Blueprint: Robotaxi

Baidu

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General Blueprint Introduction

☐ The Robotaxi Blueprint focuses on establishing an open source MEC platform combined with AI capabilities at the autonomous driving scenario.

☐ The first release of the Robotaxi Blueprint is targeted at Q2, 2020.

☐ The Robotaxi Blueprint is sponsored by Baidu, Intel, Arm, and Vmware.

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☐ Refer to: https://wiki.akraino.org/display/AK/The+AI+Edge%3A+RoboTaxi

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Blueprint Use cases

■ Urban Scenarios with autonomous driving vehicles

Avoiding blind spots or safer autonomous driving and accelerating efforts in implementing driving fleet solutions.

- Autonomous drive sharing: reducing the cost-per-kilometer by 50% compared to current private car and taxi costs

- Low-speed unmanned logistics vehicles

- Unmanned minibuses in closed parks

- Unmanned buses on city roads

autonomous ride sharing

low-speed unmanned
logistics vehicles

unmanned minibuses

unmanned buses

Blueprint Use cases

■ Use cases for Valet Parking

- Deploy sensors on vehicles and parking lots, combined with high-precision positioning, allowing vehicles to engage in fully autonomous parking.
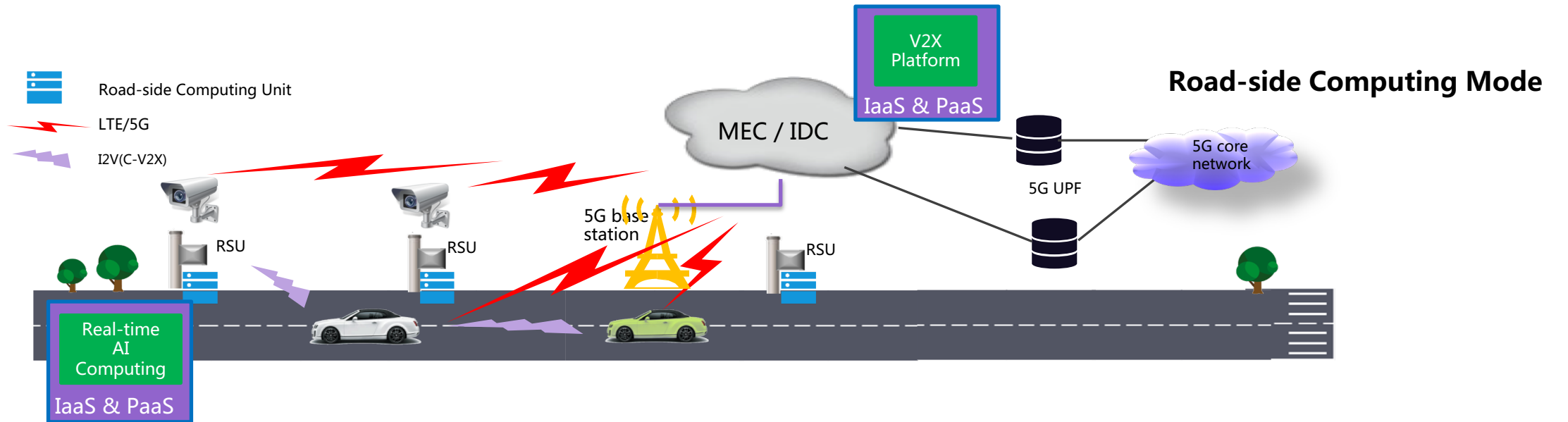
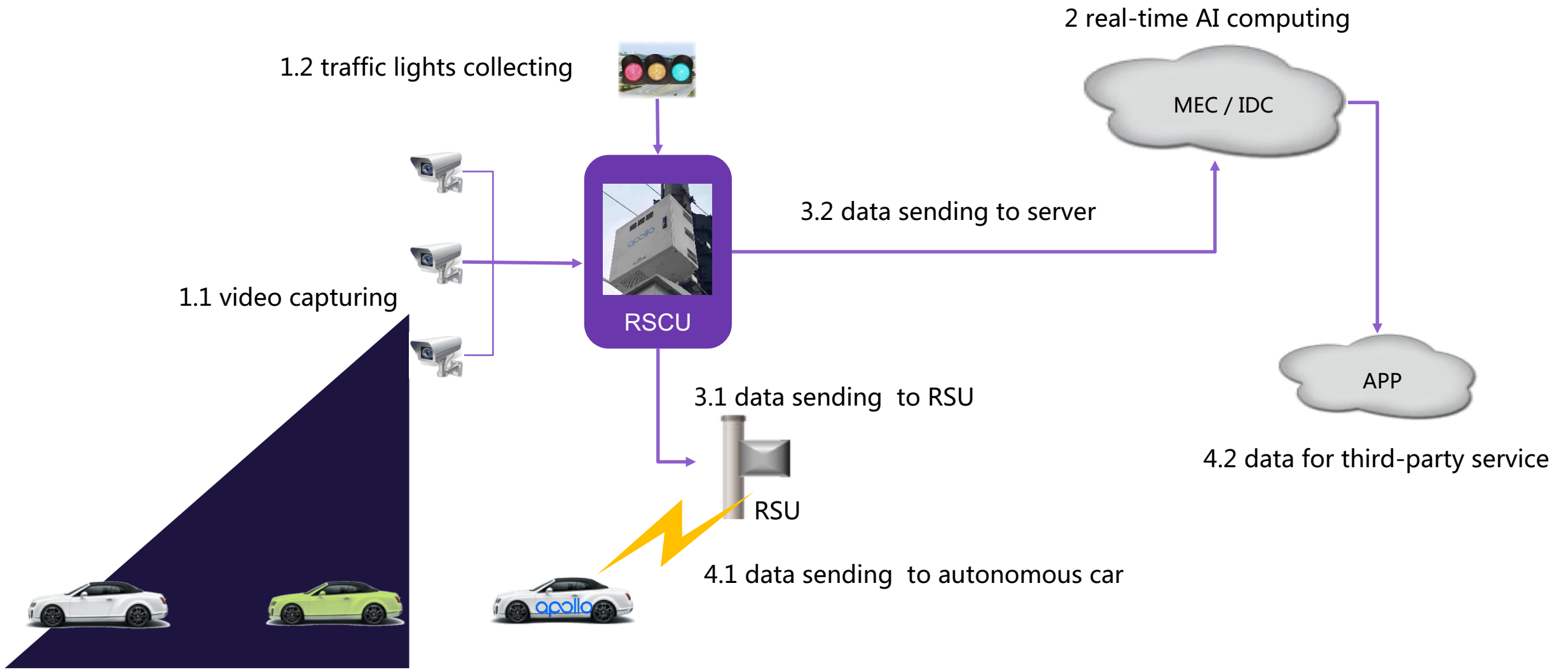■ Regional upgrade for autonomous driving vehicles

