

# LEARN RABBITMQ WITH C#

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**VOLUME 1**  
**1ST EDITION**

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## RabbitMQ Introduction

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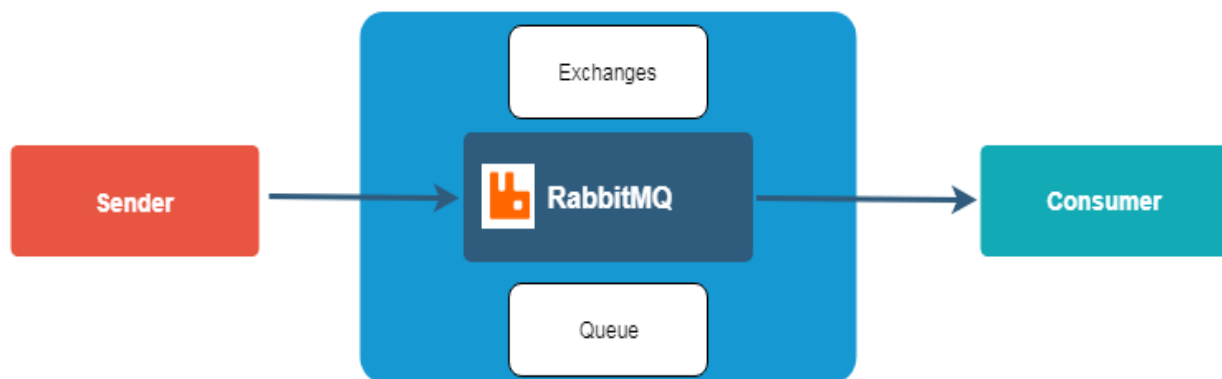
### What is RabbitMQ?

RabbitMQ an AMQP message broker is the most popular open source and cross-platform message broker.

It is built on Erlang which is also used by WhatsApp for messaging.

RabbitMQ is also a way to exchange data between applications such as a message sent from .Net application can be read by a Node.js application or Java application.

RabbitMQ is lightweight and easy to deploy on premises and in the cloud. It supports multiple messaging protocols. RabbitMQ can be deployed in distributed and federated configurations to meet high-scale, high-availability requirements.



### Why and when should we Use RabbitMQ?

We should use RabbitMQ because it is open source and easy to use with many languages such as .Net, Java, Python, Ruby, Node Js.

We can use RabbitMQ to remove some heavy work from our web application such as sending Reports in Emails in Excel or Pdf format's or sending email, SMS or another task such as a trigger to some other applications to start processing.

Nowadays most people do all this task into single application sending emails or SMS, reports which bit heavy task which is also handled by IIS if you separate this task then IIS will get more space (memory) to serve more request.

After understanding a bit about RabbitMQ next we are going to Install Erlang and RabbitMQ on Windows.

### What is AMQP?

The Advanced Message Queuing Protocol (AMQP) is an open standard application layer protocol for message-oriented the defining features of AMQP are message orientation, queuing, routing (including point-to-point and publish-and-subscribe), reliability and security.

It was developed by JPMorgan and iMatix Corporation.

### **Key Features**

AMQP was designed with the following main characteristics as goals:

- Security
- Reliability
- Interoperability
- Standard
- Open

### **Various Client Libraries**

RabbitMQ support various number of operating systems and various language and it's have various clients for different languages.

1. .Net
2. Java
3. Spring Framework
4. Ruby
5. Python
6. PHP
7. Objective-C and Swift
8. JavaScript
9. GO
10. Perl

## RabbitMQ Setup

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In this part, we are going to learn how to Setup RabbitMQ in step by step way.

1. What is Erlang
2. Downloading Erlang
3. Installing Erlang
4. Downloading RabbitMQ
5. Installing RabbitMQ
6. Starting RabbitMQ Server
7. Enabling web management plugin
8. Web Management plugin
9. Conclusion

### What is Erlang

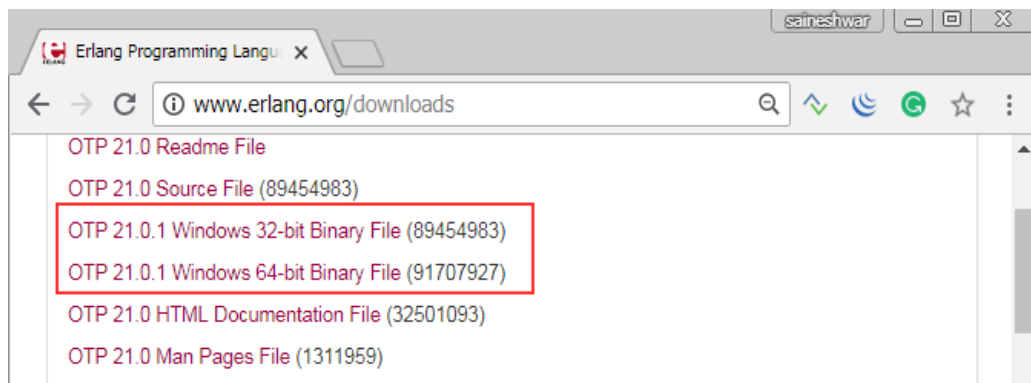
Erlang is a general-purpose programming language and runtime environment.

Erlang has built-in support for concurrency, distribution and fault tolerance. Erlang is used in several large telecommunication systems from Ericsson.

Referred from: - <http://erlang.org/faq/introduction.html>

### Link to download Erlang

<http://www.erlang.org/downloads>

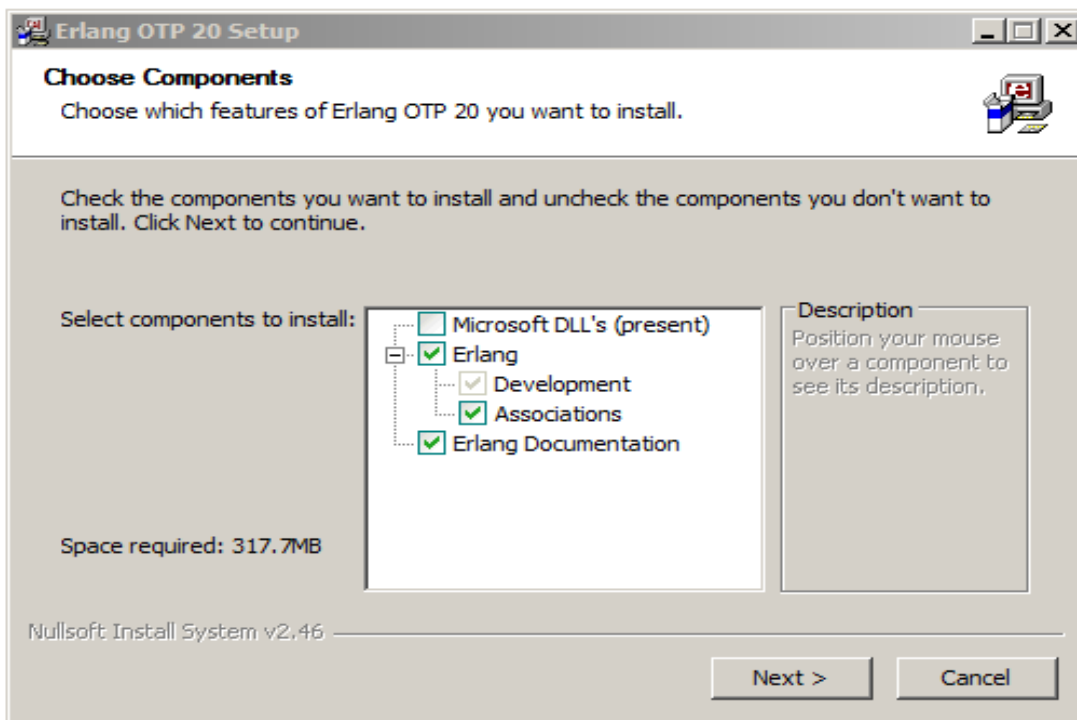


After downloading Erlang now, we are going to Installing Erlang.

### Installing Erlang

---

In this part just click on Erlang setup which you have downloaded to install.



After downloading Erlang setup just install it, after installing next we are going to Download RabbitMQ.

## Downloading RabbitMQ

First, we are going to download RabbitMQ setup for windows from link

<https://www.rabbitmq.com/download.html>

# Downloading and Installing RabbitMQ

The latest release of RabbitMQ is **3.7.7**. For release notes, see [changelog](#).

## RabbitMQ Server

### Installation guides

Linux, BSD, UNIX: [Debian, Ubuntu](#) | [RHEL, CentOS, Fedora](#) | [Generic Unix](#) | [Solaris](#)

Windows: [With installer \(recommended\)](#) | [Manual](#)

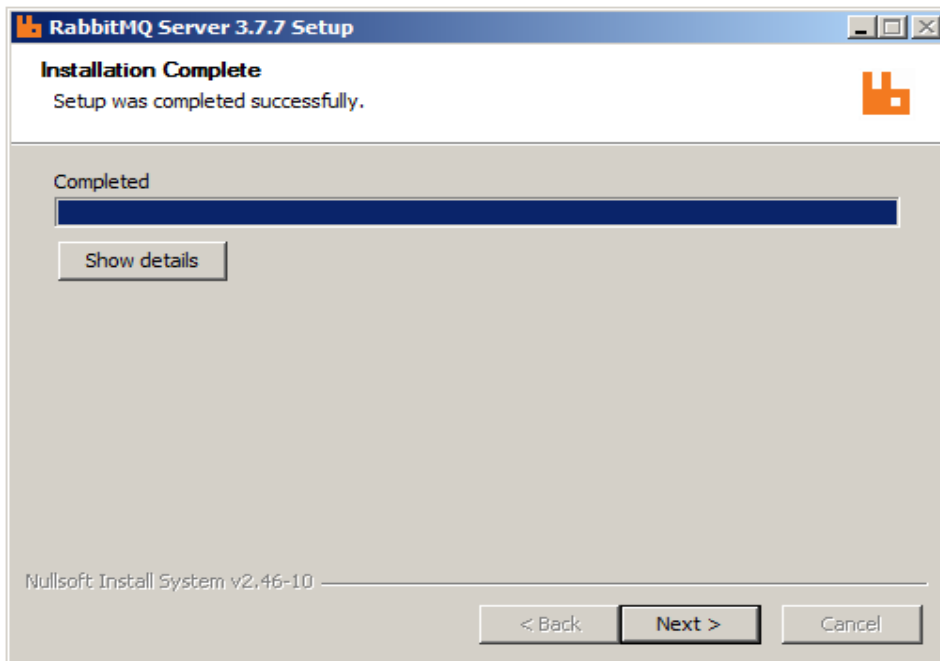
MacOS: [Homebrew](#) | [Standalone](#) | [Generic Unix](#)

[Erlang/OTP for RabbitMQ](#)

After downloading RabbitMQ now we are going to Installing RabbitMQ

## Installing RabbitMQ

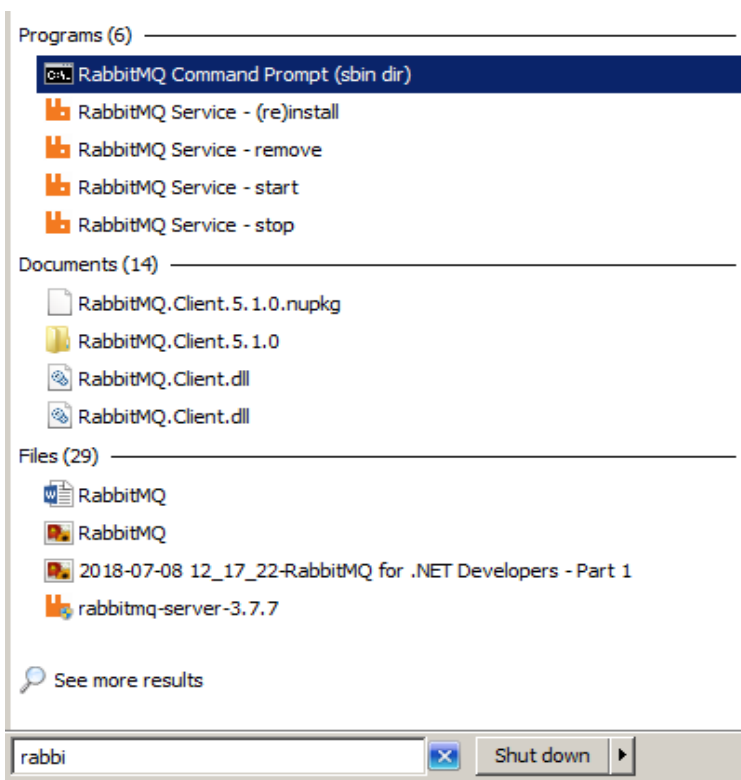
In this part just click on RabbitMQ setup which you have downloaded to install.



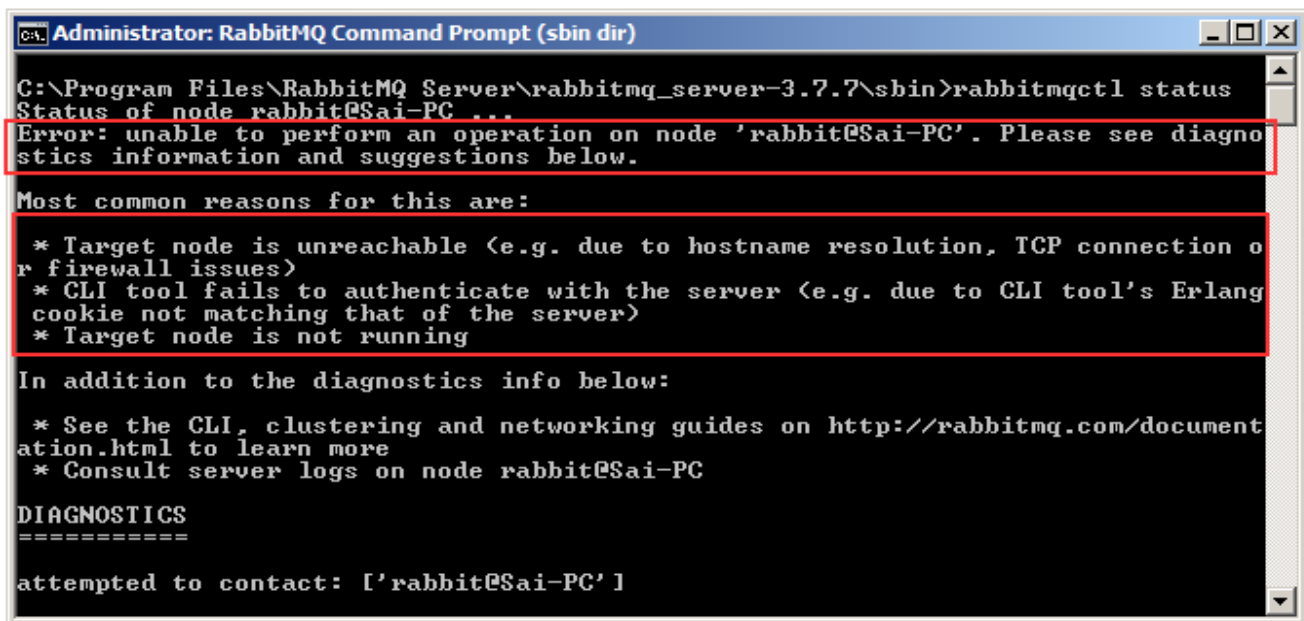
After installing Rabbit MQ Next, search RabbitMQ Command Prompt and open it with admin privilege.

### Starting RabbitMQ Server

In this part we are going to open RabbitMQ Command Prompt with admin privileges for checking status of RabbitMQ server.



After opening command prompt enter command **"rabbitmqctl status"** for checking status of RabbitMQ server. If it shows you an error as below snapshot then you need to follow some step given below.



```
Administrator: RabbitMQ Command Prompt (sbin dir)

C:\Program Files\RabbitMQ Server\rabbitmq_server-3.7.7\sbin>rabbitmqctl status
Status of node rabbit@Sai-PC ...
Error: unable to perform an operation on node 'rabbit@Sai-PC'. Please see diagnostics information and suggestions below.

Most common reasons for this are:

* Target node is unreachable (e.g. due to hostname resolution, TCP connection or firewall issues)
* CLI tool fails to authenticate with the server (e.g. due to CLI tool's Erlang cookie not matching that of the server)
* Target node is not running

In addition to the diagnostics info below:

* See the CLI, clustering and networking guides on http://rabbitmq.com/documentation.html to learn more
* Consult server logs on node rabbit@Sai-PC

DIAGNOSTICS
=====
attempted to contact: ['rabbit@Sai-PC']
```

### Steps if you get Error (Authentication failed (rejected by the remote node), check the Erlang cookie)

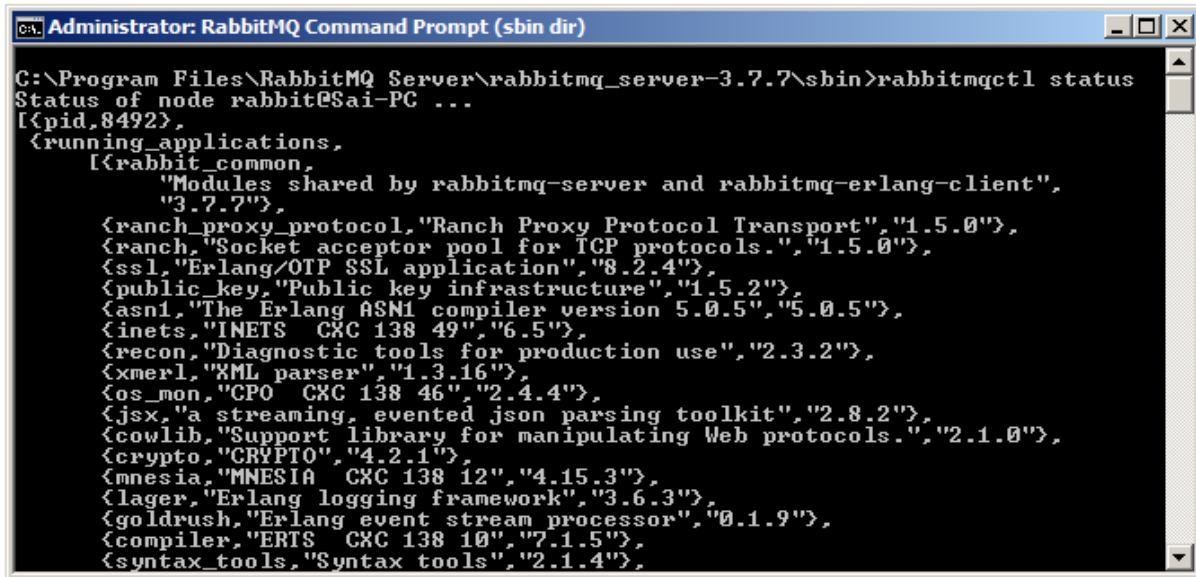
1. In File Explorer navigate to your user directory. (Paste %userprofile% in the address bar.)
2. If you already have the file .erlang.cookie in there, delete it. If not, just go to the next step.
3. In a second File Explorer, navigate to C:\Windows\System32\config\systemprofile.
4. Find the file .erlang.cookie and copy it to your user directory.
5. Now your rabbitmqctl should be able to authenticate.

