IETF-118
Intent-Based Network Management Automation Project

November 4~5, 2023

Champion: Jaehoon (Paul) Jeong

Members: Yiwen (Chris) Shen, Yoseop Ahn, and Mose Gu

Department of Computer Science and Engineering at SKKU

Email: {pauljeong, chrisshen, ahnjs124, rna0415}@skku.edu

Intent-Based Network Management Automation Project

Champion: Jaehoon (Paul) Jeong

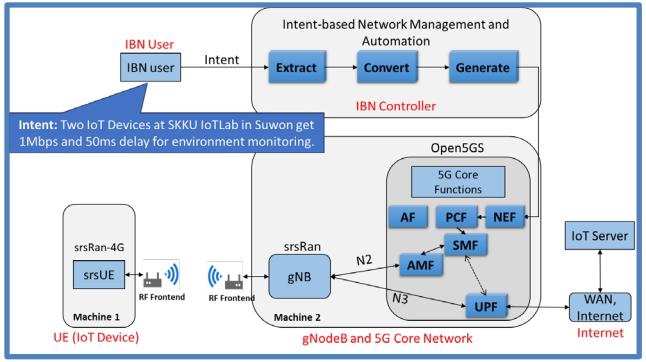
IETF-118 NMRG Hackathon Project

Professors:
- Jaehoon (Paul) Jeong (SKKU)
- Yiwen (Chris) Shen (SKKU)
- Younghan Kim (SSU)

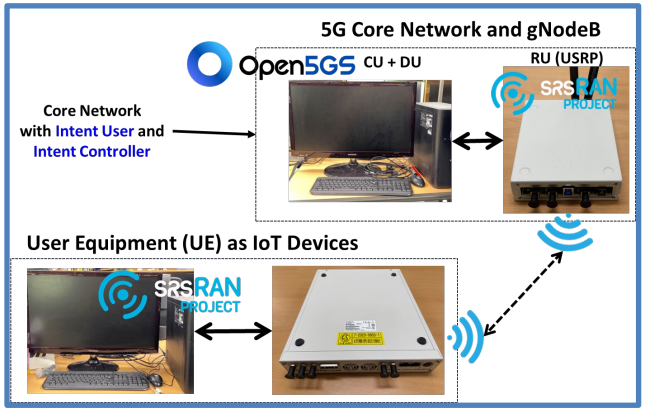
Researchers:
- Jung-Soo Park (ETRI)
- Yunchul Choi (ETRI)

Students:
- Yoseop Ahn (SKKU)
- Mose Gu (SKKU)

5G Testbed Architecture



SKKU 5G Testbed



What to pull down to set up an environment
- OS: Ubuntu 22.04
- Desktop for srsUE
- Desktop for gNodeB and 5G core
- USRP for UE
- USRP for gNodeB

Construction of Testbed
1. Install Open5gs, srsRAN22.04, MongoDB, and the dependencies
2. Modify Open5gs configuration (AMF and UPF)
3. Modify srsRAn22.04 configuration (enb.conf and rr.conf)
4. Add SIM information (imsi, key, and opc) on both Open5GS and srsUE
5. Create the TUN device with the interface name ogstun
6. Run Open5GS, gNodeB, and srsUE

Objective
- IBN User sends a configuration file to 5G Core Network.
- 5G Core Network changes its internal policy according to the configuration file.