- With roadside sensing equipment, the vehicles can get more road condition information and make the driving mode more intelligent.
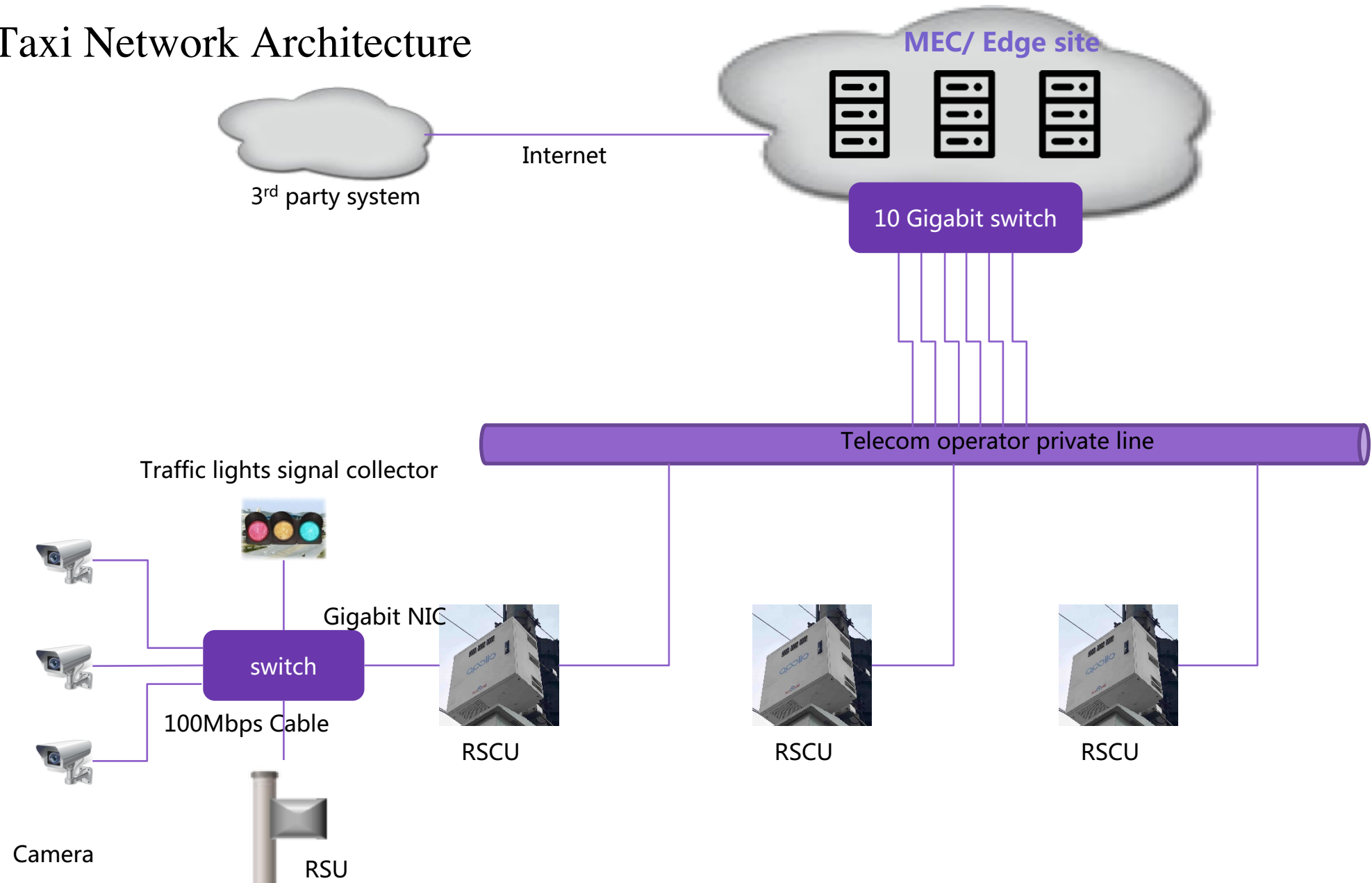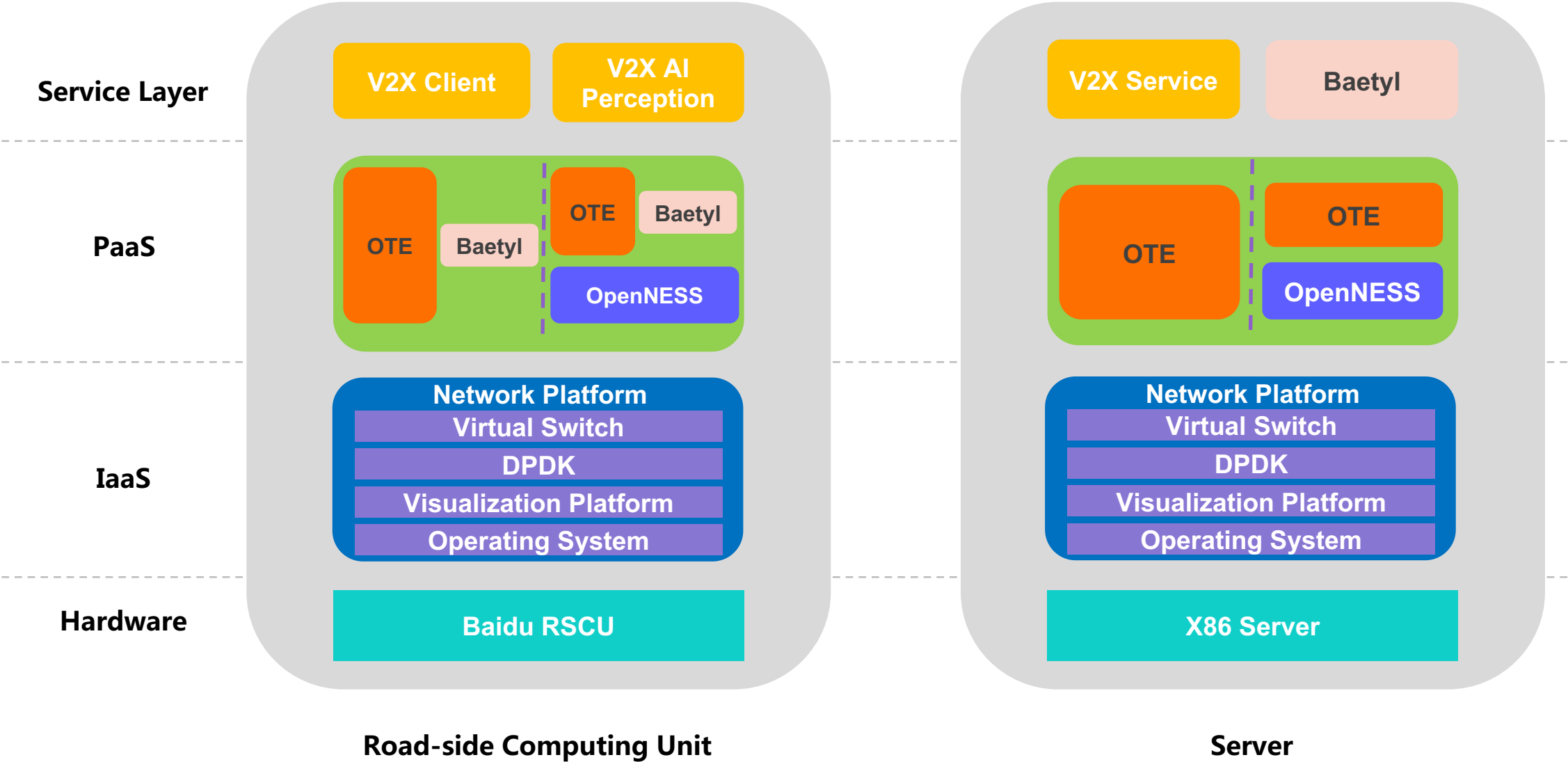
RoboTaxi Network Components

