# Practica HazelCast

## Parte 1

Se levanta el primer nodo

```
nov 05, 2019 2:41:30 PM com.hazelcast.system
INFO: [192.168.1.158]:5701 [dev] [3.7.2] Copyright (c) 2008-2016, Hazelcast, Inc. All Rights Reserved.
nov 05, 2019 2:41:30 PM com.hazelcast.system
INFO: [192.168.1.158]:5701 [dev] [3.7.2] Configured Hazelcast Serialization version : 1
nov 05, 2019 2:41:30 PM com.hazelcast.spi.impl.operationservice.impl.BackpressureRegulator
nov 05, 2019 2:41:32 PM com.hazelcast.core.LifecycleService
INFO: [192.168.1.158]:5701 [dev] [3.7.2] [192.168.1.158]:5701 is STARTING
nov 05, 2019 2:41:32 PM com.hazelcast.spi.impl.operationexecutor.impl.OperationExecutorImpl
INFO: [192.168.1.158]:5701 [dev] [3.7.2] Starting 8 partition threads
nov 05, 2019 2:41:32 PM com.hazelcast.spi.impl.operationexecutor.impl.OperationExecutorImpl
INFO: [192.168.1.158]:5701 [dev] [3.7.2] Starting 5 generic threads (1 dedicated for priority tasks)
nov 05, 2019 2:41:32 PM com.hazelcast.nio.tcp.nonblocking.NonBlockingIOThreadingModel
INFO: [192.168.1.158]:5701 [dev] [3.7.2] TcpIpConnectionManager configured with Non Blocking IO-threading model: 3 input threads and 3 output threads
nov 05, 2019 2:41:36 PM com.hazelcast.internal.cluster.impl.MulticastJoiner
INFO: [192.168.1.158]:5701 [dev] [3.7.2]


Members [1] {
        Member [192.168.1.158]:5701 - 133ea03a-7165-4c1f-98d8-ac30422b1975 this
}

nov 05, 2019 2:41:36 PM com.hazelcast.core.LifecycleService
INFO: [192.168.1.158]:5701 [dev] [3.7.2] [192.168.1.158]:5701 is STARTED
nov 05, 2019 2:41:36 PM com.hazelcast.internal.partition.impl.PartitionStateManager
INFO: [192.168.1.158]:5701 [dev] [3.7.2] Initializing cluster partition table arrangement...
```

