Intelligent Management for Edge-computing
(Network AI Project for NMRG)

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Background – Cloud computing

- Emerging paradigm

  - Cloud computing has changed the way of using the computing infrastructure
    - the resources are provided to the consumer and released by the consumer on the basis of **their demands from the shared pool of resources**
    - This on-demand resource provisioning proves **very economical** to the consumer as they are supposed to pay only for the resources they have used and this feature allows the service provider to re-allocate the released resources

  - Features like scalability, elasticity, less entry cost, easy to access and subscription and pay per use etc.

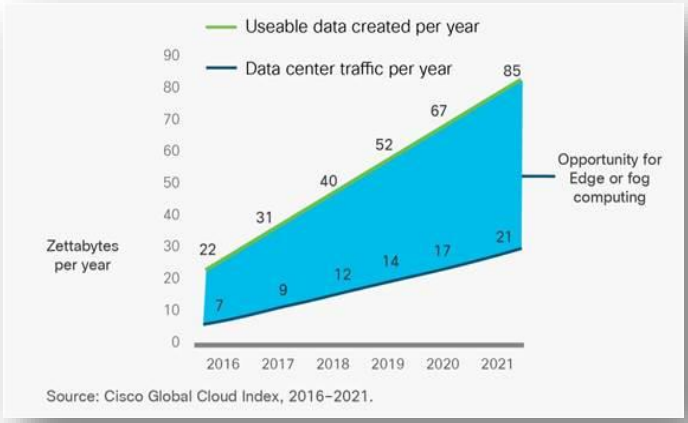
  - Compel the businesses and end users to migrate themselves from the traditional platform to the cloud based platform.

Background – Challengeable statement

- Zettabytes Era

  - Cisco GCI estimates that **nearly 850 ZB** will be generated by all people, machines, and things by 2021
    - Much of this ephemeral data is not useful to save,
    - but approximately 10 percent is useful

  - Useful data also **exceeds data center traffic** (21 ZB per year)
  - **Edge or fog computing might help bridge this gap**



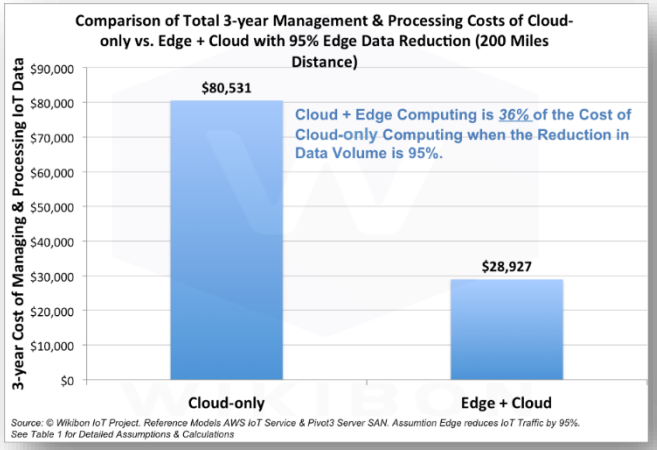
Ref: Cisco Global Cloud Index: Forecast and Methodology, 2016–2021 White Paper

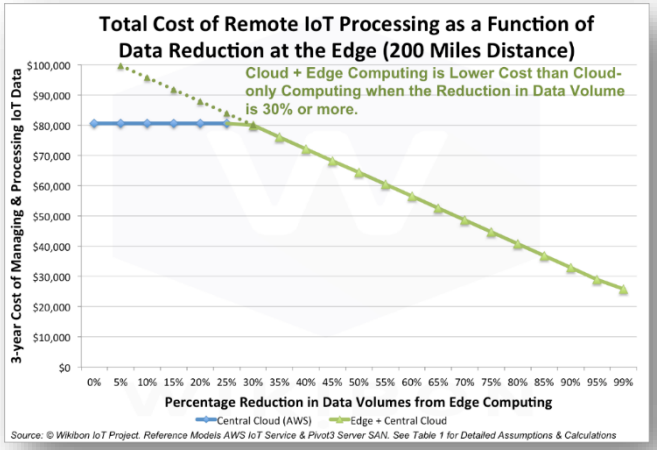
Background – Limitation of CoT

- Limitations of IoT-Cloud model
  - Explosive growth to various operation technologies (OT)
  - Smart decisions at devices
  - Need to time-critical application
  - Poor of Internet connectivity to Cloud
  - Data privacy, security and legal implications

