
TP N°2_JMS :

**Implémentation d'une communication
asynchrone avec
JMS, Spring et ActiveMQ (Artemis) Externe**

1. Prérequis

- JDK 17
- Connexion internet

2. Objectifs

1. Installation de ActiveMQ/Artemis
2. Développement d'un producer JMS : `@EnableJms, JmsTemplate`
3. Développement d'un consumer JMS en mode asynchrone : `@JmsListener`
4. Envoyer/Réceptionner une liste d'objets Java « Produit » à travers le Broker de type ActiveMQ(Artemis) externe
5. Console d'administration ActiveMQ(Artemis).

3. Installation de ActiveMQ/Artemis

- Accéder au site <https://activemq.apache.org/>
- Télécharger et copier le dossier « Artemis » vers « \JMS\apache-artemis-2.31.2»
- C:\>set JAVA_HOME=D:\jdk-17.0.9
- C:\>echo %JAVA_HOME%
➔ D:\jdk-17.0.9
- La création d'une instance d'un broker se fait en deux phase :
 1. Lancer la commande : « apache-artemis-2.31.2\bin\artemis.cmd »

```
C:\JMS\apache-artemis-2.31.2\bin\artemis.cmd"
```

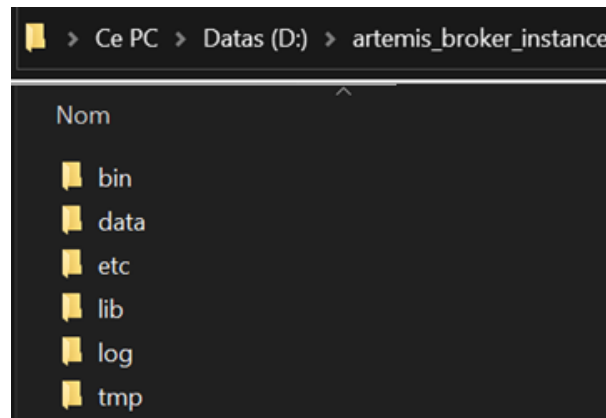
[illegible]

```
For a list of commands, type help or press <TAB>:  
Type exit or press <CTRL-D> to leave the session:  
Apache ActiveMQ Artemis 2.31.2 >
```

2. Lancer la commande : « `create D:\artemis broker instance` »

```
Apache ActiveMQ Artemis 2.31.2 > create D:\artemis_broker_instance
```

Le dossier « [D:\artemis_broker_instance](#) » est créé. Ce dossier va contenir l'ensemble des données « files d'attentes, Topics, ... » et les fichiers de journalisation, traçabilité...