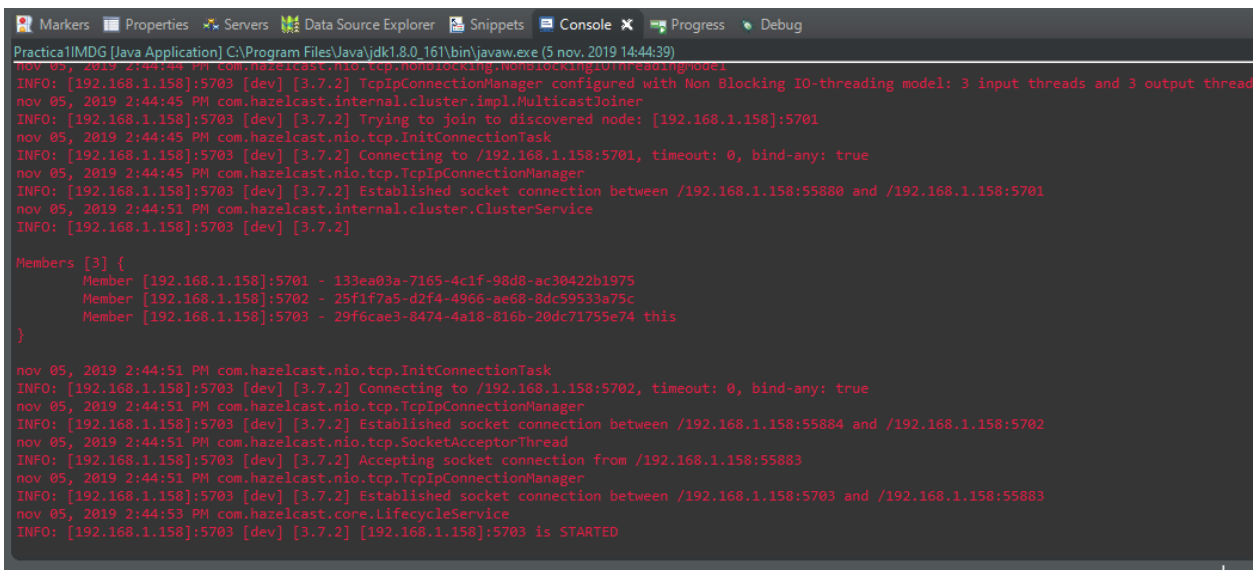
Se levanta el segundo nodo

```
INFO: [192.168.1.158]:5702 [dev] [3.7.2] TcpIpConnectionManager configured with Non Blocking IO-threading model: 3 input threads and 3 output threads
nov 05, 2019 2:42:39 PM com.hazelcast.internal.cluster.impl.MulticastJoiner
INFO: [192.168.1.158]:5702 [dev] [3.7.2] Trying to join to discovered node: [192.168.1.158]:5701
nov 05, 2019 2:42:39 PM com.hazelcast.nio.tcp.InitConnectionTask
INFO: [192.168.1.158]:5702 [dev] [3.7.2] Connecting to /192.168.1.158:5701, timeout: 0, bind-any: true
nov 05, 2019 2:42:39 PM com.hazelcast.nio.tcp.TcpIpConnectionManager
INFO: [192.168.1.158]:5702 [dev] [3.7.2] Established socket connection between /192.168.1.158:55689 and /192.168.1.158:5701
nov 05, 2019 2:42:46 PM com.hazelcast.internal.cluster.ClusterService
INFO: [192.168.1.158]:5702 [dev] [3.7.2]

Members [2] {
        Member [192.168.1.158]:5701 - 133ea03a-7165-4c1f-98d8-ac30422b1975
        Member [192.168.1.158]:5702 - 25f1f7a5-d2f4-4966-ae68-8dc59533a75c this
}

nov 05, 2019 2:42:48 PM com.hazelcast.core.LifecycleService
INFO: [192.168.1.158]:5702 [dev] [3.7.2] [192.168.1.158]:5702 is STARTED
```

Desde la terminal donde se visualiza la ejecución del primer nodo, se puede ver que el segundo se conecta

```
INFO: [192.168.1.158]:5701 [dev] [3.7.2] [192.168.1.158]:5701 is STARTING
nov 05, 2019 2:41:32 PM com.hazelcast.spi.impl.operationexecutor.impl.OperationExecutorImpl


Members [1] {
        Member [192.168.1.158]:5701 - 133ea03a-7165-4c1f-98d8-ac30422b1975 this
}

nov 05, 2019 2:41:36 PM com.hazelcast.core.LifecycleService
INFO: [192.168.1.158]:5701 [dev] [3.7.2] [192.168.1.158]:5701 is STARTED
nov 05, 2019 2:41:36 PM com.hazelcast.internal.partition.impl.PartitionStateManager
INFO: [192.168.1.158]:5701 [dev] [3.7.2] Initializing cluster partition table arrangement...
nov 05, 2019 2:42:39 PM com.hazelcast.nio.tcp.SocketAcceptorThread
INFO: [192.168.1.158]:5701 [dev] [3.7.2] Accepting socket connection from /192.168.1.158:55689
nov 05, 2019 2:42:39 PM com.hazelcast.nio.tcp.TcpIpConnectionManager
INFO: [192.168.1.158]:5701 [dev] [3.7.2] Established socket connection between /192.168.1.158:5701 and /192.168.1.15
nov 05, 2019 2:42:46 PM com.hazelcast.internal.cluster.ClusterService
INFO: [192.168.1.158]:5701 [dev] [3.7.2]

Members [2] {
        Member [192.168.1.158]:5701 - 133ea03a-7165-4c1f-98d8-ac30422b1975 this
        Member [192.168.1.158]:5702 - 25f1f7a5-d2f4-4966-ae68-8dc59533a75c
}

nov 05, 2019 2:42:46 PM com.hazelcast.internal.partition.impl.MigrationManager
INFO: [192.168.1.158]:5701 [dev] [3.7.2] Re-partitioning cluster data... Migration queue size: 271
nov 05, 2019 2:42:47 PM com.hazelcast.internal.partition.InternalPartitionService
INFO: [192.168.1.158]:5701 [dev] [3.7.2] Remaining migration tasks in queue => 17
nov 05, 2019 2:42:48 PM com.hazelcast.internal.partition.impl.MigrationThread
INFO: [192.168.1.158]:5701 [dev] [3.7.2] All migration tasks have been completed, queues are empty.
```