Background - Edge and Cloud computing

- IoT management architecture
  - Changes Cloud-only to combining edge and cloud architecture





Background – Intelligent Edge

- Summary of MWC 2019
  - Gartner survey
    - 59% of organizations believe 5G's ability to support high densities of IoT sensors will be the top use for the next-generation mobile networking technology.
    - Prepare for a 5G IoT explosion

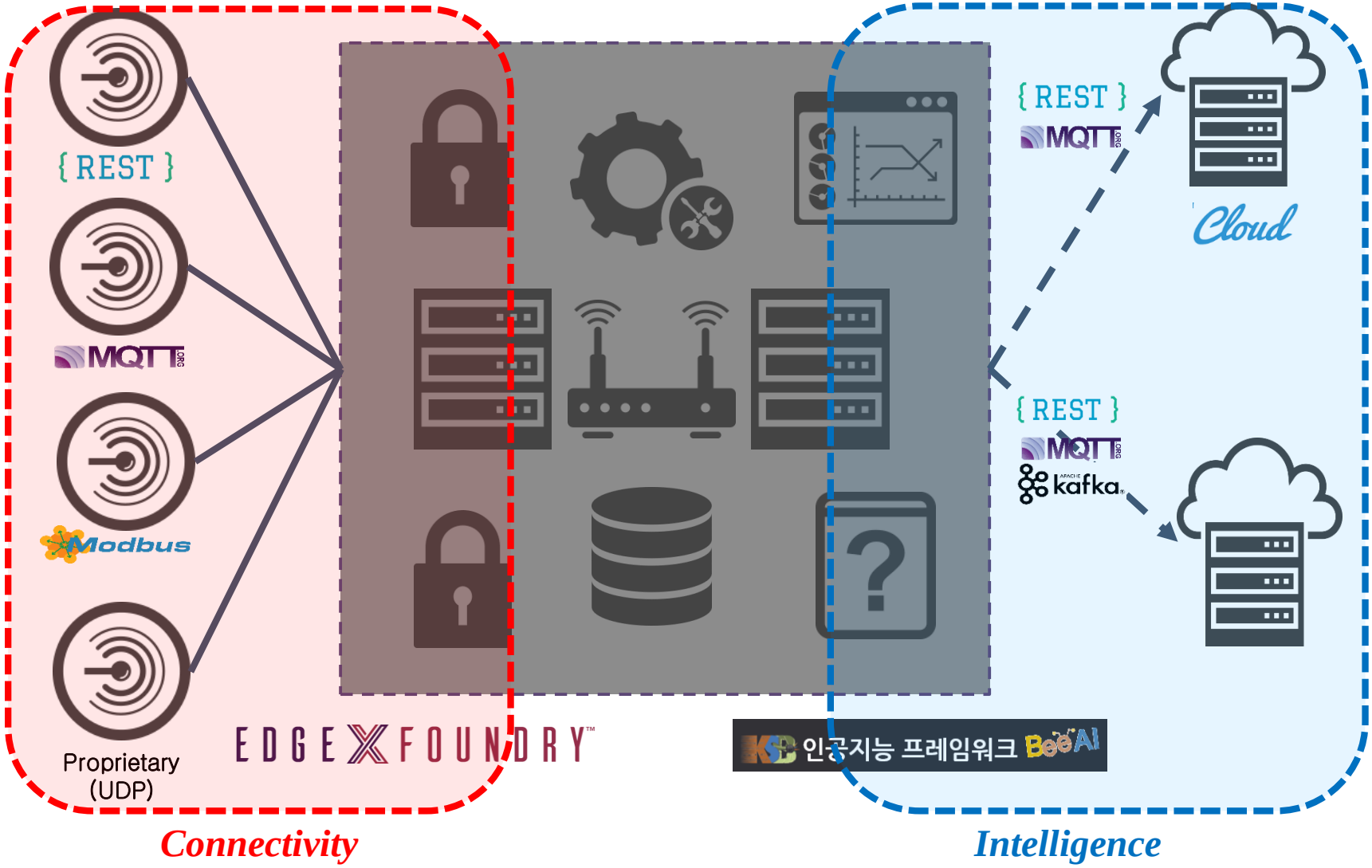
  - Intelligent Edge
    - "Computing is no longer confined to a device or even a single datacentre,"
    - "Instead, it's ubiquitous fabric, it's distributed from the cloud to the edge, closer to where data is generated"
    - "an open-source reference it hopes will encourage growth of an ecosystem to create and deploy new edge applications and services"

What is Intelligent Edge Computing ?

