

Data Service Enhancements of Intent Driven Networks in R14

Architecture Subcommittee Review
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Outline

1

Background

2

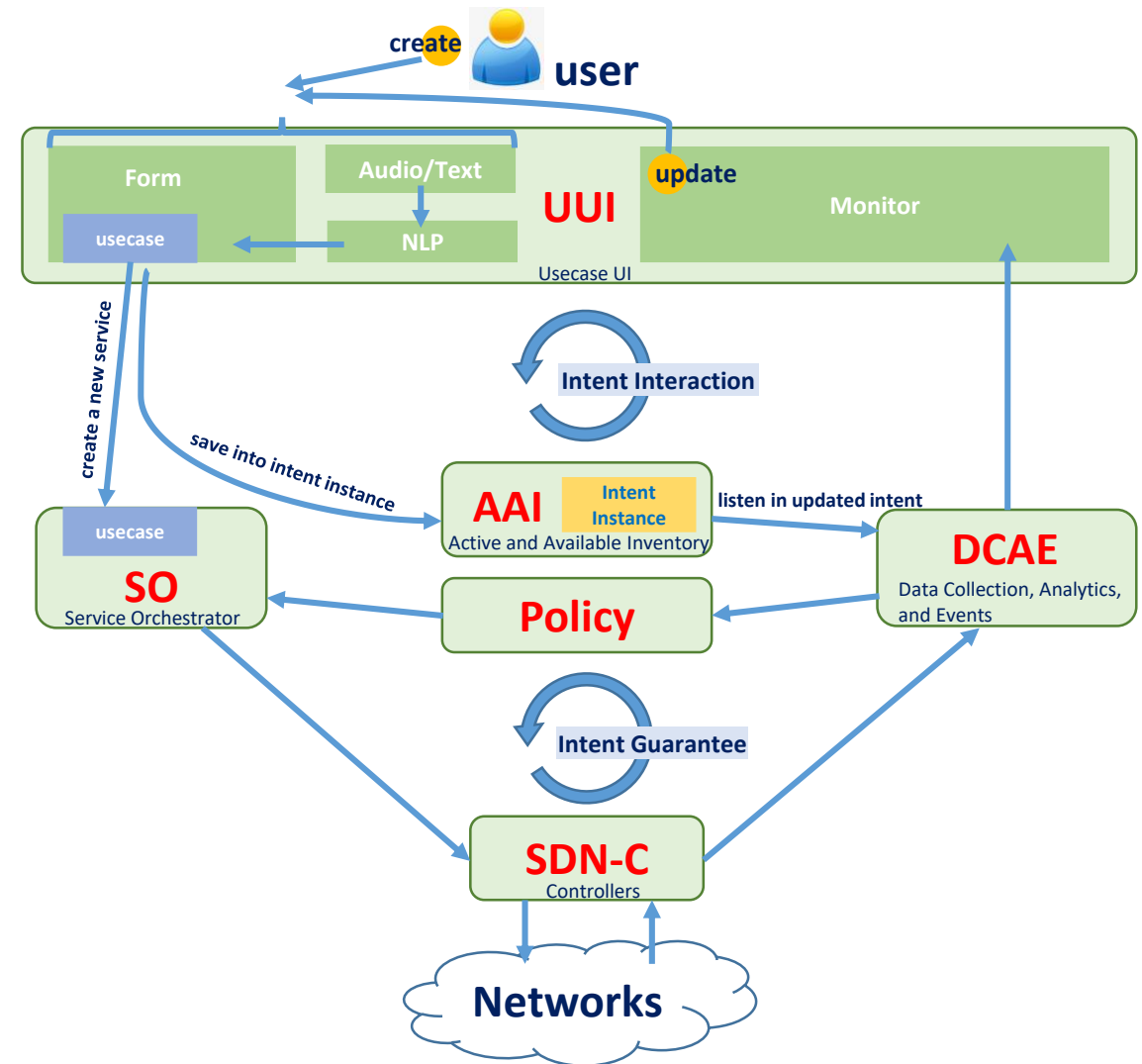
Requirements Introduction

3

Project Impact

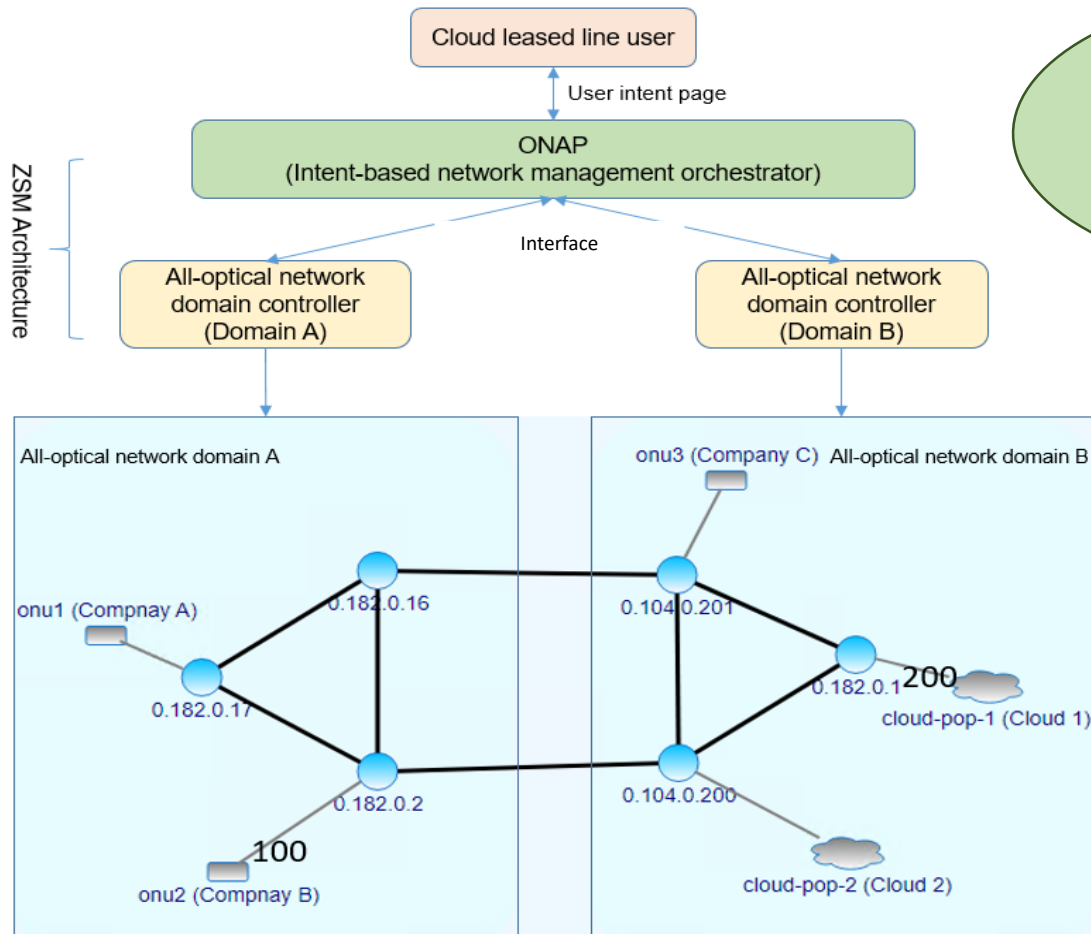
Intent-driven Closed-loop Autonomous Networks based on ONAP Projects

- A self-driving network that uses decoupling network control logic and closed-loop orchestration techniques to automate application intents.
- 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.



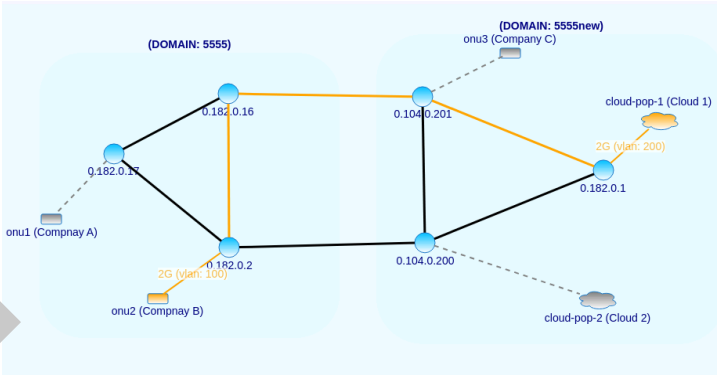
Architecture of Intent-driven Closed-loop Autonomous Networks

