

Some Puzzle Pieces for E2E Automation



ZERO Touch Conference in Bonn,
September 2019

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Open Source & Standardization Manager at Ericsson

New Market Realities

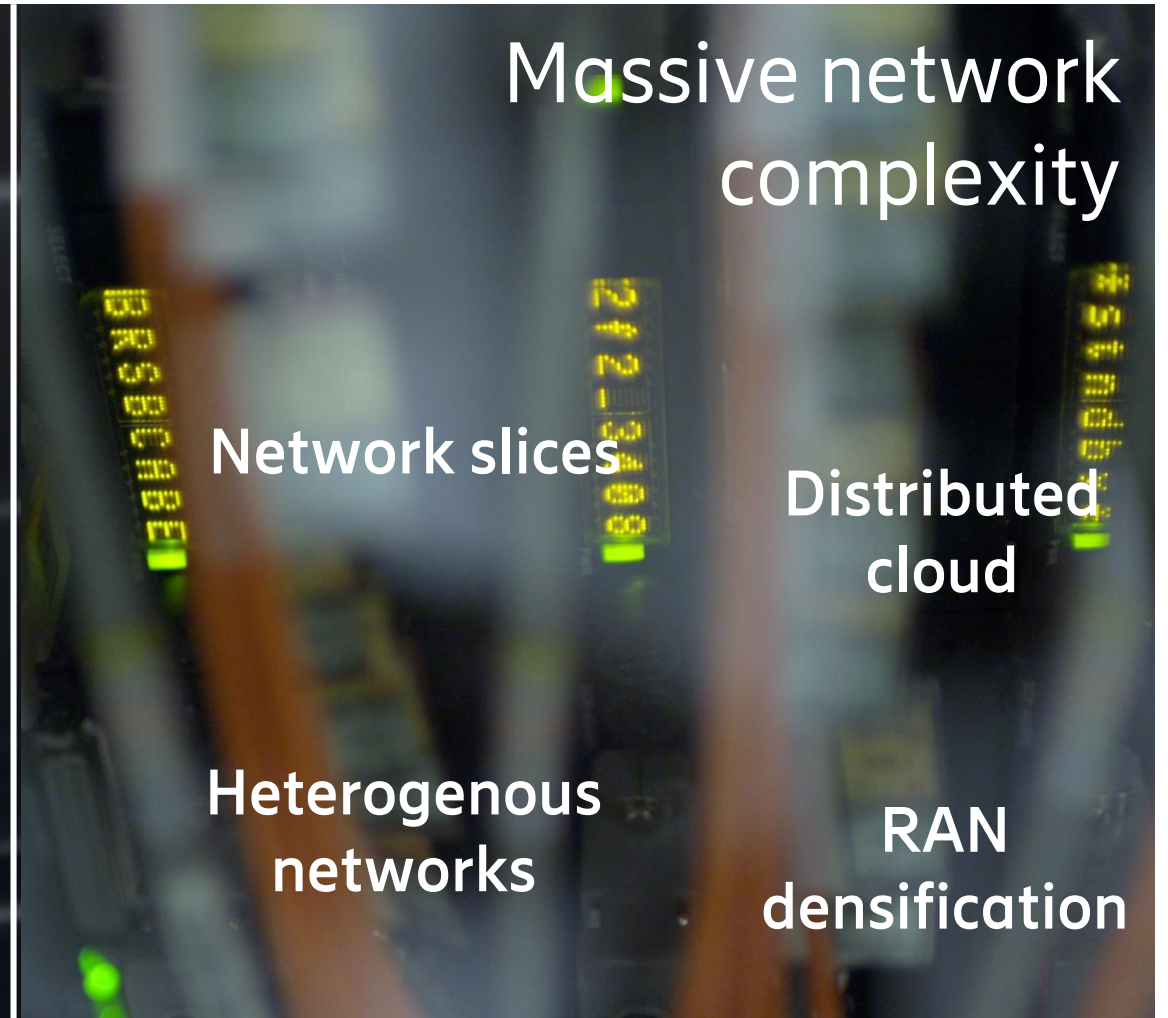


New use cases

Ultra coverage and bandwidth

Ultra reliable

Ultra low cost



