ONAP R11- General intent model

Modeling Subcommittee Review
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REQ Owners: Lingli Deng (CMCC), Keguang He (CMCC), Chuanyu Chen (Huawei),
Dong Wang (China Telecom), Henry Yu(Huawei)

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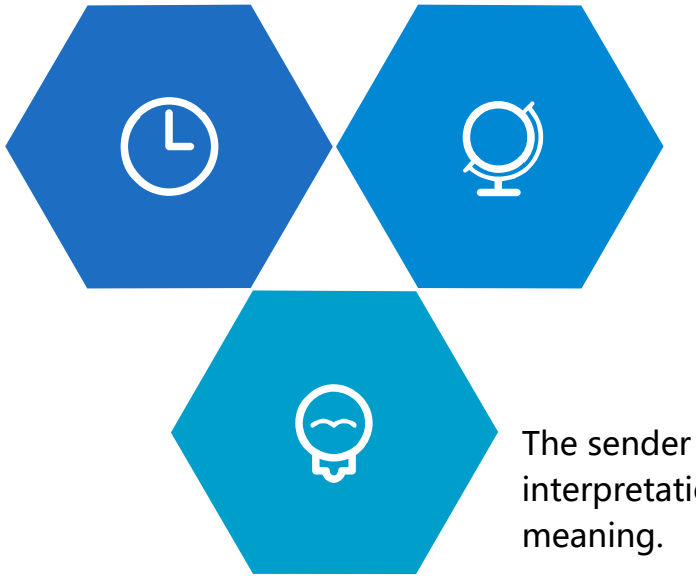
Motivation for introducing general intent model

The formal expression of intents can be achieved by well-defined information models which completely define the semantics and vocabulary that is required for the operation of each autonomous system that uses intents.

TMF IG1253

Intent modeling defines the expressiveness of intent. It introduces vocabulary and semantics needed to express and encode the knowledge about requirements, goals and constraints an intent object shall carry. Standardized intent models define common semantics in order to enable two parties to agree on the meaning of intent and remove ambiguities and divergent interpretation.



3GPP 28.312

An intent is typically understandable by humans, and also needs to be interpreted by the machine without any ambiguity.

ZSM 011

The sender and receiver of intents need to agree in their interpretation; therefore, there should be no ambiguity in their meaning.

REQ-1267 General intent model and general intent interface requirements in R11

For complex intent, such as the intent of cloud leased line, it is necessary to decompose the complex intent into sub intents of different dimensions, and implement the user's original intent through the execution of sub intents. So we need to deal with machin-machine intent, and for different intents or sub intents in the system, it is necessary to provide general intent model and general intent interface to ensure that all intents(especially machine-machine intents) operate according to the same expression and process.

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

Executive Summary - This requirement provides general intent model and general intent interface in ONAP to make all intents(especially machine-machine intents) in the system operate in the same way. At the same time, for complex intents, the technology of intent decomposition and orchestration is provided, and the above ideas and schemes are fully implemented in ONAP through a use case based on cloud leased line.

Business Impact - Complex intents can be decomposed into simple intents, and the modeling and interaction of intents can be ensured to be handled in a unified way.

Business Markets - This REQ provides a novel solution to intent modeling and interaction:

1. It provides model federation mechanism to make the intent modeling execute according to the unified specification, and can reuse the existing domain related models which enables extension to different application scenarios.
2. It provides the unified intent interface, which makes the intent interaction in the running state more interoperable and manageable.

Funding/Financial Impacts - By formulating general intent modeling methods and interactive interfaces, standardize the intent operation process, improve user friendliness, improve the customer experience and increase the business value.

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.*

Benefits of introducing general intent model in ONAP

01

Improve interoperability between components/systems via standarded intent description.

02

Model federation mechanism is introduced (later explained in detail) to enable domain extension.

03

Based on the general intent model, the machine-machine intent is supported

04

Enhance standardization based on the existing standards of TMF(TMF IG1253).

05

Reuse the existing domain related models which enables extension to different application scenarios.