CCVPN: Automation of Intent-based cloud leased line service

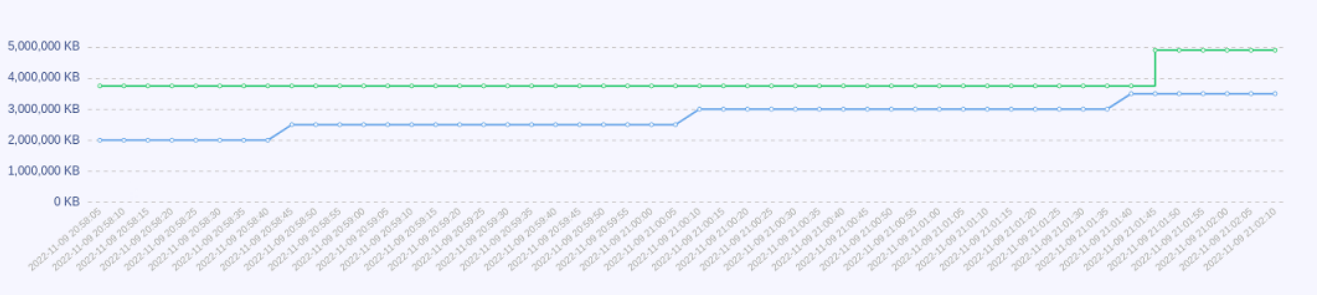


I need a connection from company B to Cloud one, with a bandwidth of 2Gbps

Translate and create

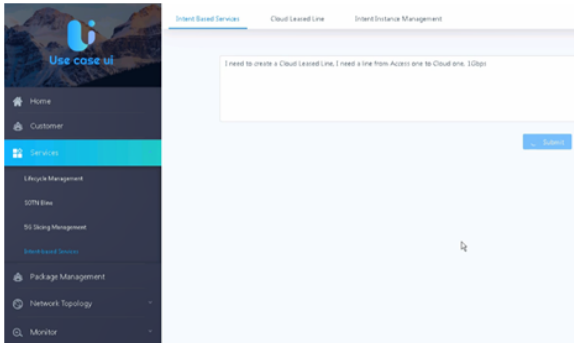


Bandwidth monitoring and guarantee

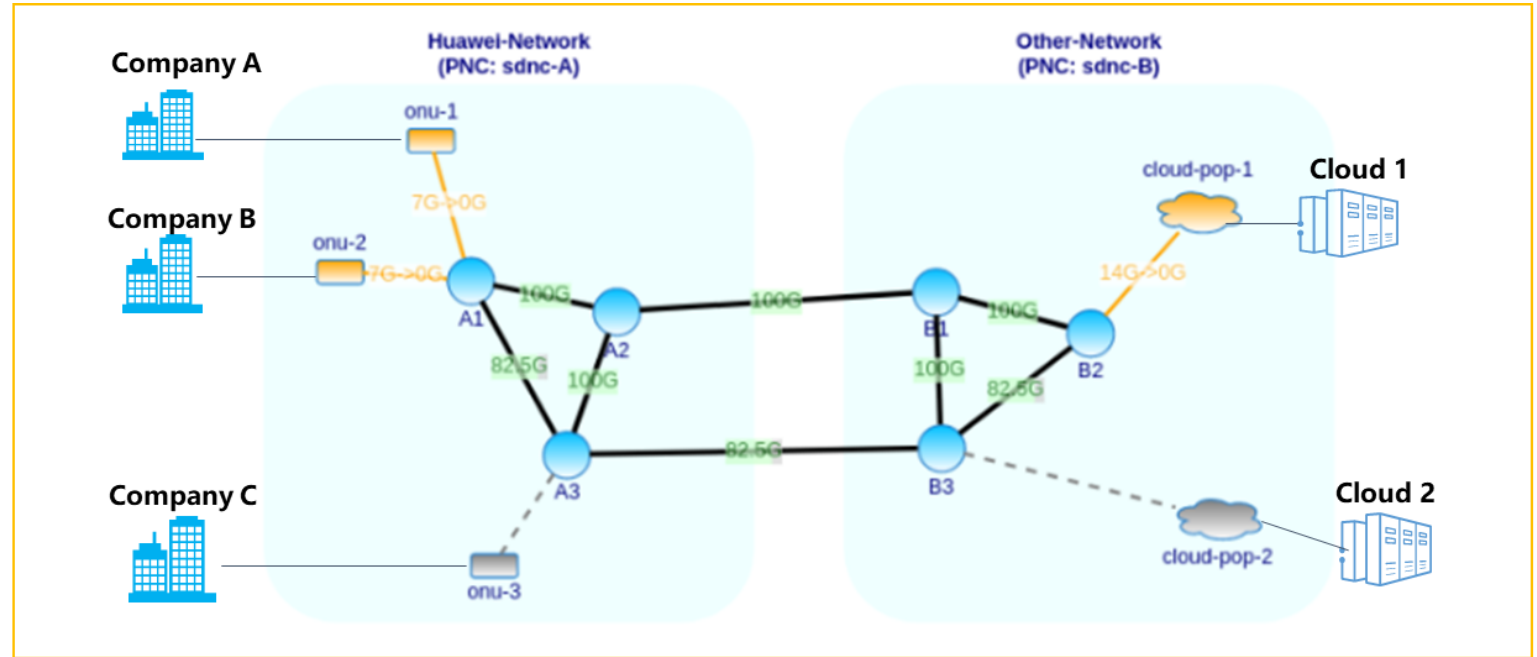


CCVPN: Automation of Intent-based cloud leased line service

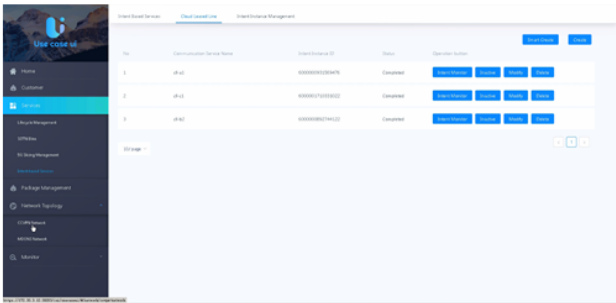
1. Create Cloud Leased Lines



Text: I need to create a Cloud Leased Line. From Company A to Cloud one, 1Gbps.



2. Closed-loop operation of CLL



3. User modify bandwidth of CLL



4. Bandwidth Monitor & Guarantee



C23.0.467 Intent-driven closed-loop autonomous services towards next-generation networks

Catalyst Project Goal :

- Enhance the intent interaction between customers and operators so as to **perceive the users' real-time requirements**, and **translate the users' requirements** to the configuration of current network. Some new ideas and techniques could be considered, like ChatGPT/GPT-4, GSMA Open Gateway, Slicing/SLA.
- Enhance the **closed-loop autonomous services of Orchestration and Management platform** by Native AI and Big data.

CHAMPIONS:



PARTICIPANTS:



UNIVERSITIES:



