

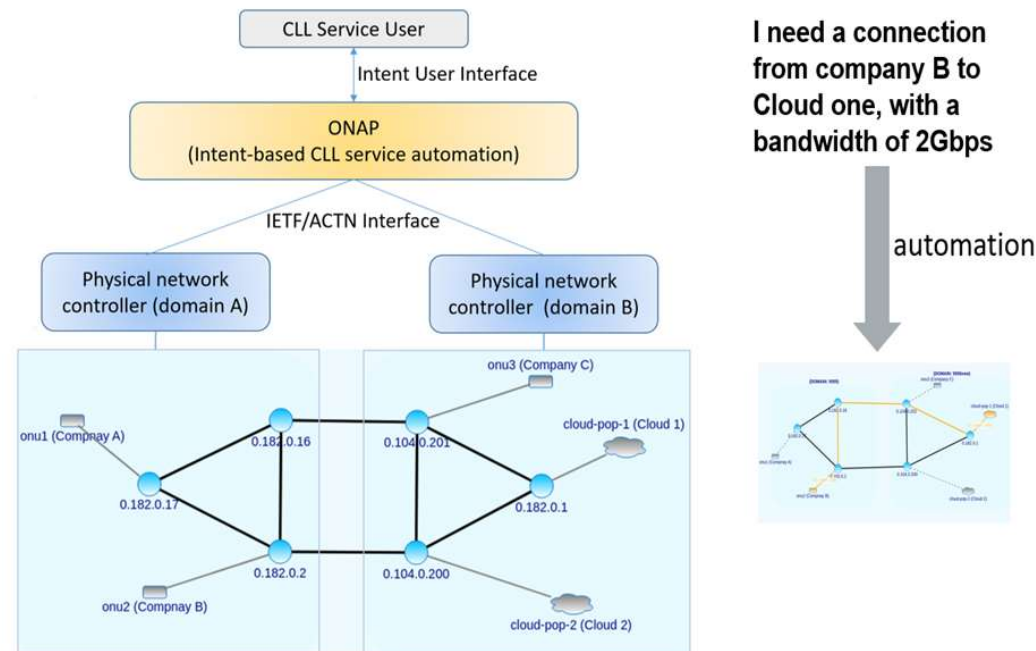
ENI PoC #18

Intent-driven Operating for User-Centric Cloud- Network Convergence Services

Rapporteur: (China Telecom)

Zhen Li
Dong Wang

PoC Background



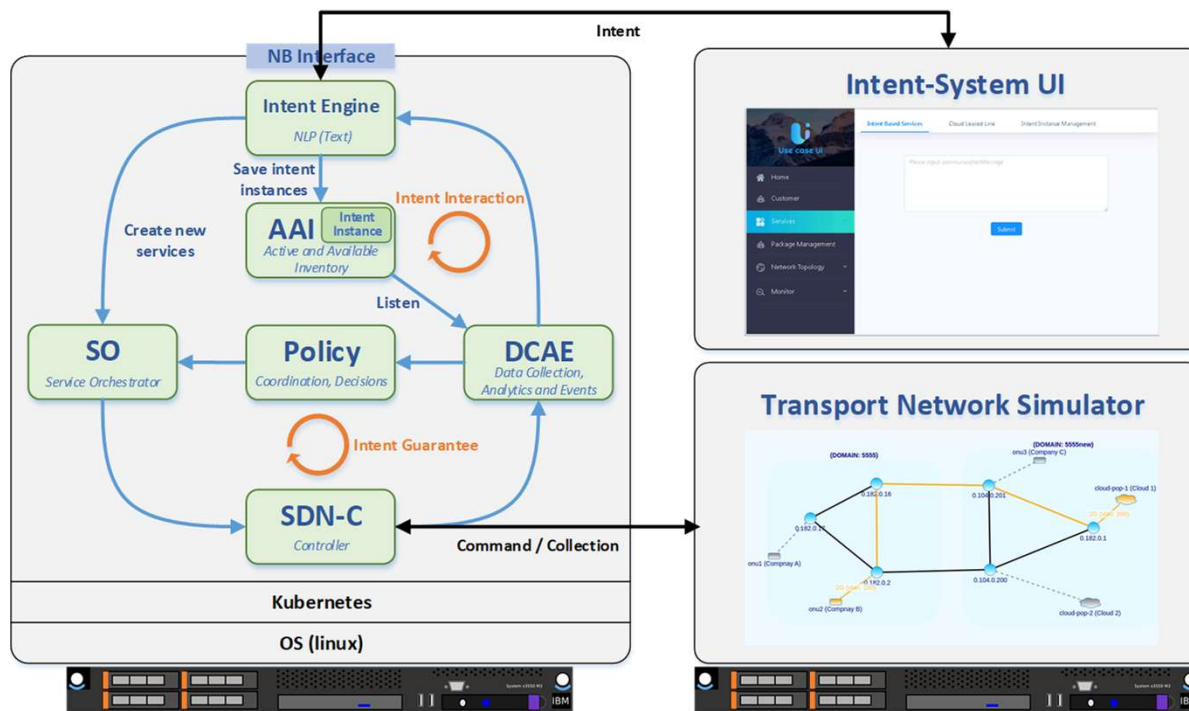
Short Description: This PoC will provide an intent-based cloud private line (CPL) service, which can connect cloud service users to edge or cloud data centres, and edge or cloud data centres to each other, with deterministic connection performance. In this PoC, we will demonstrate intent translation (NLP models) and intent instance creation to fulfil users' intent. In particular, in the proposed CPL service, this PoC aims to verify that when the network state changes or the users' intent changes, the intent requirements can still be satisfied by the ENI system. The closed-loop automation mechanism continuously validates and monitors the conditions of the network against the intent specification to ensure compliance with the intent.

