



The Standards People



# Automation of Intent-based Cloud Leased Line Service (PoC#3)

Presented by: **Henry Yu**

For: **Layer123 World Congress 2022**

Dec 2022

## Agenda

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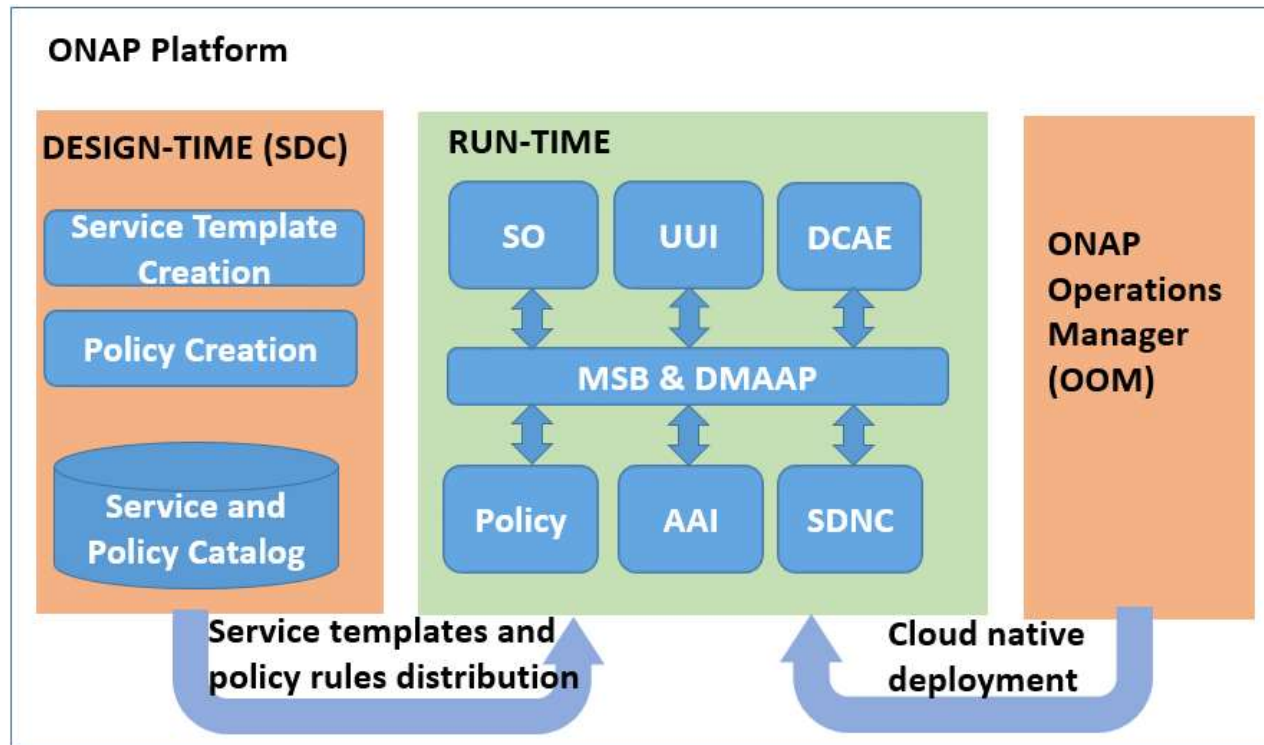
- Background of ONAP and the driver for ONAP-ZSM collaboration
- Intent-based Cloud Leased Line solution on ONAP
- ETSI ZSM POC #3 demonstration

