

Práctica Lección 6. In – memory DataGrid

Práctica 1. Creación de un cluster Hazelcast.

Se crea un clúster Hazelcast y luego se ejecuta tres veces y se obtienen los tres miembros de este. En la captura de pantalla se observan los tres miembros del clúster, un para cada ejecución.

```

package com.imdg.practicas;

import com.hazelcast.config.Config;

public class Practica1IMDG {

    public static void main(String[] args) {
        // Instanciar hazelcast y crear una cache
        HazelcastInstance hazInstance = Hazelcast.newHazelcastInstance();
        IMap<String, String> mapCustomers = hazInstance.getMap("practica5");
        // Insertar un dato y arrancar 3 veces el main,
        mapCustomers.put("EjemploClave", "EjemploValor");
        // 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();
    }
}

```

```

Practica1IMDG [Java Application] C:\Program Files\Java\jdk1.8.0_221\bin\javaw.exe (6 nov. 2019 10:21:24)
nov 06, 2019 10:22:51 AM com.hazelcast.nio.tcp.TcpIpConnectionManager
INFORMACIÓN: [169.254.178.241]:5702 [dev] [3.7.2] Accepting socket connection from /169.254.178.241:53679
nov 06, 2019 10:23:02 AM com.hazelcast.nio.tcp.TcpIpConnectionManager
INFORMACIÓN: [169.254.178.241]:5702 [dev] [3.7.2] Established socket connection between /169.254.178.241:5702 and /169.254.178.241:53679
nov 06, 2019 10:22:57 AM com.hazelcast.internal.cluster.ClusterService
INFORMACIÓN: [169.254.178.241]:5702 [dev] [3.7.2]

Members [3] {
    Member [169.254.178.241]:5702 - c24d6e8e-dbf2-4207-ab30-b7515bcb1448 this
    Member [169.254.178.241]:5703 - d4284907-8cf7-4b72-b0a2-a93e19325c9e
    Member [169.254.178.241]:5704 - 0e2be6dc-b900-497a-9db0-6ee207270844
}

nov 06, 2019 10:22:58 AM com.hazelcast.internal.partition.impl.MigrationManager
INFORMACIÓN: [169.254.178.241]:5702 [dev] [3.7.2] Re-partitioning cluster data... Migration queue size: 271
nov 06, 2019 10:23:02 AM com.hazelcast.internal.partition.InternalPartitionService
INFORMACIÓN: [169.254.178.241]:5702 [dev] [3.7.2] Remaining migration tasks in queue => 41
nov 06, 2019 10:23:03 AM com.hazelcast.internal.partition.impl.MigrationThread
INFORMACIÓN: [169.254.178.241]:5702 [dev] [3.7.2] All migration tasks have been completed, queues are empty.

```

Practica 2. Uso básico de cache distribuida.

Se crean tres clases distintas con la estructura necesaria que pide la clase person y se ejecuta, pero da un error como se muestra en la siguiente pantalla, ya que se debe realizar la serialización binaria.

```

package com.imdg.pojo;

import java.io.Serializable;

/**
 * Created by Sobrema on 22/10/2016.
 */
public class Person {

    private String name;
    private Integer zipCode;
    private String streetName;
    private String fullAddress;
}