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

General intent model

Intent model

```
├── Intent expectation list
│   ├── expectation1
│   │   └── expectation target
│   │   └── state list of expectation target
│   │       └── state1
│   │           └── condition1
│   ├── expectation2
│   │   └── expectation target
│   │   └── state list of expectation target
│   │       └── state1
│   │           └── condition1
│   │           └── condition2
│   │       └── state2
│   │           └── condition1
│   │           └── condition2
```

Base on the model federation mechanism defined in TMF IG1253

Intent common model

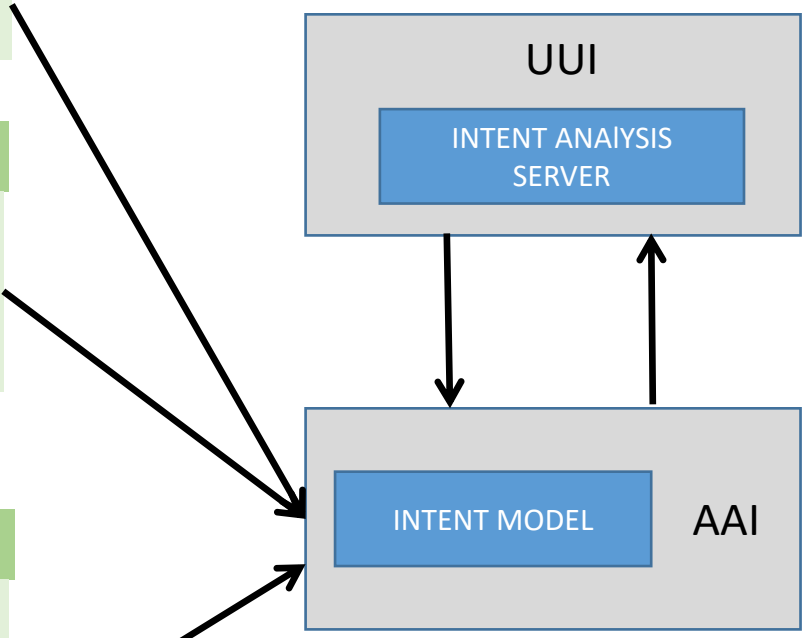
The domain independent general expression ability is defined.

