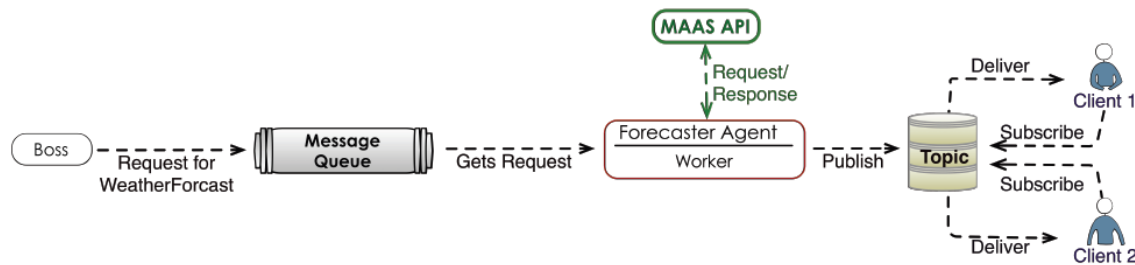


Ashkan Farivarmoheb

Message Queue Assignment

Advanced Software Architecture



First of all, this project is written based on Java language. The technology and tools to develop the project are *Spring framework*, *JMS API*, *Apache ActiveMQ*, *MAVEN*, and finally I integrate all of them.

1. Structure

The project is composed of 5 classes as follows: Boss, ForecasterAgentWorker, MessagePublisher, MessageSubscriber1 and MessageSubscriber2. 3 XML files are to configure properties, spring, jms settings(*activemq-jms-spring-properties.xml*, *activemq-jms-spring-context.xml*, *activemq-jms-spring-jms.xml*) and a POM file to gather required libs.

2. Installation

I downloaded the latest version of ActiveMQ 5.11.1 and install it on the machine.

3. Implementation

The Boss Class has a main method to generate its request for weather forecast of a specific *Sol* and then push to the queue.

```

public static void main(String[] args) {
    // Clean out any ActiveMQ data from a previous run
    FileSystemUtils.deleteRecursively(new File("activemq-data"));

    // Launch the application
    ConfigurableApplicationContext context = SpringApplication.run(Boss.class, args);

    // Send a message
    MessageCreator messageCreator = new MessageCreator() {
        @Override
        public Message createMessage(Session session) throws JMSException {
            return session.createTextMessage(args[1]);
        }
    };

    JmsTemplate jmsTemplate = context.getBean(JmsTemplate.class);
    jmsTemplate.send("mailbox-destination", messageCreator);
}

```

As we can see, input args[1] is the request for weather forecast. With help of MessageCreator we create a TextMessage and then using JmsTemplate sends to the “mailbox-destination” queue of ActiveMQ.

The ForecasterAgentWorker is defined as a Component and listens to “mailbox-destination” queue and reads the request message from the queue, processes it and invoke MAAS API and retrieve the response in JSON with help of getJSONResponse.method. The JSON result will be published by MessagePublisher.

```

@JmsListener(destination = "mailbox-destination", containerFactory = "myJmsContainerFactory")
public void receiveMessage(String message) {

    ApplicationContext applicationContext = new ClassPathXmlApplicationContext("classpath:spring/activemq-jms-spring-context.xml");
    messagePublisher = (MessagePublisher) applicationContext.getBean("messagePublisher");

    //String res = getReport(message).toString();
    String res = getJSONResponse(message, "GET");
    messagePublisher.sendMessage(res);
    //messagePublisher.sendMessage(getReport(message).toString());
    //context.close();
    //FileSystemUtils.deleteRecursively(new File("activemq-data"));
}

```

The MessagePublisher will publish the JSON message into “IN_TOPIC” topic using JmsTemplate. We have two MessageSubscriber (1,2) to receive this message. These two Subscribers registers them into DefaultMessageListenerContainer with “IN_TOPIC” topic.

```

<!-- Destination Topic -->
<bean id="destinationTopic" class="org.apache.activemq.command.ActiveMQTopic">
    <constructor-arg index="0" value="{JMS.TOPIC.NAME}" />
</bean>

```

In other words, the subscribers registers to this topic and whenever the publisher publishes the message to this topic, it will be consumed by subscribers.

```

<!-- Message Subscriber1 Container -->
<bean
    class="org.springframework.jms.listener.DefaultMessageListenerContainer">
    <property name="connectionFactory" ref="connectionFactory" />
    <property name="destinationName" value="{JMS.TOPIC.NAME}" />
    <property name="messageListener" ref="messageSubscriber1" />
    <property name="pubSubDomain" value="true" />
</bean>

<!-- Message Subscriber2 Container -->
<bean
    class="org.springframework.jms.listener.DefaultMessageListenerContainer">
    <property name="connectionFactory" ref="connectionFactory" />
    <property name="destinationName" value="{JMS.TOPIC.NAME}" />
    <property name="messageListener" ref="messageSubscriber2" />
    <property name="pubSubDomain" value="true" />
</bean>