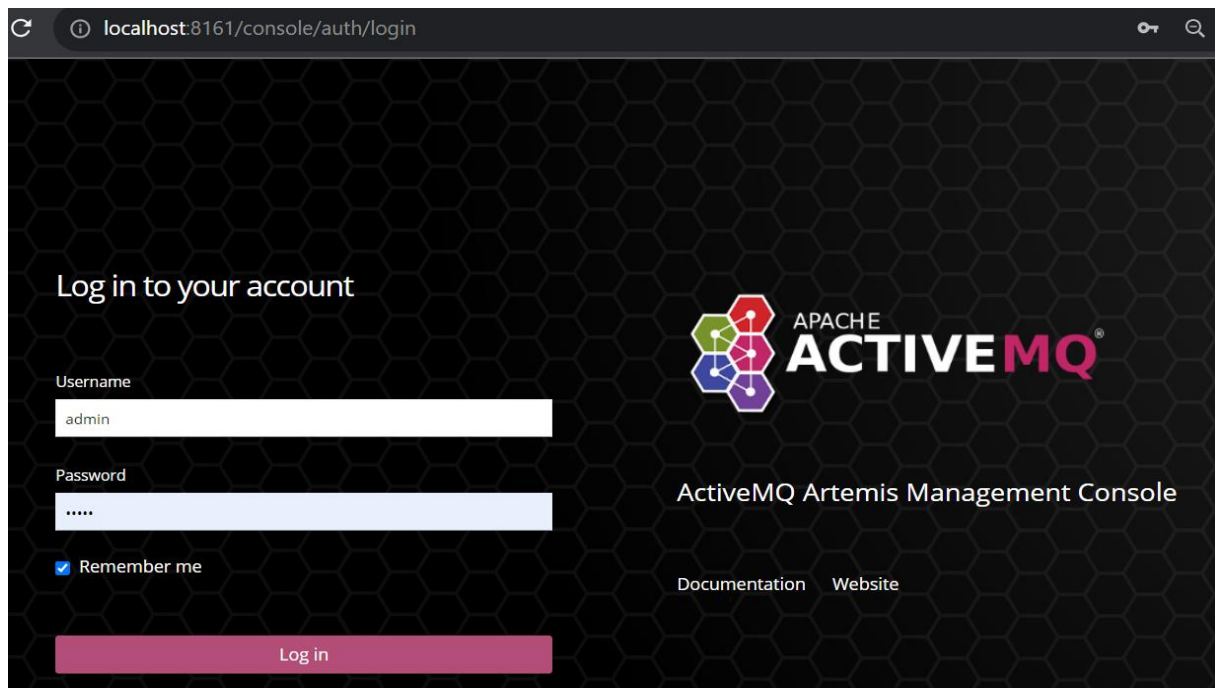


3. Démarrer l'instance du broker qui vient d'être créée :

[D:\artemis_broker_instance\bin\artemis run](#)





















```
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/ _ \ _ _ \ _ \ _ \ \ \ | | / _ /  
/ _ _ \ \ \ \ / _ / | | | \ _ \  
/ / \ \ \ \ \ \ _ \ | | | / _ /  
Apache ActiveMQ Artemis 2.31.2  
  
[AMQ101000: Starting ActiveMQ Artemis Server version 2.31.2  
AMQ221000: live Message Broker is starting with configuration Broker Configuration  
Started NIO Acceptor at 0.0.0.0:61616 for protocols [CORE, MQTT, AMQP, STOMP, HORNETQ, OPENWIRE]  
Protocol module found: [artemis-server]. Adding protocol support for: CORE  
Protocol module found: [artemis-amqp-protocol]. Adding protocol support for: AMQP  
Protocol module found: [artemis-hornetq-protocol]. Adding protocol support for: HORNETQ  
Protocol module found: [artemis-mqtt-protocol]. Adding protocol support for: MQTT  
Protocol module found: [artemis-openwire-protocol]. Adding protocol support for: OPENWIRE  
Protocol module found: [artemis-stomp-protocol]. Adding protocol support for: STOMP  
AMQ241003: Starting embedded web server  
Jolokia overridden property: [key=policyLocation, value=file:D://artemis_broker_instance/etc/jolokia-  
access.xml]  
AMQ241001: HTTP Server started at http://localhost:8161  
Artemis Jolokia REST API available at http://localhost:8161/console/jolokia  
Artemis Console available at http://localhost:8161/console
```

4. Accéder à la console d'Artemis : <http://localhost:8161/>



5. Développement d'un Producteur et Consommateur (en mode Asynchrone)

- Créer le projet Maven « jms_sb_activMQ_ext »

- ▼  jms_sb_activMQ_ext (in SpringBootDemo)
 - ▼  src/main/java
 - ▼  com.myJMS
 - >  MessageProducerApplication.java
 - ▼  com.myJMS.config
 - >  JMSConfiguration.java
 - ▼  com.myJMS.model
 - >  Product.java
 - ▼  com.myJMS.receiver
 - >  MessageReceiver.java
 - ▼  src/main/resources
 -  application.properties
 - >  src/test/java
 - >  JRE System Library [JavaSE-1.8]
 - >  Maven Dependencies
 - >  src
 - >  target
 -  mvnw
 -  mvnw.cmd
 -  pom.xml

- Modifier le fichier « pom.xml » généré comme suit :

