



ONAP presentation

@ ITU-T JCA-IMT2020 meeting, 18th April 2023

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Agenda

- Introduction to ONAP
- Walk-through of activities included in the response LS to ITU-T JCA-IMT2020
- Selected examples

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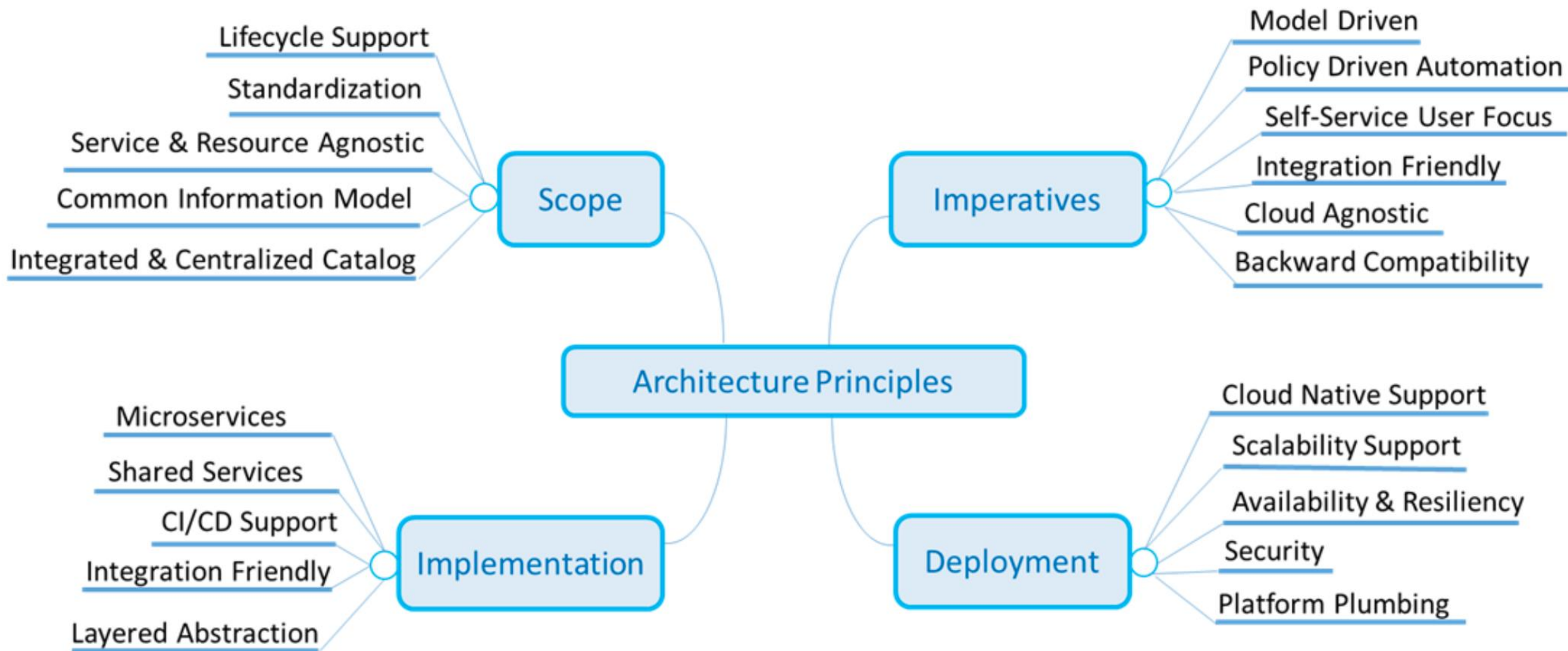
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ONAP (Open Network Automation Platform) - Introduction

- ONAP is an open-source, orchestration and automation framework. It is hosted by The Linux Foundation
- Since the first release in November 2017, ONAP provides a comprehensive platform for real-time, policy-driven service orchestration and automation
- ONAP enables service providers and developers to rapidly automate the instantiation and configuration of physical, virtual and cloud-native network functions and to support complete life cycle management activities
- Functional Overview
 - Service design - using the TOSCA approach
 - Service orchestration and deployment
 - Service operations
- Non-functional topics: Code quality, Security, Documentation, Tests & Integration, etc

