Edge AI Cloud Native Brief Introduction

Wang Ye @Baidu

The AI Edge Blueprint Family

☐ The AI Edge Blueprint focuses on establishing an open source MEC platform with AI capacities at the edge.

☐ The AI Edge Blueprint is sponsored by Baidu, Arm, and Intel.

☐ AI Edge Blueprint R5(release 5) will be released soon.

☐ The AI Edge Blueprint is composed by Federated Machine Learning, Autopilot(I-VICS), Video Monitoring, etc.

AKRAINO EDGE STACK

AI Edge Blueprint Use Cases

Security Monitoring	Conduct smoke detection on densely populated places such as industrial parks and community properties to quickly detect whether there is a fire, reduce the damage caused by fire, and improve the safety of the park.
Classroom concentration analysis	Conduct a full evaluation of the overall class and the concentration of individual students, help teachers and school authorities to fully understand the teaching situation, according to the concentration data of each course, conduct targeted class knowledge test and strengthen.
Factory safety production	By identifying whether employees wear helmets, safety gloves, etc., monitor and evaluate the work of workers in the workshop to help companies monitor the safety production status in a comprehensive and timely manner. Statistical results and analytical data can be used as a reference for strengthening the level of safety production management.
Kitchen hygiene monitoring	Monitor staff's smoking and cell phone behavior in the kitchen of the catering industry, ensuring the safety and hygiene of the food production process.

Concentration Analysis   Helmet Detection   Call Detection   Smoking Detection   Face Recognition   Fire Detection
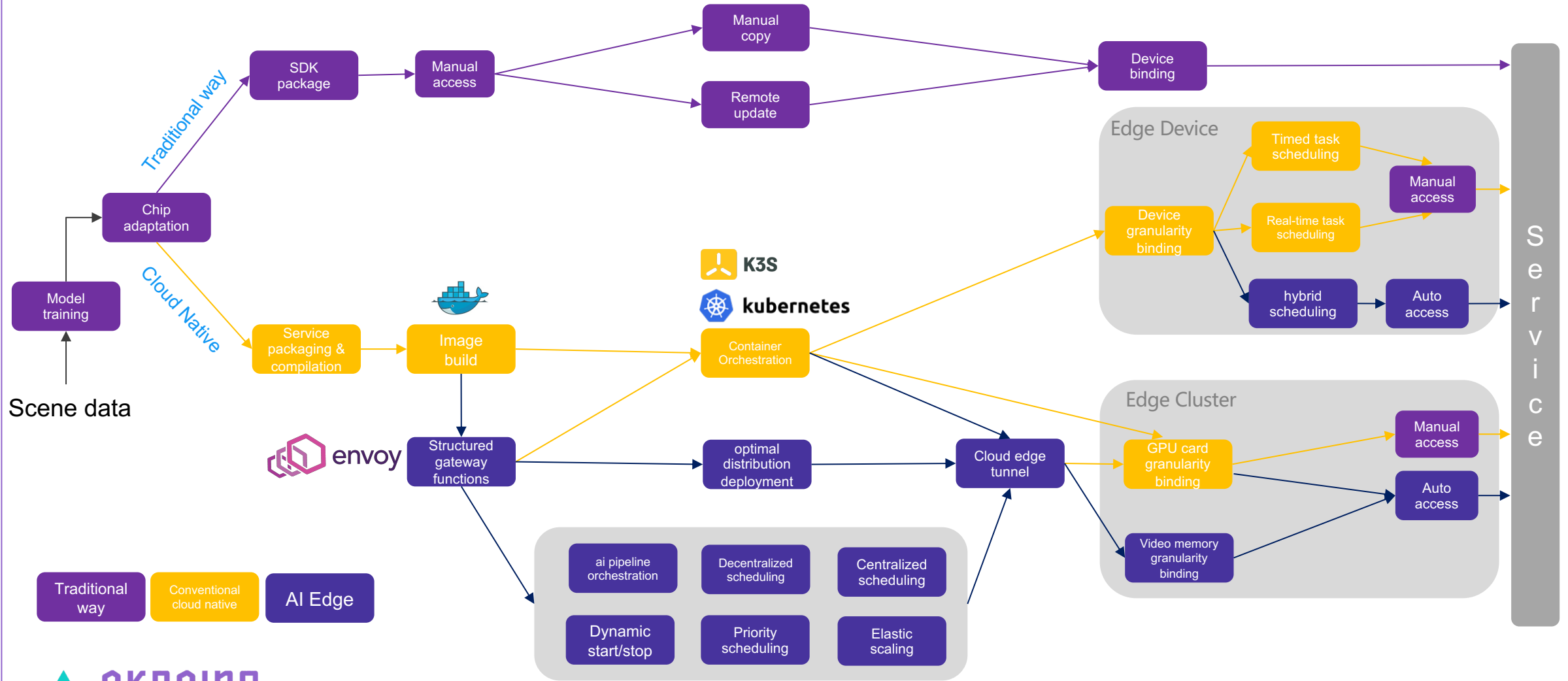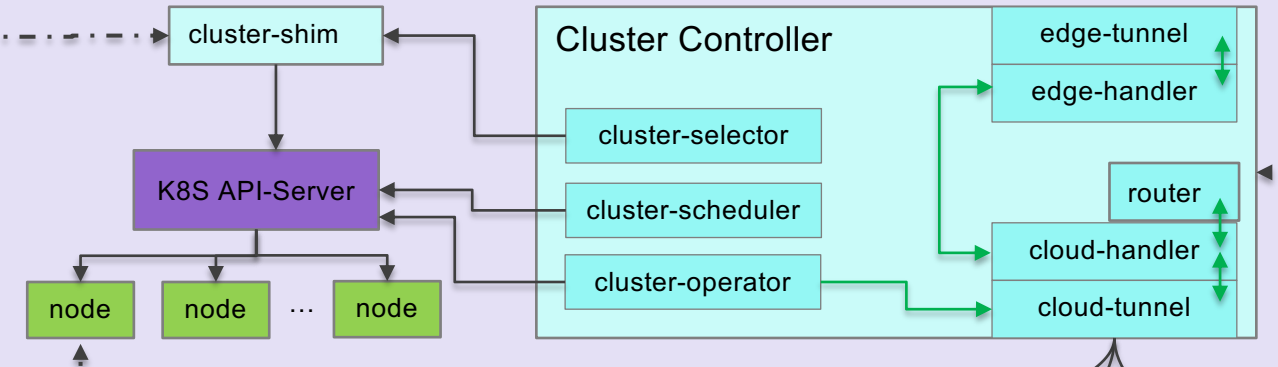
AI algorithm development process