## Background of ONAP

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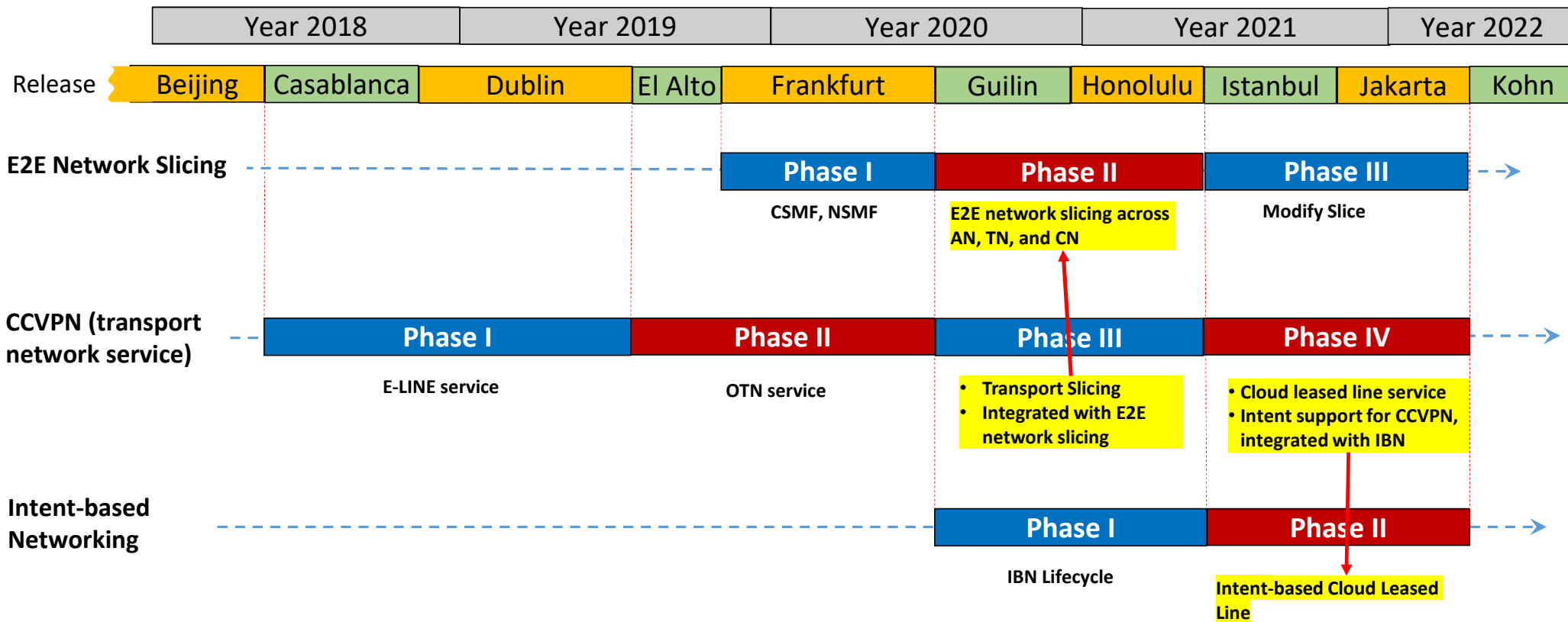
- ONAP is an open source platform for network automation (started in 2017)
- Large and diverse community (a total of 100 organizations committed code in last 5 years)
- Large code base (over 14M lines of code)
- Cloud-based architecture containing many containerized microservices

# ONAP Architecture



SDNC	SDN Controller
DCAE	Data Collection, Analytics and Events
Policy	Policy Framework
AAI	Active and Available Inventory
MSB	Microservices Bus
DMaaP	Data Movement as a Platform