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>
  <parent>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-parent</artifactId>
    <version>2.1.4.RELEASE</version>
    <relativePath /> <!-- lookup parent from repository -->
  </parent>
  <groupId>com.myJMS</groupId>
  <artifactId>JMS_SPRINGBOOT_ACTIVE_MQ_EXTERNE</artifactId>
  <version>0.0.1-SNAPSHOT</version>
  <name>SpringBootDemo</name>
  <description>JMS_SPRINGBOOT_ACTIVE_MQ_EXTERNE</description>

  <properties>
    <java.version>1.8</java.version>
```

```

        </properties>

        <dependencies>

        <dependency>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-activemq</artifactId>
        </dependency>

        <!-- <dependency>
            <groupId>org.apache.activemq</groupId>
            <artifactId>activemq-broker</artifactId>
        </dependency> -->
        <dependency>
            <groupId>com.google.code.gson</groupId>
            <artifactId>gson</artifactId>
        </dependency>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-test</artifactId>
            <scope>test</scope>
        </dependency>
        </dependencies>

        <build><plugins><plugin><groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-maven-
        plugin</artifactId></plugin></plugins></build>
    </project>

```

- a. Le fichier « `application.properties` »

```

spring.activemq.broker-url=tcp://localhost:61616
spring.activemq.user=admin
spring.activemq.password=\*\*\*\*
#spring.jms.cache.session-cache-size=5
#spring.activemq.pool.enabled=true
#spring.activemq.pool.max-connections=50

```

- a. La classe model « `Product` »

```

package com.myJMS.model;

import java.io.Serializable;

public class Product implements Serializable
{
    private int productId;
    private String name;
    private int quantity;

    public int getProductId()
    {
        return productId;
    }

    public void setProductId(int productId)

```

```

        {
            this.productId = productId;
        }

        public String getName()
        {
            return name;
        }

        public void setName(String name)
        {
            this.name = name;
        }

        public int getQuantity()
        {
            return quantity;
        }

        public void setQuantity(int quantity)
        {
            this.quantity = quantity;
        }

        @Override
        public String toString() {
            return "Product [productId=" + productId + ", name=" +
                name + ", quantity=" + quantity
                    + "]";
        }
    }

```

b. Développement du producer « MessageProducerApplication»:

```

package com.myJMS;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
import org.springframework.context.ConfigurableApplicationContext;
import org.springframework.jms.annotation.EnableJms;
import org.springframework.jms.core.JmsTemplate;

import com.myJMS.model.Product;

@SpringBootApplication
@EnableJms
public class MessageProducerApplication
{
    private static final String MESSAGE_QUEUE = "message_queue";

    public static void main(String[] args)
    {
        // Launch the application
        ConfigurableApplicationContext context =
        SpringApplication.run(MessageProducerApplication.class, args);

        // Get JMS template bean reference
        JmsTemplate jmsTemplate = context.getBean(JmsTemplate.class);

        for (int i = 1; i <= 10; i++)
        {
            Product product = new Product();
            product.setProductId(i);
            product.setName("Laptop");
            product.setQuantity(10 + i);
        }
    }
}

```

```

        // Send a message
System.out.println(" *** MessageProducerApplication : Sending a
product " + i);

jmsTemplate.convertAndSend(MESSAGE_QUEUE, product);
    }
}
}

```

c. Développement du consommateur « `MessageReceiver` »

```

package com.myJMS.receiver;

import org.springframework.jms.annotation.JmsListener;
import org.springframework.stereotype.Component;

import com.myJMS.model.Product;

@Component
public class MessageReceiver
{
    private static final String MESSAGE_QUEUE = "message_queue";

    @JmsListener(destination = MESSAGE_QUEUE)
    public void receiveMessage(Product product)
    {
        System.out.println(" ** MessageReceiver ***
receiveMessage(Product product) " + product);
    }
}

```

d. Exécuter la classe main : `MessagingJmsApplication`

```

      .
     /\ /  _
    ( ( ) \ _
   /\ /  _
  ' | _
  =====|=====|_/=///_/
:: Spring Boot ::      (v2.1.4.RELEASE)

```

```

INFO 35392 --- [          main]
com.myJMS.MessageProducerApplication : Starting

```

