

ETSI ZSM – ONAP Architecture Collaboration

Magnus Buhrgard

Henry Yu

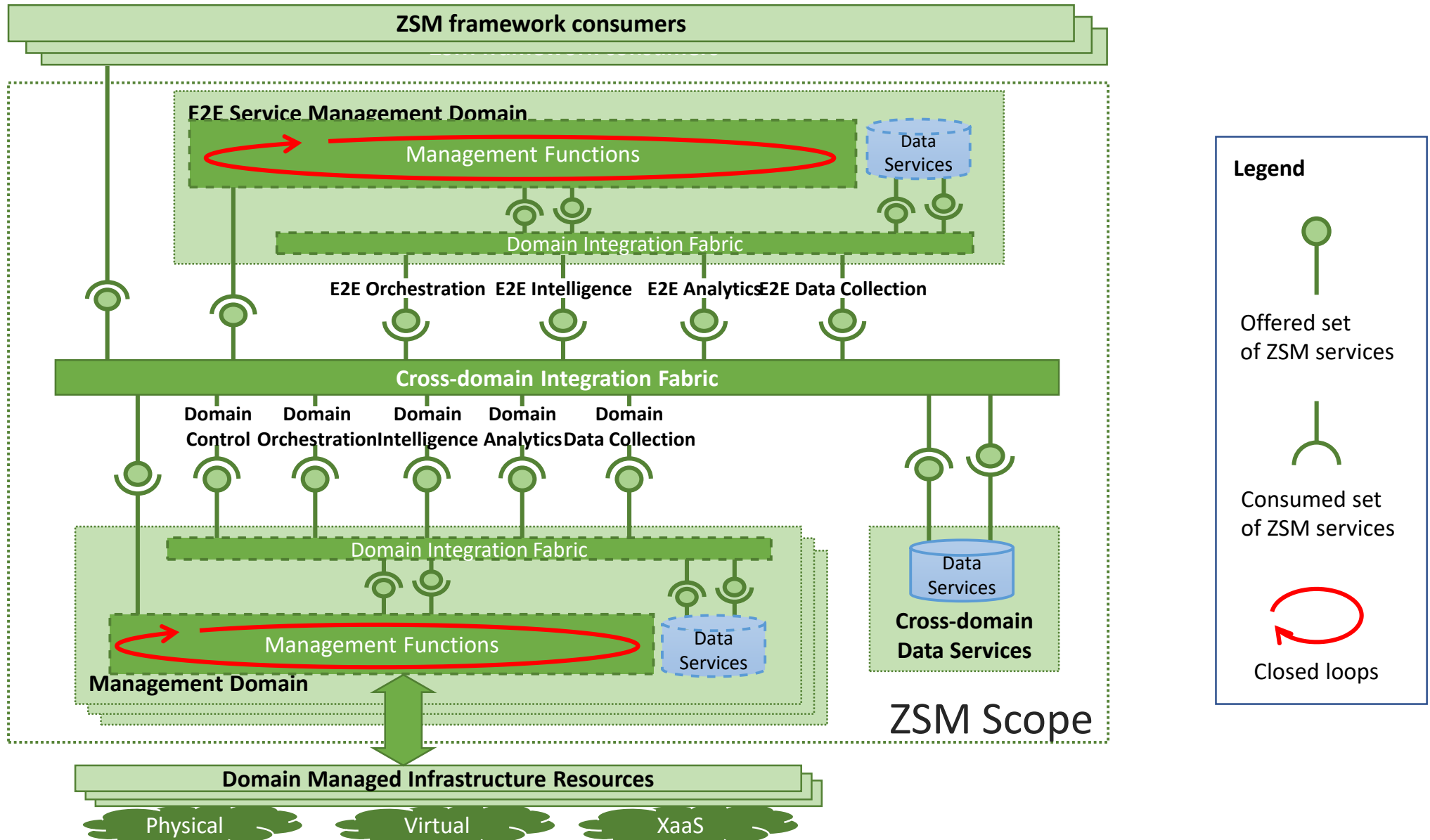
Pedro Henrique Gomes

- Using the ETSI ZSM architecture for ONAP – *Magnus Buhrgard*
- Applying ZSM Framework to Transport Slicing Solution on ONAP - A Case Study – *Henry Yu*
- ETSI ZSM009-1, Closed loop automation – Enablers – *Pedro Henrique Gomes*
- Open discussion on collaboration opportunities – *All*

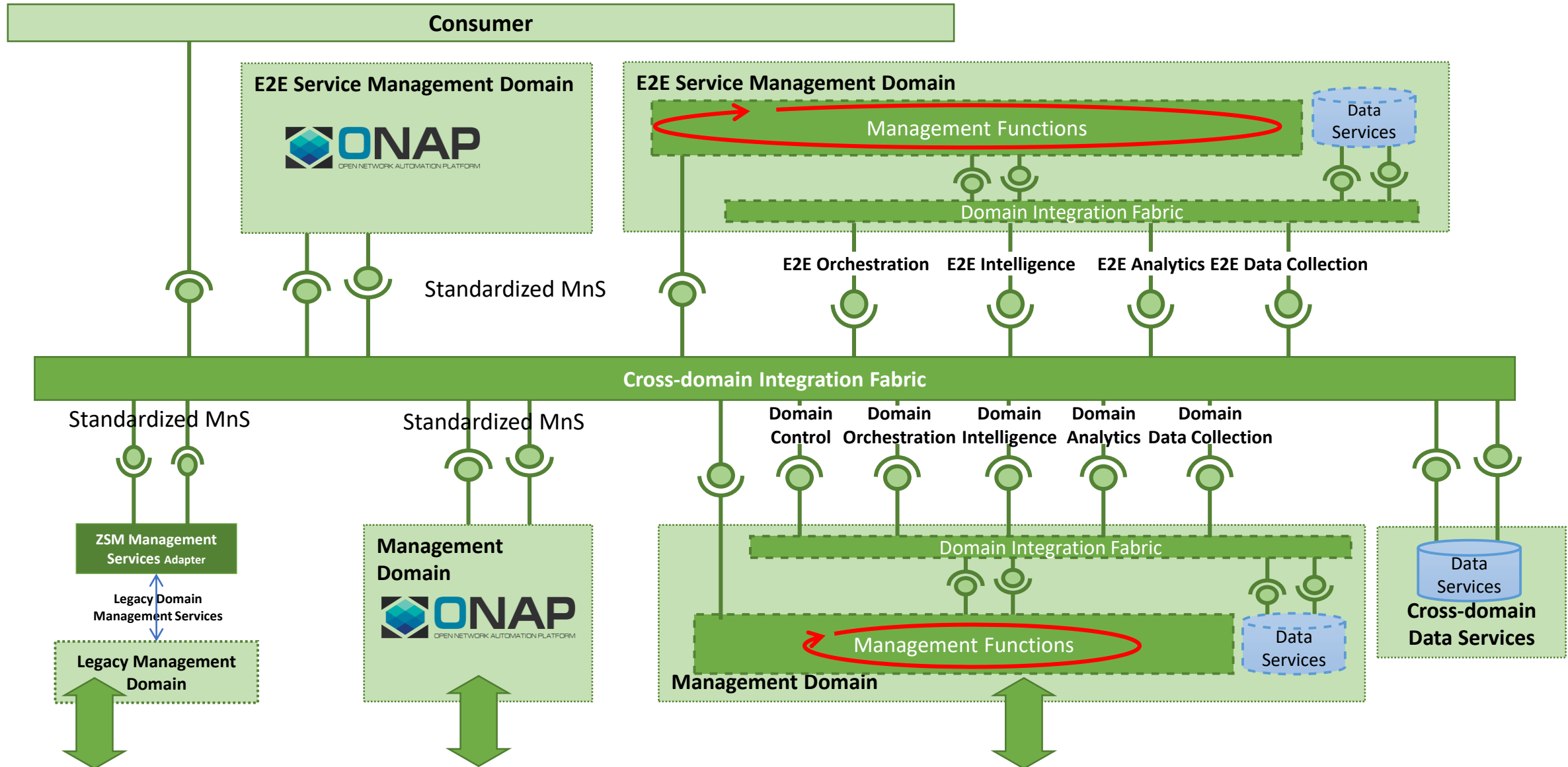
Using the ETSI ZSM architecture for ONAP