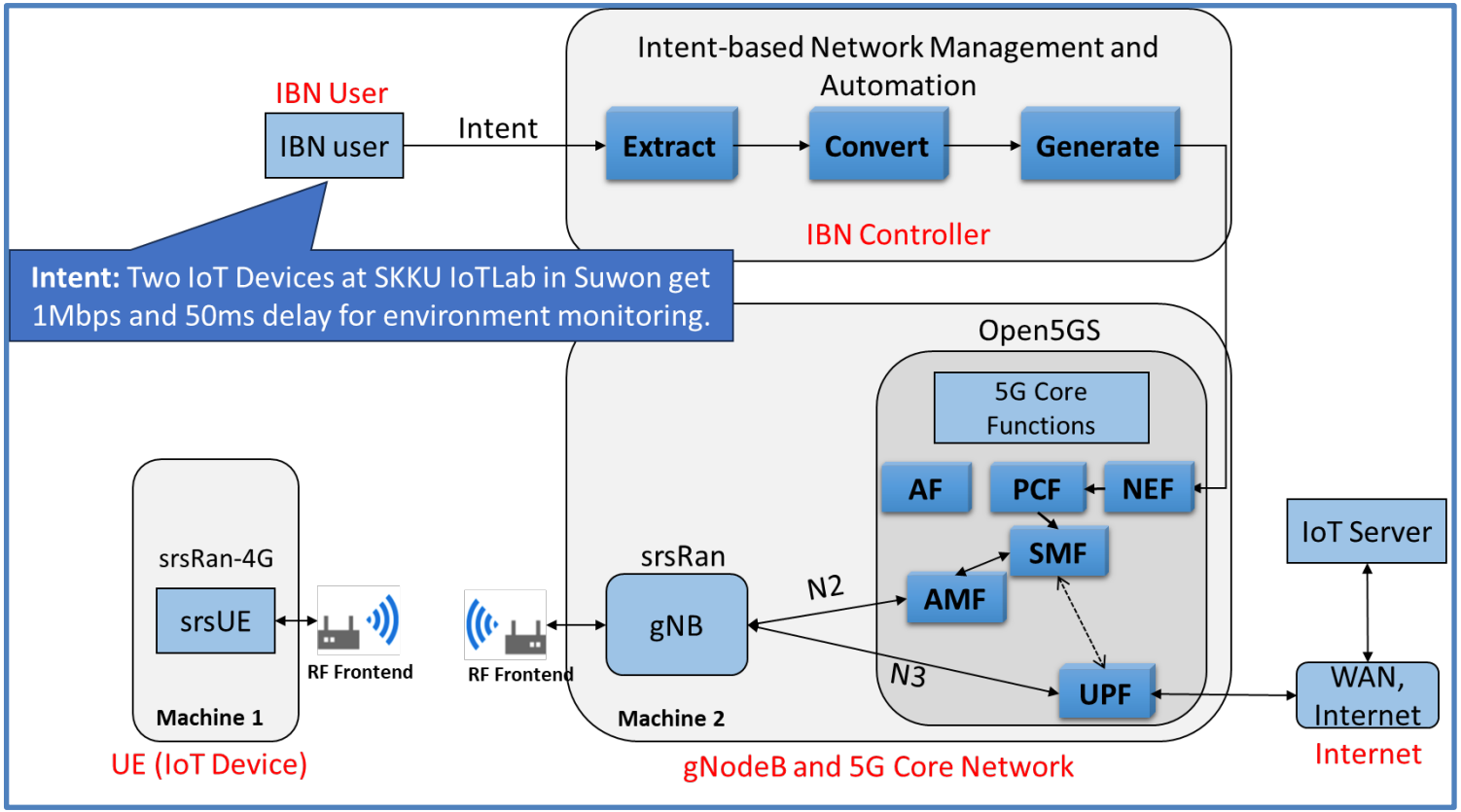
Future Work
- 5G Framework for Intent-Based Network Management Automation such as Intent Translation and Closed-loop Control
- Natural Language Processing (NLP)-based Intent Translation and Configuration File Generation

성균관대학교 SUNG KYUN KWAN UNIVERSITY | 숭실대학교 Soongsil University | ETRI 한국전자통신연구원 | SRSRAN PROJECT | Open5GS