Outline

1

Background

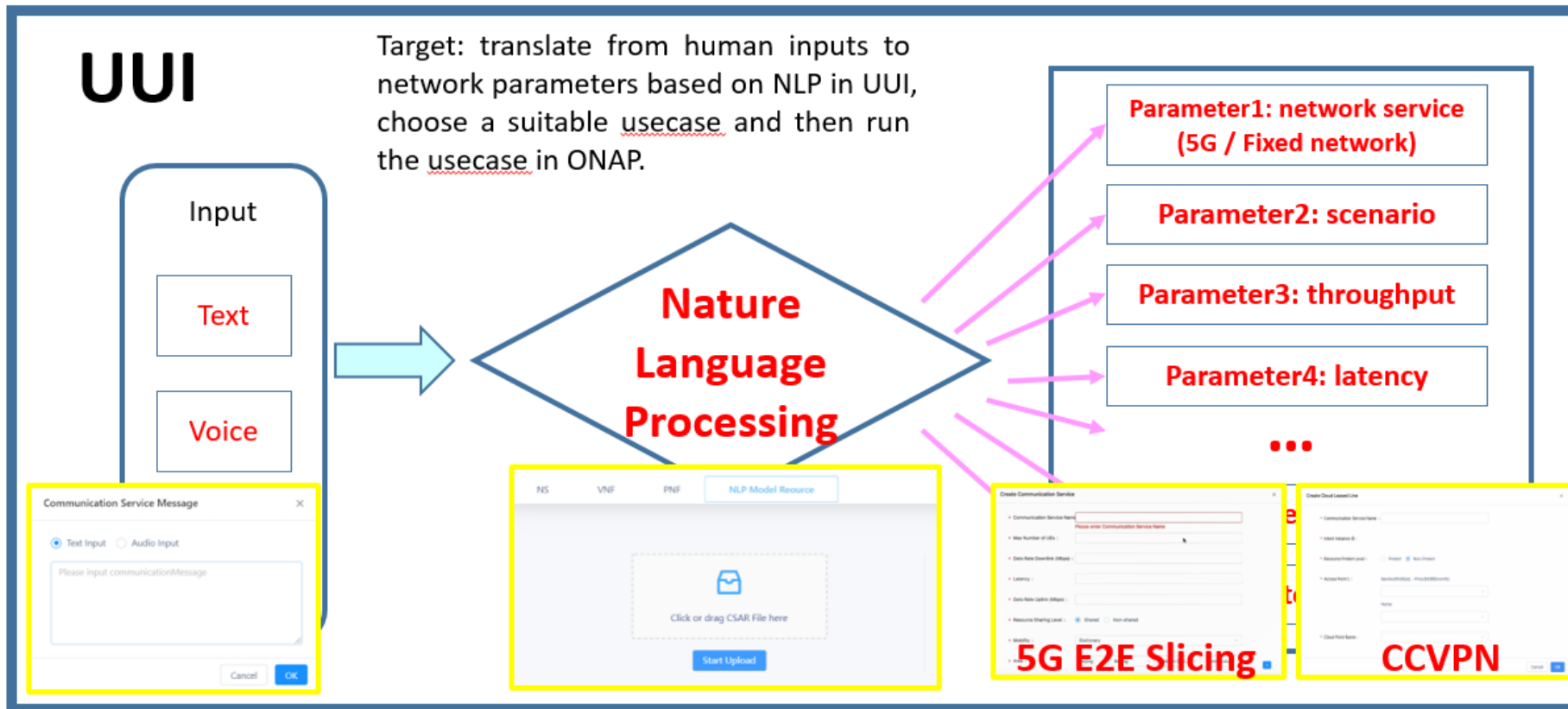
2

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AI is an important technology for IBN



- ❑ Update code to adapt to Python 3.11
- ❑ code modification for compatibility of tensorflow 2.X
- ❑ new dependency package
- ❑ ...

Not only improve the algorithm, but also increase the quantity and quality of data.

Data Services

In communication systems, the importance of data cannot be underestimated. Data is not only a carrier of information, but also the foundation of decision-making and analysis.

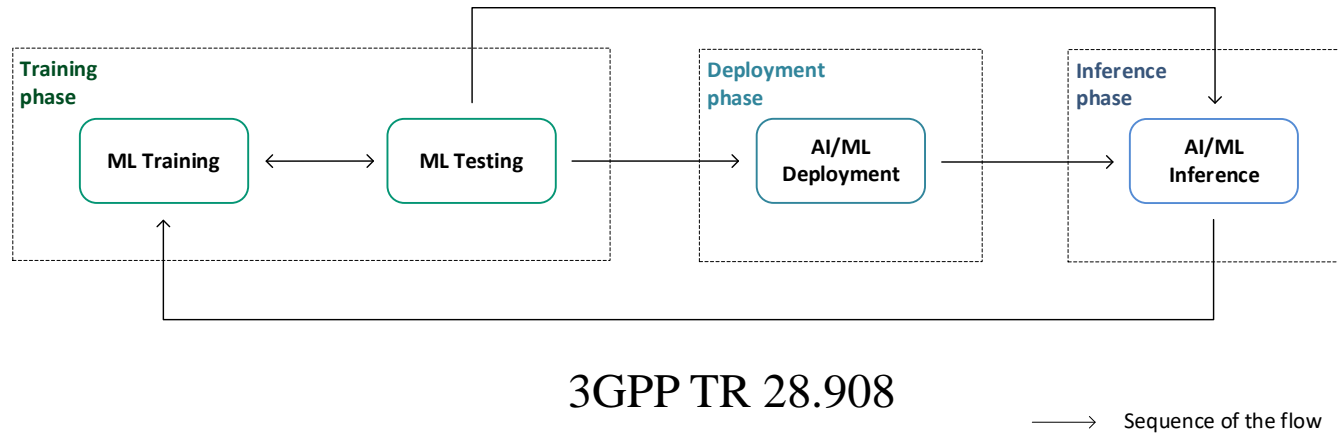
Communicate and share information: Data is the concrete manifestation of information, which is transmitted through communication systems in the network, achieving communication and sharing between people and machines.

