

SURE-PARK GARAGE MANAGEMENT SYSTEM

---

# ARCHITECTURE DESIGN

TEAM 10

# 1.Architecture Drivers

## KEY MOTIVATION

- ▶ More efficient utilize of space
- ▶ Reduce traffic congestion
- ▶ Reduce manually operation



## KEY MOTIVATION

- ▶ More efficient utilize of space
- ▶ Reduce traffic congestion
- ▶ Reduce manually operation



## KEY MOTIVATION

- ▶ More efficient utilize of space
- ▶ Reduce traffic congestion
- ▶ Reduce manually operation



## KEY MOTIVATION

- ▶ More efficient utilize of space **Reservation**
- ▶ Reduce traffic congestion **Spot Assignment**
- ▶ Reduce manually operation **Error Detection**



# FUNCTIONAL REQUIREMENTS

- ▶ Reservation
- ▶ Spot Assignment
- ▶ Error Detection



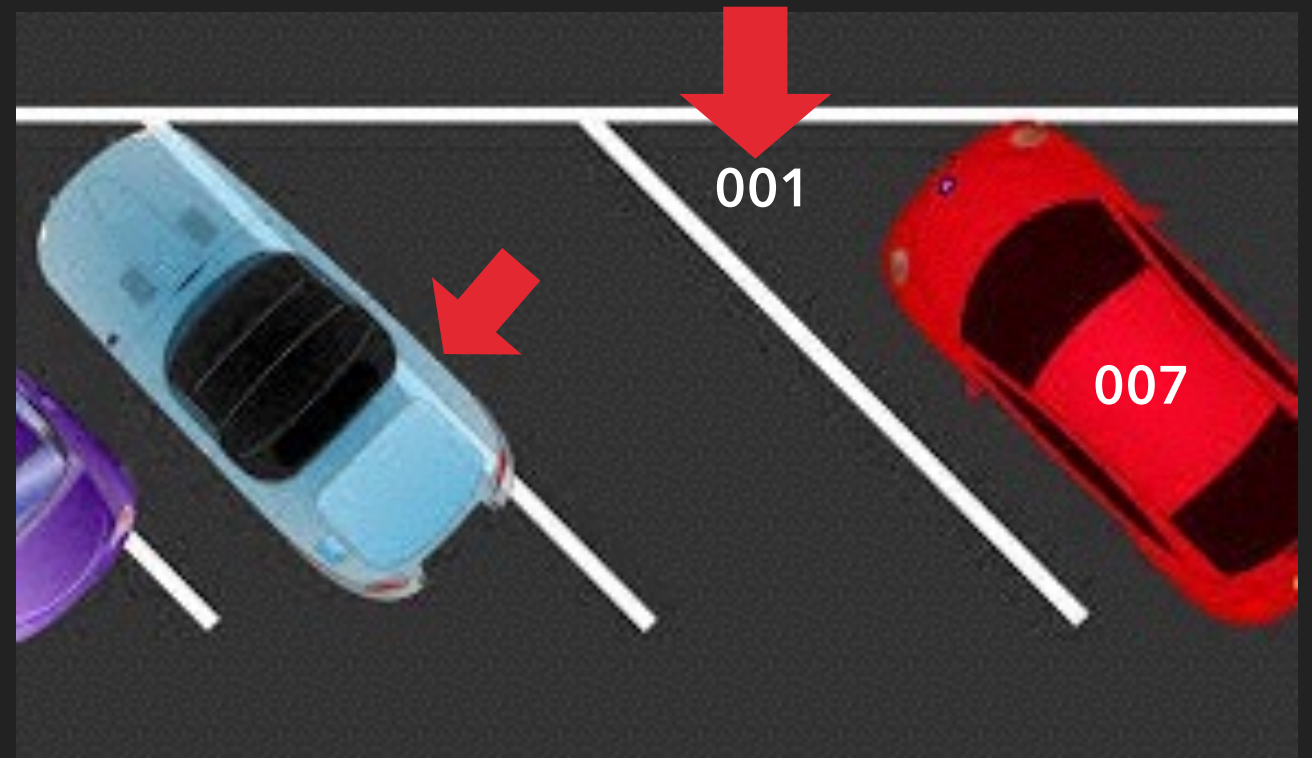
## FUNCTIONAL REQUIREMENTS

- ▶ Reservation
- ▶ Spot Assignment
- ▶ Error Detection



# FUNCTIONAL REQUIREMENTS

- ▶ Reservation
- ▶ Spot Assignment
- ▶ Error Detection

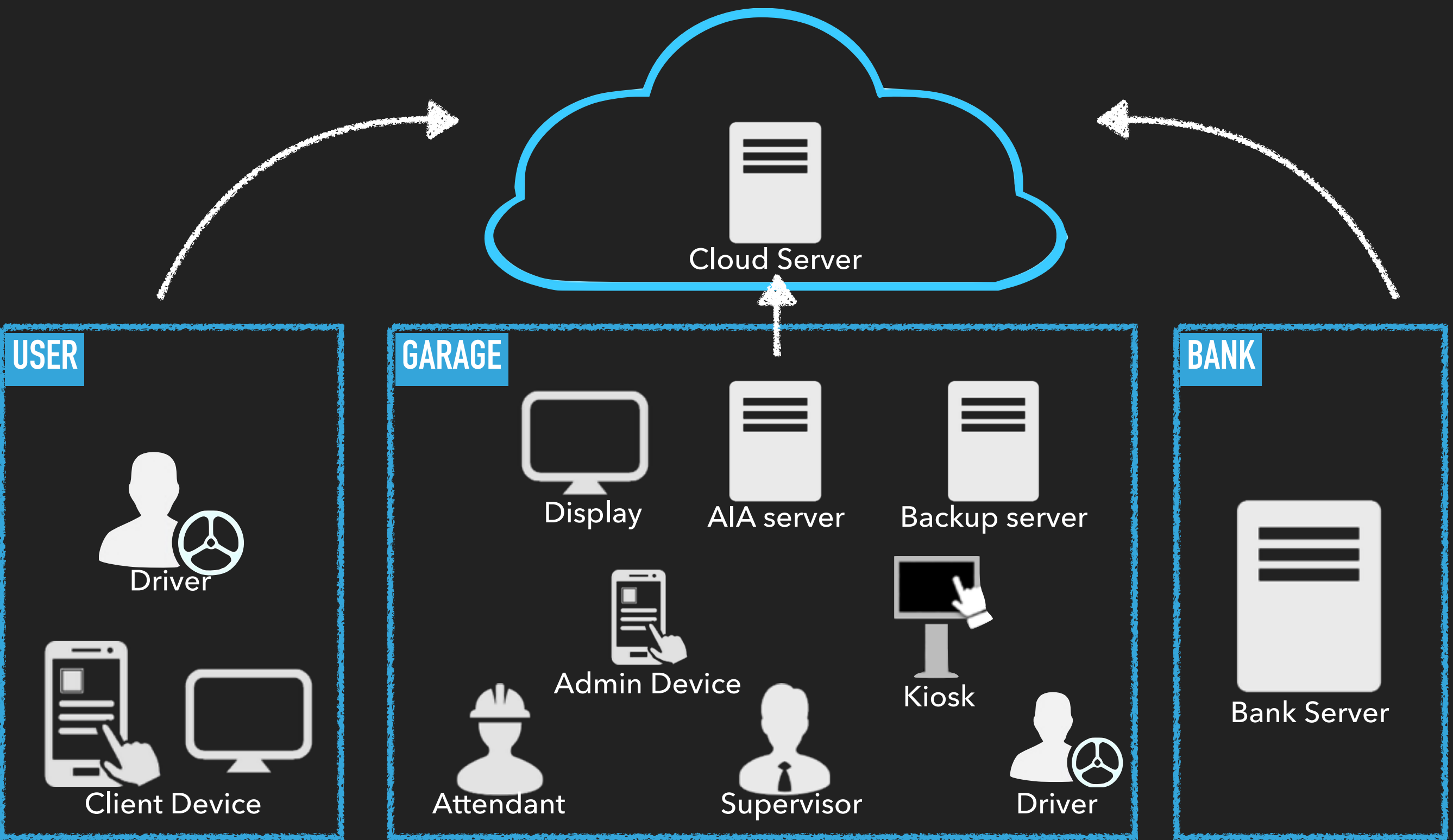


((( STRADDLING )))

((( WRONG SPOT )))

## 2.SYSTEM DESIGN

SYSTEM CONTEXT (Physical View)



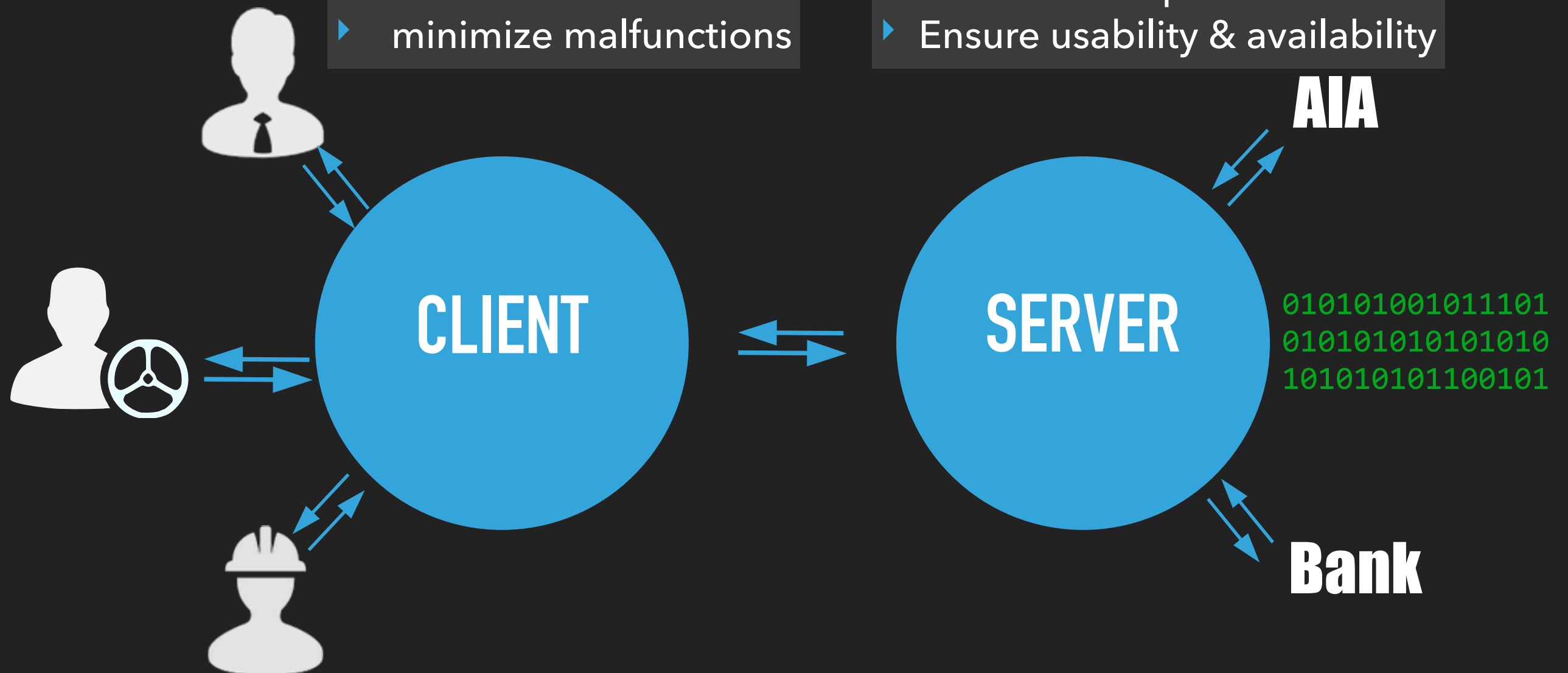
## DYNAMIC CONTEXT (Dynamic View)