Massive network complexity

Network slices

Distributed cloud

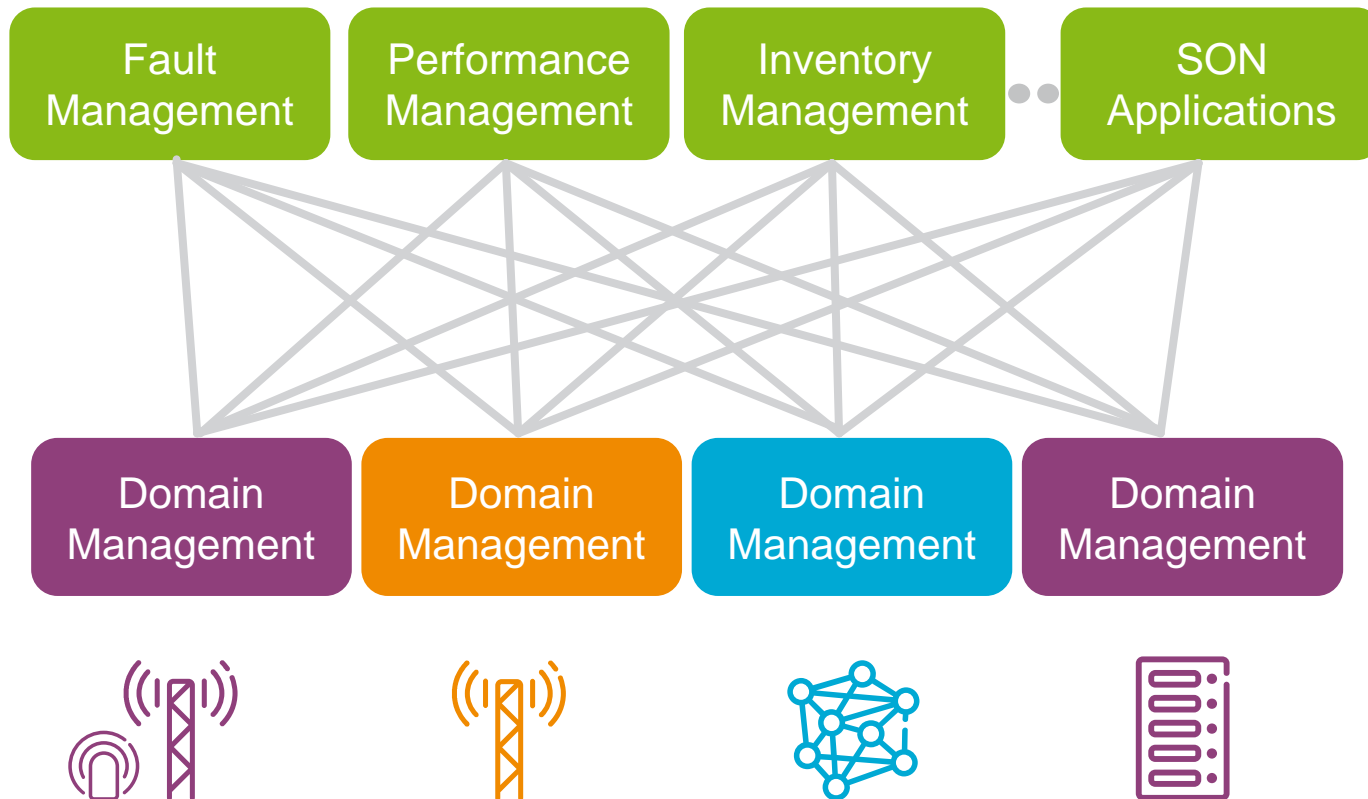
Heterogenous networks

RAN densification

Today's Network Management



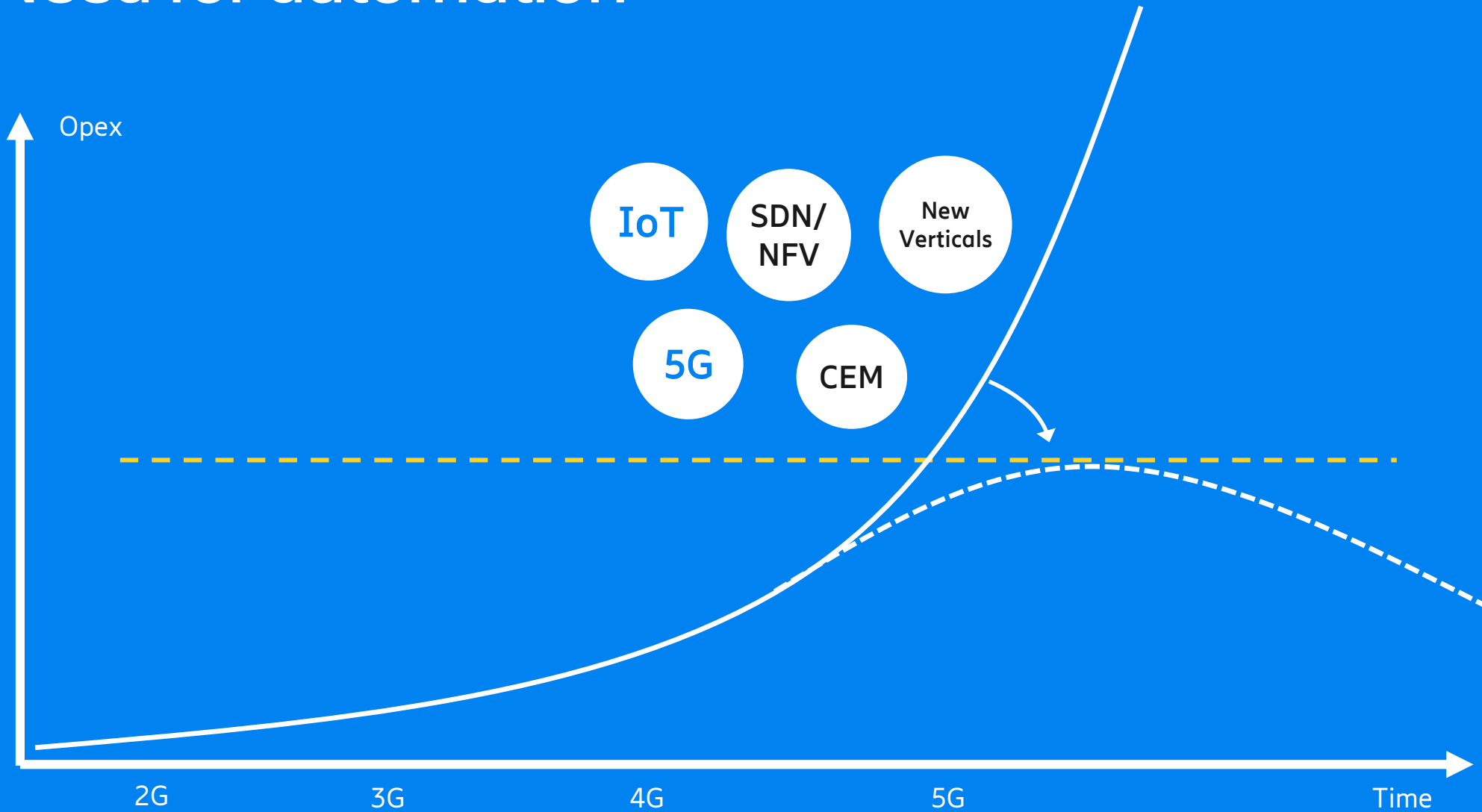
NETWORK MANAGEMENT



- Data fragmentation
- Complex integration
- Duplication of functions
- Multiple suppliers
- Inefficient use of IT resources

