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ONAP - Intent Driven Orchestration

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Intent Definition and references

Intent is a set of operational goals that a network should meet and outcomes that a network is supposed to deliver, defined in a declarative manner without specifying how to achieve or implement them. Intent is therefore purely the specification of requirements and goals separated from all implementation artifacts.

The TeleManagement Forum (TM Forum) defines intent as “the formal specification of all expectations including requirements, goals, and constraints given to a technical system.” The process of standardizing the language of expressing intents is underway (IG1253A Intent Modeling v1.0.0)

For the RAN, it is natural for this to be done by 3GPP SA5 and RAN3 groups, which will ensure that intent extensions allow for coexistence with and evolution of existing interfaces such as the 3GPP slicing interface.

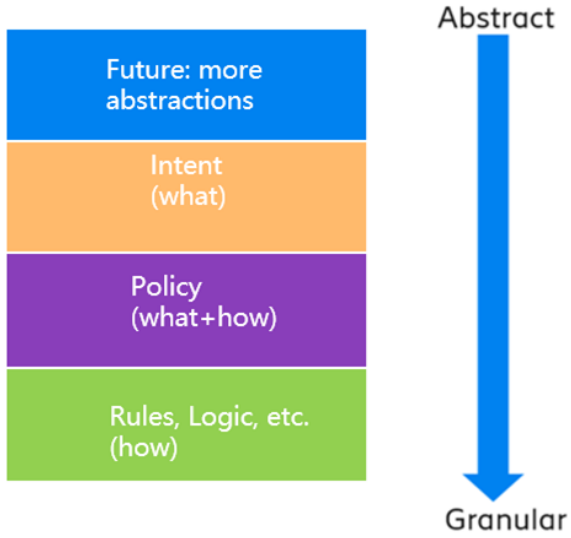
References:

1. IETF "Intent-Based Networking - Concepts and Definitions“
2. TM Forum : IG1253A Intent Modeling
3. Autonomic Networking: Definitions and Design Goals (RFC7575)
4. 3GPP TS 28.312 Intent driven management services for mobile networks

Definition of Intent

- Policy is a set of rules, typically modeled around a variation of events/conditions/actions, used to express simple control loops that can be rendered by devices without requiring intervention by the outside system. Policies let users define what to do under what circumstances, but they do not specify the desired outcome.

- Intent is a high-level, declarative goal that operates at the level of a network and services, not individual devices. It is used to define outcomes and high-level operational goals, without specifying this should be achieved or how goals should specifically be satisfied, and without the need to enumerate specific events, conditions, and actions. Which algorithm or rules to apply can be automatically "learned/derived from intent" by the IBS. In the context of autonomic networking, intent is ideally rendered by the network itself; also, the dissemination of intent across the network and any required coordination between nodes is resolved by the network without the need for external systems.



Intent Details

Intent would typically need to express the following:

Functional requirements: Specify, for example, which services need to be delivered and what function do they need to provide to the user.

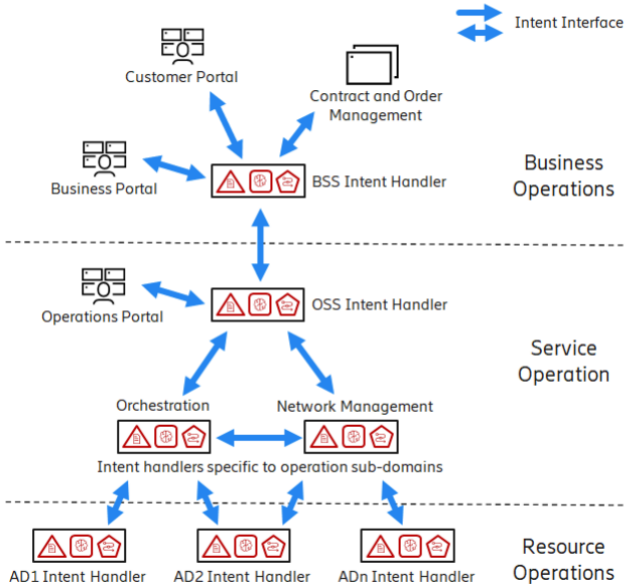
Non-functional requirements: These are typically targeted regarding performance, availability and user experience. KPI and metrics would be used to express them

Constraints and inter-dependencies: Are there any special concerns or requirements that a solution would need to obey. For example, privacy and security concerns of the customer might need to be addressed considering through multi tenancy and security levels. Another example would be that for legal reasons all data and service instances need to stay in a particular geographical location.