Se levanta el tercer nodo



Desde la terminal donde se visualiza la ejecución del segundo nodo, se puede ver que el tercero se conecta

```
INFO: [192.168.1.158]:5702 [dev] [3.7.2] Trying to join to discovered node: [192.168.1.158]:5701
nov 05, 2019 2:42:39 PM com.hazelcast.nio.tcp.InitConnectionTask
INFO: [192.168.1.158]:5702 [dev] [3.7.2] Connecting to /192.168.1.158:5701, timeout: 0, bind-any: true
        Member [192.168.1.158]:5702 - 25f1f7a5-d2f4-4966-ae68-8dc59533a75c this
}

nov 05, 2019 2:42:48 PM com.hazelcast.core.LifecycleService
INFO: [192.168.1.158]:5702 [dev] [3.7.2] [192.168.1.158]:5702 is STARTED
nov 05, 2019 2:44:51 PM com.hazelcast.internal.cluster.ClusterService
INFO: [192.168.1.158]:5702 [dev] [3.7.2]

Members [3] {
        Member [192.168.1.158]:5701 - 133ea03a-7165-4c1f-98d8-ac30422b1975
        Member [192.168.1.158]:5702 - 25f1f7a5-d2f4-4966-ae68-8dc59533a75c this
        Member [192.168.1.158]:5703 - 29f6cae3-8474-4a18-816b-20dc71755e74
}

nov 05, 2019 2:44:51 PM com.hazelcast.nio.tcp.InitConnectionTask
INFO: [192.168.1.158]:5702 [dev] [3.7.2] Connecting to /192.168.1.158:5703, timeout: 0, bind-any: true
nov 05, 2019 2:44:51 PM com.hazelcast.nio.tcp.SocketAcceptorThread
INFO: [192.168.1.158]:5702 [dev] [3.7.2] Accepting socket connection from /192.168.1.158:55884
nov 05, 2019 2:44:51 PM com.hazelcast.nio.tcp.TcpIpConnectionManager
INFO: [192.168.1.158]:5702 [dev] [3.7.2] Established socket connection between /192.168.1.158:55883 and /192.168.1.158:5703
nov 05, 2019 2:44:51 PM com.hazelcast.nio.tcp.TcpIpConnectionManager
INFO: [192.168.1.158]:5702 [dev] [3.7.2] Established socket connection between /192.168.1.158:5702 and /192.168.1.158:55884
```

## Parte 2: Uso básico de cache distribuida

En el siguiente código se expresa la implementación de los 3 nodos los cuales usan contadores distribuidos de hazelCast (countdownlatch)

```java
public static void main(String[] args) throws InterruptedException {
        // Instanciar hazelcast y crear una cache
        // Insertar un dato y arrancar 3 veces el main,
        // Leer el output de consola y ver como hazelcast va encontrando "miembros"
        // Comprobar que se conectan (en el output deberian verse 3 miembros en la consola) y capturarlo
        Config config = new Config();
        config.getNetworkConfig().getJoin().getTcpIpConfig().addMember("localhost").setEnabled(true);
        config.getNetworkConfig().getJoin().getMulticastConfig().setEnabled(false);

        Person p = new Person("Carlos", 28053, "", "");

        DataGridNode node = new DataGridNode();

        ICountDownLatch latch = node.getHzInstance().getCountDownLatch( "countDownLatch" );
        // tokens por numero de nodos
        latch.trySetCount(3);
        System.out.println( "Waiting" );
        //Process to be executed----------------------
        node.addToCache(p);
        //--------------------------------------------

        //-----Restar un token-----------------------
        latch.countDown();
        System.out.println("Faltan " + latch.getCount() + " nodos");
        //--------------------------------------------

        latch.await( 100, TimeUnit.SECONDS );
        node.printCache();
        //--------------------------------------------
        latch.destroy();
    }
```