- AI in Edge computing
  - When Edge computing is extended to the cloud
    - it can be managed and consumed as if it were local infrastructure.
    - security and privacy challenges may arise.

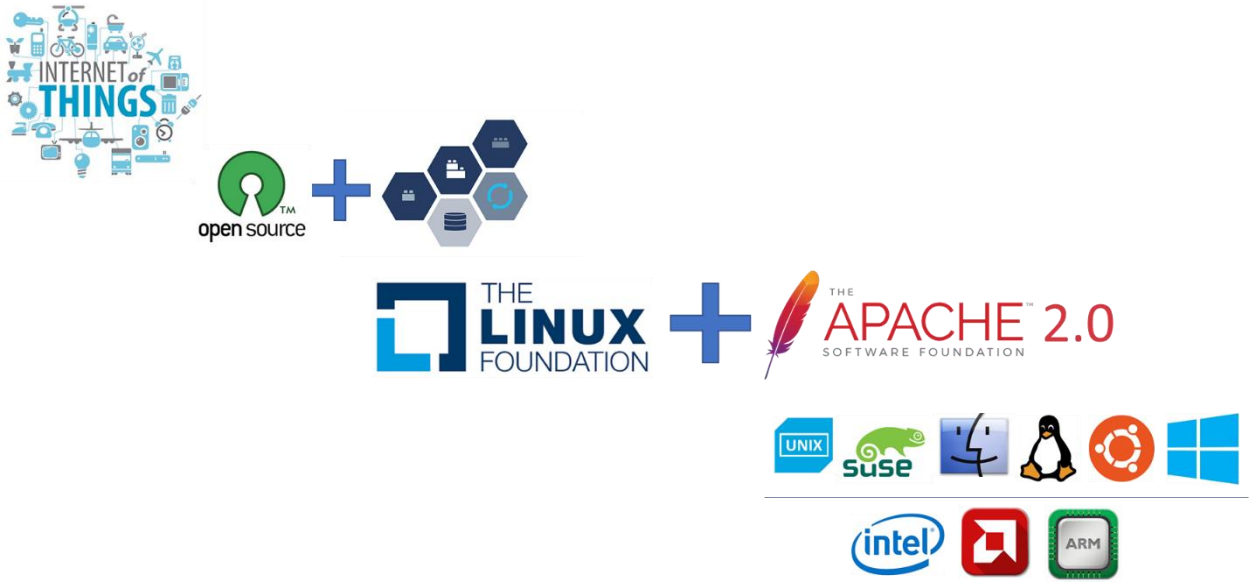
- "Intelligent Edge"
  - Edge computing will **not replace** the power of the cloud.
  - **Collaboration** with Cloud computing
    - reduce cloud payloads drastically when used in collaboration with ML.
  - Transform the AI's operation model
    - perform routine and time-critical **decisions at the edge**
    - only refer to the cloud where more intensive computation and historical analysis is needed.

Intelligent Management for Edge Computing
(by ETRI)