# ONAP Use Cases

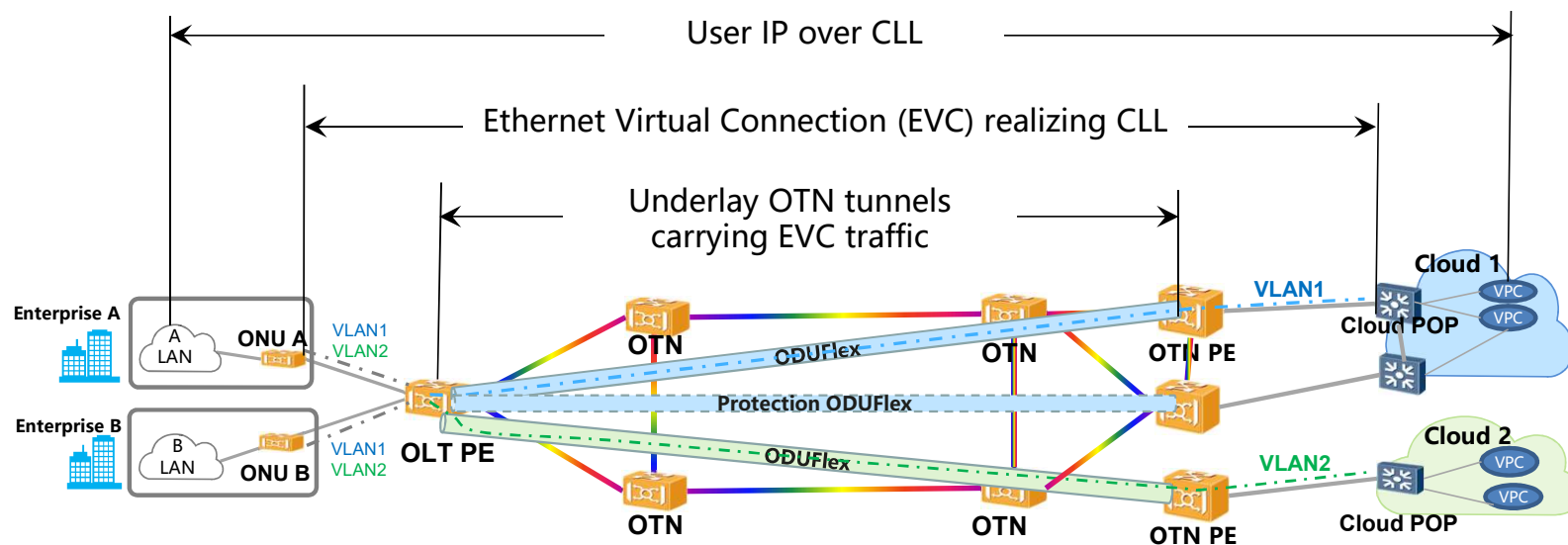


## How ZSM Standards Help Implement ONAP Use Cases

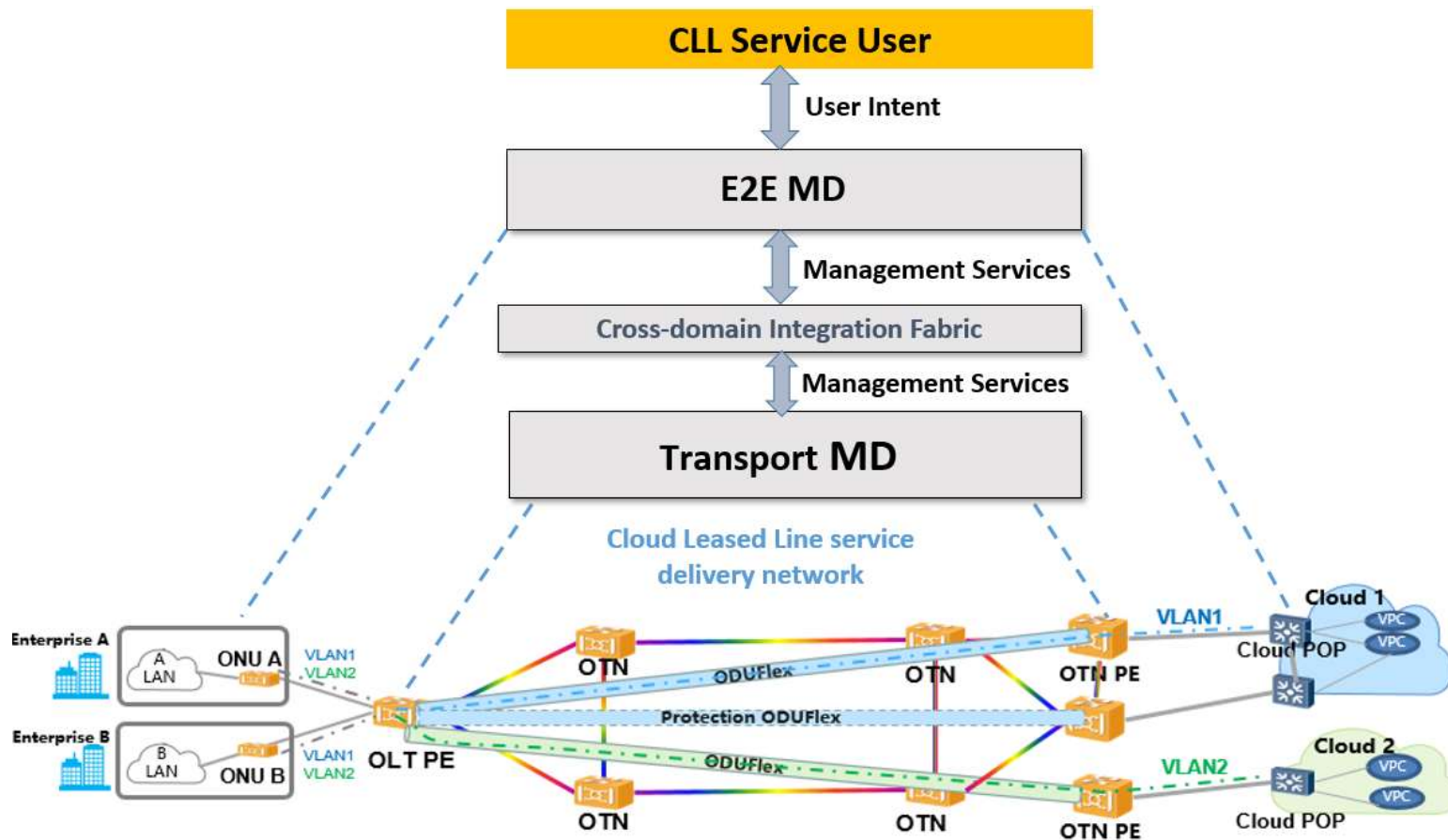
ONAP use case requirements/challenges (not exhaustive list)	Solutions inspired by ZSM standards
Use cases collaborate on new services and yet still keep their independence. E.g., IBN and CCVPN collaborate on Intent-based Cloud Leased Line	<ul style="list-style-type: none"> <li>• Apply <b>Management Domain</b> construct to use case design (e.g., CCVPN as Transport MD)</li> <li>• Use case collaboration are achieved by management domain interactions</li> </ul>
Use cases need to allow development of solutions from different standards (e.g., 3GPP, IETF, MEF, TMF, etc.)	<ul style="list-style-type: none"> <li>• Design a <b>federated solution</b> using ZSM architecture</li> </ul>
Closed-loop automation	<ul style="list-style-type: none"> <li>• Use solutions in <b>ZSM009</b> (Closed loop enablers and solutions)</li> </ul>