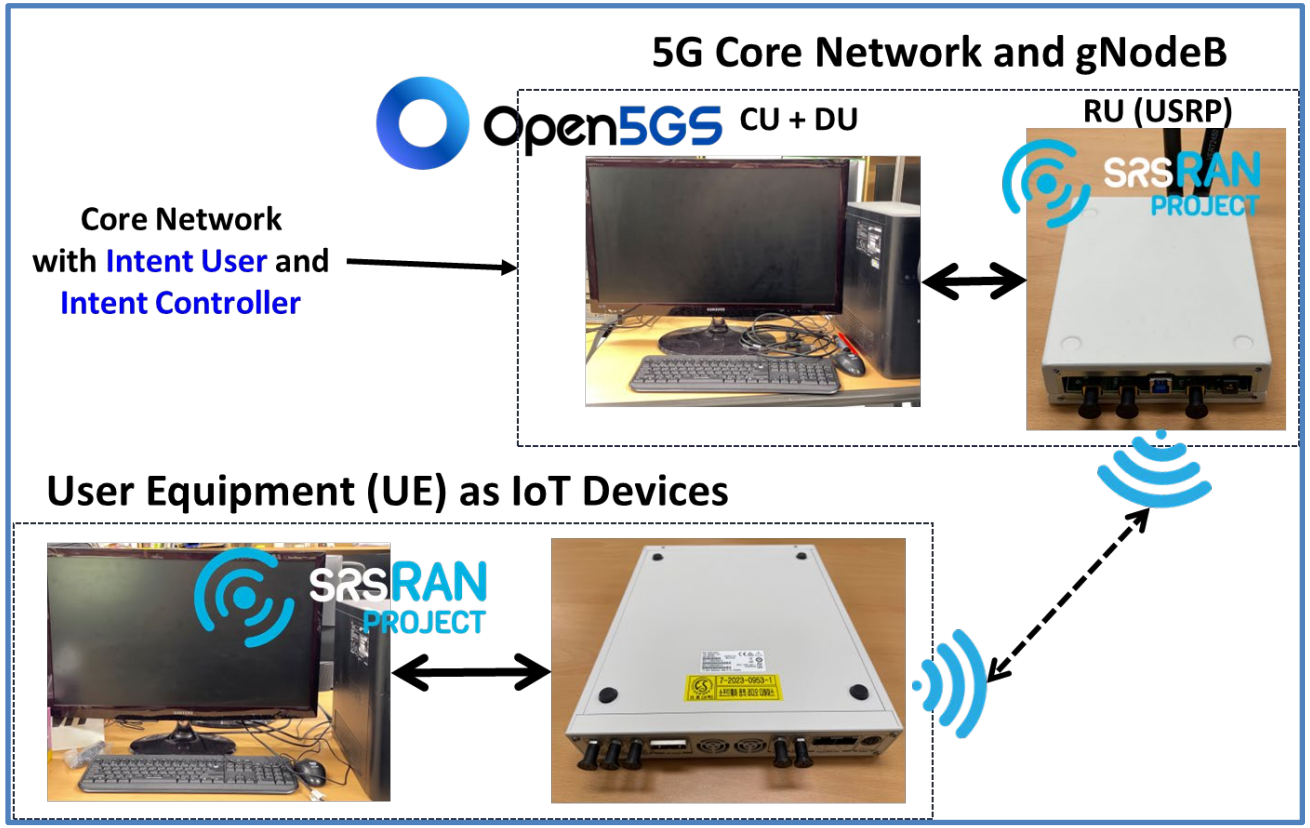
Hackathon Plan

- Goal in this hackathon project
  - To make a 5G Network Testbed for 5G Intent-Based Network Management Automation.
    - We install Open5GS, srsRAN22.04, MongDB and all the dependencies.
    - Configuration for 5G Networks
      - To configure the IP addresses of AMF and UPF and add USIM information on Open5GS
      - To configure enb.conf and rr.conf files on srsRAN based on the information on Open5GS
    - Make a communication between a UE and a RAN with USRP devices.

Intent-Based Network Management Automation in 5G Networks



SKKU 5G Network Testbed



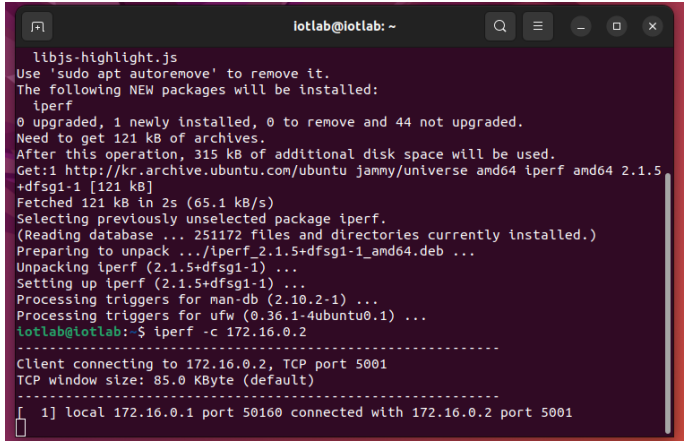
What got done (1/2)

- Both USRP devices can communicate with each other while Open5GS main functions (e.g., AMF, UPF, and SMF) are working.

- We could check the bandwidth and communication speed while both USRP devices are communicating with each other.