Technology complexity curve

- Need for automation



Technologies Enabling Business Transformation

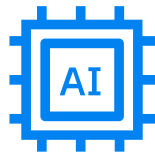


- OSS horizontalization to manage services beyond traditional
- Business Agility and efficiency
- New business models with shift to XaaS

- Development community growth due to higher programming abstraction
- On demand service creation and personalization
- Reduced TTM and TTR

- TCO reduction (OPEX reduction)
- Automated e2e service LCM
- Analytics enable next generation assurance
- Closed Loop Orchestration

- New de-facto standard for Industry alignment and agility
- Focus shift to value creation
- Innovation and differentiation accelerator



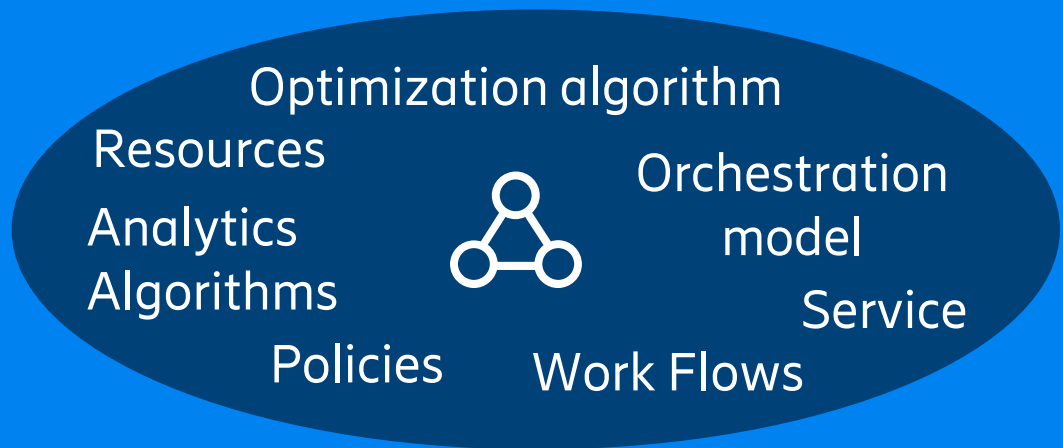
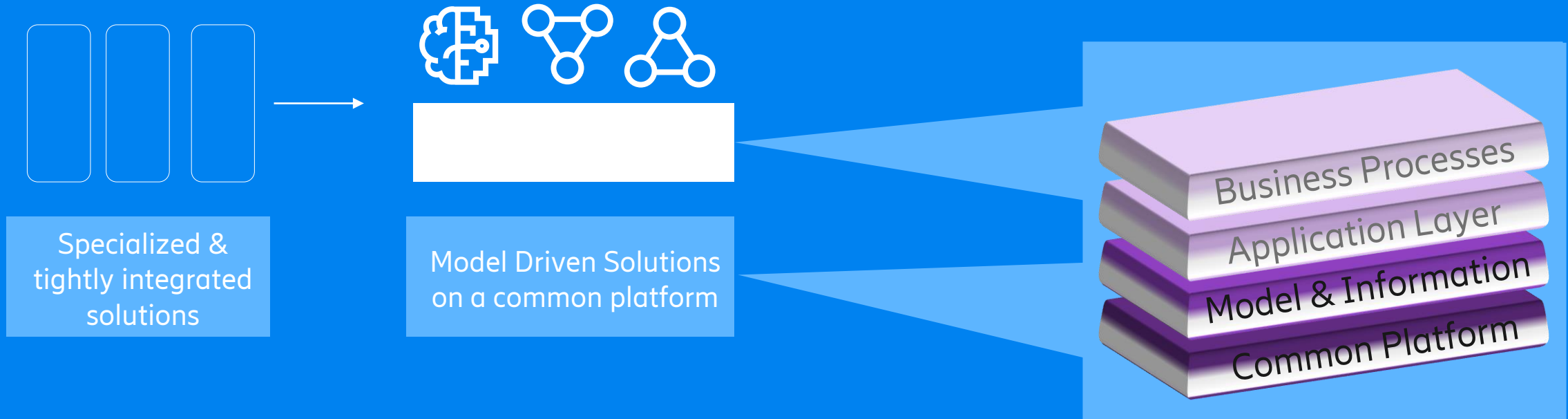
Cloudification

Model based Management

Automation, AI/ML

Open Source

Model Driven Automation



Zero Touch Principles



Zero touch decision loops

- Well defined decision loops and separation of concern
- Consistent configuration of HW and SW



Use of Machine Intelligence

- Automation of high frequency tasks
- One complete set of automation tools
- Enhanced by machine intelligence



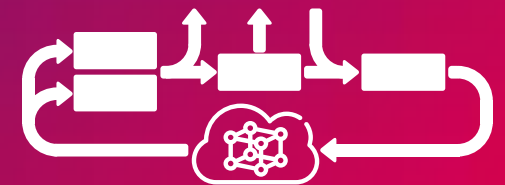
Easy to USE – Easy to trust

- Manual input to intent based policies only
- Monitoring and visualization of effects
- E2E User Scenarios



