오픈스택을 활용한 IoT-Cloud 서비스 개발기

한정수, 김승룡

네트워크 컴퓨팅 연구실
전기전자컴퓨터공학부
광주과학기술원

Speakers

- 한정수
- 광주과학기술원 전기전자컴퓨터공학부 박사과정
- 관심분야
  - 오픈스택을 활용한 테스트베드 구축
  - 워크플로우 기반의 오케스트레이션

- 김승룡
- 광주과학기술원 전기전자컴퓨터공학부 박사과정
- 관심분야
  - IoT-Cloud 환경에 대응하는 컨테이너 기반의 서비스
  - 유연하고 동적인 서비스 운영을 위한 모니터링 및 오케스트레이션

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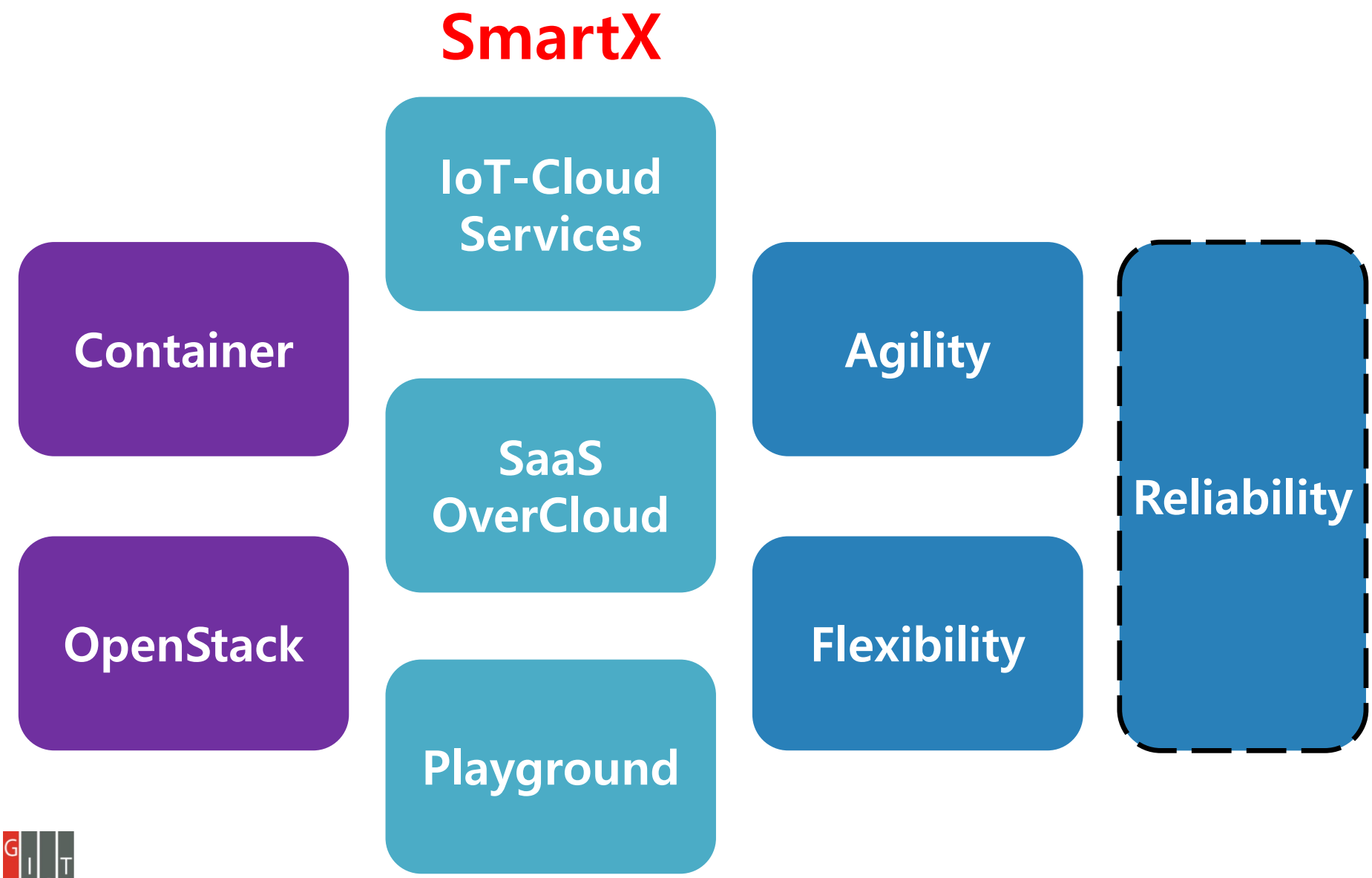
- OpenStack-leveraged SmartX Playgrounds
- Smart Energy IoT-Cloud Service
- SaaS OverCloud

Motivation


SmartX
IoT-Cloud Services
SaaS OverCloud
Playground
Container
OpenStack
Agility
Flexibility
Reliability

OpenStack-leveraged SmartX Playgrounds

Smart + X

Providing Intelligence

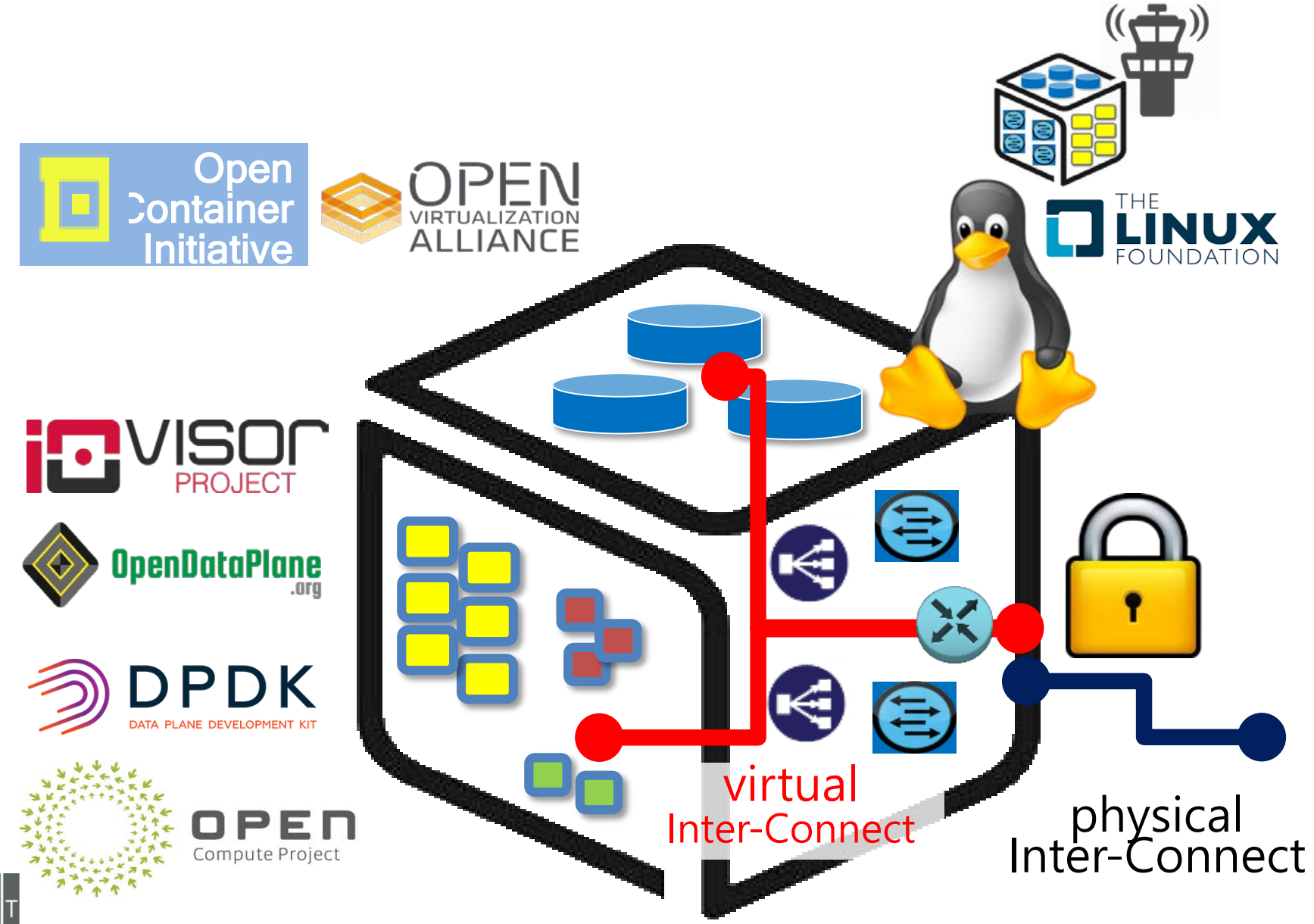
All services that are
Flexible and Adaptable