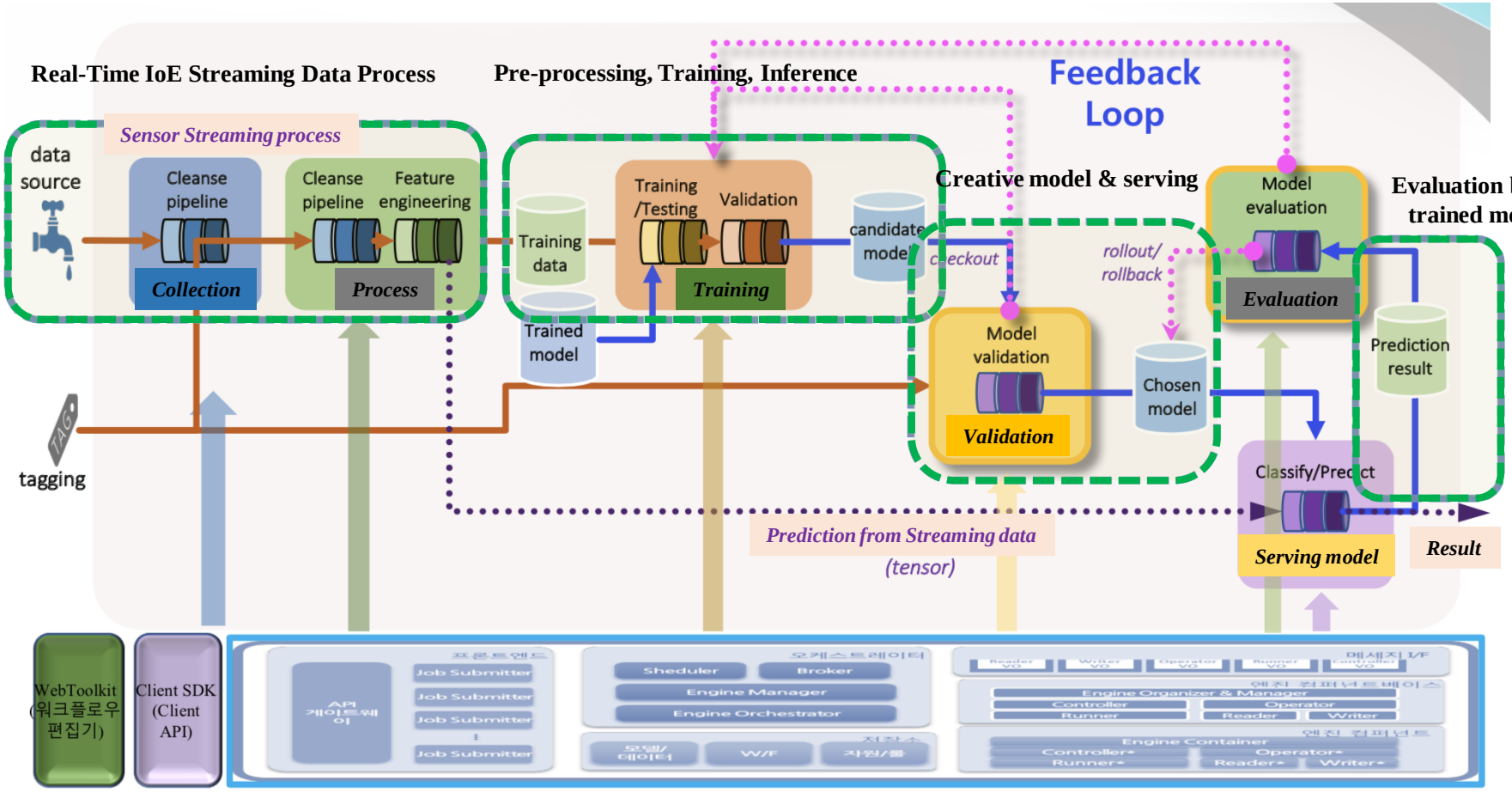
Intelligent Edge Computing for Connectivity

- EdgeX Foundry [1]
  - EdgeX Foundry is a vendor-neutral, open source, loosely-coupled micro-services framework
  - With a focus on the IoT Edge
    - EdgeX simplifies the process to design, develop and deploy solutions across industrial, enterprise, and consumer applications.



