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FOTA Software Product Introduction

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- Security

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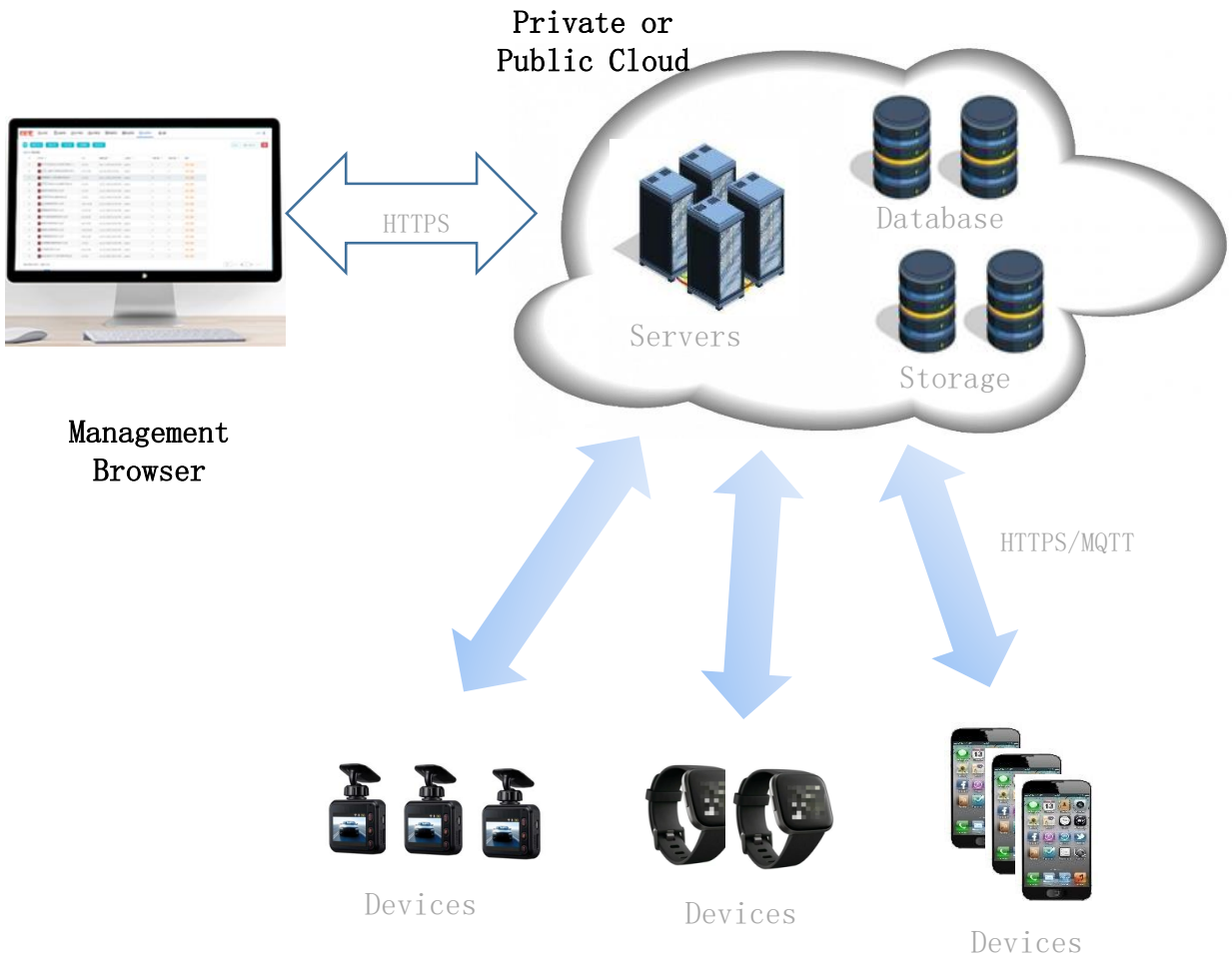
- Management cases

