RabbitMQ by Pivotal

1 "Hello World!"

The simplest thing that does *something*

Python Java Ruby PHP C# JavaScript Go Elixir Objective-C Swift

Spring AMQP

2 Work queues

Distributing tasks among workers (the competing consumers pattern)

Python Java Ruby PHP C# JavaScript Go Elixir Objective-C Swift

Spring AMQP

3 Publish/Subscribe

Sending messages to many consumers at once

Python Java Ruby PHP C# JavaScript Go Elixir Objective-C Swift

Spring AMQP

4 Routing

Receiving messages selectively

Python Java Ruby PHP C# JavaScript Go Elixir Objective-C Swift

Spring AMQP

5 Topics

Receiving messages based on a pattern (topics)

Python Java Ruby PHP C# JavaScript Go Elixir Objective-C Swift

Spring AMQP

6 RPC

Request/reply pattern example

Python Java Ruby PHP C# JavaScript Go Elixir Spring AMQP

Routing

(using the Java client)

In the previous tutorial we built a simple logging system. We were able to broadcast log messages to many receivers.

In this tutorial we're going to add a feature to it - we're going to make it possible to subscribe only to a subset of the messages. For example, we will be able to direct only critical error messages to the log file (to save disk space), while still being able to print all of the log messages on the console.

Prerequisites

This tutorial assumes RabbitMQ is installed and running on `localhost` on standard port (`5672`). In case you use a different host, port or credentials, connections settings would require adjusting.

Where to get help

If you're having trouble going through this tutorial you can contact us through the mailing list.

Bindings

In previous examples we were already creating bindings. You may recall code like:

```
channel.queueBind(queueName, EXCHANGE_NAME, "");
```

A binding is a relationship between an exchange and a queue. This can be simply read as: the queue is interested in messages from this exchange.

Bindings can take an extra `routingKey` parameter. To avoid the confusion with a `basic_publish` parameter we're going to call it a `binding key`. This is how we could create a binding with a key:

```
channel.queueBind(queueName, EXCHANGE_NAME, "black");
```

The meaning of a binding key depends on the exchange type. The `fanout` exchanges, which we used previously, simply ignored its value.

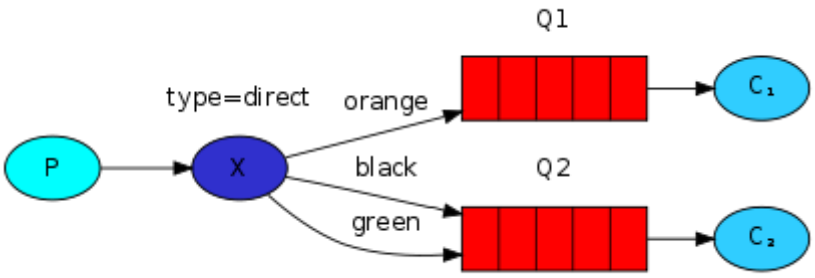
Direct exchange

Our logging system from the previous tutorial broadcasts all messages to all consumers. We want to extend that to allow filtering messages based on their severity. For example we may want a program which writes log messages to the disk to only receive critical errors, and not waste disk space on warning or info log messages.

We were using a `fanout` exchange, which doesn't give us much flexibility - it's only capable of mindless broadcasting.

We will use a `direct` exchange instead. The routing algorithm behind a `direct` exchange is simple - a message goes to the queues whose `binding key` exactly matches the `routing key` of the message.

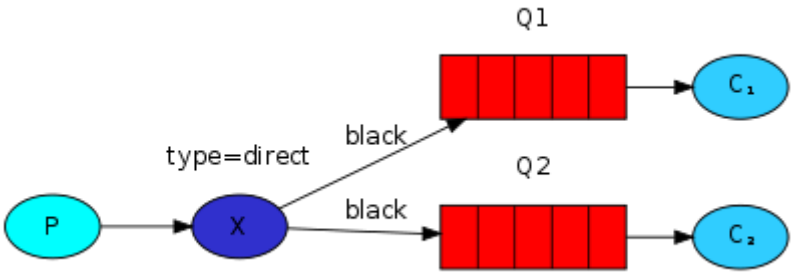
To illustrate that, consider the following setup:



In this setup, we can see the `direct` exchange `X` with two queues bound to it. The first queue is bound with binding key `orange`, and the second has two bindings, one with binding key `black` and the other one with `green`.

In such a setup a message published to the exchange with a routing key `orange` will be routed to queue `Q1`. Messages with a routing key of `black` or `green` will go to `Q2`. All other messages will be discarded.

Multiple bindings



It is perfectly legal to bind multiple queues with the same binding key. In our example we could add a binding between `X` and `Q1` with binding key `black`. In that case, the `direct` exchange will behave like `fanout` and will broadcast the message to all the matching queues. A message with routing key `black` will be delivered to both `Q1` and `Q2`.