### Low workload

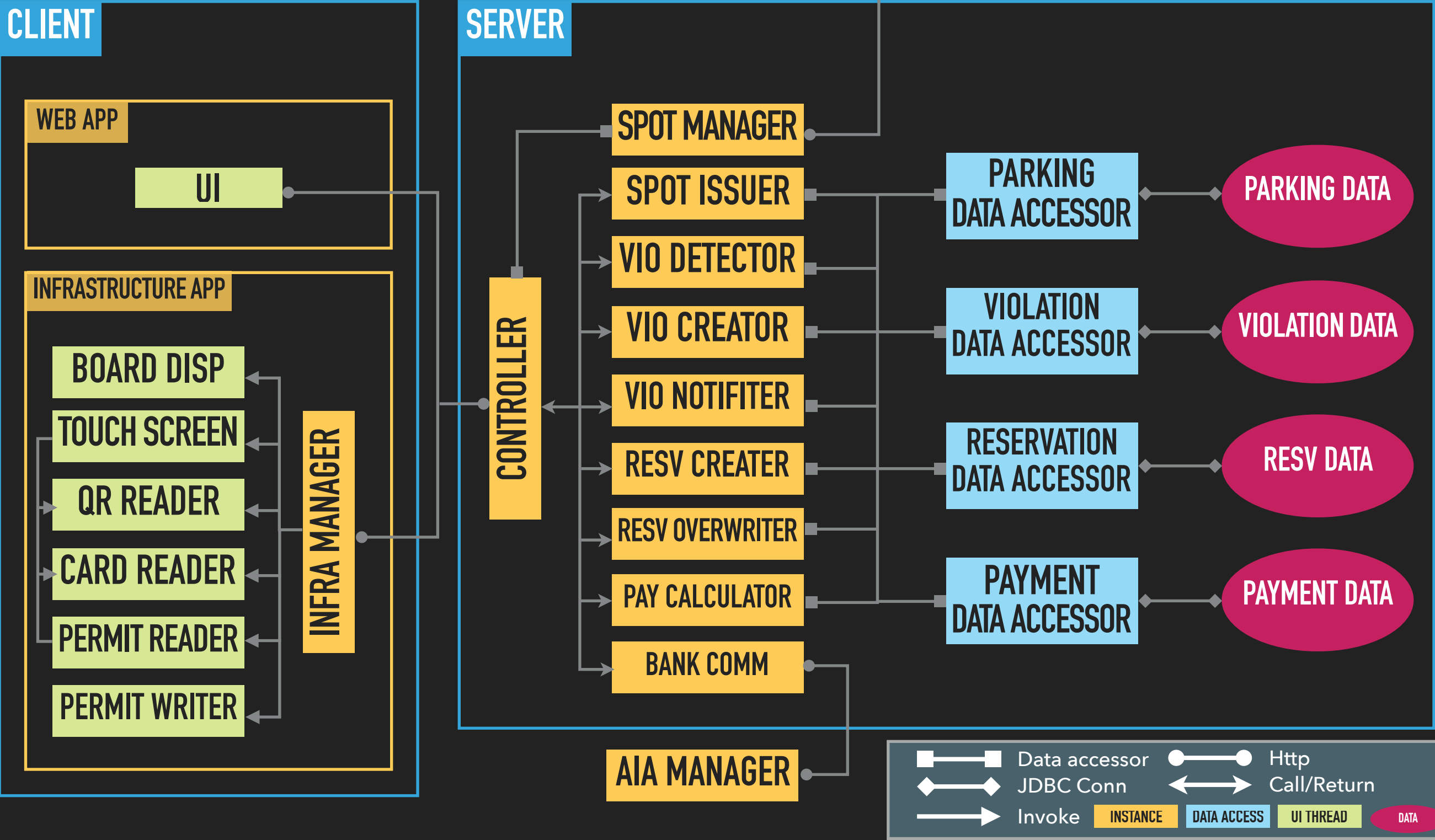
- ▶ reduce cost
- ▶ minimize malfunctions