Architecture Principles

Architectural principles provide guidelines when making architecture decisions, they are not requirements nor design of the system



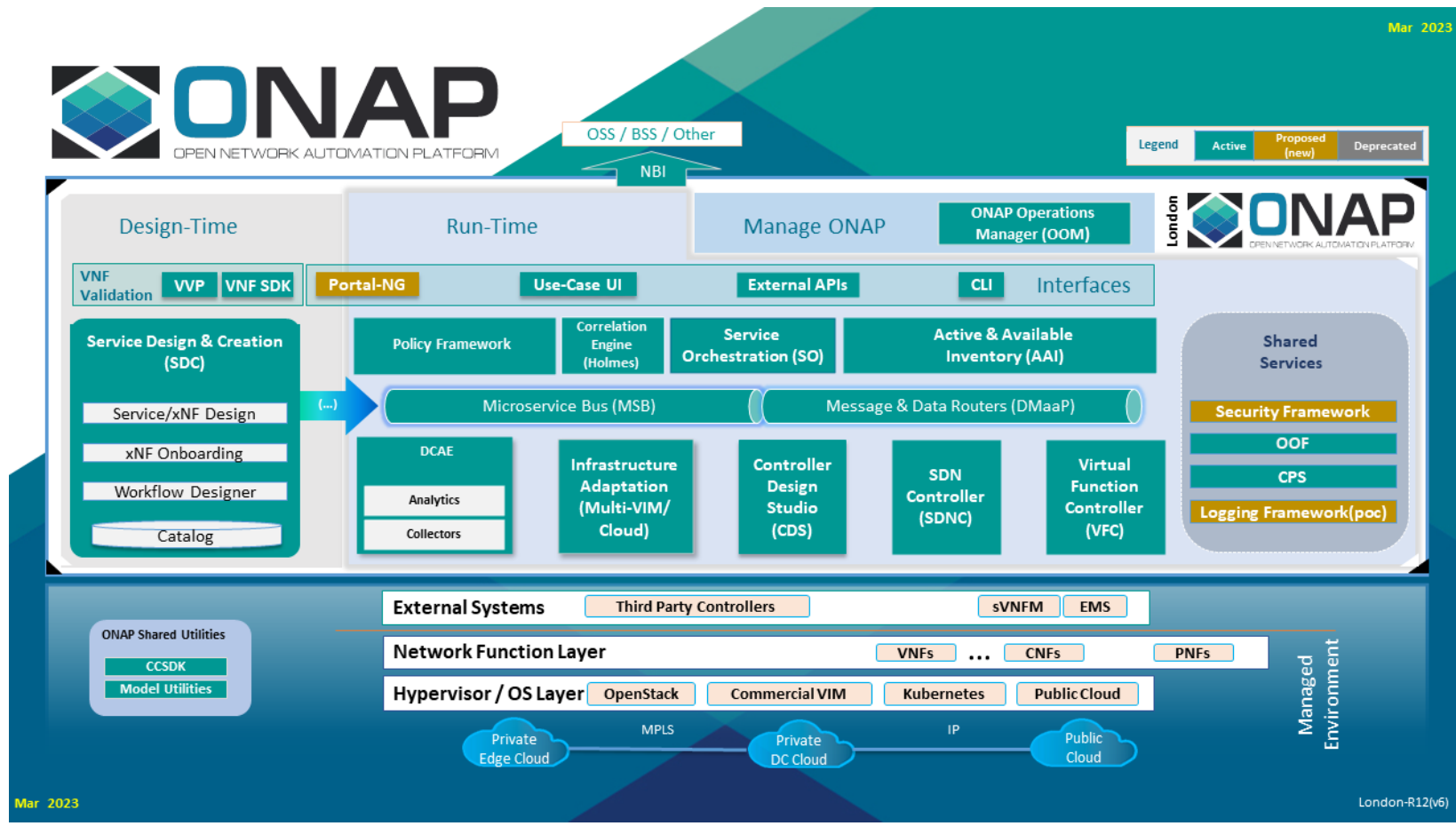
ONAP influence from a Multi-SDO perspective

Functional Architecture

Overall Automation Platform architecture

Expectations of functional and non-functional scope

Can be viewed as requirements



Technology Source/Realization

Open-source code implementation

Component & Interface Definition

Defines the components in terms of interfaces and capabilities (capabilities often expressed in code).