Programmable and flexible

- Versatile automation capabilities
- Software development kits



Integrated and unified

- One network management environment
- A normalized network model

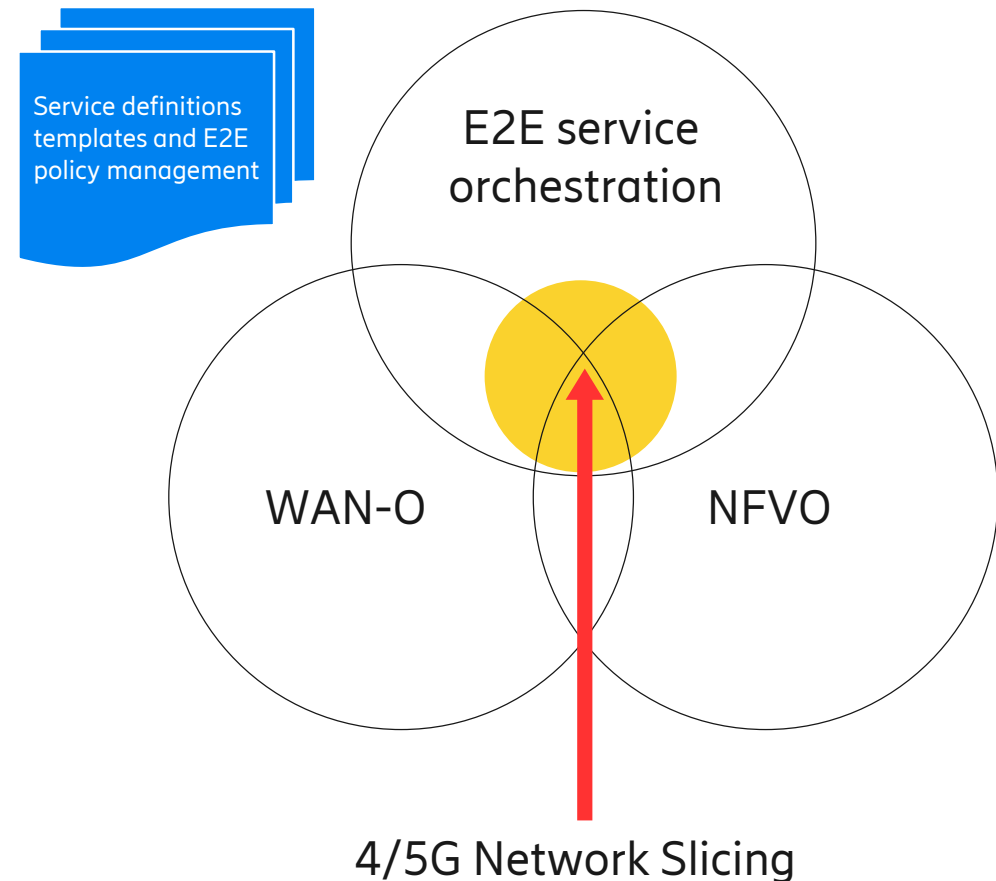


Service orchestration

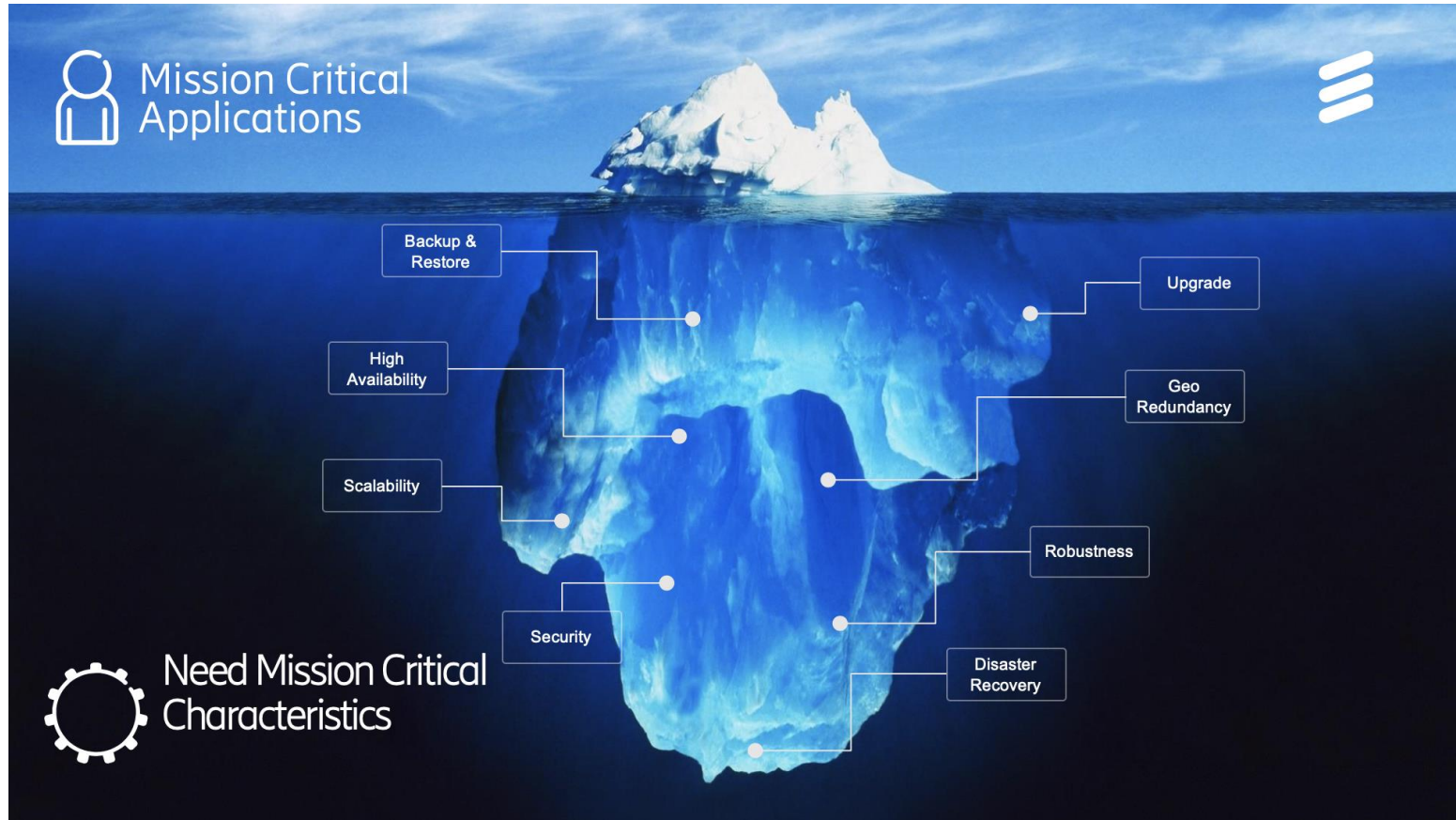


- Service Orchestration identifies end-to-end physical and virtual resource requirements to achieve closed loop
- Orchestration of Slice instances to fulfil diverse and granular requirements such as policy control, security, mobility, charging, latency, reliability, etc.
- NFV Orchestration initiates and manages the virtual elements
