



LF NETWORKING

Developer & Testing Forum

ONAP General Intent Model

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Motivation for introducing general intent model in ONAP

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

Standardized intent models define common semantics in order to enable two parties (intent owner and intent handler) to agree on the meaning of intent and remove ambiguities and divergent interpretation.



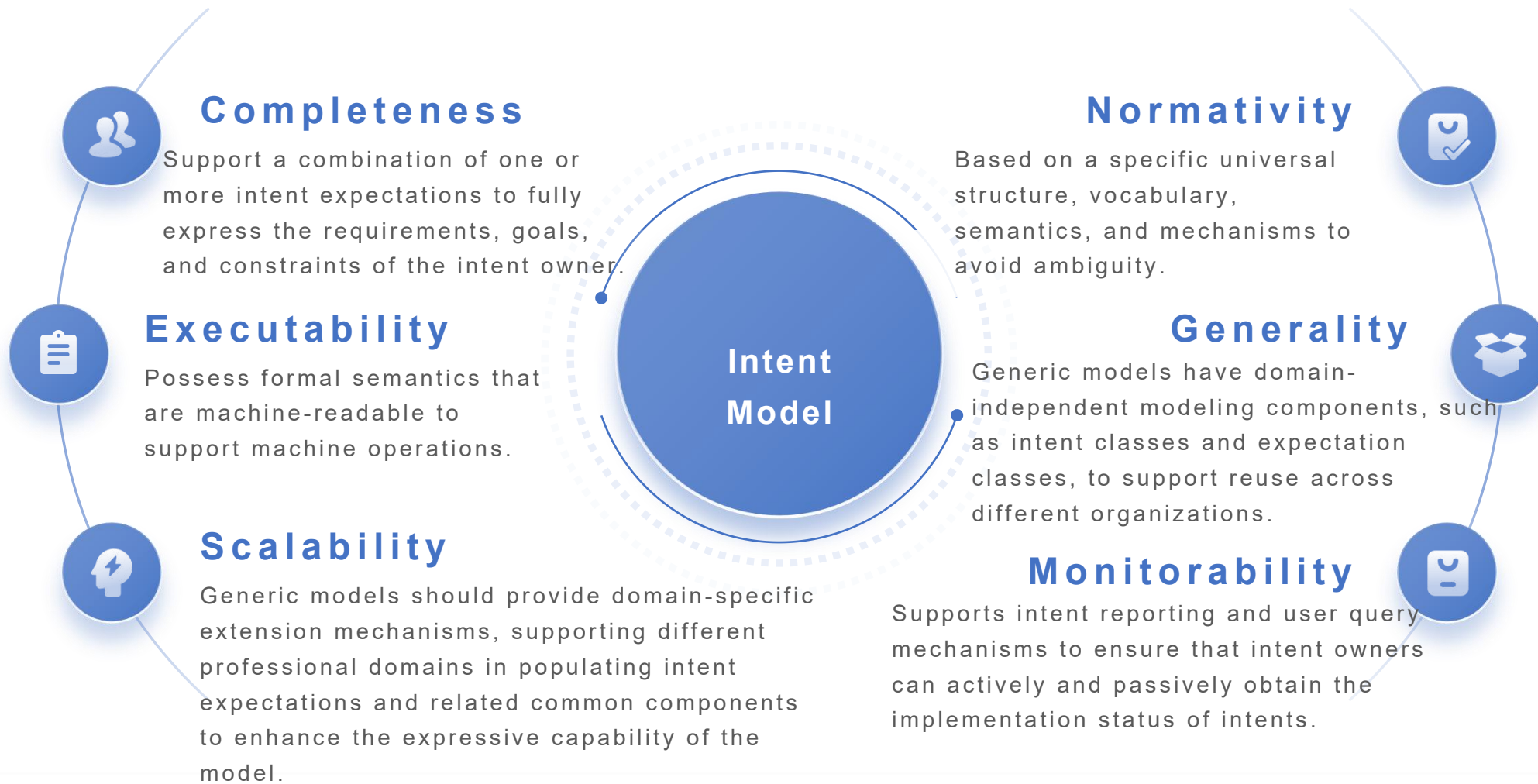
3GPP SA5

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

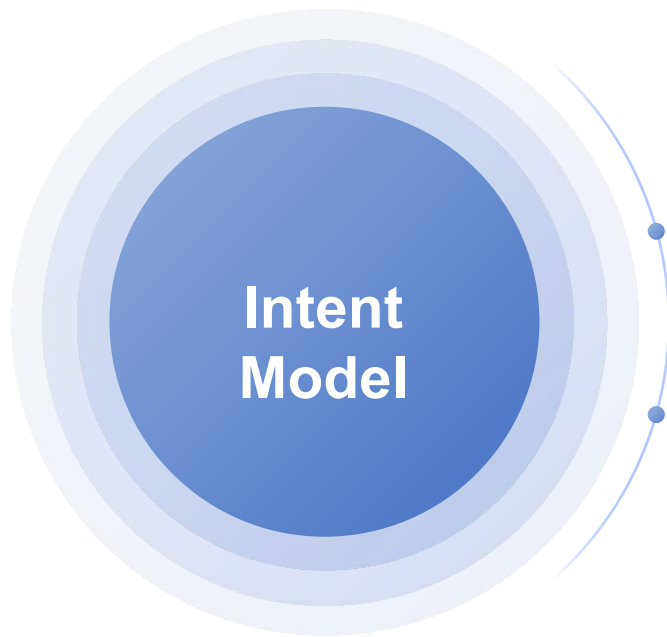
ZSM 011

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

Intent Model Design Requirements



ONAP Intent Model Design Mechanism



Intent Common Model



Intent Common Model expresses intents as a set of objects containing expectations and targets. It can be covered by a model vocabulary and semantics independent of the operational domain. It serves as the root model for all intent definitions, defining the basic types and internal structure of intent objects.

Domain Information Model



If a model is independent of the Intent Common Model, it is referred to as a Domain Information Model. This implies that information models created for existing domains independent of intent can be directly used in intent expressions.

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ONAP Intent Model-related Projects

June 2022

REQ-1267

Provide a general intent model and a general intent interface to ensure that all intents (especially machine-machine intents) operate according to the same expression and process.

January 2023

REQ-1408

Optimize the intent interaction process, introduce AI related technologies, and implement more interfaces such as intent report.

June 2023

REQ-1492

By introducing intent related technologies to address the challenge of increasing service complexity in incident management and providing standardized requirements for incident management processes.



- **Top Achievement Award:** General intent model and general intent interface requirements
- **S3P Improvements:** Usecase UI Project