```

```

<terminated> Practica2IMDG [Java Application] C:\Program Files\Java\jdk1.8.0_221\bin\javaw.exe (7 nov. 2019 10:15:11)
ADVERTENCIA: [127.0.0.1]:5702 [dev] [3.7.2] Config seed port is 5701 and cluster size is 1. Some of the ports seem occupied!
nov 07, 2019 10:15:21 AM com.hazelcast.core.LifecycleService
INFORMACIÓN: [127.0.0.1]:5702 [dev] [3.7.2] [127.0.0.1]:5702 is STARTED
nov 07, 2019 10:15:21 AM com.hazelcast.internal.partition.impl.PartitionStateManager
INFORMACIÓN: [127.0.0.1]:5702 [dev] [3.7.2] Initializing cluster partition table arrangement...
Exception in thread "main" com.hazelcast.nio.serialization.HazelcastSerializationException: Failed to serialize 'com.imdg.pojo.Person'
    at com.hazelcast.internal.serialization.impl.SerializationUtil.handleSerializeException(SerializationUtil.java:73)
    at com.hazelcast.internal.serialization.impl.AbstractSerializationService.toBytes(AbstractSerializationService.java:143)
    at com.hazelcast.internal.serialization.impl.AbstractSerializationService.toData(AbstractSerializationService.java:118)
    at com.hazelcast.spi.impl.NodeEngineImpl.toData(NodeEngineImpl.java:382)
    at com.hazelcast.spi.AbstractDistributedObject.toData(AbstractDistributedObject.java:67)
    at com.hazelcast.map.impl.proxy.MapProxyImpl.put(MapProxyImpl.java:108)
    at com.hazelcast.map.impl.proxy.MapProxyImpl.put(MapProxyImpl.java:99)
    at com.imdg.practicas.Practica2IMDG2a.main(Practica2IMDG2a.java:24)
Caused by: com.hazelcast.nio.serialization.HazelcastSerializationException: There is no suitable serializer for class com.imdg.pojo.Person
    at com.hazelcast.internal.serialization.impl.AbstractSerializationService.serializerFor(AbstractSerializationService.java:413)
    at com.hazelcast.internal.serialization.impl.AbstractSerializationService.toBytes(AbstractSerializationService.java:134)
    ... 7 more

```

Luego de modificar la clase person y se ejecutan los nodos, el resultado es el siguiente:

```

10 import java.util.concurrent.TimeUnit;
11 import java.util.logging.Level;
12 import java.util.logging.Logger;
13
14 public class PracticalMDG2c {
15
16     private final static Logger LOGGER = Logger.getLogger("com.imdg.practicas.PracticalMDG2c");
17
18     public static void main(String[] args) {
19         // Instanciar hazelcast y crear una cache
20         HazelcastInstance hzInstance = Hazelcast.newHazelcastInstance();
21         IMap<String, Person> mapCustomers = hzInstance.getMap("practica6");
22         try {
23             ICountDownLatch latch = hzInstance.getCountDownLatch("practica6");
24         }
25     }
26 }

```

```

PracticalMDG2a [Java Application] C:\Program Files\Java\jdk1.8.0_221\bin\javaw.exe (7 nov. 2019 10:39:42)
INFORMACIÓN: [192.168.43.221]:5701 [dev] [3.7.2] All migration tasks have been completed, queues are empty.
nov 07, 2019 10:40:14 AM com.hazelcast.internal.cluster.ClusterService
INFORMACIÓN: [192.168.43.221]:5701 [dev] [3.7.2]

Members [3] {
  Member [192.168.43.221]:5701 - b9a6dc01-14e9-4a43-9511-b827f98f2ce6 this
  Member [192.168.43.221]:5702 - 016e29be-ebd0-43a4-b231-be7753547fb5
  Member [192.168.43.221]:5703 - d55f39ec-5863-43d6-8650-353e48b2fde4
}

nov 07, 2019 10:40:14 AM com.hazelcast.internal.partition.impl.MigrationManager
INFORMACIÓN: [192.168.43.221]:5701 [dev] [3.7.2] Re-partitioning cluster data... Migration queue size: 271
nov 07, 2019 10:40:14 AM com.hazelcast.internal.partition.impl.MigrationManager
INFORMACIÓN: [192.168.43.221]:5701 [dev] [3.7.2] Re-partitioning cluster data... Migration queue size: 271
Person{name='Adrianna', zipCode=28051, streetName='Rejas', fullAddress='calle alcala 62, Madrid'}
Person{name='Jocelyn', zipCode=28053, streetName='Callao', fullAddress='Callao 12, Castellon'}
nov 07, 2019 10:40:18 AM com.hazelcast.internal.partition.InternalPartitionService
INFORMACIÓN: [192.168.43.221]:5701 [dev] [3.7.2] Remaining migration tasks in queue => 3
nov 07, 2019 10:40:19 AM com.hazelcast.internal.partition.impl.MigrationThread
INFORMACIÓN: [192.168.43.221]:5701 [dev] [3.7.2] All migration tasks have been completed, queues are empty.

```

Parte 2, sincronización de nodos: Utilizar contadores distribuidos.

