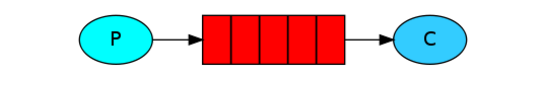
# Java操作队列

## 简单队列

功能：一个生产者P发送消息到队列Q,一个消费者C接收



P表示为生产者 、C表示为消费者 红色表示队列。

### Maven

|  |
| --- |
| <dependencies>  <dependency>  <groupId>com.rabbitmq</groupId>  <artifactId>amqp-client</artifactId>  <version>3.6.5</version>  </dependency>  </dependencies> |

### 封装Connection

|  |
| --- |
| **public** **class** MQConnectionUtils {  **public** **static** Connection newConnection() **throws** IOException, TimeoutException {  // 1.定义连接工厂  ConnectionFactory factory = **new** ConnectionFactory();  // 2.设置服务器地址  factory.setHost("127.0.0.1");  // 3.设置协议端口号  factory.setPort(5672);  // 4.设置vhost  factory.setVirtualHost("/test001\_host");  // 5.设置用户名称  factory.setUsername("test001");  // 6.设置用户密码  factory.setPassword("123456");  // 7.创建新的连接  Connection newConnection = factory.newConnection();  **return** newConnection;  }  } |

### 生产者

|  |
| --- |
| **public** **class** Producer {  **private** **static** **final** String ***QUEUE\_NAME*** = "test\_queue";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  // 1.获取连接  Connection newConnection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = newConnection.createChannel();  // 3.创建队列声明  channel.queueDeclare(***QUEUE\_NAME***, **false**, **false**, **false**, **null**);  String msg = "test\_yushengjun110";  System.***out***.println("生产者发送消息:" + msg);  // 4.发送消息  channel.basicPublish("", ***QUEUE\_NAME***, **null**, msg.getBytes());  channel.close();  newConnection.close();  }  } |

### 消费者

|  |
| --- |
| **public** **class** Customer {  **private** **static** **final** String ***QUEUE\_NAME*** = "test\_queue";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  System.***out***.println("002");  // 1.获取连接  Connection newConnection = MQConnectionUtils.*newConnection*();  // 2.获取通道  Channel channel = newConnection.createChannel();  channel.queueDeclare(***QUEUE\_NAME***, **false**, **false**, **false**, **null**);  DefaultConsumer defaultConsumer = **new** DefaultConsumer(channel) {  @Override  **public** **void** handleDelivery(String consumerTag, Envelope envelope, BasicProperties properties, **byte**[] body)  **throws** IOException {  String msgString = **new** String(body, "UTF-8");  System.***out***.println("消费者获取消息:" + msgString);  }  };  // 3.监听队列  channel.basicConsume(***QUEUE\_NAME***, **true**, defaultConsumer);  }  } |

