Event driven Architecture with Kafka

Program Details	
Topic	Apache Kafka & Streaming Distributed Messaging Training
Scope	Confluence Kafka Enterprise 5.x Kafka 2.x Version
Level	Intermediate and Advanced
Languages	Java 1.8 64 bit

Lab Setup

Host Machine	64bit Windows/Linux/Mac [Linux is preferred]
Virtual Machine	64bit Linux OS [Mint/Ubuntu OS Based]
Host Machine RAM	16 GB if developer wants to use Virtual Machine
RAM	8 GB if developer can use Linux/Mac machine directly without Host Machine
Setup Requirements	16 GB RAM 40-50 GB GB Free harddrive OS: Windows 10/Ubuntu Desktop/Mac
Cloud Machine	Trainer provides cloud machine for each participant with 160 GB SSD Harddrive, 4 vCPU and 8 GB RAM for participants, cost about 5 Euros per participant. The VM shall be only for training period. Maximum 15 VMs provided, team need to share themselves. For Cloud, the setup shall be done by trainer.
Lap Setup	1. Java 1.8 Java SDK from https://www.oracle.com/technetwork/java/javase/downloads/jdk8downloads-2133151.html 2. Intellij Community Edition for Java Development https://www.jetbrains.com/idea/download/ 3. https://www.putty.org/ or https://gitforwindows.org/ 4. https://www.confluent.io/download download the Confluent platform free, need to provide email id.

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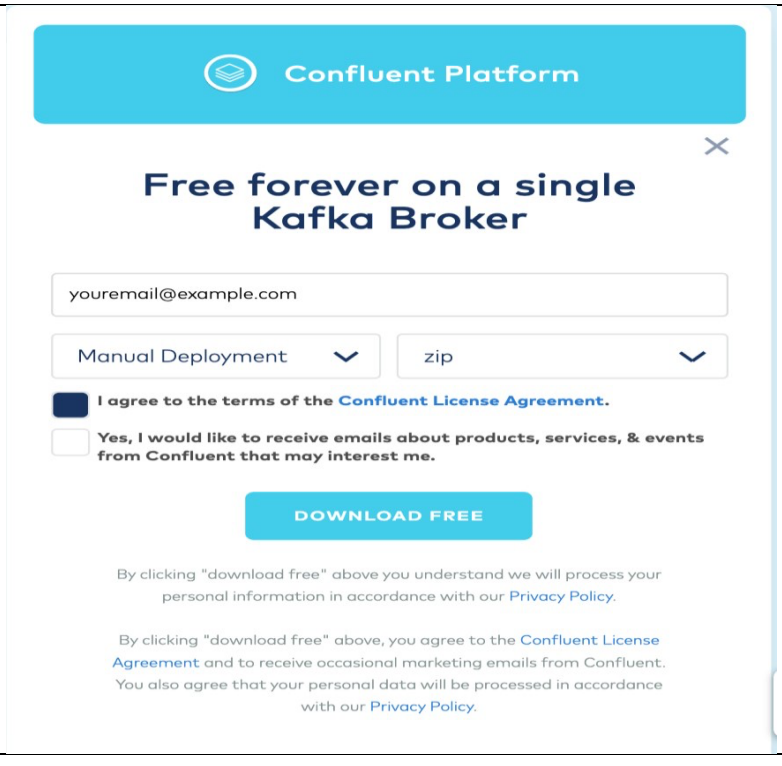

Participants Pre-requites	
JDK	Good Knowledge on Using JDK, Compiler Setup & Java. Good Working knowledge on Java /Exposure to Reactive Programming for Streaming
Maven & POM XML	Good Knowledge on Maven & POM XML files handling
Highspeed Internet	Access to Highspeed Internet
Editor	Good expertise in using IntelliJ/Eclipse Editor
Preferred, but not mandatory	High level understanding of AMQP Understanding Producer and Consumer Design Patterns Message Queuing Distributed Systems Stream vs Batch Processing
SSH	Gitbash for windows SSH client for Linux/Mac/Windows

Day 1

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Introduction	Introduction
	Kafka Introduction Kafka Features Kafka vs AMQP Kafka Features Kafka Real Use Cases
Enterprise Software Architecture	Digital Software Transformation From Monolithic to MicroServices to Serverless Applications Event-Driven Architecture (EDA) - MicroServices - Serverless - FaaS - Streaming - Event Sourcing - CQRS Reactive Manifesto
Kafka Case Studies	- MicroServices Log Analysis - Invoice Processing - Distributed Transaction Management with SAGA Pattern - Data Migration between databases
Kafka Architecture	Elements of Kafka [Consumer, Producer, Broker, ZooKeeper, Cluster] Kafka Architecture Kafka Overall Messaging Architecture Kafka Streaming Architecture Kafka Consumer and Producer Architecture Kafka Persistence Architecture Kafka Clusters Kafka Consumer Workers Group