Intent extension model

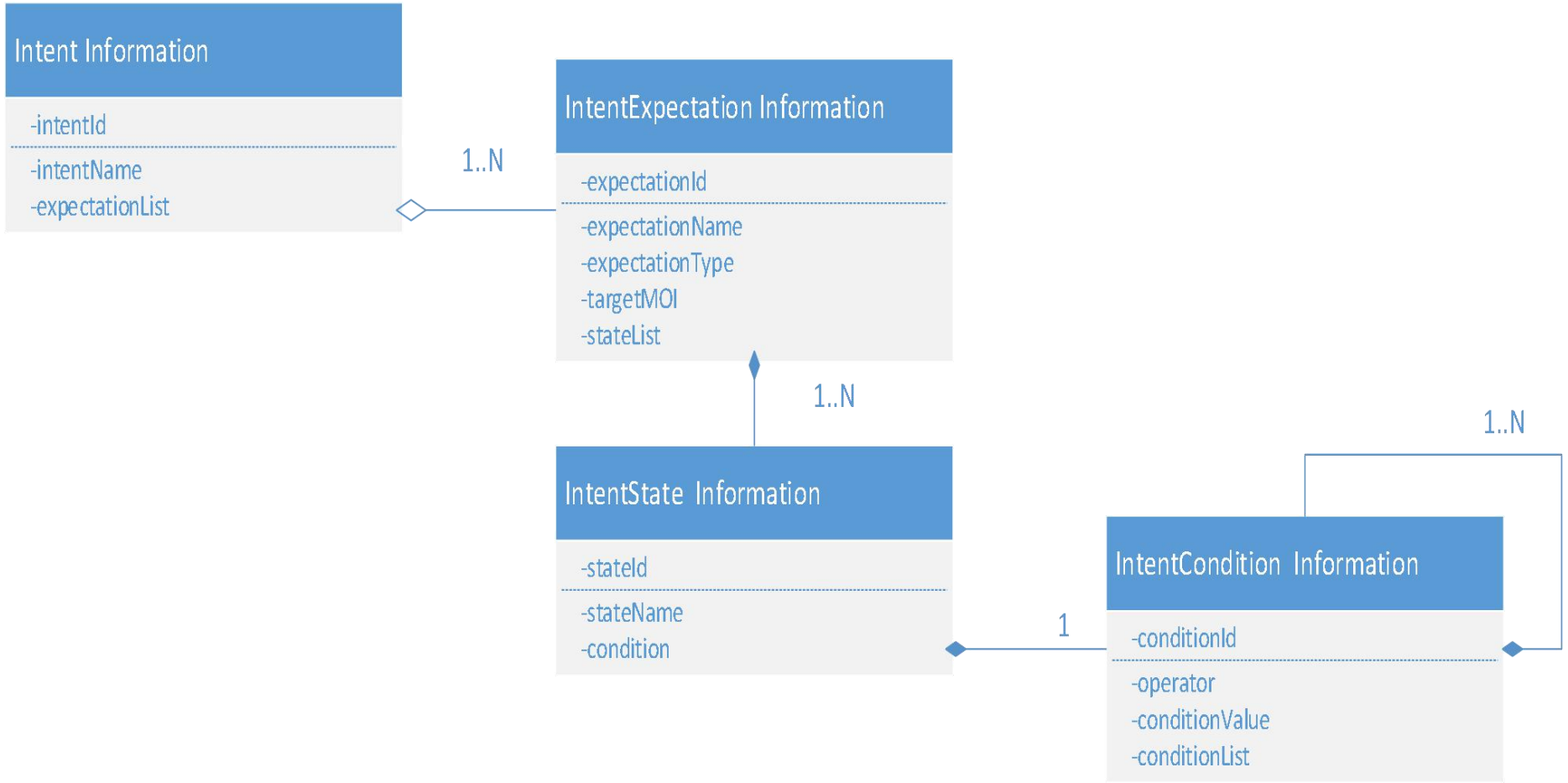
A model is based on the intent common model and connects the new modeling components with the intent common model.

Domain information model

A model is independent of the intent common model and the intent extension model. This information model of the existing domain created by the intent independent operation can be directly used in the intent expression.



UML diagram of general intent model



IntentCondition Information Element

Attribute	Qualifier	Cardinality	Content	Description
conditionId	M	1	Identifier	The identifier of this condition.
operator	M	1	Enum	If conditionValue exists, represents the specific requirements for condition. Value: ● greater than ● equal to ● less than ● not equal to ● one of ● some of ● maximum value ● minimum value ● median ● Credibility If conditionList exists, representing the relationship between all conditions. Value: ● and ● or
conditionValue	O	1	String	The specific value of the condition.
conditionList	O	1..N	IntentCondition	Composed of a group of conditions, representing composite conditions

IntentState

IntentState Information Element

Attribute	Qualifier	Cardinality	Content	Description
stateId	M	1	Identifier	The identifier of this state.
stateName	M	1	String	State name.
condition	M	1	IntentCondition	Represents the state that the condition needs to reach.

IntentExpectation

IntentExpectation Information Element

Attribute	Qualifier	Cardinality	Content	Description
expectationId	M	1	Identifier	The identifier of this expectation.
expectationName	M	1	String	Expectation name
expectationType	M	1	ENUM	Expectation type. Value: • DeliveryExpectation • PropertyExpectation
targetMOI	M	0..1	Identifier	It can be an instance ID of an existing MOI or a null value. If it is an existing MOI instance ID, it means that the corresponding instance status is modified to meet expectations; If it is a null value, it means to create a new instance that meets the expectations.
stateList	M	1..N	IntentState	Multiple state lists contained in an expectation

Intent

Intent Information Element

Attribute	Qualifier	Cardinality	Content	Description
intentId	M	1	Identifier	The identifier of this intent.
intentName	M	1	String	Intent name.
expectationList	M	1..N	IntentExpectation	Multiple expectation lists contained in one intent.