The basis for decision-making: The large amount of data generated by communication systems can be used for decision-making. Through data statistics, analysis, and mining, trends and patterns can be obtained to understand user behavior, consumption habits, market demand, and other information, thereby guiding decision-making and optimizing business.

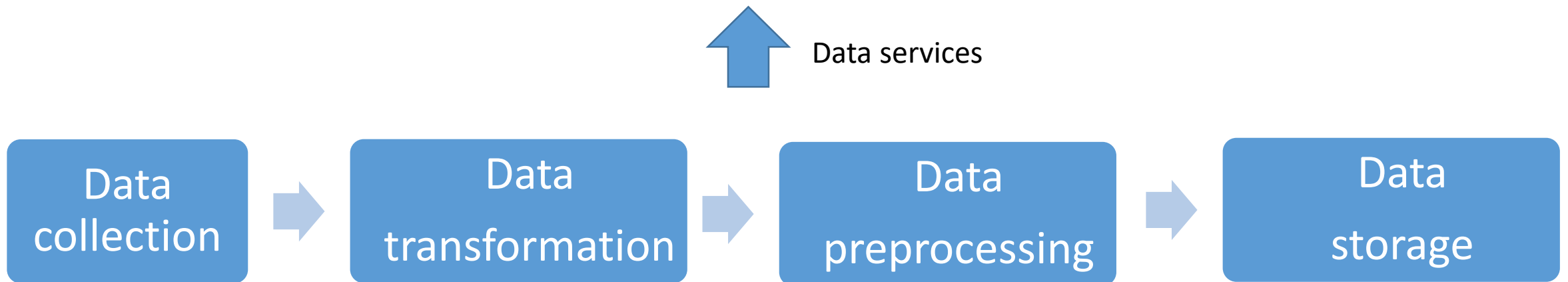
Ensure network efficiency and quality: By monitoring and analyzing data, the efficiency and quality of the network can be evaluated.

Data services are required. The data generated and consumed by network operation itself needs to be collected, preprocessed, stored, and analyzed.

Data Services



ML Training: Learning by the Machine from the training data to generate the ML entity that could be used for inference.
ML Testing: Testing of the validated ML entity with testing data to evaluate the performance of the trained ML entity for selection for inference.



Data Services in Intent Driven Networks: Taken LLM as an example

Question & Instruction	Answer
<p>Read the following context and choose the best option to answer the question.</p> <p>Context: From the triple loop she executed after five minutes, he suspected that she had managed to sneak off for flying more often than during the summers and wondered just how diligent George was about practicing on his own time.</p> <p>Question: What is a triple loop ?</p> <p>Options:</p> <p>A. None of the above choices .</p> <p>B. 3 round trips on a plane route .</p> <p>C. 3 neckties worn on flights</p> <p>D. A feature pulled off by making 3 loops in the air.</p>	D

Text:

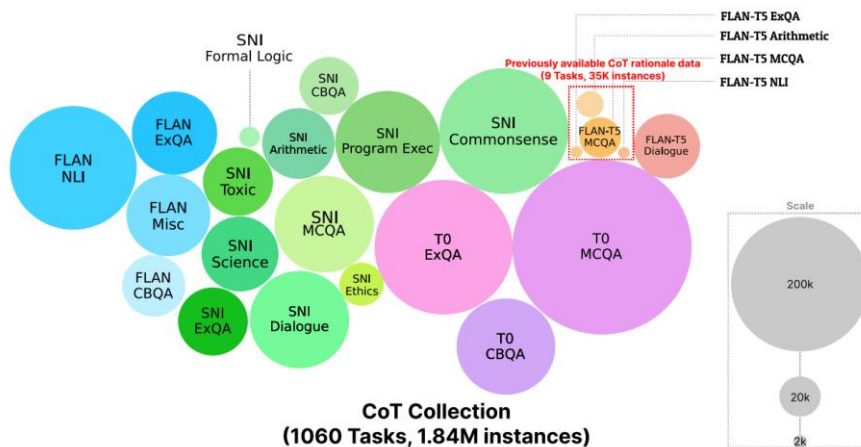
A cloud line is required from Company A to Cloud One, 10Gbps.