### High workload

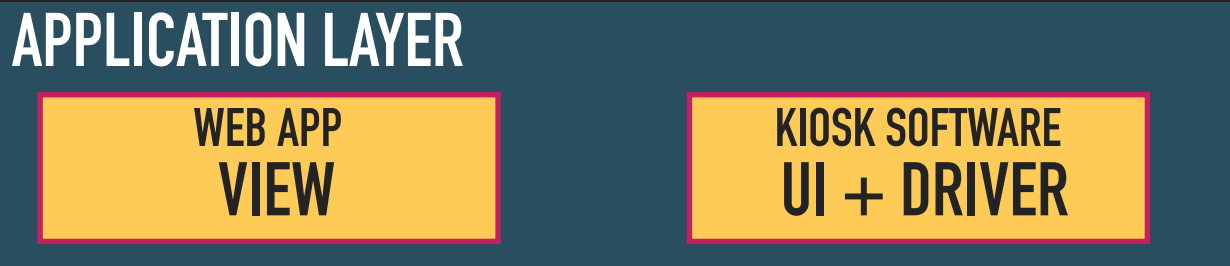
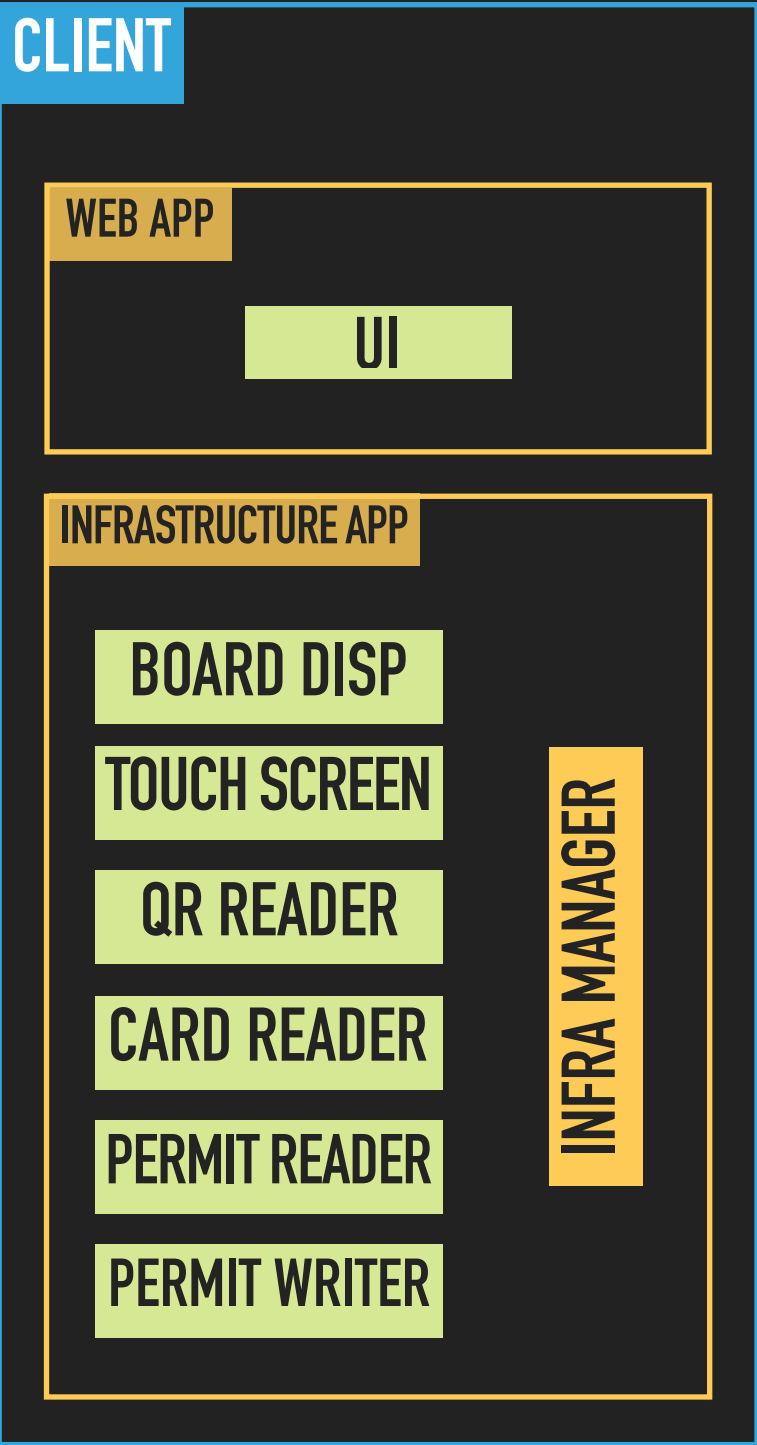
- ▶ Build on IaaS platform
- ▶ Ensure usability & availability