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Projects Impact

Project	Code impact	Notes
UUI	Support input, parsing and mapping of general intent model.	
AAI	1. Provide storage of intent general model, intent extension model and domain information model. 2. Query of the information of the existing model.	
MODELING	Document the modeling scheme of general intent model.	

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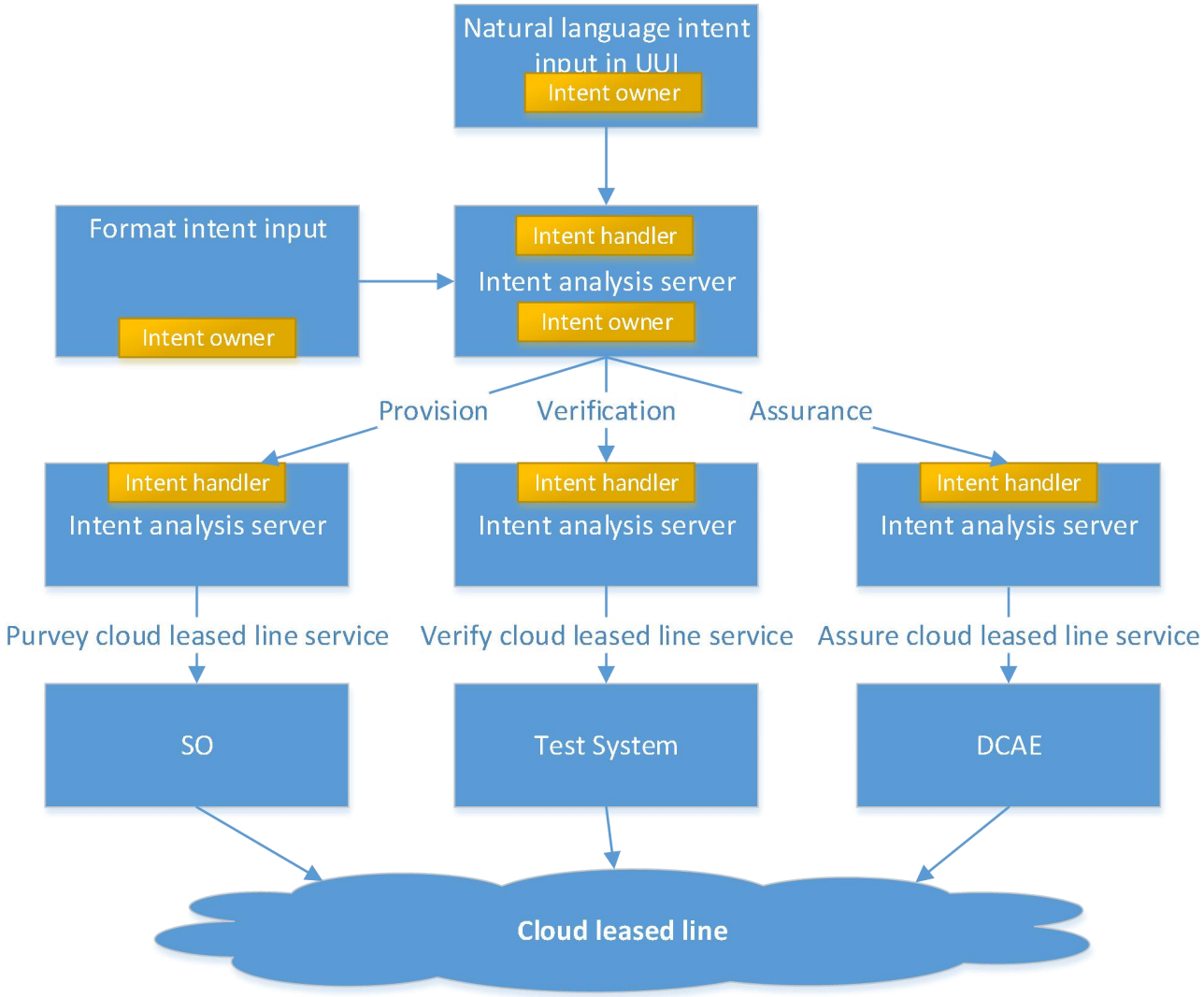
Use case