```

4. Run and result

The first step we should run the ActiveMQ so in the terminal in the proper path we type
> activemq start



```

C:\apache-activemq-5.11.1>bin\activemq start
Java Runtime: Oracle Corporation 1.8.0_31 C:\Program Files\Java\jdk1.8.0_31\jre
Heap sizes: current=1005056k free=984084k max=1005056k
JVM args: -Dcom.sun.management.jmxremote -Xms1G -Xmx1G -Djava.util.logging.c
onfig.file=logging.properties -Djava.security.auth.login.config=C:\apache-activemq-5.11.1\bin\..\conf\login.config -Dactivemq.classpath=C:\apache-activemq-5.11.1\bin\..\conf;C:\apache-activemq-5.11.1\bin\..\conf; -Dactivemq.home=C:\apache-activemq-5.11.1\bin\.. -Dactivemq.base=C:\apache-activemq-5.11.1\bin\.. -Dactivemq.conf=C:\apache-activemq-5.11.1\bin\..\conf -Dactivemq.data=C:\apache-activemq-5.11.1\bin\..\data -Djava.io.tmpdir=C:\apache-activemq-5.11.1\bin\..\data\tmp

INFO : Listening for connections at ws://Ashkan-UAIO:61614?maximumConnections=1000&wireFormat.maxFrameSize=104857600
INFO : Connector ws started
INFO : Apache ActiveMQ 5.11.1 (localhost, ID:Ashkan-UAIO-50050-1434699726056-0:1) started
INFO : For help or more information please see: http://activemq.apache.org
WARN : Store limit is 102400 mb (current store usage is 0 mb). The data directory: C:\apache-activemq-5.11.1\bin\..\data\kahadb only has 9179 mb of usable space - resetting to maximum available disk space: 9180 mb
WARN : Temporary Store limit is 51200 mb, whilst the temporary data directory: C:\apache-activemq-5.11.1\bin\..\data\localhost\tmp_storage only has 9179 mb of usable space - resetting to maximum available 9179 mb.
INFO : ActiveMQ WebConsole available at http://0.0.0.0:8161/
INFO : Initializing Spring FrameworkServlet 'dispatcher'
INFO : jolokia-agent: No access restrictor found at classpath:/jolokia-access.xml, access to all MBeans is allowed

```

The ActiveMQ is up and running and responsive to the http://localhost:8161.

[Home](#) | [Queues](#) | [Topics](#) | [Subscribers](#) | [Connections](#) | [Network](#) | [Scheduled](#) | [Send](#)

Support

Welcome!

Welcome to the Apache ActiveMQ Console of **localhost** (ID:Ashkan-VAIO-50050-1434699726056-0:1)

You can find more information about Apache ActiveMQ on the [Apache ActiveMQ Site](#)

Broker

Name	localhost
Version	5.11.1
ID	ID:Ashkan-VAIO-50050-1434699726056-0:1
Uptime	3 minutes
Store percent used	0
Memory percent used	0
Temp percent used	0

Queue Views

- Graph
- XML

Topic Views

- XML

Subscribers Views

- XML

Useful Links

- Documentation
- FAQ
- Downloads
- Forums

Copyright 2005-2014 The Apache Software Foundation.