- WAN Orchestration manages and controls the transport infrastructure

A collaborative relationship for an E2E network



In Ericsson 'Productification' generally means:

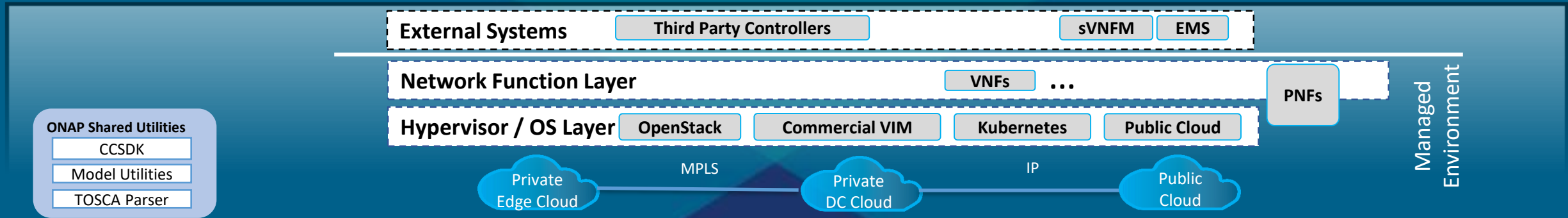
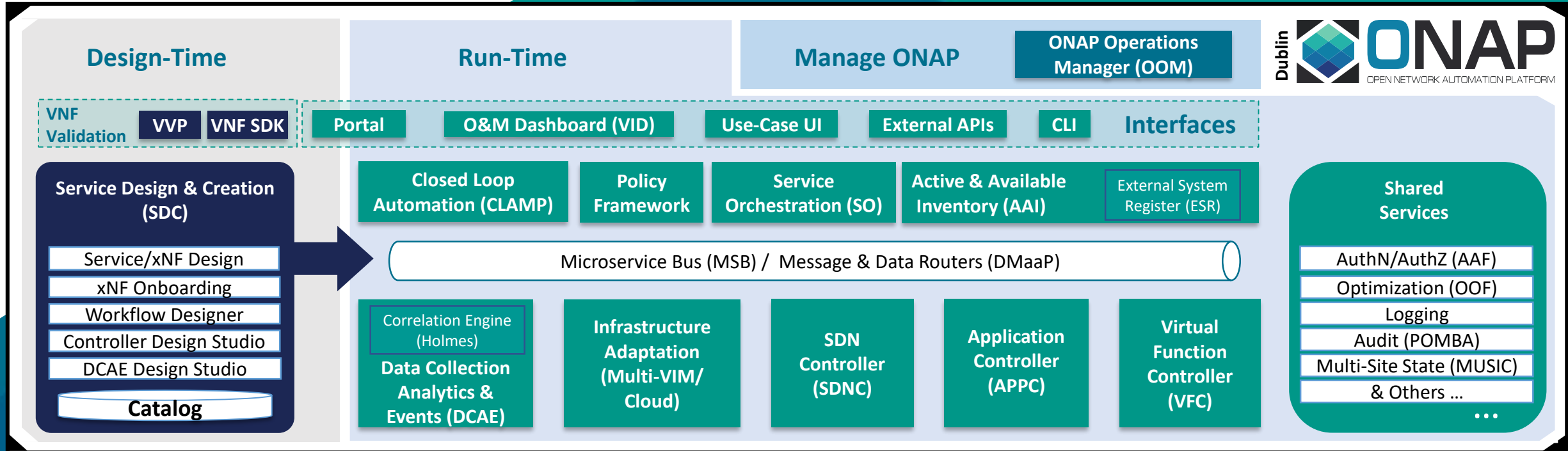


...at volume.

...but open source is becoming more and more relevant

OSS / BSS / Other

Legend **Design** **Orchestration & Management** **Operations**



ONAP Overview – Three Aspects



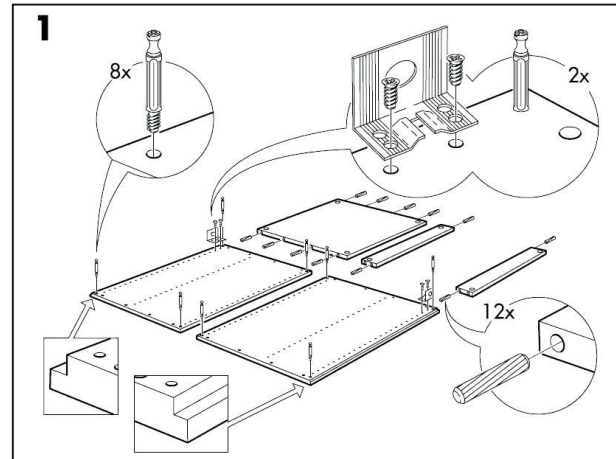
Functional Architecture



- Overall Automation Platform architecture
- Expectations of functional and non-functional scope.