Magnus Buhrgard, Ericsson

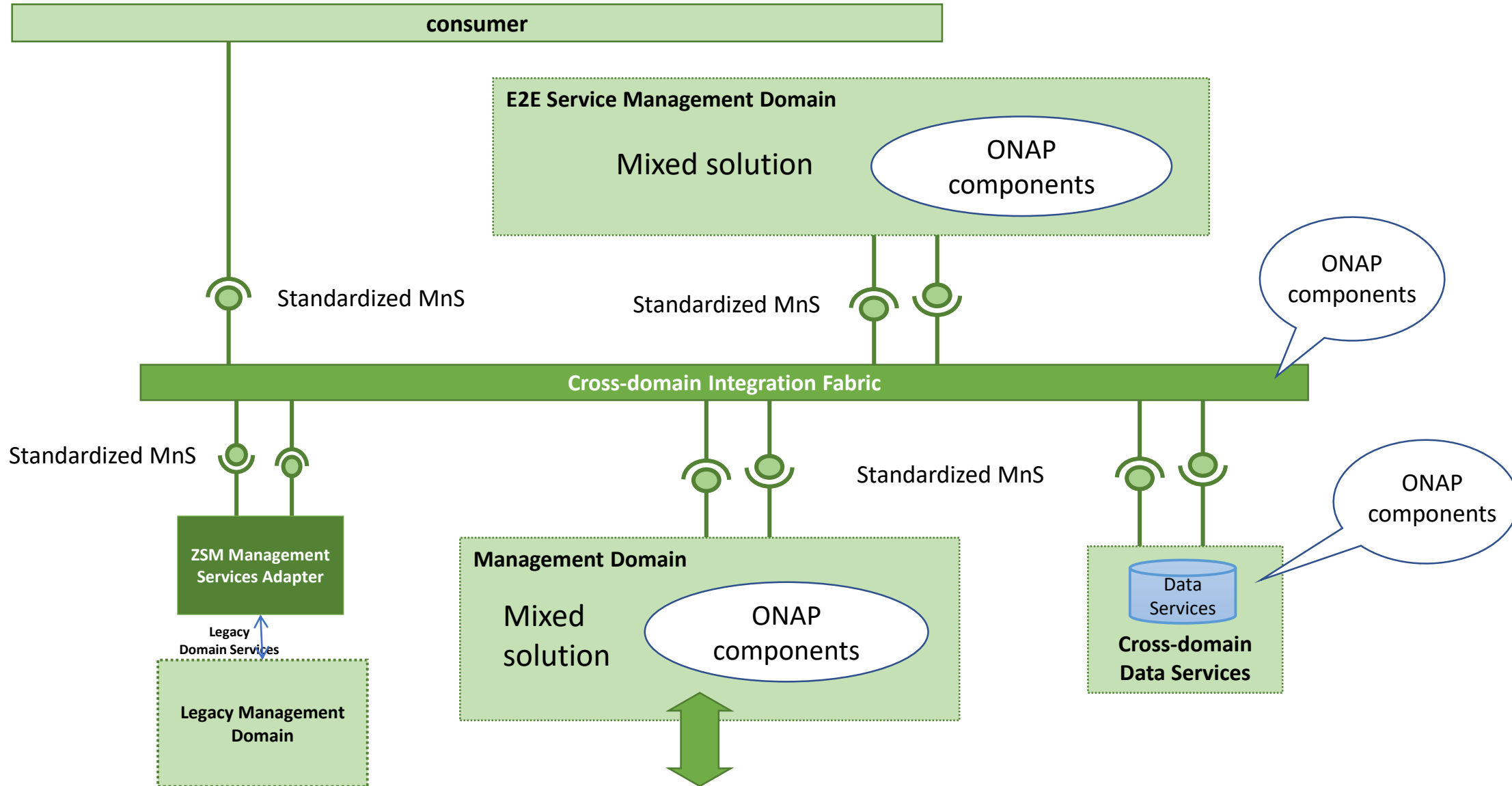
ETSI ZSM Architecture



ONAP Implementation options



ONAP Implementation options



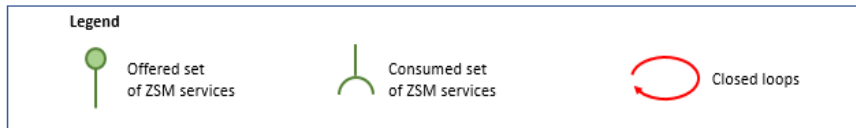
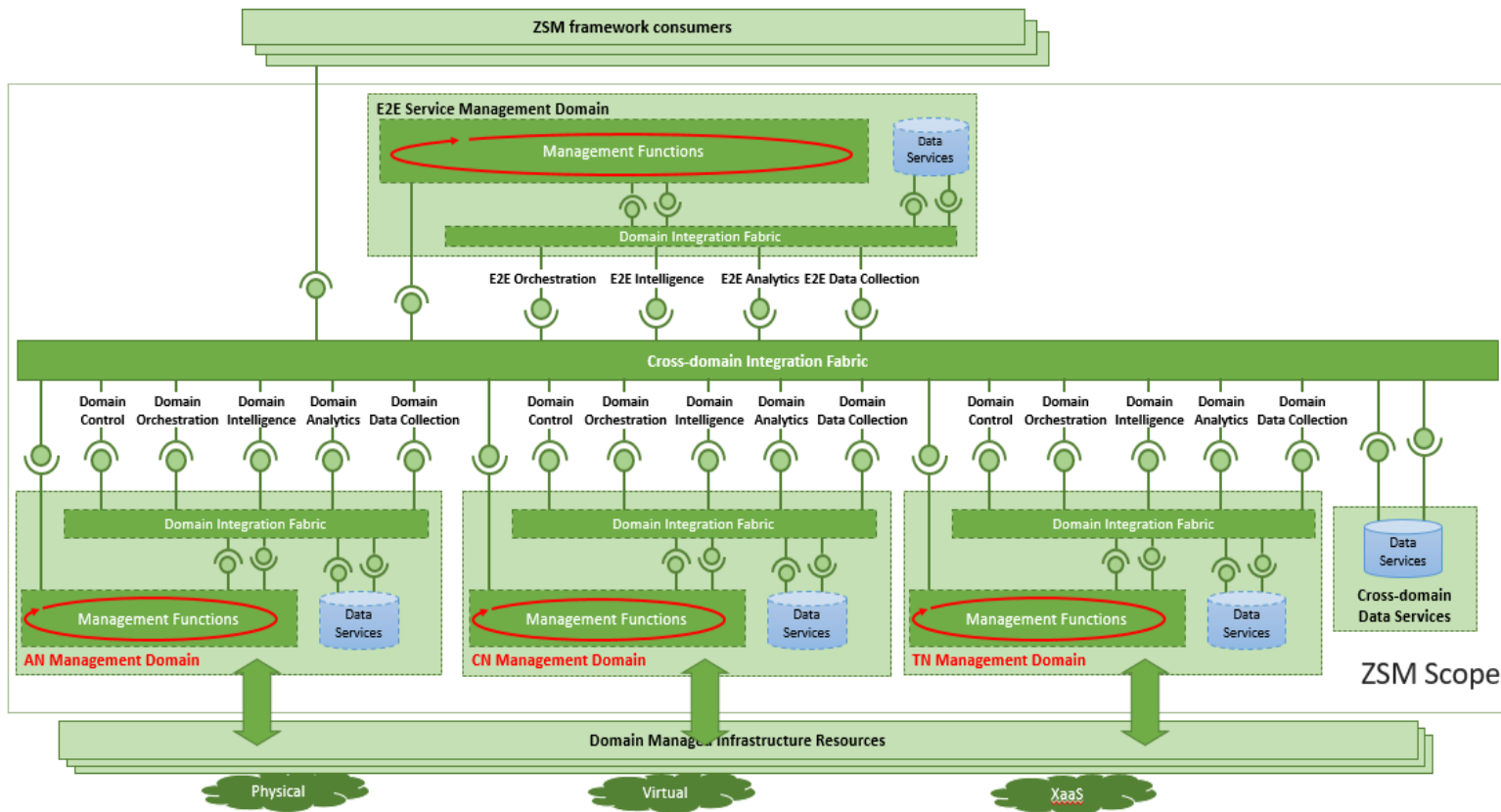
Applying ZSM Framework to Transport Slicing Solution on ONAP – A Case Study