Definition of Intent

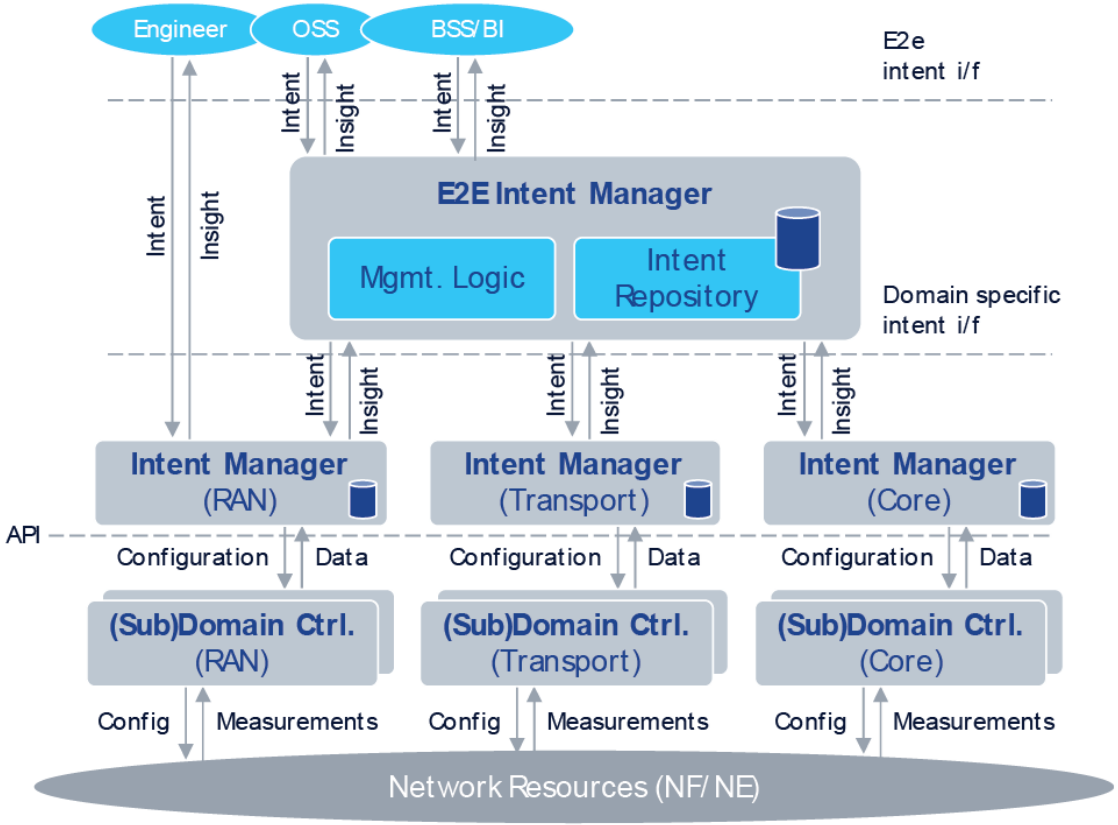
Intent is therefore purely the specification of requirements and goals separated from all implementation artifacts.

IG1253 Intent in Autonomous Networks v1.0.0



This indicates that intent is typically used in a hierarchical way where the intent of user services is broken down into intent about resource services and the behavior of the underlying infrastructure. The autonomous networks framework models this by distinguishing business intent, service intent and resource intent.

Intent Based Management Architecture



Source: Peter Szilagyi, Nokia Bell Labs, Intelligent Intent Based Networks

3GPP TS 28.312 - Intent driven management services for mobile networks

4.1.3 Intent expectations for different types of management needs

Intent expectations for different types of management needs.

- **Intent expectation for delivering network and service related object:** enables a consumer to express the intent expectation for the object (e.g. network, service, slice) to be delivered by the system. Examples of such intent expectations are:

  - "Delivering a radio network in the specified area with specified frequency information, transport information, and radio information (e.g. range of PCI, Cell Id), network capacity and performance information"

  - "Delivering a radio service in the specified area with certain service characteristics (e.g. SLS)".