Can be viewed as requirements

Component and Interface Definitions



- Defines the components in terms of interfaces and capabilities (capabilities often expressed in code).
- Component implementation may or may not use the opensource technology

Technology Source/Realization



- Open source technology to use:
1. directly - community version
 2. from a distributor - in the future

... but there is need for more



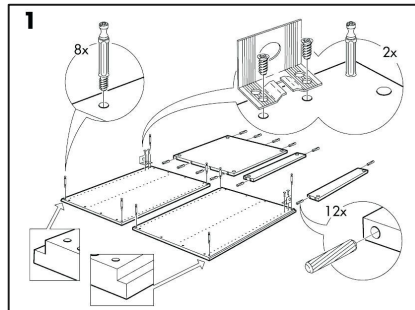
The Secret Sauce



Functional
Architecture



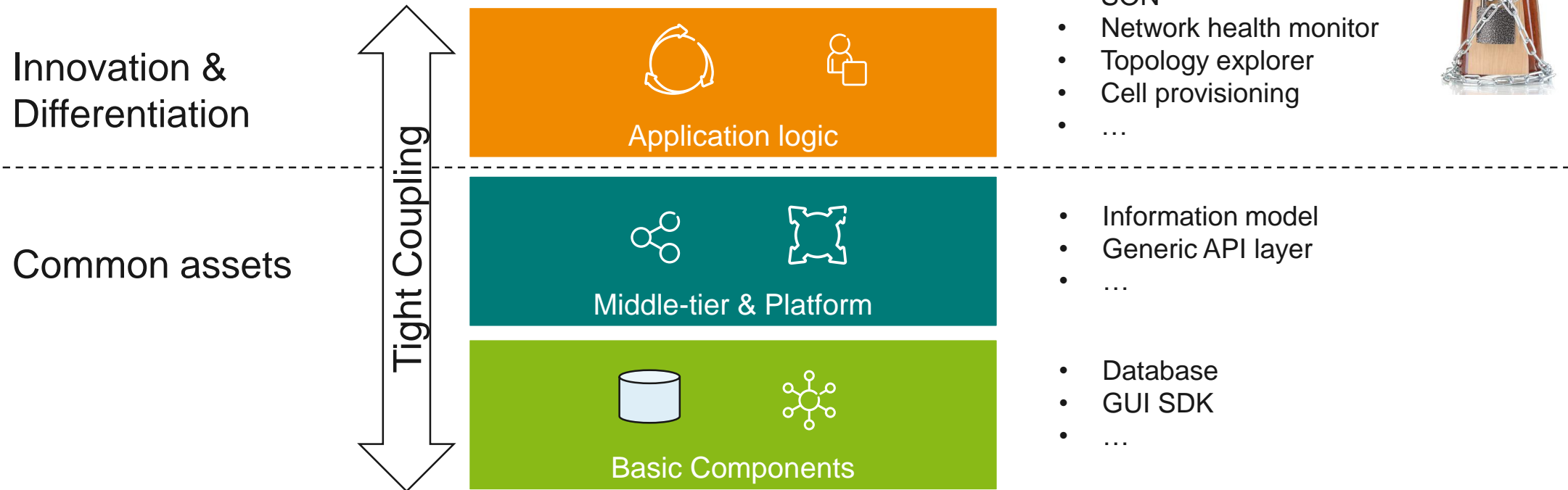
Component and
Interface Definitions



Technology
Source/Realization



Who does what ?



typically sourced from 3PP, open source (e.g. Cassandra, Camunda)

The happy path: ONAP Policy re-architecture example

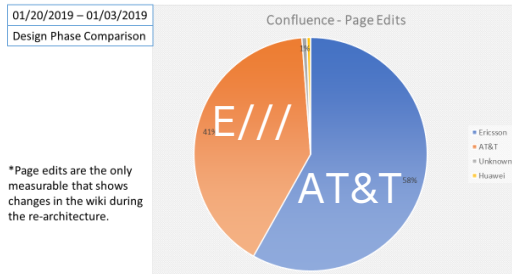


“Standardise”