# Cloud Lease Line (CLL) Service Illustration

Objective: CLL service automation based on user's intent

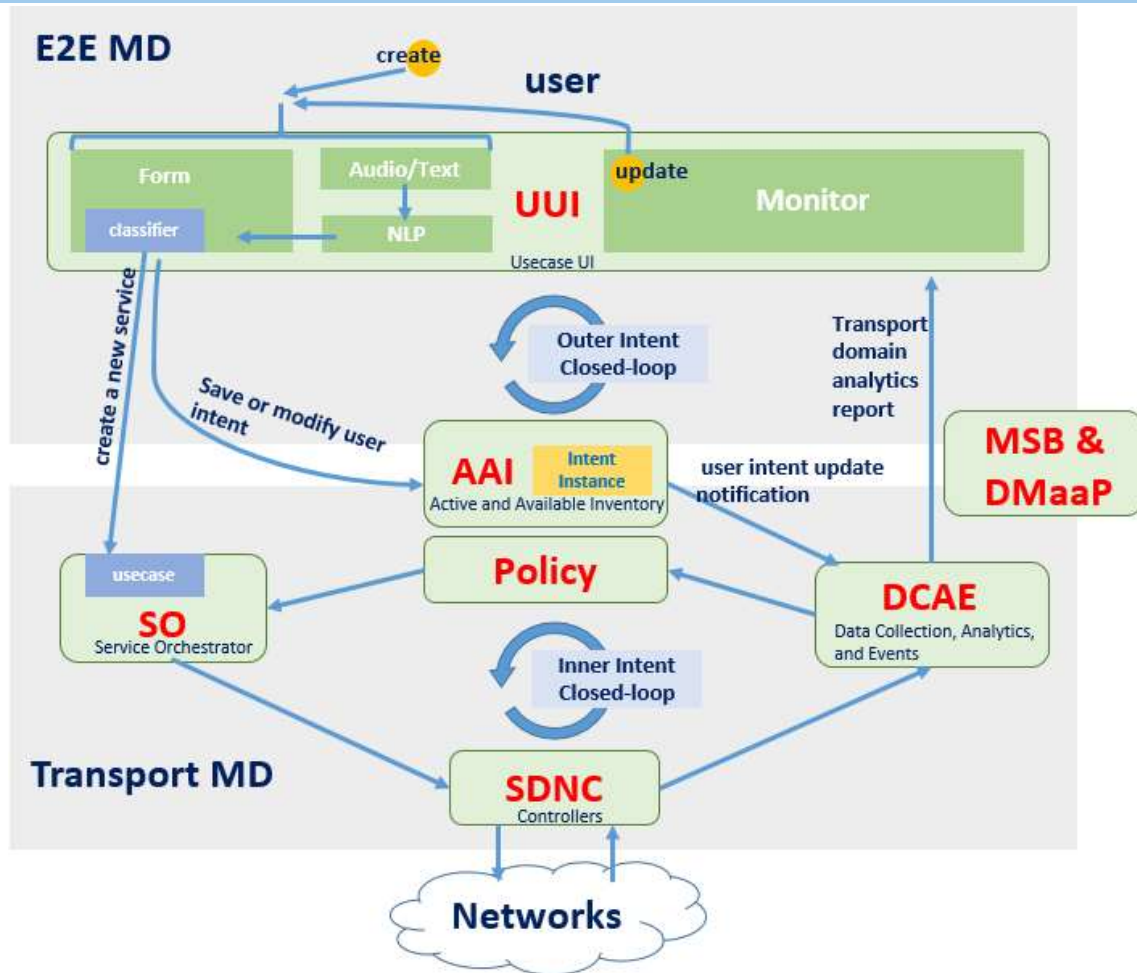


# Intent-based CLL Solution Using ZSM Framework

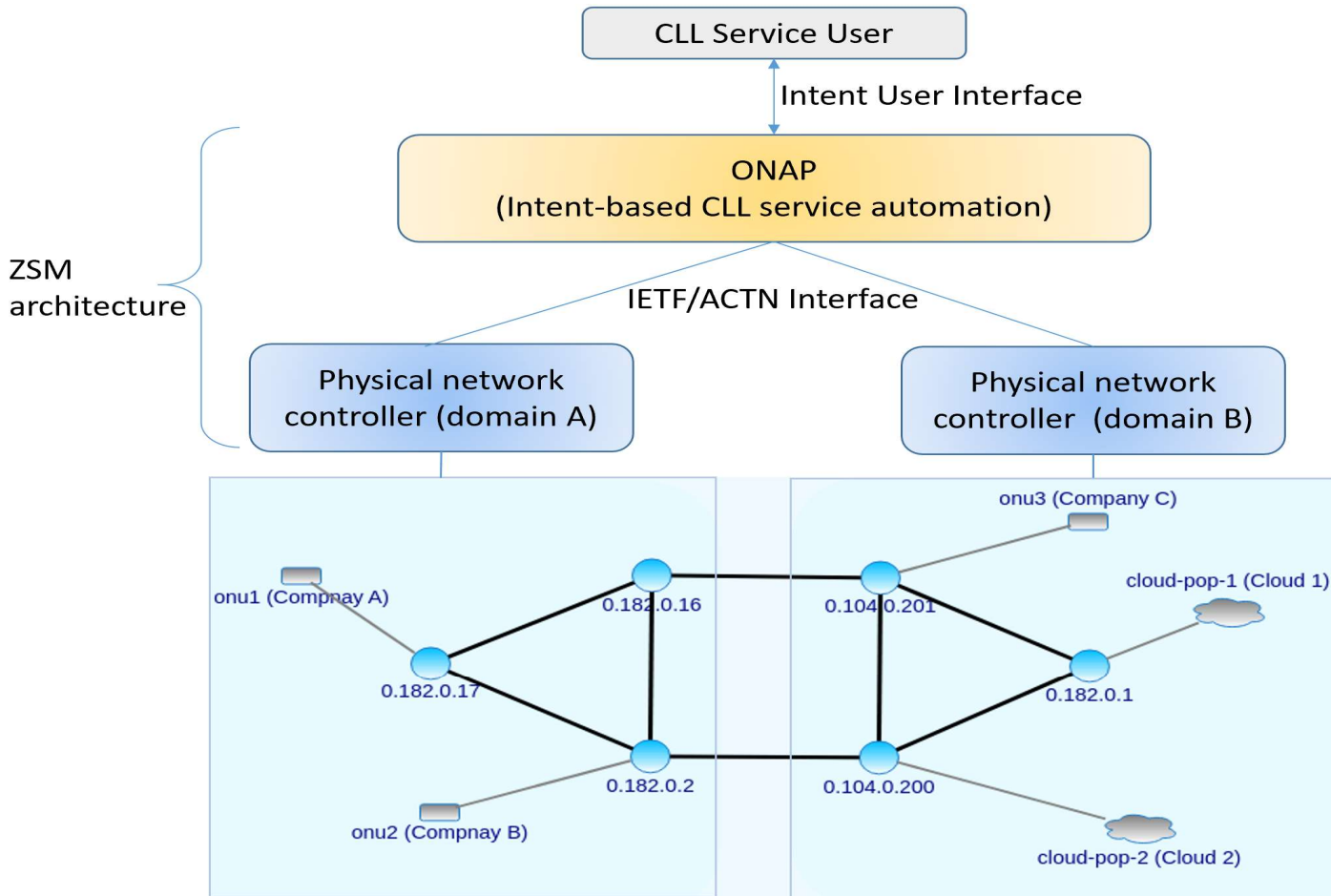




# Intent-based CLL Implementation on ONAP



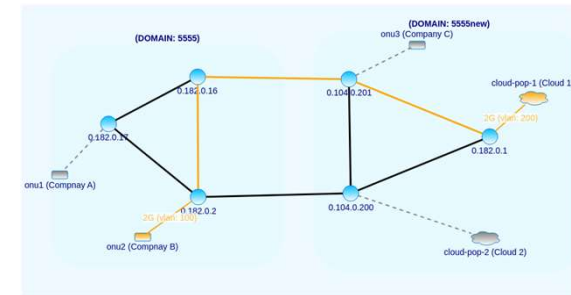