Component implementation may or may not use the opensource technology

ONAP Releases

#10



Nov 2021 – Jun 2022

#12



Oct 2021 – Jun 2023

#11



Jun 2022 – Dec 2022

- 928.7K Lines of Code Changed
- 2.88K Changesets
- 1.9K Commits
- 3.69K Jira Tickets
- 182.41K Builds
- 142 Code Contributors
- 24 Contributing Organizations

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Activities as presented to JCA-IMT2020 in LS

Activity domain	Title of deliverable	Scope of deliverable
Network Slicing	End-to-end network slicing	ONAP-based end-to-end slice management including RAN, Transport and Core subnets
5G Self-Organizing Network (SON)	5G self-organizing network aligned with O-RAN	Harmonization with O-RAN OSC for SON use cases using O1 and A1
Intent/Guidance A1 Policy Management	Improving support for Intent-based O-RAN A1 Policies to guide RAN function operation/optimizations	Using A1 Policies to manage 5G RAN elements by providing intent based policies for optimization of the RAN network performance
Cloud-native Network Functions (CNF)	Cloud-native Network Functions Orchestration	CNF orchestration based on ONAP Service Orchestrator
Intent-based Networking	Intent Interaction and General Intent Model	Improve network services for users with intent interaction closed-loop to support intent-driven closed-loop autonomous networks General intent model and general intent interface
Autonomous Networks	Closed-loop Autonomous Services	Closed-loop autonomous services based on ONAP
Cloud Leased Line	Cloud Leased Line - Cross Domain Cross Layer VPN (CCVPN)	Automation of intent-based cloud leased line service based on ONAP
Cloud-network Convergence Services	Intent-driven Operating for Cloud-network Convergence Services	Intent-driven operating for cloud-network convergence services by extending ONAP CCVPN use case
Secure communication	Secure communication with Service Mesh and Ingress protection	Service Mesh and Ingress are for facilitating secure service-to-service communications between microservices and especially adapted for a Kubernetes based solution

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Relationship between intent and autonomous network

Intent is a must for autonomous Networks

Based on the user specified intent goal, combined with AI technology to achieve automatic closed-loop, and independent evolution, finally achieve autonomous operation.

Intent defines what an autonomous domain is expected to achieve

Leave details of how to design and operate network to the internal operation of the autonomous domain.



Evolution of autonomous domain interface

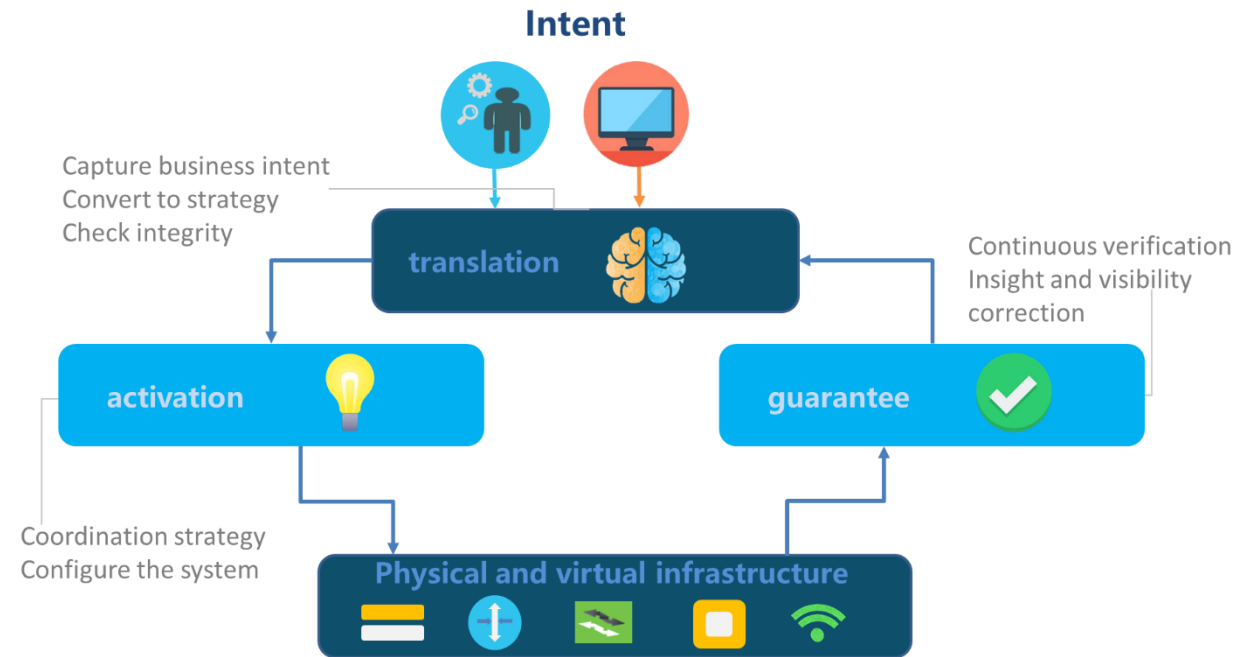
The interface between autonomous domains has evolved from rule based/policy based to intent based.