```
MessageProducerApplication
\JMS\TP_JMS\SpringBoot_JMS_ActiveMQ_Example\SpringBootDemo)
com.myJMS.MessageProducerApplication      : Started
MessageProducerApplication
*** MessageProducerApplication : Sending a product 1
*** MessageProducerApplication : Sending a product 2
*** MessageProducerApplication : Sending a product 3
*** MessageProducerApplication : Sending a product 4
*** MessageProducerApplication : Sending a product 5
*** MessageProducerApplication : Sending a product 6
*** MessageProducerApplication : Sending a product 7
*** MessageProducerApplication : Sending a product 8
*** MessageProducerApplication : Sending a product 9
*** MessageProducerApplication : Sending a product 10
** MessageReceiver *** receiveMessage(Product product)
Product [productId=1, name=Laptop, quantity=11]
** MessageReceiver *** receiveMessage(Product product)
Product [productId=2, name=Laptop, quantity=12]
** MessageReceiver *** receiveMessage(Product product)
Product [productId=3, name=Laptop, quantity=13]
** MessageReceiver *** receiveMessage(Product product)
Product [productId=4, name=Laptop, quantity=14]
** MessageReceiver *** receiveMessage(Product product)
Product [productId=5, name=Laptop, quantity=15]
** MessageReceiver *** receiveMessage(Product product)
Product [productId=6, name=Laptop, quantity=16]
** MessageReceiver *** receiveMessage(Product product)
Product [productId=7, name=Laptop, quantity=17]
** MessageReceiver *** receiveMessage(Product product)
Product [productId=8, name=Laptop, quantity=18]
** MessageReceiver *** receiveMessage(Product product)
Product [productId=9, name=Laptop, quantity=19]
** MessageReceiver *** receiveMessage(Product product)
Product [productId=10, name=Laptop, quantity=20]
```

localhost:8161/console/activemq/artemisConnections?nid=root-org.apache.activemq.artemis-0.0.0.0

Artemis

Search in

▼ 0.0.0.0

- acceptors
- addresses

Status Connections Sessions Consumers Producers Addresses Queues Attributes Operations Chart Broker diagram

Browse Connections ?

Filter Field... Operation... Value ascending ID Q Reset Columns

ID	Client ID	Users	protocol	Session Count	Remote Address	Local Address	Creation Time	Actions
1e3b7ba3	ID:L31422978-56430-1703770639049-0:1	admin	OPENWIRE	4	/127.0.0.1:56431	tcp://127.0.0.1:61616	Thu Dec 28 14:37:19 WEST 2023	Close

10 per page 1:1 of 1 1 of 1

- User : Admin

Search in

▼ 0.0.0.0

- acceptors
- addresses

Status Connections Sessions Consumers Producers Addresses Queues Attributes Operations Chart Broker diagram

Browse Sessions ?

Filter Field... Operation... Value ascending ID Q Reset Columns

ID	Connection	User	Consumer Count	Producer Count	Creation Time	Actions
38cc07d2-a586-11ee-89c2-a8934acf8ae7	1e3b7ba3	admin	0	0	Thu Dec 28 14:37:19 WEST 2023	Close
ID:L31422978-56430-1703770639049-1:1:1	1e3b7ba3	admin	0	0	Thu Dec 28 14:37:19 WEST 2023	Close
ID:L31422978-56430-1703770639049-1:1:1	1e3b7ba3	admin	1	0	Thu Dec 28 14:37:19 WEST 2023	Close
ID:L31422978-56430-1703770639049-1:1:2	1e3b7ba3	admin	0	1	Thu Dec 28 14:37:19 WEST 2023	Close

10 per page 1-4 of 4 1 of 1

- 1 Consumer.
- 1 Producer

Search in

▼ 0.0.0.0

- acceptors
- addresses

Status Connections Sessions Consumers Producers Addresses Queues Attributes Operations Chart Broker diagram

Browse Consumers ?

Filter Field... Operation... Value ascending ID Q Reset Columns

