network configuration or orchestration request (how).
  - Intent Decision and Execution
    - Decide which, if any, candidate solution shall be executed in response to a request by another managed entity for a set of governance actions.
    - Execute one of translated intent solution by sending request to other component, such as SO, CDS, Policy, or external low-level intent system (intent framework).
  - Intent Database
    - Store intent schema, intent instance and intent knowledge

PoC use case: Intent driven Network Provisioning
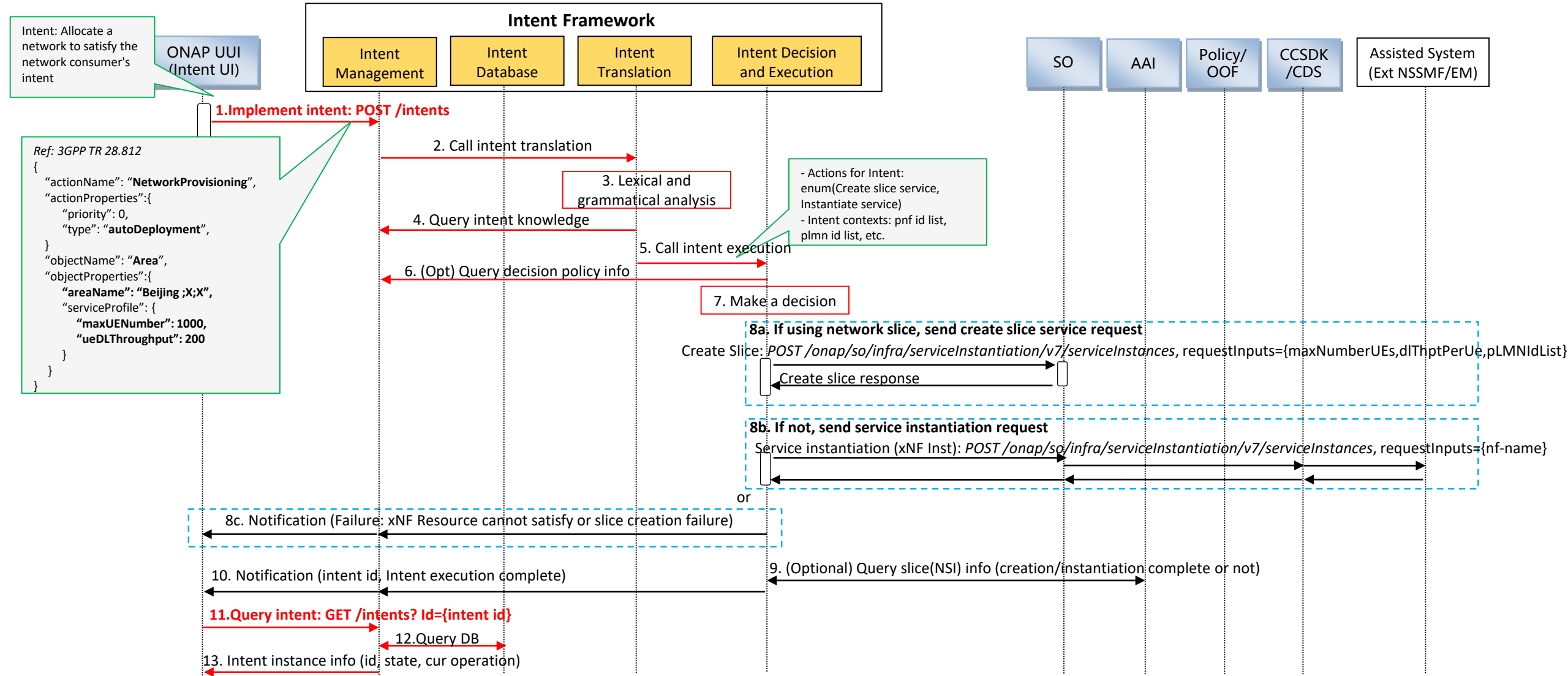
Note: The MnS producer translates the intent from the MnS consumer to network deployment related requirements (e.g. using network slice or not, network topologies, etc.) and configurations.

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Offered and Consumed APIs in the PoC

Offered APIs by Intent Framework	
Implement intent	POST /intents Request Body: *{"immediate": true, "expression": "xx"}* Response": *{"id":"intent id"}*
Query intent	GET /intents?id={intent id} Response: jsonObject, e.g. *{"id": "intent id", "state":"active",* *"createTime":"xx", "expression": "xx","fulfilmentInfo":"FULFILLED","operationList":"* *CreateSliceService"}*

Consumed APIs by Intent Framework	
Create slice service	POST /onap/so/infra/serviceInstantiation/v7/serviceInstances Request Body: jsonObject, *{"requestParameters":{……, "requestInputs": {"maxNumberUEs":100,* *"pLMNIDList":"xx", "coverageAreaList":"xx"}}}*
Service instantiation	POST /onap/so/infra/serviceInstantiation/v7/serviceInstances Request Body: jsonObject, *{"requestParameters":* *{"userParams":[{"resources":{"pnfs":["instanceName":"{nf_instance_name}"]}}]}}*

Roadmap

Rel	Scope	Link
Guilin	IBN PoC: A vertical industry use case 1. Intent management at different levels, Intent-CSC and Intent-CSP level. 2. Intent execution through configuration management operations via CDS.	https://wiki.onap.org/display/DW/Intent-Based+Network
Honolulu	PoC: Intent Framework and Intent Modeling 1. Intent Framework architecture definition • Functional blocks and interfaces between them • Initial Implementation as a separate and external component with multiple micro services. 2.External interface to other existing ONAP Components • UUI, SO, CDS, AAI/CPS, etc 3.Discussion of general Intent modeling, and giving some concrete intent data model for specific use cases • Intent-CSP and Intent-NOP from 3GPP 28.812 • Intent driven Energy Saving, etc. 4.Demo of Intent Framework: Intent driven Network Provisioning	https://wiki.onap.org/display/DW/Support+for+Intent+Framework+and+Intent+Modeling
Istanbul+	1. Intent UI and integration with Intent Framework 2. Intent schema management 3. Intent modeling enhancement with more use cases	TBD