Provides **Flexible/Agile**

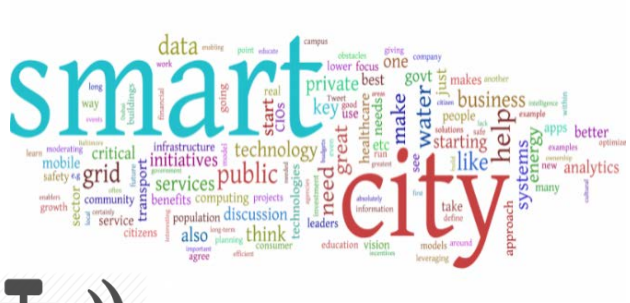
SmartX User-defined

Services and Infrastructure

SmartX Box: Inter-Connected Functions inside Boxes/Sites

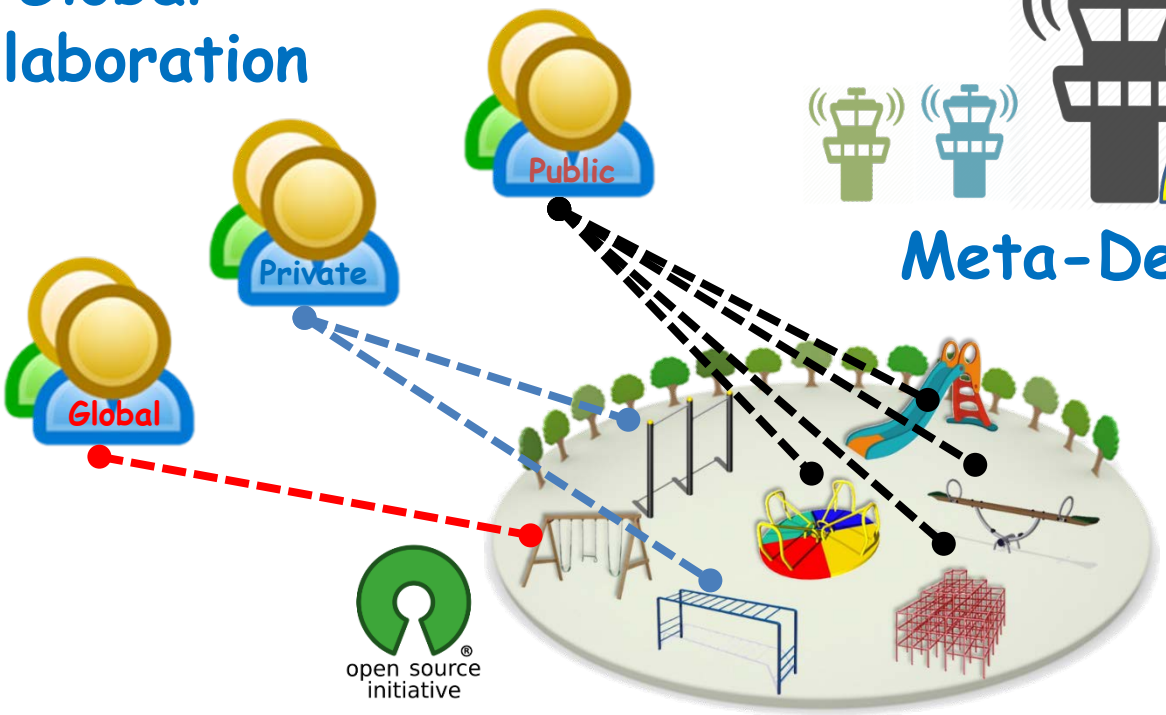


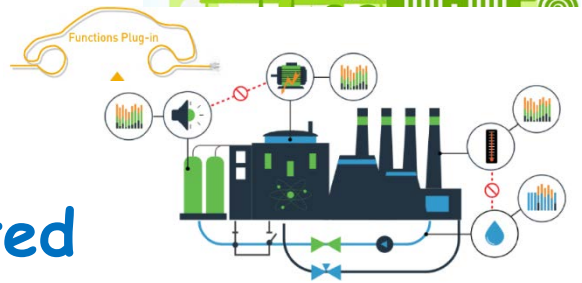
Building/Operating Open-Source, Composable, and Federated Playground



Open PPP & Global Collaboration

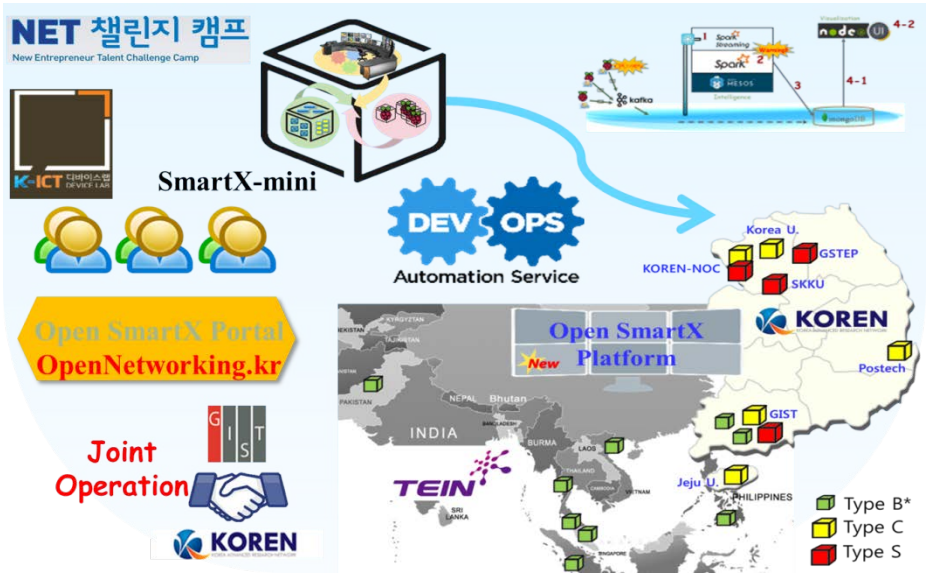
Meta-DevOps Tower



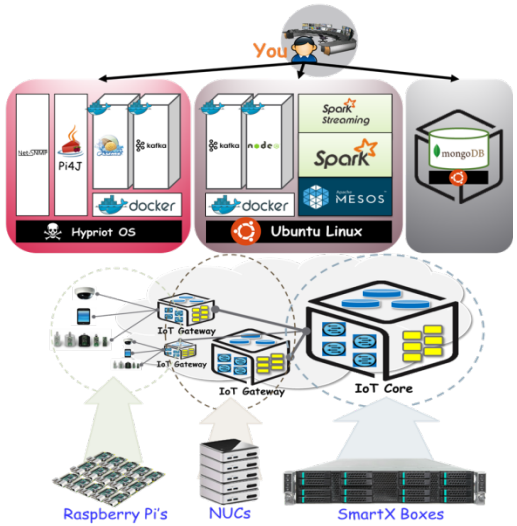


Open-Source/Composable/Federated

SmartX Playgrounds (2012 ~ 2015)

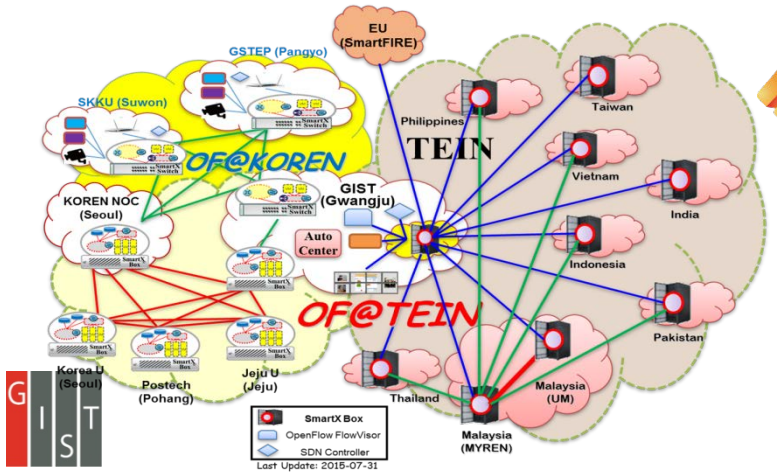


SmartX Playground Expansion for IoT—Cloud (2015~)



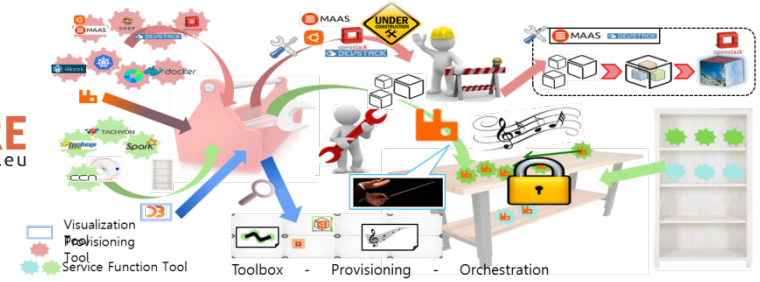
SmartX & SmartX-mini IoT-Cloud

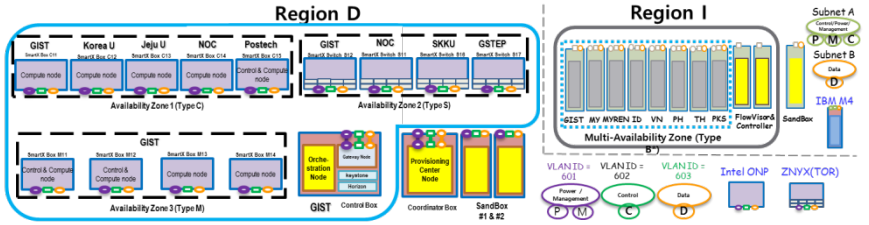
Building/Operating SmartX (OF@KOREN / OF@TEIN) Playground (2012~2015)