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Kafka Distribution	Apache Kafka Confluence Kafka Open Source Confluence Kafka Enterprise
Kafka Setup [Hands-on]	Java JDK Kafka Setup Zookeeper Configuration Single Broker Configuration Understanding build-in tools, Kafka server, test publisher, test consumer Configuration Kafka Single Node Broker Start ZooKeeper Start Kafka Server Using Example console consumer and publisher Broker, Consumer, Producer Configuration

	 Zookeeper connection Broker ID Logs Port Consumer Configuration Producer Configuration
Kafka Administrator Commands [Hands-on]	List all topics List all brokers Create Topics Change Topics Delete Topics Topic Description
Topics & Partitions	Understanding Topics Understanding Partitions Understanding Replications

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Producer [Hands-on]	Kafka Producer Introduction Kafka Producer API Writing First Producer Kafka Producer Class Build a Kafka Producer Configure Producers Kafka Topics, Partitions Configuration Send messages to Kafka Send messages Synchronously Send Message Asynchronously and process the async acknowledgement Producing Keyed and Non-Keyed Messages Serializers, Key/Value Serializer, ProducerRecord Serialize Using Apache Avro, JSON Working with Multiple Brokers
Consumer [Hands-on]	Kafka Consumer Introduction Consumers and Consumer Groups Subscribe for Topics Consumer Records Achieving higher performance with Consumer group De-serialize key and values Consumer Groups and Partition Rebalance Creating a Kafka Consumer
	The Poll Loop Configuring Consumers Commits and Offsets Rebalance Listeners Consuming Records with Specific Offsets
Kafka Internal Architecture, Storages, Cluster, Partitions in Depth	Cluster Membership The Controller Replication workflow, Replication Internals Request Processing Physical Storage Reliability Partition allocation and number of partitions Broker Configuration Using Producers in a Reliable System Using Consumers in a Reliable System Validating System Reliability Performance Tuning in Kafka

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Day 2	
Cluster Architecture and Workflow	Revising Cluster, Producer, Consumer, Broker, ZooKeeper Data Flow Between all actors in Kafka Systems Creating Clusters with Multiple Brokers Broker IDs and Master/Slave Brokers Fail-over handling in clusters Understanding Leader Broker Balancing leadership
Cluster Administration and Configuration [Hands-on]	Configure Cluster Replication High Availability Multi-Cluster Architectures Apache Kafka's MirrorMaker Topic Operations
Partition in Depth [Hands-on]	Topics and Partitions Understanding partition numbers Default partitions Explicit Partitions Under the hood partitions
Replications	Understanding Replications Replication Factors and High Availability
Messages in Details [Hands-on]	Message Models Message Serialize JSON handling Message IDs

Day 3	
Persistence [Hands-on]	Persisting Messages on File System Offline Consumer and Subscription handling Durability of Messages Failover and Persistence

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Kafka Streaming [Hands-on]	Stream Processing Stream-Processing Concepts Stream-Processing Design Patterns Kafka Streams by Example Kafka Streams: Architecture Overview KStream KTable GlobalKTable KStream to KTable KTable to KSTream Stateful/Stateless stream operation
KSQL	Kafka and KSQL KStream and KTable Creating and running persistent and non-persistent quries
Zoo Keeper Administration [Hands-on]	Managing Zookeeper Cluster Zookeeper lead, configurations

Day 4	
Kafka Monitoring	Considerations When Building Data Pipelines Metric Basics Kafka Broker Metrics Client Monitoring Lag Monitoring End-to-End Monitoring
Kafka Connect APIs + Event Sourcing + Elastic Search	Kafka Connect API overview Kafka Connect
[Hands-on]	When to Use Kafka Connect? Kafka Connect Properties Perform File source and sink using Kafka Connect Kafka Connect vs Consumer/Producer model Kafka Connect with JDBC [Requires PostgreSQL/MySQL] Using Kafka with ElasticSearch Event sourcing using Debizium with PostgreSQL Kafka Connect architecture and design Connectors, Configurations, Tasks, Workers Stand-alone vs distributed mode

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REST Proxy [Hands-on]	Managing REST Proxy Configuration
Kafka Connect Configuration & Administration [Hands-on]	Managing Kafka Connect Managing Sink/Sources Configuration and settings
Confluence Control Centre [Hands-on]	Introduction to Confluent Control Center Managing Control Center and Dashboard Kafka Monitoring
Schema Registry Configuration & Administration [Hands-on]	Managing Schema Registry services
Kafka with Spring	Spring-Kafka module Configuring KafkaTemplate Produce & Consume Messages with Kafka Template Spring-cloud-stream with Kafka binder KStream KTable
Production	Deployment Configuration, cleaner installation