

Kafka Integration with C#:

Outline:

- Introduction to Kafka
- Kafka Architecture
- Topics
- Partitions
- Brokers
- Kafka plug in .NET
- Installation of Kafka
- Basics of Zookeeper
- Demo

Hands On:

1. Create a Chat Application which uses Kafka as a streaming platform and consume the chat messages in the command prompt.
2. Create a Chat Application using C# Windows Application using Kafka and consume the message in different client applications.

output:

Kafka Server Running:

Kafka-server-start.bat ../../config/server.properties

```
C:\WINDOWS\system32\cmd. x + v
r epoch 0, of which 6 milliseconds was spent in the scheduler. (kafka.coordinator.group.GroupMetadataManager)
[2025-07-21 21:04:53,889] INFO [GroupMetadataManager brokerId=0] Finished loading offsets and group metadata from __consumer_offsets-36 in 6 milliseconds for
r epoch 0, of which 6 milliseconds was spent in the scheduler. (kafka.coordinator.group.GroupMetadataManager)
[2025-07-21 21:04:53,889] INFO [GroupMetadataManager brokerId=0] Finished loading offsets and group metadata from __consumer_offsets-6 in 6 milliseconds for
r epoch 0, of which 6 milliseconds was spent in the scheduler. (kafka.coordinator.group.GroupMetadataManager)
[2025-07-21 21:04:53,890] INFO [GroupMetadataManager brokerId=0] Finished loading offsets and group metadata from __consumer_offsets-43 in 6 milliseconds for
r epoch 0, of which 6 milliseconds was spent in the scheduler. (kafka.coordinator.group.GroupMetadataManager)
[2025-07-21 21:04:53,890] INFO [GroupMetadataManager brokerId=0] Finished loading offsets and group metadata from __consumer_offsets-13 in 6 milliseconds for
r epoch 0, of which 6 milliseconds was spent in the scheduler. (kafka.coordinator.group.GroupMetadataManager)
[2025-07-21 21:04:53,890] INFO [GroupMetadataManager brokerId=0] Finished loading offsets and group metadata from __consumer_offsets-28 in 6 milliseconds for
r epoch 0, of which 6 milliseconds was spent in the scheduler. (kafka.coordinator.group.GroupMetadataManager)
[2025-07-21 21:04:53,985] INFO [GroupCoordinator 0]: Dynamic member with unknown member id joins group console-consumer-18929 in Empty state. Created a new
member id console-consumer-07556f6e-8f86-45f5-9e23-646ab130d7c3 and request the member to rejoin with this id. (kafka.coordinator.group.GroupCoordinator)
[2025-07-21 21:04:53,972] INFO [GroupCoordinator 0]: Preparing to rebalance group console-consumer-18929 in state PreparingRebalance with old generation 0 (
__consumer_offsets-10) (reason: Adding new member console-consumer-07556f6e-8f86-45f5-9e23-646ab130d7c3 with group instance id None; client reason: rebalanc
e failed due to MemberIdRequiredException) (kafka.coordinator.group.GroupCoordinator)
[2025-07-21 21:04:53,988] INFO [GroupCoordinator 0]: Stabilized group console-consumer-18929 generation 1 (__consumer_offsets-10) with 1 members (kafka.coor
dinator.group.GroupCoordinator)
[2025-07-21 21:04:54,012] INFO [GroupCoordinator 0]: Assignment received from leader console-consumer-07556f6e-8f86-45f5-9e23-646ab130d7c3 for group console
-consumer-18929 for generation 1. The group has 1 members, 0 of which are static. (kafka.coordinator.group.GroupCoordinator)
[2025-07-21 21:09:09,459] INFO [GroupCoordinator 0]: Member console-consumer-07556f6e-8f86-45f5-9e23-646ab130d7c3 in group console-consumer-18929 has failed
, removing it from the group (kafka.coordinator.group.GroupCoordinator)
[2025-07-21 21:09:09,462] INFO [GroupCoordinator 0]: Preparing to rebalance group console-consumer-18929 in state PreparingRebalance with old generation 1 (
__consumer_offsets-16) (reason: Adding new member console-consumer-87c15991-8f71-4448-a6dd-dd321c3d3fb8 with group instance id None; client reason: rebalanc
e failed due to MemberIdRequiredException) (kafka.coordinator.group.GroupCoordinator)
[2025-07-21 21:09:09,464] INFO [GroupCoordinator 0]: Group console-consumer-18929 with generation 2 is now empty (__consumer_offsets-10) (kafka.coordinator.
group.GroupCoordinator)
[2025-07-21 21:10:21,685] INFO [GroupMetadataManager brokerId=0] Group console-consumer-18929 transitioned to Dead in generation 2 (kafka.coordinator.group.
GroupMetadataManager)
[2025-07-21 21:13:45,312] INFO [BrokerToControllerChannelManager id=0 name=forwarding] Node 0 disconnected. (org.apache.kafka.clients.NetworkClient)
[2025-07-21 21:27:03,324] INFO [GroupCoordinator 0]: Dynamic member with unknown member id joins group console-consumer-45998 in Empty state. Created a new
member id console-consumer-87c15991-8f71-4448-a6dd-dd321c3d3fb8 and request the member to rejoin with this id. (kafka.coordinator.group.GroupCoordinator)
[2025-07-21 21:27:03,328] INFO [GroupCoordinator 0]: Preparing to rebalance group console-consumer-45998 in state PreparingRebalance with old generation 0 (
__consumer_offsets-16) (reason: Adding new member console-consumer-87c15991-8f71-4448-a6dd-dd321c3d3fb8 with group instance id None; client reason: rebalanc
e failed due to MemberIdRequiredException) (kafka.coordinator.group.GroupCoordinator)
[2025-07-21 21:27:03,329] INFO [GroupCoordinator 0]: Stabilized group console-consumer-45998 generation 1 (__consumer_offsets-16) with 1 members (kafka.coor
dinator.group.GroupCoordinator)
[2025-07-21 21:27:03,344] INFO [GroupCoordinator 0]: Assignment received from leader console-consumer-87c15991-8f71-4448-a6dd-dd321c3d3fb8 for group console
-consumer-45998 for generation 1. The group has 1 members, 0 of which are static. (kafka.coordinator.group.GroupCoordinator)
```