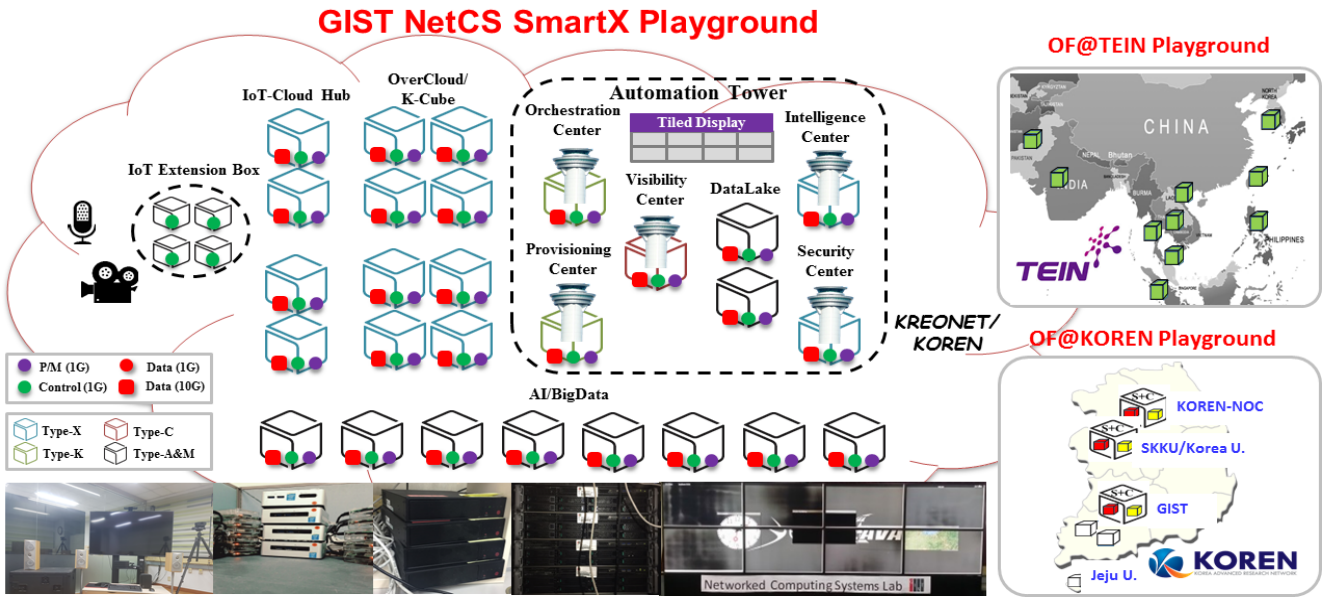
SmartFIRE
www.eukorea-fire.eu

SmartX Playground & Operation Tower (2012~2015)



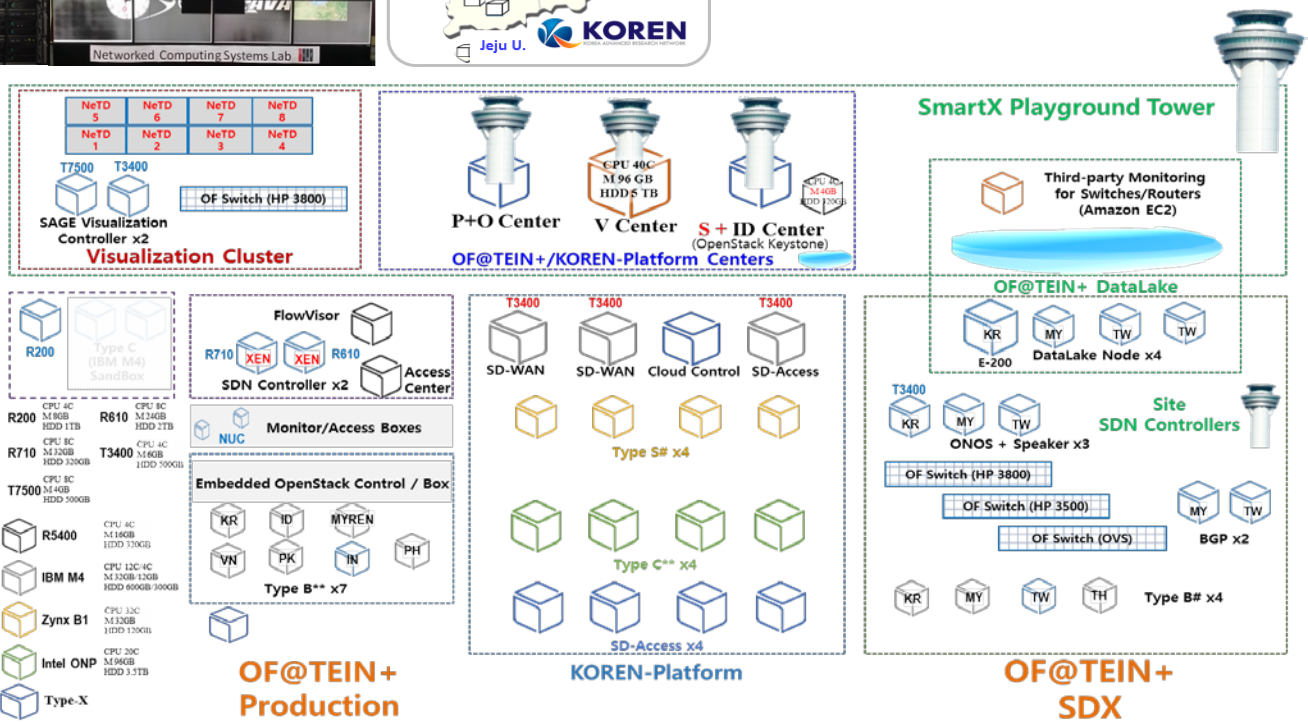


SmartX Playgrounds (2015 ~ 2017)