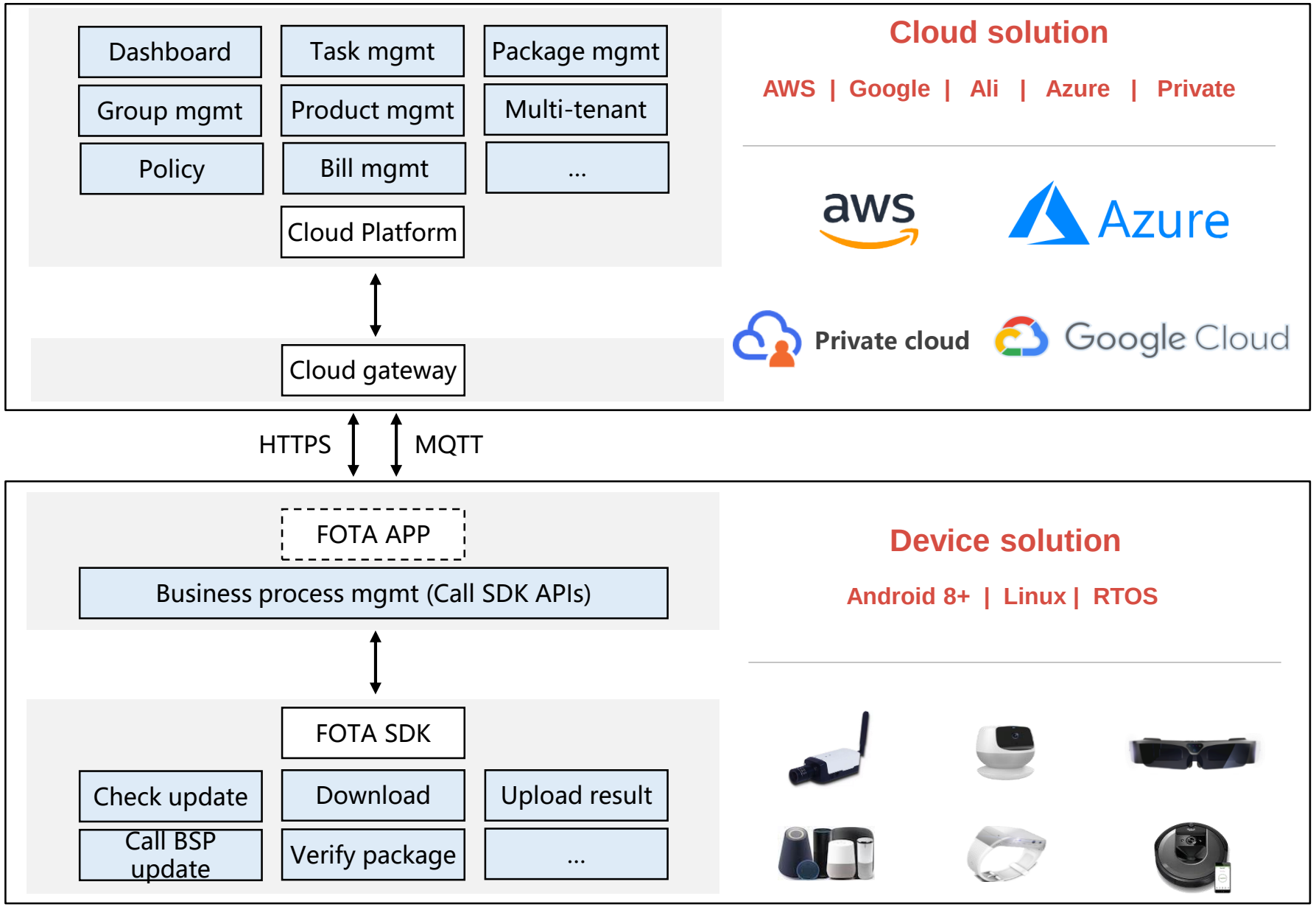
Overview

Network Image:



- Private Type
  - Network infrastructure in a local environment
  - Whole cloud system only for the customer
  - High customization
- Public Type （SaaS)
  - We provide cloud system as a SaaS.
  - Cloud system provided by Thundercomm.
  - Standard features
  - Simple

Overview



Support Global Business

- Provide SAAS service or Global private deployment
- Dynamic capacity from development phase to MP
- High availability, SLA 99.9%
- Global network accelerated node
- Support Chinese/English/Japanese

Service Reliability

- Two-way file verification
- System parameter matching
- Download from breakpoint

Deep Customization

- System signature
- Recovery/AB transform
- Automated differ tool
- Less storage of package

Successful Stories

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2017 FOTA Software

A Company
Target area : U.S.A

Sprint: 7 model smartphone

AT&T: 4 model smartphone

2018 - 2019 FOTA Product

S Company
Area: Korea
Product: IPC
OS: Ubuntu

S Company
Area : USA
Product: Mobile
OS: Android 8.1

J Company
Area : Japan
Product : Dash camera
OS: Android 8.1

G Company
Area : Japan
Product : Virtual robot
OS: Android 8.1

2020 - Now SaaS platform & Private service

D Company
Area : Japan
Product : Dash camera
OS: Android 9.0
Quantity: 1M+
Solution: Private&customized

F Company
Area : USA
Product : Wearable
OS: Android 9.0
Quantity : 1M+
Solution: Private&customized

S Company
Area : Japan
Product : Edge AI box
OS: Linux
Quantity : 100K+
Solution : SaaS

L Company
Area : Europe
Product : Wearable
OS: Android 9.0
Quantity: 50K+
Solution: SaaS

Provides OTA solution in global, stably and safely support 5+ millions devices on OTA service

Products Display

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Camera

Demo

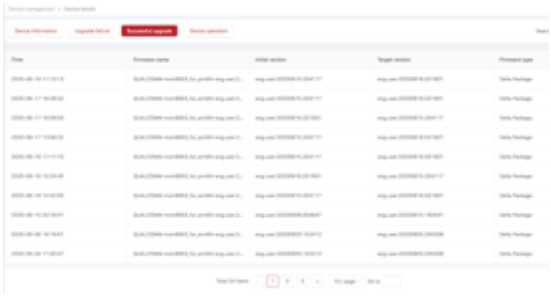
Mobile

Demo

Wearable

Demo

Smart home



Demo

Server Capability

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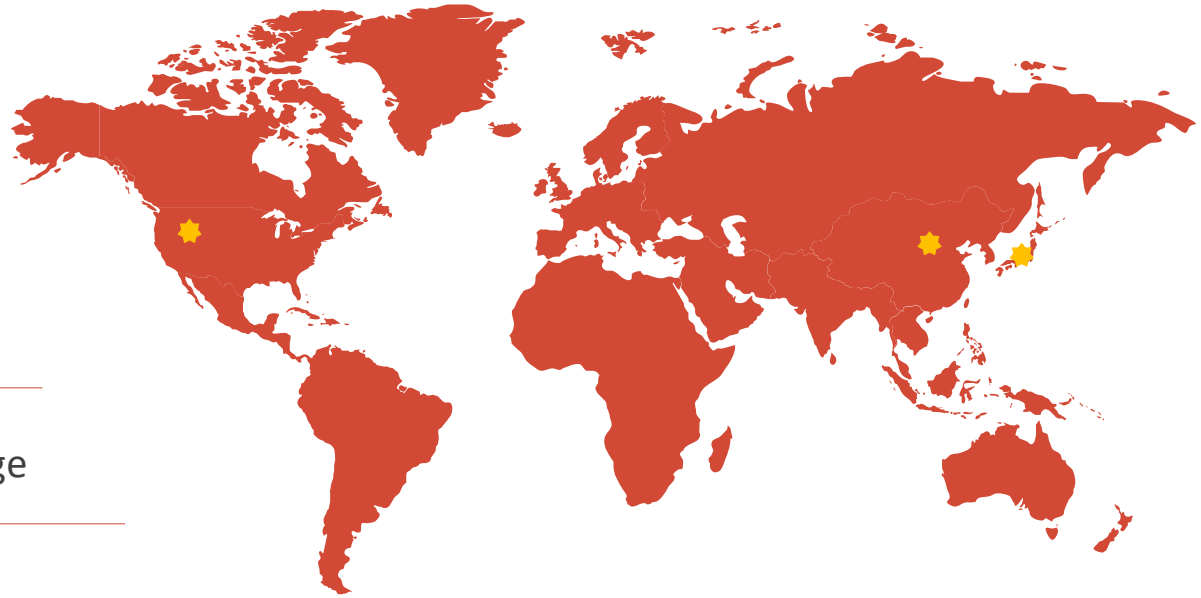
- **Compliant data protection:** Global deployment
- Advanced architecture: Dynamic devices volume
- Stable download speed: Detect the Fastest download node
- Less size diff package: Only 20%-50% size than original package
- Simple integration: Provide FOTA SaaS, Private solution.
  PaaS solution in the future.