### Links for Solution

- <https://stackoverflow.com/questions/47893899/authentication-failed-rejected-by-the-remote-node-please-check-the-erlang-coo?rq=1>
- <https://stackoverflow.com/questions/28258392/rabbitmq-has-nodedown-error>

After you completed steps again if you running the same command **"rabbitmqctl status"** then below screen should appear.





```

Administrator: RabbitMQ Command Prompt (sbin dir)

C:\Program Files\RabbitMQ Server\rabbitmq_server-3.7.7\sbin>rabbitmqctl status
Status of node rabbit@Sai-PC ...
[{pid,8492},
 {running_applications,
  [{rabbit_common,
    "Modules shared by rabbitmq-server and rabbitmq-erlang-client",
    "3.7.7"},
   {ranch_proxy_protocol,"Ranch Proxy Protocol Transport","1.5.0"},
   {ranch,"Socket acceptor pool for TCP protocols","1.5.0"},
   {ssl,"Erlang/OTP SSL application","8.2.4"},
   {public_key,"Public key infrastructure","1.5.2"},
   {asni,"The Erlang ASN1 compiler version 5.0.5","5.0.5"},
   {inets,"INET6 CXC 138 49","6.5"},
   {recon,"Diagnostic tools for production use","2.3.2"},
   {xmerl,"XML parser","1.3.16"},
   {os_mon,"CPO CXC 138 46","2.4.4"},
   {jsx,"a streaming, evented json parsing toolkit","2.8.2"},
   {cowlib,"Support library for manipulating Web protocols","2.1.0"},
   {crypto,"CRYPTO","4.2.1"},
   {mnesia,"MNESIA CXC 138 12","4.15.3"},
   {lager,"Erlang logging framework","3.6.3"},
   {goldrush,"Erlang event stream processor","0.1.9"},
   {compiler,"ERTS CXC 138 10","7.1.5"},
   {syntax_tools,"Syntax tools","2.1.4"}]}]}

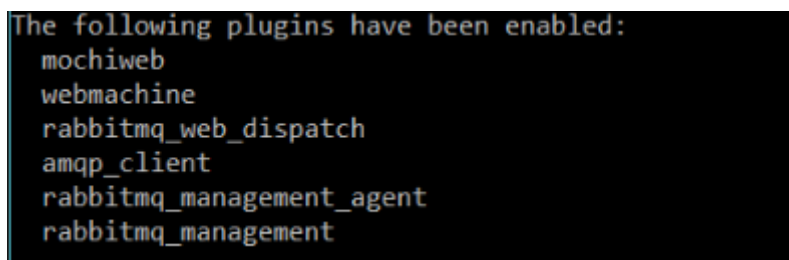
```

Now we have started Server next we are going to enable web management plugin of RabbitMQ.

### Enabling web management plugin

For enabling web management plugin, you need to start RabbitMQ command prompt with administrator privilege and enter the command **"rabbitmq-plugins enable rabbitmq\_management"**.

After executing this command, you will see below plugins will be enabled.

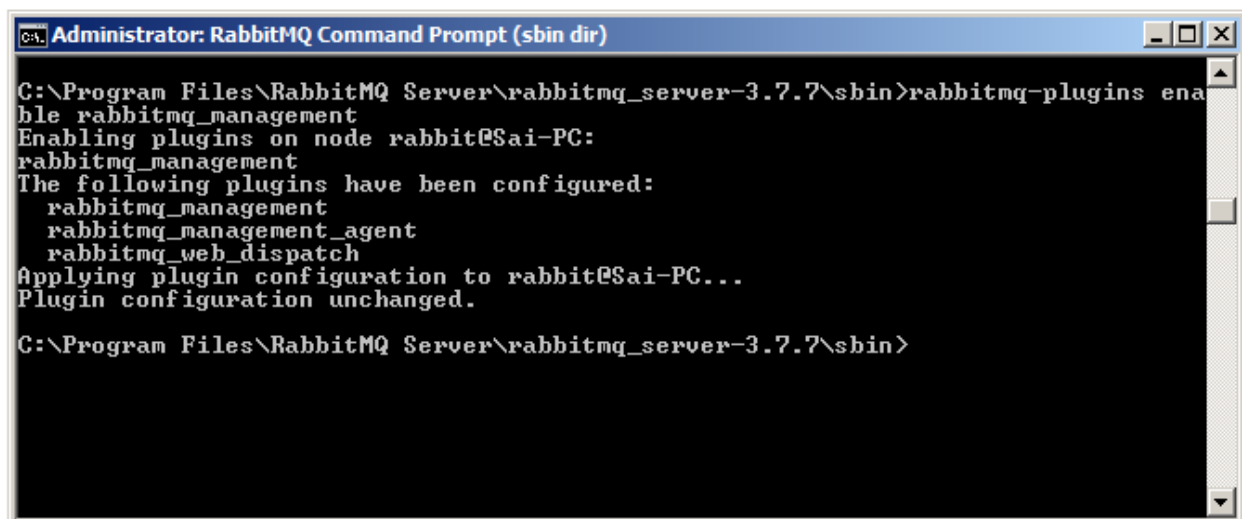


```

The following plugins have been enabled:
mochiweb
webmachine
rabbitmq_web_dispatch
amqp_client
rabbitmq_management_agent
rabbitmq_management

```

This screen is same but I have already enabled plugin that's why it is should different messages.



```

Administrator: RabbitMQ Command Prompt (sbin dir)

C:\Program Files\RabbitMQ Server\rabbitmq_server-3.7.7\sbin>rabbitmq-plugins enable rabbitmq_management
Enabling plugins on node rabbit@Sai-PC:
rabbitmq_management
The following plugins have been configured:
  rabbitmq_management
  rabbitmq_management_agent
  rabbitmq_web_dispatch
Applying plugin configuration to rabbit@Sai-PC...
Plugin configuration unchanged.

C:\Program Files\RabbitMQ Server\rabbitmq_server-3.7.7\sbin>

```

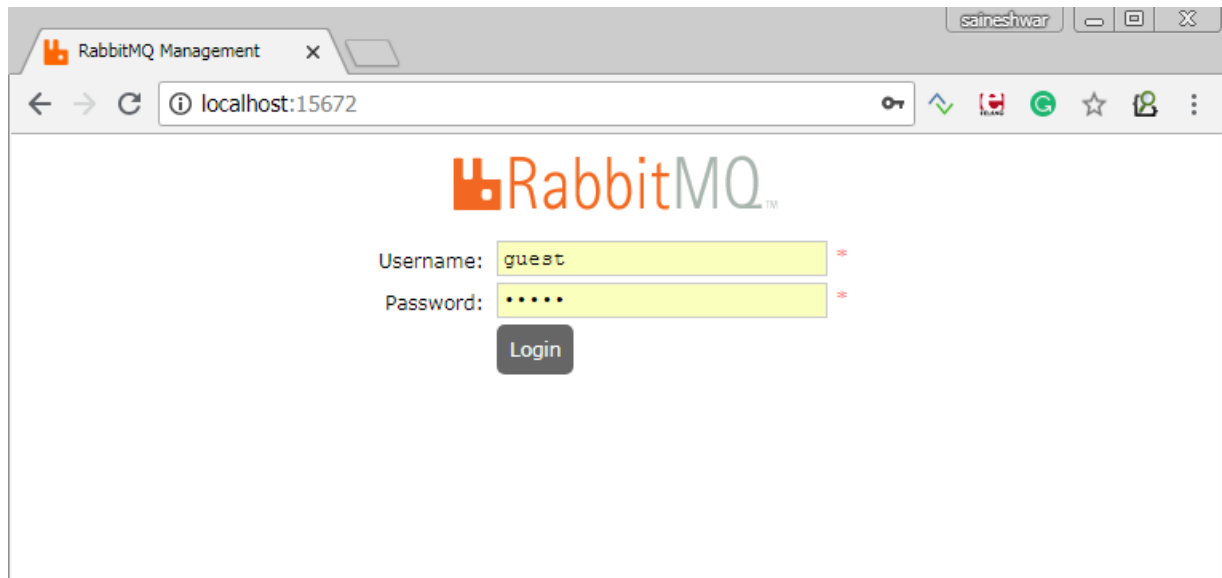
Now you can open web management plugin in the browser.

## Web Management plugin

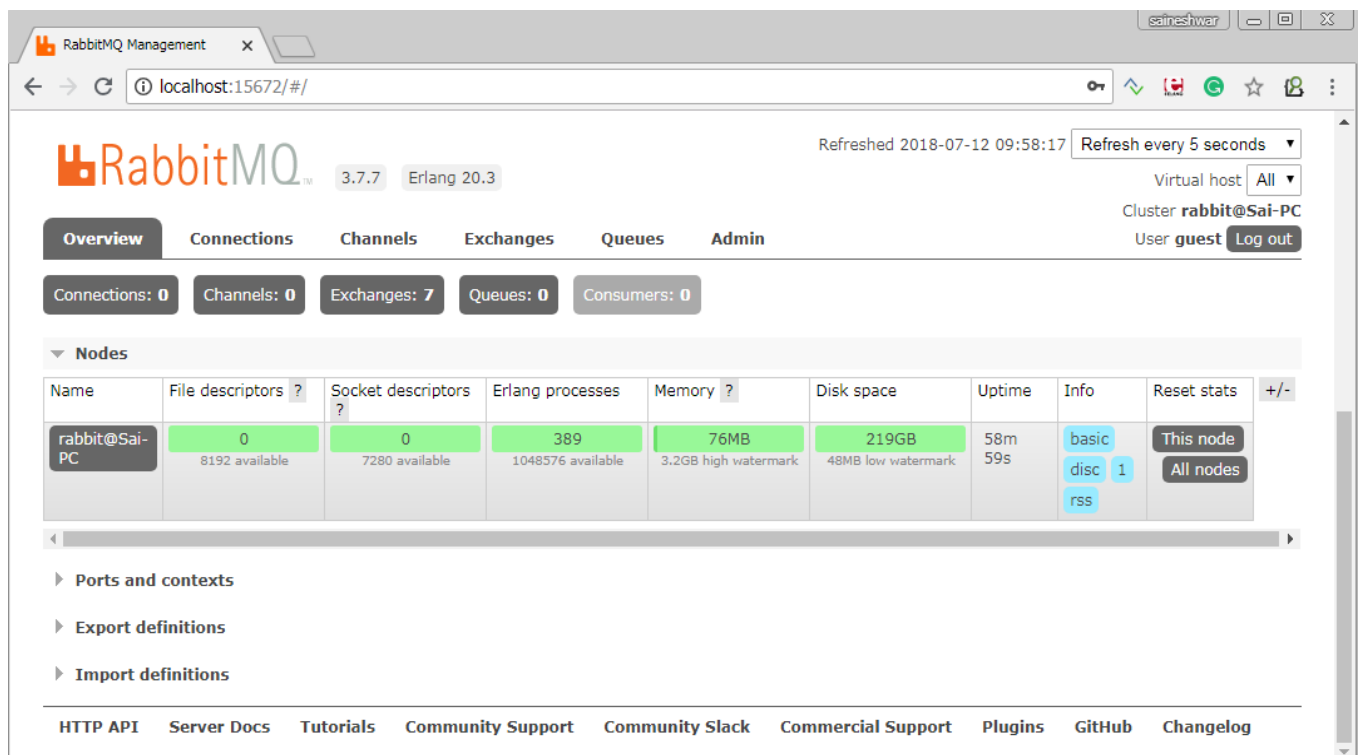
Now to use web Management plugin enter localhost URL in browser "<http://localhost:15672/>".

After entering localhost URL in browser, it will ask for credentials for accessing web management plugin.

The Default Username and password of management plugin is "guest" (Username: "guest" | Password: "guest").



After login with default credentials below overview screen will appear.



For detail information on all tabs, you can visit: - <https://www.cloudamqp.com/blog/2015-05-27-part3-rabbitmq-for-beginners-the-management-interface.html#overview>

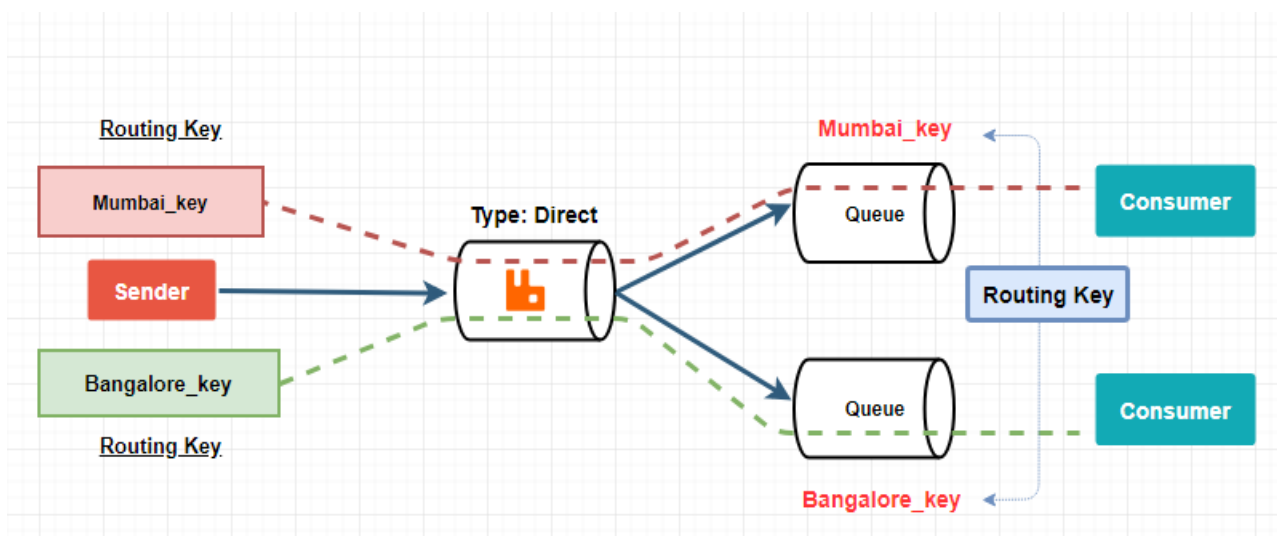
## RabbitMQ Exchanges

### What are the Exchanges?

When a producer creates a message, it is not directly sent to a queue first message is send to exchanges after that a routing agent reads and sends it to the appropriate queue with help of header attributes, bindings, and routing keys. There are four types of Exchanges which route the message in different ways along with that there are various parameters which you can set such as Type, Durability Auto-delete, Internal,

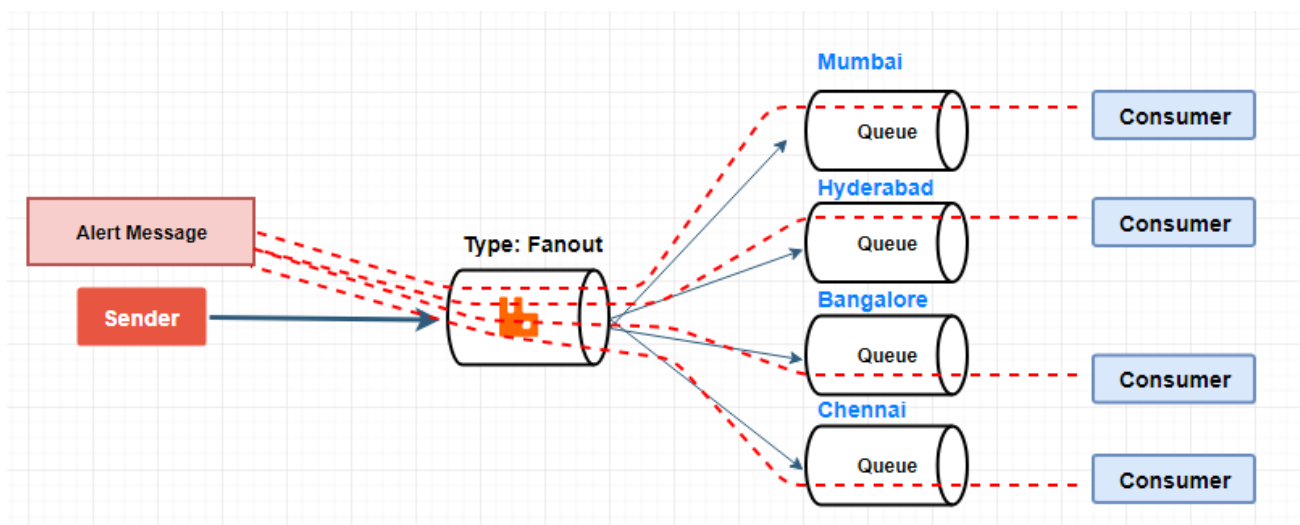
### Direct Exchange

**Direct:** A direct exchange delivers messages to queues based on a message routing key. In a direct exchange, the message is routed to the queues whose binding key exactly matches the routing key of the message.