Implement

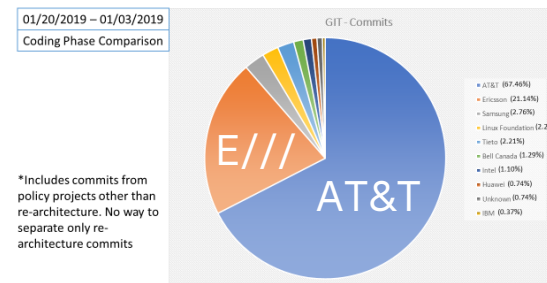
Consume

Policy Re-Architecture Confluence Comparison



— Influence and standardize the architecture

Policy Re-Architecture GIT Comparison



— Share implementation cost



AT&T

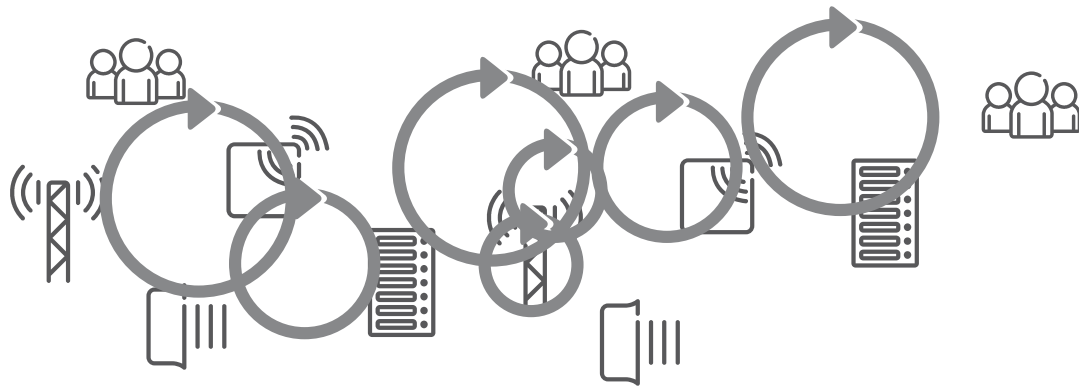


ERICSSON

— Aligned approach leads to channel for delivery
— Still fit for generic product

Zero Touch Decision Loops

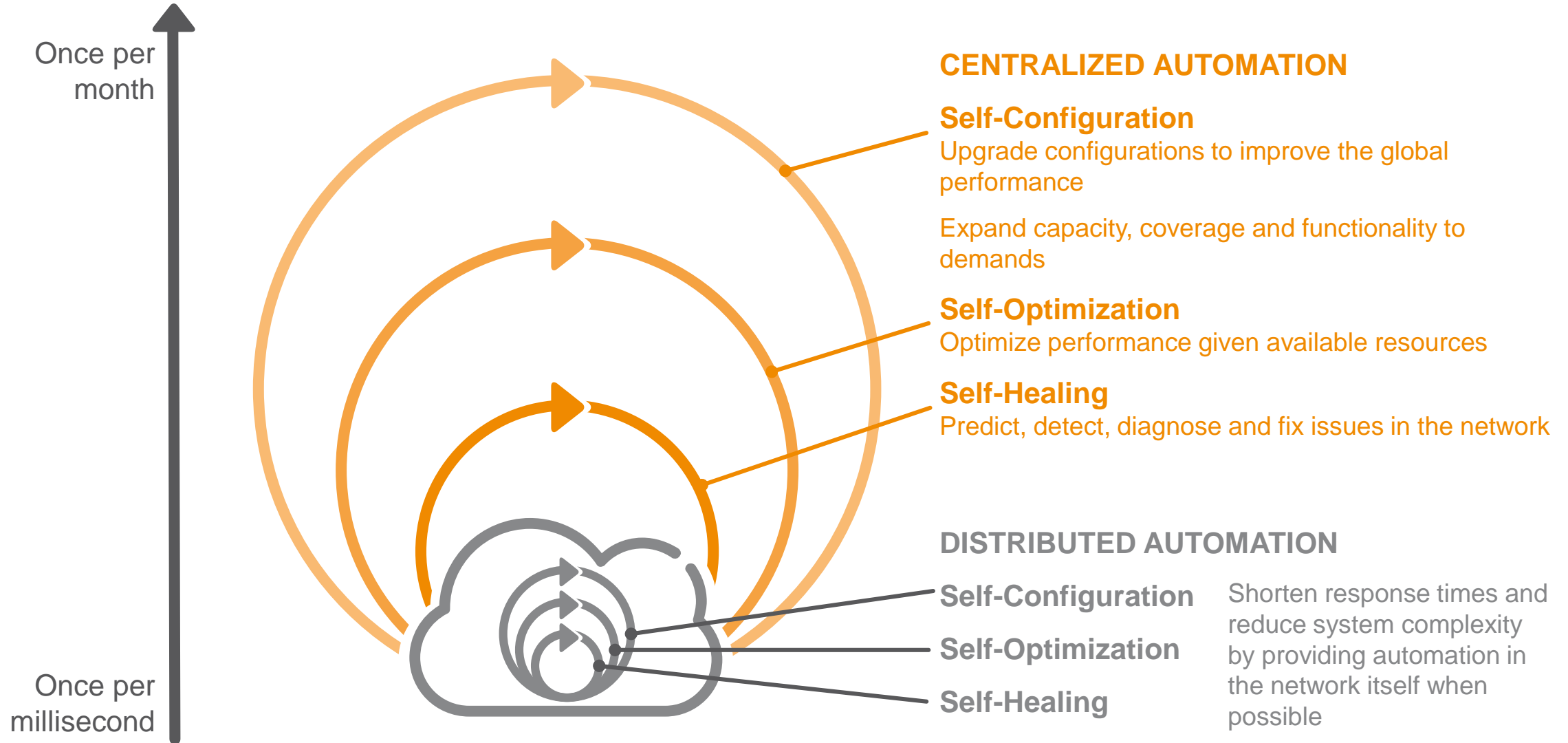
Fundamental principles to remain stability and to reduce complexity



- › Global parameter settings
- › Separation in time
- › Separation of concern and control
- › Distributed automation