Para conseguir que ninguno de los nodos empiece a sacar por pantalla valores hasta que todos los demás (los otros 3) hayan insertado sus valores, es decir, hasta que los demás nodos no hayan escrito.

```

21 IMap<String, Person> mapCustomers = hzInstance.getMap("practica6");
22
23 try {
24     ICountDownLatch latch = hzInstance.getCountDownLatch("practica6");
25     System.out.println("Waiting");
26     boolean success = latch.await(10, TimeUnit.SECONDS);
27     System.out.println("Complete: " + success);
28     latch.trySetCount(3);
29     // Insertar un dato y arrancar 3 veces el main,
30     mapCustomers.put("nodo3", new Person("Jocelyn", 28053, "Callao", "Callao 12, Castellon"));
31
32     latch.countDown();
33     // Leer el output de consola y ver como hazelcast va encontrando "miembros"
34     // Comprobar que se conectan (en el output deberían verse 3 miembros en la consola) y capturarlo
35     Config config = new Config();
36     config.getNetworkConfig().getJoin().getTcpIpConfig().addMember("localhost").setEnabled(true);
37     config.getNetworkConfig().getJoin().getMulticastConfig().setEnabled(false);
38
39     latch.await(30, TimeUnit.SECONDS);
40     System.out.println(mapCustomers.get("nodo1"));
41     System.out.println(mapCustomers.get("nodo2"));
42     System.out.println(mapCustomers.get("nodo3"));
43
44     latch.destroy();
45 } catch (InterruptedException e) {
46     LOGGER.log(Level.WARNING, "Hazelcast interrupted");
47 }

```

```

PracticalMDG2a [Java Application] C:\Program Files\Java\jdk1.8.0_221\bin\javaw.exe (11 nov. 2019 15:36:51)
nov 07, 2019 15:36:51 PM com.hazelcast.internal.cluster.ClusterService
INFORMACIÓN: [192.168.1.26]:5701 [dev] [3.7.2] All migration tasks have been completed, queues are empty.
Person{name='Adrian', zipCode=28051, streetName='Rejas', fullAddress='calle alcala 62, Madrid'}
Person{name='Arianna', zipCode=28052, streetName='avenida', fullAddress='avenida america 2, Madrid'}
Person{name='Jocelyn', zipCode=28053, streetName='callao', fullAddress='Callao 12, Castellon'}
Leader finished

```

Practica 3. Utilizando nuestro propio servidor

Por último, se ha realizado un cliente de conexión al servidor lanzado por las clases propias de Hazelcast. Al lanzar solo el cliente da un error y es porque no hay ningún servidor levantado, como se observa a continuación:

The screenshot shows the Eclipse IDE with a project named 'Practica3IMDG'. The main class is 'Practica3IMDG.java'. The code defines a 'main' method that creates a 'ClientConfig' and a 'HazelcastClient'. The console output shows the following sequence of events:

```

<terminated> Practica3IMDG [Java Application] C:\Program Files\Java\jdk1.8.0_221\bin\javaw.exe (12 nov. 2019 9:47:00)
nov 12, 2019 9:47:01 AM com.hazelcast.core.LifecycleService
INFORMACIÓN: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is STARTING
nov 12, 2019 9:47:02 AM com.hazelcast.core.LifecycleService
INFORMACIÓN: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is STARTED
nov 12, 2019 9:47:08 AM com.hazelcast.client.spi.impl.ClusterListenerSupport
ADVERTENCIA: hz.client_0 [dev] [3.7.2] Unable to get alive cluster connection, try in 0 ms later, attempt 1 of 2.
nov 12, 2019 9:47:14 AM com.hazelcast.client.spi.impl.ClusterListenerSupport
ADVERTENCIA: hz.client_0 [dev] [3.7.2] Unable to get alive cluster connection, try in 0 ms later, attempt 2 of 2.
nov 12, 2019 9:47:14 AM com.hazelcast.core.LifecycleService
INFORMACIÓN: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is SHUTTING_DOWN
nov 12, 2019 9:47:14 AM com.hazelcast.core.LifecycleService
INFORMACIÓN: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is SHUTDOWN
Exception in thread "main" java.lang.IllegalStateException: Unable to connect to any address in the config! The following addresses were
at com.hazelcast.client.spi.impl.ClusterListenerSupport.connectToCluster(ClusterListenerSupport.java:175)
at com.hazelcast.client.spi.impl.ClientClusterServiceImpl.start(ClientClusterServiceImpl.java:191)
at com.hazelcast.client.impl.HazelcastClientInstanceImpl.start(HazelcastClientInstanceImpl.java:379)
at com.hazelcast.client.HazelcastClientManager.newHazelcastClient(HazelcastClientManager.java:78)
at com.hazelcast.client.HazelcastClient.newHazelcastClient(HazelcastClient.java:72)
at com.imdg.practicas.Practica3IMDG.main(Practica3IMDG.java:26)