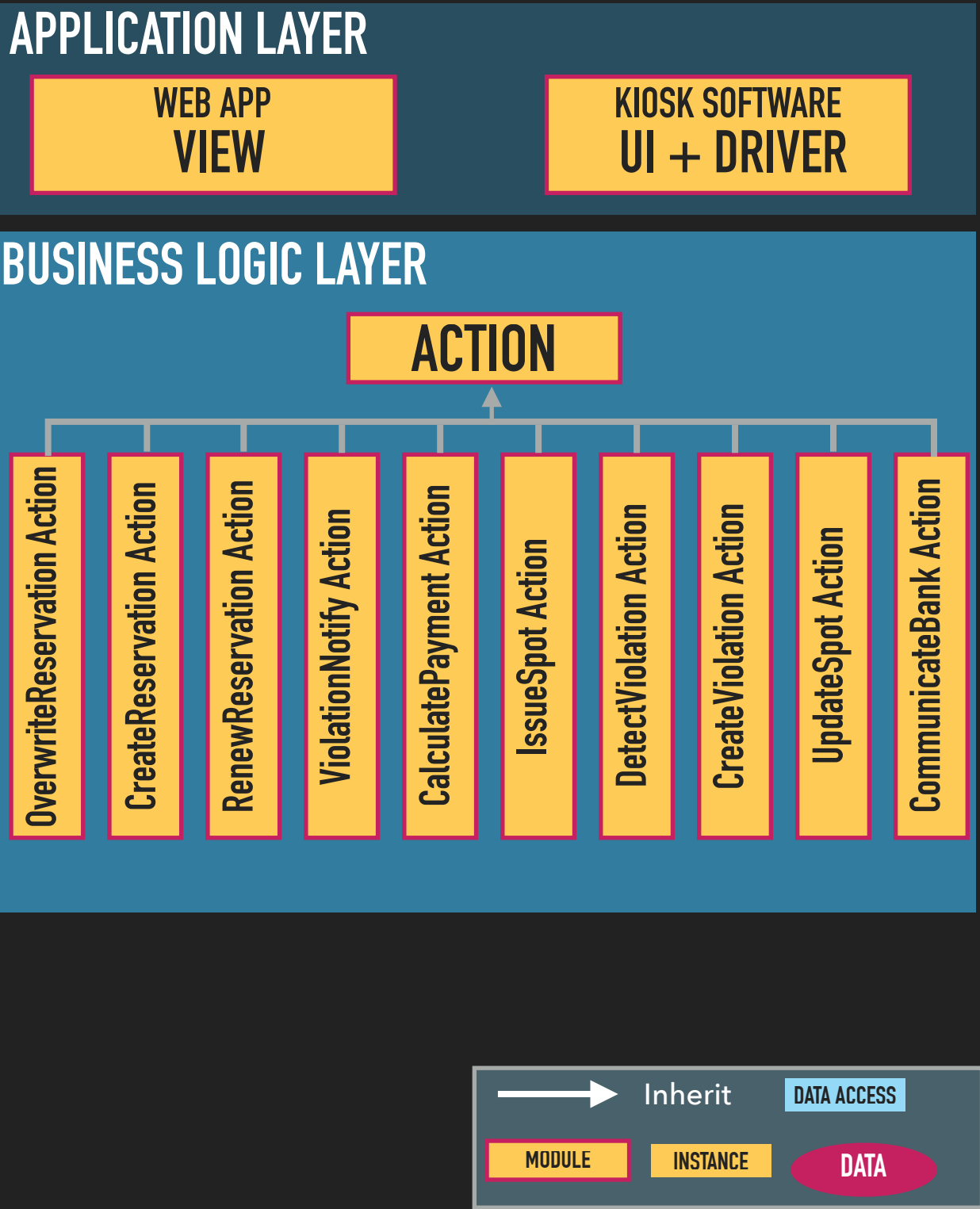
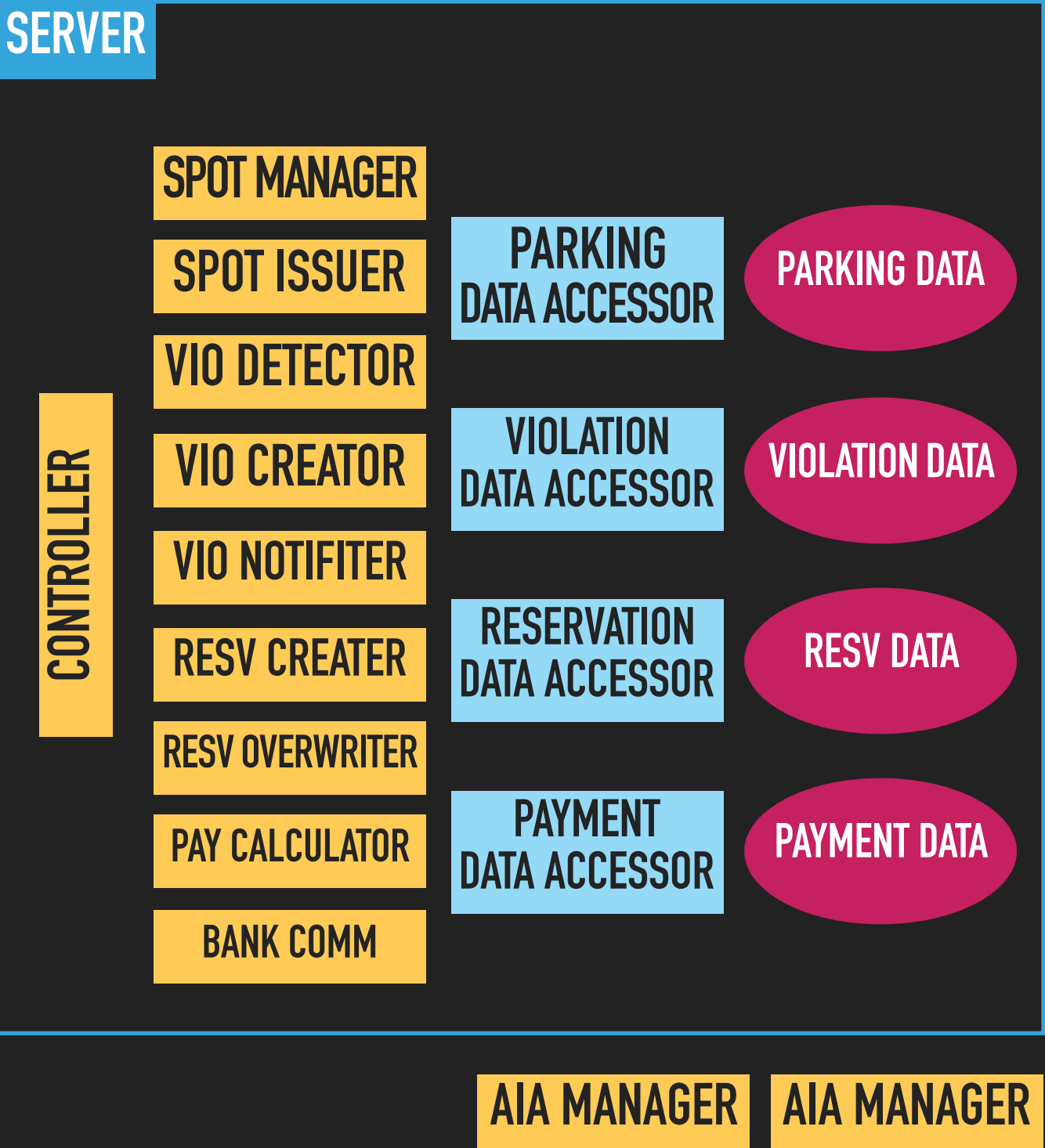
# SYSTEM DECOMPOSITION (Dynamic View)