Key Competence

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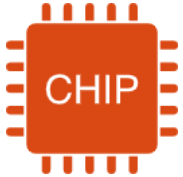
Diversified Services



Multi Platforms

- Qualcomm
- Samsung
- MTK
- NXP
- Intel
- Spreadtrum

Multi OS

- Android
- RTOS
- Linux

Multi Modules

- Bootloader
- Modem
- Customized Partition
- System
- Userdata

Multi Regions

- China
- US
- Japan
- Europe

Reliable Solutions

Global Deployment

- Global data center
- Support IDC deployment

High Applicability Business

- Elastic Service expansion
- High concurrency, High performance

Security Mechanism

- SSL/TLS1.2 two-way communication authentication
- SDK file and upgrade package verification
- Communication security encryption

Customization

- Deep Customized solution

Architecture

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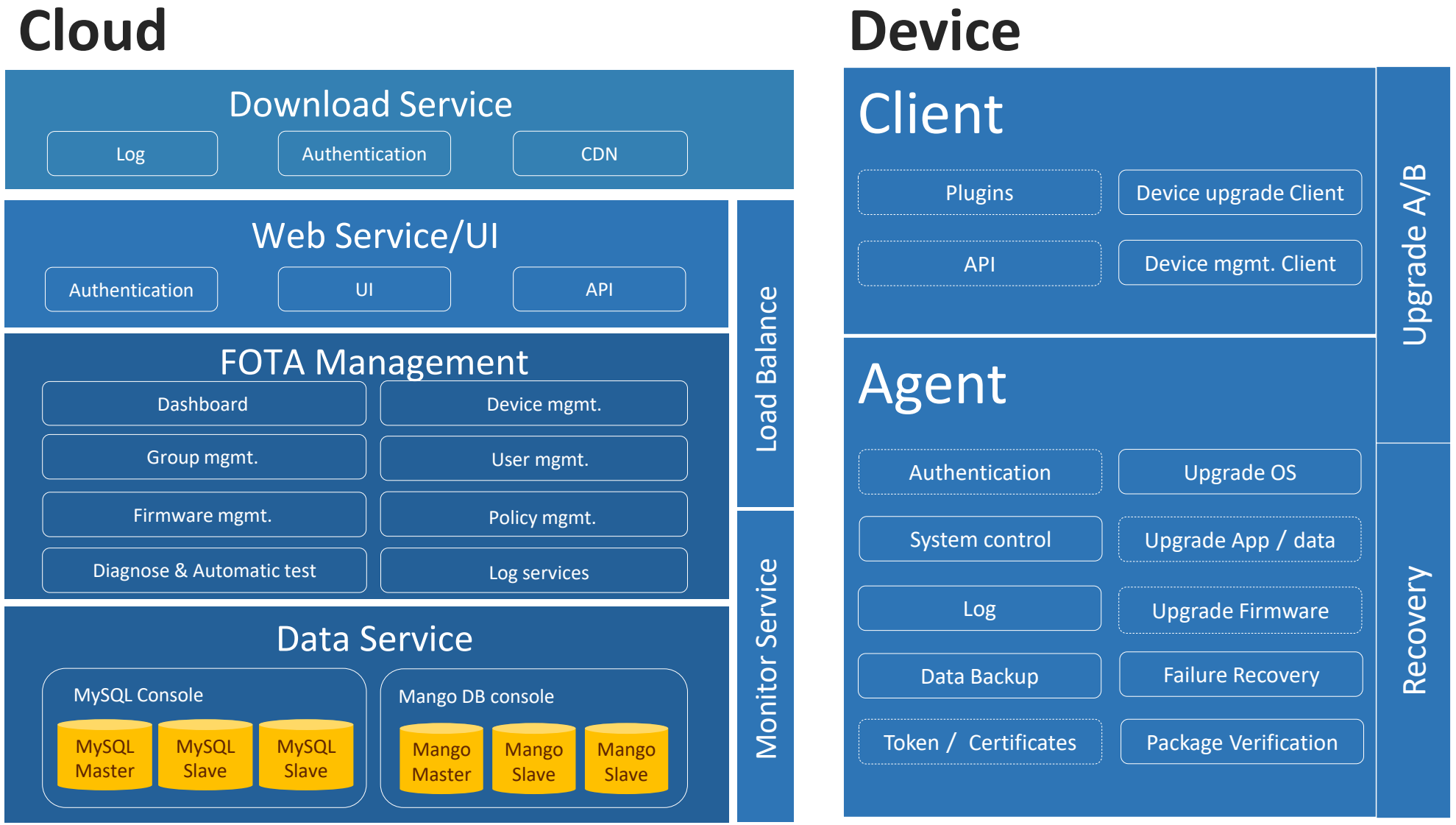

Security

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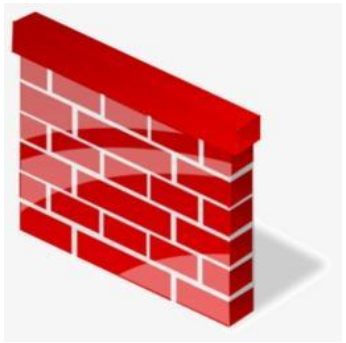
Network Attack

- Login Security
- Device Hijacking
- DDoS
- Privacy leak
- Disaster

Upgrade Risk

- Failure Upgrade
- Package Upload
- Package Download



- Cloud Firewall
- Identify Certification
- Device Authentication
- ……

+

- Integrity Check
- Client Authentication
- Signature Verification
- SSL Based Encryption
- Retry and Recover
- Checksum Verificatiyon
- Robust Backup
- Failure Log
- Report of Upgrade

