KOENIG step forward

Microsoft Solutions Partner
Microsoft Cloud Training Services

KOENIG SOLUTIONS · COURSE OUTLINE

System Design and Architecture (Microsoft)

Learn to design scalable, reliable systems, covering architectural patterns, networking, databases and high-availability strategies.

5 Days
8 HOURS A DAY

27
TOPICS

6
HANDS-ON ACTIVITIES

COURSE OVERVIEW

This course covers the fundamentals of system design, including scalability, performance and the distinction between system design and software architecture, alongside key concepts such as latency, throughput and the CAP theorem. It then examines architectural patterns including monolithic and microservices architecture, event-driven and serverless computing, along with load balancing, caching and API rate limiting. Networking and communication topics follow, covering HTTP, WebSockets, gRPC, REST and GraphQL, as well as message queues and event streaming with Kafka, RabbitMQ and Amazon SQS. The remaining sessions address database design, sharding and replication, scalability and disaster recovery strategies, and conclude with case studies and a mock system design interview.

WHO THIS COURSE IS FOR

- **System Architects**
- **Software Engineers**
- **Backend Developers**
- **Solution Architects**
- **Technical Leads**

PREREQUISITES

- Basic knowledge of programming, databases, and web development

LEARNING OBJECTIVES

- Explain core system design concepts such as latency and throughput
- Compare consistency and availability using the CAP theorem
- Analyse monolithic versus microservices architecture patterns
- Apply load balancing, caching and API rate limiting strategies
- Evaluate networking protocols such as REST, GraphQL and gRPC
- Assess message queue and event streaming platforms such as Kafka
- Design database schemas using sharding and replication strategies
- Plan high-availability and disaster recovery strategies for systems

COURSE SYLLABUS

27 Topics

DAY 1 Introduction to System Design

Understanding System Design

Hands-on Exercise

TOPICS

What is system design? · Importance of scalability and performance · System design vs. software architecture

Key Terminologies & Concepts

TOPICS

Latency vs. Throughput · Consistency vs. Availability (CAP Theorem) · Horizontal vs. Vertical Scaling

DAY 2 Architectural Patterns & Design Principles

Common System Design Patterns

Hands-on Exercise

TOPICS

Monolithic vs. Microservices Architecture · Event-Driven Architecture · Serverless Computing

Principles of Scalable System Design

TOPICS

Load Balancing · Caching Strategies · API Rate Limiting

DAY 3 Networking & Communication Between Services

Networking Basics for System Design

Hands-on Exercise

TOPICS

HTTP vs. WebSockets vs. gRPC · REST APIs vs. GraphQL vs gRPC

Message Queues & Event Streaming

TOPICS

Apache Kafka vs. RabbitMQ vs. Amazon SQS · Pub/Sub Messaging Model

DAY 4 Databases & Storage Design + Scalability & High Availability Strategies

Databases / Storage Design

Hands-on Exercise

RELATIONAL VS. NOSQL DATABASES

- When to use SQL (PostgreSQL, MySQL) vs. NoSQL (MongoDB, Cassandra)

DATABASE SHARDING & REPLICATION

- Partitioning Strategies
- Leader-Follower Replication

Scalability & High Availability Strategies

Hands-on Exercise

SCALING SYSTEMS EFFICIENTLY

Load Balancers (Nginx, AWS ELB) · Content Delivery Networks (CDN)

HIGH AVAILABILITY & DISASTER RECOVERY

Redundancy & Failover Strategies · Handling Database Failures

DAY 5 Case Studies & Real-World System Design

System Design of Large-Scale Applications

Hands-on Exercise

TOPICS

Architecture Overview · Scalability Strategies

Breaking Down a System Design Interview

TOPICS

How to approach design questions · Step-by-step framework for system design

NOTES

- Mode: Instructor-led

HANDS-ON ACTIVITIES

Practise What You Learn

MODULE	ACTIVITY
Introduction to System Design	Analyze how a simple web application handles requests
Architectural Patterns & Design Principles	Design a basic load-balanced architecture
Networking & Communication Between Services	Implement an API using REST and WebSockets
Databases / Storage Design	Design a database schema
Scalability & High Availability Strategies	Design a scalable web application infrastructure
Case Studies & Real-World System Design	Mock system design interview on designing

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

FLEXIBLE DELIVERY

Learn the Way That Suits You

Classroom Training | Live Online Classes (ILO) | Fly-Me-A-Trainer (FMAT) | Flexi (Self-Paced) | 1-on-1 Training

Ready to Get Started?

Talk to a learning advisor about schedules, group training and customised delivery.

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