Henry Yu (Huawei)

- Background of Transport Slicing project on ONAP
- ZSM 003: Architectural framework for E2E Network Slicing
- ZSM 002: Design principles adopted by Transport Slicing
- ZSM collaboration and alignment with other SDOs
- Implementation of Transport Slicing on ONAP
- Future roadmap and further collaboration with ZSM

- Transport Slicing started in Guilin release. Its objective is to provide transport services (i.e., TN NSSMF) which can be consumed by the E2E Network Slicing use case.
- Some design requirements are (not a full list):
 - **Modular design:** avoid monolithic systems; keep well-defined interfaces; self-contained and independently deployable solution.
 - **Standards-based solution:** Interfaces/solutions are based on open standards
 - **Flexible:** can satisfy different requirements; prefer federated solution
- Our implementation adopts the ZSM framework, for it satisfies our design requirements and also aligns with our future roadmap.

ZSM 003: Architectural Framework for E2E Network Slicing



- ZSM 003 provides a specification of E2E Network Slicing management solutions and related management interfaces
- Furthermore, it provides an architecture that identifies the components and specifies their functionalities and interfaces.
- It follows, therefore, that the solution to Transport Slicing (i.e., TN MD) is illustrated in the context of E2E network slicing.
- Thus, it is ideal to use ZSM 003 as the architectural framework for Transport Slicing.

ZSM architecture deployment example for network slicing management (source: ZSM 003)