Potential Threat | **Cloud Security Mechanism** | **FOTA Solution Security Mechanism**

Cloud Server Architecture

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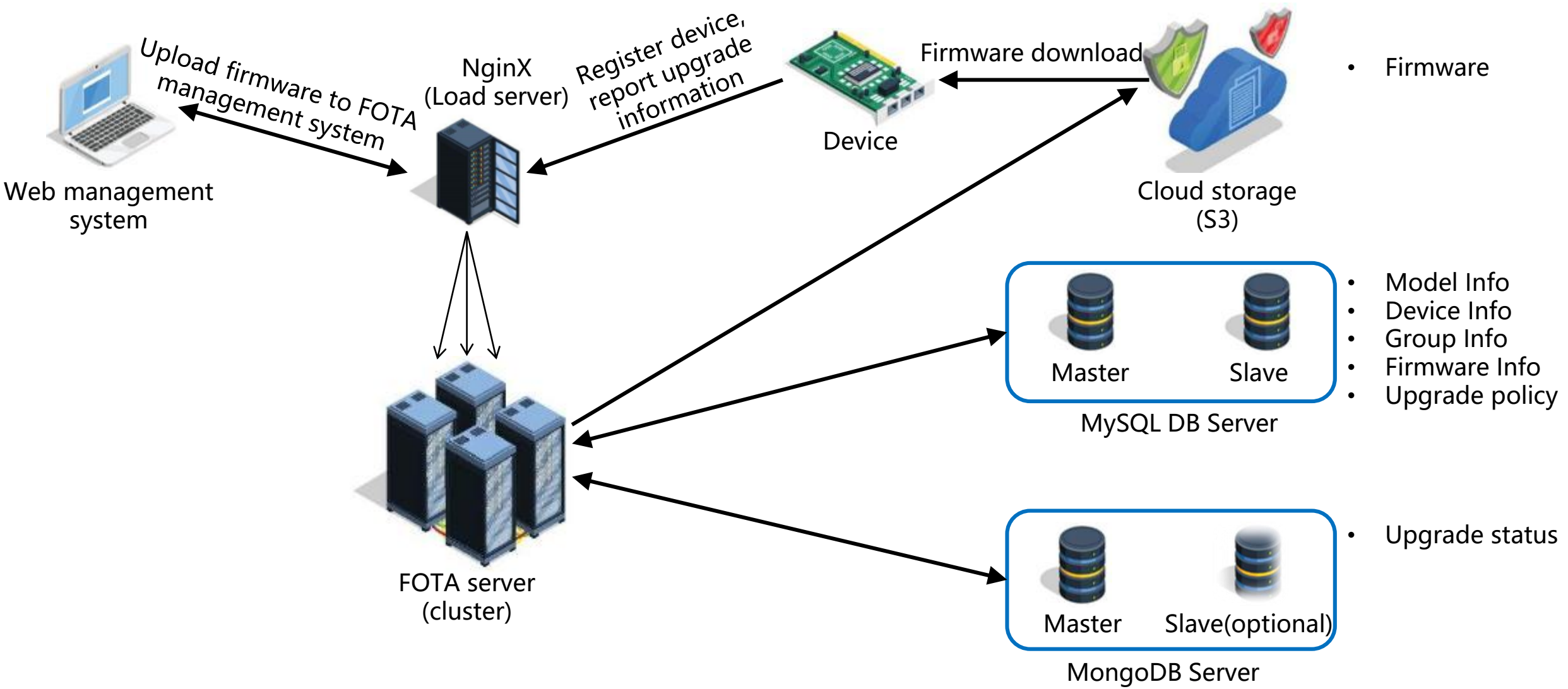

- Firmware
- Model Info
- Device Info
- Group Info
- Firmware Info
- Upgrade policy
- Upgrade status

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Features

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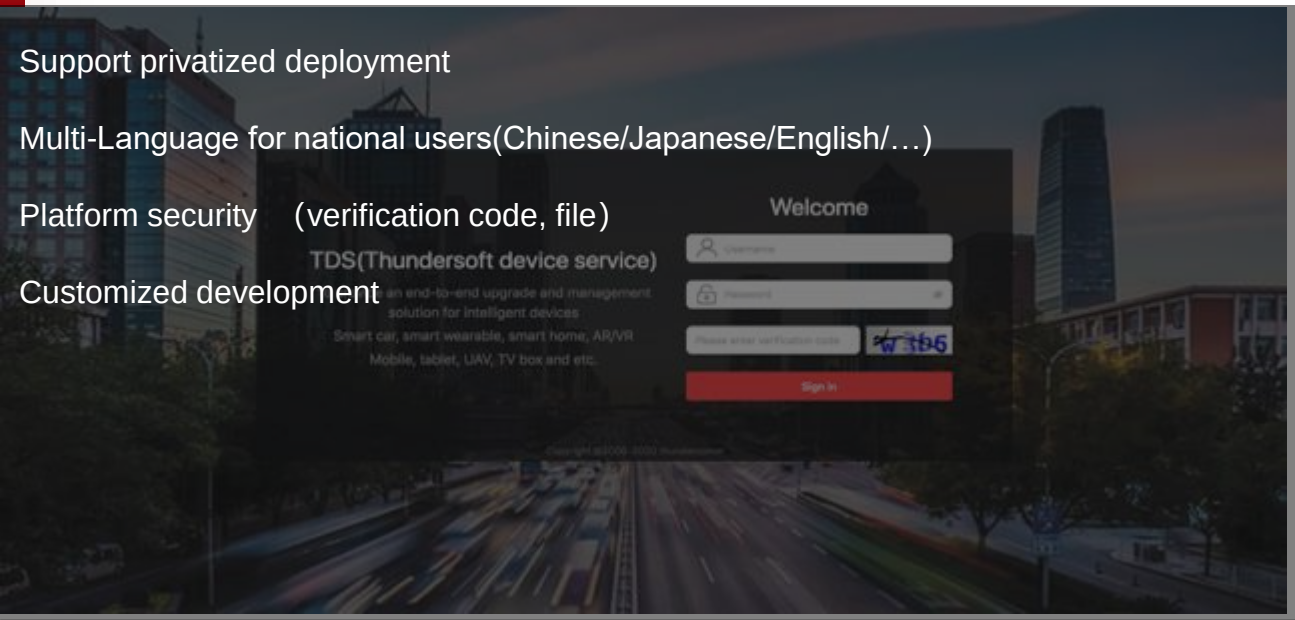