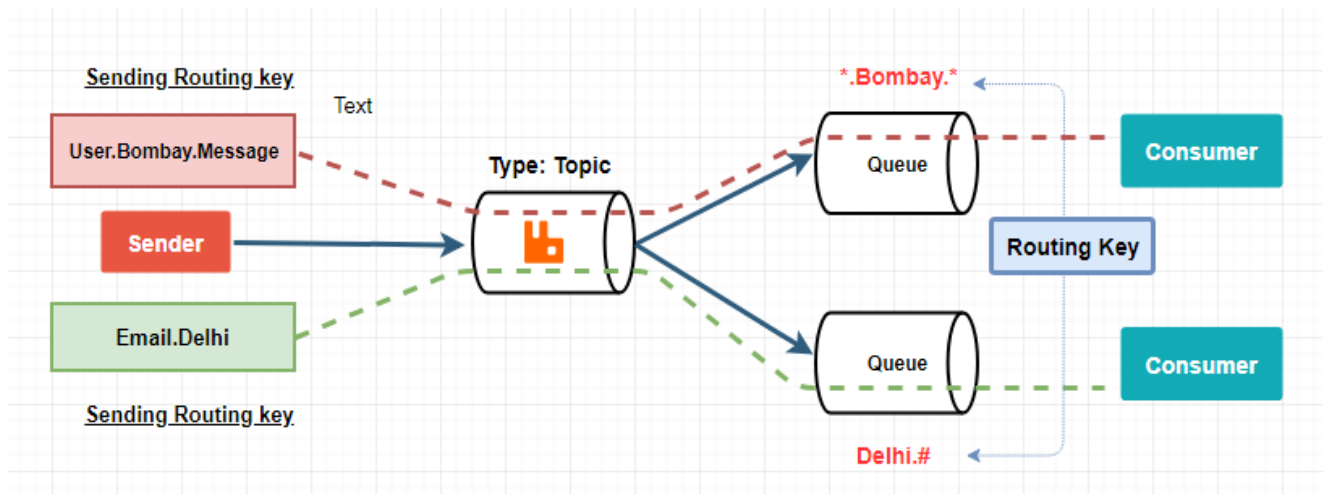
### Fanout Exchange

**Fanout:** A fanout exchange routes messages to all of the queues that are bound to it.



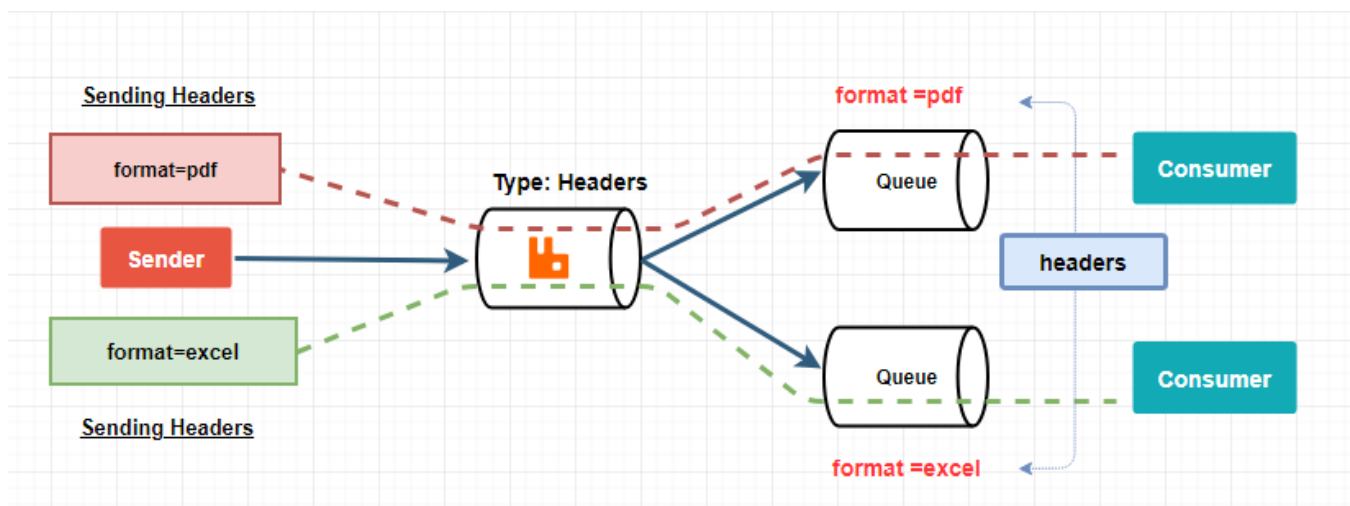
## Topic Exchange

**Topic:** The topic exchange does a wildcard match between the routing key and the routing pattern specified in the binding.



## Headers Exchange

**Headers:** Headers exchanges use the message header attributes for routing.



## Properties Details

### Name

The name will be an exchange name which you will set it must be unique.

### Type

**Direct:** A direct exchange delivers messages to queues based on a message routing key. In a direct exchange, the message is routed to the queues whose binding key exactly matches the routing key of the message.

**Fanout:** A fanout exchange routes messages to all of the queues that are bound to it.

**Topic:** The topic exchange does a wildcard match between the routing key and the routing pattern specified in the binding.

**Headers:** Headers exchanges use the message header attributes for routing.

### Durability

Durability is a property of exchange which tells that a message can survive server restarts (broker restart).

There are 2 types of Durability options.

1. Durable
2. Transient (Non-Durable)

**Durable:** - if you mark exchange as durable then it will survive server restarts

**Transient:** - if you mark exchange as Transient then it will survive server restarts.

▼ Add a new exchange

Name:  \*

Type:

Durability:

Auto delete: ?

Internal: ?

Arguments:  =

Add Alternate exchange ?

Add exchange

### Auto delete

▼ Add a new exchange

Name:  \*

Type:

Durability:

Auto delete: ?

Internal: ?

Arguments:  =

Add Alternate exchange ?

Add exchange

There are 2 options in auto delete

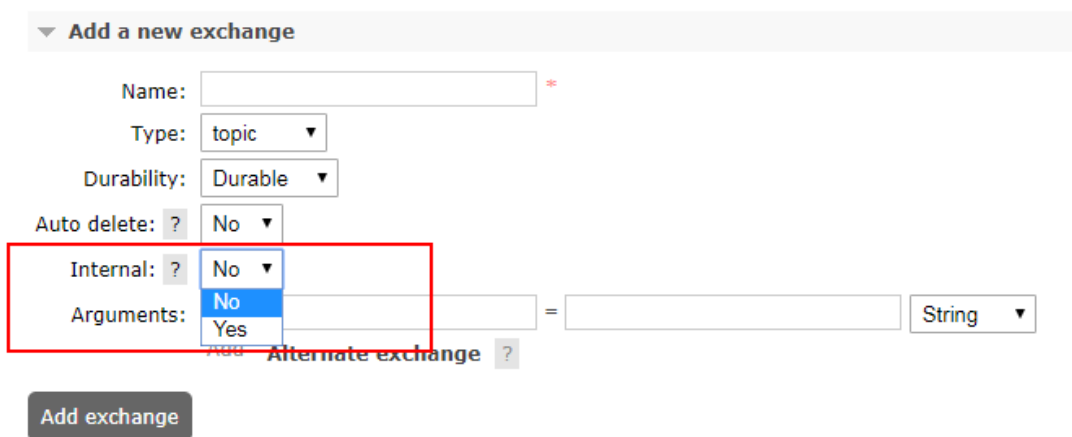
1. Yes
2. No

If yes, the exchange will delete itself after at least one queue or exchange has been bound to this one, and then all queues or exchanges have been unbound.

e.g. In this part, if you Create an Exchange and bind it to a queue and as you unbind queue it will delete it exchange also.

### **Internal**

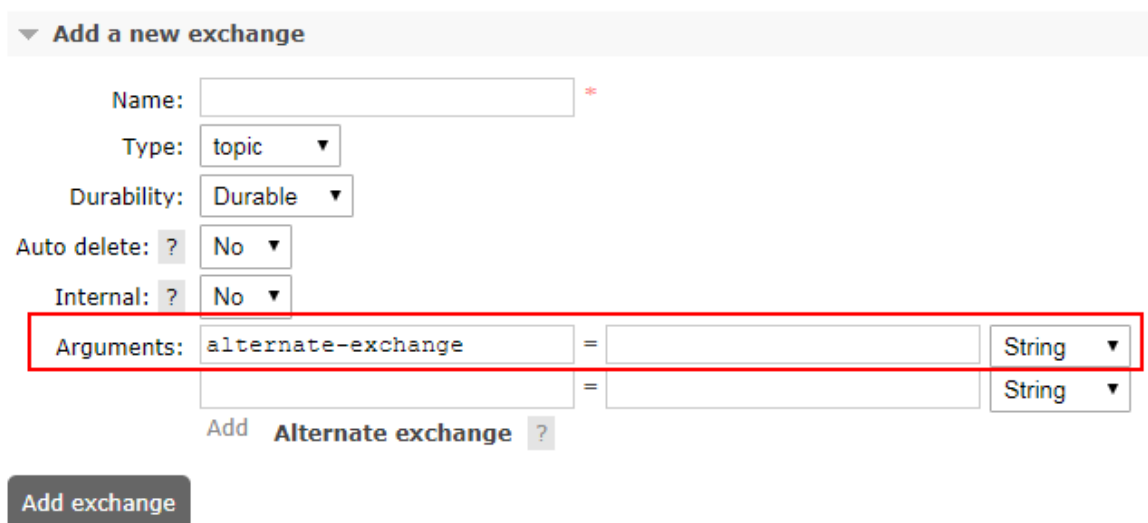
If set, the exchange may not be used directly by publishers, but only when bound to other exchanges. Internal exchanges are used to construct wiring that is not visible to applications.



The screenshot shows the 'Add a new exchange' form. The 'Internal' dropdown menu is open, showing 'No' as the selected option. The 'Auto delete' dropdown is set to 'No'. The 'Arguments' field is empty, and the 'Alternate exchange' field is also empty. The 'Add exchange' button is at the bottom.

### **Alternate-exchange:**

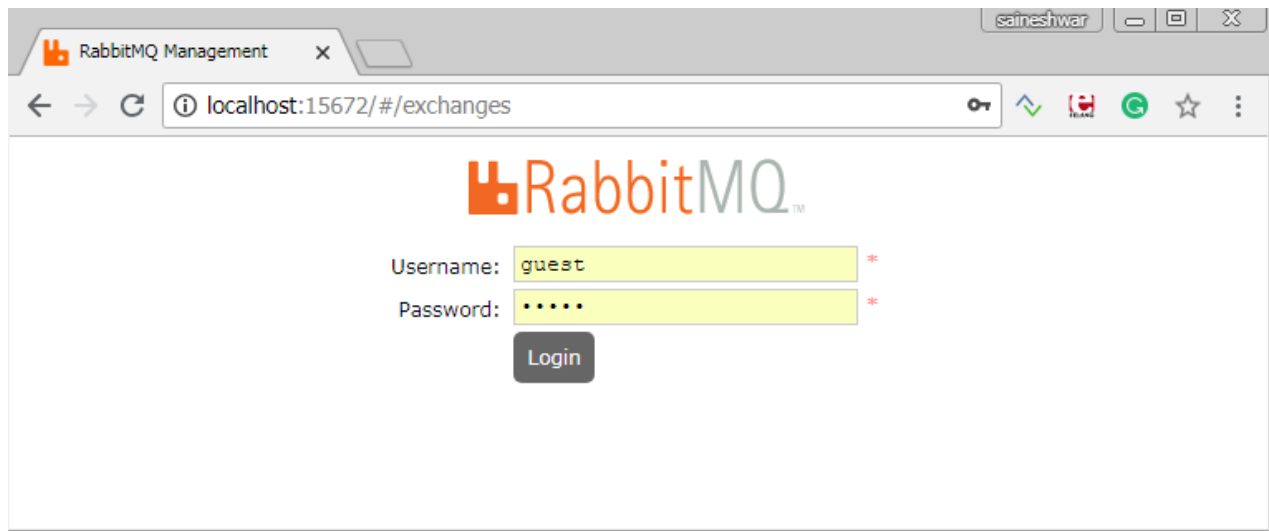
If there is an issue in publishing message to an exchange you can specify alternate exchange it will send a message to another queue.



The screenshot shows the 'Add a new exchange' form. The 'Alternate exchange' dropdown menu is open, showing 'alternate-exchange' as the selected option. The 'Auto delete' dropdown is set to 'No'. The 'Internal' dropdown is set to 'No'. The 'Arguments' field is empty, and the 'Alternate exchange' field is also empty. The 'Add exchange' button is at the bottom.

## Adding Exchanges

To add exchanges, we are first going to log in with default credentials and then we are going to choose Exchanges tab.



After choosing tab you will see "Add a new exchange panel" just click on that panel to expand, next after expansion it will ask for exchange name for demo we are going to name exchange as "**demoexchange**" and in type we are going to choose "direct" and click on add button to create.



After entering all details next, we are going click on add exchange button to create an exchange.

## Snapshot after adding Exchanges

Overview	Connections	Channels	User <b>guest</b> <a href="#">Log out</a>	
Exchanges	Queues	Admin		
amq.direct	direct	<a href="#">D</a>		
amq.fanout	fanout	<a href="#">D</a>		
amq.headers	headers	<a href="#">D</a>		
amq.match	headers	<a href="#">D</a>		
amq.rabbitmq.trace	topic	<a href="#">D</a> <a href="#">I</a>		
amq.topic	topic	<a href="#">D</a>		
<b>demoexchange</b>	direct	<a href="#">D</a>		

In a similar way, we can add various exchanges and with different types.

## RabbitMQ Queues

What is the Queue?

A Queue is a Buffer that stores messages that are sent from exchanges to queues.



### Parameters of Queues in details

#### Name

Name of the queue which we can reference in the application. The name must be unique and it must not be any system define queue name.

#### Durability

Durability is a property of queue which tells that a message can survive server restarts (broker restart).

There are 2 types of Durability options.

1. Durable
2. Transient (Non-Durable)

**Durable:** - if you mark queue as durable then it will survive server restarts

**Transient:** - if you mark exchange as Transient then it will not survive server restarts.



▼ Add a new queue

Name:

Durability: Durable ▼

Auto delete: ? Durable  
Transient

Arguments:  =  String ▼

Add Message TTL ? | Auto expire ? | Max length ? | Max length bytes ? | C  
Dead letter exchange ? | Dead letter routing key ? | Maximum priority ?  
Lazy mode ? Master locator ?

Add queue

## Auto delete

There are 2 options in auto delete

1. Yes
2. No

If the queue is exclusive, the durability attribute has no effect because the queue will be deleted as soon as client disconnects (or its connection is lost). auto-deleted queues are deleted when the last consumer is canceled (or its channel is closed, or its connection is lost).

If there never was a consumer it won't be deleted.

## Arguments

Arguments (optional; used by plugins and broker-specific features such as message TTL, queue length limit, etc)

## Time-to-live

In this part, you can set timespan to a queue which will discard if it reaches its lifespan which is set.

Time will be in milliseconds.

▼ Add a new queue

Name:

Durability: Durable ▼

Auto delete: ? No ▼

Arguments: x-message-ttl =  Number ▼  
 =  String ▼

Add Message TTL ? | Auto expire ? | Max length ? | Max length bytes ? | Overflow behaviour ?  
Dead letter exchange ? | Dead letter routing key ? | Maximum priority ?  
Lazy mode ? Master locator ?

Add queue

## Auto expire

In this part, you can set expiry to a queue by setting this property.

This controls for how long a queue can be unused before it is automatically deleted.

Unused means the queue has no consumers, the queue has not been redeclared, and basic.get has not been invoked for a duration of at least the expiration period

▼ Add a new queue

Name:

Durability: Durable ▼

Auto delete: ? No ▼

Arguments: x-expires = 60000 Number ▼  
 =  String ▼

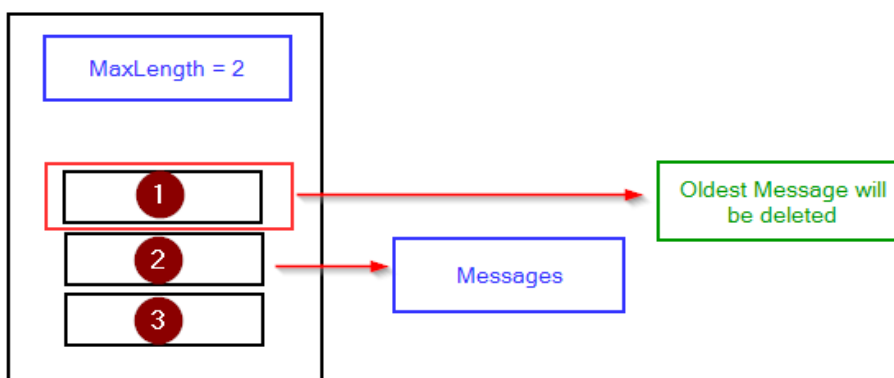
Add Message TTL ? | Auto expire ? | Max length ? | Max length bytes ? | Dead letter exchange ? | Dead letter routing key ? | Maximum priority ? | Lazy mode ? | Master locator ?

Add queue

## Max Length

How many (ready) messages a queue can contain before it starts to drop them from its head.

A maximum number of messages can be set by supplying the x-max-length queue declaration argument with a non-negative integer value.



e.g. If you set value x-max-length = 2 and if you publish 3 messages in the queue then only 2 messages will be there the oldest will be deleted from the queue.

Add a new queue

Name:

Durability: Durable

Auto delete: No

Arguments: x-max-length = 10 Number

=  String

Add Message TTL | Auto expire | Max length | Max length bytes | Dead letter exchange | Dead letter routing key | Maximum priority | Lazy mode | Master locator

Add queue

## Max Length Bytes

Total body size for ready messages a queue can contain before it starts to drop them from its head.

Maximum length in bytes can be set by supplying the `x-max-length-bytes` queue declaration argument with a non-negative integer value.

(Sets the "x-max-length-bytes" argument.) 1000000 bytes = 1MB

e.g. If you set value `x-max-length-bytes = 1000000` and if you publish messages in queue and the queue size increase more than 1 MB then the oldest will be deleted from the queue (drop them from its head).