Como resultado de la ejecución los nodos instanciados esperan la terminación del proceso de todos los nodos para hacer un printCache:

```
Markers  Properties  Servers  Data Source Explorer  Snippets  Console  Progress  Debug
Practica2IMDGa [Java Application] C:\Program Files\Java\jdk1.8.0_161\bin\javaw.exe (11 nov. 2019 15:45:03)
INFO: [10.118.49.199]:5701 [dev] [3.7.2] Re-partitioning cluster data... Migration queue size: 271
nov 11, 2019 3:45:33 PM com.hazelcast.internal.partition.impl.MigrationThread
INFO: [10.118.49.199]:5701 [dev] [3.7.2] All migration tasks have been completed, queues are empty.
nov 11, 2019 3:45:41 PM com.hazelcast.nio.tcp.SocketAcceptorThread
INFO: [10.118.49.199]:5701 [dev] [3.7.2] Accepting socket connection from /10.118.49.199:51065
nov 11, 2019 3:45:41 PM com.hazelcast.nio.tcp.TcpIpConnectionManager
INFO: [10.118.49.199]:5701 [dev] [3.7.2] Established socket connection between /10.118.49.199:5701 and /10.118.49.199:51065
nov 11, 2019 3:45:47 PM com.hazelcast.internal.cluster.ClusterService
INFO: [10.118.49.199]:5701 [dev] [3.7.2]

Members [3] {
        Member [10.118.49.199]:5701 - 705c0373-6ebc-47ab-bd15-e23944b8ace1 this
        Member [10.118.49.199]:5702 - 9dff9f9e-187c-4fec-97d7-63cc276cbeaf
        Member [10.118.49.199]:5703 - d881e0da-c989-426b-acb5-04299cf85991
}

nov 11, 2019 3:45:47 PM com.hazelcast.internal.partition.impl.MigrationManager
INFO: [10.118.49.199]:5701 [dev] [3.7.2] Re-partitioning cluster data... Migration queue size: 271
nov 11, 2019 3:45:50 PM com.hazelcast.internal.partition.impl.MigrationThread
INFO: [10.118.49.199]:5701 [dev] [3.7.2] All migration tasks have been completed, queues are empty.
Faltan 2 nodos
printCache

Person name: Irene zipCode: 28052
Person name: Carlos zipCode: 28053
Person name: Alvaro zipCode: 28051
```

```
PROBLEMS 31  OUTPUT  DEBUG CONSOLE  TERMINAL                    2: Java Process Console
        Member [10.118.49.199]:5702 - 9dff9f9e-187c-4fec-97d7-63cc276cbeaf this
        Member [10.118.49.199]:5703 - d881e0da-c989-426b-acb5-04299cf85991
}

nov 11, 2019 3:45:47 PM com.hazelcast.nio.tcp.InitConnectionTask
INFO: [10.118.49.199]:5702 [dev] [3.7.2] Connecting to /10.118.49.199:5703, timeout: 0, bind-any: true
nov 11, 2019 3:45:47 PM com.hazelcast.nio.tcp.SocketAcceptorThread
INFO: [10.118.49.199]:5702 [dev] [3.7.2] Accepting socket connection from /10.118.49.199:51067
nov 11, 2019 3:45:47 PM com.hazelcast.nio.tcp.TcpIpConnectionManager
INFO: [10.118.49.199]:5702 [dev] [3.7.2] Established socket connection between /10.118.49.199:51066 and /10.118.49.199:5703
nov 11, 2019 3:45:47 PM com.hazelcast.nio.tcp.TcpIpConnectionManager
INFO: [10.118.49.199]:5702 [dev] [3.7.2] Established socket connection between /10.118.49.199:5702 and /10.118.49.199:51067
Faltan 1 nodos
printCache

Person name: Irene zipCode: 28052
Person name: Carlos zipCode: 28053
Person name: Alvaro zipCode: 28051
```

```
PROBLEMS 102  OUTPUT  DEBUG CONSOLE  TERMINAL

INFO: [10.118.49.199]:5703 [dev] [3.7.2] Established socket connection between /10.118.49.199:51067 and /10.118.49.199:5702
nov 11, 2019 3:45:47 PM com.hazelcast.nio.tcp.SocketAcceptorThread
INFO: [10.118.49.199]:5703 [dev] [3.7.2] Accepting socket connection from /10.118.49.199:51066
nov 11, 2019 3:45:47 PM com.hazelcast.nio.tcp.TcpIpConnectionManager
INFO: [10.118.49.199]:5703 [dev] [3.7.2] Established socket connection between /10.118.49.199:5703 and /10.118.49.199:51066
nov 11, 2019 3:45:49 PM com.hazelcast.core.LifecycleService
INFO: [10.118.49.199]:5703 [dev] [3.7.2] [10.118.49.199]:5703 is STARTED
Waiting
Faltan 0 nodos
printCache

Person name: Irene zipCode: 28052
Person name: Carlos zipCode: 28053
Person name: Alvaro zipCode: 28051
ctorFinanciero)
```

## Parte 3: Utilizando nuestro propio servidor

Para esta parte se levanta un servidor genérico el cual se puede conectar cualquier cliente con la ip correspondiente (localhost en este caso).