Cloud Edge Container Engine

Cluster adaptation layer, responsible for accessing different types of clusters
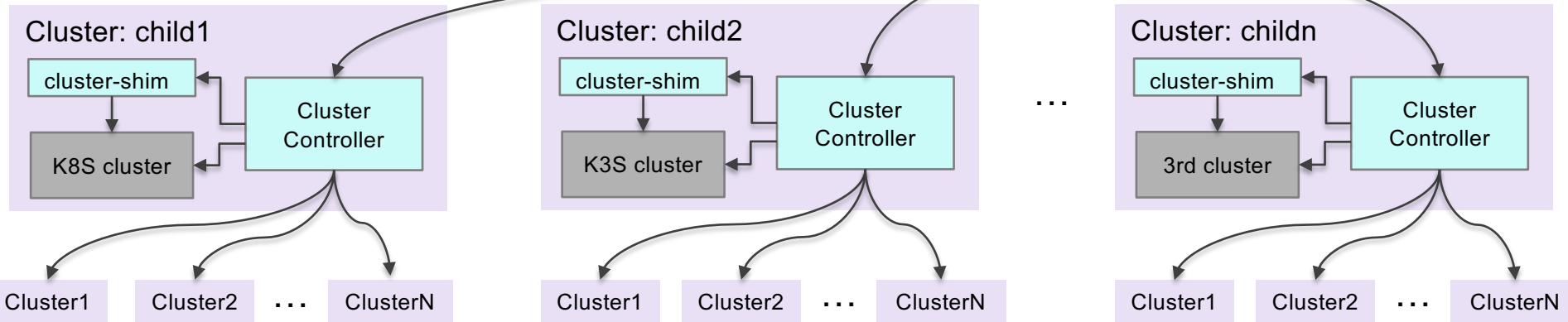
1. Provide multiple runtime nodes to support the generation of various IaaS resources
2. Provide high performance, container network components that support network policies