Zookeeper Running:

Zookeeper-server-start.bat ../../config/zookeeper.properties

```
C:\WINDOWS\system32\cmd. x + v
[2025-07-21 20:58:23,878] INFO minSessionTimeout set to 6000 ms (org.apache.zookeeper.server.ZooKeeperServer)
[2025-07-21 20:58:23,878] INFO maxSessionTimeout set to 60000 ms (org.apache.zookeeper.server.ZooKeeperServer)
[2025-07-21 20:58:23,880] INFO getData response cache size is initialized with value 400. (org.apache.zookeeper.server.ResponseCache)
[2025-07-21 20:58:23,880] INFO getChildren response cache size is initialized with value 400. (org.apache.zookeeper.server.ResponseCache)
[2025-07-21 20:58:23,881] INFO zookeeper.pathStats.slotCapacity = 60 (org.apache.zookeeper.server.util.RequestPathMetricsCollector)
[2025-07-21 20:58:23,881] INFO zookeeper.pathStats.slotDuration = 15 (org.apache.zookeeper.server.util.RequestPathMetricsCollector)
[2025-07-21 20:58:23,881] INFO zookeeper.pathStats.maxDepth = 6 (org.apache.zookeeper.server.util.RequestPathMetricsCollector)
[2025-07-21 20:58:23,881] INFO zookeeper.pathStats.initialDelay = 5 (org.apache.zookeeper.server.util.RequestPathMetricsCollector)
[2025-07-21 20:58:23,882] INFO zookeeper.pathStats.delay = 5 (org.apache.zookeeper.server.util.RequestPathMetricsCollector)
[2025-07-21 20:58:23,882] INFO zookeeper.pathStats.enabled = false (org.apache.zookeeper.server.util.RequestPathMetricsCollector)
[2025-07-21 20:58:23,885] INFO The max bytes for all large requests are set to 104857600 (org.apache.zookeeper.server.ZooKeeperServer)
[2025-07-21 20:58:23,886] INFO The large request threshold is set to -1 (org.apache.zookeeper.server.ZooKeeperServer)
[2025-07-21 20:58:23,886] INFO zookeeper.enforce.auth.enabled = false (org.apache.zookeeper.server.AuthenticationHelper)
[2025-07-21 20:58:23,887] INFO zookeeper.enforce.auth.schemes = [] (org.apache.zookeeper.server.AuthenticationHelper)
[2025-07-21 20:58:23,887] INFO Created server with tickTime 3000 ms minSessionTimeout 6000 ms maxSessionTimeout 60000 ms clientPortListenBacklog -1 datadir
\tmp\zookeeper\version-2 snapdir \tmp\zookeeper\version-2 (org.apache.zookeeper.server.ZooKeeperServer)
[2025-07-21 20:58:23,897] INFO Using org.apache.zookeeper.server.NIOServerCnxnFactory as server connection factory (org.apache.zookeeper.server.ServerCnxnFactory)
[2025-07-21 20:58:23,898] WARN maxCnxns is not configured, using default value 0. (org.apache.zookeeper.server.ServerCnxnFactory)
[2025-07-21 20:58:23,901] INFO Configuring NIO connection handler with 10s sessionless connection timeout, 2 selector thread(s), 24 worker threads, and 64 k
B direct buffers. (org.apache.zookeeper.server.NIOServerCnxnFactory)
[2025-07-21 20:58:23,951] INFO binding to port 0.0.0.0/0.0.0.0:2181 (org.apache.zookeeper.server.NIOServerCnxnFactory)
[2025-07-21 20:58:23,968] INFO Using org.apache.zookeeper.server.watch.WatchManager as watch manager (org.apache.zookeeper.server.watch.WatchManagerFactory)
[2025-07-21 20:58:23,968] INFO Using org.apache.zookeeper.server.watch.WatchManager as watch manager (org.apache.zookeeper.server.watch.WatchManagerFactory)
[2025-07-21 20:58:23,968] INFO zookeeper.snapshotSizeFactor = 0.33 (org.apache.zookeeper.server.ZKDatabase)
[2025-07-21 20:58:23,969] INFO zookeeper.commitLogCount=500 (org.apache.zookeeper.server.ZKDatabase)
[2025-07-21 20:58:23,979] INFO zookeeper.snapshot.compression.method = CHECKED (org.apache.zookeeper.server.persistence.SnapStream)
[2025-07-21 20:58:23,980] INFO Snapshotting: 0x0 to \tmp\zookeeper\version-2\snapshot.0 (org.apache.zookeeper.server.persistence.FileTxnSnapLog)
[2025-07-21 20:58:23,987] INFO Snapshot loaded in 17 ms, highest zxid is 0x0, digest is 1371985584 (org.apache.zookeeper.server.ZKDatabase)
[2025-07-21 20:58:23,989] INFO Snapshotting: 0x0 to \tmp\zookeeper\version-2\snapshot.0 (org.apache.zookeeper.server.persistence.FileTxnSnapLog)
[2025-07-21 20:58:23,990] INFO Snapshot taken in 1 ms (org.apache.zookeeper.server.ZooKeeperServer)
[2025-07-21 20:58:24,010] INFO PrepRequestProcessor (sid:0) started, reconfigEnabled=false (org.apache.zookeeper.server.PrepareRequestProcessor)
[2025-07-21 20:58:24,033] INFO Using checkIntervalMs=60000 maxPerMinute=10000 maxNeverUsedIntervalMs=0 (org.apache.zookeeper.server.RequestThrottler)
[2025-07-21 20:58:24,034] INFO ZooKeeper audit is disabled. (org.apache.zookeeper.audit.ZKAuditProvider)
[2025-07-21 21:00:20,260] INFO Creating new log file: log.1 (org.apache.zookeeper.server.persistence.FileTxnLog)
log4j:ERROR Failed to rename [C:\kafka\kafka_2.13-3.6.1\logs\server.log] to [C:\kafka\kafka_2.13-3.6.1\logs\server.log.2025-07-21-20].
```