## 工作队列

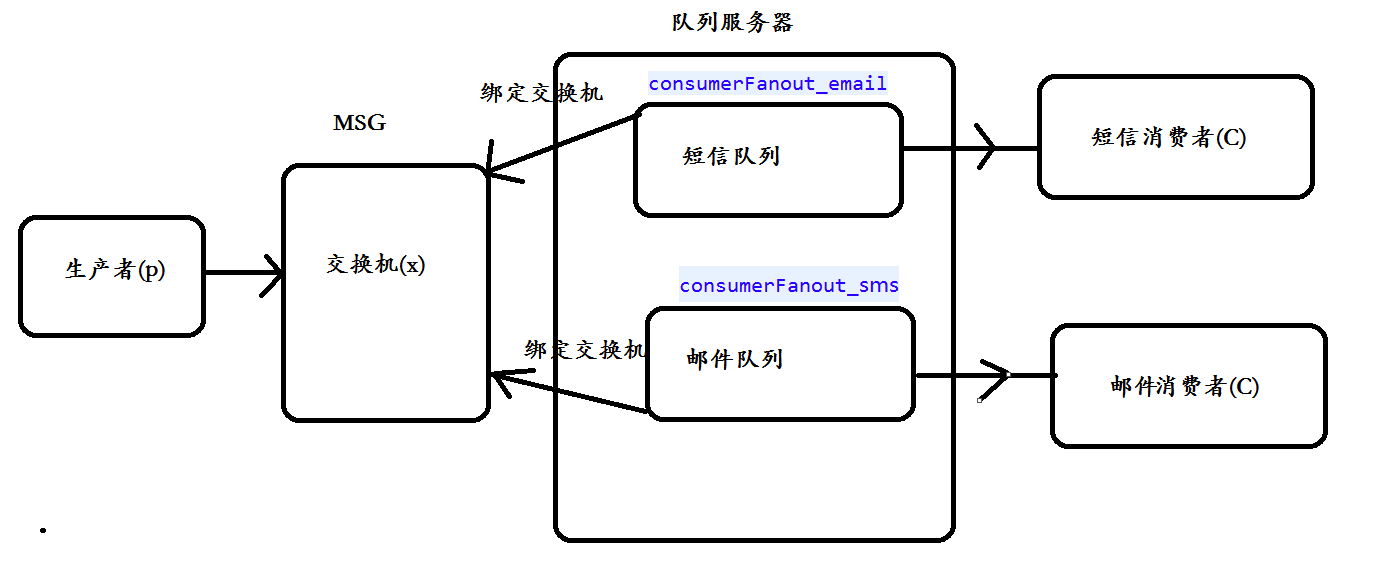
### 生产者

|  |
| --- |
| **public** **class** Producer {  **private** **static** **final** String ***QUEUE\_NAME*** = "test\_queue";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  // 1.获取连接  Connection newConnection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = newConnection.createChannel();  // 3.创建队列声明  channel.queueDeclare(***QUEUE\_NAME***, **false**, **false**, **false**, **null**);  channel.basicQos(1);// 保证一次只分发一次 限制发送给同一个消费者 不得超过一条消息  **for** (**int** i = 1; i <= 50; i++) {  String msg = "test\_yushengjun" + i;  System.***out***.println("生产者发送消息:" + msg);  // 4.发送消息  channel.basicPublish("", ***QUEUE\_NAME***, **null**, msg.getBytes());  }  channel.close();  newConnection.close();  }  } |

### 消费者

|  |
| --- |
| **public** **class** Customer1 {  **private** **static** **final** String ***QUEUE\_NAME*** = "test\_queue";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  System.***out***.println("001");  // 1.获取连接  Connection newConnection = MQConnectionUtils.*newConnection*();  // 2.获取通道  **final** Channel channel = newConnection.createChannel();  channel.queueDeclare(***QUEUE\_NAME***, **false**, **false**, **false**, **null**);  channel.basicQos(1);// 保证一次只分发一次 限制发送给同一个消费者 不得超过一条消息  DefaultConsumer defaultConsumer = **new** DefaultConsumer(channel) {  @Override  **public** **void** handleDelivery(String consumerTag, Envelope envelope, BasicProperties properties, **byte**[] body)  **throws** IOException {  String msgString = **new** String(body, "UTF-8");  System.***out***.println("消费者获取消息:" + msgString);  **try** {  Thread.*sleep*(1000);  } **catch** (Exception e) {  } **finally** {  // 手动回执消息  channel.basicAck(envelope.getDeliveryTag(), **false**);  }  }  };  // 3.监听队列  channel.basicConsume(***QUEUE\_NAME***, **false**, defaultConsumer);  }  } |

## 发布订阅



### 生产者

|  |
| --- |
| **public** **class** ProducerFanout {  **private** **static** **final** String ***EXCHANGE\_NAME*** = "fanout\_exchange";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  // 1.创建新的连接  Connection connection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = connection.createChannel();  // 3.绑定的交换机 参数1交互机名称 参数2 exchange类型  channel.exchangeDeclare(***EXCHANGE\_NAME***, "fanout");  String msg = "fanout\_exchange\_msg";  // 4.发送消息  channel.basicPublish(***EXCHANGE\_NAME***, "", **null**, msg.getBytes());  // System.out.println("生产者发送msg：" + msg);  // // 5.关闭通道、连接  // channel.close();  // connection.close();  // 注意：如果消费没有绑定交换机和队列，则消息会丢失  }  } |