Cluster: root

cluster-shim

Cluster Controller

cluster-selector

K8S API-Server

cluster-scheduler

cluster-operator

node · node · ··· · node

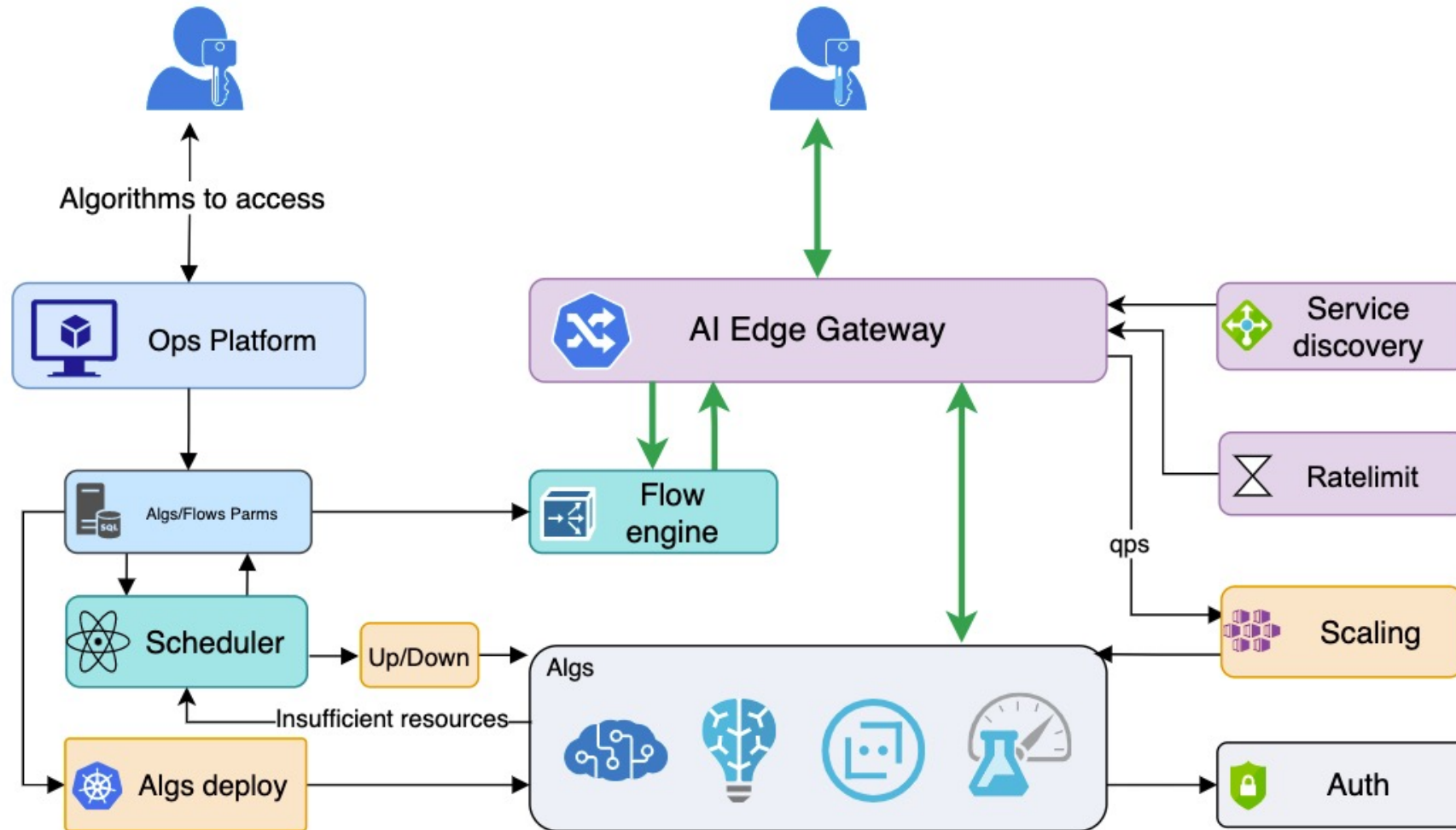edge-tunnel

edge-handler

router

cloud-handler

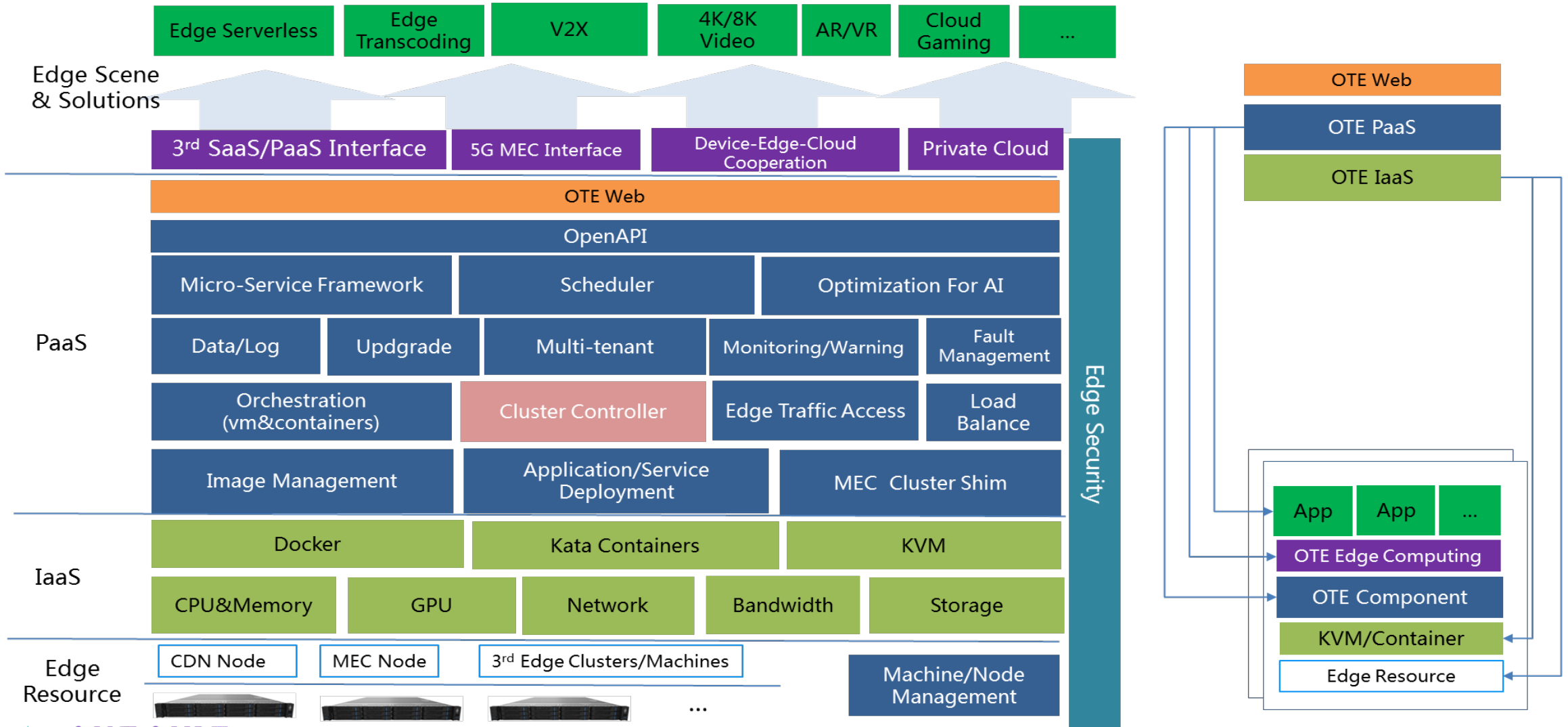cloud-tunnel

Cluster Controller maintains tree topology

1. selector, cluster label screening;
2. Operator& scheduler, sub-cluster task scheduling assignment;
3. edge-tunnel& edge-handler, connect parent node and process command
4. Router, maintain routing table of all descendant clusters
5. cloud-handler& cloud-tunnel, command conversion and subcluster connection

Cluster: child1

cluster-shim

Cluster Controller

K8S cluster

Cluster1 · Cluster2 · ··· · ClusterN

Cluster: child2

cluster-shim

Cluster Controller

K3S cluster

Cluster1 · Cluster2 · ··· · ClusterN

···

Cluster: childn

cluster-shim

Cluster Controller

3rd cluster

Cluster1 · Cluster2 · ··· · ClusterN

AKRAINO EDGE STACK

Orchestration with AI Flow

MEC Software Architecture

Thank you for listening!