Add a new queue

Name:

Durability: Durable

Auto delete: No

Arguments: x-max-length-bytes = 1000000 Number

=  String

Add Message TTL | Auto expire | Max length | Max length bytes | Dead letter exchange | Dead letter routing key | Maximum priority | Lazy mode | Master locator

Add queue

## Overflow behaviour

Sets the queue overflow behavior. This determines what happens to messages when the maximum length of a queue is reached. Valid values are `drop-head` or `reject-publish`.

Add a new queue

Name:  \*

Durability: Durable

Auto delete: ? No

Arguments: x-overflow = drop-head String

Add
Message TTL ? | Auto expire ? | Max length ? | Max length bytes ? |
Dead letter exchange ? | Dead letter routing key ? | Maximum priority ?
Lazy mode ? Master locator ?

Add queue

### Dead letter exchange

Optional name of an exchange to which messages will be republished if they are rejected or expire.

Add a new queue

Name:  \*

Durability: Durable

Auto delete: ? No

Arguments: x-dead-letter-exchange = defaultexchange String

Add
Message TTL ? | Auto expire ? | Max length ? | Max length bytes ? | C
Dead letter exchange ? | Dead letter routing key ? | Maximum priority ?
Lazy mode ? Master locator ?

Add queue

### Dead letter routing key

Optional replacement routing key to use when a message is dead-lettered. If this is not set, the message's original routing key will be used.

For example, if you publish a message to an exchange with routing key foo, and that message is dead-lettered, it will be published to its dead letter exchange with routing key foo. If the queue the message originally landed on had been declared with x-dead-letter-routing-key set to bar, then the message will be published to its dead letter exchange with routing key bar.

Add a new queue

Name:  \*

Durability: Durable

Auto delete: ? No

Arguments: x-dead-letter-routing-key = demokey String

Add Message TTL ? | Auto expire ? | Max length ? | Max length bytes ? | 0

Dead letter exchange ? | Dead letter routing key ? | Maximum priority ?

Lazy mode ? Master locator ?

Add queue

### Maximum priority

A maximum number of priority levels for the queue to support; if not set, the queue will not support message priorities.

(Sets the "x-max-priority" argument.)

To declare a priority queue, use the x-max-priority optional queue argument. This argument should be a positive integer between 1 and 255, indicating the maximum priority the queue should support

Add a new queue

Name:  \*

Durability: Durable

Auto delete: ? No

Arguments: x-max-priority = 1 Number

Add Message TTL ? | Auto expire ? | Max length ? | Max length bytes ? | 0

Dead letter exchange ? | Dead letter routing key ? | Maximum priority ?

Lazy mode ? Master locator ?

Add queue

### Lazy mode

Set the queue into the lazy mode, keeping as many messages as possible on disk to reduce RAM usage; if not set, the queue will keep an in-memory cache to deliver messages as fast as possible.

(Sets the "x-queue-mode" argument.)

▼ Add a new queue

Name:  \*

Durability:

Auto delete:

Arguments:  =

=

Add  |  |  |  |  |  |  |  |

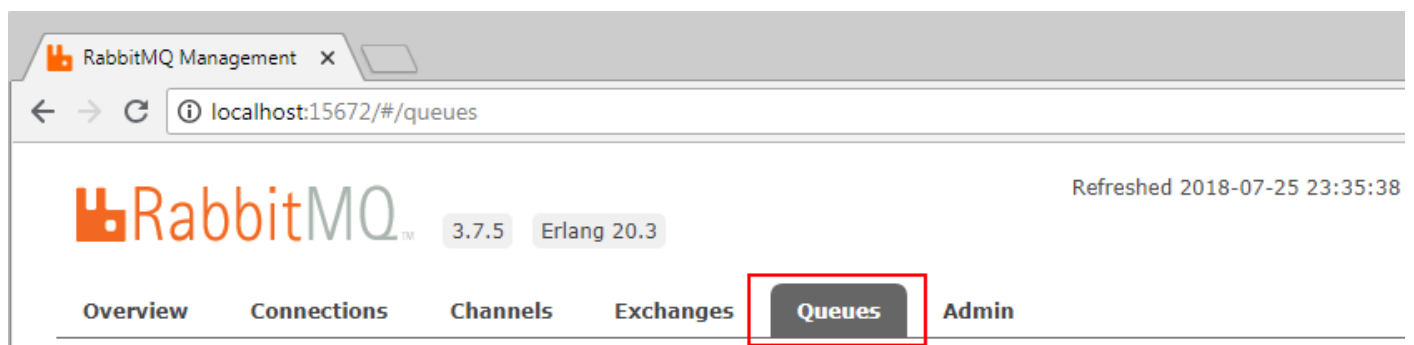
### Master locator

Set the queue into master location mode, determining the rule by which the queue master is located when declared on a cluster of nodes.

(Sets the "x-queue-master-locator" argument.)

### Adding queue

To create a queue, you need to click on the queue tab in web management plugin.



After clicking on queues tab, you will see add Queue panel with an arrow just click on that panel to expand.



3.7.5

Erlang 20.3

Overview

Connections

Channels

Exchanges

Queues

Admin

## Queues

▼ All queues (0)

Pagination

Page ▼ of 0 - Filter:  ☐ Regex ?

... no queues ...

► Add a new queue

After clicking on Add a new panel queue will expand in that we are going enter queue details.

First, we are going to start with the name of the queue we are going to name it as **"demoqueue"** then we are going to choose durability as a Durable and final option we are going set is auto delete to No and click on Add queue button to create a queue.

▼ Add a new queue

Name:  \*

Durability:  ▼

Auto delete: ?  ▼

Arguments:  =   ▼

Add **Message TTL** ? | **Auto expire** ? | **Max length** ? | **Max length bytes** ? |  
**Dead letter exchange** ? | **Dead letter routing key** ? | **Maximum priority** |  
**Lazy mode** ? **Master locator** ?

Add queue

After adding a queue, you can view queue which you have recently added, it is located just above add queue panel.

# Queues

▼ All queues (1)

Pagination

Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
demoqueue	D	idle	0	0	0				



## Binding in RabbitMQ

### What is Binding

A binding is a connection which we can configure between a queue and an exchange.

Simple words: - A binding is a relationship between an exchange and a queue.

In this part, we are going to bind exchange with queue using routing key and this will be used for direct type exchange. The exchange will route the request to particular queue on basis of routing key.

For binding click on queue name which you have entered "**demoqueue**" after click on it bindings panel will expand, next it will ask for exchange name enter exchange name which we have created "**demoexchange**" and routing key "**demokey**" and click on bind button.

#### Pagination

Page  of 1 - Filter:  ☐ Regex   
 Displaying 1 item , page size up to:

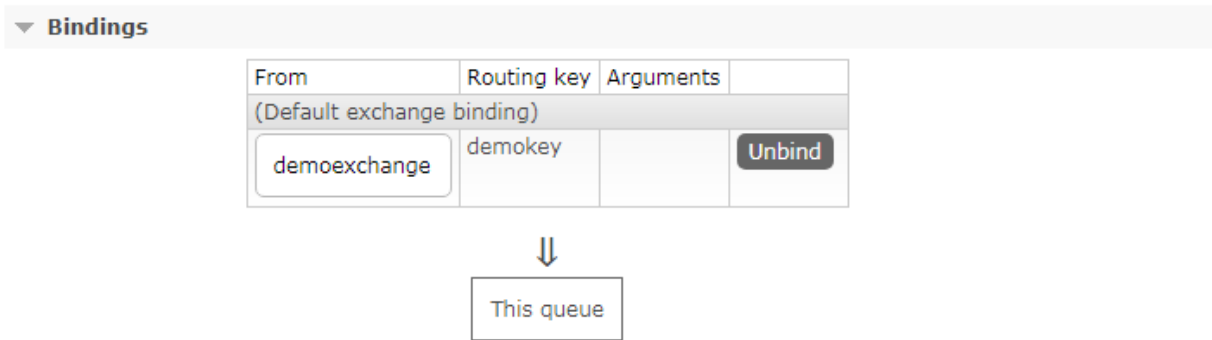
Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
demoqueue	D	idle	0	0	0				

### Snapshot after binding

The screenshot shows the RabbitMQ Management interface. The browser address bar indicates the URL is `localhost:15672/#/queues/%2F/demoqueue`. The page title is "RabbitMQ 3.7.7 Erlang 20.3". The "Refreshed" timestamp is "2018-07-14 09:57:33". The "Refresh every 5 seconds" dropdown is set to "5 seconds". The "Virtual host" is "All". The "Cluster" is "rabbit@Sai-PC". The "User" is "guest" and the "Log out" button is visible.

The "Overview" tab is selected, and the "Bindings" section is expanded. The "From" field is "demoexchange", the "Routing key" is "demokey", and the "Arguments" field is empty. The "Bind" button is visible.

Below the "Add binding to this queue" section, there is a "Publish message" section.

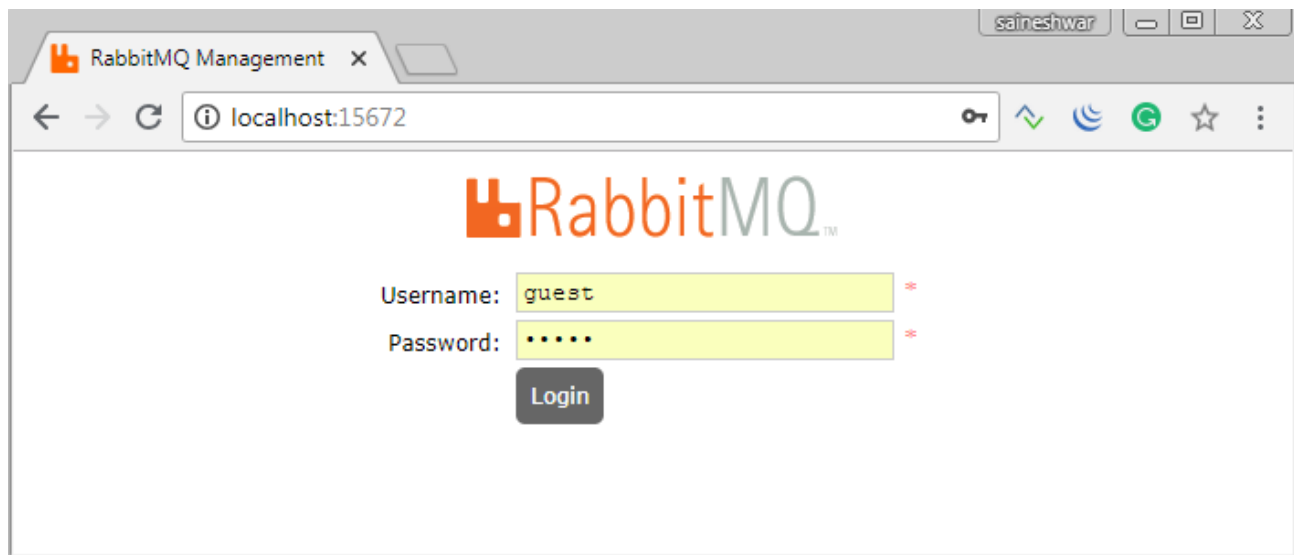


After binding if you want to unbind it then you can click on unbind button to remove binding.

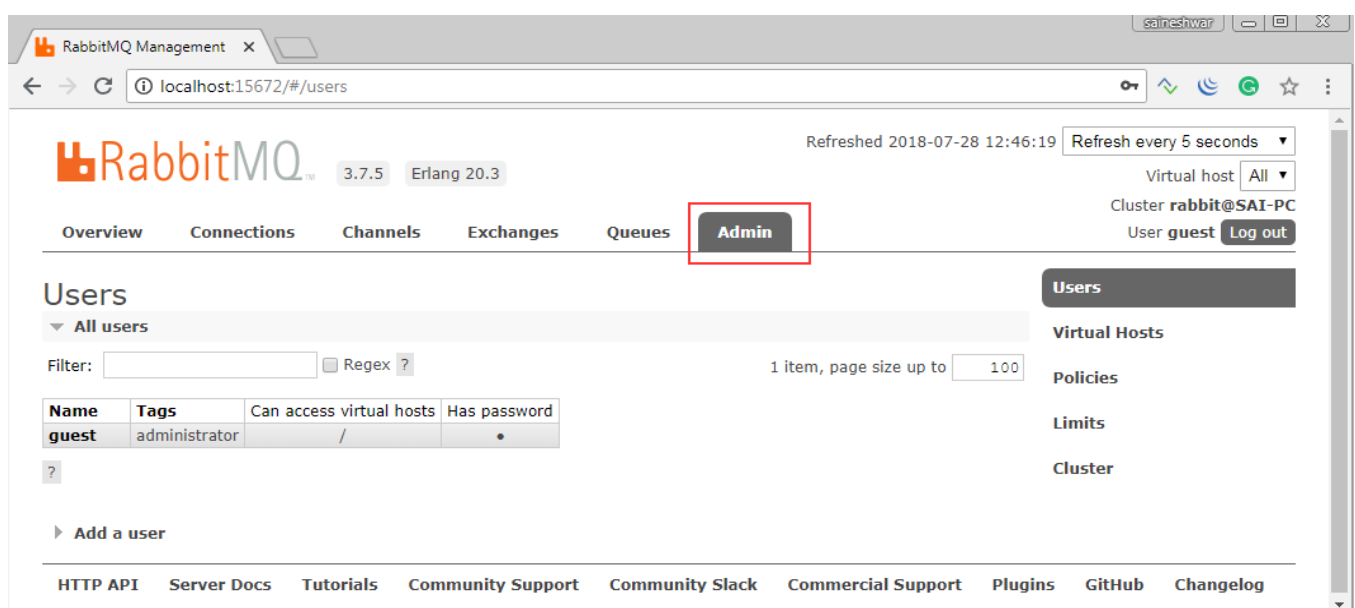
## RabbitMQ Users

In this part, we are going to learn how to create a new User and give permission to New User.

For creating a New user, we need to login into Web Management Plugin using default credentials.



After logging into the application, we are going to choose Admin tab.



After choosing admin tab we can see a default user which is “**guest**” which as “administrator” privilege below that we can see add new user panel.

Overview Connections Channels Exchanges Queues **Admin**

## Users

▼ All users

Filter:  ☐ Regex ? 1 item, page 1

Name	Tags	Can access virtual hosts	Has password
guest	administrator	/	•

?

► Add a user

Clicking on “Add a User” panel to create new Users.

▼ Add a user

Username:

Password:   (confirm)

Tags:  ?

Set **Admin** | **Monitoring** | **Policymaker**  
**Management** | **Impersonator** | **None**

Add user

Before moving ahead let's first have a look at tags. Tags in this part are as rights (privileges) which are assigned to users which are created. we can set single or multiple privileges to a user if we want multiple privileges then just set privileges as comma-separated (administrator, management)

### Currently supported by the management plugin

#### Management

The user can access the management plugin

#### Policymaker

The user can access the management plugin and manage policies and parameters for the vhosts they have access to.

#### Monitoring

The user can access the management plugin and see all connections and channels as well as node-related information.

## Administrator

The user can do everything monitoring can do, manage users, vhosts, and permissions, close other user's connections, and manage policies and parameters for all vhosts.

## Creating Users

In this part we are going to create new user and we are going to set Username as "**demouser**" after that we are going to set password as "123456" after that we are going to set privilege to this user as "**administrator**" (just click on Admin link it will set "**administrator**" in tags field) finally click on Add user to create new user.

▼ Add a user

Username: demouser

Password: ▼

.....

.....

Tags: administrator

Set

Admin | Monitoring | Policymaker

Management | Impersonator | None

Add user

After adding a user, you can see all Users in all user's panel just expand it. After expanding you can see the new user "demouser" but in the grid, you can see "can access virtual hosts" columns where it has the value "No access" which means we do not have the privilege to virtual hosts.

## Users

▼ All users

Filter:  ☐ Regex ?

Name	Tags	Can access virtual hosts	Has password
demouser	administrator	No access	•
guest	administrator	/	•

?

## Setting privilege to access virtual hosts

For setting permission just click on username which we have created "demouser".

### Users

▼ All users

Filter:  ☐ Regex ?

Name	Tags	Can access virtual hosts	Has password
<b>demouser</b>	administrator	No access	•
guest	administrator	/	•

?

After clicking on "**demouser**" go to permission panel which is just below overview panel.

Just expand permission panel and just click on set permission button to set permission to demouser.

▼ Permissions

Current permissions

... no permissions ...

Set permission

Virtual Host: / ▼

Configure regexp: .\*

Write regexp: .\*

Read regexp: .\*

Set permission

Once the permission is set, you'll see the "Current permission" as shown below.

Now you should be able to log in as this "**demouser**" to the RabbitMQ Web Management Plugin.

### User: demouser

▼ Overview

Tags administrator

Can log in with password •

▼ Permissions

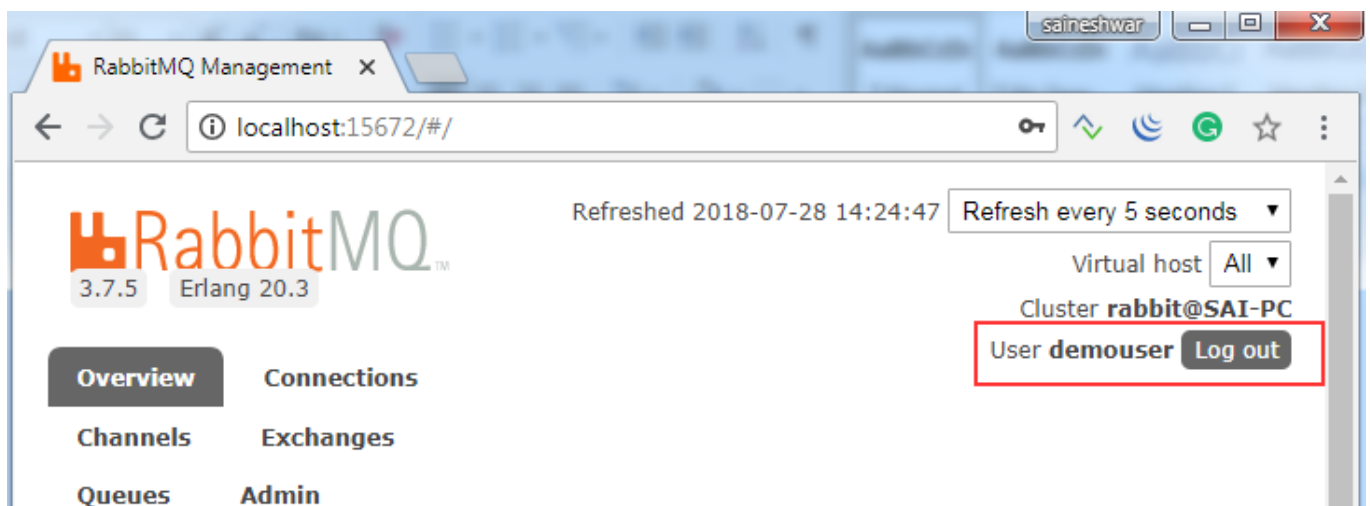
Current permissions

Virtual host	Configure regexp	Write regexp	Read regexp	
/	.*	.*	.*	Clear

Let's login into RabbitMQ Web Management Plugin with new user "demouser".