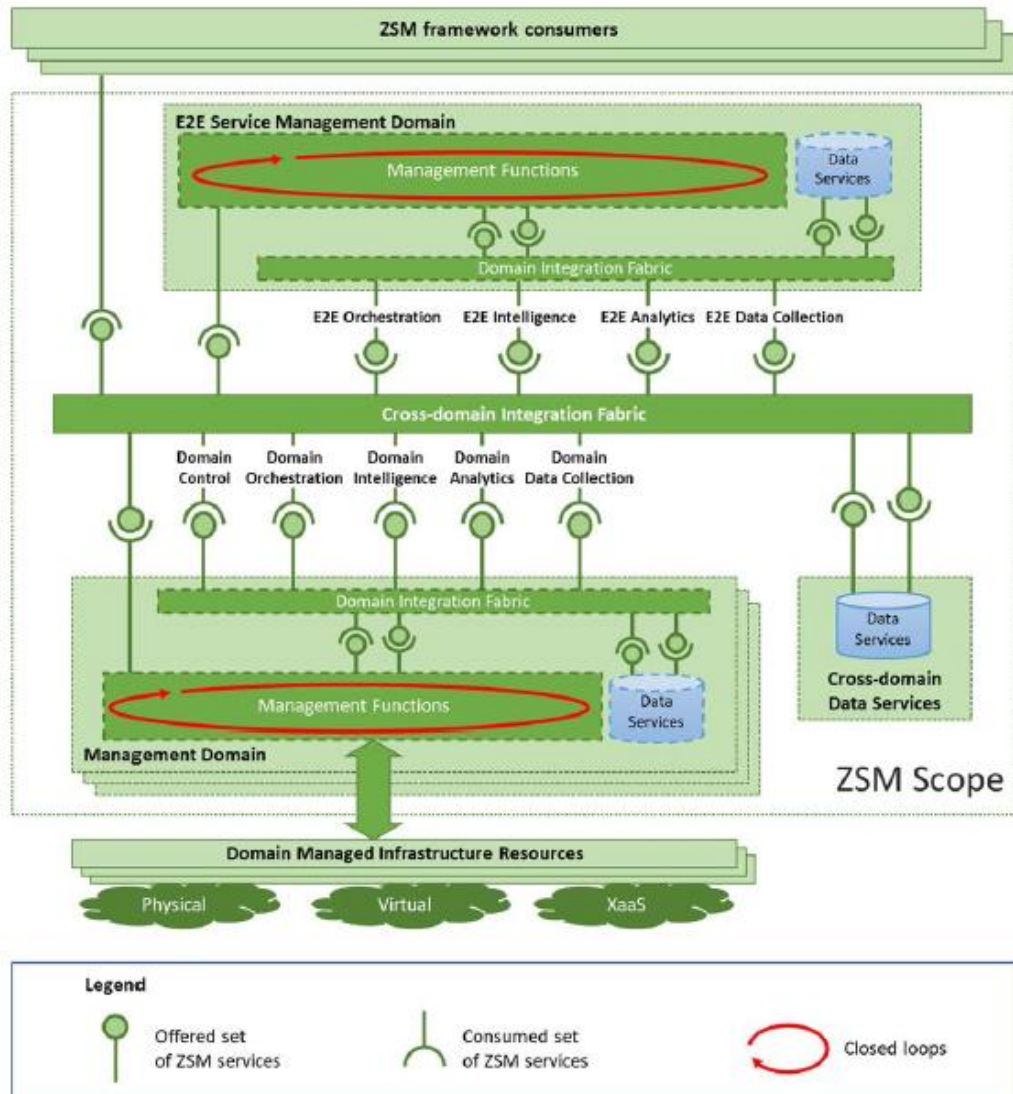
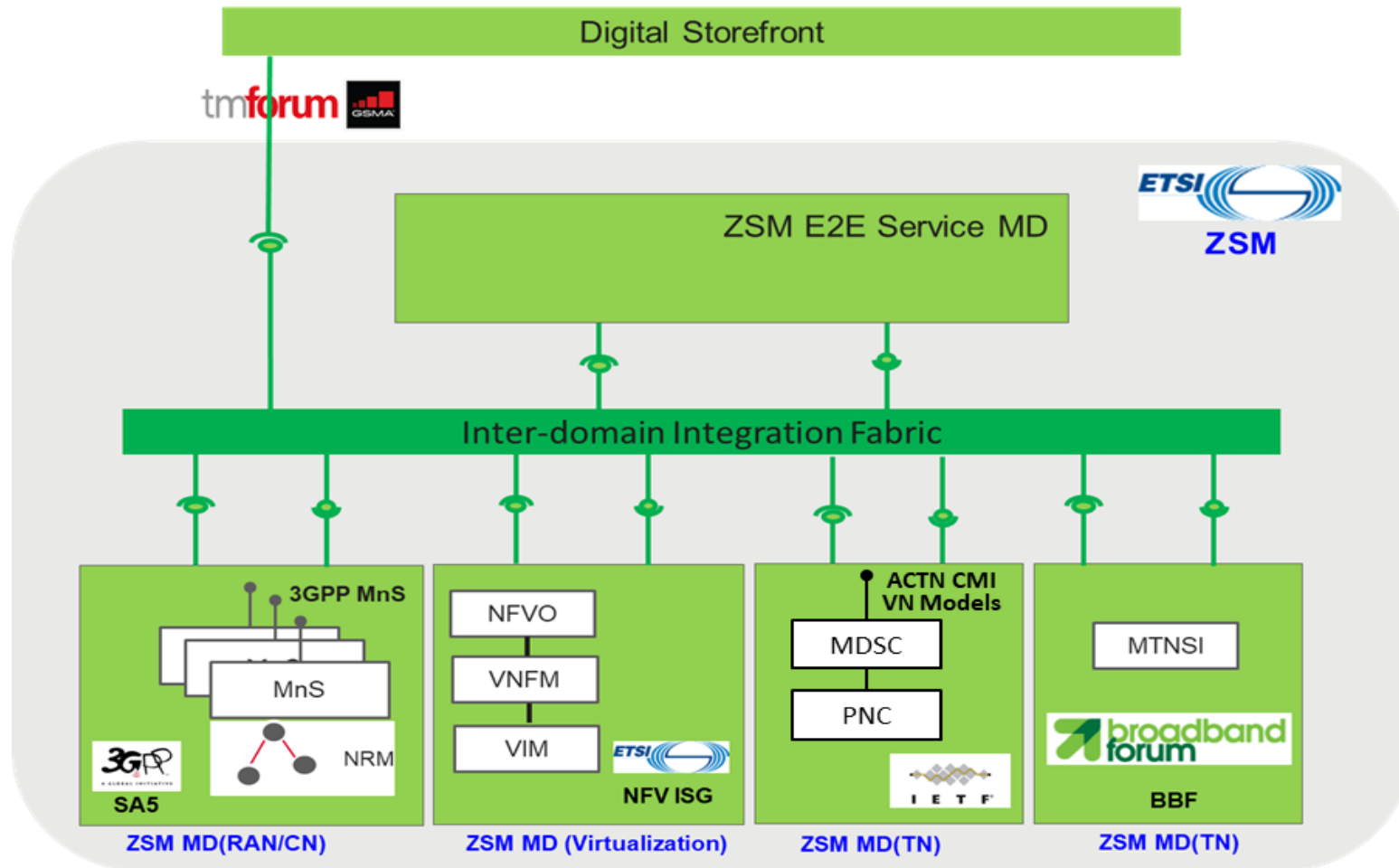


Figure 6.2-1: ZSM framework reference architecture

While ZSM 003 provides a specification for Transport Slicing functionality, as well as its interfaces, ZSM 002 provides the design principles on how to design such a solution (e.g., a management domain). Some of those principles are:

- **Model-driven, open interfaces.** models are independent from the implementation.
- **Separation of concerns.** Decoupling of management domains and E2E Service Management domain. Avoid monolithic systems.
- **Intent-based interfaces.** Declarative interface. Hide complexity, technology, vendor-specific details away from user.
- **Designed for automation.** Zero-touch network.
- **Closed-loop management automation.**

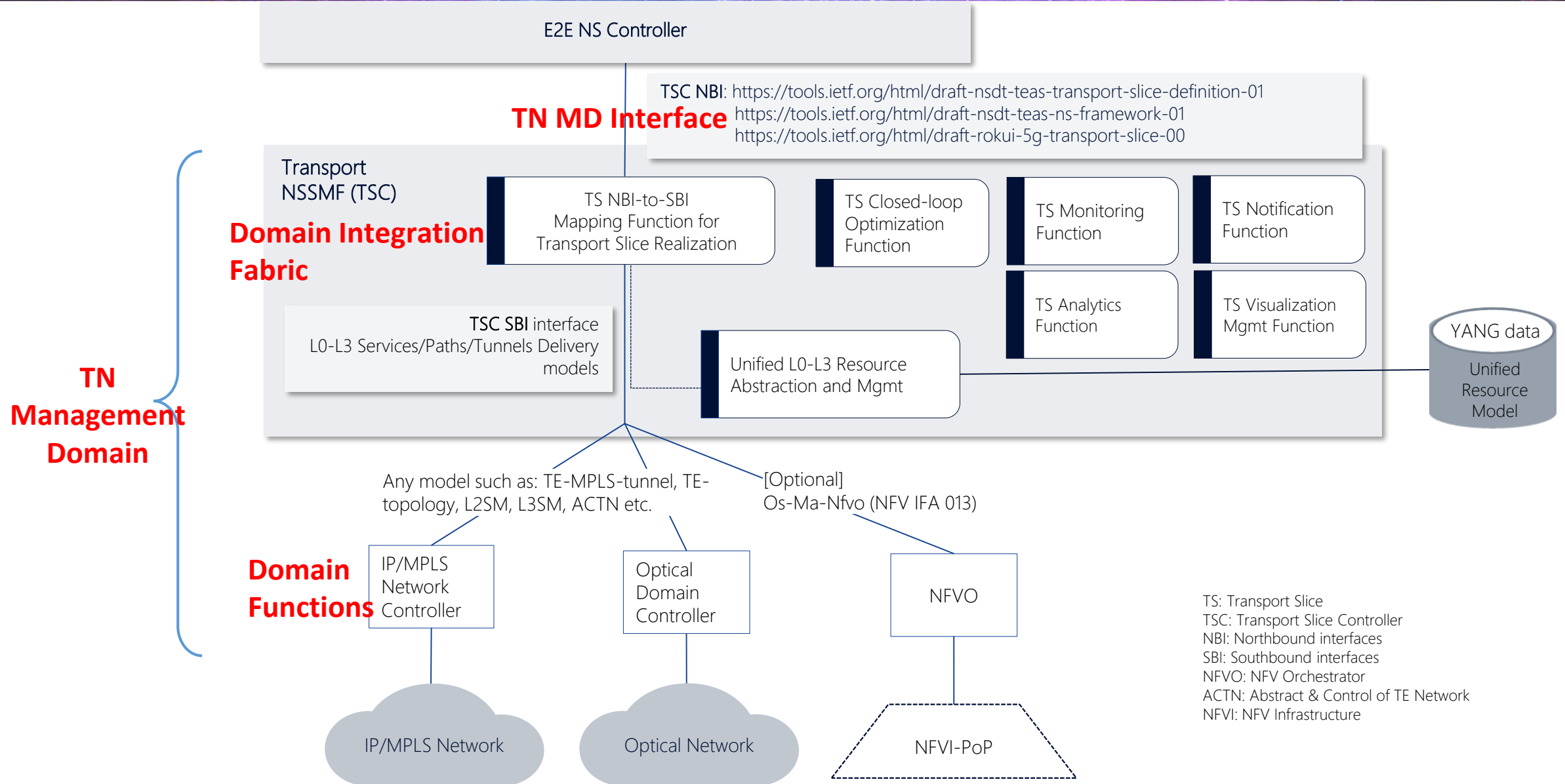
ZSM collaboration and alignment with other SDOs