PoC goals and PoC member

	Organization name	ISG ENI participant (yes/no)	Contact (Email)	PoC Point of Contact (see note 1)	Role (see note 2)	PoC Components
1	China Telecom	yes	Zhen Li liz779@chinatelecom.cn Dong Wang wangd5@chinatelecom.cn	X	network operator	Design, development and integration of intent-driven user-centric cloud-network convergence services
2	Huawei	yes	Henry Yu henry.yu1@huawei.com		infrastructure provider	Design and development of cloud-network convergence environment
3	AsiaInfo	yes	Lei Shi shilei8@asiainfo.com		infrastructure provider	Deployment of demo environment
4	Beijing University of Posts and Telecommunications (BUPT)	yes	Xiqing Liu liuxiqing@bupt.edu.cn Shi Yan yanshi01@bupt.edu.cn Yaohua Sun sunyaohua@bupt.edu.cn		university	Enhancement of network AI model and algorithm for network optimization
5	Xidian University	no	Chungang Yang cgyang@xidian.edu.cn		university	Design of intent-driven services and enhancement of intent translation based on NLP model.

- **PoC Project Goal #1:** The PoC will demonstrate that the intent instance can be created to meet the intent requirements of the users.
- **PoC Project Goal #2:** The PoC will demonstrate that the ENI system can still meet the intent requirements of the user, when the network state changes or the users' intents changes.

PoC Architecture



•Intent translation and intent instance creation. The user expresses an intent of creating a cloud-network convergence service. This intent is then automatically fulfilled by provisioning the corresponding services and allocating the required resources.

•Intent interaction. The already fulfilled intent can be modified by the user. The new intent can be automatically fulfilled by provisioning the corresponding services and allocating the required resources.

•Intent guarantee. The Intent-based system monitors the parameters of the cloud-network convergence service (e.g., bandwidth usage), and automatically triggers the closed-loop actions (e.g., increase max bandwidth) in order to guarantee the intent.