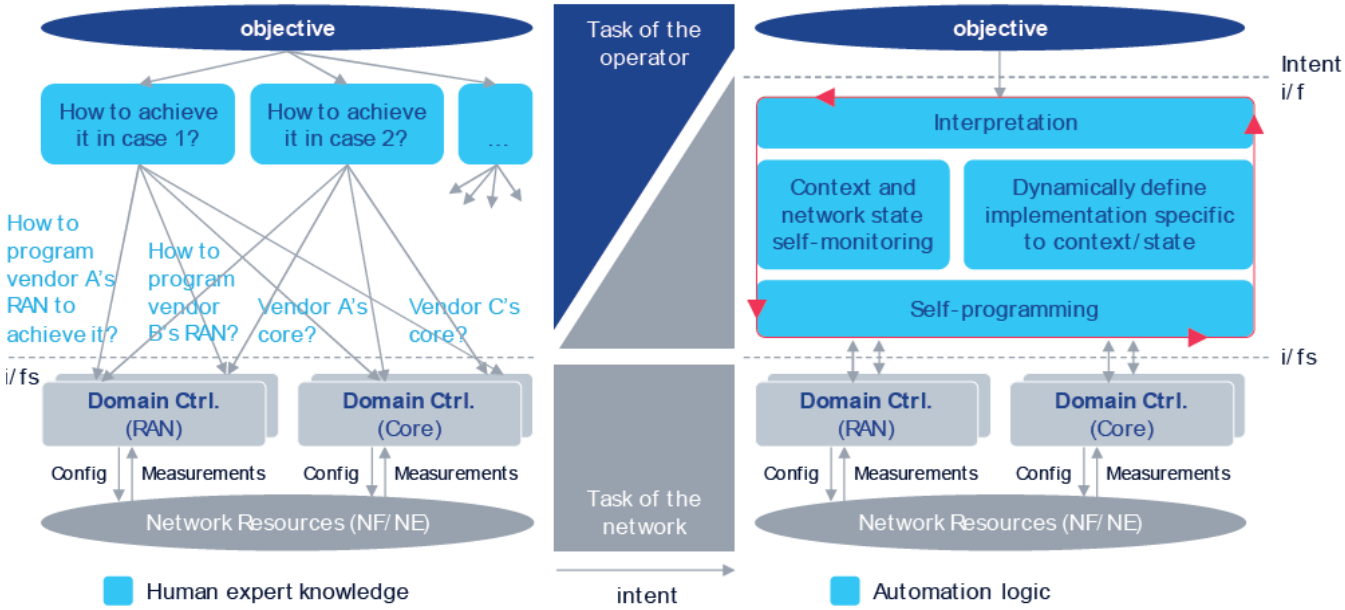
- **Intent expectation for network and service related object performance:** enables a consumer to express the performance objectives of the object (e.g. network, service, slice) to be assured. Examples of such intent expectations are:

  - "Ensure the radio network in the specified area meets certain expected RAN UE throughput objectives (e.g. expected average RAN UE DL throughput, expected percentage of UE with the RAN UE DL throughout less than 5Mbps)"

  - "Ensure the radio network in the specified area meets certain expected coverage objectives (e.g. expected coverage ratio, expected average RSRP)".

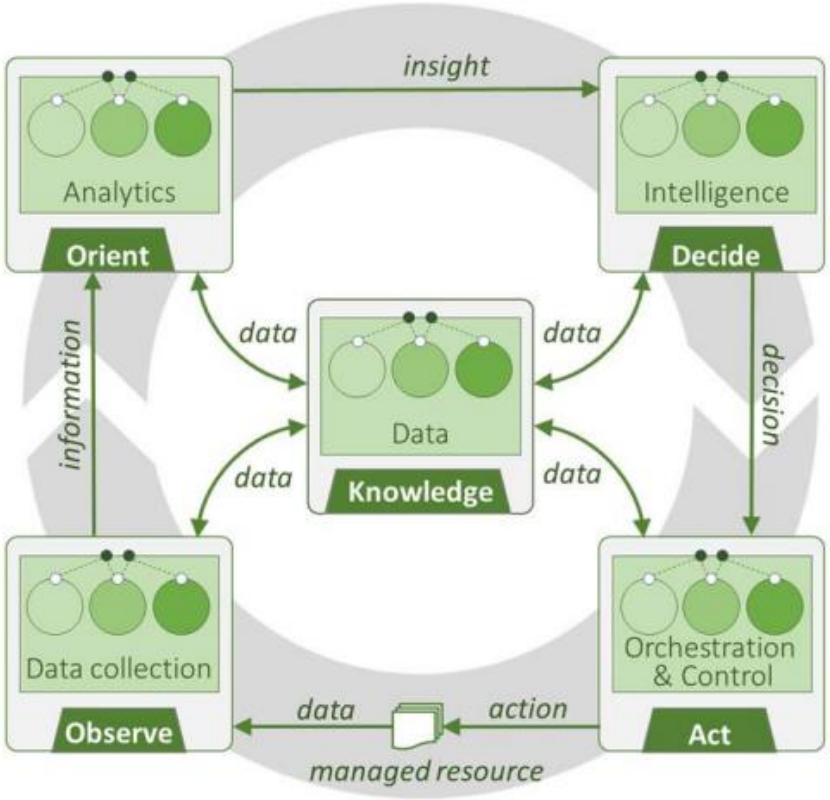
Programmable networks and the benefits of the intent paradigm