The second step we should run the application in the terminal. The first argument states for the main class to be run (Boss class) and second one states to the request for weather forecast (<http://marsweather.ingenology.com/v1/latest/?sol=157>).

```
G:\Users\Ashkan\My Documents\GitHub\gs-messaging-jms\complete>java -jar target\gs-messaging-jms-0.1.0.jar controller.Boss http://marsweather.ingenology.com/v1/latest/?sol=157

The Boss request for weather into 'mailbox-desitination' queue:http://marsweather.ingenology.com/v1/latest/?sol=157

The ForecasterAgentWorker recieve the request from 'mailbox-desitination' queue:http://marsweather.ingenology.com/v1/latest/?sol=157

The MessagePublisher publish JSON result into 'IN_TOPIC' topic:<"report": {"terrestrial_date": "2015-06-03", "sol": 1004, "ls": 352.0, "min_temp": -74.0, "min_temp_fahrenheit": -101.2, "max_temp": -9.0, "max_temp_fahrenheit": 15.8, "pressure": 842.0, "pressure_string": "Higher", "abs_humidity": null, "wind_speed": null, "wind_direction": "--", "atmo_opacity": "Sunny", "season": "Month 12", "sunrise": "2015-06-03T11:44:00Z", "sunset": "2015-06-03T23:46:00Z"}>

Message consumed by MessageSubscriber1 :
<"report": {"terrestrial_date": "2015-06-03", "sol": 1004, "ls": 352.0, "min_temp": -74.0, "min_temp_fahrenheit": -101.2, "max_temp": -9.0, "max_temp_fahrenheit": 15.8, "pressure": 842.0, "pressure_string": "Higher", "abs_humidity": null, "wind_speed": null, "wind_direction": "--", "atmo_opacity": "Sunny", "season": "Month 12", "sunrise": "2015-06-03T11:44:00Z", "sunset": "2015-06-03T23:46:00Z"}>

Message consumed by MessageSubscriber2 :
<"report": {"terrestrial_date": "2015-06-03", "sol": 1004, "ls": 352.0, "min_temp": -74.0, "min_temp_fahrenheit": -101.2, "max_temp": -9.0, "max_temp_fahrenheit": 15.8, "pressure": 842.0, "pressure_string": "Higher", "abs_humidity": null, "wind_speed": null, "wind_direction": "--", "atmo_opacity": "Sunny", "season": "Month 12", "sunrise": "2015-06-03T11:44:00Z", "sunset": "2015-06-03T23:46:00Z"}>
```

Active Producers for IN_TOPIC

Client ID Connection ID	SessionId	ProducerId	ProducerWindowSize	DispatchAsync	Blocked	BlockedTime	SentCount
ID:Ashkan-VAIO-51676-1434712908418-4:1	3	ID:Ashkan-VAIO-51676-1434712908418-5:1:3:1	0	false	false	0	1
ID:Ashkan-VAIO-51676-1434712908418-5:1							

Active Subscribers for IN_TOPIC

Client ID Connection ID	SessionId	SubscriptionId	Selector	Active	Network	Pending Queue Size	Inflight	Enqueued	Dequeued	Prefetch	Subscription Name
ID:Ashkan-VAIO-51676-1434712908418-4:1	1	1		true	false	0	0	1	1	32767	
ID:Ashkan-VAIO-51676-1434712908418-5:1											
ID:Ashkan-VAIO-51676-1434712908418-4:1	2	1		true	false	0	0	1	1	32767	
ID:Ashkan-VAIO-51676-1434712908418-5:1											

Connections

Connector ws

Name	Remote Address	Active	Slow
------	----------------	--------	------

Connector openwire

Name	Remote Address	Active	Slow
ID:Ashkan-VAIO-51676-1434712908418-4:1	tcp://127.0.0.1:51678	true	false

Connector topics

Topics

Name	Number Of Consumers	Messages Enqueued	Messages Dequeued	Operations
ActiveMQ.Advisory.Connection	0	13	0	Send To Active Subscribers Active Producers Delete
ActiveMQ.Advisory.Consumer.Topic.IN_TOPIC	0	26	0	Send To Active Subscribers Active Producers Delete
ActiveMQ.Advisory.MasterBroker	0	1	0	Send To Active Subscribers Active Producers Delete
ActiveMQ.Advisory.Producer.Topic.IN_TOPIC	0	13	0	Send To Active Subscribers Active Producers Delete
ActiveMQ.Advisory.Topic	0	1	0	Send To Active Subscribers Active Producers Delete
IN_TOPIC	2	1	2	Send To Active Subscribers Active Producers Delete

Active Non-Durable Topic Subscribers

Client ID	Subscription Name	Connection ID	Destination	Selector	Pending Queue Size	Dispatched Queue Size	Dispatched Counter	Enqueue Counter	Dequeue Counter	Operations
ID:Ashk...		ID:Ashk...	IN_TOPIC		0	0	1	1	1	
ID:Ashk...		ID:Ashk...	IN_TOPIC		0	0	1	1	1	
ID:Ashk...		ID:Ashk...	ActiveM...		0	0	0	0	0	