### 邮件消费者

|  |
| --- |
| **public** **class** ConsumerEmailFanout {  **private** **static** **final** String ***QUEUE\_NAME*** = "consumerFanout\_email";  **private** **static** **final** String ***EXCHANGE\_NAME*** = "fanout\_exchange";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  System.***out***.println("邮件消费者启动");  // 1.创建新的连接  Connection connection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = connection.createChannel();  // 3.消费者关联队列  channel.queueDeclare(***QUEUE\_NAME***, **false**, **false**, **false**, **null**);  // 4.消费者绑定交换机 参数1 队列 参数2交换机 参数3 routingKey  channel.queueBind(***QUEUE\_NAME***, ***EXCHANGE\_NAME***, "");  DefaultConsumer consumer = **new** DefaultConsumer(channel) {  @Override  **public** **void** handleDelivery(String consumerTag, Envelope envelope, BasicProperties properties, **byte**[] body)  **throws** IOException {  String msg = **new** String(body, "UTF-8");  System.***out***.println("消费者获取生产者消息:" + msg);  }  };  // 5.消费者监听队列消息  channel.basicConsume(***QUEUE\_NAME***, **true**, consumer);  }  } |

### 短信消费者

|  |
| --- |
| **public** **class** ConsumerSMSFanout {  **private** **static** **final** String ***QUEUE\_NAME*** = "ConsumerFanout\_sms";  **private** **static** **final** String ***EXCHANGE\_NAME*** = "fanout\_exchange";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  System.***out***.println("短信消费者启动");  // 1.创建新的连接  Connection connection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = connection.createChannel();  // 3.消费者关联队列  channel.queueDeclare(***QUEUE\_NAME***, **false**, **false**, **false**, **null**);  // 4.消费者绑定交换机 参数1 队列 参数2交换机 参数3 routingKey  channel.queueBind(***QUEUE\_NAME***, ***EXCHANGE\_NAME***, "");  DefaultConsumer consumer = **new** DefaultConsumer(channel) {  @Override  **public** **void** handleDelivery(String consumerTag, Envelope envelope, BasicProperties properties, **byte**[] body)  **throws** IOException {  String msg = **new** String(body, "UTF-8");  System.***out***.println("消费者获取生产者消息:" + msg);  }  };  // 5.消费者监听队列消息  channel.basicConsume(***QUEUE\_NAME***, **true**, consumer);  }  } |

## 路由模式

### 生产者

|  |
| --- |
| **public** **class** ProducerDirect {  **private** **static** **final** String ***EXCHANGE\_NAME*** = "direct\_exchange";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  // 1.创建新的连接  Connection connection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = connection.createChannel();  // 3.绑定的交换机 参数1交互机名称 参数2 exchange类型  channel.exchangeDeclare(***EXCHANGE\_NAME***, "direct");  String routingKey = "info";  String msg = "direct\_exchange\_msg" + routingKey;  // 4.发送消息  channel.basicPublish(***EXCHANGE\_NAME***, routingKey, **null**, msg.getBytes());  System.***out***.println("生产者发送msg：" + msg);  // // 5.关闭通道、连接  // channel.close();  // connection.close();  // 注意：如果消费没有绑定交换机和队列，则消息会丢失  }  } |

### 邮件消费者

|  |
| --- |
| **public** **class** ConsumerEmailDirect {  **private** **static** **final** String ***QUEUE\_NAME*** = "consumer\_direct\_email";  **private** **static** **final** String ***EXCHANGE\_NAME*** = "direct\_exchange";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  System.***out***.println("邮件消费者启动");  // 1.创建新的连接  Connection connection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = connection.createChannel();  // 3.消费者关联队列  channel.queueDeclare(***QUEUE\_NAME***, **false**, **false**, **false**, **null**);  // 4.消费者绑定交换机 参数1 队列 参数2交换机 参数3 routingKey  channel.queueBind(***QUEUE\_NAME***, ***EXCHANGE\_NAME***, "error");  channel.queueBind(***QUEUE\_NAME***, ***EXCHANGE\_NAME***, "info");  DefaultConsumer consumer = **new** DefaultConsumer(channel) {  @Override  **public** **void** handleDelivery(String consumerTag, Envelope envelope, BasicProperties properties, **byte**[] body)  **throws** IOException {  String msg = **new** String(body, "UTF-8");  System.***out***.println("消费者获取生产者消息:" + msg);  }  };  // 5.消费者监听队列消息  channel.basicConsume(***QUEUE\_NAME***, **true**, consumer);  }  } |