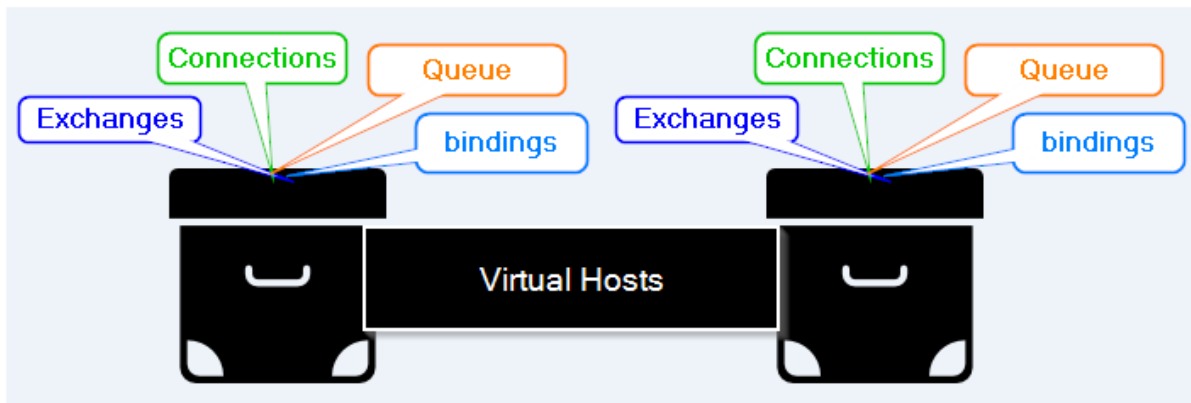
Below is snapshot after logging into RabbitMQ Web Management Plugin with new user "demouser".



## RabbitMQ Virtual Hosts

What are Virtual Hosts?

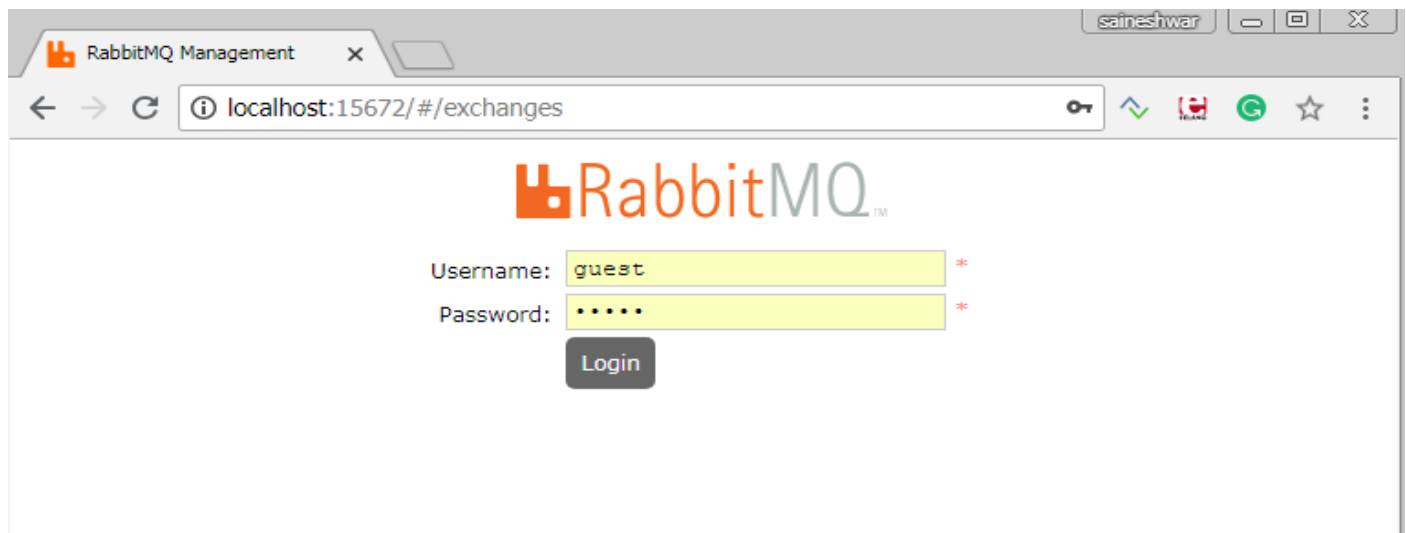
Virtual hosts are like a virtual box which contains a logical grouping of connections, exchanges, queues, bindings, user permissions, policies and many more things.



We can create different virtual host and each virtual host will have users.

## Creating Virtual host

To create a new virtual host, we are first going to log in with default credentials and then we are going to choose admin tab.



After choosing admin tab you will see vertical menus in right part of the page in that choose "Virtual Hosts".

The screenshot shows the RabbitMQ Management interface. The 'Admin' tab is selected. The 'Virtual Hosts' menu item is highlighted in the right sidebar. The main content area shows a table of virtual hosts.

Overview			Messages			Network		Message rates	
Name	Users ?	State	Ready	Unacked	Total	From client	To client	publish	deliver / get
/	demouser, guest	running	0	0	0				

After choosing “**Virtual Hosts**” you will see the default “**Virtual Hosts**” which is already present below that there is a panel “**Add a new virtual host**” just click on it to expand.

RabbitMQ 3.7.5 Erlang 20.3

Refreshed 2018-07-29 18:32:03 Refresh every 5 seconds

Virtual host All

Cluster rabbit@SAI-PC

User guest Log out

Overview Connections Channels Exchanges Queues Admin

## Virtual Hosts

► All virtual hosts

► Add a new virtual host

Users

Virtual Hosts

Policies

Limits

Cluster

After expanding we can see for adding virtual host we need to add Name parameter here I am entering the name as “**demohost**” next click on Add virtual host button to create “**demohost**” virtual host.

Overview Connections Channels Exchanges Queues Admin

## Virtual Hosts

► All virtual hosts

▼ Add a new virtual host

Name: demohost \*

Add virtual host

After adding a virtual host, we can see the newly added virtual host in All virtual hosts panel.

## Virtual Hosts

▼ All virtual hosts

Filter:  ☐ Regex ?

2 items, page size up to 100

Overview			Messages			Network		Message rates		
Name	Users ?	State	Ready	Unacked	Total	From client	To client	publish	deliver / get	
/	demouser, guest	running	0	0	0					
demohost	guest	running	NaN	NaN	NaN					

Now till now, we have created virtual host but we have not assigned any user to this virtual host let's create new User.

## Creating Users

In this part we are going to create new user and we are going to set Username as “**virtualuser**” after that we are going to set password as “123456” after that we are going to set privilege to this user as



"**administrator**" (just click on Admin link it will set "**administrator**" in tags field) finally click on Add user to create new user.

After adding a user, you can see all Users in all user's panel just expand it. After expanding you can see the new user "**virtualuser**" but in the grid, you can see "can access virtual hosts" columns where it has the value "No access" which means we do not have the privilege to virtual hosts.

## Users

▼ All users

Filter:  ☐ Regex ?

Name	Tags	Can access virtual hosts	Has password
demouser	administrator	/	•
guest	administrator	/, demohost	•
<b>virtualuser</b>	administrator	No access	•

?

### Setting privilege to access virtual hosts

For setting permission just click on username which we have created "**virtualuser**".

## Users

▼ All users

Filter:  ☐ Regex ?

Name	Tags	Can access virtual hosts	Has password
demouser	administrator	/	•
quest	administrator	/, demohost	•
<b>virtualuser</b>	administrator	No access	•

?

After clicking on "**virtualuser**" go to permission panel which is just below overview panel.

Just expand permission panel and just click on set permission button to set permission to **virtualuser**.

Permissions

Current permissions

... no permissions ...

Set permission

Virtual Host: demohost

Configure regexp: .\*

Write regexp: .\*

Read regexp: .\*

Set permission

The default value is ".\*" which allows access to all exchanges and queues in the virtual host.

Once the permission is set, you'll see the "Current permission" as shown below.

## User: virtualuser

Overview

Tags administrator

Can log in with password

Permissions

Current permissions

Virtual host	Configure regexp	Write regexp	Read regexp	
demohost	.*	.*	.*	Clear

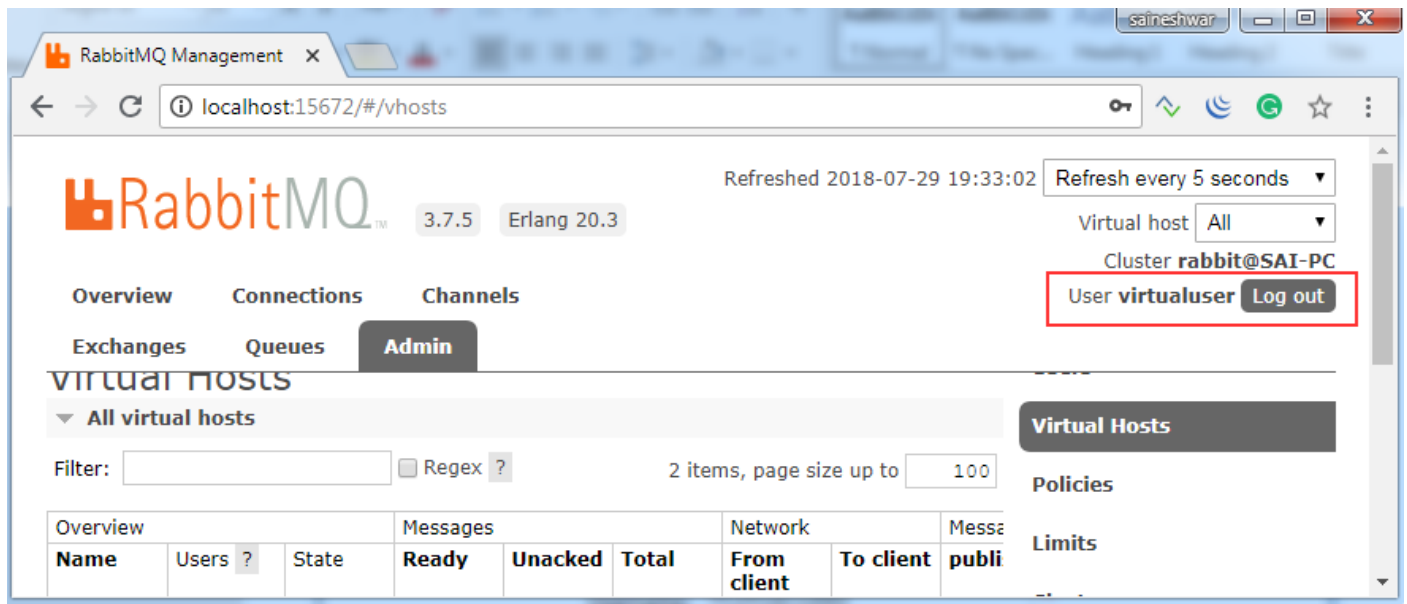
Now you should be able to log in as this "**virtualuser**" to the RabbitMQ Web Management Plugin.

Let's login into RabbitMQ Web Management Plugin with new user "**virtualuser**".

The screenshot shows a web browser window with the title "RabbitMQ Management". The address bar shows "localhost:15672/#/users/virtualuser". The page displays the RabbitMQ logo and a login form with the following fields:

- Username: virtualuser
- Password: (masked with dots)
- Login button

Below is snapshot after logging into RabbitMQ Web Management Plugin with new user "virtualuser".



Now we have completed creating new virtual host along with that we have to assign a new user to it.

## Connections

A connection is a TCP connection between your application and the RabbitMQ broker.

Referenced from: - <https://www.cloudamqp.com/blog/2015-05-18-part1-rabbitmq-for-beginners-what-is-rabbitmq.html>

In connection tab it will show live connections of both producer of message and consumer of the message along with that it will show usernames of each connection with the state of connection if you are using SSL/TLS then it will indicate in the connection it will mark with a dark dot "." It will also show which protocol is been used after that in the network it will show from the client and to client network utilization.



3.7.5 Erlang 20.3

Overview

Connections

Channels

Exchanges

Queues

Admin

## Connections

▼ All connections (15)

Pagination

Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Details			Network		+/-
Name	User name	State	SSL / TLS	Protocol	Channels	From client	To client	
[::1]:53662 undefined	guest	running	○	AMQP 0-9-1	1	0B/s	0B/s	
[::1]:53671 undefined	guest	running	○	AMQP 0-9-1	1	0B/s	0B/s	
[::1]:53672 undefined	guest	running	○	AMQP 0-9-1	1	0B/s	0B/s	
[::1]:53673 undefined	guest	running	○	AMQP 0-9-1	1	0B/s	0B/s	
[::1]:53674 undefined	guest	running	○	AMQP 0-9-1	1	0B/s	0B/s	

If you want to see details of each connection then click on connection name.

## Connections

▼ All connections (6)

Pagination

Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Details			Network		+/-
Name	User name	State	SSL / TLS	Protocol	Channels	▼ From client	To client	
[::1]:54708 undefined	guest	running	○	AMQP 0-9-1	1	2B/s	2B/s	

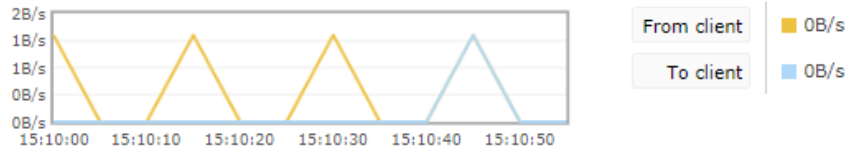
After clicking on connection name, it will show all details of connection along with data rates, channels, client properties, runtime metric, and finally close connection.



3.7.5 Erlang 20.3

[Overview](#) **[Connections](#)** [Channels](#) [Exchanges](#) [Queues](#) [Admin](#)

▼ Overview

Data rates **last minute**

Details

Client-provided name	undefined	State	running
Username	guest	Heartbeat	60s
Protocol	AMQP 0-9-1	Frame max	131072 bytes
Connected at	2018-07-28 14:59:43	Channel limit	2047 channels
Authentication	PLAIN		

▼ Channels

Overview				Details			Message rates				+/-
Channel	User name	Mode ?	State	Unconfirmed	Prefetch ?	Unacked	publish	confirm	deliver / get	ack	
[::1]:54708 (1)	guest		idle	0		0	0.00/s	0.00/s			

▶ Client properties

▶ Runtime Metrics (Advanced)

▶ Close this connection

If you want to close connection then you can open "close this connection" tab type reason and click on force close button.

▼ Close this connection

Reason: 

Force Close

## Channels

A channel is a virtual connection inside a connection. When you are publishing or consuming messages from a queue - it's all done over a channel.

Referenced from: - <https://www.cloudamqp.com/blog/2015-05-18-part1-rabbitmq-for-beginners-what-is-rabbitmq.html>

In channel tab it will show live channels of both producer of message and consumer of the message along with that it will show mode. There are 2 modes. C – confirm Channel will send streaming publish confirmations. T – transactional Channel is transactional after that it will show state of channel. Next details in that we have Unconfirmed column it will show Number of published messages not yet

confirmed next to Unconfirmed column is Prefetch column which shows details of per channel limit. Next to Prefetch column is Unacked column the Unacked means that the consumer has promised to process them but has not acknowledged that they are processed further we have message rates which show published and confirmed rates along with delivered and acknowledge details.

### **Note for Mode**

Channel guarantee mode. Can be one of the following, or neither:

C – confirm

Channel will send streaming publish confirmations.

T – transactional

Channel is transactional.

### **Note for Prefetch count**

Channel prefetch counts.

Each channel can have two prefetch counts: A per-consumer count, which will limit each new consumer created on the channel, and a global count, which is shared between all consumers on the channel.

This column shows one, the other, or both limits if they are set.

Overview

Connections

Channels

Exchanges

Queues

Admin

Channels

▼ All channels (11)

Pagination

Page 1 ▼ of 1 - Filter:

☐ Regex ?

Overview				Details			Message rates				+/-
Channel	User name	Mode ?	State	Unconfirmed	Prefetch ?	Unacked	publish	confirm	deliver / get	ack	
[::1]:56857 (1)	guest		idle	0		0	0.00/s	0.00/s			
[::1]:56856 (1)	guest		idle	0		0	0.00/s	0.00/s			
[::1]:56855 (1)	guest		idle	0		0	0.00/s	0.00/s			
[::1]:56854 (1)	guest		idle	0		0	0.00/s	0.00/s			
[::1]:56853 (1)	guest		idle	0		0	0.00/s	0.00/s			

If you want to see details of each channel then click on "channel" name "[::1]:57086 (1)" it will show all details related to that channel.

Overview
Connections
**Channels**
Exchanges
Queues
Admin

## Channel: [::1]:57086 -> [::1]:5672 (1)

▼ Overview

Message rates **last minute** ?



Publish 0.00/s  
Publisher confirm 0.00/s  
Return 0.00/s

Details

Connection	[::1]:57086	State	idle	Messages unacknowledged	0
Username	guest	Prefetch count	0	Messages unconfirmed	0
Mode ?		Global prefetch count	0	Messages uncommitted	0
				Acks uncommitted	0

▼ Consumers

... no consumers ...