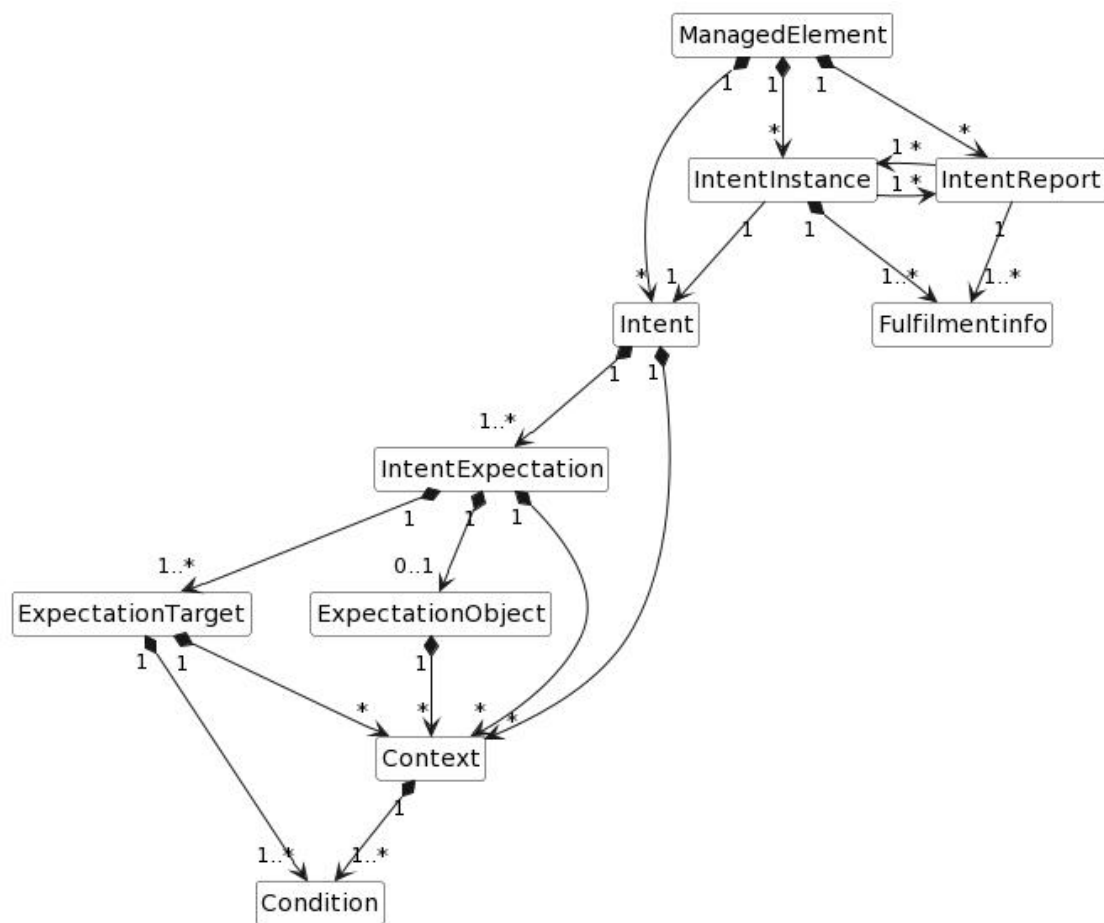
Top Achievement Award Results: Tie

Demo winners:

A General Implementation with Intent based network in ONAP

@ Lingli Deng @ **Keguang He** @ Chuanyu Chen
@ Dan Xu @ Shuting Qing @ zhen zhang

ONAP Intent Common Model



- Intent can be comprised of a set of expectations, which can be based on common model expectations. When specifically defining the list of states expectations aim to achieve, it is possible to describe them based on the domain information model.
- For each intent, there may exist intent expectations and corresponding contexts in multiple dimensions. For each expectation, it can be composed of several expectation targets and a set of corresponding expectation contexts.
- At the operational stage, it is also necessary to provide Intent Instances and Intent Reports.

ONAP Intent Common Model

Intent

Attribute	Cardinality	Type	Description
intentId	1	Identifier	Identifier for this intent.
intentName	1	String	Name of the intent.
intentExpectations	1..N	IntentExpectation	List of expectations within the intent.
intentContexts	0..N	Context	List describing the context of the intent, representing constraints and conditions.

ONAP Intent Common Model

IntentExpectation

Attribute	Cardinality	Type	Description
expectationId	1	Identifier	Identifier for this expectation.
expectationName	1	String	Name of the expectation.
expectationType	0..1	Not specified	Describes the attributes and type of the intent expectation. Values: Delivery;Assurance;Report; Property
expectationObject	0..1	ExpectationObject	Represents the intent expectation object that needs to be acted upon.
expectationTargets	1..N	ExpectationTarget	Describes the list of ExpectationTarget(s) representing specific outcomes or abstract indices characterizing performance metrics for the given intent expectation.
expectationContexts	0..N	Context	Describes the list of contexts applicable to a specific intentExpectation, representing constraints and conditions.