DYNAMIC -> STATIC



DYNAMIC -> STATIC



DYNAMIC -> STATIC

SERVER

CONTROLLER

SPOT MANAGER

SPOT ISSUER

VIO DETECTOR

VIO CREATOR

VIO NOTIFITER

RESV CREATER

RESV OVERWRITER

PAY CALCULATOR

BANK COMM

PARKING  
DATA ACCESSOR

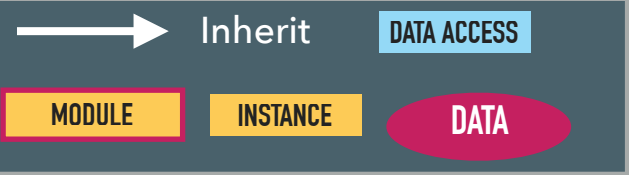
VIOLATION  
DATA ACCESSOR

RESERVATION  
DATA ACCESSOR

PAYMENT  
DATA ACCESSOR

AIA MANAGER

AIA MANAGER



APPLICATION LAYER

WEB APP  
VIEW

KIOSK SOFTWARE  
UI + DRIVER

BUSINESS LOGIC LAYER

ACTION



DATA ACCESS LAYER



# 3.FEATURES

## CLOUD SERVERS

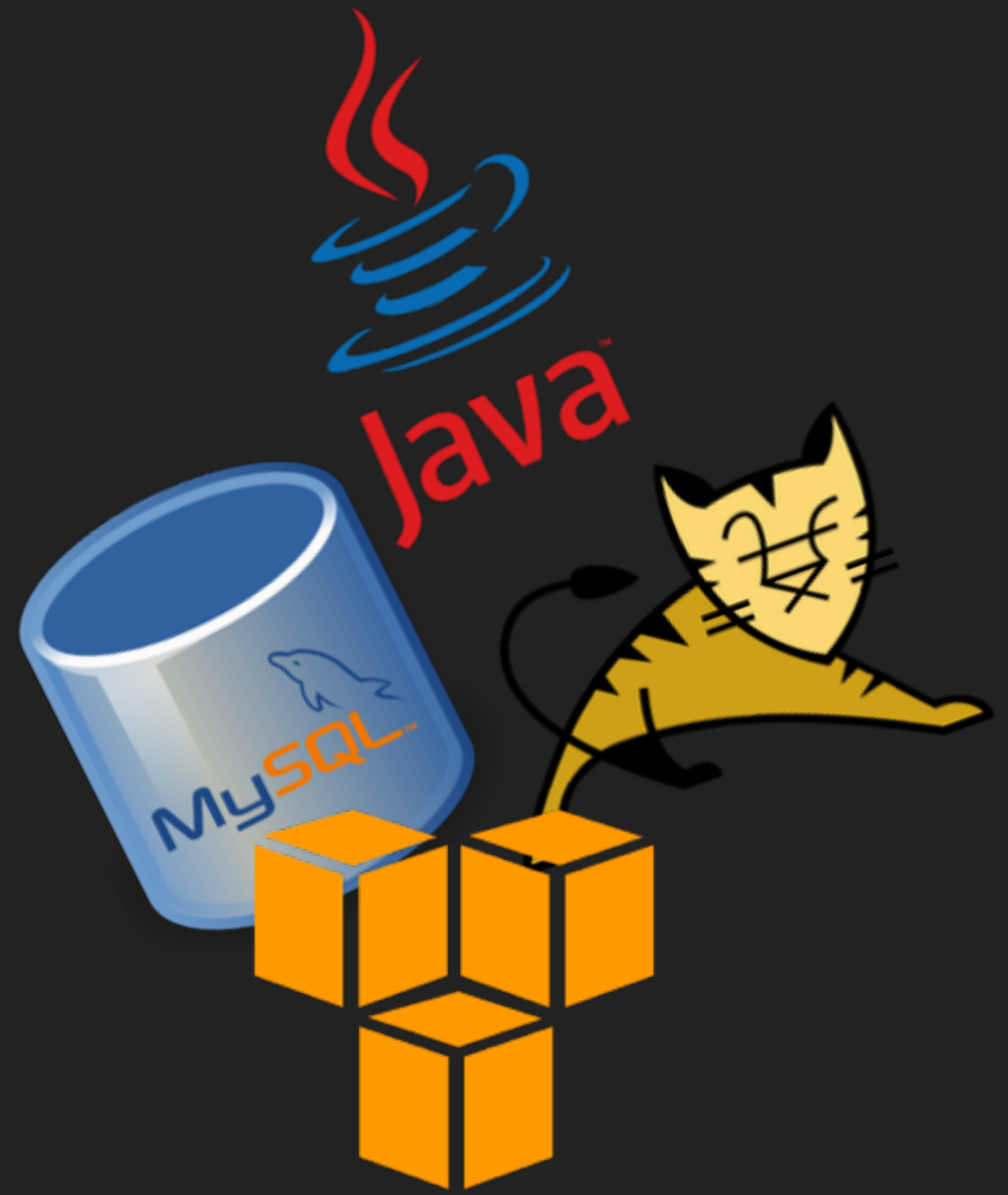
- ▶ Global Computing Infrastructure
  - ▶ 24/7 Stable Services
  - ▶ Multimillion \$ online business over decades
- ▶ Flexible Virtual Environment
- ▶ AWS Storage Gateway
- ▶ Auto Scaling
- ▶ Cost Effective



**AVAILABILITY**

## CLOUD SERVERS

- ▶ Global Computing Infrastructure
- ▶ Flexible Virtual Environment
  - ▶ programing language
  - ▶ web application platform
  - ▶ database
- ▶ AWS Storage Gateway
- ▶ Auto Scaling
- ▶ Cost-Effective