Support privatized deployment

Multi-Language for national users(Chinese/Japanese/English/…)

Platform security (verification code, file)

Customized development

Dashboard

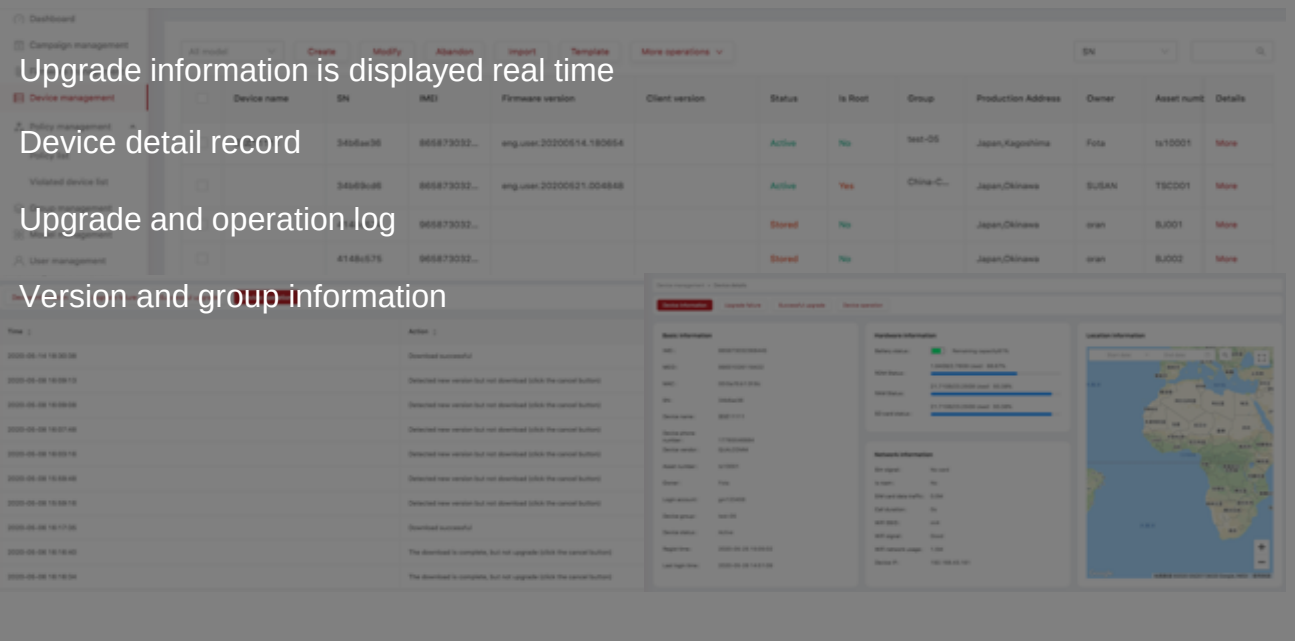
Campaign management

Firmware management

Device management

Product management

Bill management

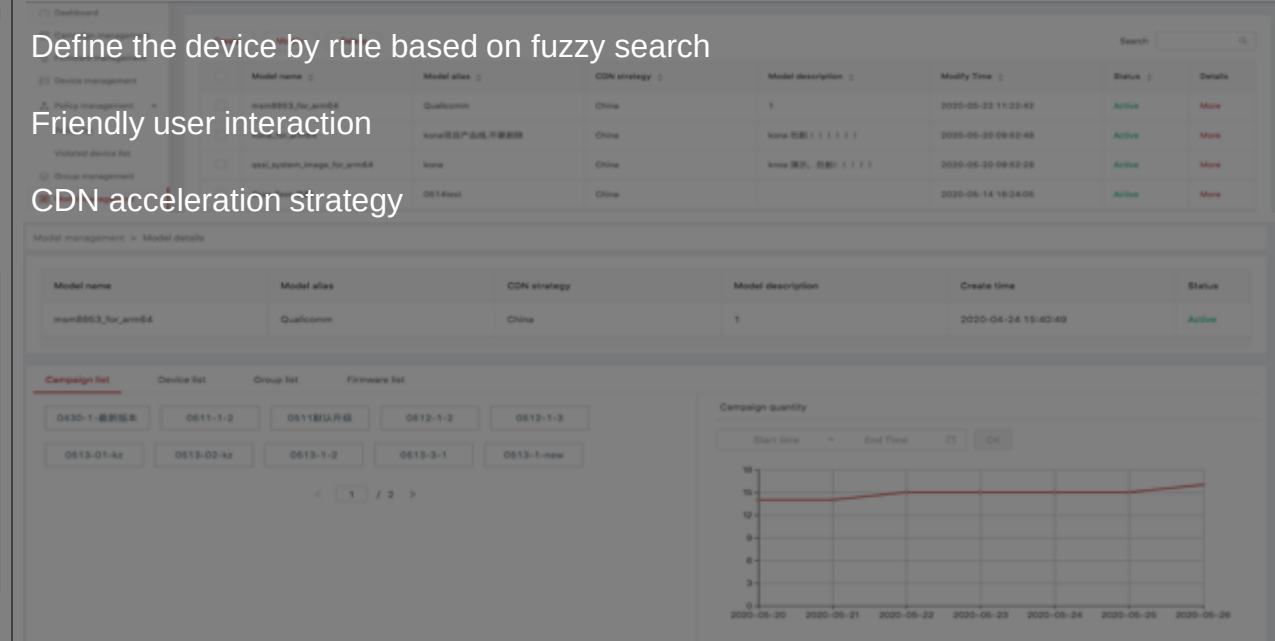


Upgrade information is displayed real time

Device detail record

Upgrade and operation log

Version and group information



Define the device by rule based on fuzzy search

Friendly user interaction

CDN acceleration strategy

Device Upgrade Service

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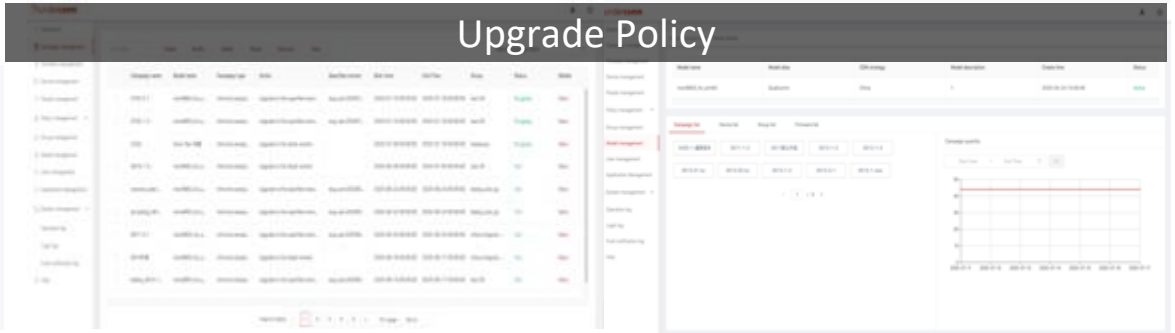
Data Center

Upgrade Statistics

End-side Application and SDK

Dashboard

Upgrade Policy



Provide customer an one stop, End to End, high security based OTA solution

Device Upgrade Workflow

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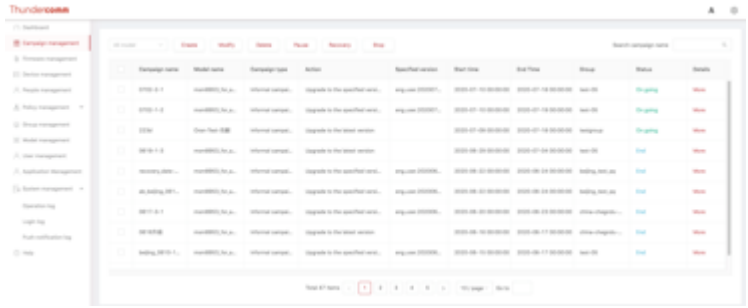