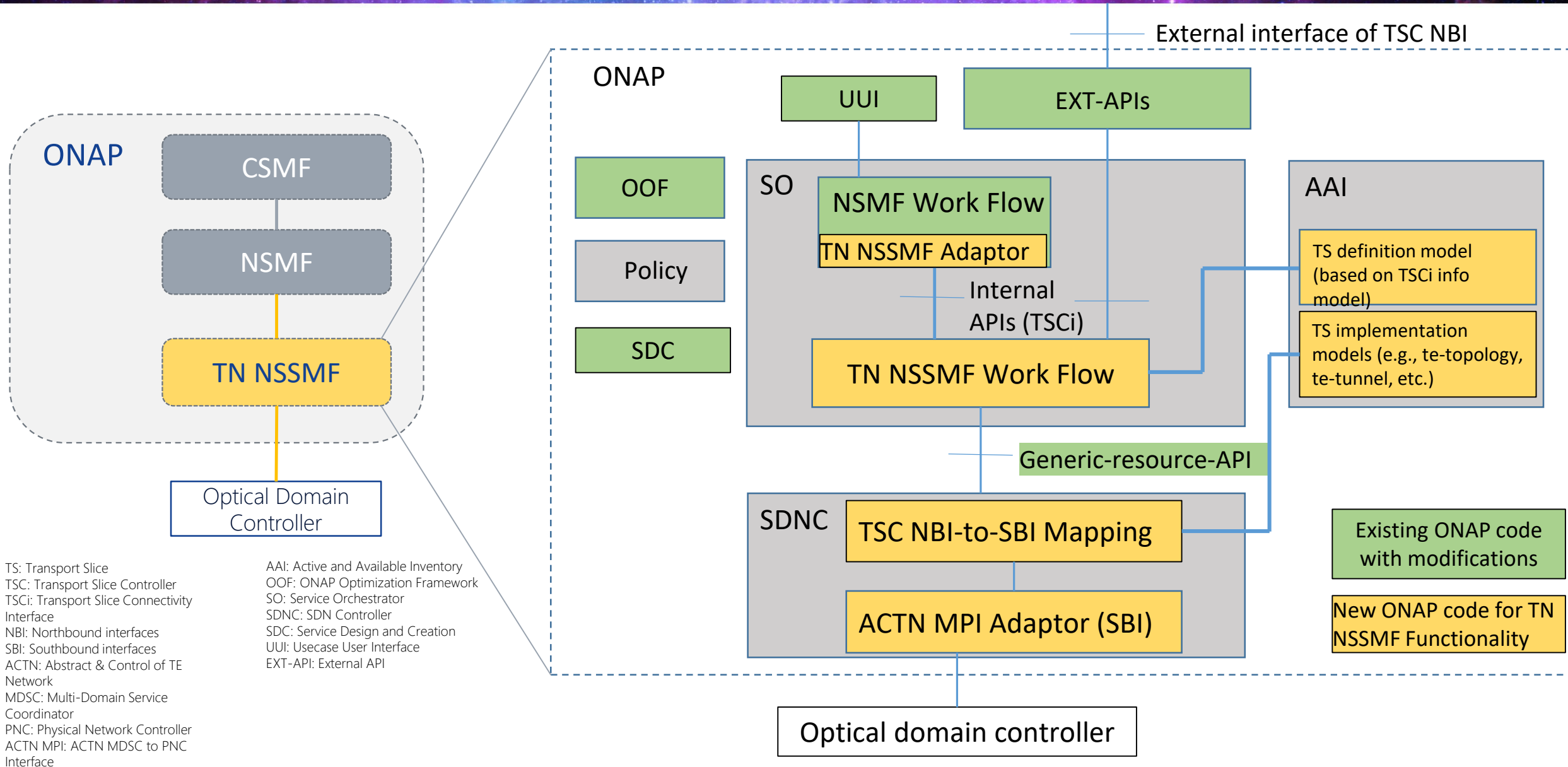
- ZSM stitches related work from different SDOs (e.g., TMF, 3GPP, IETF, BBF, etc.) and provides a federated solution.
- In other words, ZSM is a platform which integrates different standards and produces a unified and implementable solution, from which the ONAP network slicing use case may benefit.

Illustration of the relation between the scopes of ZSM and other groups (source: ZSM 003)