What got done (2/2)

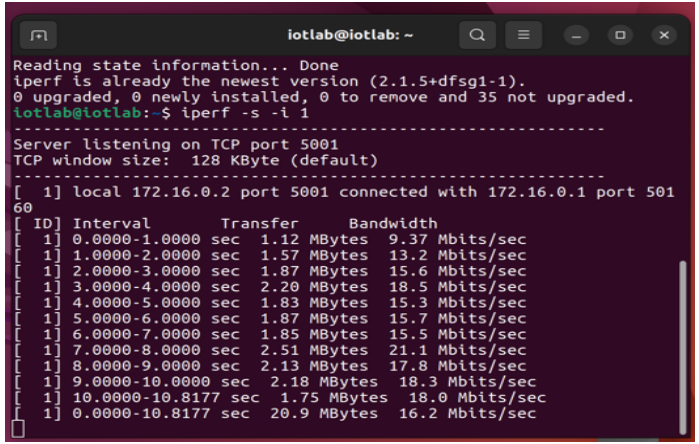
USRP1



Send messagea to the USRP2 using iperf.

5G Core Network and gNodeB

USRP2

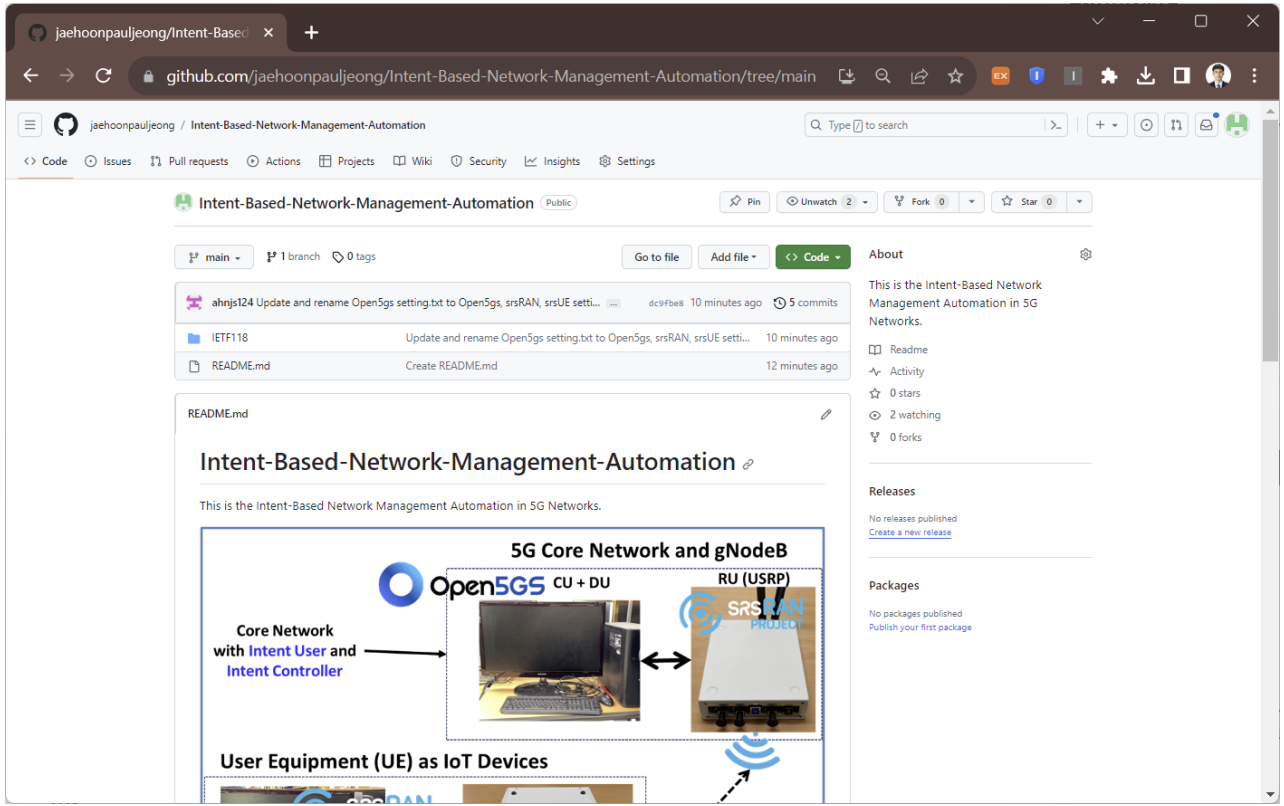


Receive messages from the USRP1 using iperf.

