Smart Cities R6 Architecture

Blueprint overview/Introduction

The purpose of Smart Cities blueprint is to provide edge computing platform base on Arm Soc , Improve deployment flexibility and security in the edge computing.

Use Case

<use case 1>

Device(NVIDIA Jetson Nano #1) join network. In this use case, parsec is used for authentication and encryption to realize the security authentication of devices newly joined to the network.
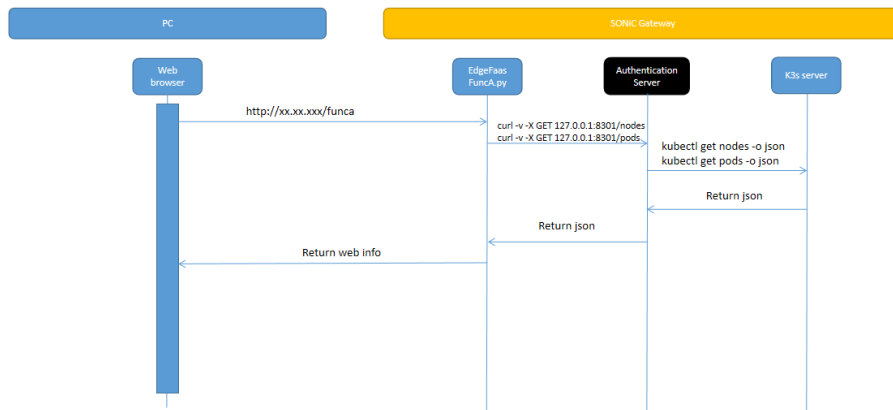
Use case1: NVIDIA Jetson Nano #1 join network

<use case 2>
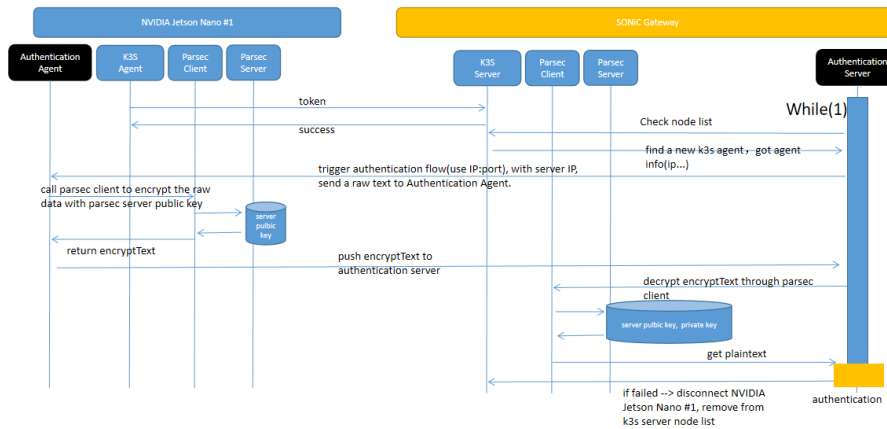
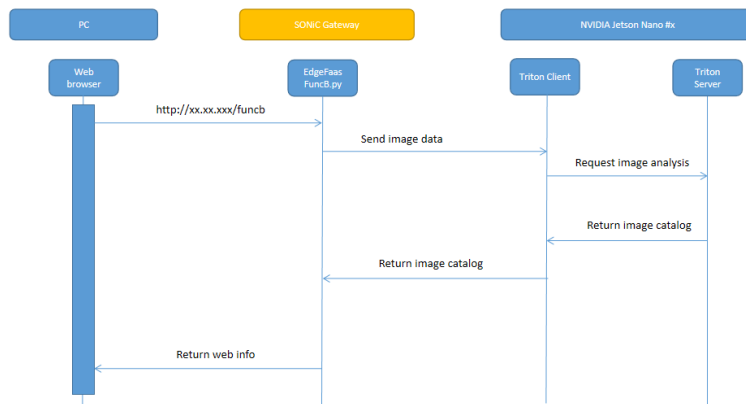Get cluster system info by EdgeFaaS from SONiC gateway.

Use case2: Get cluster system info

- PC
  - Web browser
- SONIC Gateway
  - EdgeFaas FuncA.py
  - Authentication Server
  - K3s server

- http://xx.xx.xxx/funca
- curl -v -X GET 127.0.0.1:8301/nodes
- curl -v -X GET 127.0.0.1:8301/pods
- kubectl get nodes -o json
- kubectl get pods -o json
- Return json
- Return json
- Return web info

<use case 3>

Image recognition by Triton on device(NVIDIA Jetson Nano #1).

Use case3: Image recognition

- PC
  - Web browser
- SONIC Gateway
  - EdgeFaas FuncB.py
- NVIDIA Jetson Nano #x
  - Triton Client
  - Triton Server

- http://xx.xx.xxx/funcb
- Send image data
- Request image analysis
- Return image catalog
- Return image catalog
- Return web info

<use case 4>

Get camera image by device(NVIDIA Jetson Nano #1) and provide to PC user.