Adopting ZSM Framework on Transport Slicing

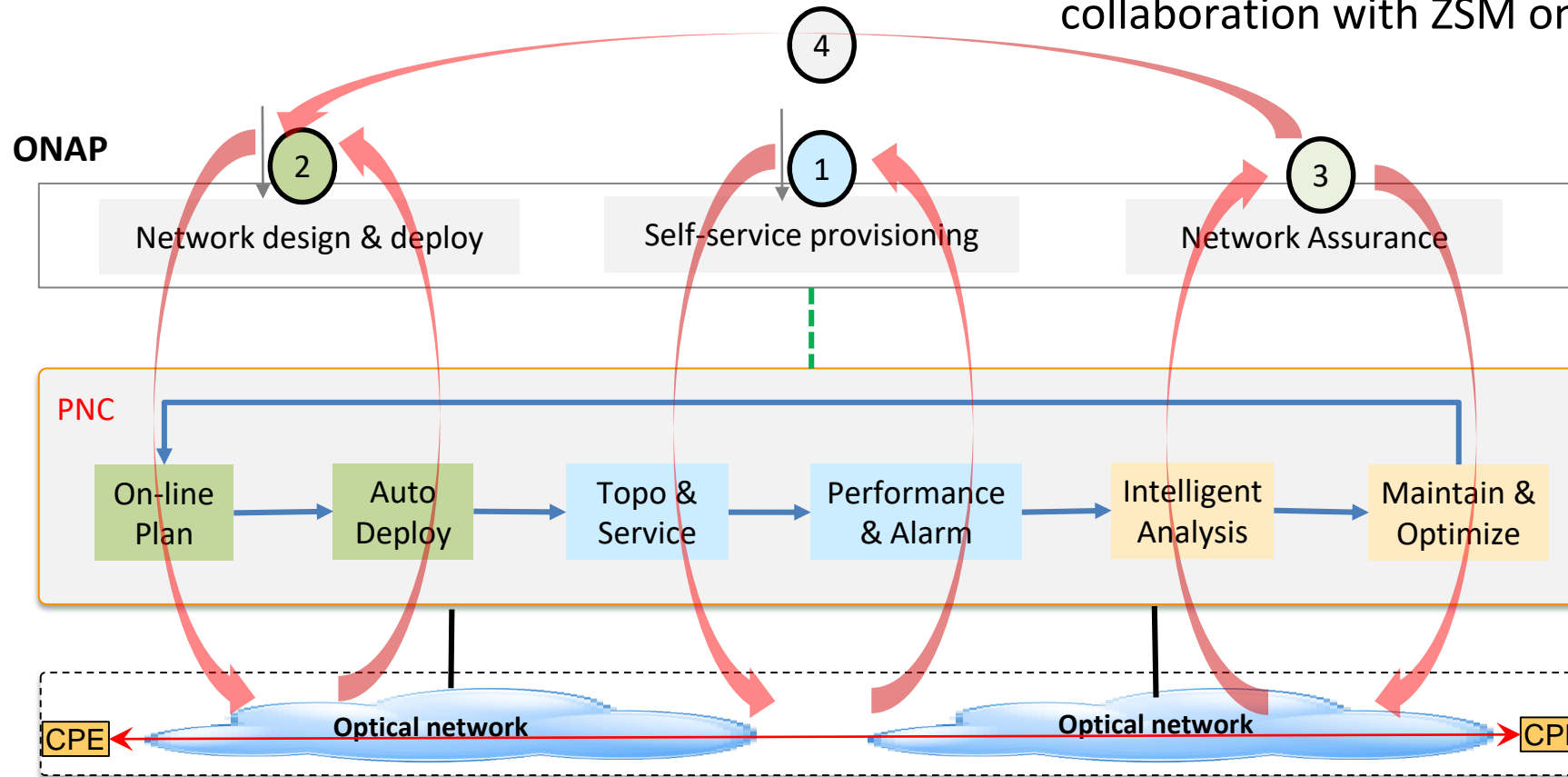


Implementation of Transport Slicing on ONAP



Future roadmap: Transport Slicing with Closed-loop Automation

Looking beyond Guilin release, we are looking for further collaboration with ZSM on closed-loop automation.



Four Types of Closed-loop Automation

- ① Service provisioning and activation:
 - Days → Minutes
- ② Network planning and deployment:
 - Weeks → Days
- ③ Network troubleshooting and restoration:
 - Hours → Minutes
- ④ Traffic prediction based auto network planning:
 - Months → weeks

● 2021: New CPE online and deployment (and auto service activation)

- 2018: L2 service
- 2019: L1 service
- 2020: Transport Slicing

● 2022+: Network performance prediction based service disruption prevention



The Standards People



ETSI ZSM009-1

Closed loop automation - Enablers

Presented by:

- **Pedro Henrique Gomes** Ericsson | ETSI
ZSM rapporteur

For:

OLFN NETWORKING
Virtual Technical Meetings

- Oct 15th 2020

Motivation

- ❖ Further specify how Closed Loop Automation can be realized within the ZSM framework
- ❖ Identify gaps and improve the ZSM framework
 - ❖ New management services and capabilities
 - ❖ Use case-agnostic enablers
 - ❖ Solutions to documented scenarios
- ❖ Enable the creation and execution of closed loops, as well as the integration and interoperability between closed loops within ZSM framework
- ❖ Influence other SDOs and open source projects



ZSM009 – Closed Loop (CL) Automation

• ZSM009-1 – Enablers

- Enablers for closed loop automation for multiple use cases
- Mainly divided into:
 - CL Governance
 - CL Coordination
- Extension of ZSM framework with new management services and capabilities

ZSM009-2 – Solutions

- Solutions for end-to-end service and network automation
- Based primarily on the scenarios of ZSM001
- (Re)-uses the enablers specified in ZSM009-1

ZSM009-3 – Advanced topics

- Advanced topics, such as cognitive capabilities
- Further details in a following presentation

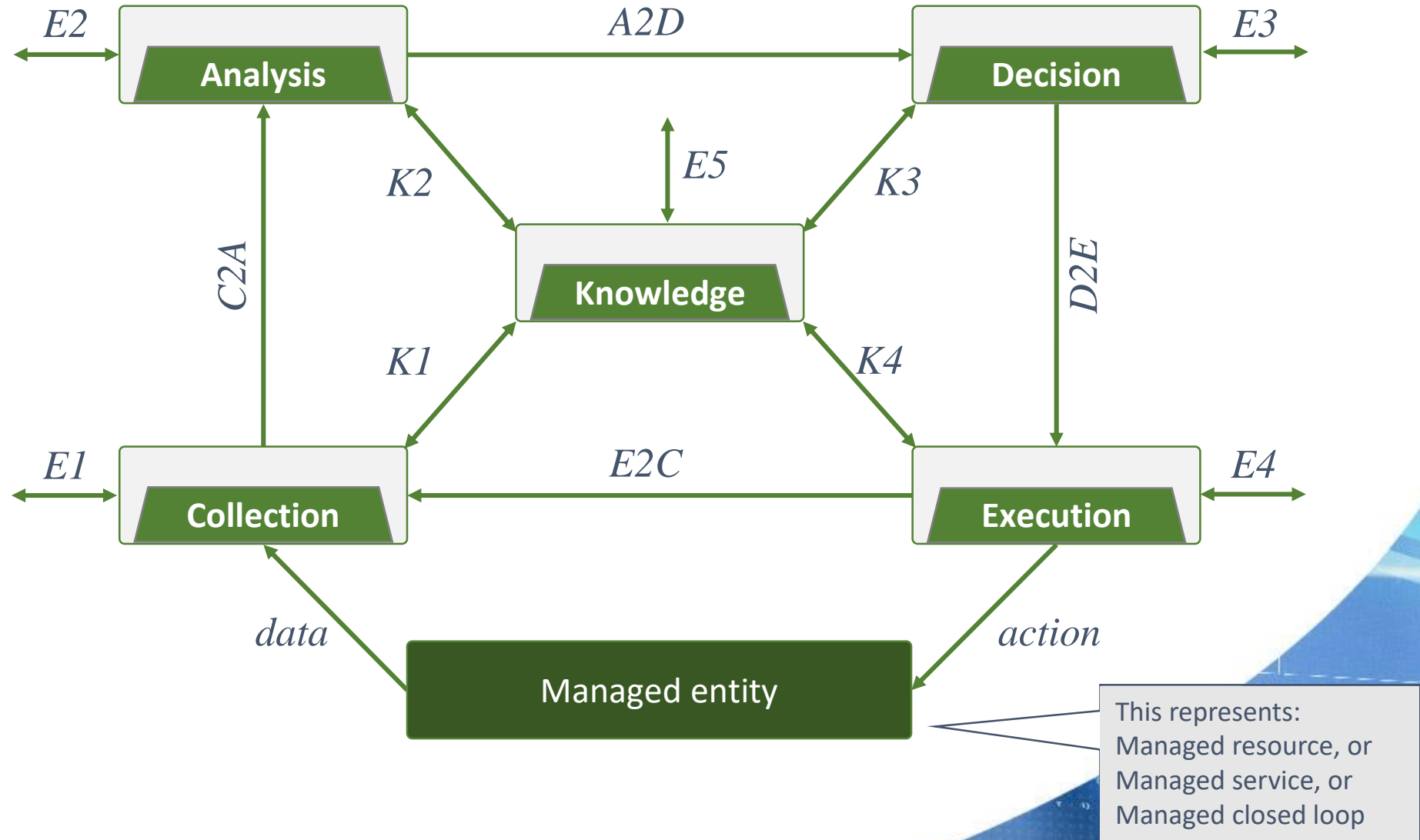
But before that...