► Runtime Metrics (Advanced)

## Publishing Message

For publishing a message Login into web management plugin with credentials.



After logging into web management plugin next click on the queue(demoqueue).

## Queues

▼ All queues (1)

Pagination

Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
<b>demoqueue</b>	D	idle	10	0	10	0.00/s	0.00/s	0.00/s	

After clicking on demoqueue “queue” just Below bindings panel is publish message panel in that just enter a message in Payload text area and click on publish message.

Overview

Connections

Channels

Exchanges

**Queues**

Admin

Process memory ? 14kB

▶ Consumers

▶ Bindings

**▶ Publish message**

▶ Get messages

▼ Publish message

Message will be published to the default exchange with routing key **demoqueue**, routing it to this queue.

Delivery mode: 1 - Non-persistent ▼

Headers: ?  =  String ▼

Properties: ?  =

Payload:

**Publish message**

### Snapshot after publishing message



Arguments: Message published.

Bind Close

▼ Publish message

Message will be published to the default exchange with routing key **demoqueue**, routing it to this queue.

Delivery mode: 1 - Non-persistent ▼

Headers: ? = String ▼

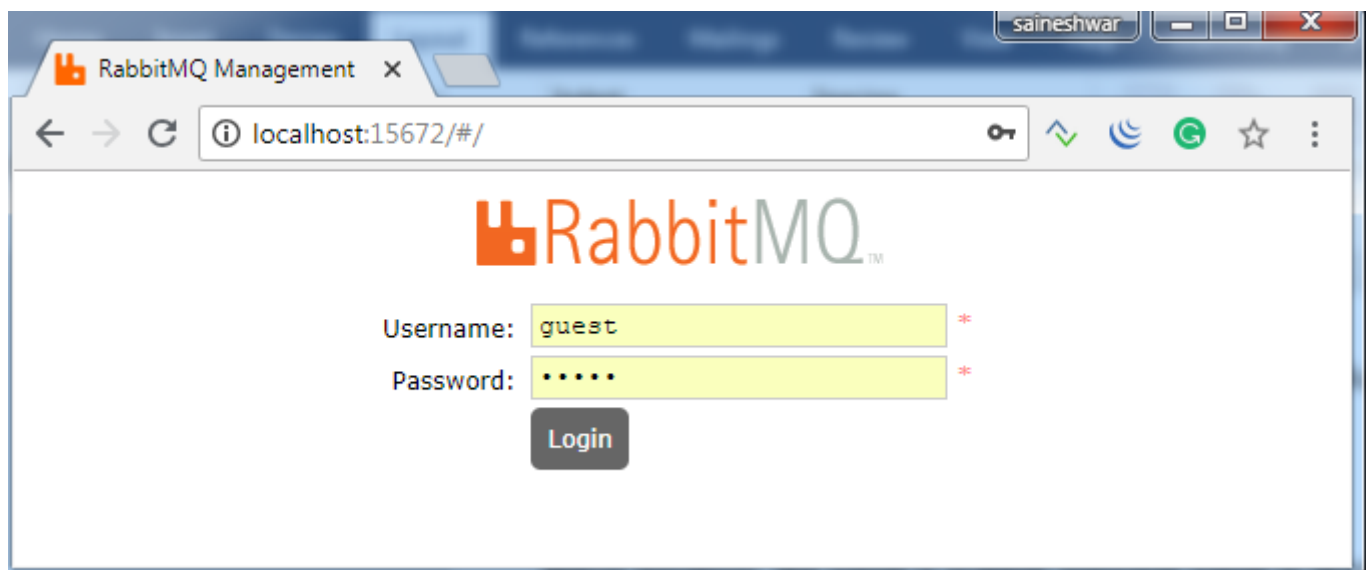
Properties: ? =

Payload: Hello RabbitMQ

Publish message

## Reading Message

For reading a message Login into web management plugin with credentials.



After logging into web management plugin next click on the queue(demoqueue).

## Queues

▼ All queues (1)

Pagination

Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
<b>demoqueue</b>	D	idle	10	0	10	0.00/s	0.00/s	0.00/s	

Below publishes message is Get message here you can read a message from "**demoqueue**" here in message textbox you can enter the count of messages to read from the queue and click on Get Message but to get Message.

Overview
Connections
Channels
Exchanges
**Queues**
Admin

Process memory ? 14kB

► Consumers
► Bindings
► Publish message
**► Get messages**

▼ Get messages

Warning: getting messages from a queue is a destructive action. ?

Ack Mode: Nack message requeue true ▼

Encoding: Auto string / base64 ▼ ?

Messages:

**Get Message(s)**

### Snapshot while reading the message

▼ **Get messages**

Warning: getting messages from a queue is a destructive action. ?

Ack Mode:

Encoding:  ?

Messages:

**Get Message(s)**

Message 1

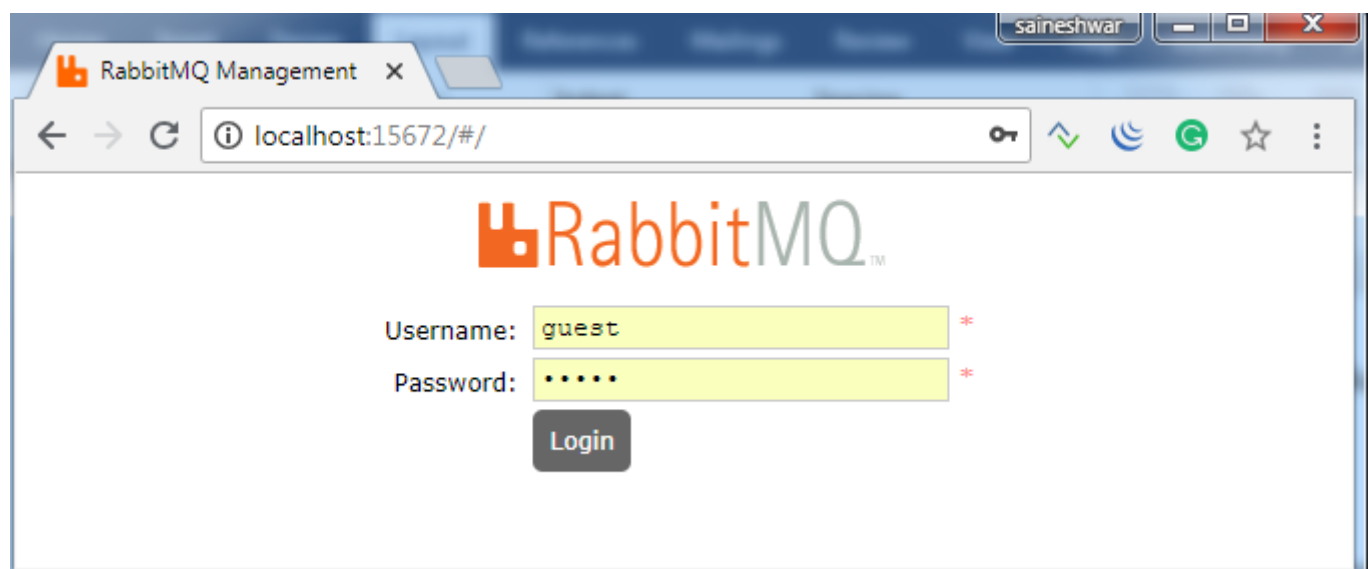
The server reported 1 messages remaining.

Exchange	(AMQP default)
Routing Key	demoqueue
Redelivered	•
Properties	delivery_mode: 1 headers:
Payload 14 bytes Encoding: string	Hello RabbitMQ

After reading the message next last part we are going to see is Deleting Queue.

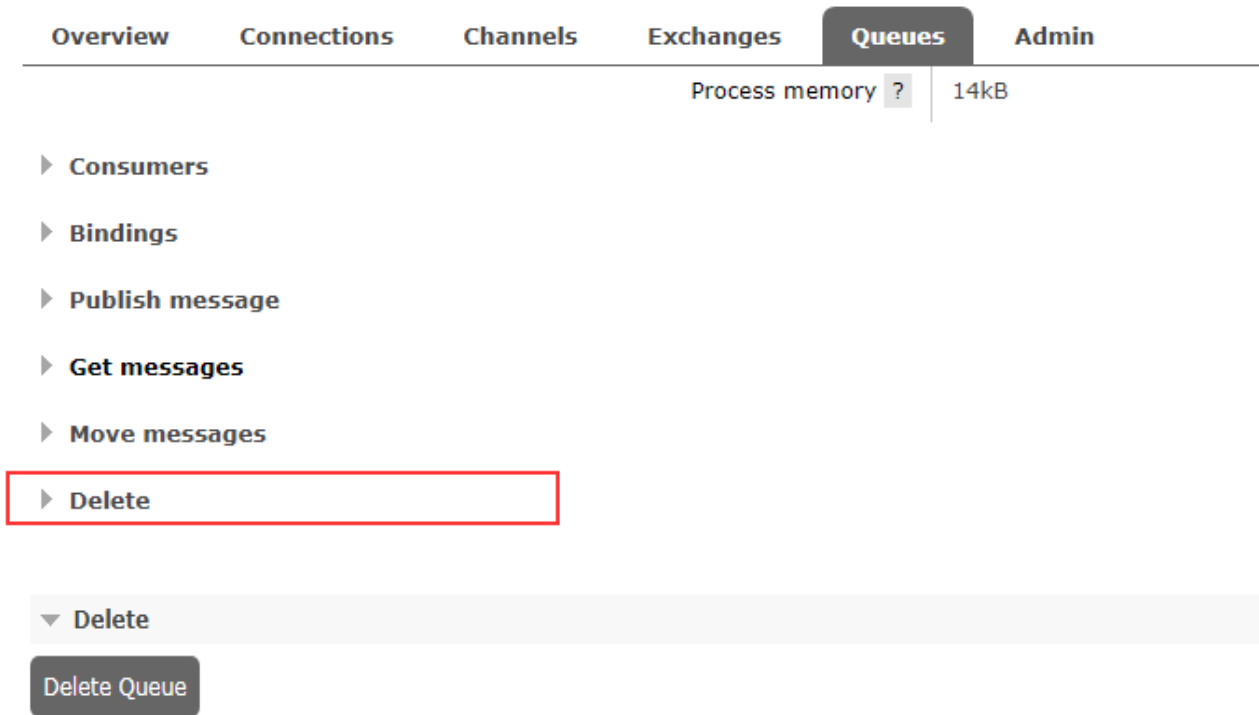
## Delete Message

For deleting a message Login into web management plugin with credentials.

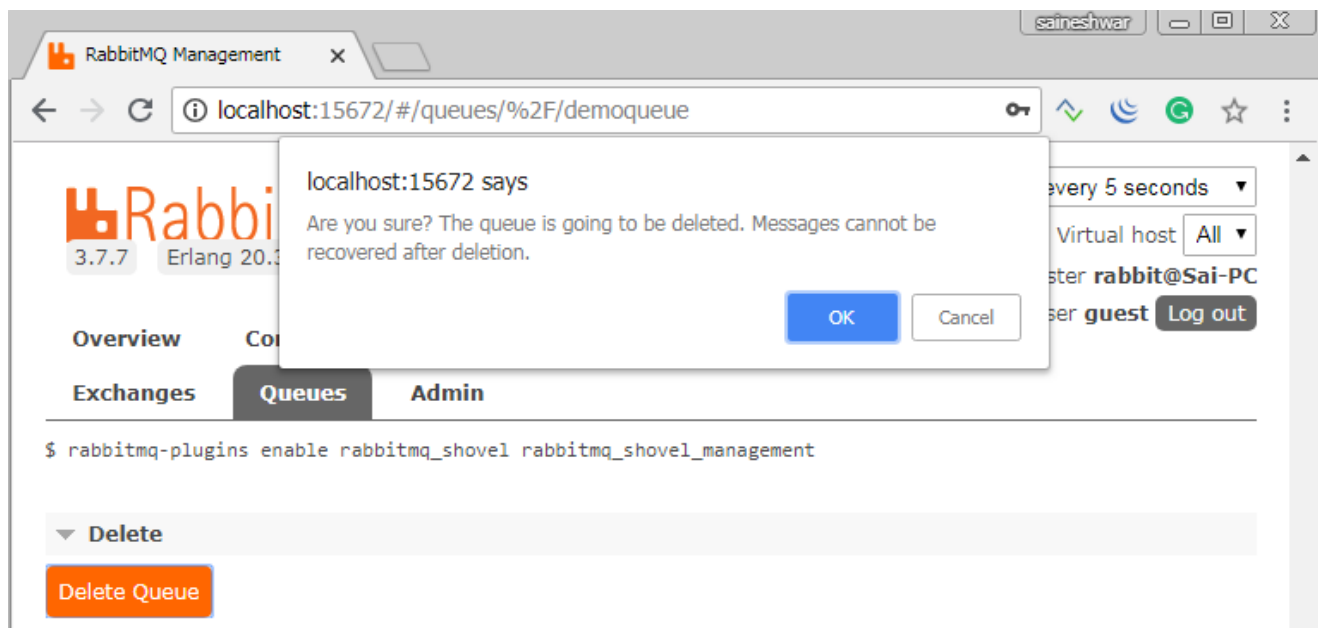


After logging into web management plugin next click on the queue(demoqueue).

To delete the message, you can expand delete panel in that you will see only delete button. Just click on it to delete.



After clicking on deleting a message it will ask for confirmation as shown below.



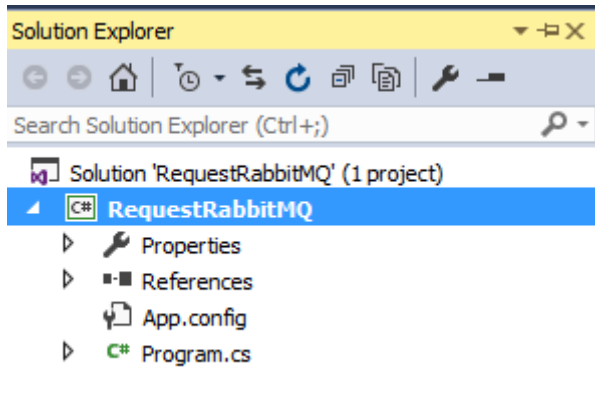
If we click on the ok button it will delete queue.

## Publish Message Using C# to RabbitMQ

In this article, we are going to learn how to Publish a Message to RabbitMQ using .Net Application and RabbitMQ.Client in step by step way.

### Creating RequestRabbitMQ Application

Let's Create a simple console application with Name "**RequestRabbitMQ**".

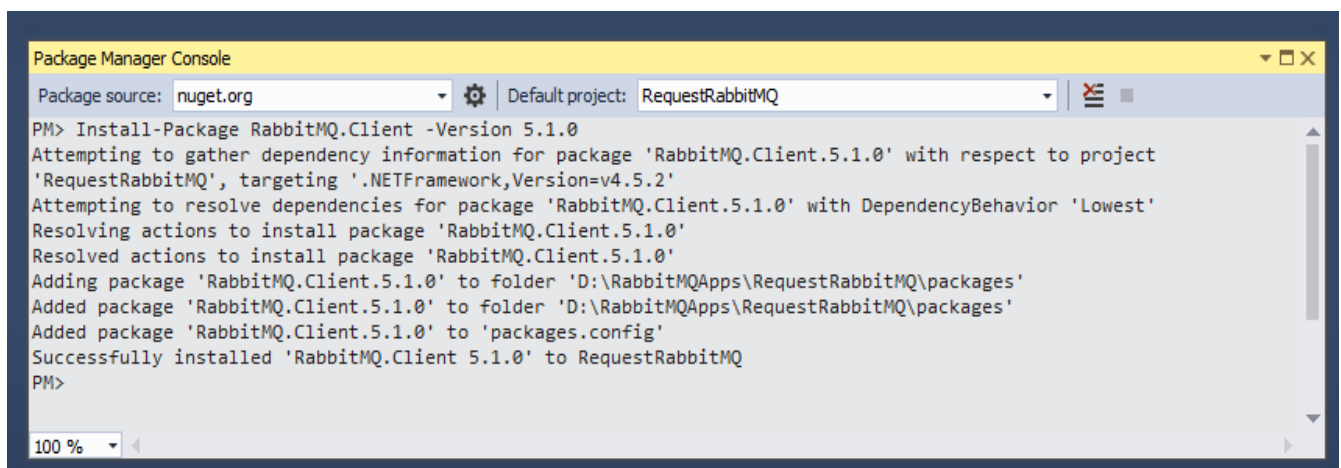


After creating application next we are going to add "**RabbitMQ.Client**" NuGet package.

### **Adding RabbitMQ.Client NuGet Package**

In this part for creating a connection with the RabbitMQ server to create request, we need to add "RabbitMQ.Client" package from NuGet Package.

Command to install: - Install-Package RabbitMQ.Client -Version 5.1.0



After installing NuGet package of "**RabbitMQ.Client**" next we are going to create an exchange from web admin console.

### **Adding Direct Exchange**

In this part, we are going to create an exchange for doing that we have first created a connection to RabbitMQ server using RabbitMQ.Client after creating connection next we have passed credentials along with HostName to connectionFactory after that we have created a connection by calling "**CreateConnection**" method, next to add exchange we have called method "**ExchangeDeclare**" method and passed parameters such as "exchange name" and "exchange type".