ID	Session	Client ID	Protocol	Queue	Queue Type	Filter	Address	Remote Address	Local Address	Creation Time	Actions
2147483939	ID:L31422978-56430-1703770639049-1:1:1	ID:L31422978-56430-1703770639049-0:1	OPENWIRE	message_queue	anycast		message_queue	/127.0.0.1:56431	tcp://127.0.0.1:61616	Thu Dec 28 14:37:19 WEST 2023	Close

10 per page 1-1 of 1 1 of 1

Search *tn*

0.0.0.0

>

acceptors

addresses

StatusConnectionsSessionsConsumersProducersAddressesQueuesAttributesOperationsChartBroker diagram

Browse Producers ?

Filter Field...Operation...Value

ascendingID

Reset

Columns

ID	Name	Session	Client ID	Protocol	User	Address	Remote Address	Local Address
1	ID:L31422978-56430-1703770639049-1:1:2:1	ID:L31422978-56430-1703770639049-1:1:2	ID:L31422978-56430-1703770639049-0:1	OPENWIRE	admin	message_queue	/127.0.0.1:56431	tcp://127.0.0.1:61616

10 per page1-1 of 11 of 1

Search *tn*

0.0.0.0

>

acceptors

addresses

StatusConnectionsSessionsConsumersProducersAddressesQueuesAttributesOperationsChartBroker diagram

Browse Queues ?

Filter Field...Operation...Value

ascendingID

Reset

Columns

ID	Name	Address	Routing Type	Filter	Durable	Max Consumers	Purge On No Consumers	Consumer Count	Message Count	Actions
3	DLQ	DLQ	ANYCAST		true	-1	false	0	20	attributesoperations
7	ExpiryQueue	ExpiryQueue	ANYCAST		true	-1	false	0	0	attributesoperations
25	message_queue	message_queue	ANYCAST		true	-1	false	1	0	attributesoperations
574	message_queueee	message_queueee	ANYCAST		true	-1	false	0	0	attributesoperations

10 per page1-4 of 41 of 1

← → ↻

localhost:8161/console/artemis/artemisConnections?tab=artemis&nid=root-org.apache.activemq.artemis-0.0.0.0-a...

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Redémarrer pour mettre à jour ⋮

APACHE
ACTIVE MQ

Artemis

JMX

Runtime

Diagnostics

Search tree:

0.0.0.0

- acceptors
- addresses
 - \$sys.mq.tts.sessions
 - DLQ
 - ExpiryQueue
 - activemq.notifications
 - message_queue
 - queues
 - anycast

message_queue

org.apache.activemq.artemis:broker="0.0.0.0",component=addresses,address="message_queue",subcomponent=queues,router-type="anycast",queue="message_queue"

StatusConnectionsSessionsConsumersProducersAddressesQueuesAttributesOperationsChartMore

Browse Connections ⓘ

Filter Field... Operation... Value

ascending ID 🔍 Reset Columns

ID	Client ID	Users	protocol	Session Count	Remote Address	Local Address	Creation Time	Actions
a4c6025b	ID:L31422978-51896-1699009579564-0:1	admin	OPENWIRE	4	/127.0.0.1:51899	tcp://127.0.0.1:61616	Fri Nov 03 12:06:19 WEST 2023	Close

10 per page1-1 of 1

Search tree:

0.0.0.0

- acceptors
- addresses
 - \$sys.mq.tts.sessions
 - DLQ
 - ExpiryQueue
 - activemq.notifications
 - message_queue
 - queues
 - anycast

message_queue

org.apache.activemq.artemis:broker="0.0.0.0",component=addresses,address="message_queue",subcomponent=queues,router-type="anycast",queue="message_queue"

StatusConnectionsSessionsConsumersProducersAddressesQueuesAttributesOperationsChartMore

Browse Sessions ⓘ

Filter Field... Operation... Value

ascending ID 🔍 Reset Columns

ID	Connection	User	Consumer Count	Producer Count	Creation Time	Actions
0431f011-7a39-11ee-b7dc-a8934ac8ae7	a4c6025b	admin	0	0	Fri Nov 03 12:06:19 WEST 2023	Close
ID:L31422978-51896-1699009579564-1:1-1	a4c6025b	admin	0	0	Fri Nov 03 12:06:19 WEST 2023	Close
ID:L31422978-51896-1699009579564-1:1:1	a4c6025b	admin	1	0	Fri Nov 03 12:06:19 WEST 2023	Close
