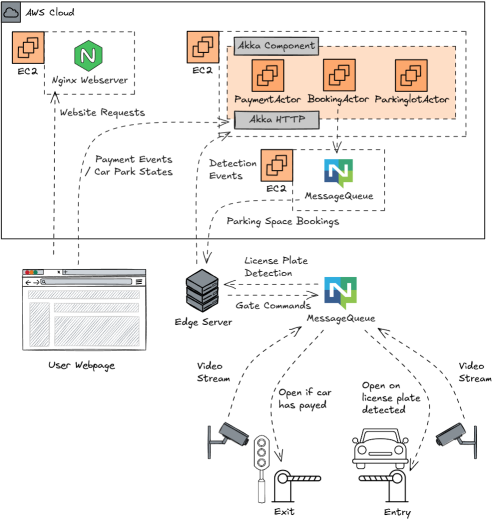


# **Ticketless Parking**

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# System Architecture



## Resources (1/3)

- ▶ **Dataset: Car License Plate Detection (Kaggle)**
  - 400+ annotated images (front/rear views)
  - Suitable for prototyping and evaluation

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  - Real-time license plate detection on the edge
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- ▶ **Messaging: NATS**
  - Pub/Sub for camera frames and control signals (barrier)
  - Asynchronous cloud-to-edge communication

## Resources (2/3)

- ▶ **Edge Stack: Python + SQLite + FastAPI + Akka**
  - **Python** for ML integration
  - **SQLite** as lightweight local store
  - **FastAPI** to monitor barrier state and camera input

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- ▶ **Edge Stack: Python + SQLite + FastAPI + Akka**
  - **Python** for ML integration
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  - **FastAPI** to monitor barrier state and camera input
- ▶ **Cloud Stack: Akka Typed + Akka HTTP + DynamoDB**
  - Actor-based orchestration for *parking lot* functionality
  - **REST API** for edge and web clients
  - Persistent actor state via **DynamoDB**

## Resources (3/3)

### ► Web Application: React + Tailwind CSS

- **React** provides a dynamic UI for availability, reservations, routing and payments
- **Tailwind** CSS for responsive layout
- Browser-based **geolocation** supports finding nearby parking facilities



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### ► Hosting & Deployment: EC2 + Nginx + Terraform (+ S3)

- EC2 hosts the Akka backend and the web frontend on separate instances
- **Nginx** serves as webserver for the WebApp
- **Terraform** defines infrastructure as code; build artifacts are distributed via S3

**Live Demo**

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# Evaluation

**Thank you for your attention!**

Questions?