IBN not only use policies/rules, but also adopts them and create new, based on feedback



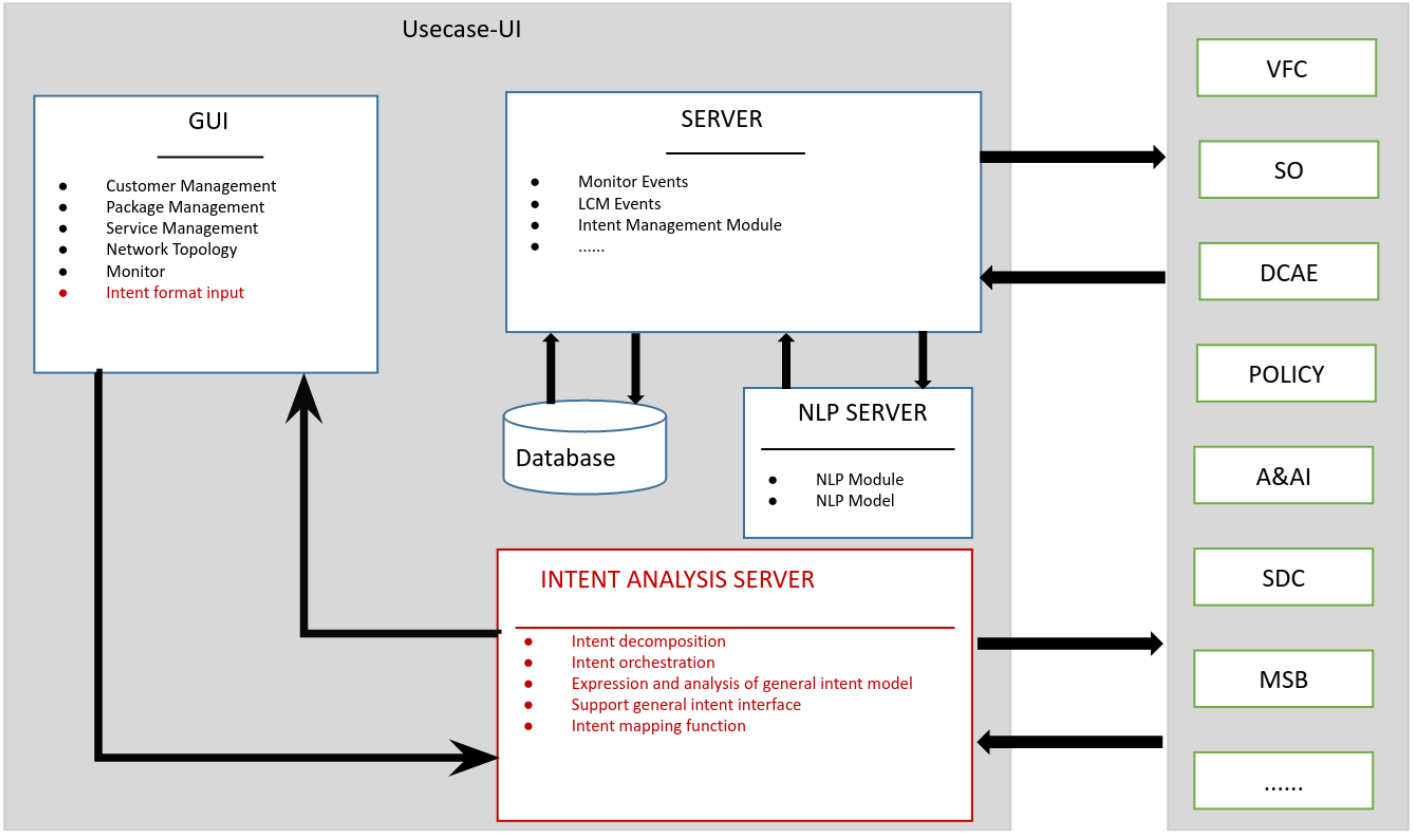
Source: Peter Szilagyi, Nokia Bell Labs, Intelligent Intent Based Networks