```

Se ha lanzado el servidor, y una vez lanzado el cliente se han hecho dos pruebas. La primera, conseguir el valor sin haber insertado nada, y la segunda, conseguirlo una vez se ha insertado en el servidor. El resultado ha sido el siguiente:

The screenshot shows the Eclipse IDE with the same project 'Practica3IMDG'. The code is updated to include a 'getMap' call and a 'println' statement. The console output shows the following sequence of events:

```

<terminated> Practica3IMDG [Java Application] C:\Program Files\Java\jdk1.8.0_221\bin\javaw.exe (12 nov. 2019 9:51:50)
Members [1] {
  Member [127.0.0.1]:5701 - 2680c895-60db-48f3-8990-c2da73da553c
}
nov 12, 2019 9:51:57 AM com.hazelcast.core.LifecycleService
INFORMACIÓN: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is CLIENT_CONNECTED
Antes : null
Después: VALOR
nov 12, 2019 9:51:57 AM com.hazelcast.core.LifecycleService
INFORMACIÓN: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is SHUTTING_DOWN
nov 12, 2019 9:51:57 AM com.hazelcast.core.LifecycleService
INFORMACIÓN: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is SHUTDOWN

```

practicas - Lesson6/src/main/java/com/imdg/practicas/Practica3IMDG.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Debug Project Explorer

Lesson6 [MasterUC3Practices master]

- src/main/java
 - com.imdg.pojos
 - Person.java
 - com.imdg.practicas
 - Practica1IMDG.java
 - Practica3IMDG.java
 - PracticaIMDG2a.java
 - PracticaIMDG2b.java
 - PracticaIMDG2c.java
- JRE System Library [JavaSE-1.8]
- Maven Dependencies
 - hazelcast-3.7.2
 - bin
 - cluster.sh
 - hazelcast_instance.pid
 - hazelcast-full-example.xml
 - hazelcast.xml
 - start.bat
 - start.sh
 - stop.bat
 - stop.sh
 - demo
 - lib
 - license
 - mancenter
 - changelog.txt
 - readme.html
 - release_notes.txt
 - src
 - target

Person.java Practica3IMDG.java

```

14 import com.hazelcast.core.Hazelcast;
15 import com.hazelcast.core.IdGenerator;
16 import com.imdg.pojos.Person;
17 public class Practica3IMDG {
18
19     public static void main(String[] args) {
20         // Instanciar hazelcast cliente y crear una cache
21
22         ClientConfig config = new ClientConfig();
23         ArrayList<String> ips = new ArrayList<String>();
24         ips.add("127.0.0.1");
25         config.getNetworkConfig().setAddresses(ips);
26         HazelcastInstance client = HazelcastClient.newHazelcastClient( config );
27
28         IMap<String, String> mapCustomers = client.getMap("practica6");
29
30         System.out.println("Antes : " + mapCustomers.get("CLAVE"));
31         mapCustomers.put("CLAVE", "VALOR");
32         System.out.println("Después: " + mapCustomers.get("CLAVE"));
33     }
34 }

```

Console

```

<terminated> Practica3IMDG [Java Application] C:\Program Files\Java\jdk1.8.0_221\bin\javaw.exe (12 nov. 2019 9:52:24)
Members [1] {
  Member [127.0.0.1]:5701 - 2680c895-60db-48f3-8990-c2da73da553c
}

nov 12, 2019 9:52:31 AM com.hazelcast.core.LifecycleService
INFORMACIÓN: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is CLIENT_CONNECTED
Antes : VALOR
Después: VALOR
nov 12, 2019 9:52:31 AM com.hazelcast.core.LifecycleService
INFORMACIÓN: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is SHUTTING_DOWN
nov 12, 2019 9:52:31 AM com.hazelcast.core.LifecycleService
INFORMACIÓN: hz.client_0 [dev] [3.7.2] HazelcastClient 3.7.2 (20161004 - 540b01c) is SHUTDOWN

```