Questions:

["bandwidth", "access point", "cloud point"]

Answers:

{"bandwidth": "10Gbps", "access point": "Company A", "cloud point": "Cloud One"}



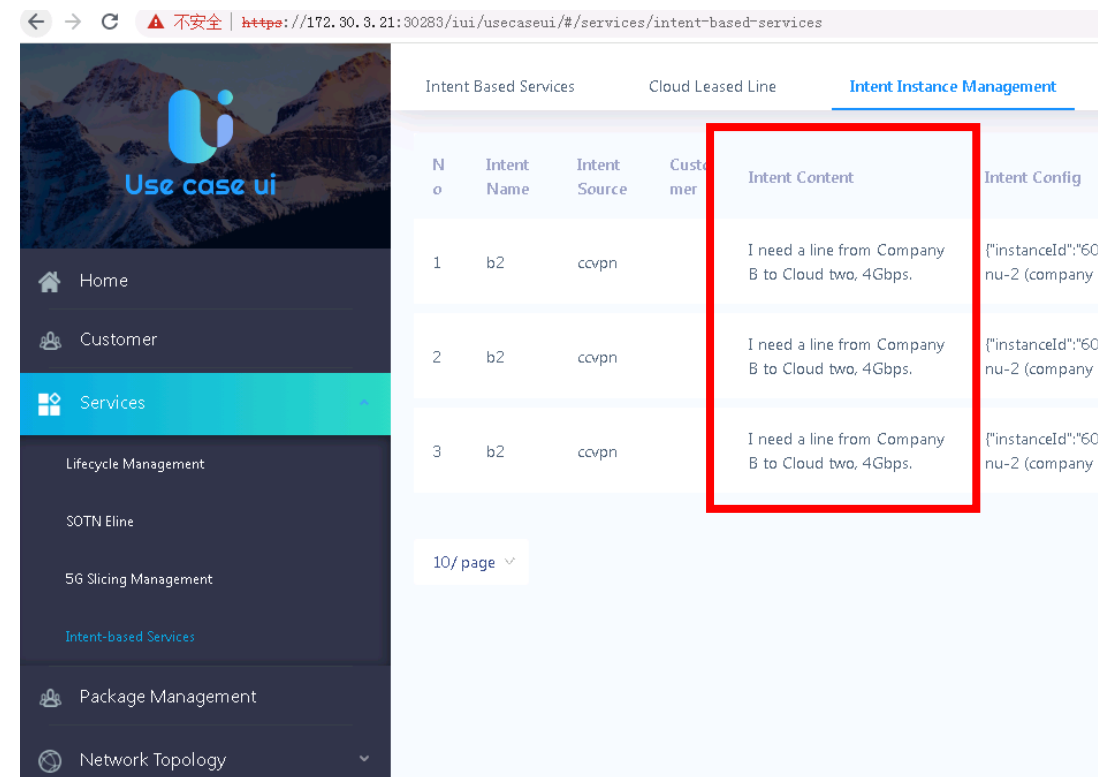
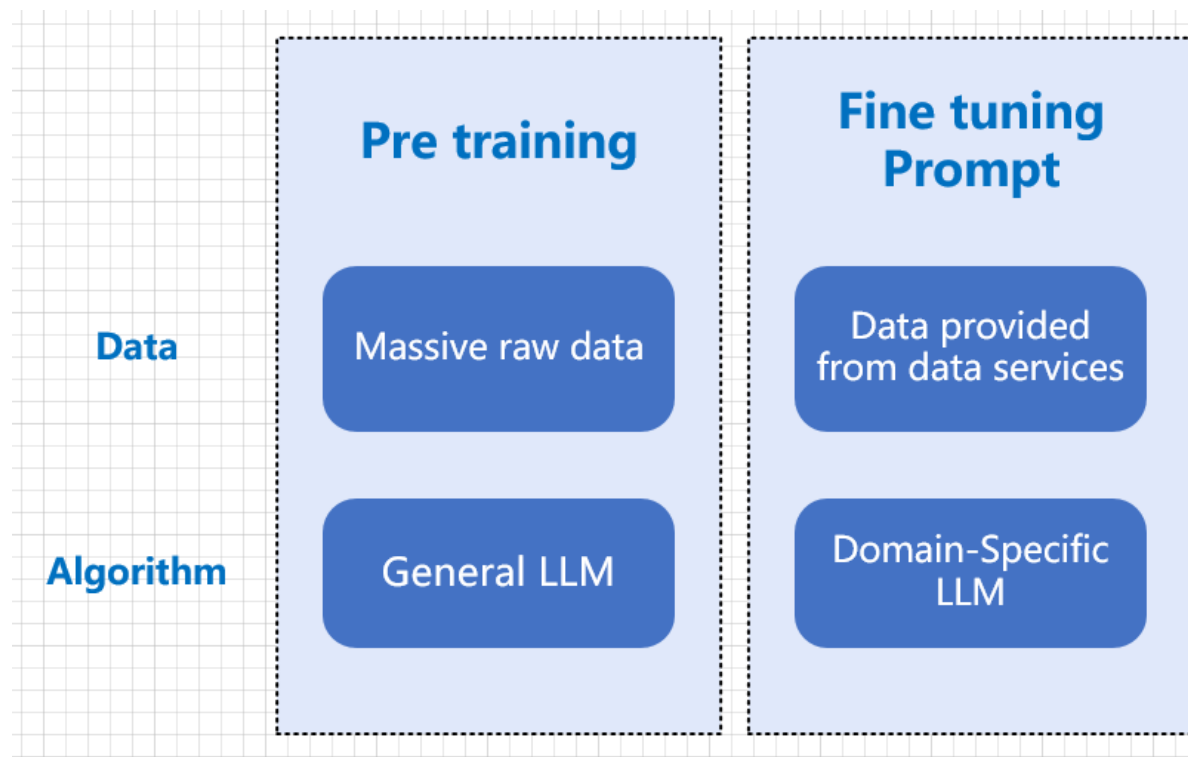
The LLM is consistent with intent translation methods.