Key technologies of closed-loop management automation

Closed loop realizes and maintains explicitly intent goals through perception, analysis, decision-making and execution.

Intent-based Networking (IBN)

- Intent-based networking (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 Networking

Collaborations among Academics, SDOs and ONAP

Academics



- A Survey on Intent-Driven Networks
- A Brief Survey and Implementation on Refinement for Intent-Driven Networking

Academic exchanges

Open-source



Align with Multi-SDO

Autonomous Networks Multi-SDO Initiative

Who we are

SDO	Group/Project	SDO	Role
3GPP	SA5	IETF	WG on AN
CCSA	TC7	ITU-T	FG-AN
ETSI	ENI, F5G, MEC, NFV, PDL, TC INT/AFI, ZSM	Linux Foundation*	ONAP
GSMA	Future Networks	NGMN	Automation
IEEE	Future Networks	TM Forum	AN Project

*Open Source Community

SDOs



IETF/IRTF:

- Intent-Based Networking - Concepts and Definitions
- Intent Classification



ETSI ZSM/ENI:

- ZSM 011 Intent-driven autonomous networks; Generic aspects
- ENI 008 InTent Aware Network Autonomicity (ITANA)



TMF:

- IG1234 Intent Oriented Customer Engagement (IoCE) Guide
- IG1253 Intent in Autonomous Networks



3GPP SA5:

- TS 28.312 Intent driven management services for mobile networks
- TR 28.812 Study on scenarios for Intent driven management services for mobile networks



ITU-T:

- Scenarios and Requirements of Intent-Based Network for network evolution
- functional architecture of NGN evolution by adoption of Intent-Based Network



CCSA:

- 2015B58 Network Intelligent Capability Enhancement for SDN/NFV: Study of Key Technologies of Intent Network