# ZSM PoC#3 Demo Setup



**I need a connection from company B to Cloud one, with a bandwidth of 2Gbps**



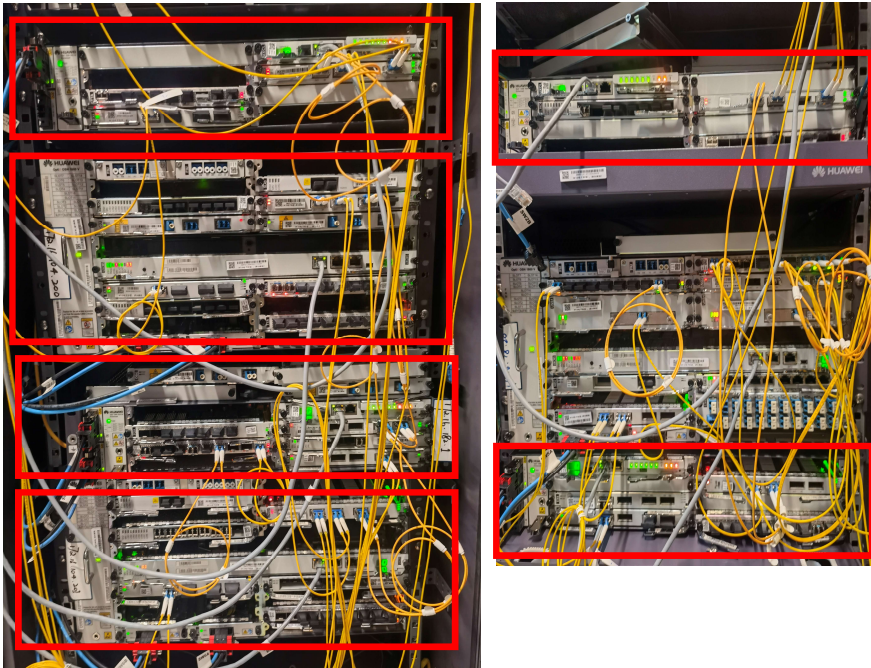
**automation**



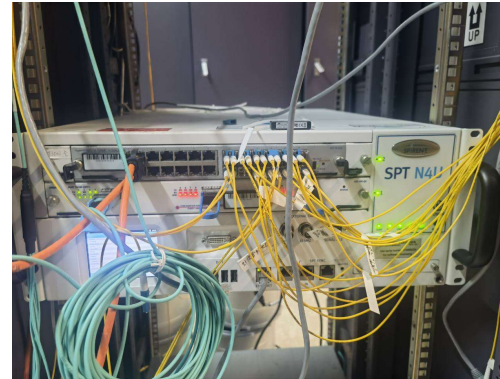
# Lab Equipments

China Unicom and Huawei Joint Lab in Wuhan China

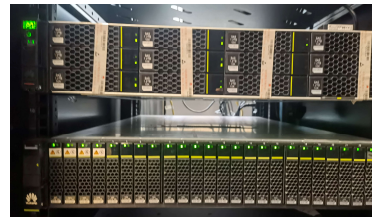
Six Network Nodes (providing Ethernet over OTN service)



Traffic Generator (Ethernet packets)