We employ CoT-T5 (LLM) and test the performance.

Data services is required for LLM.

<https://arxiv.org/abs/2305.14045>

Benefit from Data Services: Taken LLM as an example



Using the data provided from data services, the general LLM becomes a domain-specific LLM, which can be used to strengthen the transformation of intent ,even give advises to intent strategies.

Provide data services to collect, process and organize the data in CCVPN use case of intent driven networks.

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REQ-1589: Data Service Enhancements of Intent Driven Networks in R14

Intent-based networking is applied to support the smart interaction between users (customers/operators) and networks. Based on the closed-loop automation of ONAP, the proposal of **Intent-driven Closed-loop Autonomous Networks** is proposed for the smart operation of networks. In R14, the proposal proposes data service enhancements for Intent Driven Networks based on CCVPN usecase.

Key Contacts -Zhen Li (China Telecom), Jianzhang Guo(China Telecom), Jinsong Zhang (China Telecom), Dong Wang(China Telecom)

Executive Summary - Intent-based networking is applied to support the smart interaction between users (customers/operators) and networks. Based on the closed-loop automation of ONAP, the proposal of Intent-driven Closed-loop Autonomous Networks is proposed for the smart operation of networks. In R14, the proposal proposes data service enhancements for Intent Driven Networks based on CCVPN usecase.

Business Impact - It is a challenging problem for networks to satisfy users' intents in real time. The REQ intent-based networking provides intent interaction and guarantee functions for users.

Business Markets - This REQ provides a novel solution of Intent-driven Closed-loop Autonomous Networks with two closed-loops, intent interaction closed-loop and intent guarantee closed-loop. And intent instance is used to manage users' real-time intents.

Funding/Financial Impacts - Intent-based networking simplifies interaction and network configuration to save OPEX cost. It also provides the services to satisfy users' real-time intents, so as to increase the income of operators with few investments.

Organization Mgmt, Sales Strategies - *There is no additional organizational management or sales strategies for this requirement outside of a service providers "normal" ONAP deployment and its attendant organizational resources from a service provider.*

Projects Impact

Project	Impact	Notes
UUI	<ul style="list-style-type: none">● Provide data services in CCVPN use case of intent driven networks● Provide backend server for a unified interface● Provide a frontend page to call the backend for interactivity.	



ONAP

OPEN NETWORK AUTOMATION PLATFORM

Thanks!