### 短信消费者

|  |
| --- |
| **public** **class** ConsumerSMSDirect {  **private** **static** **final** String ***QUEUE\_NAME*** = "consumer\_direct\_sms";  **private** **static** **final** String ***EXCHANGE\_NAME*** = "direct\_exchange";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  System.***out***.println("短信消费者启动");  // 1.创建新的连接  Connection connection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = connection.createChannel();  // 3.消费者关联队列  channel.queueDeclare(***QUEUE\_NAME***, **false**, **false**, **false**, **null**);  // 4.消费者绑定交换机 参数1 队列 参数2交换机 参数3 routingKey  channel.queueBind(***QUEUE\_NAME***, ***EXCHANGE\_NAME***, "error");  DefaultConsumer consumer = **new** DefaultConsumer(channel) {  @Override  **public** **void** handleDelivery(String consumerTag, Envelope envelope, BasicProperties properties, **byte**[] body)  **throws** IOException {  String msg = **new** String(body, "UTF-8");  System.***out***.println("消费者获取生产者消息:" + msg);  }  };  // 5.消费者监听队列消息  channel.basicConsume(***QUEUE\_NAME***, **true**, consumer);  }  } |

## 主题模式

### 生产者

|  |
| --- |
| **public** **class** ProducerDirect {  **private** **static** **final** String ***EXCHANGE\_NAME*** = "topic\_exchange";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  // 1.创建新的连接  Connection connection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = connection.createChannel();  // 3.绑定的交换机 参数1交互机名称 参数2 exchange类型  channel.exchangeDeclare(***EXCHANGE\_NAME***, "topic");  String routingKey = "log.info.error";  String msg = "topic\_exchange\_msg" + routingKey;  // 4.发送消息  channel.basicPublish(***EXCHANGE\_NAME***, routingKey, **null**, msg.getBytes());  System.***out***.println("生产者发送msg：" + msg);  // // 5.关闭通道、连接  channel.close();  connection.close();  // 注意：如果消费没有绑定交换机和队列，则消息会丢失  }  } |

### 邮件消费者

|  |
| --- |
| **public** **class** ConsumerEmailDirect {  **private** **static** **final** String ***QUEUE\_NAME*** = "consumer\_topic\_email";  **private** **static** **final** String ***EXCHANGE\_NAME*** = "topic\_exchange";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  System.***out***.println("邮件消费者启动");  // 1.创建新的连接  Connection connection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = connection.createChannel();  // 3.消费者关联队列  channel.queueDeclare(***QUEUE\_NAME***, **false**, **false**, **false**, **null**);  channel.queueBind(***QUEUE\_NAME***, ***EXCHANGE\_NAME***, "log.#");  // 4.消费者绑定交换机 参数1 队列 参数2交换机 参数3 routingKey  DefaultConsumer consumer = **new** DefaultConsumer(channel) {  @Override  **public** **void** handleDelivery(String consumerTag, Envelope envelope, BasicProperties properties, **byte**[] body)  **throws** IOException {  String msg = **new** String(body, "UTF-8");  System.***out***.println("消费者获取生产者消息:" + msg);  }  };  // 5.消费者监听队列消息  channel.basicConsume(***QUEUE\_NAME***, **true**, consumer);  }  } |