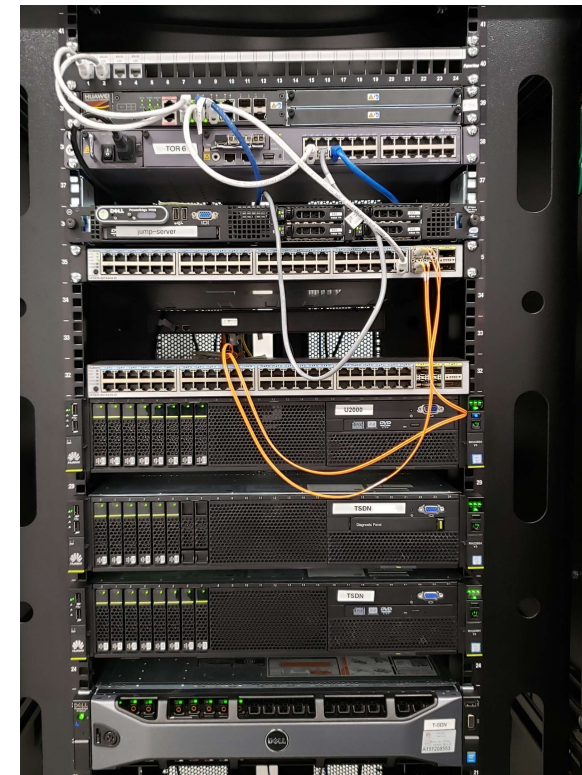


SDN Controller Servers



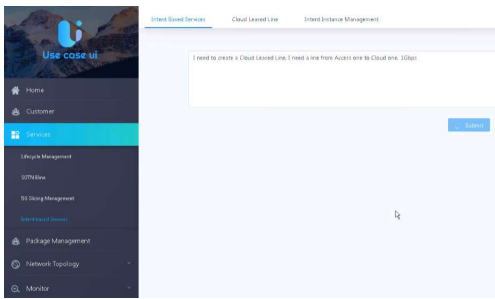
Huawei Canada Lab in Ottawa

ONAP Servers

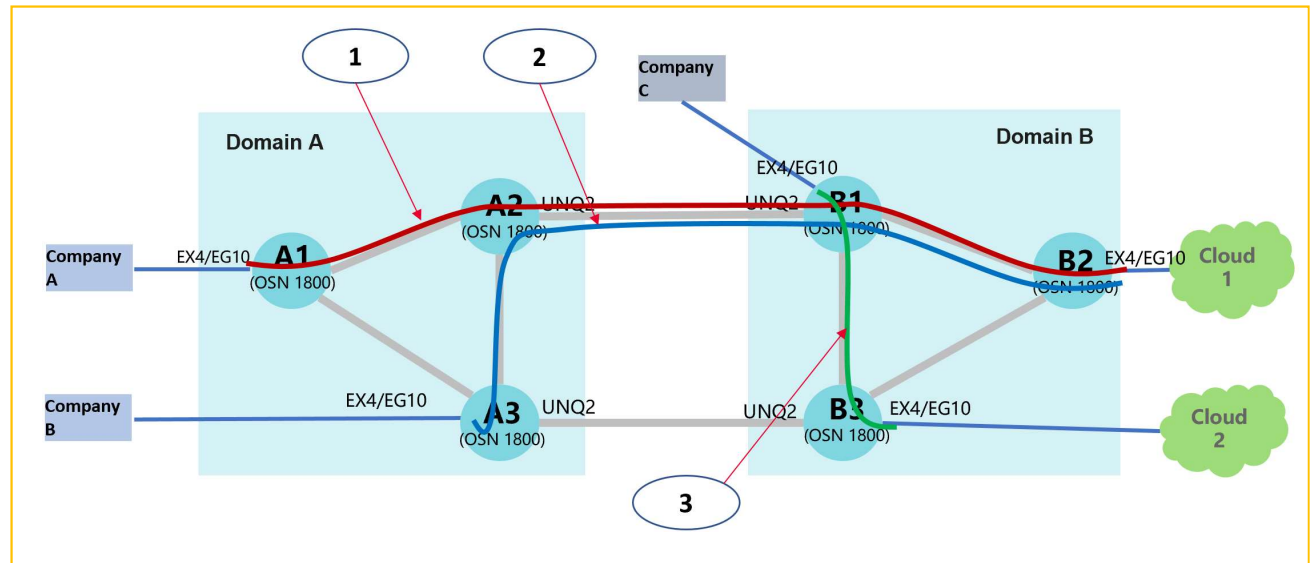


# Content of the Demo

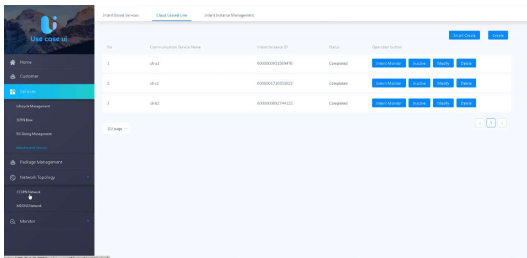
## 1. NLP Translation of User Intent



Text: I need a service from Company A to Cloud one, with a bandwidth of 1Gbps.