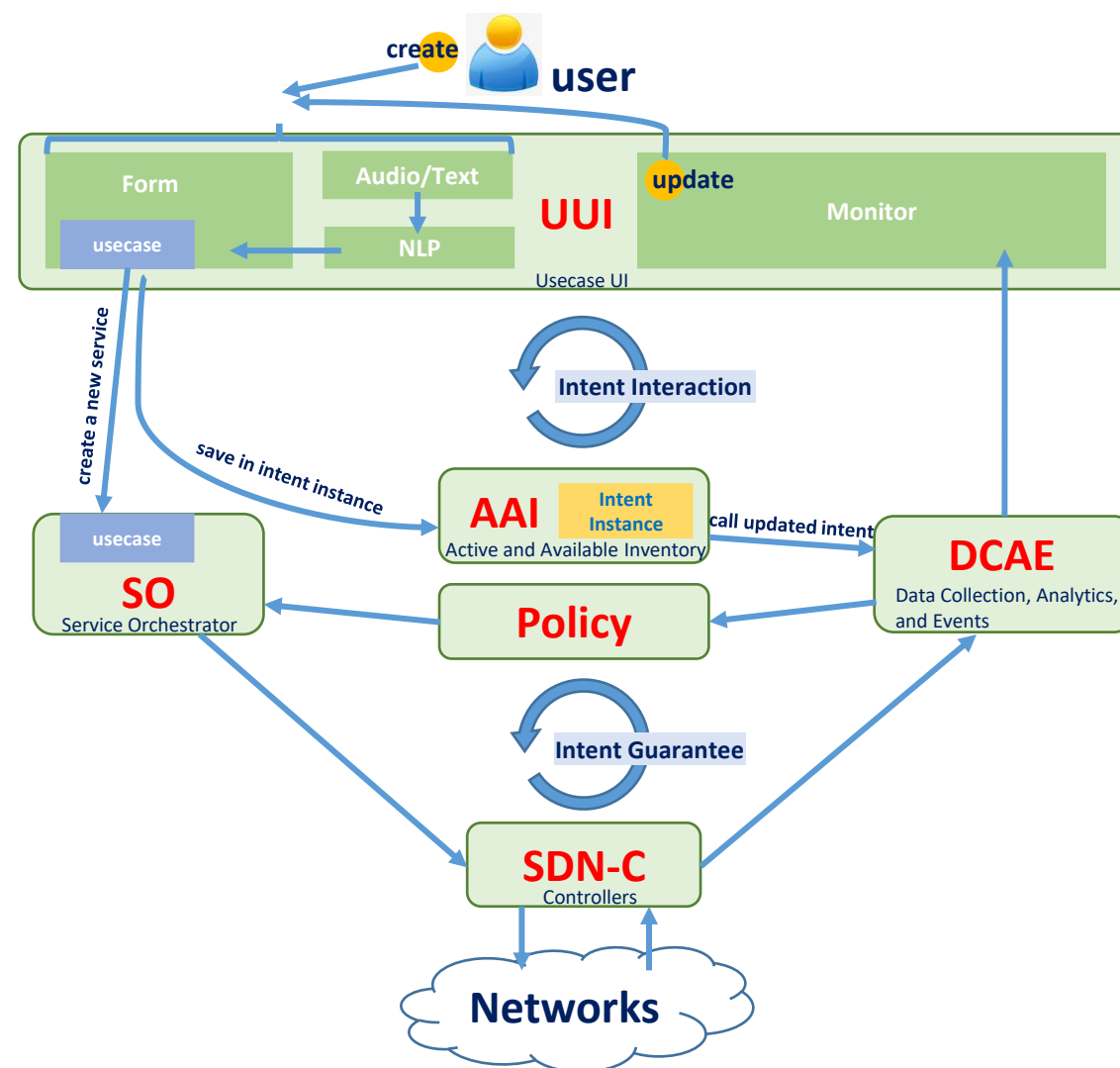
Architecture of Intent-driven Closed-loop Autonomous Networks based on ONAP Projects

Key Functions and Developments of Intent-based Networking in ONAP:

- ✓ **REQ-453/ONAPARC-641** Smart Operator Intent Translation in UUI based on IBN - R8 5G Slicing Support
- ✓ **REQ-861/ONAPARC-701** Smart Intent Guarantee based on IBN - R9 Intent Instance
- ✓ **REQ-1074/ONAPARC-729** Smart Intent Guarantee based on Closed-loop in R10
- ✓ **REQ-1075/ONAPARC-730** Network Services without Perception for Users based on IBN
- Maintain and Enhancement of Intent-driven Closed-loop Autonomous Networks in R11

Collaborations and Outputs with SDOs (ETSI ZSM / ITU-T):

- ✓ **ETSI ZSM PoC 003:** Automation of Intent-based cloud leased line service
- ✓ **ITU-T:** Scenarios and Requirements of Intent-Based Network for network evolution; functional architecture of NGN evolution by adoption of Intent-Based Network; signalling architecture of Intent-Based Network for network evolution



Architecture of Intent-driven Closed-loop Autonomous Networks