1. Package Preparation

- Build FOTA Package(Full/Delta)
- Upload FOTA Package to FOTA Server



2. Package Management

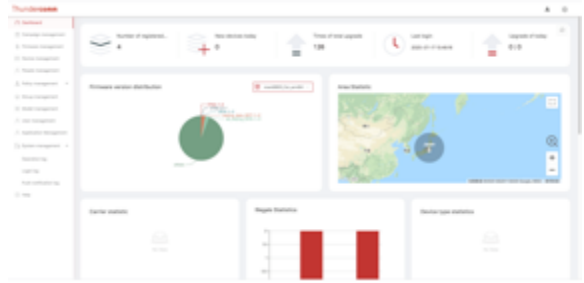
- User mgmt.
- Group mgmt.
- Firmware mgmt.
- Model mgmt.
- Device mgmt.

3. Upgrade on Device

- Download Upgrade package
- Upgrade on Device

4. Upgrade Analysis

- Data Collection and Analysis



Scenario 1 of Device Upgrade Service – Upgrade Package Management

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Strategy 1 : Full pack Mode From 0.9 - 1.2
Requires the 1.2 version package

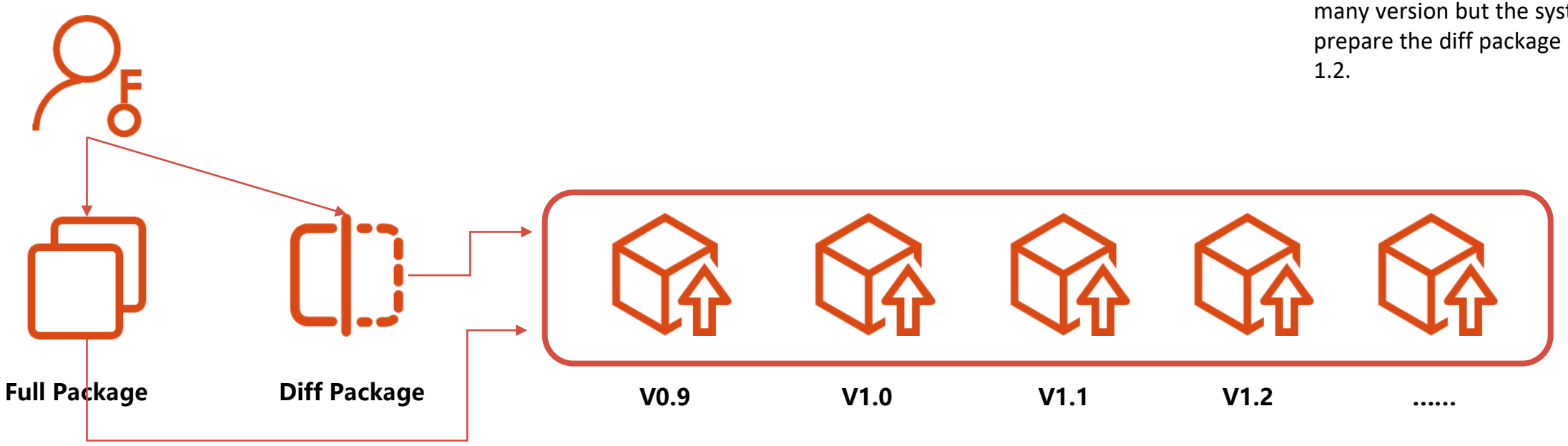
Strategy 1 is using full package to upgrade device. It will need full package of version 1.2. But **download size is large**.

Strategy 2 : Diff Mode From 0.9 - 1.2
Requires the diff between 0.9 - 1.2

Strategy 2 is using diff upgrade. It will need to prepare the diff package 0.9 > 1.2. **The download size is small**.

