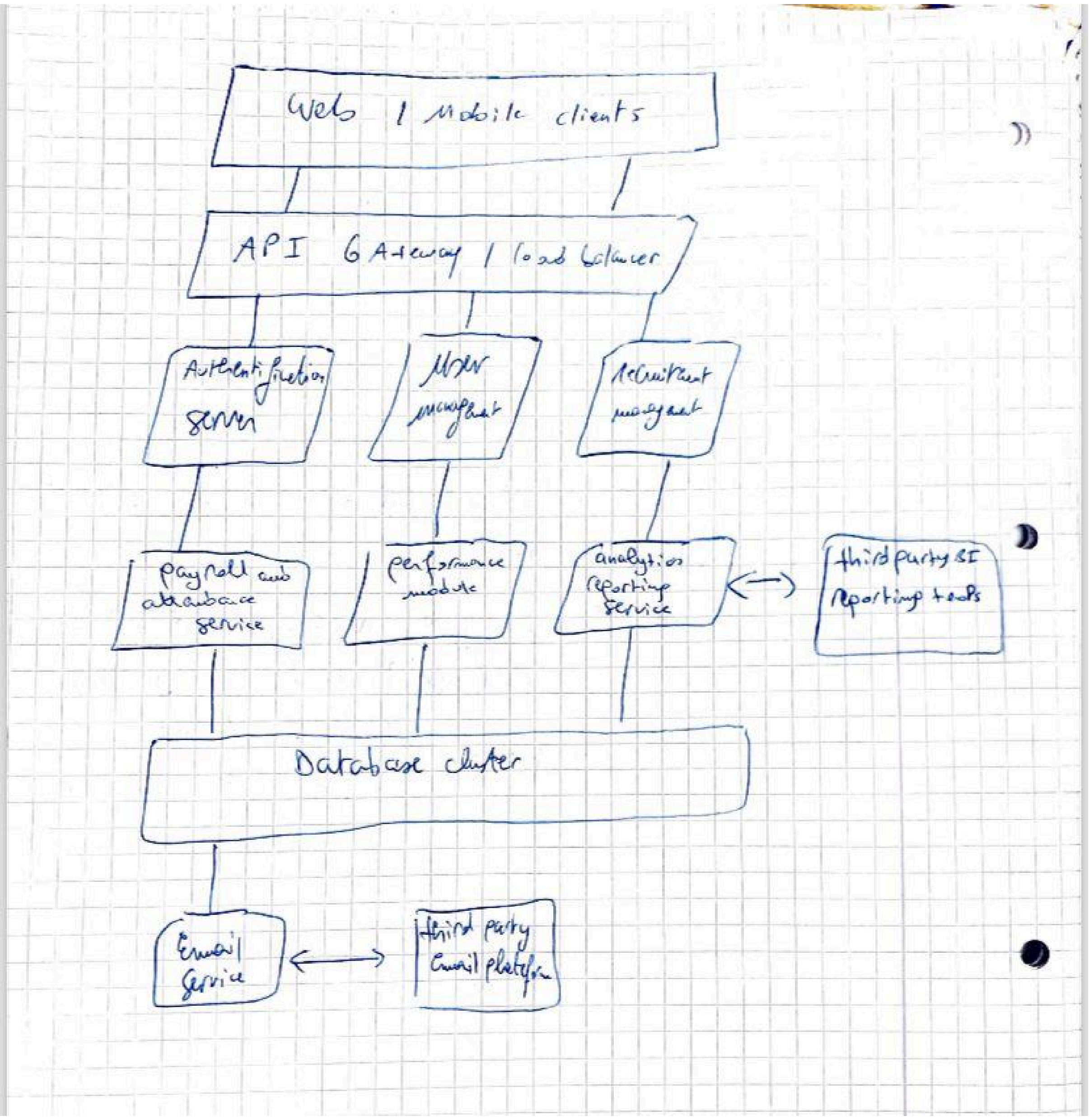
Exercise 2
1.1

Employee Information Management: Employee profiles, contracts, documents..

Recruitment Management: Job postings, resume collection, interview scheduling..

Payroll & Attendance: Salary calculations, disbursements..

1.2


Web / Mobile clients
API Gateway / load balancer
Authentification server
User managment
recruitment managment
payroll and attendance service
performance module
analytics reporting service
third party BI reporting tools
Database cluster
Email service
third party Email platform

API Gateway: Central entry point for routing, throttling, and authentication.

Microservices: Domain-driven, independently deployable services (Authentication, User, Recruitment, Payroll, Performance, Analytics).