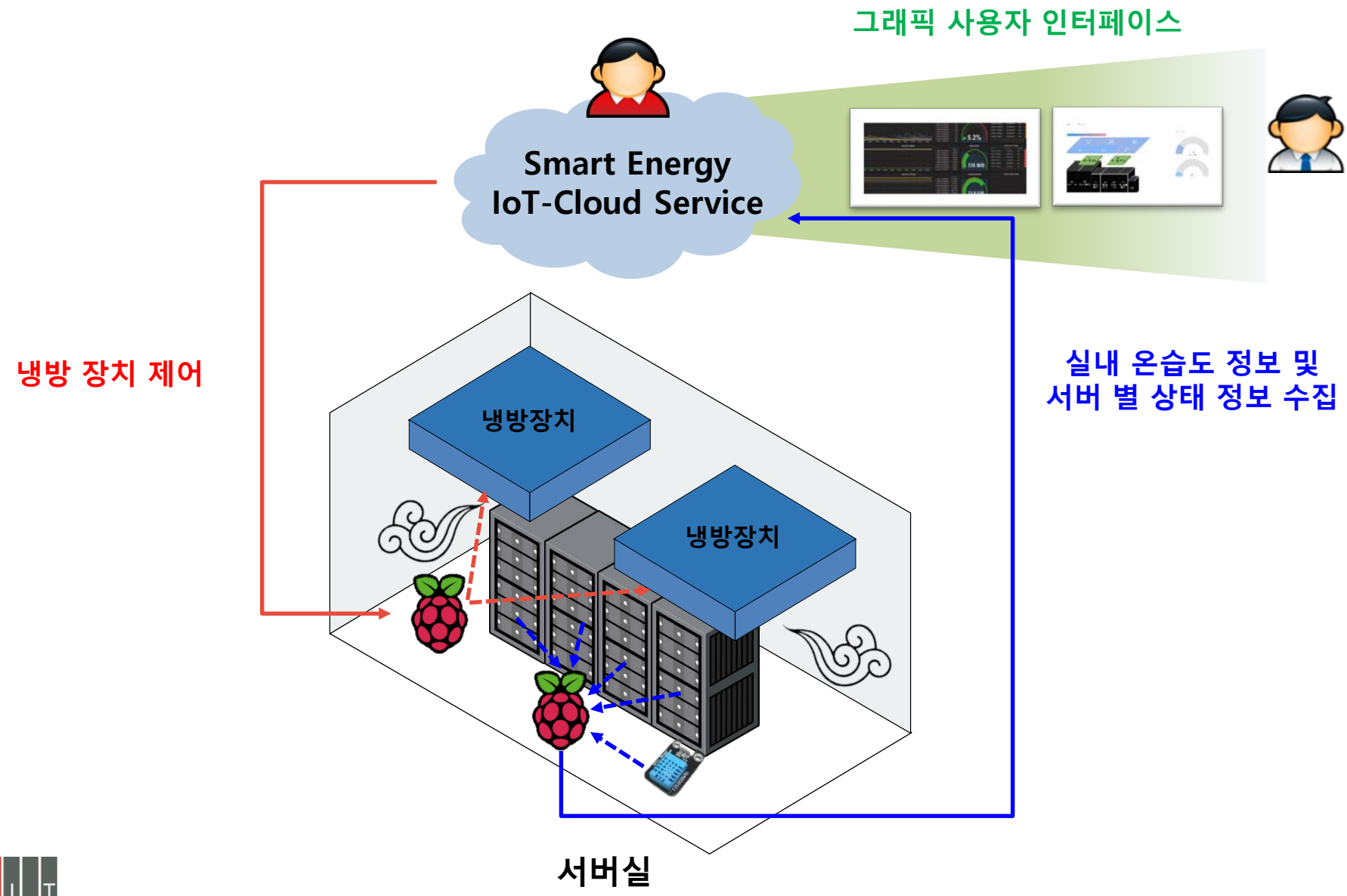
GIST NetCS SmartX Playground

OF@TEIN+/ KOREN-Platform Playground

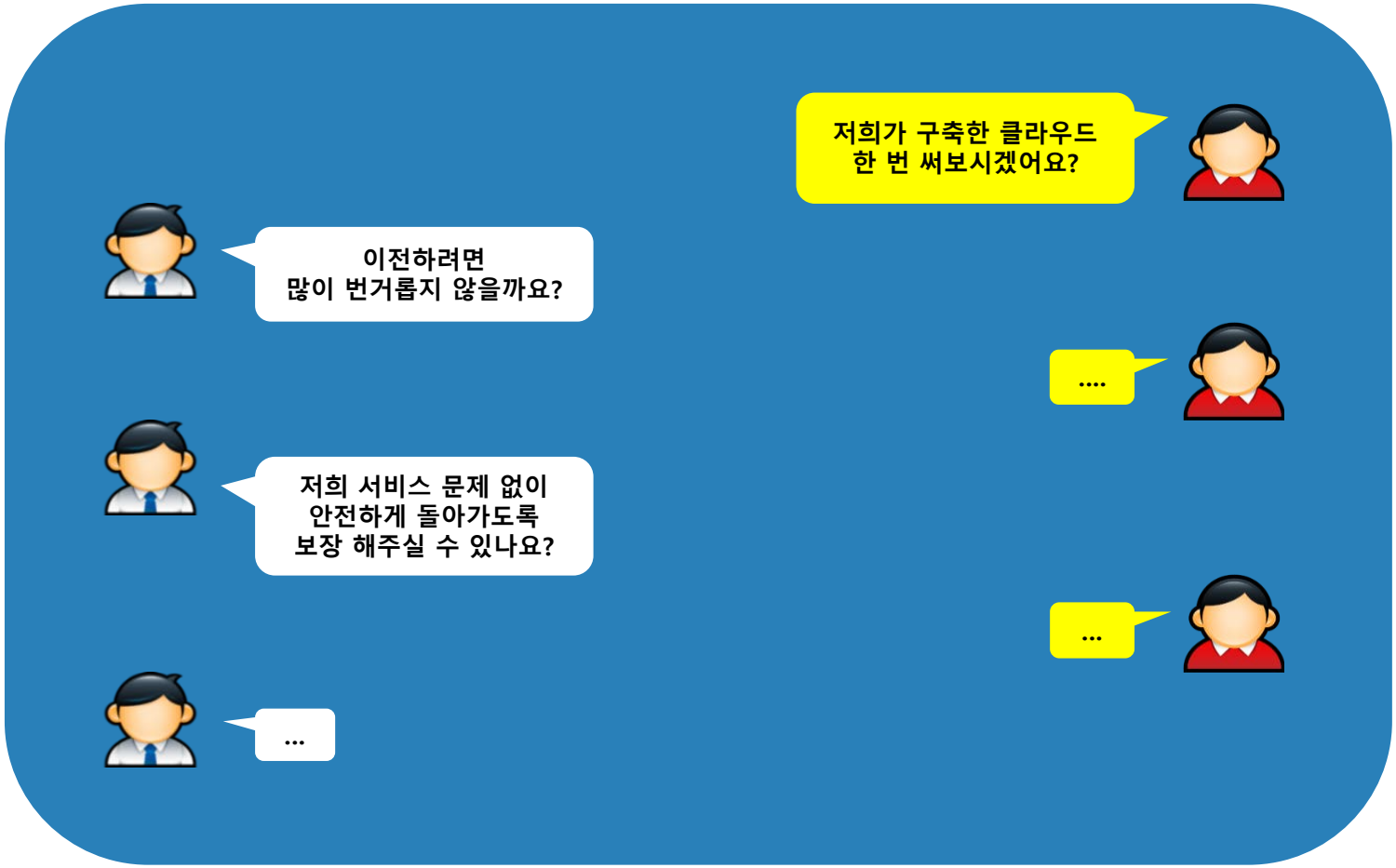


Smart Energy IoT-Cloud Service

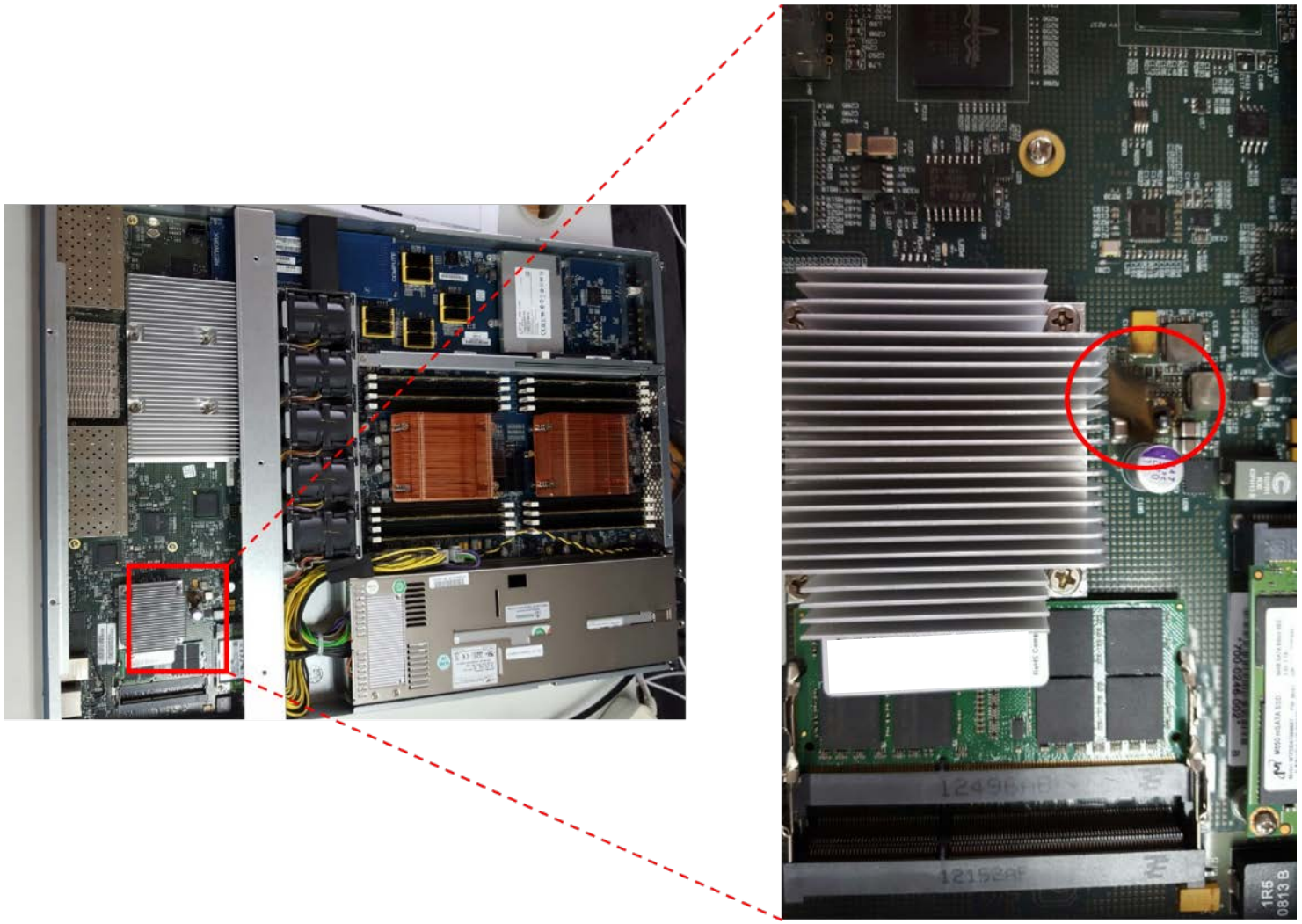
IoT-Cloud Service: Overview