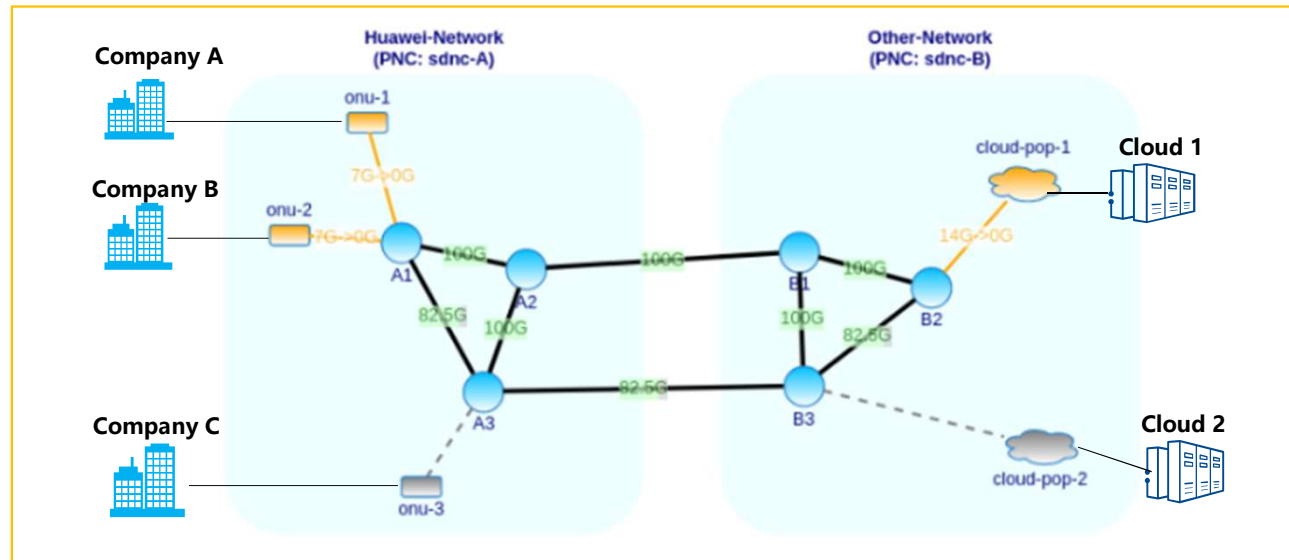
PoC Milestones and Current Progress

New use case for Intent-driven Operating for User-Centric Cloud-Network Convergence Services	ENI 015 Processing and Management of Intent Policy	Contribute to new use case in ENI 0025 WI (Processing and Management of Intent Policy)	07/2023
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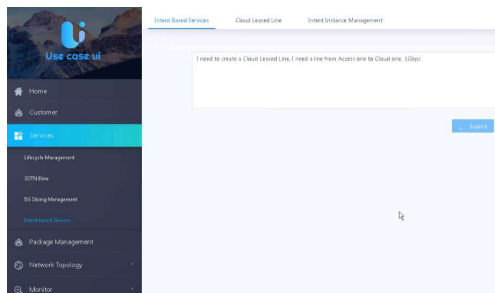
PoC Milestone	Stages/Milestone description	Target Date	Additional Info
P.S	PoC Project Start	June 2023	Presentation at ENI#26 plenary meeting
P.TP.1	PoC User Story finalization	July 2023	Finalization of the high-level description of the scenario.
P.C.1	PoC Expected Contribution 1	July 2023	Contribution to ENI 0025 WI
P.TP.2	PoC Test Plan 1	September 2023	AI based Intent translation and intent instance creation of the cloud-network convergence scenario.
P.D1	PoC Demo	September 2023	Demo at TMF Catalyst meeting
P.TP.3	PoC Test Plan 2	December 2023	Users' intent modification and fulfilment of the scenario.

Current Progress

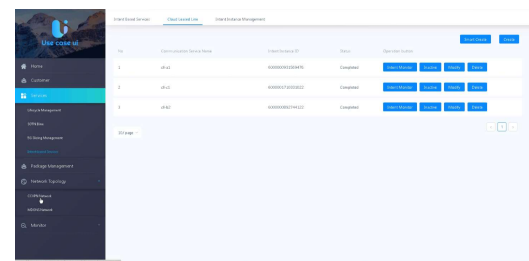


Text: I need to create a Cloud Leased Line. From Company A to Cloud one, 1Gbps.

1. Create Cloud Leased Lines



2. Closed-loop operation of CLL



Current Progress

- The intent translation is formulated as question answering(QA) problem.