Database Cluster: Scalable relational stores with master‑slave replication and sharding for high throughput.

Third‑Party Integrations: External services that the system connects to in order to extend or enhance its functionality.

1.3 Architectural Styles

Data-Centric Architecture: central database cluster serves as the system's shared data source, accessed by multiple services for persistent storage.

Distributed Systems: Composed of autonomous services that interact over a network.

Service-Oriented Architecture (SOA):Modular, loosely coupled services communicating via standard protocols.

Event-Based Architecture: Components communicate through asynchronous events rather than direct calls.

2.

2.1

Comparaison with lecture styles:

Service-Oriented: Matches exactly; multiple services interact via contracts

Distributed Systems:Services are distributed and connected over a network

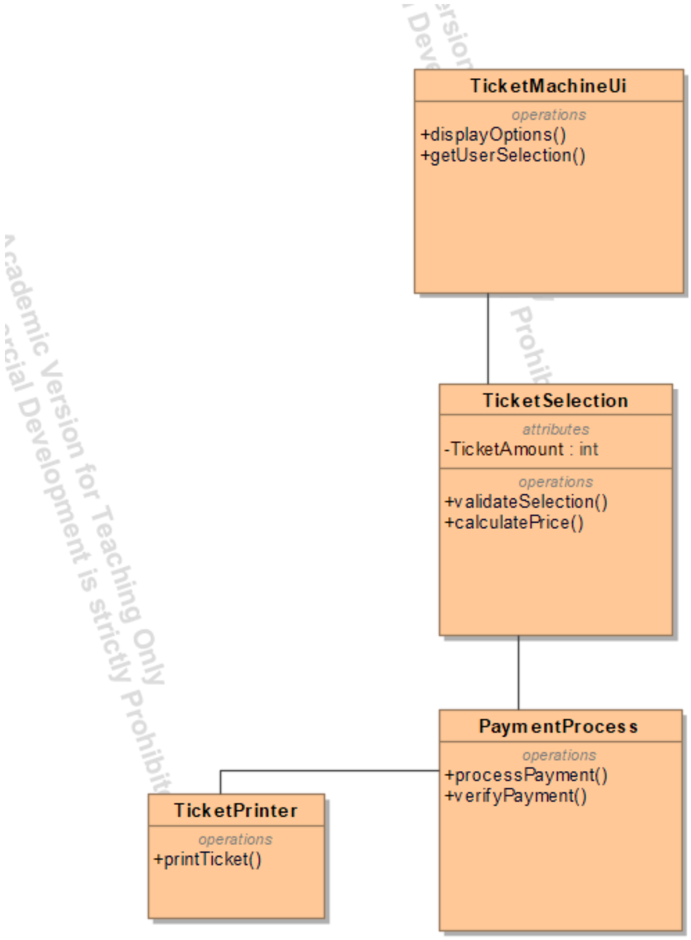
Event-Based:Partial overlap; less emphasis on decoupled event queues

Data-Centric:Not emphasized; services may have local or shared stores

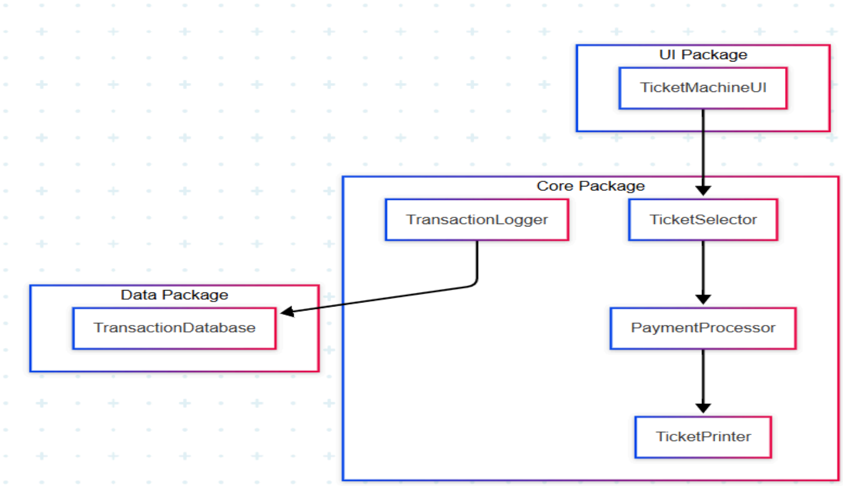
Hierarchical:Not a fit; no clear layered structure