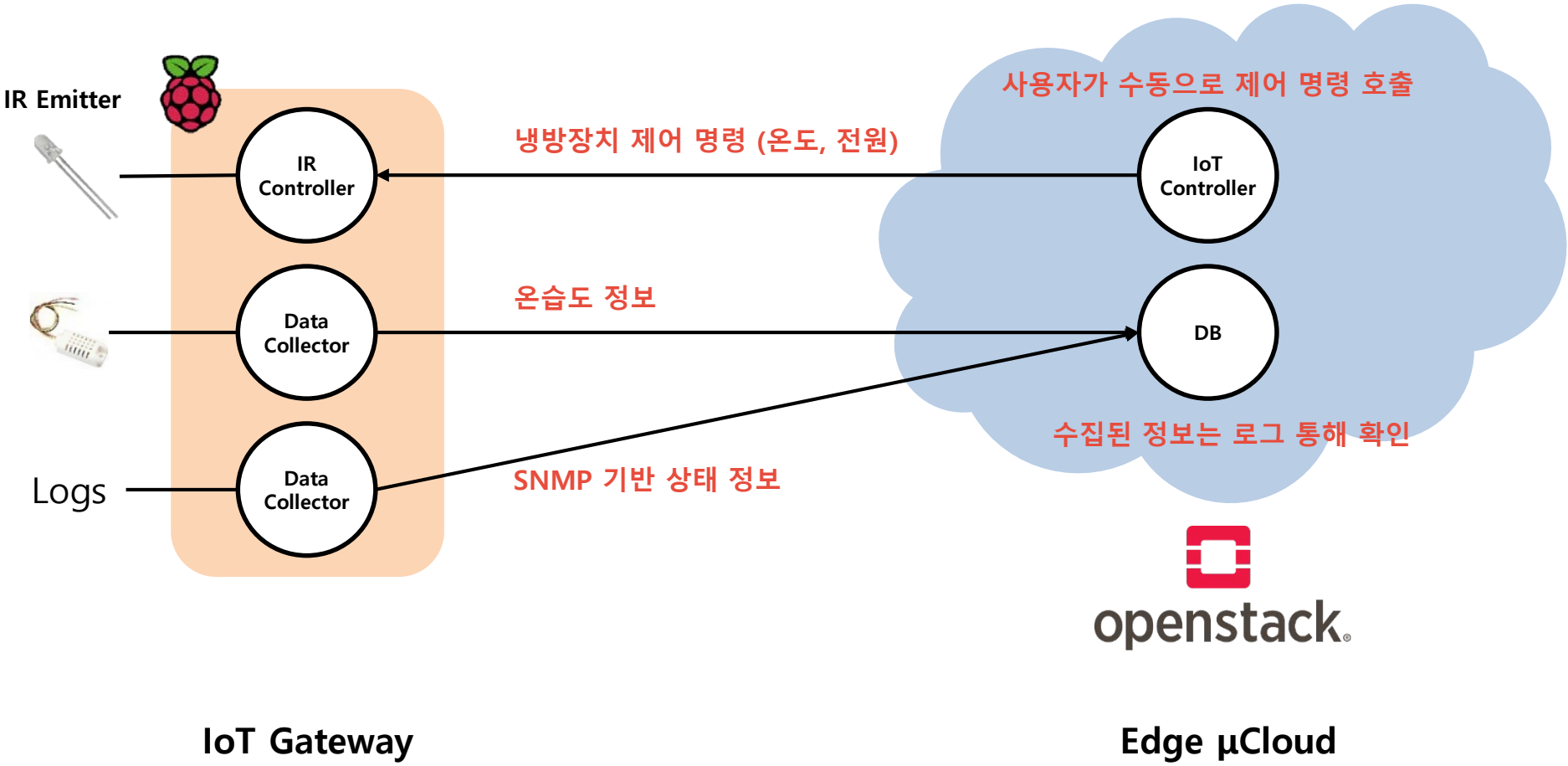
IoT-Cloud Service: Motivation



IoT-Cloud Service: Motivation



IoT-Cloud Service: Prototyping with Edge µCloud



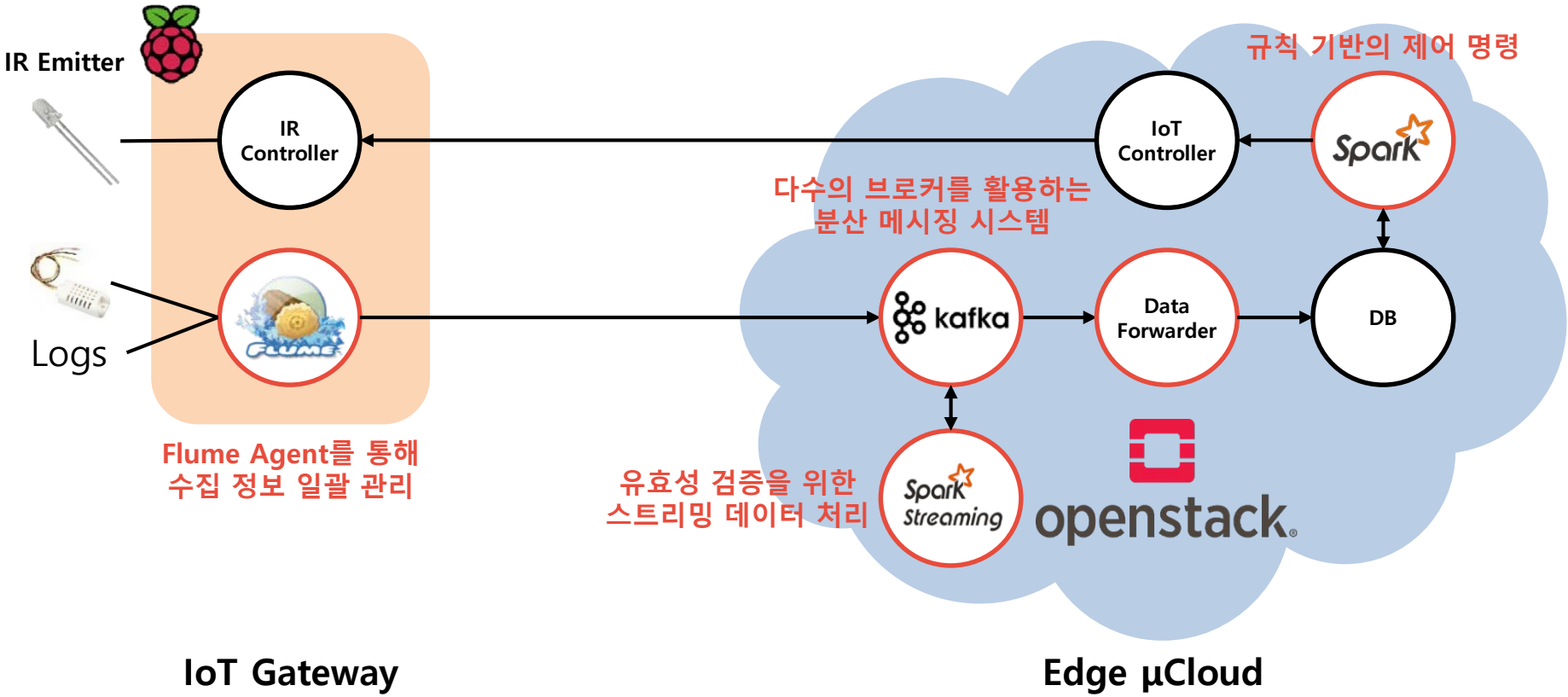
Problems

- 해결해야 하는 문제들
  1. 불안정한 네트워크 환경
  2. 사물인터넷 장비들의 열악한 성능 및 환경

