Hochschule Konstanz
Fakultät Informatik

Cloud Native Project - Cloud Application Development – Winter Term 2025/26

Project team

1 Requirements

Give a short introduction into the system scope and main features.

1.1 System Context

Provide a **system context diagram** of the application and give a description of all neighboring systems, external interfaces and actors.

1.2 Feature Overview

Provide a brief description of the main features of the application.

2 Development View

2.1 Software Components

Development time view on software components:

- Which repositories for the source code are used (link)? How is the repository organized?
- What are the software components of your application?
- In which programming languages is the software written? What frameworks are used? Which important libraries are used?
- Which external interfaces do your components provide?

2.2 Data Model

Describe the data model of persistent data.

- Describe the different persistent storages your application uses
- For each storage, define the data model (e.g. ER-Diagram, JSON Schema, …)

3 Runtime View

3.1 Runtime Overview

Describe the cloud resources (diagram) and the external interfaces and UI interfaces here. Describe the configurations of cloud resources used (e.g. API Gateway).

Describe how synchronous services (e.g. Web Frontends) and asynchronous services are implemented.

Provide links to the running application and the cloud environment.

3.2 Microservices

Give a detailed description of each microservice. Which software components belong to the microservice (See chapter 2)? Describe

- How is the service runtime configured?
- Is the microservice scalable? Is scaling handled manual or automatically?
- What is the security setup?
- What connections to external cloud services (e.g. datastores) exists?

3.3 Datastores

Which storage containers exist at runtime and give a link to the data model.

4 DevOps

4.1 IaC

Describe your Infrastructure-as-Code setup

5 Performance Tests

Analyze the performance of the application under various conditions.

5.1 Periodic Workload

Simulate the following scenarios

- 100 concurrent users during peak times and 10 during low demand times
- 1000 concurrent users during peak times and 20 during low demand times

Provide the following information:

- With which data is the application initialized before testing?
- Describe the transaction mix?
- Describe ramp-up/ramp-down phases of the load test, make sure you test long enough!
- Include report of response times, failure rates and resource utilization.

Analyze the results.

5.2 Once-in-a-lifetime Workload

Simulate the following scenarios

- Start with a base load of 10 concurrent users for a while and then add constantly new users.

Determine the max once-in-a-lifetime workload your application survives for a given growth rate of users.

- Which workload does the application survive without degradation?
- Which workload does the application survive with degradation?
- Which workload does the application no longer survive?

Provide the following information:

- With which data is the application initialized before testing?
- Describe the transaction mix?
- Describe ramp-up/ramp-down phases of the load test, make sure you test long enough!
- Include report of response times, failure rates and resource utilization.

Analyze the results.