Operators provide intent based cloud leased line services, and provide corresponding assurance measures based on user needs. An enterprise user orders a cloud leased line with a bandwidth of 1G from the operator. In order to meet this intent, the intent handler will configure the cloud leased line with a bandwidth of 1G and enable the exclusive assurance measures. At the same time, provides some high level service quality assurance technology. For example, When the bandwidth utilization rate exceeds 80%, the bandwidth will be expanded by 60% to ensure the user experience. At the same time, when the traffic returns to normal (the utilization rate is 30%), the service bandwidth will be restored to 1g. Whenever the expansion / reduction operation is executed, the intent handler will notify the intent owner through the intent report.



Intent model description

----expectation1: DeliveryExpectation
----|----targetMOI: NULL
----|----|----state1: Cloud leased line service type
----|----|----|----condition1： The type of cloud leased line service that an operator has used for a certain service (such as game service, such as video service)
----|----|----state2: Whether to provide high-level service quality assurance
----|----|----|----condition1: Yes
----expectation2： PropertyExpectation
----|----targetMOI: NULL
----|----|----state1: Bandwidth
----|----|----|----condition1: = 1G
----|----|----state1： Latency
----|----|----|----condition1: >5ms
----|----|----|----condition2: <10ms

Intent model description

1. Intent Information Element：

intendId: 0932-ab93-76ca-9023
intentName:Cloud_leased_line_intent
expectationList: deliveryExpectationId, propertyExpecatationId,

1.1. deliveryExpectation：

expectationId: ac23-3432-ea21-2345
expectationName: Cloud_leased_line_delivery_expectaion
targetMOI: NULL
stateList: serviceTypeStateId, highLevelAssuranceStateId

1. serviceTypeState:

stateId: ac23-3432-ea21-2345
stateName: Cloud_leased_line_Service_Type
condition: IntentConditionId

- IntentCondition:
  conditionId: 8909-erw3-3454-2345
  operator: equal to
  conditionValue: The type of cloud leased line that an operator has used for a certain service (such as game service, such as video service)
  conditionList: NULL

2. highLevelAssuranceState
stateId: dwe2-332d-er23-23ef
stateName:highLevelAssuranceState
condition: IntentCondition1Id

- IntentCondition:
  conditionId: 8909-erw3-3454-2345
  operator: equal to
  conditionValue: true
  conditionList: NULL

Intent model description

1.2. propertyExpecatation1:

- propertyExpecatation1

expectationId: 5489-12ad-2312-7854
expectationName: Cloud_leased_line_purvey_expectaion
targetMOI: NULL
stateList: bandwidthStateId, latencyStateId

1. bandwidthState:
stateId: 2313-4532-ea21-2345
stateName: bandwidthState
condition: IntentCondition1Id

- IntentCondition:

conditionId: 2313-4532-ea21-2345
operator: equal to
conditionValue: 1g
conditionList: NULL

2. latencyState
stateId: 2313-4532-ea21-2345
stateName: latencyState
condition: IntentCondition1Id

- IntentCondition1:

conditionId: we23-erw3-23ew-12qw
operator: and
conditionValue: NULL
conditionList: IntentCondition2Id, IntentCondition3Id

- IntentCondition2:

conditionId: 2354-erw3-332w-23er
operator: lesser than
conditionValue: 10ms
conditionList: NULL

- IntentCondition3:

conditionId: 2895-erw3-4321-7894
operator: greater than
conditionValue: 5ms
conditionList: NULL

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Intent model description

- Question1: Why is the intent approach adopted for service assurance instead of the poicy approach?

Answer: By means of intent, users do not need to pay attention to the technical implementation details of the assurance. For example, in our use case, the user only needs to tell the system whether to adopt high-level service quality assurance. If the user selects true, the system will provide with capacity expansion solutions for high bandwidth utilization. Of course, users do not need to pay attention to the adopted solution. They are concerned about whether the service quality has been well assuranced.

Thanks!

hekeguang@chinamobile.com