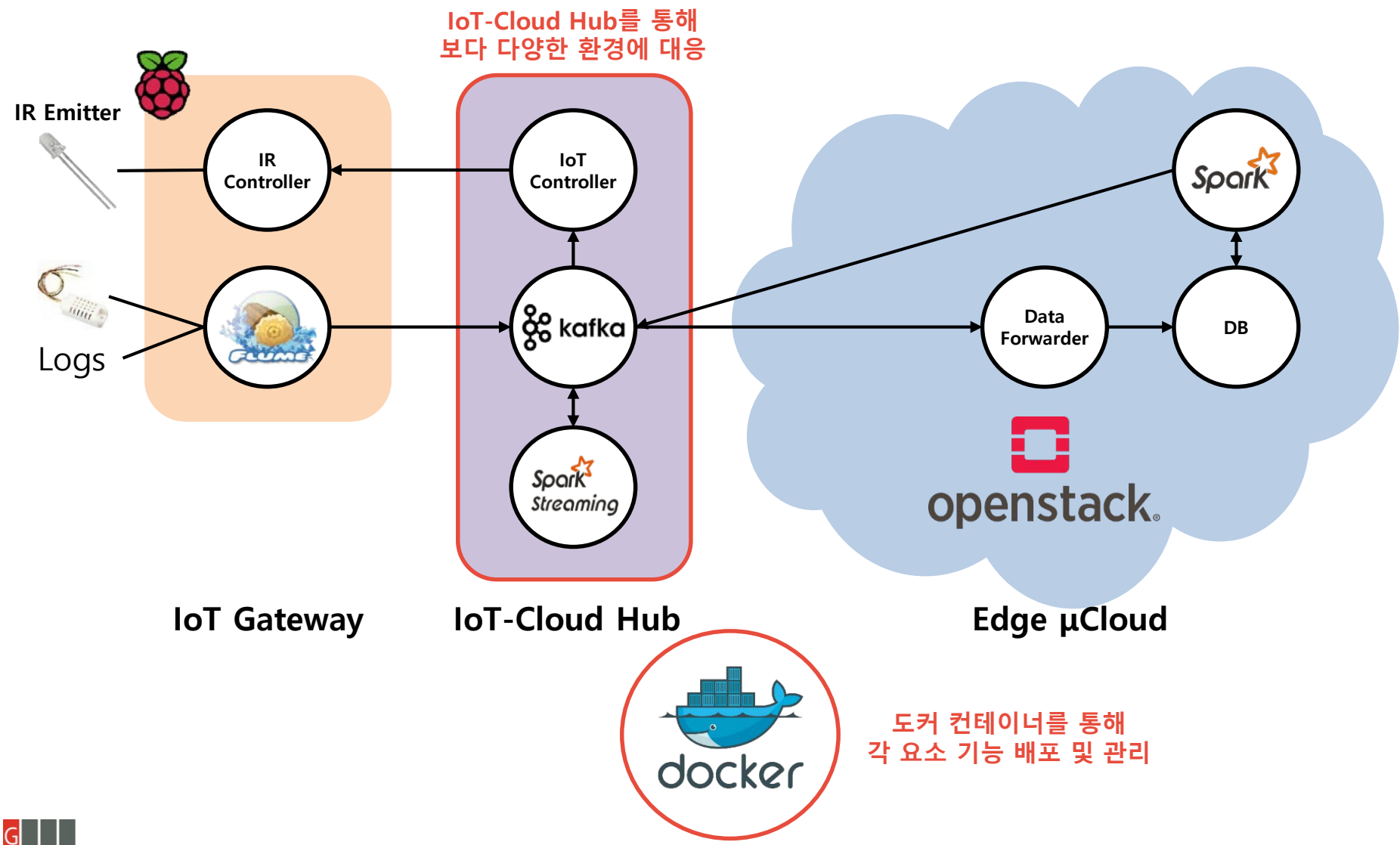
  → 이로 인해 발생하는 데이터의 지연, 손실, 변조 등

- 해당 문제들을 해결하기 위한 방안
  1. 문제 발생을 최소화
  2. 문제의 범위를 축소
  3. 발생한 문제에 대해 기민한 대응

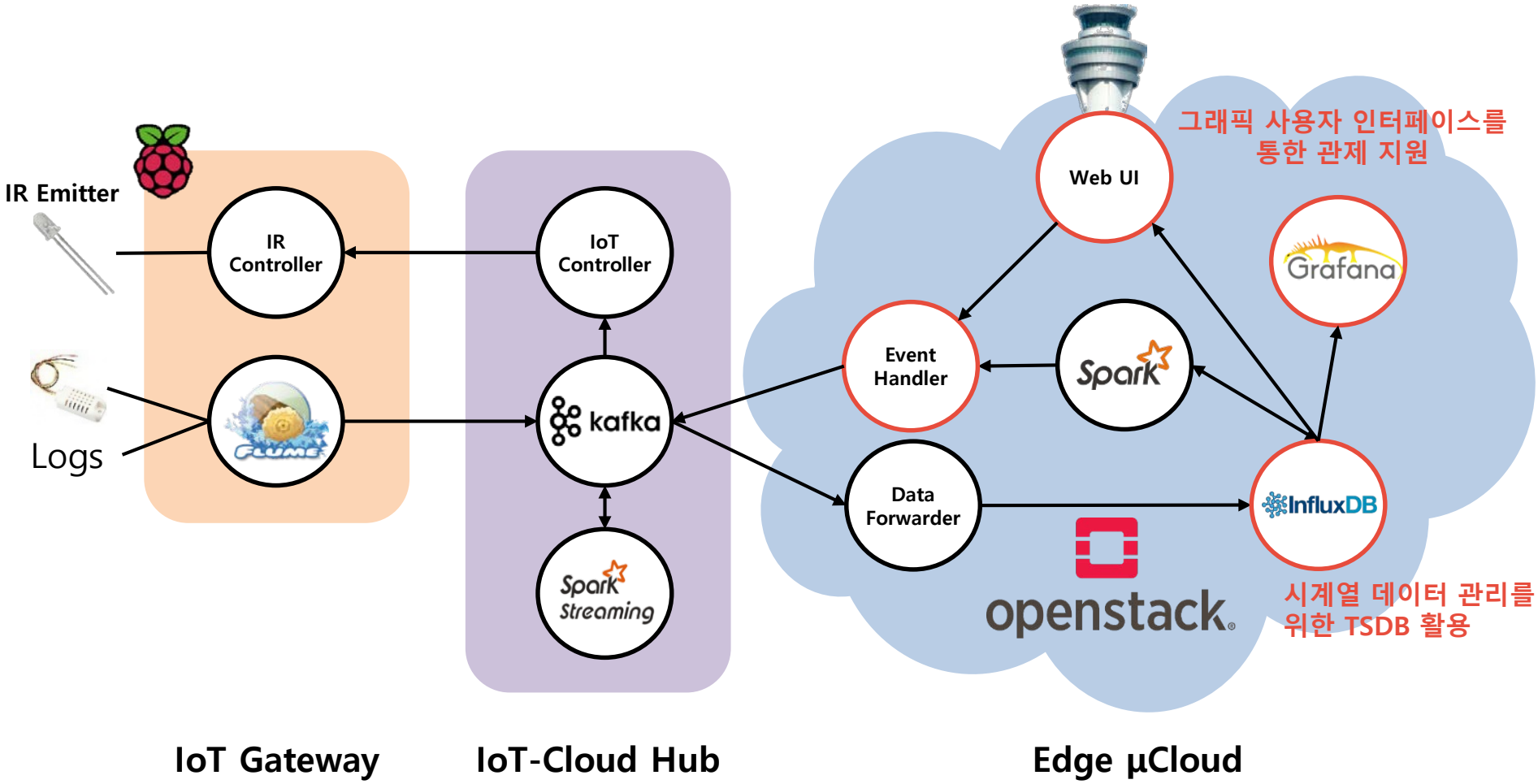
IoT-Cloud Service: Using Open-source Software