Topic Created:

```
C:\WINDOWS\system32\cmd. x + v
Microsoft Windows [Version 10.0.22631.5624]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Krishna S>cd C:\kafka\kafka_2.13-3.6.1

C:\kafka\kafka_2.13-3.6.1>.bin\windows\kafka-topics.bat --create --topic test-topic --bootstrap-server localhost:9092 --partitions 1 --replication-factor 1
Created topic test-topic.

C:\kafka\kafka_2.13-3.6.1>
```

Creating Publisher in Command Prompt:

```
C:\Users\Krishna S\OneDrive\ x + v
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: https://localhost:7230
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: http://localhost:5093
info: Microsoft.Hosting.Lifetime[0]
      Application started. Press Ctrl+C to shut down.
info: Microsoft.Hosting.Lifetime[0]
      Hosting environment: Development
info: Microsoft.Hosting.Lifetime[0]
      Content root path: C:\Users\Krishna S\OneDrive\Desktop\Cognizant-Mandatory-Hands-On\Week4-Mandatory-Hands-On\KafkaWebApi\KafkaWebApi
? Message delivered to: test-topic [[0]] @5
```

Client Application:

```
C:\WINDOWS\system32\cmd. x + v
Microsoft Windows [Version 10.0.22631.5624]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Krishna S>cd C:\kafka\kafka_2.13-3.6.1

C:\kafka\kafka_2.13-3.6.1>.\bin\windows\kafka-console-consumer.bat --bootstrap-server localhost:9092 --topic test-topic --from-beginning
hello
this is krishna
kafka is running
Hello Kafka from WebAPI!
Hello Kafka from WebAPI!
Hello Kafka from WebAPI!
```

