

◆ Day 1: Kafka Fundamentals & Architecture (8 Hours)

1. Introduction to Apache Kafka (1.5 hrs)

- What is Kafka? Why Kafka?
- Kafka Features & Real-Life Case Studies
- Messaging vs Streaming

2. Kafka Architecture Overview (2 hrs)

- Kafka Ecosystem: Broker, Topic, Partition, Zookeeper, etc.
- Kafka Data Flow
- Kafka vs other pub-sub systems

3. Kafka Components & Broker Internals (2.5 hrs)

- Detailed view: Producer, Consumer, Broker, Topic
- Multiple brokers on a single machine
- Broker deployment patterns
- Decommissioning brokers

4. Hands-on Lab (2 hrs)

- Install multi-broker Kafka cluster (local)
- Use CLI to create topics, send/receive messages
- Explore logs and configuration

◆ Day 2: Kafka Producers, Consumers, Topics & Mirroring (8 Hours)

1. Kafka Python Producer (2.5 hrs)

- `kafka-python` or `confluent-kafka` setup
- Message publishing: sync vs async
- Partition strategies: Round Robin, Keyed, Custom
- Hands-on: Python producer with partitioning

2. Kafka Python Consumer (2.5 hrs)

- Concepts: Consumer Group, Offset, Rebalancing
- Queue vs Broadcast consumption
- Hands-on: Python consumer subscribing to Kafka topic

3. Topics, Partitions & Mirroring (2 hrs)

- Topic configs: cleanup policy, retention, compaction
- Partition reassignment: manual and automatic
- Mirroring: MirrorMaker architecture
- Hands-on: Topic update + MirrorMaker setup

4. Bonus Lab (1 hr)

- Complete pipeline: Python Producer → Kafka → Python Consumer
- Multi-topic and multi-partition example

♦ Day 3: Replication, Monitoring, and OCI Compute Deployment (8 Hours)

1. Kafka Replication Concepts (2 hrs)

- Replication factor, ISR, Leader Election

- Quorum-based replication (KRaft mode intro)
- Hands-on: Simulate leader failover, change replication

2. Partition Reassignment & Tuning (1.5 hrs)

- Performance tuning: I/O, batching, buffer sizes
- Hands-on: Increase partitions, reassign with tools

3. Monitoring Kafka (1.5 hrs)

- Metrics, log files, health checks
- JMX, Prometheus + Grafana (overview)

4. Kafka Manual Deployment on OCI Compute VM (3 hrs)

- Launch Ubuntu VM on OCI
- Install and configure Kafka broker + Python client
- Hands-on: Produce and consume from Kafka on OCI Compute

◆ Day 4: Kafka on OCI + ODI/OGG Integration (4 hrs) + Final Project & Q&A (4 hrs)

★ Part A: Kafka on OCI (4 hrs)

1. OCI Streaming (2 hrs)

- What is OCI Streaming?
- Kafka Compatibility Layer
- Hands-on: Produce/consume data using Python and OCI streaming

2. ODI Integration with Kafka (1 hr)

- Stream ingestion into ODI
- Hands-on: Consume Kafka messages in ODI workflow

3. OGG Stream Analytics (1 hr)

- Kafka connector with GoldenGate
 - Hands-on: Stream DB updates to Kafka using OGG
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★ Part B: Final Project, Advanced Topics & Wrap-Up (4 hrs)

1. Capstone Project (2 hrs)

- Use Case: Python Producer → Kafka (OCI Streaming) → ODI Integration
- Use Partitioning, Replication, and Offset Management
- Deploy Kafka on OCI Compute (hybrid use)

2. Advanced Topics (1 hr)

- Kafka ACLs and Security Basics
- Kafka REST Proxy overview
- Kafka Schema Registry and Avro

3. Wrap-Up and Review (1 hr)

- Recap of key concepts
- Troubleshooting tips and best practices
- Q&A and career-focused suggestions