- ✓ What is a Closed Loop?
 - ✓ Control mechanism that uses feedback signals to monitor and regulate itself with the objective of achieving a specific goal

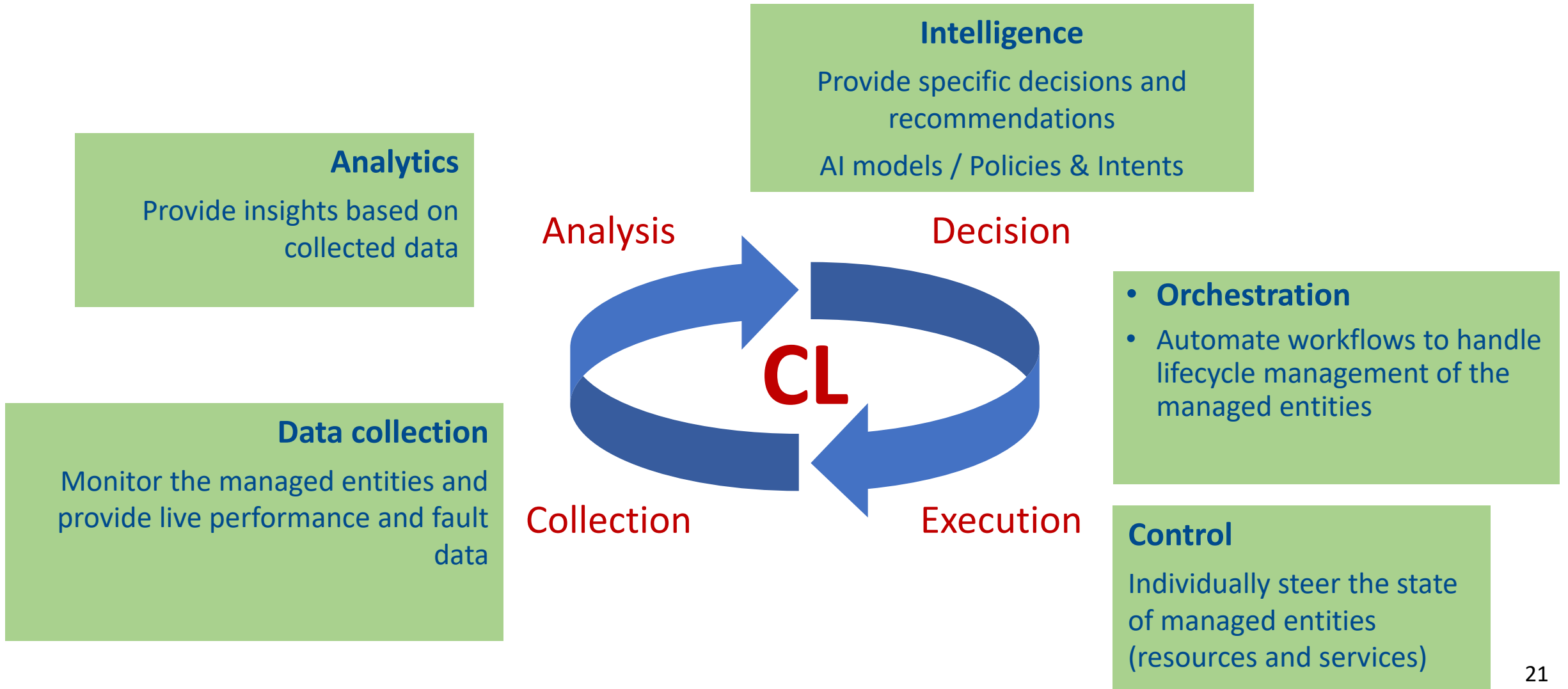
- ✓ What is Closed Loop Automation?
 - ✓ *Combination of automated processes with a closed feedback loop*
 - ✓ In management systems -> process that chains management services (data, analytics, policy, orchestration, etc.)
 - ✓ Autonomous systems that constantly monitor and assess the network and take corrective actions when the goals are not met

Ultimate goal: reduce human intervention, but still allow interactions with operators for goals definition and monitoring performance