**USABILITY**

## CLOUD SERVERS

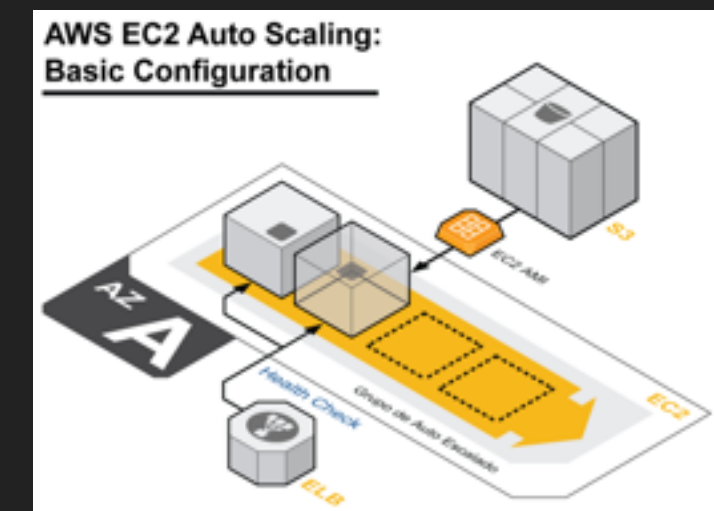
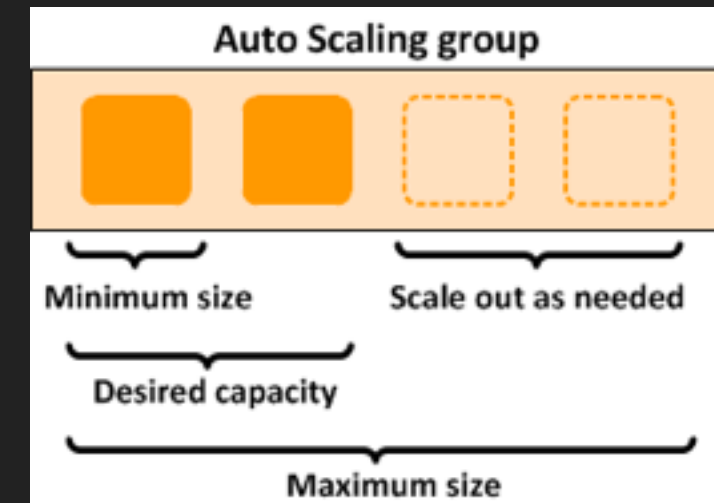
- ▶ Global Computing Infrastructure
- ▶ Flexible Virtual Environment
- ▶ AWS Storage Gateway
  - ▶ Backup
  - ▶ Disaster Recovery and Resilience
  - ▶ Data Mirroring
- ▶ Auto Scaling
- ▶ Cost-Effective



**SECURITY**

## CLOUD SERVERS

- ▶ Global Computing Infrastructure
- ▶ Flexible Virtual Environment
- ▶ AWS Storage Gateway
- ▶ Auto Scaling
  - ▶ Ensure flexible scalability
- ▶ Cost-Effective



# SCALABILITY

## CLOUD SERVERS

- ▶ Global Computing Infrastructure
- ▶ Flexible Virtual Environment
- ▶ AWS Storage Gateway
- ▶ Auto Scaling
- ▶ Cost-Effective
  - ▶ Pay as you go



**ECONOMY**

## BACKUP SERVER

- ▶ Local physical server
- ▶ Protect system from unexpected Internet disconnection