El siguiente es la implementación de un cliente el cual hace print de cache inicialmente y luego agrega un objeto al cache, el cual queda persistido en el servidor

```java
public static void main(String[] args) {
        // Instanciar hazelcast Cliente y crear una cache
        ClientConfig config = new ClientConfig();
        ArrayList<String> ips=new ArrayList();
        ips.add("127.0.0.1");
        config.getNetworkConfig().setAddresses(ips);

        HazelcastInstance client = HazelcastClient.newHazelcastClient( config );
        //print cache
        printClientCache(client);
        //Vuestro código va aqui
        IMap<Long, Object> cacheNode = client.getMap("data");
        Person p = new Person("Alvaro", 28005, "", "");
        //put to cache
        IdGenerator idGenerator = client.getIdGenerator("newid");
        cacheNode.put(idGenerator.newId(), p);
        //print cache
        printClientCache(client);

        client.shutdown();

    }

    private static void printClientCache(HazelcastInstance client){
        System.out.println( "printCache\n" );
        IMap<Long, Person> map = client.getMap("data");
        for (Entry<Long, Person> entry : map.entrySet()) {
            System.out.println("Entry key: "+ entry.getKey() + " Person name: " + entry.getValue().getName() +
            " zipCode: " + entry.getValue().getZipCode());
        }
    }
```

En la primera ejecución el cache esta vacío

```
nov 11, 2019 4:29:12 PM com.hazelcast.core.LifecycleService
INFO: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is STARTING
nov 11, 2019 4:29:13 PM com.hazelcast.core.LifecycleService
INFO: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is STARTED
nov 11, 2019 4:29:17 PM com.hazelcast.client.spi.impl.ClientMembershipListener
INFO: hz.client_0 [dev] [3.7.2]

Members [1] {
        Member [127.0.0.1]:5701 - 82937ffc-2bc5-47ca-beaf-473e6163e299
}
nov 11, 2019 4:29:17 PM com.hazelcast.core.LifecycleService
INFO: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is CLIENT_CONNECTED
printCache

printCache

Entry key: 0 Person name: Alvaro zipCode: 28005
nov 11, 2019 4:29:18 PM com.hazelcast.core.LifecycleService
INFO: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is SHUTTING_DOWN
nov 11, 2019 4:29:18 PM com.hazelcast.core.LifecycleService
INFO: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is SHUTDOWN
```

Posterior se re ejecuta el cliente y se visualiza que la cache esta previamente poblada:

```
nov 11, 2019 4:29:35 PM com.hazelcast.core.LifecycleService
INFO: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is STARTING
nov 11, 2019 4:29:36 PM com.hazelcast.core.LifecycleService
INFO: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is STARTED
nov 11, 2019 4:29:40 PM com.hazelcast.client.spi.impl.ClientMembershipListener
INFO: hz.client_0 [dev] [3.7.2]

Members [1] {
        Member [127.0.0.1]:5701 - 82937ffc-2bc5-47ca-beaf-473e6163e299
}

nov 11, 2019 4:29:40 PM com.hazelcast.core.LifecycleService
INFO: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is CLIENT_CONNECTED
printCache

Entry key: 0 Person name: Alvaro zipCode: 28005
printCache

Entry key: 0 Person name: Alvaro zipCode: 28005
Entry key: 10000 Person name: Alvaro zipCode: 28005
nov 11, 2019 4:29:40 PM com.hazelcast.core.LifecycleService
INFO: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is SHUTTING_DOWN
nov 11, 2019 4:29:40 PM com.hazelcast.core.LifecycleService
INFO: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is SHUTDOWN
PS D:\DEV\GIT_REPO\uc3m\my\uc3m-tecnSectorFinanciero>
```