ONAP Intent Common Model

ExpectationObject

Attribute	Cardinality	Type	Description
objectType	0..1	String	Describes the type of IntentExpectation expectation object to be applied, can be the class name of the managed object. Condition: The intent expectation is not specific to a particular object instance, or the intent owner is unaware of the identity of this specific object instance.
objectInstanceId	0..N	Identifier	Describes the specific object instances (e.g., instances of managed objects) to which the intentExpectation should be applied. Condition: The intent expectation is specific to a particular object instance, and the intent owner knows the identity of that specific object instance.
objectFilter	0..1	Not specified	Describes a list of ObjectContext(s).ObjectContext(s) list represents constraints and conditions used as filtering information to identify the objects to which a given intentExpectation should apply.

ONAP Intent Common Model

ExpectationTarget

Attribute	Cardinality	Type	Description
targetId	1	Identifier	Identifier for this target.
targetName	1	String	Name of the expected target.
targetConditions	1..N	Condition	Represents the conditions that the expected target must satisfy.
targetContexts	0..N	Context	Describes the list of constraints to be applied to the specific expected target.

ONAP Intent Common Model

Condition

Attribute	Cardinality	Type	Description
conditionId	1	Identifier	Identifier for this condition.
conditionName	1	String	Name of the condition.
operator	1	Enum	If conditionValue is present, it indicates specific requirements for the condition. Values: Greater than; Equal to; Less than; Not equal to; One of; Some of; Maximum value; Minimum value; Median value; Confidence If conditionList is present, it indicates the relationship between all conditions in the list. Values: AND; OR
conditionValue	0..1	String	If it is a simple condition, it represents the specific value of the condition.
conditionList	0..N	Identifier	If it is a composite condition, it represents a group of conditions.

ONAP Intent Common Model

Context

Attribute	Cardinality	Type	Description
contextId	1	Identifier	Identifier for this condition.
contextName	1	String	Name of the condition.
contextConditions	1	Enum	If conditionValue is present, it indicates specific requirements for the condition. Values: Greater than; Equal to; Less than; Not equal to; One of; Some of; Maximum value; Minimum value; Median value; Confidence If conditionList is present, it indicates the relationship between all conditions in the list. Values: AND; OR
conditionValue	0..1	String	If it is a simple condition, it represents the specific value of the condition.
conditionList	0..N	Identifier	If it is a composite condition, it represents a group of conditions.

ONAP Intent Common Model

FulfilmentInfo

Attribute	Cardinality	Type	Description
fulfillmentObjectId	1	Identifier	Corresponding ID of the intent/expectation/target.
fulfillmentStatus	1	Enum	Describes the current status of the completion result. Values: Completed, Not Completed
notFulfilledState	0..1	Enum	Required if fulfillmentStatus is "Not Completed". Describes the current progress value: Initial, Feasible, Degraded, Terminated, Completion Failure
notFulfilledReasons	0..1	String	Optional if fulfillmentStatus is "Not Completed". Describes reasons/observations related to the specific notFulfilledState.
achievedValue	0..1	Not Specified	Required if FulfillmentInfo is about ExpectationTarget. Describes the performance metrics of the ExpectationTarget.
objectInstances	0..N	Identifier	If fulfillmentObject references intentExpectation, apply this property.

ONAP Intent Common Model

IntentReport

Attribute	Cardinality	Type	Description
intentReportId	1	Identifier	Identifier for this intent report.
intentReference	1	Identifier	Identifier of the associated intent instance.
fulfillmentInfoList	1..N	FulfillmentInfo	Describes the implementation information of intent, intent expectations, and expectation targets.
reportTime	0..1	DateTime	Indicates the creation time of the intent report.

ONAP Intent Common Model

IntentInstance

Attribute	Cardinality	Type	Description
intentInstanceid	1	Identifier	Identifier for this intent instance.
intentId	1	Identifier	Identifier of the associated intent object.
fulfillmentInfos	1..N	FulfillmentInfo	Describes the implementation information of the associated intent, intent expectations, and expectation targets.
intentReports	0..N	DateTime	Identifies a series of intent reports generated based on this intent instance.