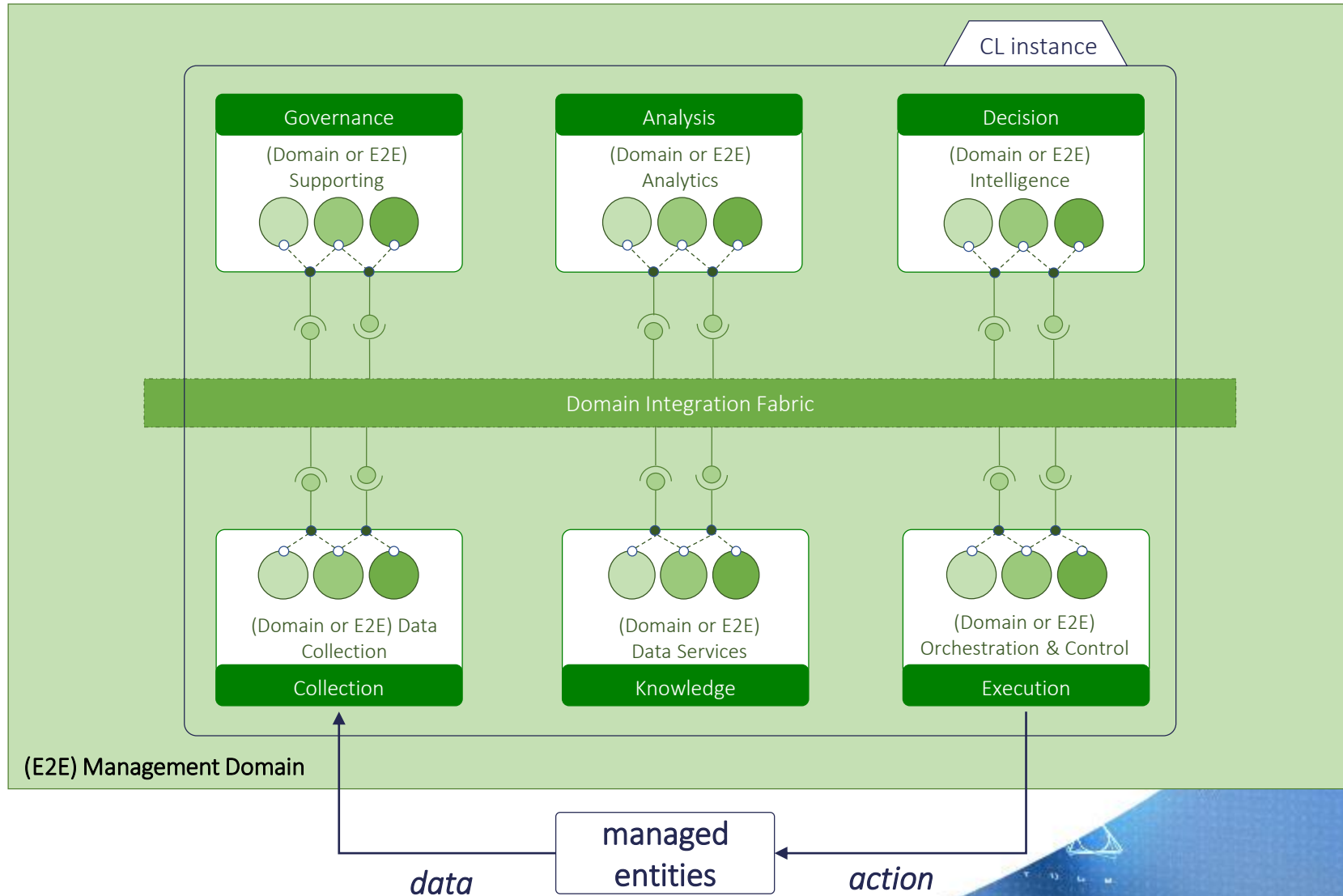
CL in ZSM framework - Functional view



ZSM framework management services grouping



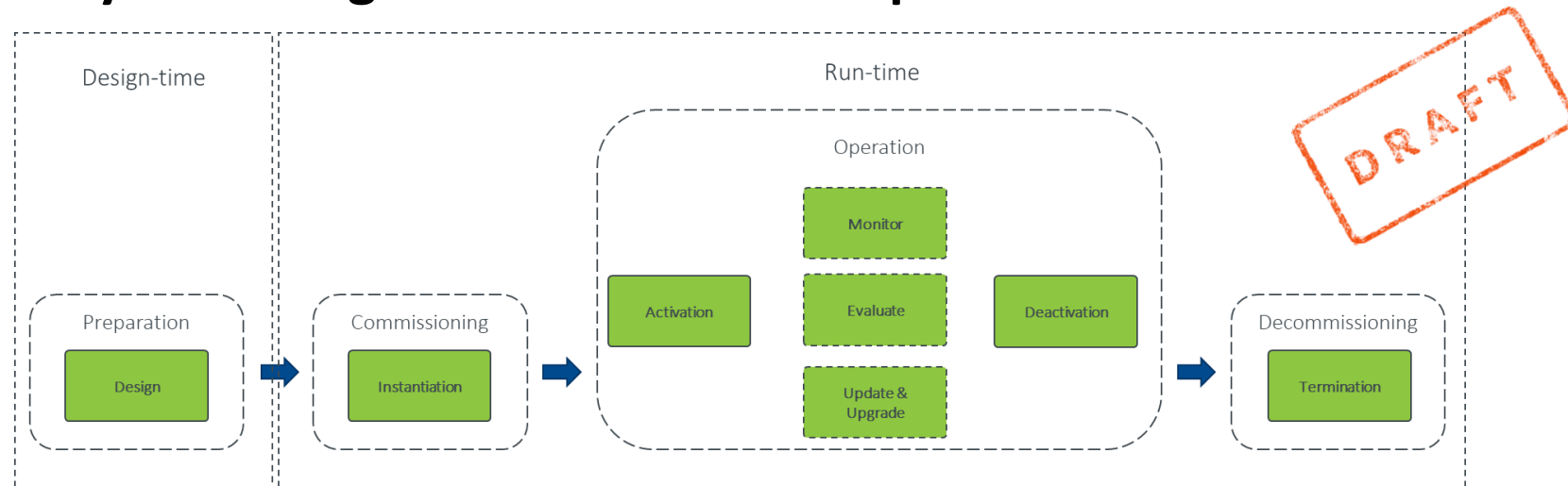
CL in ZSM framework - Deployment view



Closed loop governance

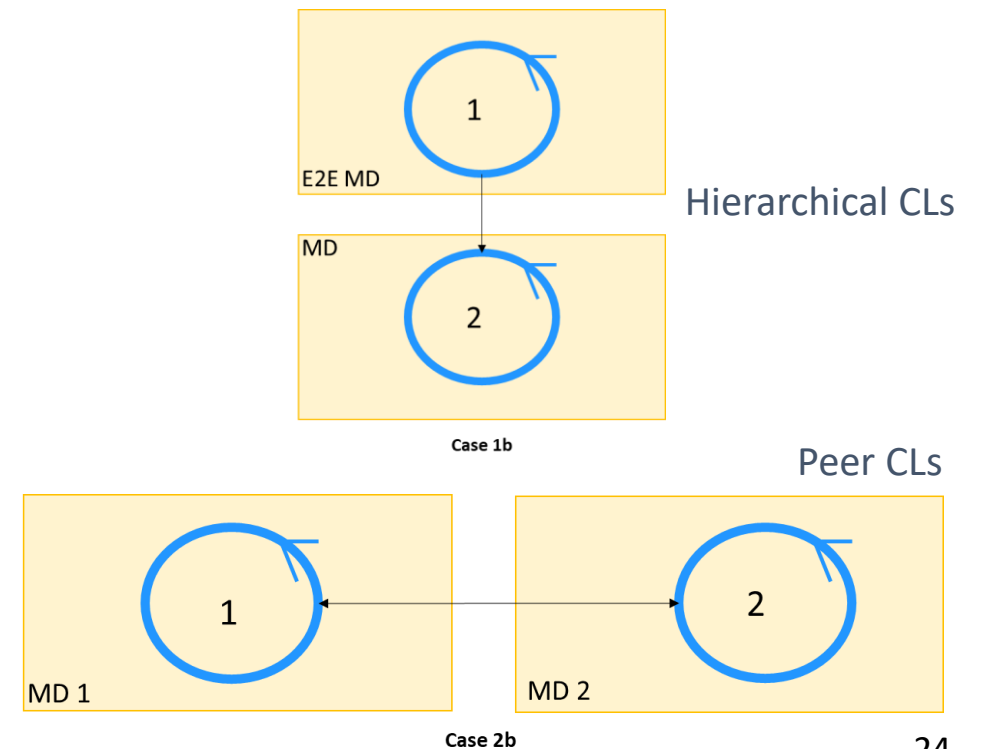
- Set of capabilities for external entities to manage the CL models and the lifecycle of CLs (design-time AND run-time)
- May also be used to retrieve information about the CL, e.g. performance and status

Lifecycle management of Closed Loops – Phases and activities



Closed loop coordination

- ✔ Set of capabilities that allows multiple CLs running within the ZSM framework to be coordinated (run-time)
- ✔ Main objective: improve the performance and the fulfilment of the CL goal(s)
- ✔ Focus on conflict detection and mitigation
- ✔ Pre-action and post-action coordination
- ✔ Delegation and escalation
- ✔ Information sharing between multiple CLs



What next?

- ✓ Expected publication by Q4 2020 (stable draft v0.10.1)
- ✓ Focus on aspects related to Closed Loop coordination
- ✓ Further collaboration with ONAP
 - ✓ Ongoing control loop PoC
 - ✓ ONAP Control Loop in TOSCA PoC and Rel H evolution
 - ✓ <https://wiki.onap.org/display/DW/TOSCA+Defined+Control+Loop+PoC+in+ONAP+Rel+G>



Thank You