[1] https://edgexfoundry.org

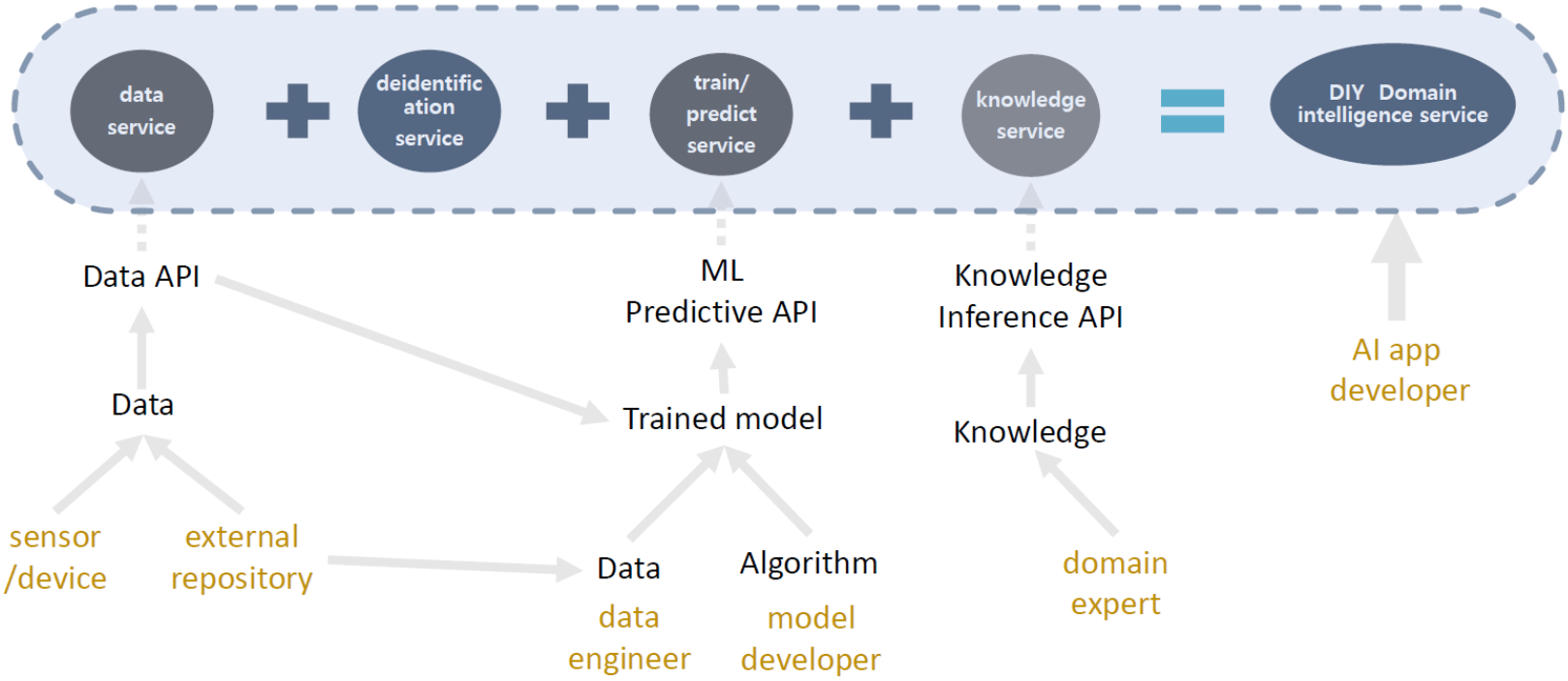
Intelligent Edge Computing for Intelligence