**AVAILABILITY**

## 4.FEASIBILITY

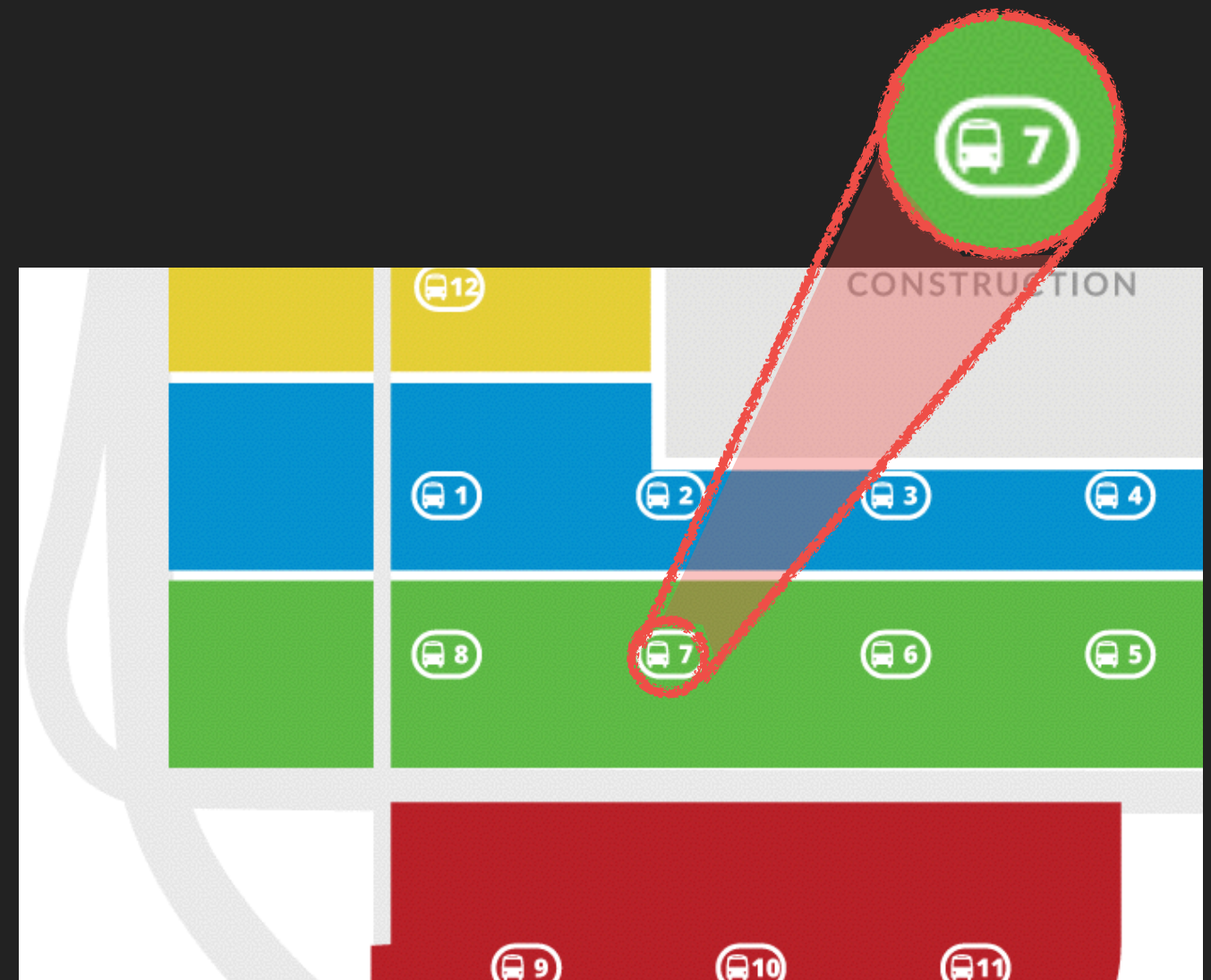
# FEASIBILITY

- ▶ Mature Design Pattern
  - ▶ Client-Server
  - ▶ Model-View-Controller
  - ▶ Layer Model
- ▶ Existing Physical Facility
- ▶ State-of-the-art Cloud Services



## FEASIBILITY

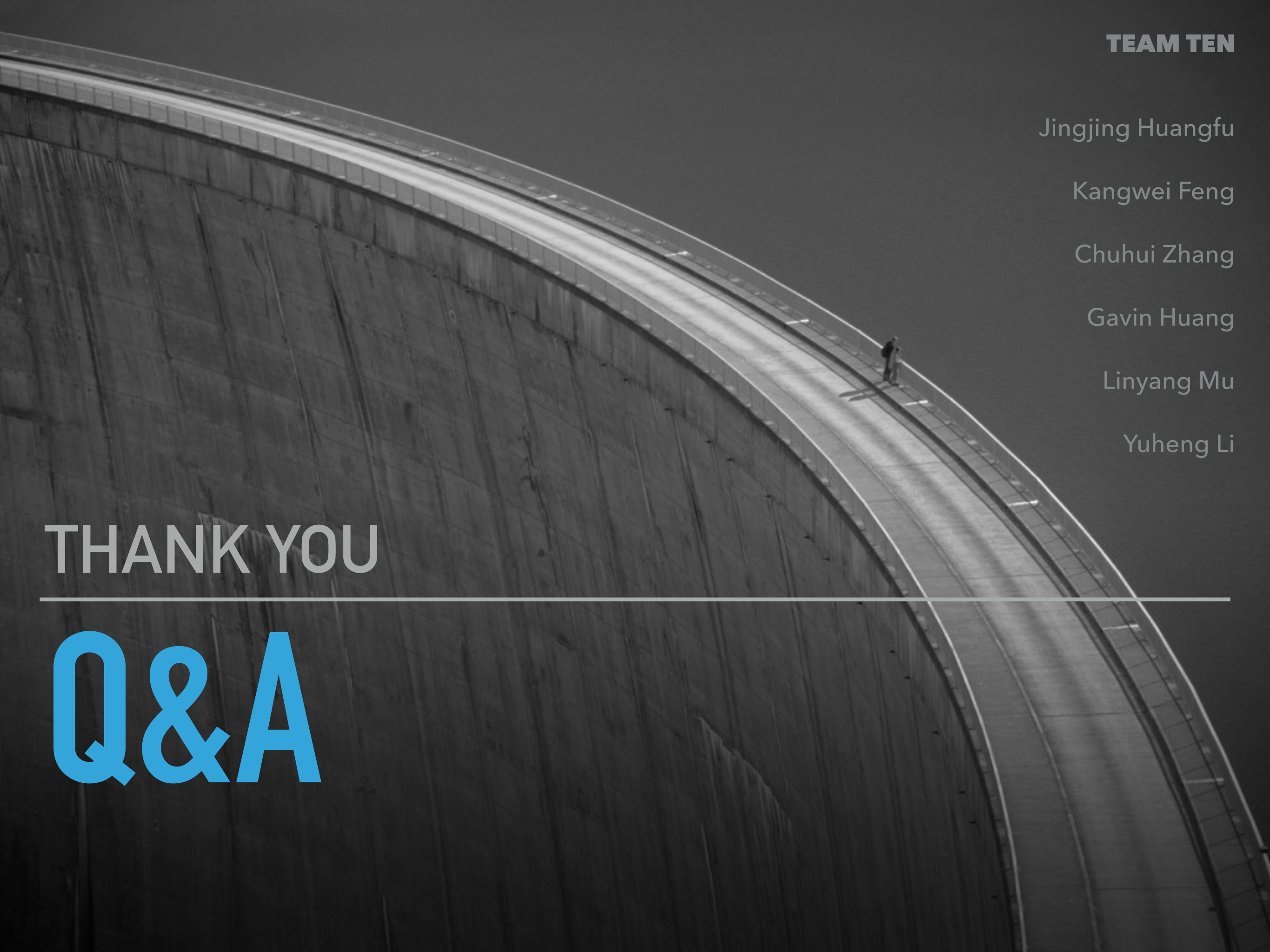
- ▶ Mature Design Pattern
- ▶ Existing Physical Facility
  - ▶ Available Spot Number
  - ▶ Backup Power
- ▶ State-of-the-art Cloud Services



# FEASIBILITY

- ▶ Mature Design Pattern
- ▶ Existing Physical Facility
- ▶ State-of-the-art Cloud Services
  - ▶ Usability
  - ▶ Availability
  - ▶ Scalability
  - ▶ Security





**TEAM TEN**

Jingjing Huangfu

Kangwei Feng

Chuhui Zhang

Gavin Huang

Linyang Mu

Yuheng Li

THANK YOU

---

Q&A