Dataflow-Centric:Not directly applicable; workflow exists but not pipelined

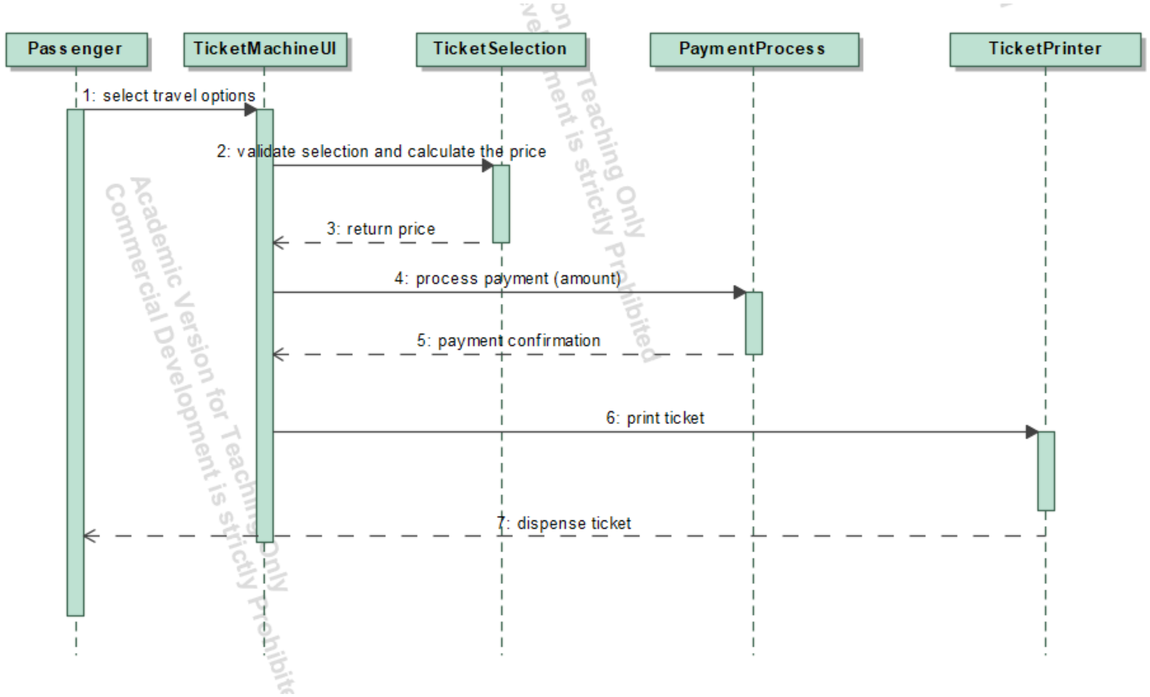
3.1 Logical View (Class Diagram)



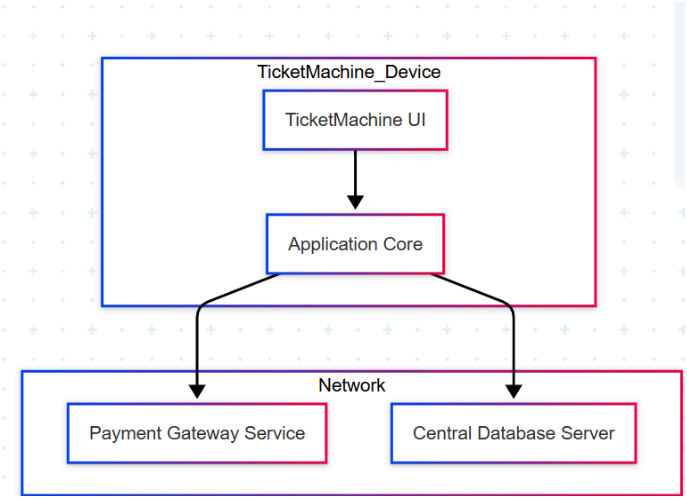
3.2 Development View (Component/Package Diagram)



3.3 Process View (Sequence Diagram)



3.4 Deployment View (Deployment Diagram)



Aufgbabe 4

a) Whistleblowing System: Microkernel Architecture

Security isolation: Core is minimal and easier to audit.

Customizability for clients and can easily extend with minimal disruption.

b) A Video Conferencing System: Client-Server

You need a central server for coordination (user authentication, room setup, signaling)

Scalable: Central server does not stream video.
Low latency: Peer-to-peer media transport is faster.

c) A GPS Tracker for Cats: Event-Driven Architecture

The GPS tracker is a low-power embedded system that periodically sends events (location, battery, movement).

Scalable and reactive: backend can handle events from many devices.

Flexible: easy to add features.