



*Training Course:
System Design & Architecture*

*21 - 25 April 2025
Amsterdam (Netherlands)
Grand Hotel Amrâth Amsterdam*

Training Course: System Design & Architecture

Training Course code: SC235715 From: 21 - 25 April 2025 Venue: Amsterdam (Netherlands) - Grand Hotel Amrâth
Amsterdam Training Course Fees: 6000 € Euro

Introduction

System design is the cornerstone of building robust, scalable, and high-performing applications in today's technology landscape. This training program provides participants with a comprehensive understanding of system design fundamentals, architectural patterns, and advanced concepts like scalability, high availability, and communication between services. With a blend of theoretical knowledge and hands-on exercises, participants will gain practical insights into creating systems that can meet the demands of modern applications.

Target Audience

This training is ideal for:

- Software engineers and developers aiming to enhance their system design skills.
- IT architects and solution designers responsible for designing scalable systems.
- Technical managers and team leads overseeing software development projects.
- Students or professionals aspiring to enter technical roles involving system architecture.

Objectives

By the end of this training program, participants will be able to:

1. **Understand Key Concepts:** Grasp the foundational concepts of system design, including scalability, performance, and the differences between system design and software architecture.
2. **Analyze and Apply Patterns:** Identify and implement common architectural patterns such as monolithic, microservices, and event-driven architectures.
3. **Optimize Communication:** Evaluate and utilize various communication protocols like REST, WebSockets, and gRPC for effective service interaction.
4. **Design Efficient Storage Solutions:** Differentiate between relational and NoSQL databases, and implement sharding and replication strategies.
5. **Implement Scalability and High Availability:** Build systems with efficient load balancing, caching, and disaster recovery mechanisms.
6. **Engage in Practical Exercises:** Apply theoretical knowledge to real-world scenarios through hands-on activities, including analyzing web applications, designing architectures, and implementing APIs.

Outlines:

Day 1:

Introduction to System Design

- Understanding System Design
- What is system design?
- Importance of scalability and performance
- System design vs. software architecture
- Key Terminologies & Concepts
- Latency vs. Throughput
- Consistency vs. Availability CAP Theorem
- Horizontal vs. Vertical Scaling

Hands-on Exercise: Analyze how a simple web application handles requests

Day 2:

Architectural Patterns & Design Principles

- Common System Design Patterns
- Monolithic vs. Microservices Architecture
- Event-Driven Architecture
- Serverless Computing
- Principles of Scalable System Design
- Load Balancing
- Caching Strategies
- API Rate Limiting

Hands-on Exercise: Design a basic load-balanced architecture

Day 3:

Networking & Communication Between Services

- Networking Basics for System Design
- HTTP vs. WebSockets vs. gRPC
- REST APIs vs. GraphQL vs gRPC
- Message Queues & Event Streaming
- Apache Kafka vs. RabbitMQ vs. Amazon SQS
- Pub/Sub Messaging Model

Hands-on Exercise: Implement an API using REST and WebSockets

Day 4:

Databases & Storage Design + Scalability & High Availability Strategies

- Databases / Storage Design
- Relational vs. NoSQL Databases
- When to use SQL PostgreSQL, MySQL vs. NoSQL MongoDB, Cassandra
- Database Sharding & Replication
- Partitioning Strategies
- Leader-Follower Replication

Hands-on Exercise: Design a database schema

- Scalability & High Availability Strategies
- Scaling Systems Efficiently
- Load Balancers Nginx, AWS ELB
- Content Delivery Networks CDN
- High Availability & Disaster Recovery
- Redundancy & Failover Strategies
- Handling Database Failures

Hands-on Exercise: Design a scalable web application infrastructure

Day 5:

Case Studies & Real-World System Design

- System Design of Large-Scale Applications
- Uber's Architecture Overview
- Netflix, Facebook & Instagram Scalability Strategies
- Breaking Down a System Design Interview
- How to approach design questions
- Step-by-step framework for system design

Hands-on Exercise: Mock system design interview on designing

Registration form on the Training Course: System Design & Architecture

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Complete & Mail or fax to Global Horizon Training Center (GHTC) at the address given below

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