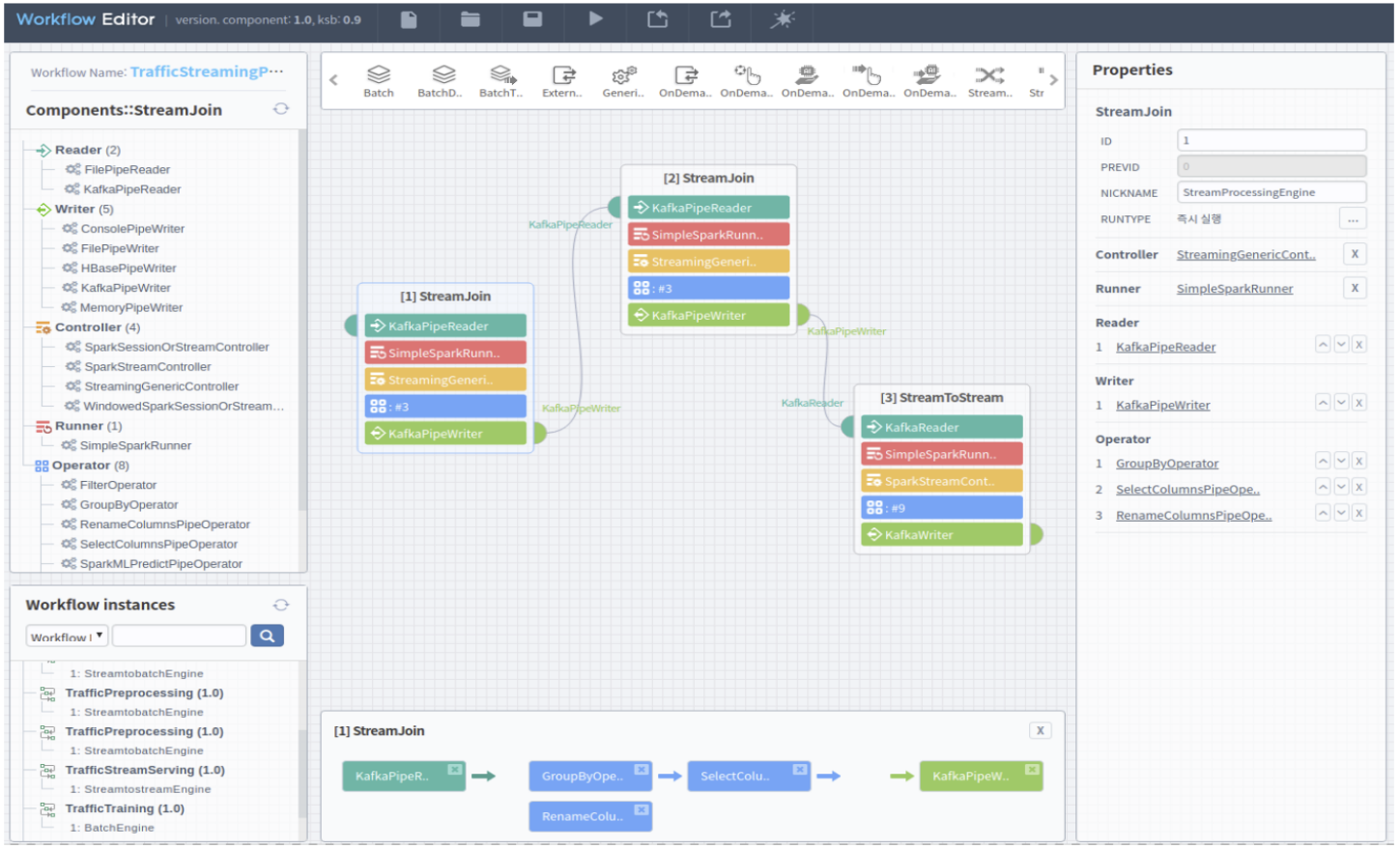
BeeAI Framework overview

Intelligent Edge Computing for Intelligence

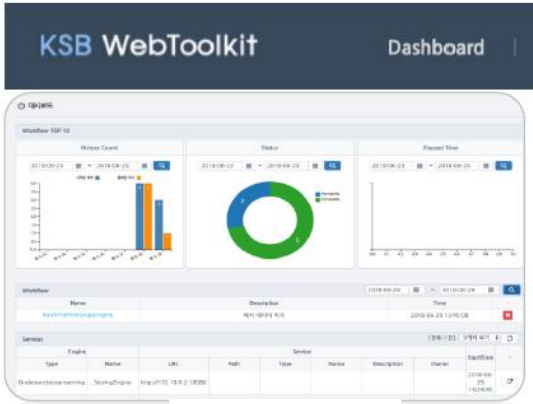
- KSB Industrial AI Service Infra Framework
  - For application developer, ML developer, S/W developer, etc.
  - Knowledge accumulation



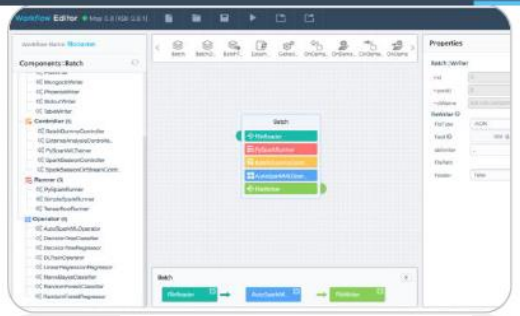
Intelligent Edge Computing for Intelligence
(BeeAI Web-toolkit)



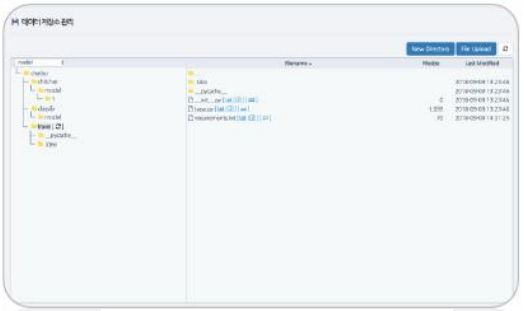
Intelligent Edge Computing for Intelligence
(BeeAI Web-toolkit)