Road-side Computing Unit

LTE/5G

I2V(C-V2X)

Road-side Computing Mode

V2X Platform

IaaS & PaaS

MEC / IDC

5G UPF

5G core network

RSU

RSU

5G base station

RSU

Real-time AI Computing

IaaS & PaaS

RoboTaxi Network Architecture

1.2 traffic lights collecting

2 real-time AI computing

MEC / IDC

3.2 data sending to server

1.1 video capturing

RSCU

3.1 data sending to RSU

APP

4.2 data for third-party service

RSU

4.1 data sending to autonomous car

RoboTaxi Network Architecture

MEC/ Edge site

Internet

3rd party system

10 Gigabit switch

Telecom operator private line

Traffic lights signal collector

Gigabit NIC

switch

100Mbps Cable

RSCU

RSCU

RSCU

Camera

RSU

RoboTaxi MEC platform softwre architecture

Service Layer

V2X Client	V2X AI Perception

PaaS

OTE · Baetyl · OTE · Baetyl · OpenNESS

IaaS

Network Platform
- Virtual Switch
- DPDK
- Visualization Platform
- Operating System

Hardware

Baidu RSCU

Server side:

V2X Service · Baetyl

OTE · OTE · OpenNESS

Network Platform
- Virtual Switch
- DPDK
- Visualization Platform
- Operating System

X86 Server

Road-side Computing Unit

Server

Future Plan

□ The first demo of the RoboTaxi Blueprint is targeted at Q1, 2020.

□ The first Akraino version will be released in Q2, 2020.

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The Robotaxi Blueprint Criteria

Case Attributes	Description	Informational
Type	New	
Blueprint Family - Proposed Name	The AI Edge	
Use Case	Autonomous driving taxi	
Blueprint proposed Name	Robotaxi	
Initial POD Cost (capex)	Leverage Unicycle POD - less than $150k	
Scale & Type	Up to 4 servers, x86 server or deep edge class With nVIDIA Tesla P4/T4 GPUs	
Applications	Autonomous driving taxi	
Power Restrictions	Less than 10Kw	
Infrastructure orchestration	Docker 1.13.1 or above K8s 1.12.5 or above- Container Orchestration OS – CentOS 7.0 or above	
PaaS	OTE Stack + OpenEdge + OpenNESS	
SDN	Calico container networking, or OVS-DPDK	
Workload Type	Containers	
Additional Details	N/A	

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