User Equipment (UE) as IoT Devices

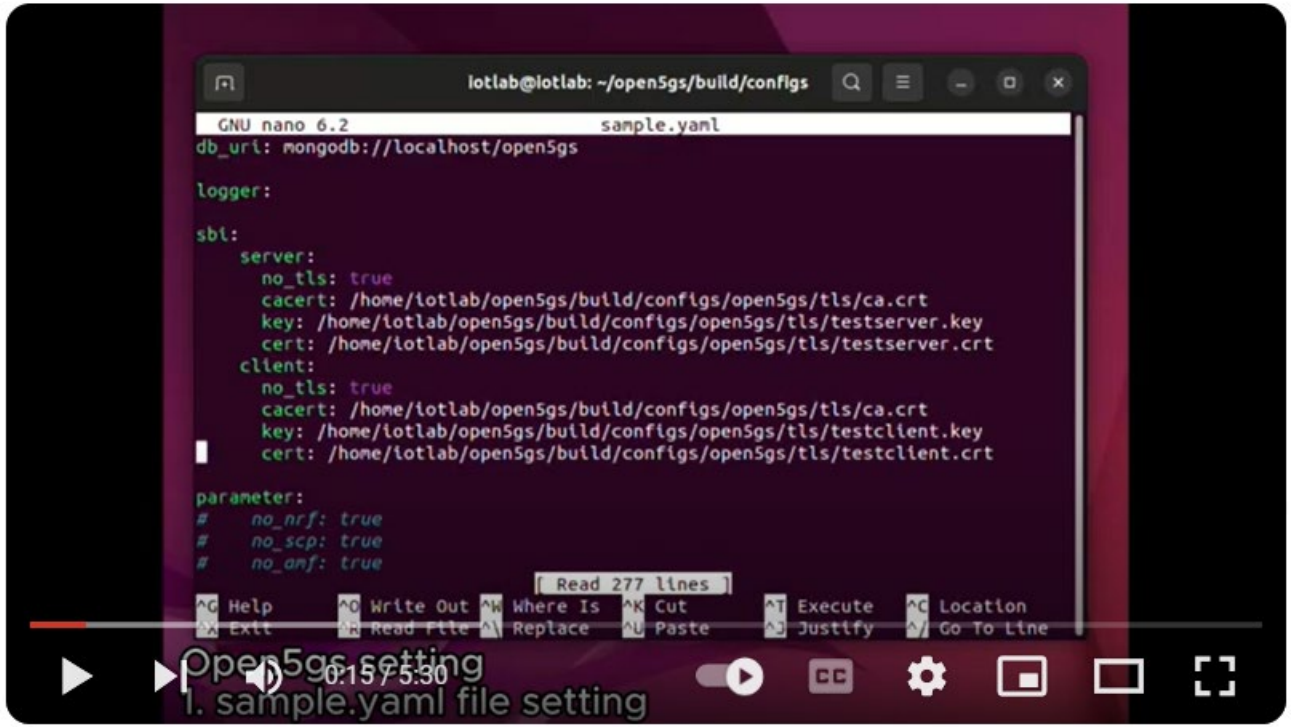
Open Source

URL: https://github.com/jaehoonpauljeong/Intent-Based-Network-Management-Automation/tree/main



Demonstration in YouTube (1/2)

URL: https://www.youtube.com/watch?v=DSxbhpWRvaI

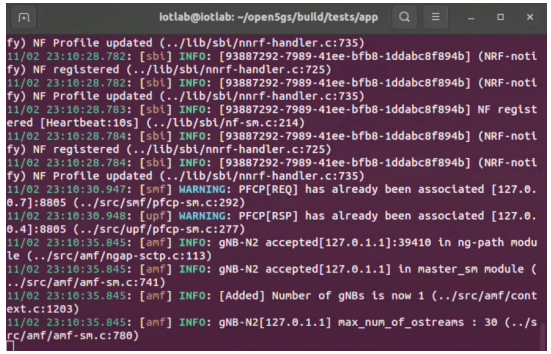


Open5gs(5gc) + srsRAN22.04 + srsUE demo (USRP B210)

