Development of Local Cloud Environment in the User Vicinity

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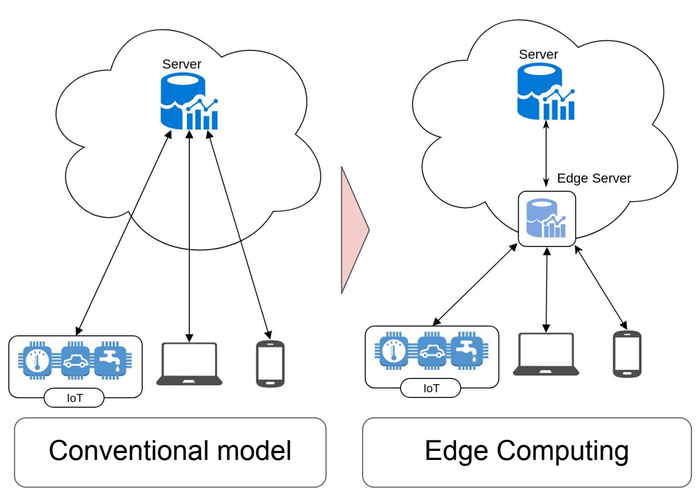
Background

As the Internet environment has evolved, terminals connected to cloud services are increasing. This situation is facing new challenges. In order to solve problems such as communication delay, has emerged a processing model called edge computing.

However, in order to perform edge computing, it is required to have the server near the user. Neighboring placement on the Internet can be achieved by installing a server at a data center or the like, while physical edge computing outside the Internet is another way which is used as the de facto standard in construction and operation. With the spread of IoT devices, the demand for local intra-communication that does not need to connect to the Internet is rising, but it is time-consuming and expensive to operate such communication network, especially the construction and the control mechanism in the physical environment.

This study is focusing on the research and development of
physical infrastructure systems for local environment



Issues

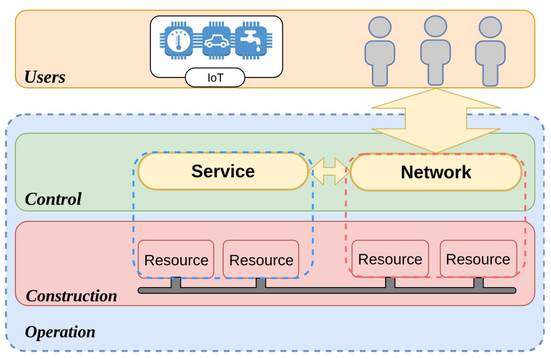
There are some challenges in
Service delivery for local environment,
communication platform for IoT devices
using edge computing, and physical
infrastructure implementation

Outdoor, mountains and fields etc...

Construction	Challenges on installation / Reproducibility OS and network equipments set-up for a specific area
Operation	Mobility and failure in local. Configuration expansion issue or hardware upgrade problem.
Control	Flexible control mechanism tailored to the situation Deployment of networks that can accommodate users and IoT devices.

Solution

We propose a compact and inexpensive
portable cloud that can solve
the problem of physical infrastructure.
The scalability and migratory are
considered, and it's cheap and
it can be exchanged easily.
More than one single board computers
are used and mounted.

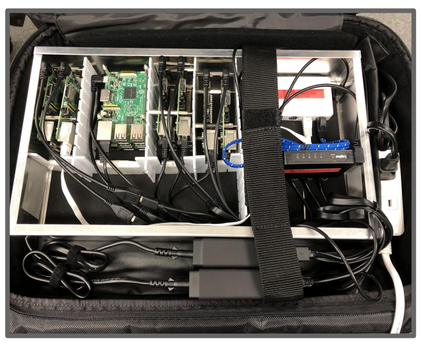


Construction	Since it is possible to prepare multiple units and to unify settings, OS installation and network construction
Operation	Compact size makes it easy to handle and is ideal for moving Because it is inexpensive and easy to obtain, it can cope with trouble, etc.
Control	Services and networks according to requirements. Systems that can be flexibly controlled and managed.

Method

Construction / **Operation**	Physical environment
Operation / **Control**	Network provision
Control	Service delivery

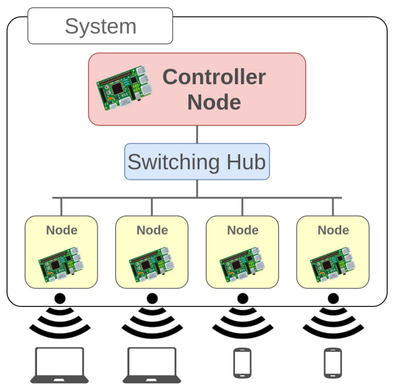
Consideration of scalability, mobility,
easy to replace with single board computer
Multi-equipement implementation.



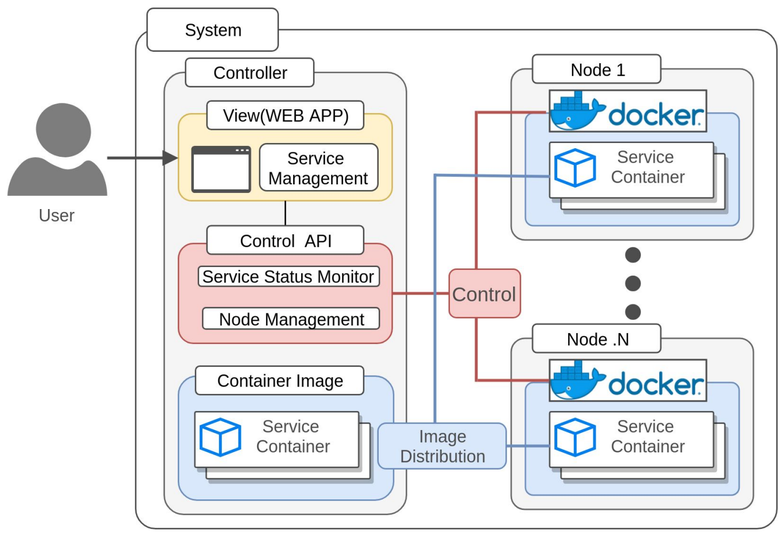
1st Prototype System Configuration
(9 units)
2 small switching hubs

2nd Prototype System Configuration
(5 units)
1 small switching hubs

It provides a network for user
accommodation the nodes
operate as a single board computer



Available access points depending on the number of connected terminals.
can adapt according to the needs.



Internal service provisioning is implemented with Docker. It is possible to activate required applications only, depending on the usage / situation giving more flexibility

Future Works

- Implementation of functions that enable to backup and set up of processed data in the local area using the internet or the data Storage media.
- Improvement of the system configuration from current bag to physical

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