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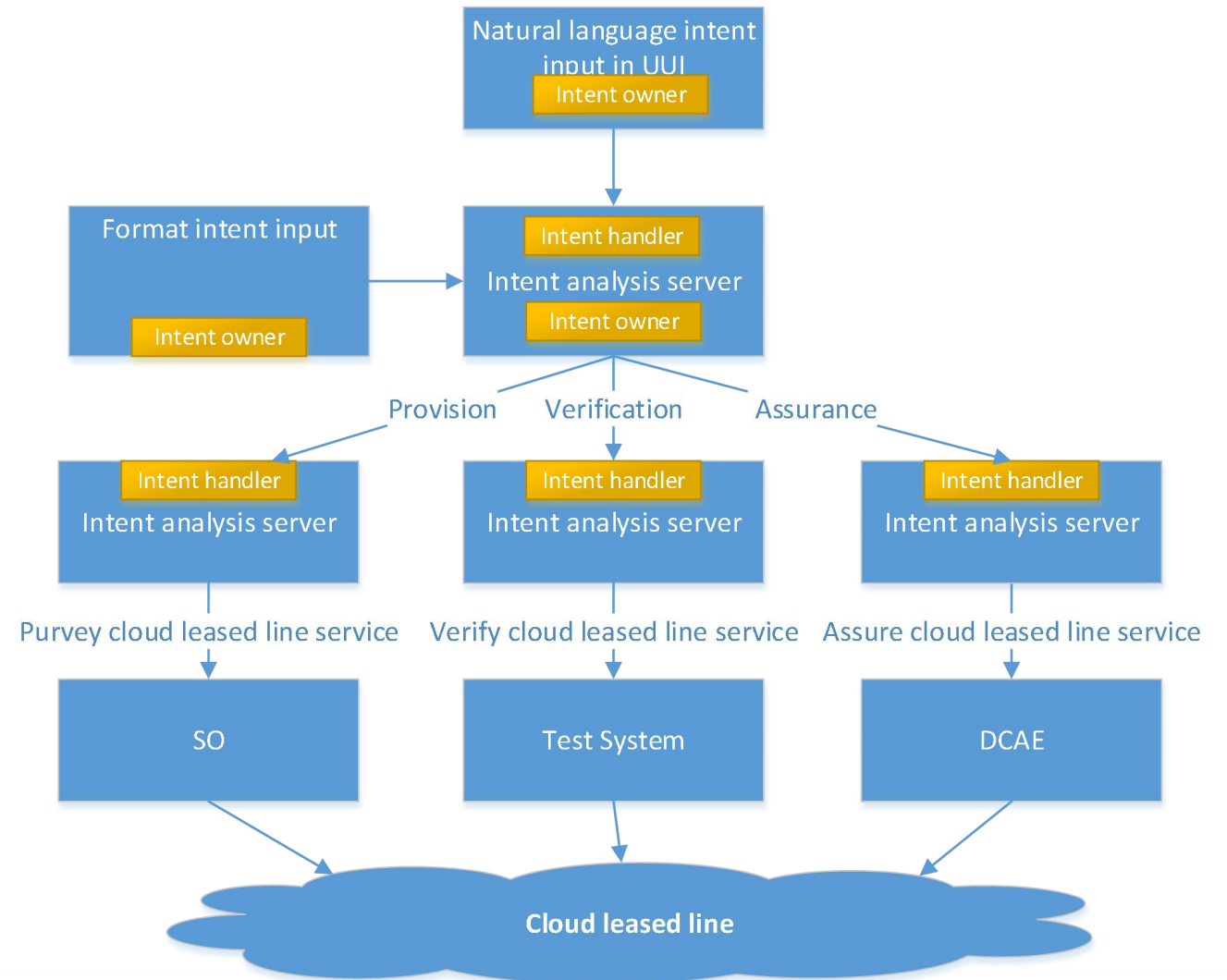
Intent Model Use Cases

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Conclusion and Discussion

Use case

- Operators provide intent based cloud leased line services, and provide corresponding assurance measures based on user's requirements. An enterprise user orders a cloud leased line with a bandwidth of 1G from the operator.
- 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.