Emitting logs

We'll use this model for our logging system. Instead of `fanout` we'll send messages to a `direct` exchange. We will supply the log severity as a `routing key`. That way the receiving program will be able to select the severity it wants to receive. Let's focus on emitting logs first.

As always, we need to create an exchange first:

```
channel.exchangeDeclare(EXCHANGE_NAME, "direct");
```

And we're ready to send a message:

```
channel.basicPublish(EXCHANGE_NAME, severity, null, message.getBytes());
```

To simplify things we will assume that 'severity' can be one of 'info', 'warning', 'error'.

Subscribing

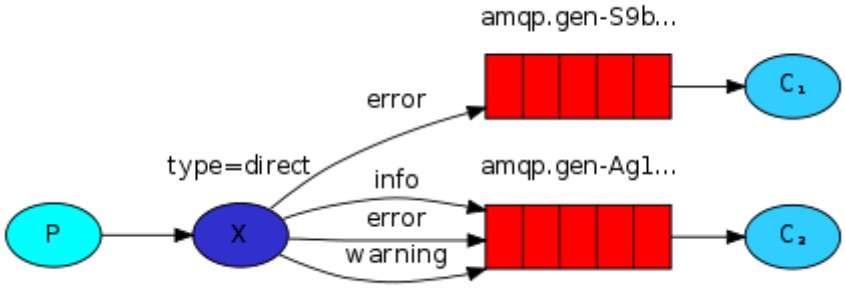
Receiving messages will work just like in the previous tutorial, with one exception - we're going to create a new binding for each severity we're interested in.

```
String queueName = channel.queueDeclare().getQueue();

for(String severity : argv){
```

```
    channel.queueBind(queueName, EXCHANGE_NAME, severity);
}
```

Putting it all together



The code for `EmitLogDirect.java` class:

```
import com.rabbitmq.client.*;

import java.io.IOException;

public class EmitLogDirect {

    private static final String EXCHANGE_NAME = "direct_logs";

    public static void main(String[] argv)
                  throws java.io.IOException {

        ConnectionFactory factory = new ConnectionFactory();
        factory.setHost("localhost");
        Connection connection = factory.newConnection();
        Channel channel = connection.createChannel();

        channel.exchangeDeclare(EXCHANGE_NAME, "direct");

        String severity = getSeverity(argv);
        String message = getMessage(argv);

        channel.basicPublish(EXCHANGE_NAME, severity, null, message.getBytes());
        System.out.println(" [x] Sent '" + severity + "':'" + message + "'");
```

```
        channel.close();
        connection.close();
    }
    //..
}
```

The code for `ReceiveLogsDirect.java`:

```
import com.rabbitmq.client.*;

import java.io.IOException;

public class ReceiveLogsDirect {

  private static final String EXCHANGE_NAME = "direct_logs";

  public static void main(String[] argv) throws Exception {
    ConnectionFactory factory = new ConnectionFactory();
    factory.setHost("localhost");
    Connection connection = factory.newConnection();
    Channel channel = connection.createChannel();

    channel.exchangeDeclare(EXCHANGE_NAME, "direct");
    String queueName = channel.queueDeclare().getQueue();

    if (argv.length < 1){
      System.err.println("Usage: ReceiveLogsDirect [info] [warning] [error]");
      System.exit(1);
    }

    for(String severity : argv){
      channel.queueBind(queueName, EXCHANGE_NAME, severity);
    }
    System.out.println(" [*] Waiting for messages. To exit press CTRL+C");

    Consumer consumer = new DefaultConsumer(channel) {
      @Override
      public void handleDelivery(String consumerTag, Envelope envelope,
                                 AMQP.BasicProperties properties, byte[] body) throws
```

```
IOException {
        String message = new String(body, "UTF-8");
        System.out.println(" [x] Received '" + envelope.getRoutingKey() + "':'" +
message + "'");
      }
    };
    channel.basicConsume(queueName, true, consumer);
  }
}
```

Compile as usual (see tutorial one for compilation and classpath advice). For convenience we'll use an environment variable $CP (that's %CP% on Windows) for the classpath when running examples.

```
javac -cp $CP ReceiveLogsDirect.java EmitLogDirect.java
```

If you want to save only 'warning' and 'error' (and not 'info') log messages to a file, just open a console and type:

```
java -cp $CP ReceiveLogsDirect warning error > logs_from_rabbit.log
```

If you'd like to see all the log messages on your screen, open a new terminal and do:

```
java -cp $CP ReceiveLogsDirect info warning error
# => [*] Waiting for logs. To exit press CTRL+C
```

And, for example, to emit an `error` log message just type:

```
java -cp $CP EmitLogDirect error "Run. Run. Or it will explode."
# => [x] Sent 'error':'Run. Run. Or it will explode.'
```

(Full source code for (EmitLogDirect.java source) and (ReceiveLogsDirect.java source))

Move on to tutorial 5 to find out how to listen for messages based on a pattern.