Strategy 3 : Diff Mode From 0.9 - 1.1
Requires diff 0.9-1.0, 1.0-1.1……

Strategy 3 is using diff upgrade. It will need to prepare Diff packages from 0.9>1.0>1.1>1.2. **The download size is small**. It happens when users passed many version but the system doesn't prepare the diff package between 0.9 and 1.2.



Scenario 2 of Device Upgrade Service- Upgrade Rule Management

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Scenario A : Upgrade in city A and B, but not C

Group Setting

Group based on device characteristics

Scenario B : Upgrade only at night

Duration setting

Scenario C : Set devices to target version

Version Setting

Upgrade to the latest version

Upgrade to the specified version

Successful case：Dash camera solution

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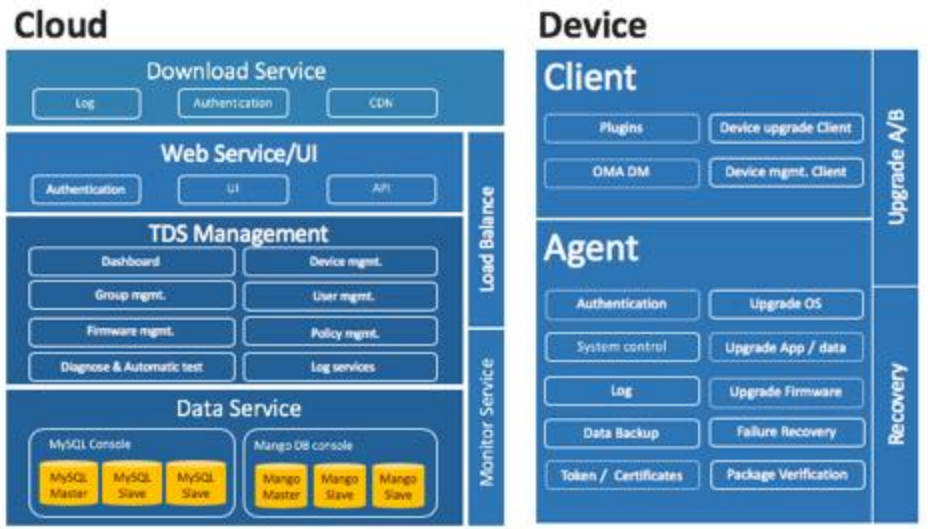
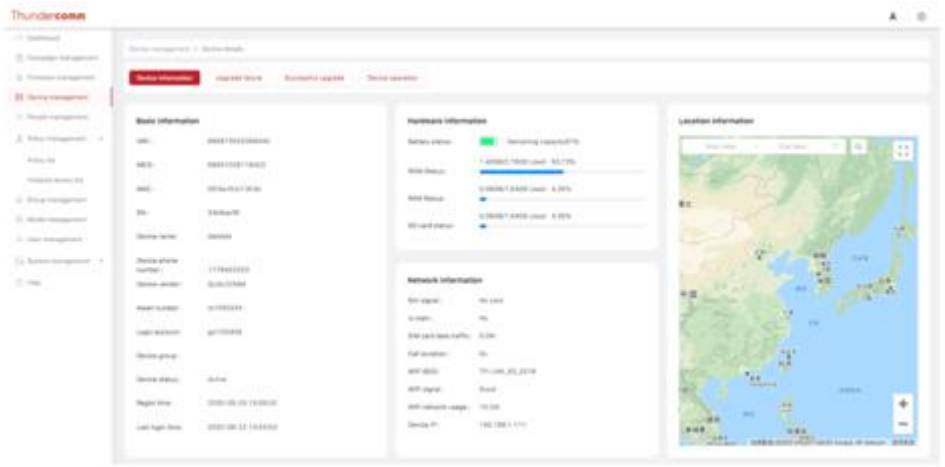
Advantages

- Support millions devices
- Dynamic server architecture
- VPC private network
- Multiple data center
- Device management
- FOTA
- Fail-safe
- Standard SDK