### 短信服务器

|  |
| --- |
| **public** **class** ConsumerSMSDirect {  **private** **static** **final** String ***QUEUE\_NAME*** = "consumer\_topic\_sms";  **private** **static** **final** String ***EXCHANGE\_NAME*** = "topic\_exchange";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  System.***out***.println("短信消费者启动");  // 1.创建新的连接  Connection connection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = connection.createChannel();  // 3.消费者关联队列  channel.queueDeclare(***QUEUE\_NAME***, **false**, **false**, **false**, **null**);  // 4.消费者绑定交换机 参数1 队列 参数2交换机 参数3 routingKey  channel.queueBind(***QUEUE\_NAME***, ***EXCHANGE\_NAME***, "log.\*");  DefaultConsumer consumer = **new** DefaultConsumer(channel) {  @Override  **public** **void** handleDelivery(String consumerTag, Envelope envelope, BasicProperties properties, **byte**[] body)  **throws** IOException {  String msg = **new** String(body, "UTF-8");  System.***out***.println("消费者获取生产者消息:" + msg);  }  };  // 5.消费者监听队列消息  channel.basicConsume(***QUEUE\_NAME***, **true**, consumer);  }  } |

## RabbitMQ消息确认机制

生产者发送消息出去之后，不知道到底有没有发送到RabbitMQ服务器， 默认是不知道的。而且有的时候我们在发送消息之后，后面的逻辑出问题了，我们不想要发送之前的消息了，需要撤回该怎么做。 解决方案: 1.AMQP 事务机制 2.Confirm 模式事务模式: txSelect 将当前channel设置为transaction模式 txCommit 提交当前事务 txRollback 事务回滚

### AMQP 事务机制

#### 生产者

|  |
| --- |
| **public** **class** Producer {  **private** **static** **final** String ***QUEUE\_NAME*** = "test\_queue";  **public** **static** **void** main(String[] args) **throws** IOException, TimeoutException {  // 1.获取连接  Connection newConnection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = newConnection.createChannel();  // 3.创建队列声明  channel.queueDeclare(***QUEUE\_NAME***, **false**, **false**, **false**, **null**);  // 将当前管道设置为 txSelect 将当前channel设置为transaction模式 开启事务  channel.txSelect();  String msg = "test\_yushengjun110";  **try** {  // 4.发送消息  channel.basicPublish("", ***QUEUE\_NAME***, **null**, msg.getBytes());  // int i = 1 / 0;  channel.txCommit();// 提交事务  System.***out***.println("生产者发送消息:" + msg);  } **catch** (Exception e) {  System.***out***.println("消息进行回滚操作");  channel.txRollback();// 回滚事务  } **finally** {  channel.close();  newConnection.close();  }  }  } |

#### 消费者

|  |
| --- |
| // 1.获取连接  Connection newConnection = MQConnectionUtils.*newConnection*();  // 2.创建通道  Channel channel = newConnection.createChannel();  // 3.创建队列声明  channel.queueDeclare(***QUEUE\_NAME***, **false**, **false**, **false**, **null**);  // confirm机制  channel.confirmSelect();  String msg = "test\_yushengjun110";  // 4.发送消息  channel.basicPublish("", ***QUEUE\_NAME***, **null**, msg.getBytes());  System.***out***.println("生产者发送消息:" + msg);  **if** (!channel.waitForConfirms()) {  System.***out***.println("消息发送失败!");  } **else** {  System.***out***.println("消息发送成功!");  }  channel.close();  newConnection.close(); |

### Confirm 模式

## SpringBoot整合RabbitMQ

### 生产者

#### Maven环境依赖

|  |
| --- |
| <parent>  <groupId>org.springframework.boot</groupId>  <artifactId>spring-boot-starter-parent</artifactId>  <version>2.0.0.RELEASE</version>  </parent>  <dependencies>  <!-- springboot-web组件 -->  <dependency>  <groupId>org.springframework.boot</groupId>  <artifactId>spring-boot-starter-web</artifactId>  </dependency>  <!-- 添加springboot对amqp的支持 -->  <dependency>  <groupId>org.springframework.boot</groupId>  <artifactId>spring-boot-starter-amqp</artifactId>  </dependency>  <dependency>  <groupId>org.apache.commons</groupId>  <artifactId>commons-lang3</artifactId>  </dependency>  <!--fastjson -->  <dependency>  <groupId>com.alibaba</groupId>  <artifactId>fastjson</artifactId>  <version>1.2.49</version>  </dependency>  </dependencies> |