Text:

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

Questions:

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

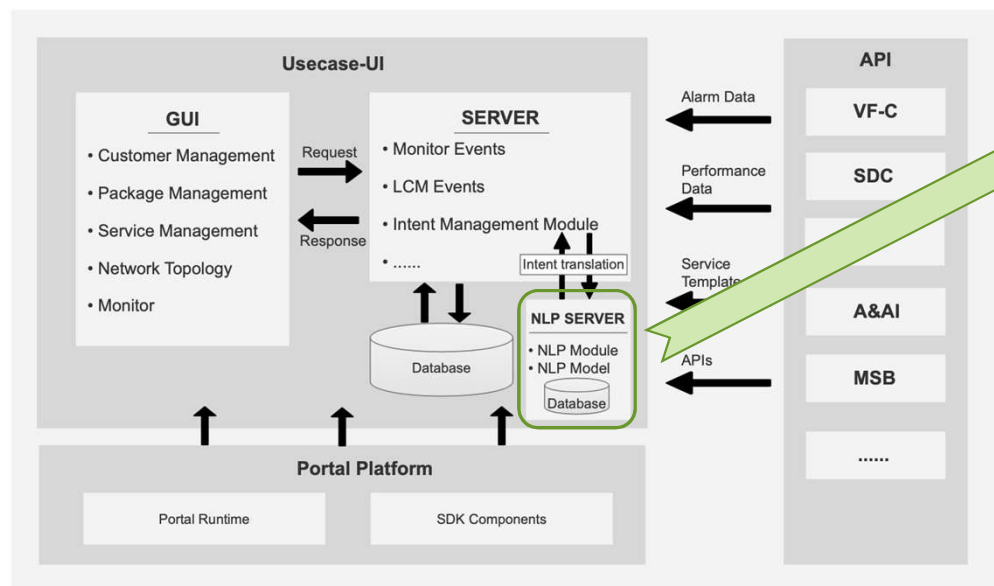
Answers:

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

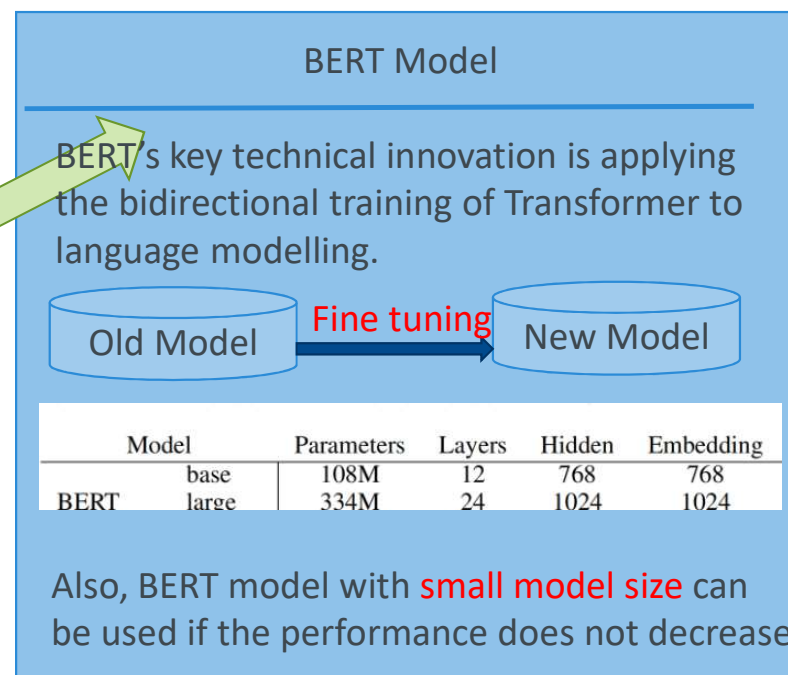
- ◆ BERT (Bidirectional Encoder Representations from Transformers): developed by researchers at Google AI Language. BERT's key technical innovation is applying the bidirectional training of Transformer, a popular attention model, to language modelling.