Use case4: Get Camera Image

- PC
  - Web browser
- SONIC Gateway
  - EdgeFaas FuncC.py
- NVIDIA Jetson Nano #x
  - Camera Client
  - Camera device

- http://xx.xx.xxx/funcc
- Send request
- Request Capture image
- Return image
- Return image
- Return web info

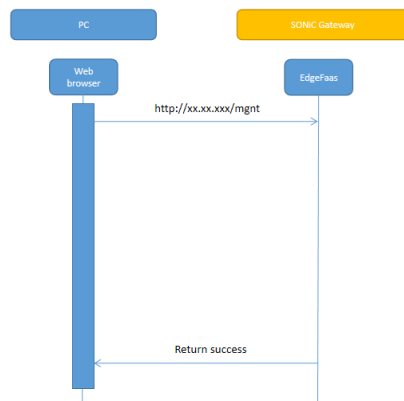<use case 5>
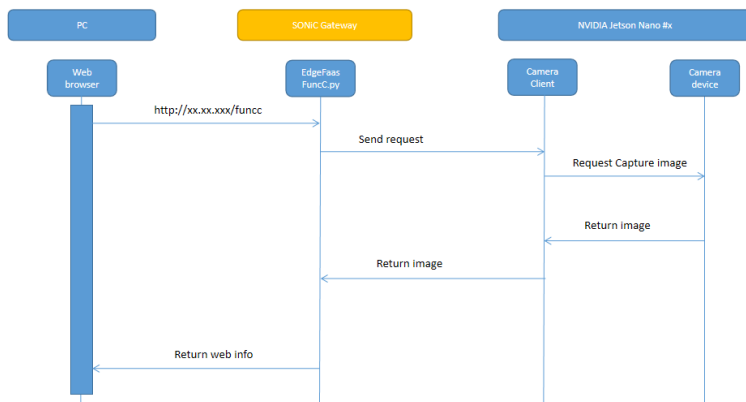
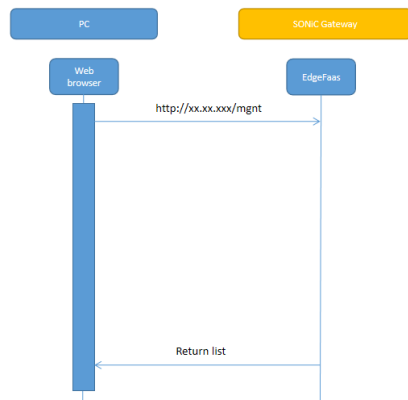Update new Func on SONiC gateway by EdgeFaaS.

Use case5: Update new Func

<use case 6>

PC get Api list by EdgeFaaS on SONiC gateway.

Use case6: Get Api list

Where on the Edge

Business Drivers

Overall Architecture

Based on the parsec codebase of release 5, more functions are added in release 6. The basic requirements of smart cities are considered. a lightweight demonstration application is designed and implemented. The demo program integrates K3S, edgefaas, Parsec ,and Triton multiple open source platforms on SONiC gateway device, and completes the ability of network access security verification and computing power registration of heterogeneous computing resource.Its overall structure is as follows:
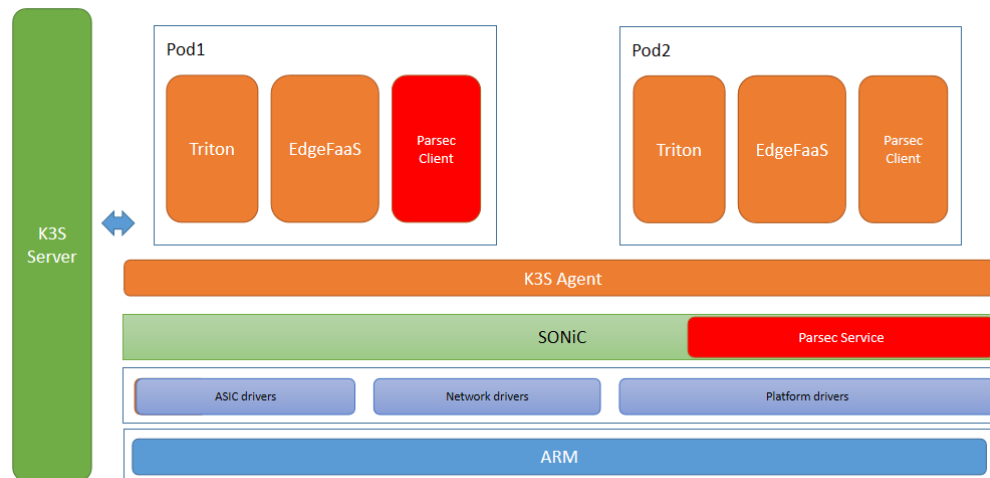
Demo App Design:

FuncA: System Info
FuncB: Triton func1
FuncC: Triton func2
....
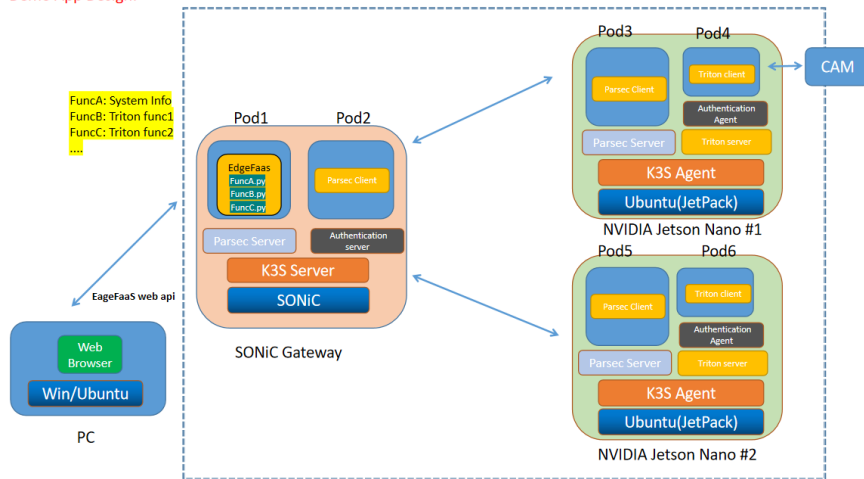
Platform Architecture

NA

Software Platform Architecture

APIs

Smart Cities R6 API Document

Hardware and Software Management

Licensing

- GNU/common license