5. Log Text

C:\Users\Ashkan\My Documents\GitHub\gs-messaging-jms\complete>java -jar target\g

712908418-0:1) is starting
 2015-06-19 15:51:48.586 INFO 5004 --- [main] o.apache.activemq.broker.BrokerService : Apache ActiveMQ 5.11.1 (localhost, ID:Ashkan-VAIO-51676-1434712908418-0:1) started
 2015-06-19 15:51:48.587 INFO 5004 --- [main] o.apache.activemq.broker.BrokerService : For help or more information please see: <http://activemq.apache.org>
 2015-06-19 15:51:48.592 WARN 5004 --- [main] o.apache.activemq.broker.BrokerService : Temporary Store limit is 51200 mb, whilst the temporary data directory: C:\Users\Ashkan\My Documents\GitHub\gs-messaging-jms\complete\activemq-data\localhost\tmp_storage only has 8720 mb of usable space - resetting to maximum available 8720 mb.
 2015-06-19 15:51:48.645 INFO 5004 --- [main] o.a.activemq.broker.TransportConnector : Connector vm://localhost started
 2015-06-19 15:51:48.805 INFO 5004 --- [main] o.s.j.e.a.AnnotationMethodProcessor : Registering beans for JMX exposure on startup
 2015-06-19 15:51:48.813 INFO 5004 --- [main] o.s.c.support.DefaultLifecycleProcessor : Starting beans in phase 2147483647
 2015-06-19 15:51:48.821 INFO 5004 --- [main] controller.Boss : Started Boss in 3.642 seconds (JVM running for 4.654)

The Boss request for weather into 'mailbox-desitination' queue:<http://marsweather.ingenology.com/v1/latest/?sol=157>

The ForecasterAgentWorker recieve the request from 'mailbox-desitination' queue:<http://marsweather.ingenology.com/v1/latest/?sol=157>

2015-06-19 15:51:48.879 INFO 5004 --- [Session Task-1] o.s.c.s.ClassPathXmlApplicationContext : Refreshing org.springframework.context.support.ClassPathXmlApplicationContext@35f17640: startup date [Fri Jun 19 15:51:48 IRDT 2015]; root of context hierarchy
 2015-06-19 15:51:48.886 INFO 5004 --- [Session Task-1] o.s.b.f.xml.XmlBeanDefinitionReader : Loading XML bean definitions from class path resource [spring/activemq-jms-spring-context.xml]
 2015-06-19 15:51:49.079 INFO 5004 --- [Session Task-1] o.s.b.f.xml.XmlBeanDefinitionReader : Loading XML bean definitions from class path resource [activemq-jms-spring-properties.xml]
 2015-06-19 15:51:49.126 INFO 5004 --- [Session Task-1] o.s.b.f.xml.XmlBeanDefinitionReader : Loading XML bean definitions from class path resource [jms/activemq-jms-spring-jms.xml]
 2015-06-19 15:51:49.304 INFO 5004 --- [Session Task-1] o.s.c.support.DefaultLifecycleProcessor : Starting beans in phase 2147483647

2015-06-19 15:51:49.385 INFO 5004 --- [Session Task-1] o.s.j.c.CachingConnectionFactory : Established shared JMS Connection: ActiveMQConnection {id=ID:Ashkan-VAIO-51676-1434712908418-5:1,clientId=null,started=false}

The MessagePublisher publish JSON result into 'IN_TOPIC' topic:{"report": {"terrestrial_date": "2015-06-03", "sol": 1004, "ls": 352.0, "min_temp": -74.0, "min_temp_fahrenheit": -101.2, "max_temp": -9.0, "max_temp_fahrenheit": 15.8, "pressure": 842.0, "pressure_string": "Higher", "abs_humidity": null, "wind_speed": null, "wind_direction": "--", "atmo_opacity": "Sunny", "season": "Month 12", "sunrise": "2015-06-03T11:44:00Z", "sunset": "2015-06-03T23:46:00Z"}}

Message consumed by MessageSubscriber1 :

{"report": {"terrestrial_date": "2015-06-03", "sol": 1004, "ls": 352.0, "min_temp": -74.0, "min_temp_fahrenheit": -101.2, "max_temp": -9.0, "max_temp_fahrenheit": 15.8, "pressure": 842.0, "pressure_string": "Higher", "abs_humidity": null, "wind_speed": null, "wind_direction": "--", "atmo_opacity": "Sunny", "season": "Month 12", "sunrise": "2015-06-03T11:44:00Z", "sunset": "2015-06-03T23:46:00Z"}}

Message consumed by MessageSubscriber2 :

{"report": {"terrestrial_date": "2015-06-03", "sol": 1004, "ls": 352.0, "min_temp": -74.0, "min_temp_fahrenheit": -101.2, "max_temp": -9.0, "max_temp_fahrenheit": 15.8, "pressure": 842.0, "pressure_string": "Higher", "abs_humidity": null, "wind_speed": null, "wind_direction": "--", "atmo_opacity": "Sunny", "season": "Month 12", "sunrise": "2015-06-03T11:44:00Z", "sunset": "2015-06-03T23:46:00Z"}}