Current Progress

- Fine tuning BERT model with new and small corpus
- Try to employ BERT models with different model sizes
- Support both TensorFlow and PyTorch frameworks

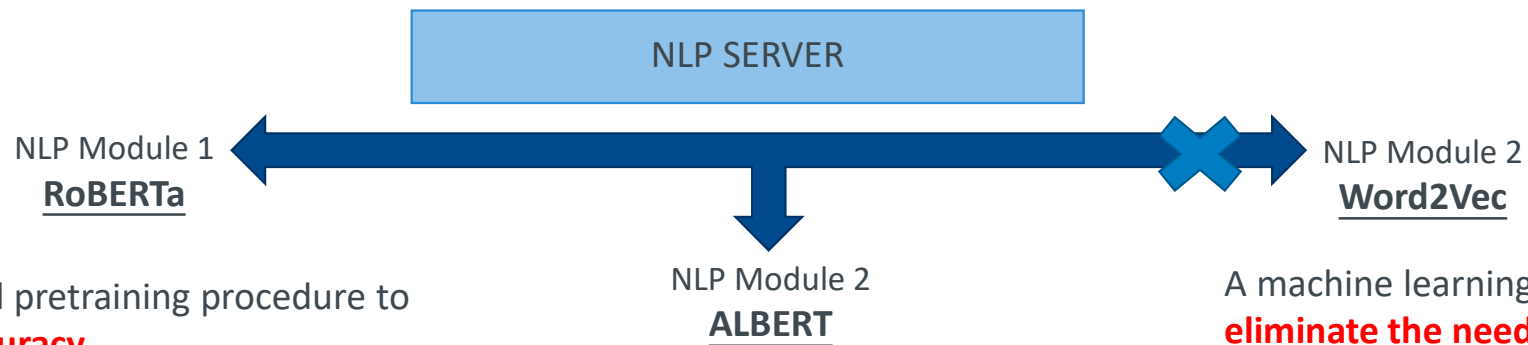


Components of UUI

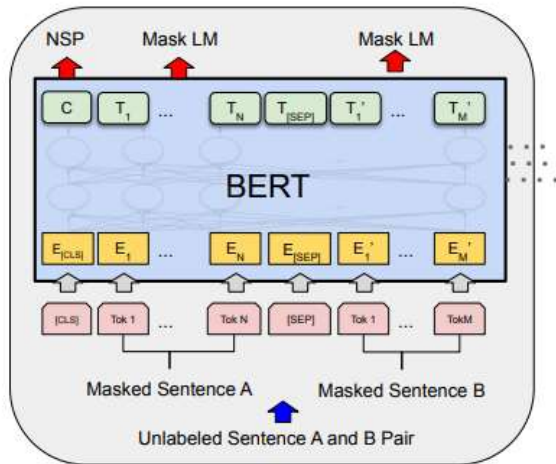


Enhancement of BERT Model

Current Progress

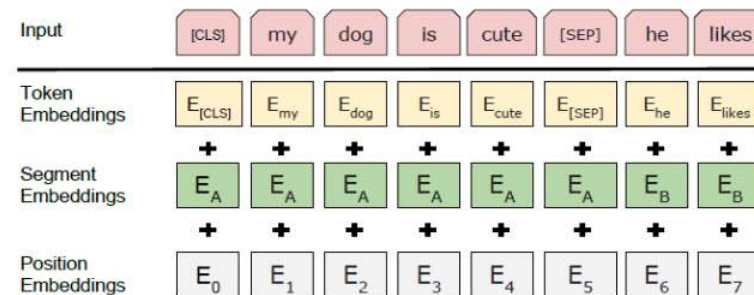


An improved pretraining procedure to **improve accuracy**.

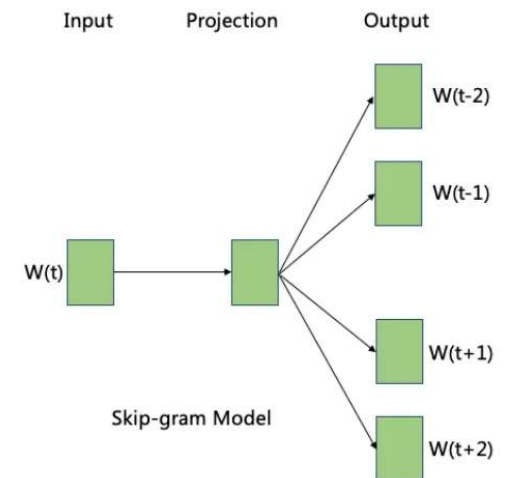


Pre-training

A simplified method to **reduce parameters**.



A machine learning algorithm to **eliminate the need of NLP Server**.



Current Progress

Thanks!