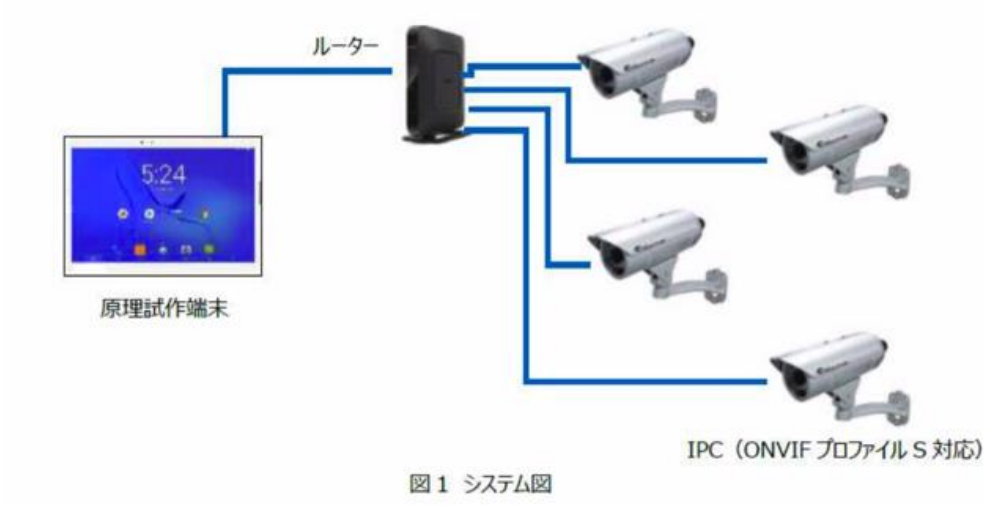
Architecture



Management Backend



Successful case： Home security monitor solution



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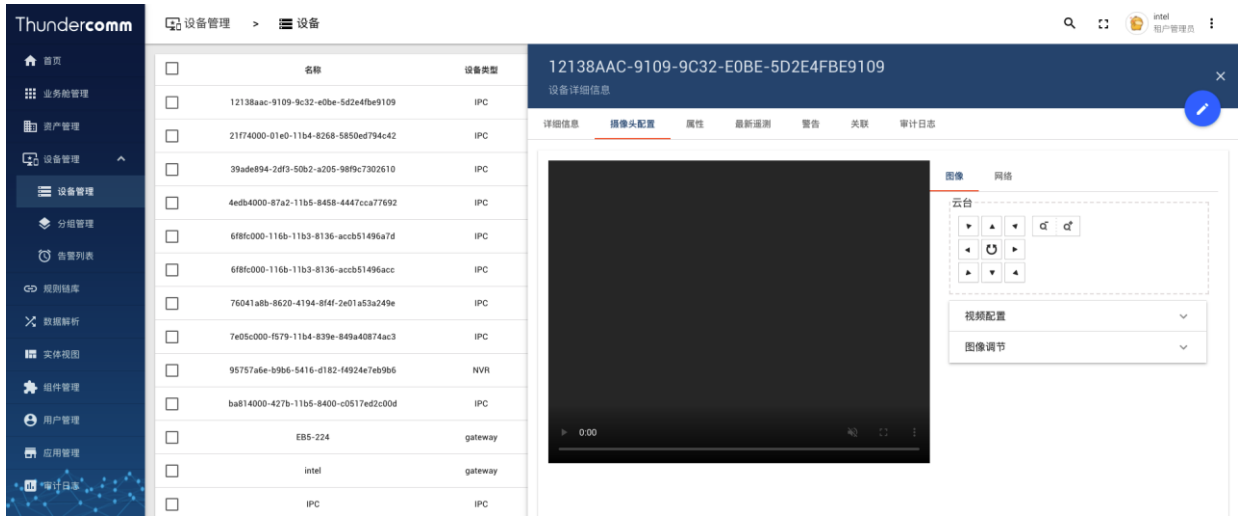

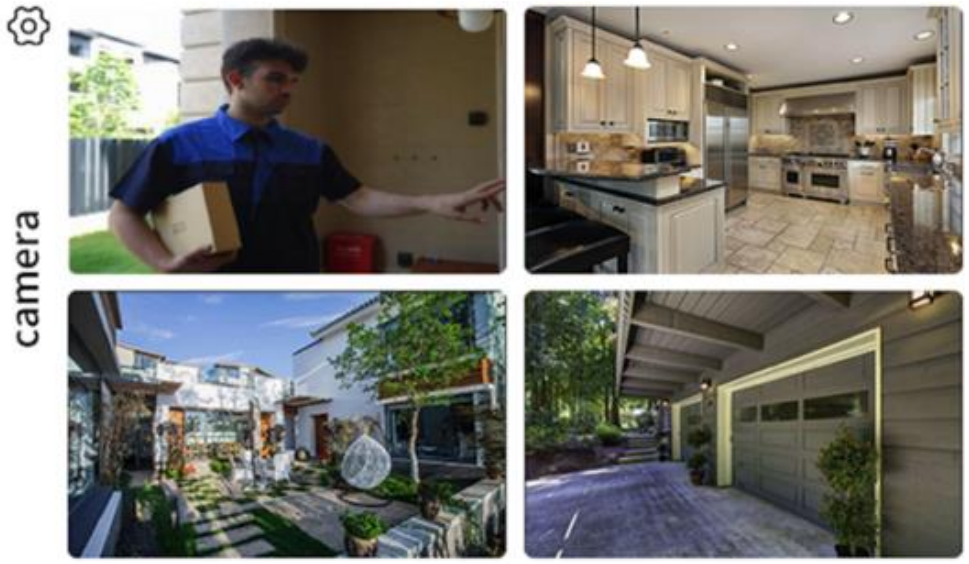

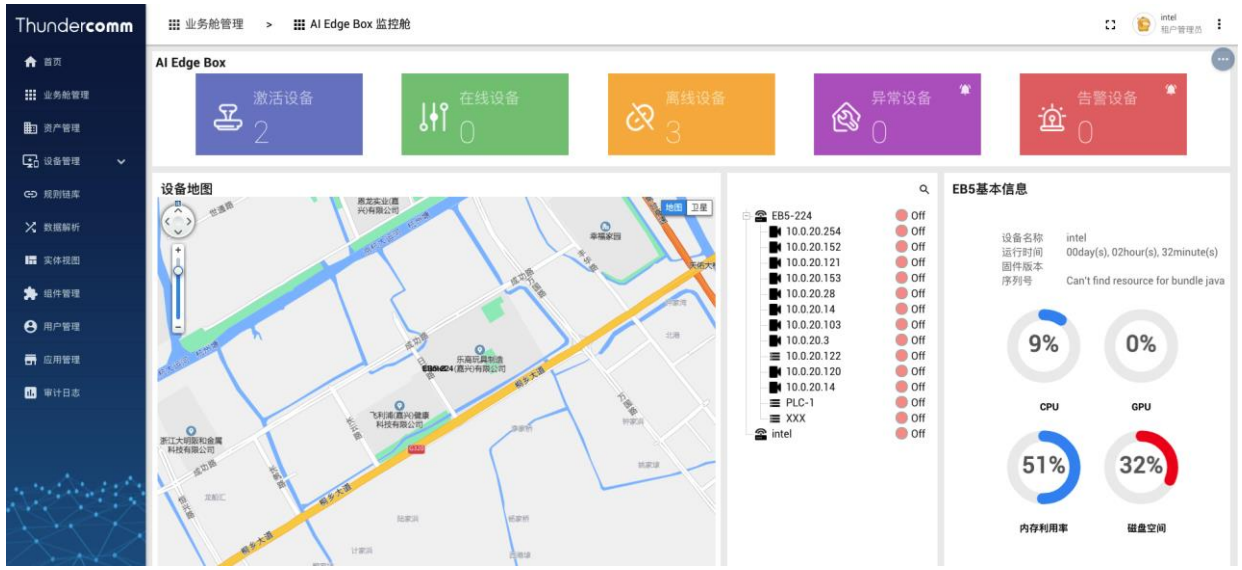

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Enriching an Intelligent World!

Thundercomm

Empowering Every IoT Device with Our Technology

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