### **Code Snippet**

```
using RabbitMQ.Client;
```

```

using System;

namespace RequestRabbitMQ
{
    class Program
    {
        static void Main(string[] args)
        {
            string UserName = "guest";
            string Password = "guest";
            string HostName = "localhost";

            //Main entry point to the RabbitMQ .NET AMQP client
            var connectionFactory = new RabbitMQ.Client.ConnectionFactory()
            {
                UserName = UserName,
                Password = Password,
                HostName = HostName
            };

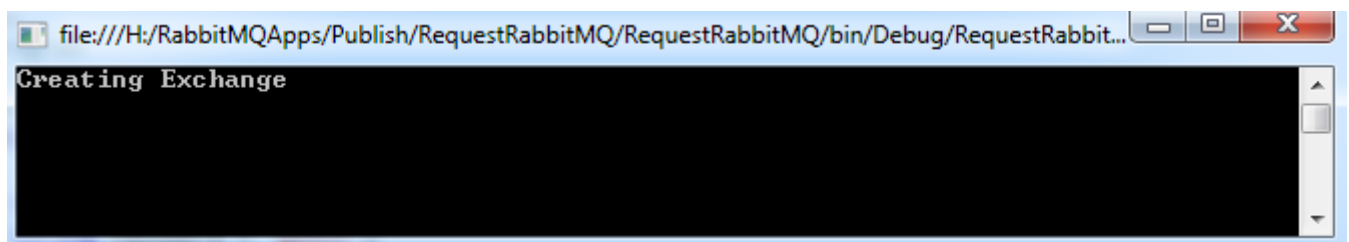
            var connection = connectionFactory.CreateConnection();
            var model = connection.CreateModel();

            //// Create Exchange
            model.ExchangeDeclare("demoExchange", ExchangeType.Direct);

            Console.ReadLine();
        }
    }
}

```

Let's check result by running application.



After adding exchange let's check web management plugin you will see we have successfully created exchanges.

Overview	Connections	Channels	Exchanges	Queues	Admin
amq.direct	direct	D			
amq.fanout	fanout	D			
amq.headers	headers	D			
amq.match	headers	D			
amq.rabbitmq.trace	topic	D I			
amq.topic	topic	D			
demoExchange	direct				

## Adding queue

Now we are going to add a queue.

For doing that we are going to add call "**QueueDeclare**" method and pass parameters to it.

Method definition

```
//
// Summary:
//     Declare a queue.
// [AmqpMethodDoNotImplement(null)]
QueueDeclareOk QueueDeclare(string queue, bool durable, bool exclusive, bool autoDelete, IDictionary<string, object> arguments);
//
//
```

First parameter is queue name "demoqueue".

The second parameter is Durable "true".

The third parameter is Exclusive "false".

The fourth parameter is autodelete "false".

Fifth parameter is Arguments "null".

```
// Create Queue
model.QueueDeclare("demoqueue", true, false, false, null);
```

## Code Snippet

```
using RabbitMQ.Client;
using System;

namespace RequestRabbitMQ
{
    class Program
    {
        static void Main(string[] args)
        {
            string UserName = "guest";
            string Password = "guest";
            string HostName = "localhost";

            //Main entry point to the RabbitMQ .NET AMQP client
            var connectionFactory = new RabbitMQ.Client.ConnectionFactory()
            {
                UserName = UserName,
                Password = Password,
                HostName = HostName
            };

            var connection = connectionFactory.CreateConnection();
            var model = connection.CreateModel();

            //// Create Exchange
            //model.ExchangeDeclare("demoExchange", ExchangeType.Direct);
            //Console.WriteLine("Creating Exchange");
        }
    }
}
```

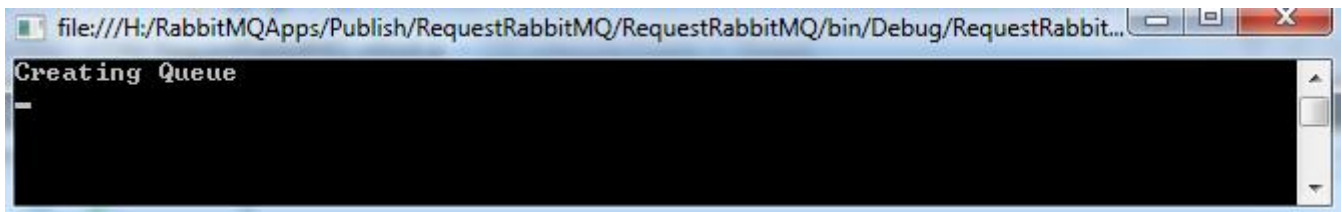
```

// Create Queue
model.QueueDeclare("demoqueue", true, false, false, null);
Console.WriteLine("Creating Queue");

Console.ReadLine();
    }
}
}

```

Let's check result by running application.



After adding queue let's check web management plugin you will see we have successfully created the queue.

## Queues

▼ All queues (1)

Pagination

Page **1** ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates				+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver	/ get	ack	
demoqueue	D	idle	0	0	0					

After adding queue next we are going to bind queue with the exchange.

### Binding the demoqueue with demoExchange

In binding, we are going to enter the name of exchange "**demoExchange**" and we are going to enter routing key as "**directexchange\_key**".

Method definition

```

//
// Summary:
//     /// (Spec method) Binds a queue. ///
public static void QueueBind(this IModel model, string queue, string exchange, string routingKey, IDictionary<string, object> arguments = null);
//

```

First parameter is queue name "**demoqueue**".



The second parameter is Exchange "**demoExchange**".

Third parameter is routing key "**directexchange\_key**".

```
// Creating Binding
model.QueueBind("demoqueue", "demoExchange", "directexchange_key");
Console.WriteLine("Creating Binding");
```

## Code Snippet

```
using RabbitMQ.Client;
using System;

namespace RequestRabbitMQ
{
    class Program
    {
        static void Main(string[] args)
        {
            string UserName = "guest";
            string Password = "guest";
            string HostName = "localhost";

            //Main entry point to the RabbitMQ .NET AMQP client
            var connectionFactory = new RabbitMQ.Client.ConnectionFactory()
            {
                UserName = UserName,
                Password = Password,
                HostName = HostName
            };

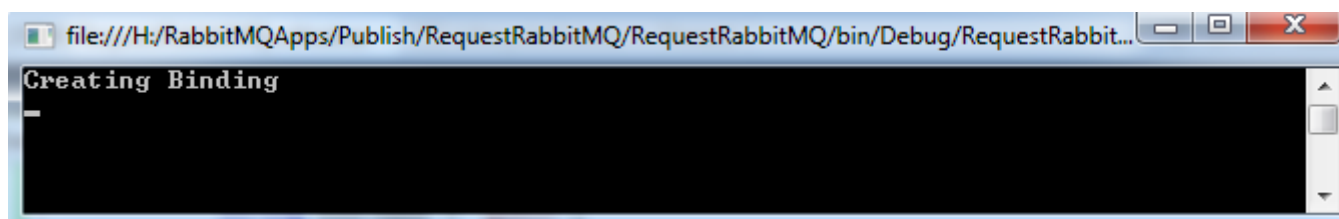
            var connection = connectionFactory.CreateConnection();
            var model = connection.CreateModel();

            //// Create Exchange
            //model.ExchangeDeclare("demoExchange", ExchangeType.Direct);
            //Console.WriteLine("Creating Exchange");

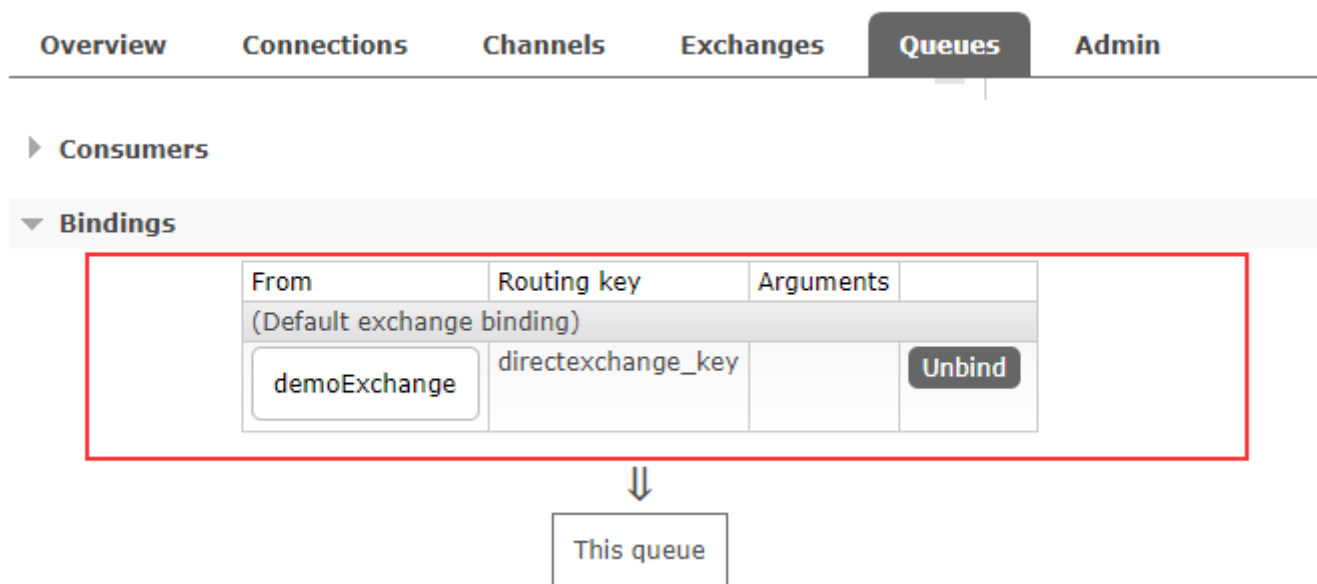
            //// Create Queue
            //model.QueueDeclare("demoqueue", true, false, false, null);
            //Console.WriteLine("Creating Queue");

            // Creating Binding
            model.QueueBind("demoqueue", "demoExchange", "directexchange_key");
            Console.WriteLine("Creating Binding");

            Console.ReadLine();
        }
    }
}
```



After creating binding let's check web management plugin you will see we have successfully created the binding.



Now let's Create Push Message to "**demoqueue**" from a console application.

### Adding a Directmessages Class

We have created a "Directmessage" name class in this class we are going to create request and push to RabbitMQ.

First, we have declared Username, Password, and HostName as constant. After that, we have created a method with name "**SendMessage**" in that message we have created a connection to RabbitMQ server using RabbitMQ.Client after creating connection next we have passed credentials along with HostName to connectionFactory.

Next, we have written a simple message "Direct Message" and got it in bytes array form, finally, we are going to assign all these values to a BasicPublish method of "**RabbitMQ.Client**"

### Method definition

```
/// <summary>
/// (Extension method) Convenience overload of BasicPublish.
/// </summary>
/// <remarks>The publication occurs with mandatory=false</remarks>
public static void BasicPublish(this IModel model, string exchange, string routingKey, IBasicProperties basicProperties, byte[] body)
{
    model.BasicPublish(exchange, routingKey, false, basicProperties, body);
}
```

### The parameter passed to it

Exchange: "demoExchange"

Routing key: "directexchange\_key"

### Code Snippet

```

using RabbitMQ.Client;
using System;
using System.Text;

namespace RequestRabbitMQ
{
    class Program
    {
        static void Main(string[] args)
        {
            string UserName = "guest";
            string Password = "guest";
            string HostName = "localhost";

            //Main entry point to the RabbitMQ .NET AMQP client
            var connectionFactory = new RabbitMQ.Client.ConnectionFactory()
            {
                UserName = UserName,
                Password = Password,
                HostName = HostName
            };

            var connection = connectionFactory.CreateConnection();
            var model = connection.CreateModel();

            //// Create Exchange
            //model.ExchangeDeclare("demoExchange", ExchangeType.Direct);
            //Console.WriteLine("Creating Exchange");

            //// Create Queue
            //model.QueueDeclare("demoqueue", true, false, false, null);
            //Console.WriteLine("Creating Queue");

            // Creating Binding
            //model.QueueBind("demoqueue", "demoExchange", "directexchange_key");
            //Console.WriteLine("Creating Binding");

            var properties = model.CreateBasicProperties();
            properties.Persistent = false;

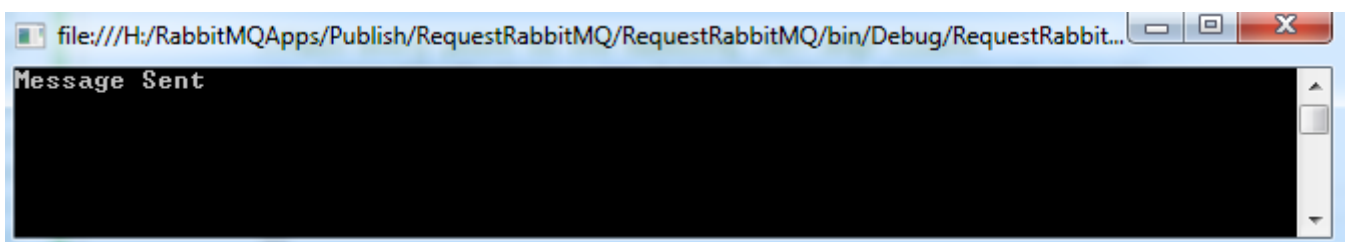
            byte[] messagebuffer = Encoding.Default.GetBytes("Direct Message");

            model.BasicPublish("demoExchange", "directexchange_key", properties, messagebuffer);
            Console.WriteLine("Message Sent");

            Console.ReadLine();
        }
    }
}

```

After completing entire process let's save the application and run after running the application you will see a Message sent a message on a console just for notification.



After sending a message now let's have a look on the queue (demoqueue).

## Now Let's See queue status "demoqueue"

If you see Queues status you will see Ready "1" which means we have successfully published a message to "demoqueue".

### Queues

▼ All queues (1)

Pagination

Page 1 ▼ of 1 - Filter:  ☐ Regex ?

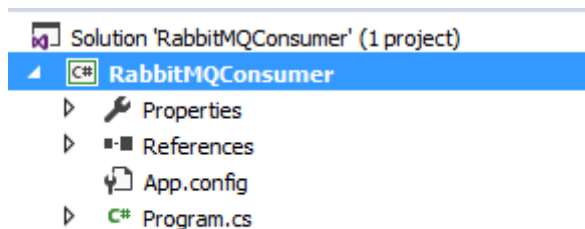
Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
demoqueue	D	idle	1	0	1	0.00/s			

## Consume Message Using C# to RabbitMQ

In this article we are going to learn how to consume messages from RabbitMQ using .Net in step by step way.

### Creating RabbitMQConsumer Application

Let's create another console application for consuming messages from a queue with Name "RabbitMQConsumer"

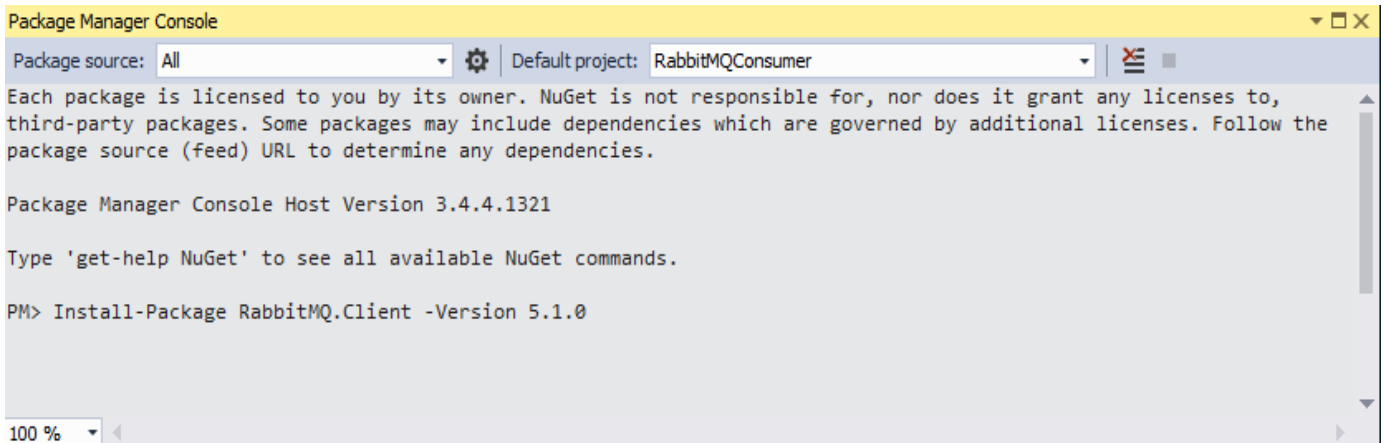


After creating application next we are going to add "RabbitMQ.Client" NuGet package.

### Adding RabbitMQ.Client NuGet Package

In this part for creating a connection with RabbitMQ server to create request, we need to add "RabbitMQ.Client" package from NuGet Package.

Command to install: - Install-Package RabbitMQ.Client -Version 5.1.0



After installing RabbitMQ.Client next we are going to add a class with name **"MessageReceiver"**.

### Code snippet of MessageReceiver class

In this part, we have created MessageReceiver class and this class inherits DefaultBasicConsumer class which is from RabbitMQ.Client next we have to override HandleBasicDeliver method this method receives message body next, we are going to write these messages as we can see in its console.

```
using System;
using System.Text;
using RabbitMQ.Client;

namespace RabbitMQConsumer
{
    public class MessageReceiver : DefaultBasicConsumer
    {
        private readonly IModel _channel;

        public MessageReceiver(IModel channel)
        {
            _channel = channel;
        }

        public override void HandleBasicDeliver(string consumerTag, ulong deliveryTag, bool
redelivered, string exchange, string routingKey, IBasicProperties properties, byte[] body)
        {
            Console.WriteLine($"Consuming Message");
            Console.WriteLine(string.Concat("Message received from the exchange ", exchange));
            Console.WriteLine(string.Concat("Consumer tag: ", consumerTag));
            Console.WriteLine(string.Concat("Delivery tag: ", deliveryTag));
            Console.WriteLine(string.Concat("Routing tag: ", routingKey));
            Console.WriteLine(string.Concat("Message: ", Encoding.UTF8.GetString(body)));
            _channel.BasicAck(deliveryTag, false);
        }
    }
}
```

After completing with understanding code snippet of MessageReceiver class next we are going to calls this class in the Main method.