#### application.yml

|  |
| --- |
| spring:  rabbitmq:  ####连接地址  host: 127.0.0.1  ####端口号  port: 5672  ####账号  username: guest  ####密码  password: guest  ### 地址  virtual-host: / |

#### 交换机绑定队列

|  |
| --- |
| @Component  **public** **class** FanoutConfig {  // 邮件队列  **private** String FANOUT\_EMAIL\_QUEUE = "fanout\_eamil\_queue";  // 短信队列  **private** String FANOUT\_SMS\_QUEUE = "fanout\_sms\_queue";  // 短信队列  **private** String EXCHANGE\_NAME = "fanoutExchange";  // 1.定义队列邮件  @Bean  **public** Queue fanOutEamilQueue() {  **return** **new** Queue(FANOUT\_EMAIL\_QUEUE);  }  @Bean  **public** Queue fanOutSmsQueue() {  **return** **new** Queue(FANOUT\_SMS\_QUEUE);  }  // 2.定义交换机  @Bean  FanoutExchange fanoutExchange() {  **return** **new** FanoutExchange(EXCHANGE\_NAME);  }  // 3.队列与交换机绑定邮件队列  @Bean  Binding bindingExchangeEamil(Queue fanOutEamilQueue, FanoutExchange fanoutExchange) {  **return** BindingBuilder.*bind*(fanOutEamilQueue).to(fanoutExchange);  }  // 4.队列与交换机绑定短信队列  @Bean  Binding bindingExchangeSms(Queue fanOutSmsQueue, FanoutExchange fanoutExchange) {  **return** BindingBuilder.*bind*(fanOutSmsQueue).to(fanoutExchange);  }  } |

#### 生产者投递消息

|  |
| --- |
| @Component  **public** **class** FanoutProducer {  @Autowired  **private** AmqpTemplate amqpTemplate;  **public** **void** send(String queueName) {  String msg = "my\_fanout\_msg:" + **new** Date();  System.***out***.println(msg + ":" + msg);  amqpTemplate.convertAndSend(queueName, msg);  }  } |

#### 控制层调用代码

|  |
| --- |
| @RestController  **public** **class** ProducerController {  @Autowired  **private** FanoutProducer fanoutProducer;  @RequestMapping("/sendFanout")  **public** String sendFanout(String queueName) {  fanoutProducer.send(queueName);  **return** "success";  }  } |

### 消费者

#### Maven环境依赖

|  |
| --- |
| <parent>  <groupId>org.springframework.boot</groupId>  <artifactId>spring-boot-starter-parent</artifactId>  <version>2.0.0.RELEASE</version>  </parent>  <dependencies>  <!-- springboot-web组件 -->  <dependency>  <groupId>org.springframework.boot</groupId>  <artifactId>spring-boot-starter-web</artifactId>  </dependency>  <!-- 添加springboot对amqp的支持 -->  <dependency>  <groupId>org.springframework.boot</groupId>  <artifactId>spring-boot-starter-amqp</artifactId>  </dependency>  <dependency>  <groupId>org.apache.commons</groupId>  <artifactId>commons-lang3</artifactId>  </dependency>  <!--fastjson -->  <dependency>  <groupId>com.alibaba</groupId>  <artifactId>fastjson</artifactId>  <version>1.2.49</version>  </dependency>  </dependencies> |

#### 邮件消费者

|  |
| --- |
| @Component  @RabbitListener(queues = "fanout\_eamil\_queue")  **public** **class** FanoutEamilConsumer {  @RabbitHandler  **public** **void** process(String msg) **throws** Exception {  System.***out***.println("邮件消费者获取生产者消息msg:" + msg);  }  } |

#### 短信消费者

|  |
| --- |
| @Component  @RabbitListener(queues = "fanout\_sms\_queue")  **public** **class** FanoutSmsConsumer {  @RabbitHandler  **public** **void** process(String msg) {  System.***out***.println("短信消费者获取生产者消息msg:" + msg);  }  } |

#### application.yml

|  |
| --- |
| spring:  rabbitmq:  ####连接地址  host: 127.0.0.1  ####端口号  port: 5672  ####账号  username: guest  ####密码  password: guest  ### 地址  virtual-host: / |