IoT-Cloud Service: Containerized Functions



IoT-Cloud Service: Visibility & Visualization

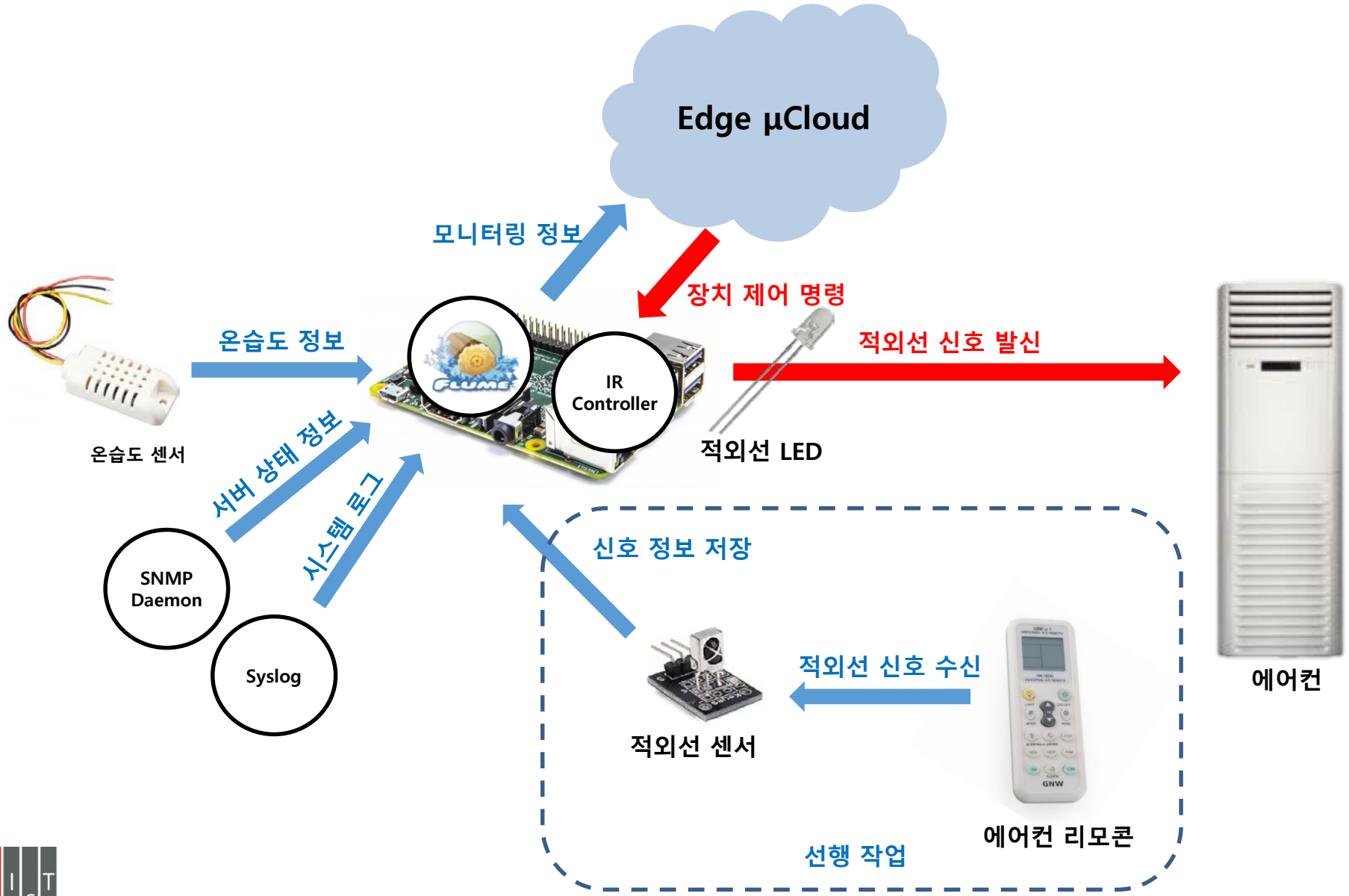


docker

DEV OPS Automation Service

Jenkins 등의 DevOps 도구 활용

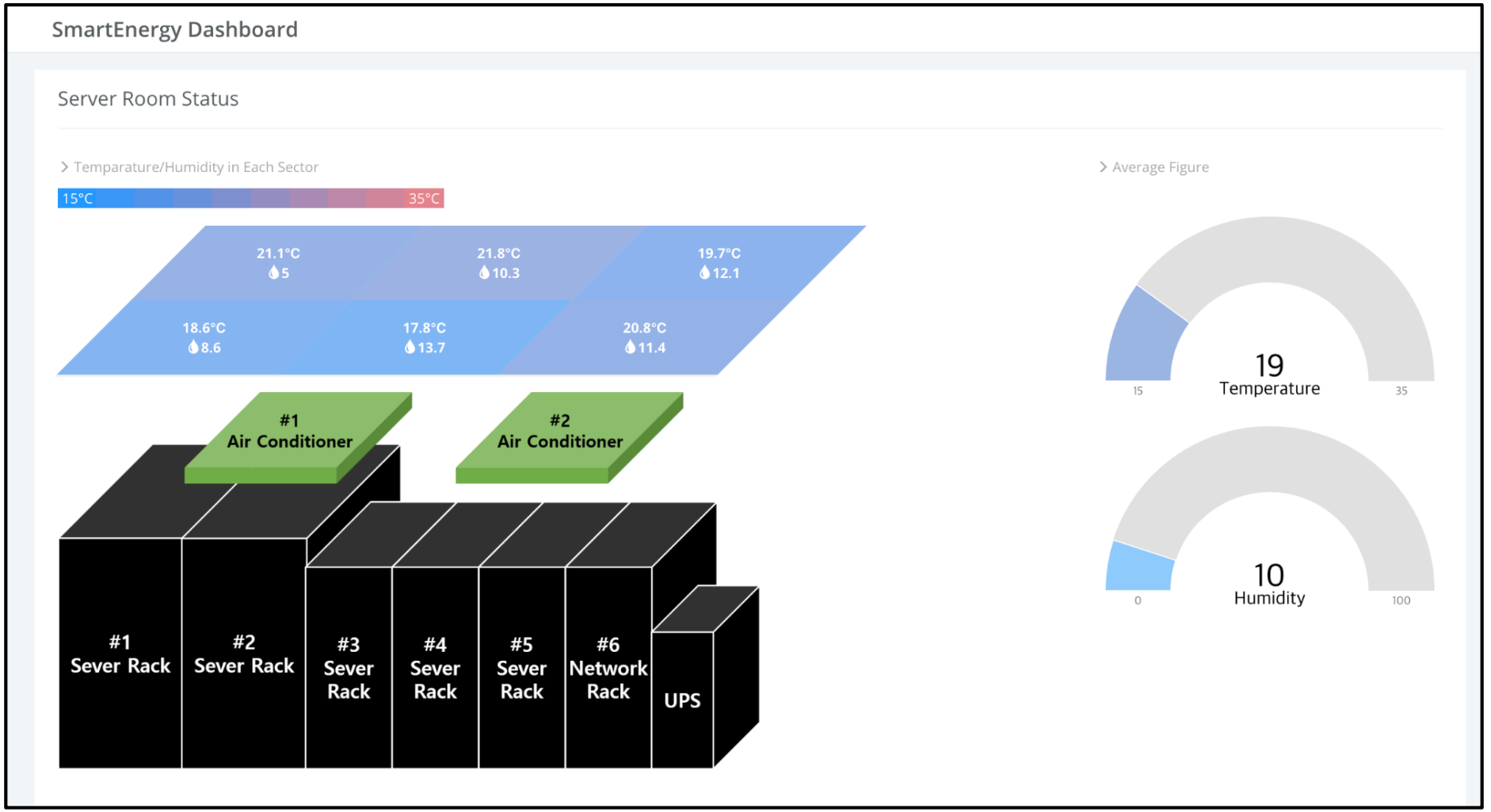
IoT-Cloud Service: Things



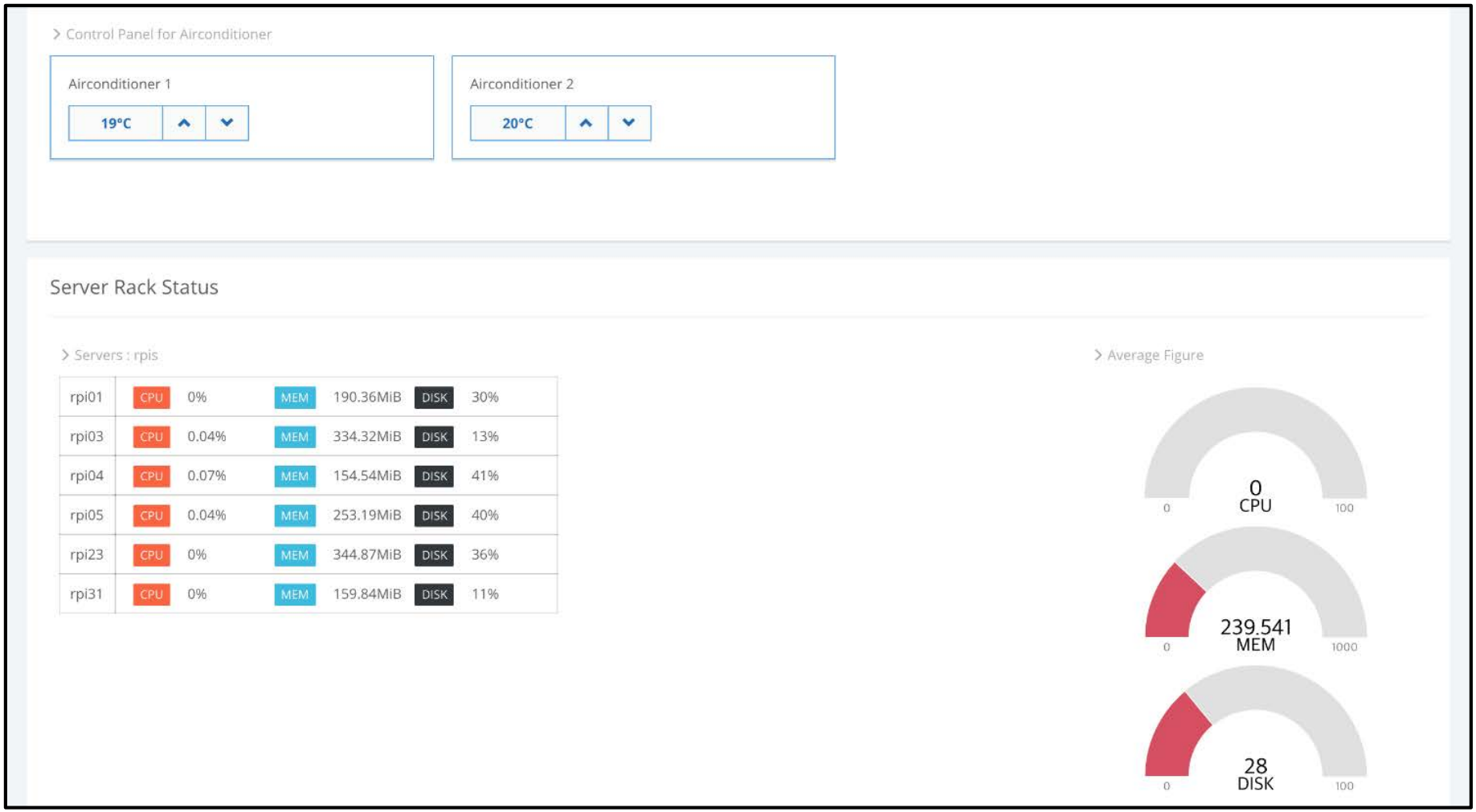
IoT-Cloud Service: Things with IR Emitter

IoT-Cloud Service: Visualization

IoT-Cloud Service: User Interface

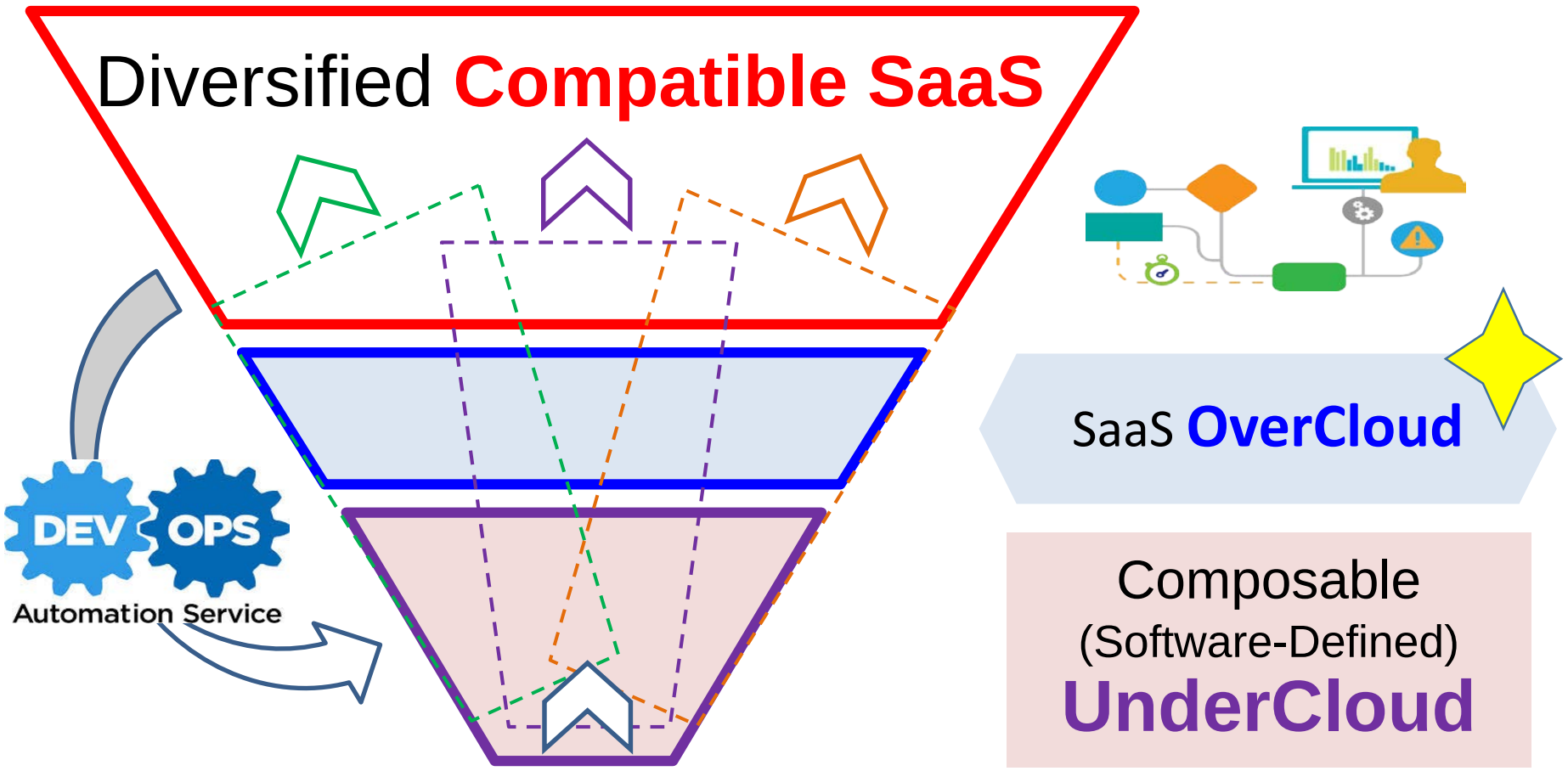


IoT-Cloud Service: User Interface



SaaS OverCloud

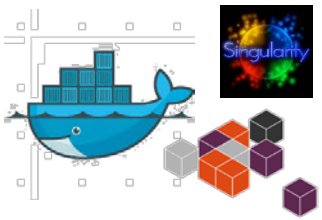
SaaS OverCloud: Enabling Diversified Compatible SaaS



SaaS OverCloud, enables a specially-arranged razor-thin overlay layer and leverages container-based on micro-services architecture for improved SaaS compatibility

SaaS OverCloud: Overall Design

Container-based
Functions for Microservices



SaaS Compatibility Enhancement

(3-tier, IoT-Cloud, HPC/BigData)

SaaS Service Compatibility

Multi-level Visibility

Application

Operation

SaaS Developers

SaaS OverCloud Requirements

Customized OverCloud for

DataLake

DevTower

Logical (v+c+p) Cluster(s)

Customized OverCloud for

DataLake

DevTower

Logical (v+c+p) Cluster(s)