Use case

1. Intent Information Element:

intendId: 0932-ab93-76ca-9023
intentName: Cloud_leased_line_intent
intentExpectations: deliveryExpectationId, propertyExpectationId
intentContexts: intentContext1
intentFulfilmentInfo: intentFulfilmentInfo1

intentContext1:

contextId: 0321-ab3e-22cd-2231
contextName: customer_level_context
contextType: customerInfo
contextCondition: intentContextCondition

intentContextCondition

conditionId: 8475-ae43-3256-7896
operator: equal to
conditionValue: high
conditionList: NULL

intentFulfilmentInfo:

fulfilmentStatus: NOT_FULFILLED
notFulfilledState: FULFILMENTFAILED
notFulfilledReasons: Insufficient resources

1.1. deliveryExpectation:

expectationId: ac23-3432-ea21-2345
expectationName: Cloud_leased_line_delivery_expectaion
expectationType: Delivery
expectationObject: expectationObject1
expectationTargets: serviceTypeTarget1
expectationContexts: expectationContext1
expectationfulfilmentInfo: expectationfulfilmentInfo1

expectationObject1:

objectType: cmcc_cloud_leased_line_service
objectInstance: null
objectContexts: objectContexts1

serviceTypeTarget1:

targetId: ac23-3432-ea21-2345
targetName: Cloud_leased_line_Service_Type
targetCondition: targetCondition1
targetContexts: targetContext1
targetFulfilmentInfo: targetFulfilmentInfo1

● targetCondition:

conditionId: 8909-erw3-3454-2345
conditionName: service_type_condition
operator: equal to
conditionValue: high level service quality assurance
conditionList: NULL

1.2. propertyExpectation1:

propertyExpectation1

expectationId: 5489-12ad-2312-7854
expectationName: Cloud_leased_line_purvey_expectaion
expectationType: property
expectationObject: expectationObject2
expectationTargets: bandwidthTarget, latencyTarget
expectationContexts: expectationContext2
expectationfulfilmentInfo: expectationfulfilmentInfo2

expectationObject2:

objectType: cmcc_cloud_leased_line_service
objectInstance: null
objectContexts: objectContexts2

bandwidthTarget:

targetId: 2323-3421-ea21-2112
targetName: bandwidthTarget
targetCondition: targetCondition2
targetContexts: targetContext2
targetFulfilmentInfo: targetFulfilmentInfo2

targetCondition2:

conditionId: 8909-erw3-3454-3421
conditionName: bandwidthCondition
operator: equal to
conditionValue: 1g
conditionList: NULL

2. latencyTarget

targetId: 2313-4532-ea21-2345
targetName: latencyTarget
targetCondition: targetCondition3
targetContexts: targetContext3
targetFulfilmentInfo: targetFulfilmentInfo3

targetCondition3:

conditionId: 8909-we23-3454-1125
conditionName: latencyCondition
operator: and
conditionValue: NULL
conditionList: targetCondition3, targetCondition4

targetCondition3:

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

targetCondition4:

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

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01

- The common intent model needs to possess generality, completeness, standardization, and executability.
- By providing specific common structures, vocabulary, semantics, and mechanisms, it ensures unambiguous expression and machine readability.

02

The common intent model needs to provide domain-specific extension mechanisms, supporting various professional domains to populate intent expectations and related common components, thereby enhancing the expressive capability of the model.

03

The common intent model should thoroughly consider feedback on the effectiveness of intent implementation. It is recommended that the model supports intent reporting and user query mechanisms, ensuring that intent owners can proactively and passively obtain the status of intent implementation.

1

Does the current intent common model adequately fulfill the description of intents, or is there a need to introduce new classes or mechanisms?

2

How does the ONAP Intent Model coordinate and transform with intent models from other standard organizations? (e.g., 3GPP SA5 using Yaml, TM Forum using RDF, ETSI NFV (??))

3

How ONAP's Intent Model collaborates with Nephio's Custom Resource Definition (CRD) to achieve end-to-end intent implementation?



Thanks!