ID:L31422978-51896-1699009579564-1:1:2	a4c6025b	admin	0	1	Fri Nov 03 12:06:19 WEST 2023	Close

10 per page1-4 of 4

message_queue

org.apache.activemq.artemis:broker="0.0.0.0",component=addresses,address="message_queue",subcomponent=queues,router-type="anycast",queue="message_queue"

StatusConnectionsSessionsConsumersProducersAddressesQueuesAttributesOperationsChartMore

Browse Consumers ⓘ

Filter Field... Operation... message_queue

ascending ID 🔍 Reset Columns

ID	Session	Client ID	Protocol	Queue	Queue Type	Filter	Address	Remote Address	Local Address	Creation Time	Actions
94	ID:L31422978-51896-1699009579564-1:1:1	ID:L31422978-51896-1699009579564-0:1	OPENWIRE	message_queue	anycast		message_queue	/127.0.0.1:51899	tcp://127.0.0.1:61616	Fri Nov 03 12:06:19 WEST 2023	Close

10 per page1-1 of 1

message_queue

org.apache.activemq.artemis:broker="0.0.0.0",component=addresses,address="message_queue",subcomponent=queues,routing-type="anycast",queue="message_queue"

- Status
- Connections
- Sessions
- Consumers
- Producers
- Addresses
- Queues
- Attributes
- Operations
- Chart
- More ▾

Browse Producers ⓘ

Filter Field..

Operation..

Value

ascending

ID

Q

Reset

Columns

ID	Name	Session	Client ID	Protocol	User	Address	Remote Address	Local Address
1	ID:L31422978-51896-1699009579564-1:1:2:1	ID:L31422978-51896-1699009579564-1:1:2	ID:L31422978-51896-1699009579564-0:1	OPENWIRE	admin	message_queue	/127.0.0.1:51899	tcp://127.0.0.1:61616

10

per page

1-1 of 1

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1

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of 1

message_queue

org.apache.activemq.artemis:broker="0.0.0.0",component=addresses,address="message_queue",subcomponent=queues,routing-type="anycast",queue="message_queue"

- Status
- Connections
- Sessions
- Consumers
- Producers
- Addresses
- Queues
- Attributes
- Operations
- Chart
- More ▾

Browse Queues ⓘ

Filter Field.. ▾

Operation.. ▾

Value

ascending ▾

ID ▾

Q

Reset

Columns

ID	Name	Address	Routing Type	Filter	Durable	Max Consumers	Purge On No Consumers	Consumer Count	Message Count	Actions
3	DLQ	DLQ	ANYCAST		true	-1	false	0	0	attributes operations
7	ExpiryQueue	ExpiryQueue	ANYCAST		true	-1	false	0	0	attributes operations
25	message_queue	message_queue	ANYCAST		true	-1	false	1	0	attributes operations

10 ▾

 per page

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« < 1 of 1 > »

On peut lancer plusieurs fois le Producer et vérifier que le nombre de messages augmentent dans la file d’attente, et que le l’opération de consommation se fait de manière aléatoire :

Search tree:

org.apache.activemq.artemis

0.0.0.0

acceptors

addresses

\$sys.mqtt.sessions

DLQ

ExpiryQueue

activemq.notifications

jsa-topic

message_queue

queues

anycast

message_queue...

message_queue

message_queue

org.apache.activemq.artemis:broker="0.0.0.0",component=addresses,address="message_queue",subcomponent=queues,routing-type="anycast",queue="message_queue"

Attributes

Operations

Chart

Messages acknowledged	40
Messages added	41
Messages expired	0
Messages killed	1
Name	message_queue
Object Name	org.apache.activemq.artemis:broker="0.0.0.0",component=addresses,addres...
Paused	false
Persistent size	0
Prepared transaction message count	0
Purge on no consumers	false
Retroactive resource	false
Ring size	-1
Routing type	ANYCAST
Scheduled count	0
Scheduled size	0
Temporary	false
User	admin