Orchestration

Visibility

Provisioning

OverCloud

UnderCloud

DTN

DTN

DTN

DTN

DTN

DTN

openstack

Infra/Platform

Hyper-converged Boxes with Fast Inter-Connect

amazon web services

Infra/Platform

Azure

Infra/Platform

Dynamic SaaS OverCloud Integration & Verification

Automated Realization over SmartX Open Playground

Verification & Business Model

DevOps Tower

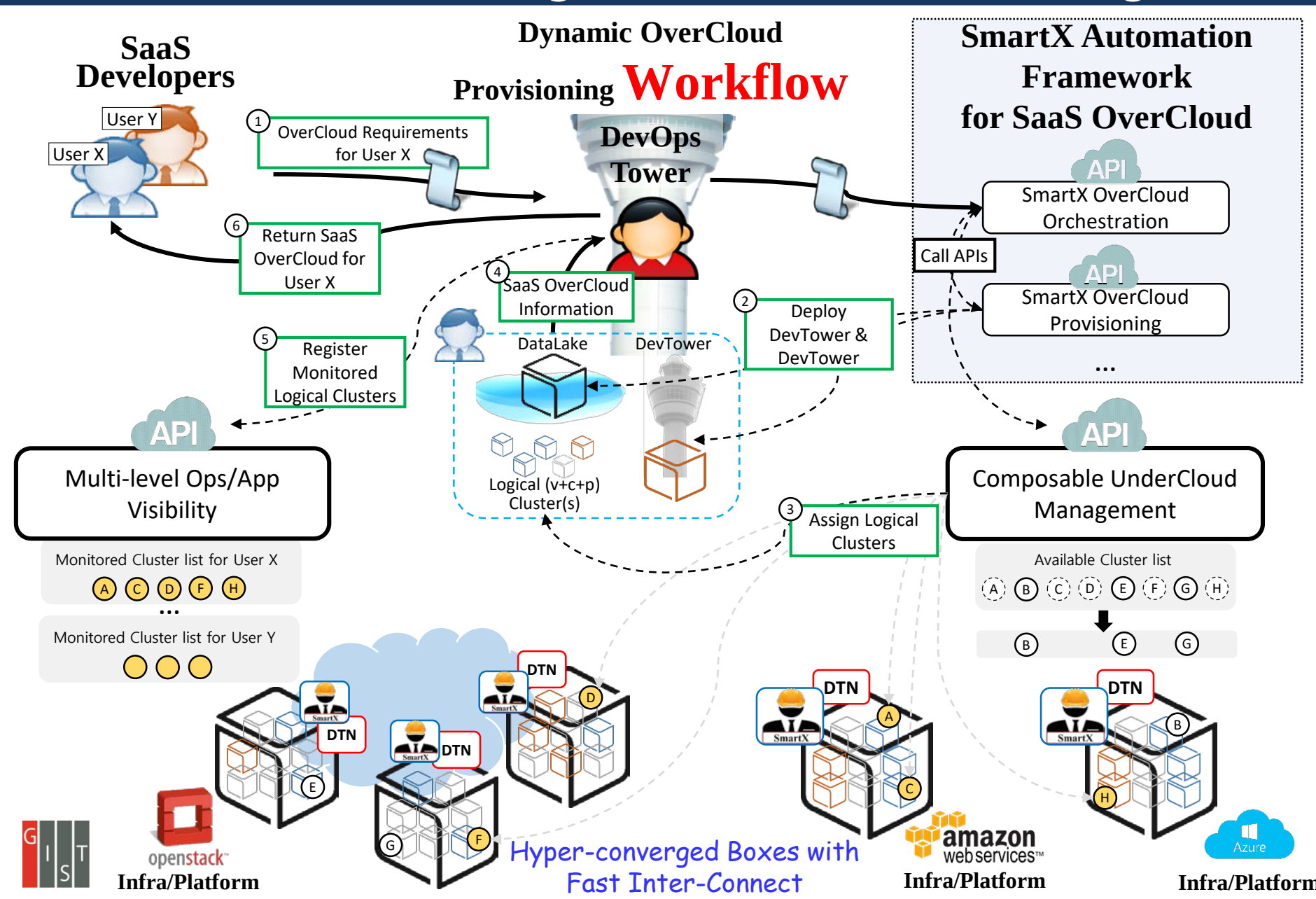
Composable UnderCloud Management

Migration

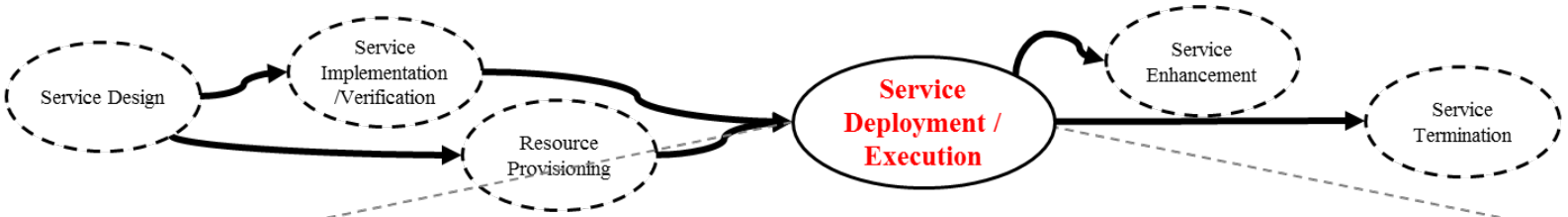
Placement

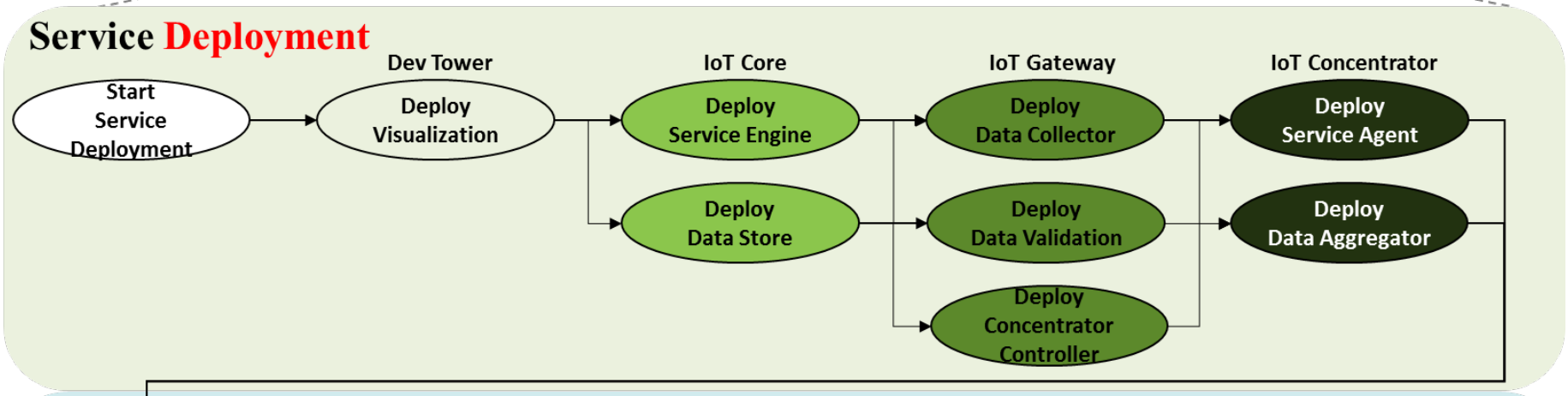
Federation

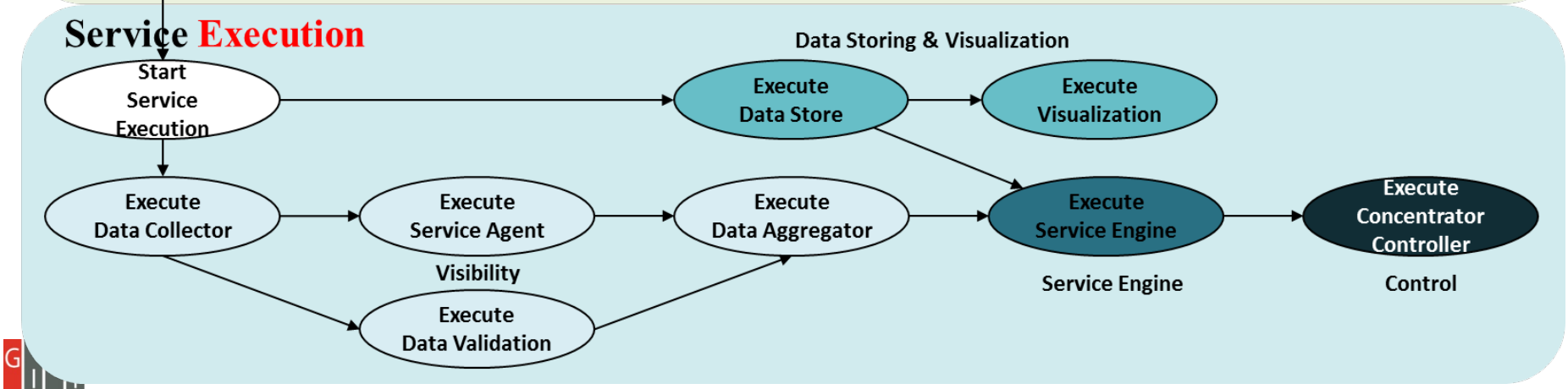
SaaS OverCloud: Workflow-leveraged OverCloud Provisioning



SaaS OverCloud: Workflow-leveraged Service Deployment & Execution







Future Works

- MicroService Architecture 기반의 Container-leveraged 서비스를 위한 워크플로우 엔진 부재
  - 오픈스택 Mistral의 한계

- SaaS OverCloud의 Flexibility & Agility 를 위한 노력
  - 효율적인 OverCloud 구성을 위한 워크플로우
  - 가볍고 유연한 Container-leveraged Storage

GitHub Repository

https://github.com/SmartX-Labs

https://github.com/SmartX-Team

감사합니다

Thank you!

jshan@smartx.kr
srkim@smartx.kr