

5G Project

Project period

August 2018~

Project overview

In this project, for the purpose of "evaluating the local 5G environment using OSS", we will share with OOL members the knowledge gained from function and performance verification of mobile-related OSS such as RAN and 5GC, MEC and the orchestrator/controller as the surrounding technologies.

In FY2020, we focused on a stand-alone configuration, which is one of the configurations in 5G, and conducted functional verification using OSS mainly related to 5GC. In addition, we carried out functions and performance evaluations of OSS realizing low-latency processing in MEC, and function evaluations of OSS related to the orchestrator/controller.

In FY2021, we will continue to evaluate mobile-related OSS and focus on visualization from an operational perspective.

In addition, we will construct a series of verification environments connecting RAN, 5GC, MEC, etc., and evaluate the effectiveness of OSS in assumed use cases.

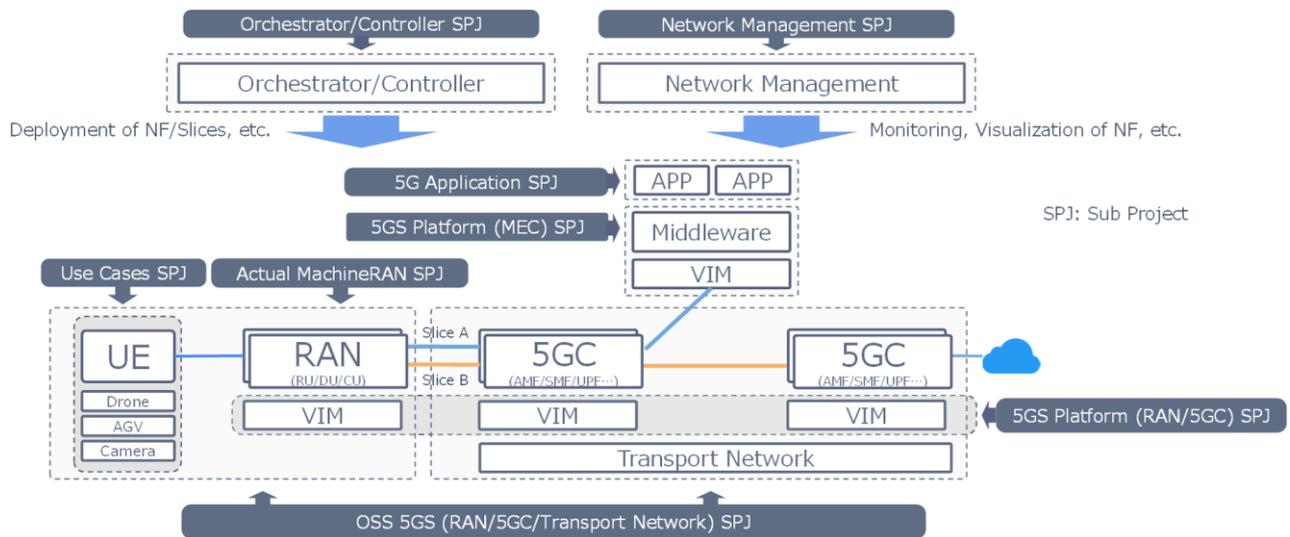
Project background

5G has three main features: high-speed and large capacity (eMBB), multiple simultaneous connections (mMTC), and high-reliability and low latency (uRLLC), and is classified as a carrier 5G built by mobile operators and a local 5G that general enterprises and local governments built by themselves in the limited areas. As the latter one increases, various services rooted in the local area are expected to be developed, so that active slice control according to the traffic attribute (eMBB/mMTC/uRLLC) for each service is considered to become more important.

On another side, many of mobile control software and equipment required to build mobile networks such as 5G are considered to be provided by major vendors at present. On the other hand, various OSS mobile control software (OpenAirInterface5g, free5GC, etc.) have been developed on a community basis in recent years. Although the implementation status and software quality differ from community to community, by using these OSS mobile control software, general companies and local governments can build their own mobile networks with greater degrees of freedom.

As a basic policy of OOL and 5G project, we will focus on local 5G and slice control technology, and conduct investigation and verification. At the same time, by investigating and verifying the implementation status of OSS mobile control software, we will clarify various requirements and

technical methods necessary for slice control for each service using OSS, and deliver the knowledge obtained.



List of sub projects (SPJ)

- OSS 5GS (RAN/5GC)
 - RAN/5GC
 - Transport Network
- Actual Machine RAN
- Network Management
 - Operation
 - Visualization/Security
- 5GS Platform (RAN/5GC)
- Use Cases
- 5G Application
- Orchestrator/Controller
- 5GS Platform (MEC) * Under adjustment of SPJ members

OSS 5GS (RAN/5GC) Sub PJ

- Objective
 - Investigate and verify the implementation status of each OSS for evaluating the practicability of 5GS using OSS
- Implementation plan
 - Investigate and verify 5G SA implementation status of open source RAN
 - Investigate and verify 5G SA implementation status of open source 5GC (free5GC/Open5GS)

Actual Machine RAN Sub PJ

- Objective
 - Establish a connection between 5G UE devices and 5GC using OSS (free5GC, Open5GS) through 5G RAN equipment (RU, CU, DU)
- Implementation plan
 - Verify connections in all-in-one configuration (RU, CU, DU integrated configuration)
 - ✧ Sub-6Ghz (N78, etc.)
 - ✧ (mmWave) *Depending on time and resources
 - Verify connections in isolated configurations (RU+CU/DU configurations)
 - ✧ Sub-6Ghz (N78, etc.)
 - Verify network slicing of RAN sections *Depending on time and resources

Network Management Sub PJ

- Objective
 - Develop, build and verify tools and environments that enable start and stop of each function, event detection, and traffic visualization for the management of 5G networks using OSS
- Implementation plan
 - Develop tools to start and stop NF
 - Develop event detection tools for 5G networks
 - Build traffic visualization environment for 5G networks

5GS Platform (RAN/5GC) Sub PJ

- Objective
 - Clarify technologies for realizing containers and virtual machine environments, their related technologies and applicable areas on the 5GS platform

- Implementation plan
 - Organize applicable areas of containers and virtual machines for 5GS
 - Build and verify containers and virtual machines environments for 5GS
 - ◇ Verify and organize surrounding functions and tools
 - Verify OSS 5GS operation on containers and virtual machines

Use Cases Sub PJ

- Objective
 - Consider 5G use cases unique to Okinawa and OOL
 - Identify system issues of 5G systems through demonstration experiments in the examined use cases

- Implementation plan
 - Study use cases to be demonstrated in PoC environment built with free5GC
 - ◇ Prioritize use cases that are effective in the technical field of sub projects with certain results (network slices, etc.)
 - Consider system applications for the use cases considered
 - Examine 5G system issues based on the results of demonstration experiments

* For application development, we are looking for participation from outside of OOL, such as cooperation with students.