



*Training Course:  
System Design & Architecture*

*21 - 25 April 2025  
Amsterdam (Netherlands)*

## Training Course: System Design & Architecture

Training Course code: SC235715 From: 21 - 25 April 2025 Venue: Amsterdam (Netherlands) - 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

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

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

### Delegate Information

Full Name (Mr / Ms / Dr / Eng): .....  
Position: .....  
Telephone / Mobile: .....  
Personal E-Mail: .....  
Official E-Mail: .....

### Company Information

Company Name: .....  
Address: .....  
City / Country: .....

### Person Responsible for Training and Development

Full Name (Mr / Ms / Dr / Eng): .....  
Position: .....  
Telephone / Mobile: .....  
Personal E-Mail: .....  
Official E-Mail: .....

### Payment Method

- ☐ Please find enclosed a cheque made payable to Global Horizon
- ☐ Please invoice me
- ☐ Please invoice my company

### Easy Ways To Register

Telephone:  
+201095004484 to  
provisionally reserve your  
place.

Fax your completed  
registration  
form to: +20233379764

E-mail to us :  
info@gh4t.com  
or training@gh4t.com

Complete & return the  
booking form with cheque  
to: Global Horizon  
3 Oudai street, Aldouki,  
Giza, Giza Governorate,  
Egypt.