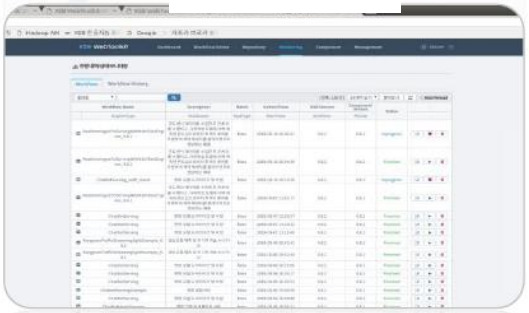
Dashboard



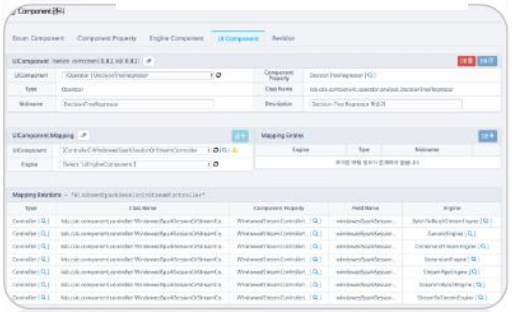
Work-Flow Editor



Repository



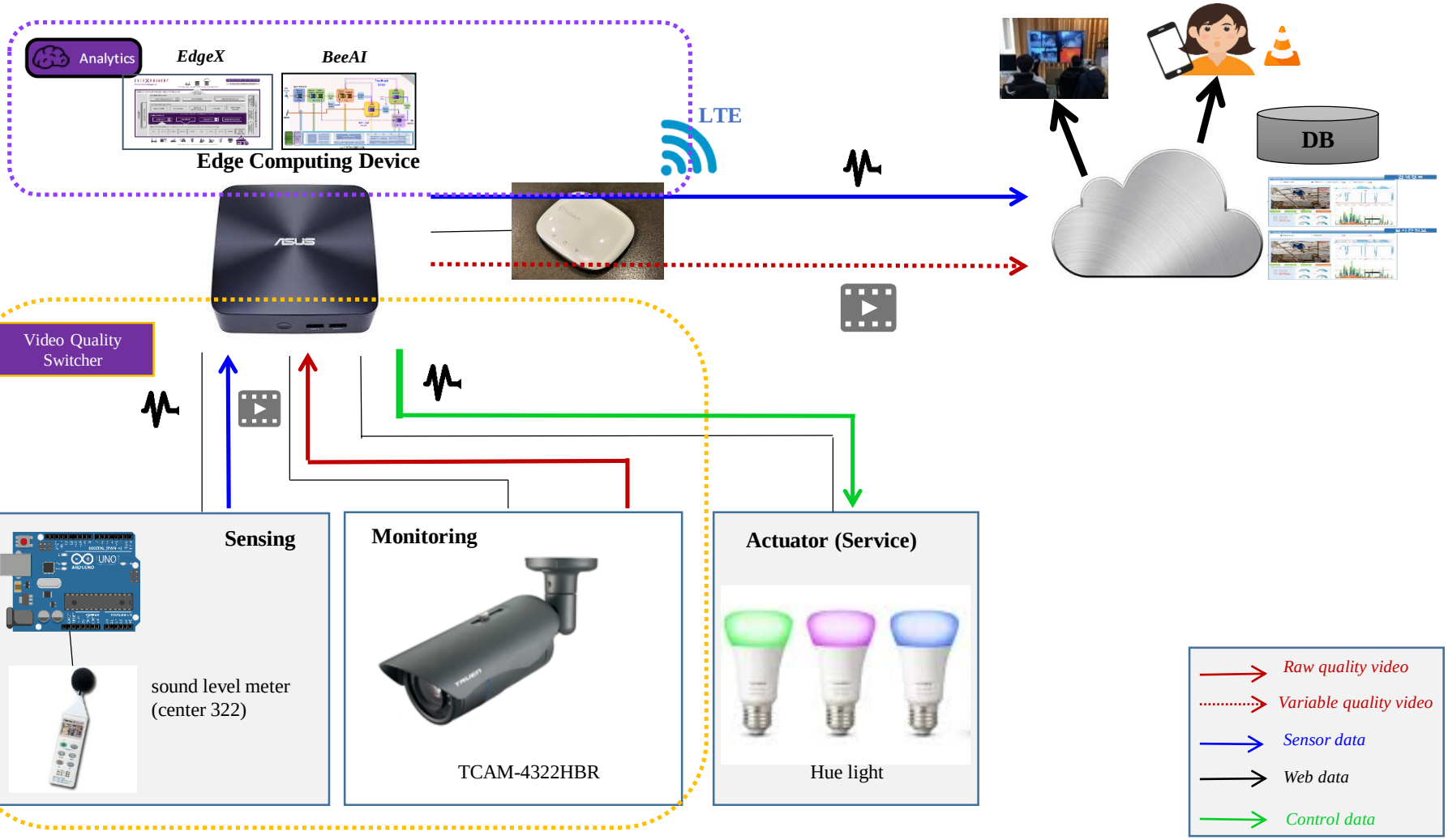
Monitoring



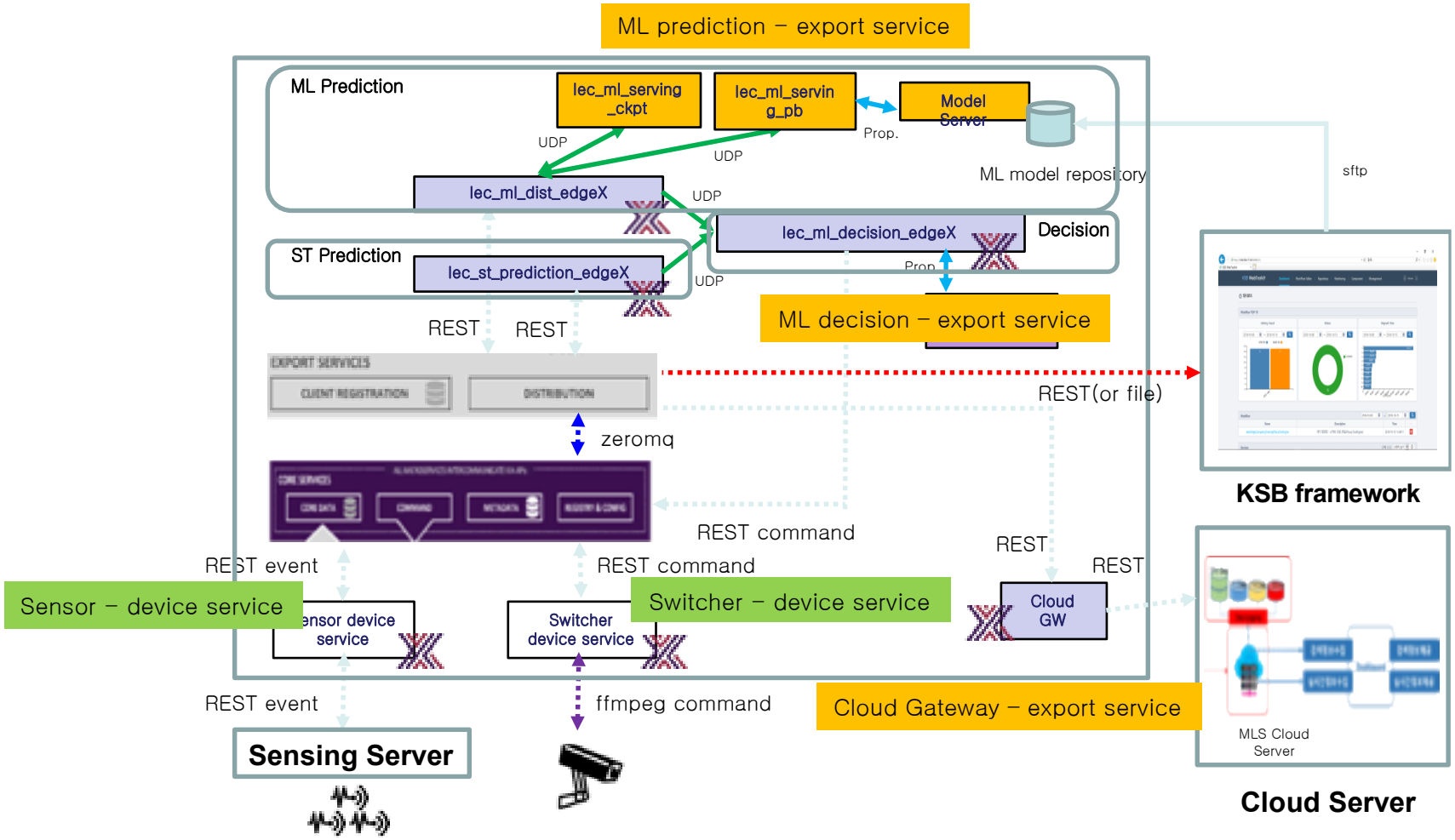
Component

Management

Intelligent Edge Computing for Intelligence
(Use-case for Smart Factory)



Intelligent Edge Computing for Intelligence
(Overview of Data Pipeline in use-case)



Thank you

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