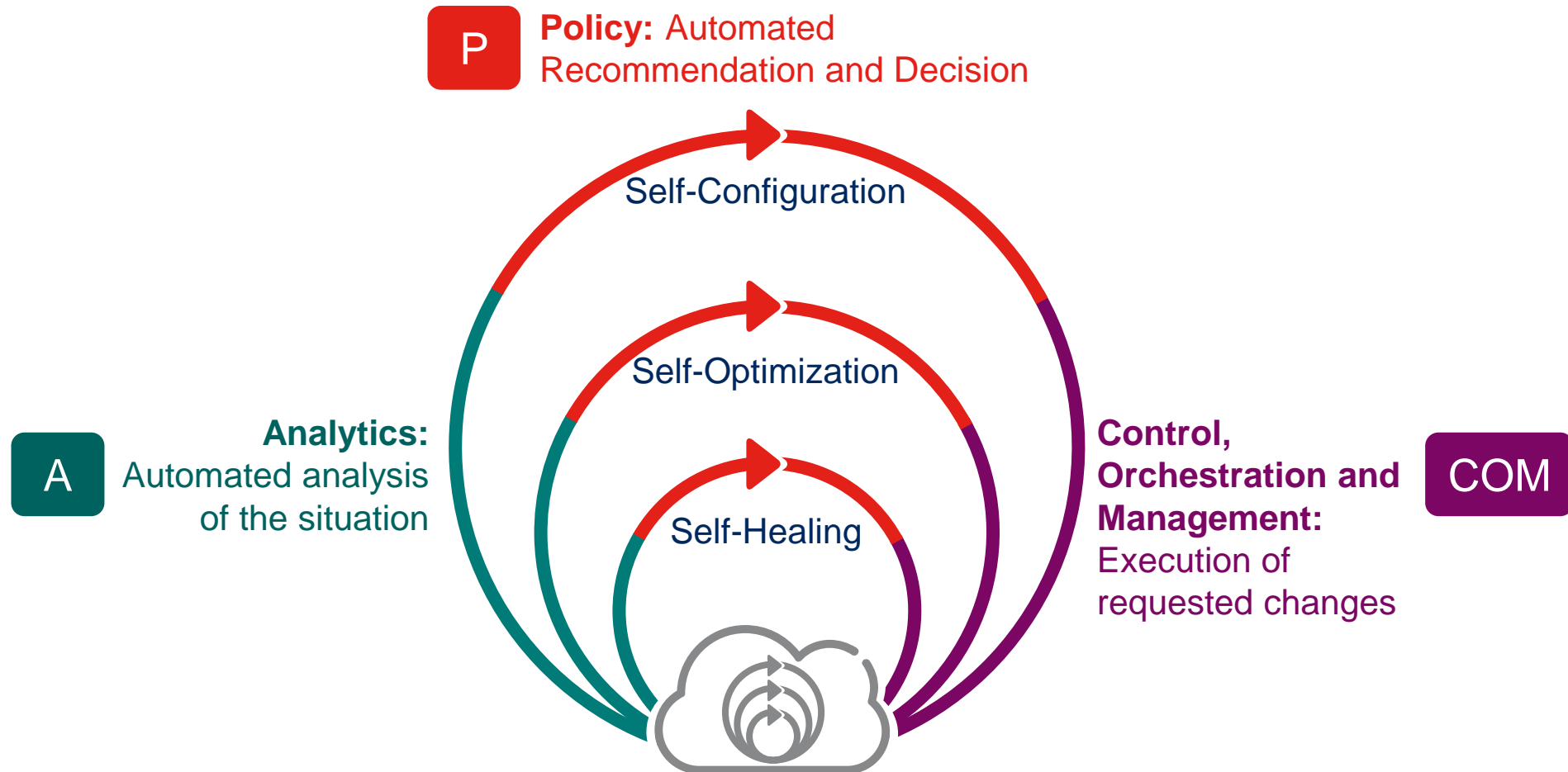
Zero Touch Decision Loops

The self-organizing network



Based on Analytics and Policy

All phases of the decision loops are supported by automation



Closed Loop

3GPP SA5

3GPP TSG-SA5 Meeting #126
Bruges, Belgium 19-23 August 2019

S5-195530
Revision of S5-19xxxx

Source: Ericsson, Deutsche Telekom AG, Cisco
Title: New WID on Closed loop SLS Assurance
Document for: Approval
Agenda Item: 6.2

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](#), article 39 and the TSG Working Methods in [3GPP TR 21.900](#)

Title: Closed loop SLS Assurance

Closed loop assurance helps an operator to continuously deliver the expected level of communication service quality, by automatically reconfiguring the mobile network resources when a performance degradation impacts the communication service SLS (Service Level Specification).

Management data analytics is an enabler of closed loop assurance of communication service.

ETSI ZSM

ETSI GS ZSM-009-1 V0.0.1 (2019-07)



**Zero-Touch Network and Service Management (ZSM);
Closed-loop automation;
Enablers**

- Closed loop as an entity
- Interactions between different closed loops
 - Interactions between peer closed loops
 - Interactions between hierarchical closed loops
- Interactions between closed loops and external entities
 - Interactions based on policies
 - Interactions based on intents
- Closed loops interfaces
- Lifecycle management of closed loops

Cloosed Loop

ONAP

[Dashboard](#) / ... / [Control Loop Subcommittee](#)

Control Loop Sub Committee Frankfurt Release Planning

Skapad av Pamela Dragosh, senast ändrad den aug 14, 2019

Each of these line items should be considered as a Functional Requirements line item in the Use Case Subcommittee

[Dashboard](#) / ... / [Control Loop Sub Committee Frankfurt Release Planning](#)

PNF support in Control Loops

Skapad av Liam Fallon, senast ändrad den aug 16, 2019

Overview

Currently, control loops are VNF oriented, more specifically on VNF orchestration use cases. Here, we are examining how the control loop concept and implementation might be expanded so that it could be used to support PNF use cases.

[Dashboard](#) / ... / [Control Loop Sub Committee Frankfurt Release Planning](#)

Metadata Driven Control Loops

Skapad av Liam Fallon, senast ändrad den jun 12, 2019

Overview

Currently, control loops are triggered by DCAE (Analytics) microservices, trigger a policy, which in turn triggers an action on a controller (actor). The trigger could be any component, not necessarily be a DCAE microservice.



15th International Conference on Network and Service Management

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Embracing the New Wave of AI



Autonomic Closed Control Loops for Management, an idea whose time has come?

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You can't automate it all.. Or can you?