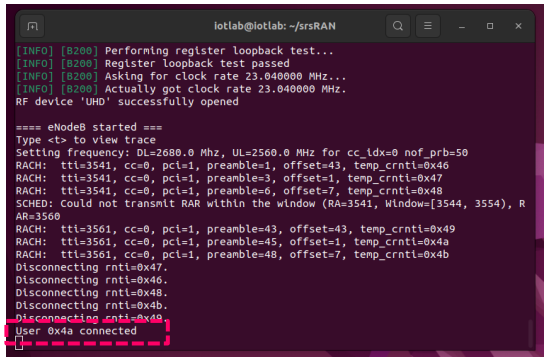
Demonstration in YouTube (2/2)

URL: https://www.youtube.com/watch?v=DSxbhpWRvaI

USRP1

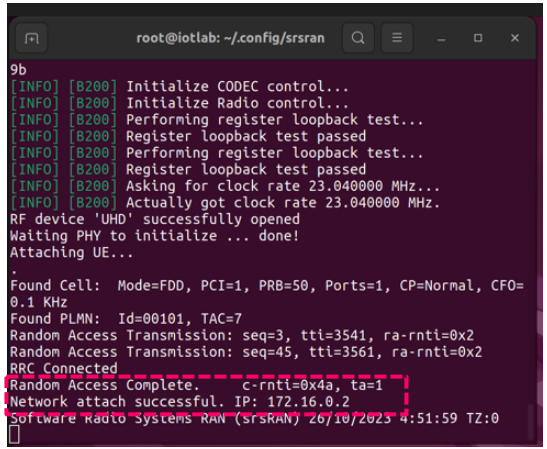


Open5gs (5gc)



SRSENB

5G Core Network and gNodeB



SRSUE

User Equipment (UE) as IoT Devices

USRP2

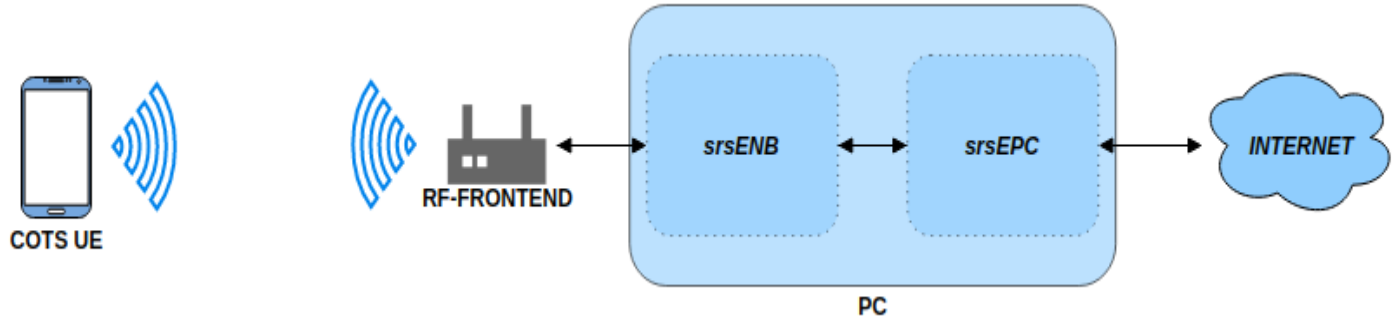
What we learned

- We learned the main structure of the Open5GS for the communicate between two USRP devices.

- We learned the following:
  - The setting of the configuration between Open5GS and srsRAN
  - How to make a communication through Open5GS and srsRAN using USRP devices.

Next Step

- We aim to configure and connect a 5G-capable COTS UE to a 5G SA network using the srsRAN-Project gNB and a 3rd-party 5G core network.
- We will implement and demonstrate an Intent-Based Network Management Automation in 5G Networks.



Wrap Up

Hackathon Team

- **Professors:**
  - **Jaehoon (Paul) Jeong (SKKU)**
  - **Yiwen (Chris) Shen (SKKU)**
  - **Younghan Kim (SSU)**
- **Researchers:**
  - **Jung-Soo Park (ETRI)**
  - **Yunchul Choi (ETRI)**
- **Students:**
  - **Yoseop Ahn (SKKU)**
  - **Mose Gu (SKKU)**
  - **Nobuo Aoki (NII)**

Hackathon Team Photo