Zero-touch network and Service Management ETSI GS ZSM 002

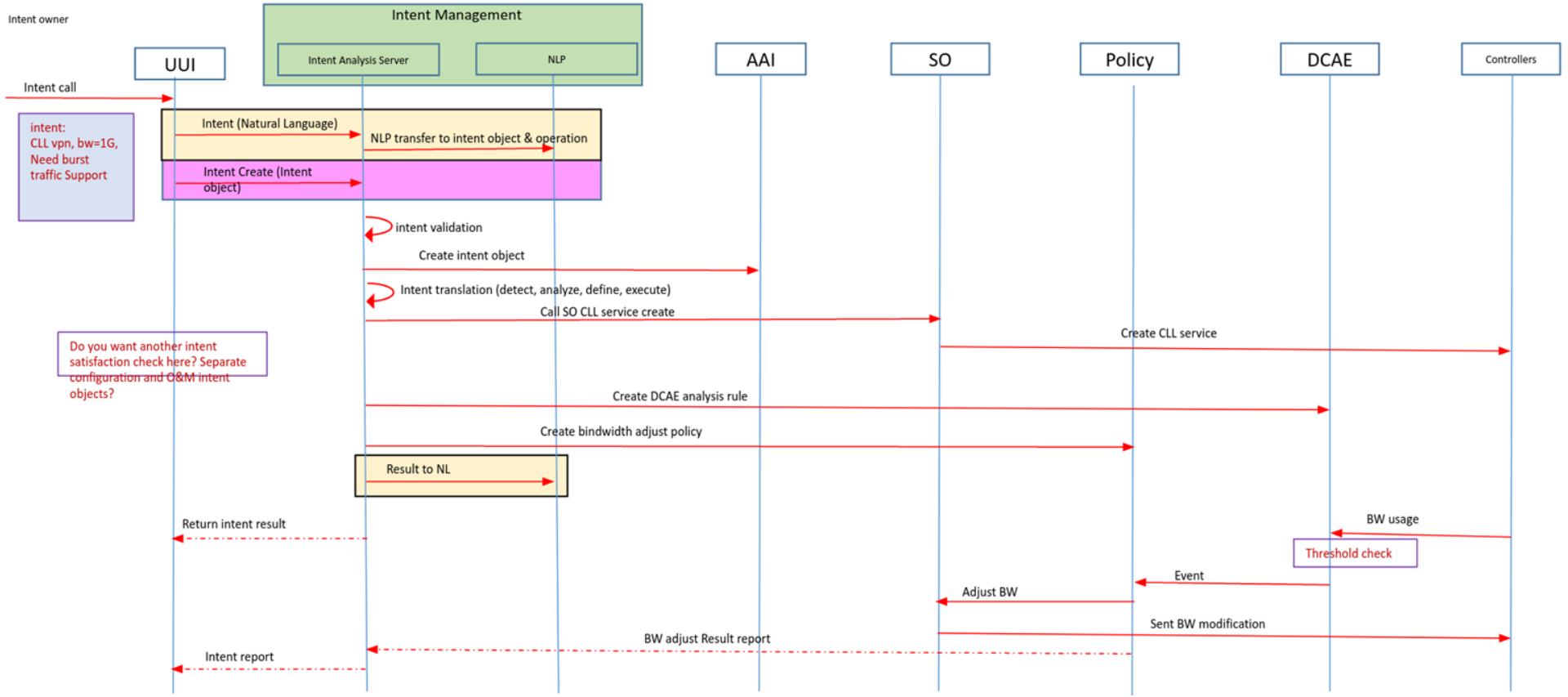


Mapping between architectural building blocks and closed-loop steps

Proposal in ONAP K release



Intent Creation



Invitation

ONAP: Automation of Intent-based Cloud Leased Line Service (Part 1 and 2)

Wed Jun 15 2022

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