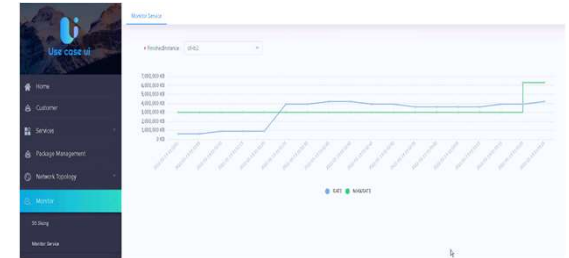
## 2. Intent creation and deletion



## 3. Intent modification



## 4. Bandwidth monitor & closed-loop



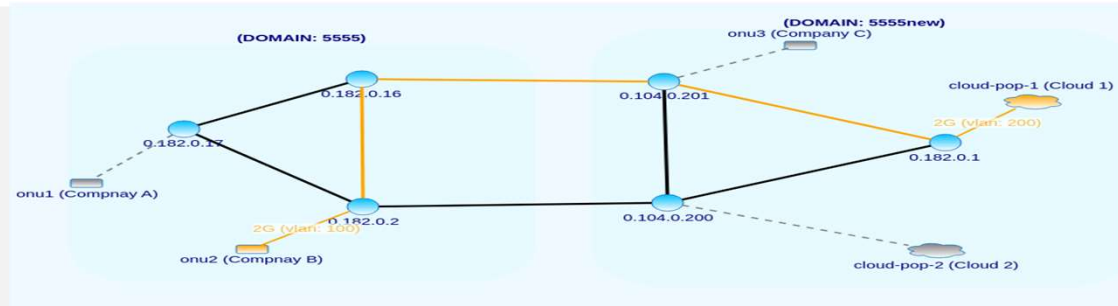


# Three-level Verification of Each Test Case

**Intent Management Level:** Verify user intent model values and life cycle operation

No	Communication Service Name	Intent Instance ID	Status	Operation button
1	intent-UC1	6000002003484610	Completed	Intent Monitor Inactive Modify Delete
2	intent-UC2	6000001953223125	Completed	Intent Monitor Inactive Modify Delete
3	intent-UC3	6000001036285019	Completed	Intent Monitor Inactive Modify Delete

**Network Configuration Level:** Verify network inventory and configuration data are correct and consistent with the Intent operation



**Datapath Level:** Verify data traffic patterns are consistent with the network configurations

Name/ID	Rx Port Names	Aggregated Rx Port Count	Tx Count (Frames)	Rx Count (Frames)	Tx Rate (bps)	Rx Rate (bps)	Tx Count (bits)	Rx Count (bits)	Tx L1 Count (bits)
CLL-UC1/65536		0	89,751,775	0	864,864,304	0	91,905,817,600	0	106,266,101,600
CLL-UC3/196608	N/A	0	265,219,622	0	2,580,642,488	0	271,584,892,928	0	314,020,032,448
CLL-UC2/262144	N/A	0	102,910,300	0	1,729,729,688	0	105,380,147,200	0	121,845,795,200

## ZSM PoC#3 Milestones

Milestone	Date
<b>PoC project start</b>	Jan 2022
<b>Demo 1:</b> Automated CLL service creation, modification and deletion (simulated hardware)	May 2022 (ZSM#19)
<b>Demo 2:</b> Closed-loop operations for CLL service assurance (simulated hardware)	May 2022 (ZSM#19)
<b>Demo 3:</b> CLL service automation and closed-loop operations with real hardware and real data traffic	Nov 2022 (ZSM#21)
<b>Final report:</b> Contribution on lessons learned from the PoC	Dec 2022
<b>PoC project end</b>	Dec 2022

### ZSM PoC#3 Team Members

China Telecom 

China Mobile 

China Unicom 

Huawei Technologies 

AsialInfo Technologies 

Xidian University 