### Code snippet of Main Method

In the main method we have created connectionFactory class and passed credentials and Hostname after that we have created connection, next we have created channel and set prefetchCount to 1 such that it tells RabbitMQ not to give more than one message to a worker at a time, Next, we have created instance of MessageReceiver class and passed IModel (channel) to it, in final step we have called "**BasicConsume**" method and passed queue name to it "**demoqueue**" along with we have set autoAck to false and passed the messageReceiver instance to it.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using RabbitMQ.Client;

namespace RabbitMQConsumer
{
    class Program
    {
        private const string UserName = "guest";
        private const string Password = "guest";
        private const string HostName = "localhost";

        static void Main(string[] args)
        {
            ConnectionFactory connectionFactory = new ConnectionFactory
            {
                HostName = HostName,
                UserName = UserName,
                Password = Password,
            };

            var connection = connectionFactory.CreateConnection();
            var channel = connection.CreateModel();

            // accept only one unack-ed message at a time
            // uint prefetchSize, ushort prefetchCount, bool global

            channel.BasicQos(0, 1, false);

            MessageReceiver messageReceiver = new MessageReceiver(channel);
            channel.BasicConsume("demoqueue", false, messageReceiver);

            Console.ReadLine();
        }
    }
}
```

Note: - prefetchCount

In order to defeat that we can set the prefetch count with the value of 1. This tells RabbitMQ not to give more than one message to a worker at a time. Or, in other words, don't dispatch a new message to a worker until it has processed and acknowledged the previous one. Instead, it will dispatch it to the next worker that is not still busy.

Now we have complete working mechanism Let's create request from "**RequestRabbitMQ**" console and consume a message from "**RabbitMQConsumer**" application.

## Queue is Empty

### Queues

▼ All queues (1)

Pagination

Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
demoqueue	D	idle	0	0	0	0.00/s	0.00/s	0.00/s	

After we saw that queue (demoqueue) is empty next we are going to publish message to demoqueue.

## Publishing Message

```

var connection = connectionFactory.CreateConnection();
var model = connection.CreateModel();

Create Exchange | Create Queue | Creating Binding

var properties = model.CreateBasicProperties();
properties.Persistent = false;

byte[] messagebuffer = Encoding.Default.GetBytes("Direct Message");

model.BasicPublish("demoExchange", "directexchange_key", properties, messagebuffer);
Console.WriteLine("Message Sent");

Console.ReadLine();

```

After we have published message now let's have a view on (queue) demoqueue.

## Queue after publishing Message

### Queues

▼ All queues (1)

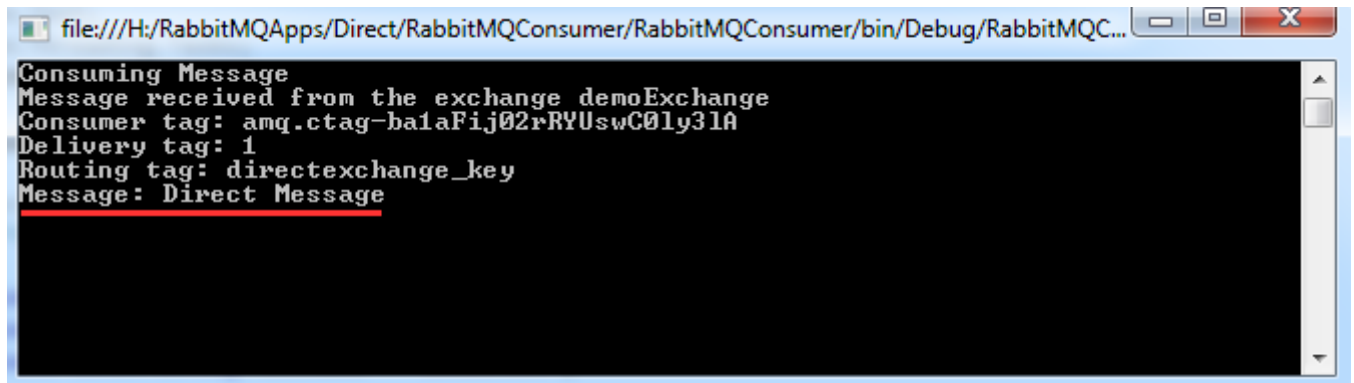
Pagination

Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
demoqueue	D	idle	1	0	1	0.00/s	0.00/s	0.00/s	

After we have push message to (queue) demqueue the console application will start consuming it below is snapshot.

### Consumed Message from demqueue



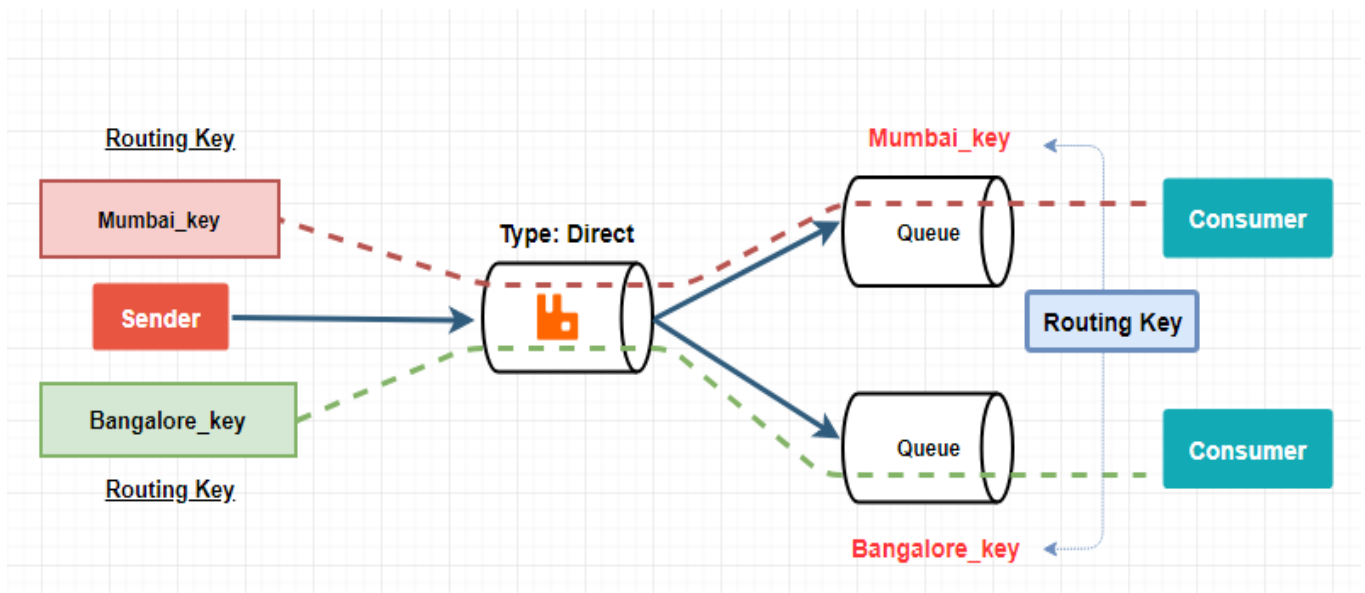
```

file:///H:/RabbitMQApps/Direct/RabbitMQConsumer/RabbitMQConsumer/bin/Debug/RabbitMQC...
Consuming Message
Message received from the exchange demoExchange
Consumer tag: amq.ctag-ba1aFij02rRYUswC01y31A
Delivery tag: 1
Routing tag: directexchange_key
Message: Direct Message
  
```

Finally, we have completed consuming Message from RabbitMQ queue.

### Using RabbitMQ Direct Message Exchanges with .Net Application

In this article, we are going to use Direct Message Exchanges and push messages into RabbitMQ using .Net Application and RabbitMQ.Client and read messages from RabbitMQ using .Net Application and RabbitMQ.Client in step by step way.



### Types of Exchanges

1. Direct
2. fanout
3. Headers
4. Topic



## Details of Exchanges

**Direct:** A direct exchange delivers messages to queues based on a message routing key.

In a direct exchange, the message is routed to the queues whose binding key exactly matches the routing key of the message.

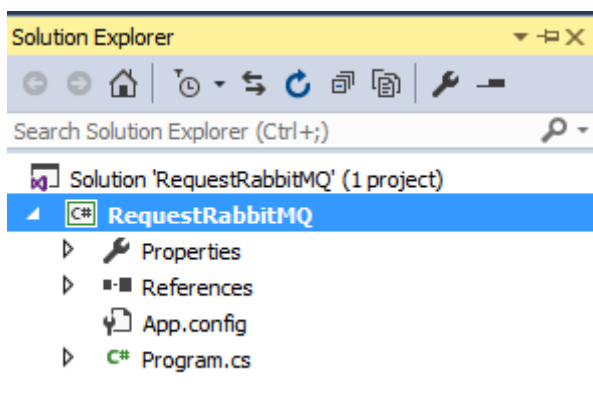
**Fanout:** A fanout exchange routes messages to all of the queues that are bound to it.

**Topic:** The topic exchange does a wildcard match between the routing key and the routing pattern specified in the binding.

**Headers:** Headers exchanges use the message header attributes for routing.

## Creating RequestRabbitMQ Application

Let's Create a simple console application with Name "**RequestRabbitMQ**".

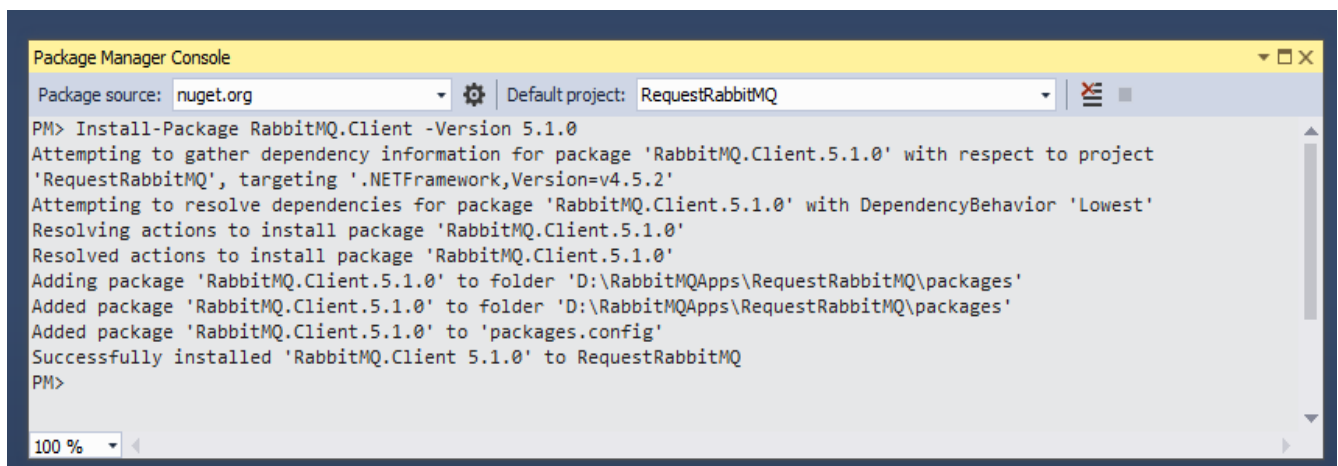


After creating application next we are going to add "**RabbitMQ.Client**" NuGet package.

## Adding RabbitMQ.Client NuGet Package

In this part for creating a connection with RabbitMQ server to create request, we need to add "RabbitMQ.Client" package from NuGet Package.

Command to install: - Install-Package RabbitMQ.Client -Version 5.1.0



After installing NuGet package of **"RabbitMQ.Client"** next we are going to create an exchange from web admin console.

### Adding Direct Exchange

Go to <http://localhost:15672/#/exchanges> , name exchange as **"request.exchange"** after entering name next, we select Type as **"direct"** and click on add exchange button to create.

▼ Add a new exchange

Name:  \*

Type:

Durability:

Auto delete: ?

Internal: ?

Arguments:  =

Add Alternate exchange ?

Add exchange

After adding exchange (request.exchange) next we are going to add Queue (request Queue).

### Adding queue

Go to <http://localhost:15672/#/queues> , add queue: request.queue.

▼ Add a new queue

Name:  \*

Durability:

Auto delete: ?

Arguments:  =

Add Message TTL ? | Auto expire ? | Max length ? | Max length bytes ? | ( Dead letter exchange ? | Dead letter routing key ? | Maximum priority ? Lazy mode ? Master locator ?

Add queue

After adding queue next we are going to bind queue with exchange.

### Binding the request.queue with request.exchange

In binding, we are going to enter the name of exchange **"request.exchange"** and we are going to enter routing key as **"directexchange\_key"**.

## ▼ Bindings

From	Routing key	Arguments	
(Default exchange binding)			
request.exchange	directexchange_key		Unbind



This queue

Add binding to this queue

From exchange:  \*

Routing key:

Arguments:  =  String ▼

Bind

Now let's Create Push Message to "**request.queue**" from a console application.

### Adding a Directmessages Class

We have created a "Directmessage" name class in this class we are going to create request and push to RabbitMQ.

First, we have declared Username, Password and HostName as constant. After that, we have created a method with name "**SendMessage**" in that message we have created a connection to RabbitMQ server using RabbitMQ.Client after creating connection next we have passed credentials along with HostName to connectionFactory. Next, we have written a simple message "Direct Message" and got it in bytes array form, finally, we are going assign all these values to a BasicPublish method of "**RabbitMQ.Client**"

### BasicPublish View

```
/// <summary>
/// (Extension method) Convenience overload of BasicPublish.
/// </summary>
/// <remarks>The publication occurs with mandatory=false</remarks>
public static void BasicPublish(this IModel model, string exchange, string routingKey, IBasicProperties basicProperties, byte[] body)
{
    model.BasicPublish(exchange, routingKey, false, basicProperties, body);
}
```

### The parameter passed to it

Exchange: "request.exchange"

Routingkey: "directexchange\_key"

**Code Snippet**

```

using RabbitMQ.Client;
using System.Text;

namespace RequestRabbitMQ
{
    public class Directmessages
    {
        private const string UserName = "guest";
        private const string Password = "guest";
        private const string HostName = "localhost";

        public void SendMessage()
        {
            //Main entry point to the RabbitMQ .NET AMQP client
            var connectionFactory = new RabbitMQ.Client.ConnectionFactory()
            {
                UserName = UserName,
                Password = Password,
                HostName = HostName
            };

            var connection = connectionFactory.CreateConnection();
            var model = connection.CreateModel();

            var properties = model.CreateBasicProperties();
            properties.Persistent = false;

            byte[] messagebuffer = Encoding.Default.GetBytes("Direct Message");

            model.BasicPublish("request.exchange", "directexchange_key", properties,
messagebuffer);
            Console.WriteLine("Message Sent");
        }
    }
}

```

**Main Code snippet**

```

using System;

namespace RequestRabbitMQ
{
    class Program
    {
        static void Main(string[] args)
        {
            Directmessages directmessages = new Directmessages();
            directmessages.SendMessage();
            Console.ReadLine();
        }
    }
}

```

After completing entire process let's save the application and run after running the application you will see a Message sent a message on a console just for notification.



After sending message now let's have a look on queue (request.queue).

### **Now Let's See queue status "request.queue"**

If you see Queues status you will see Ready "1" which means we have successfully published a message to "request.queue".

## Queues

▼ All queues (1)

Pagination

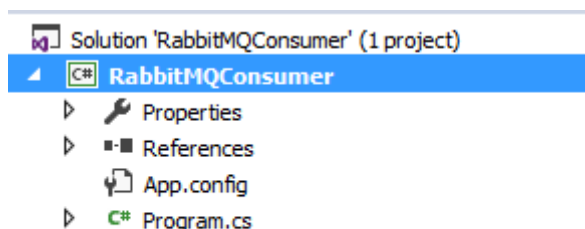
Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
request.queue	D	idle	1	0	1	0.00/s			

After publishing message next we are going to create .Net Console application for consuming message from queue.

### **Creating RabbitMQConsumer Application**

Let's create another console application for consuming messages from a queue with Name "RabbitMQConsumer"

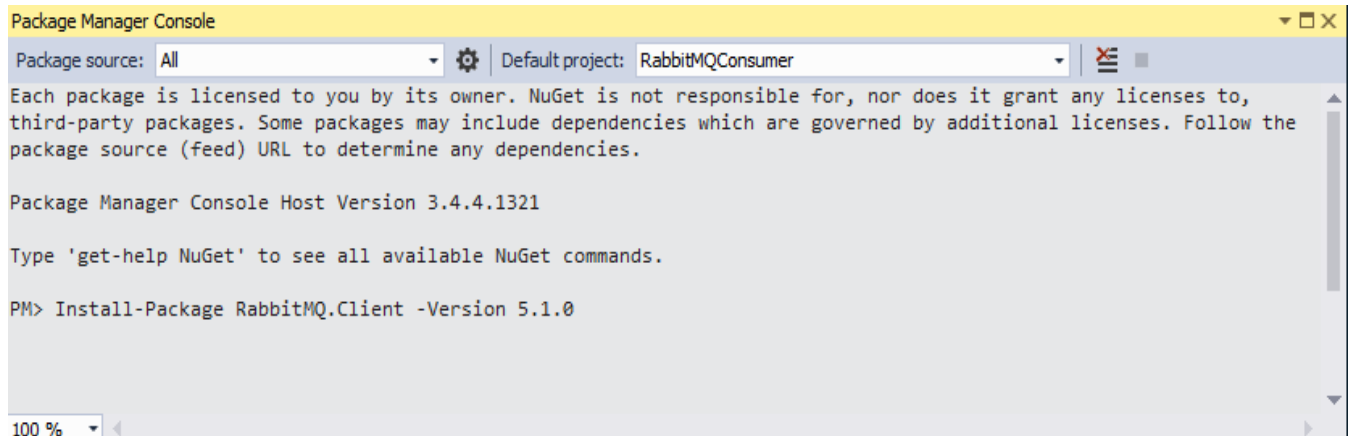


After creating application next we are going to add "RabbitMQ.Client" NuGet package.

## Adding RabbitMQ.Client NuGet Package

In this part for creating a connection with RabbitMQ server to create request, we need to add "RabbitMQ.Client" package from NuGet Package.

Command to install: - Install-Package RabbitMQ.Client -Version 5.1.0



After installing RabbitMQ.Client next we are going to add a class with name **"MessageReceiver"**.

## Code snippet of MessageReceiver class

In this part, we have created MessageReceiver class and this class inherits DefaultBasicConsumer class which is from RabbitMQ.Client next we have to override HandleBasicDeliver method this method receives message body next, we are going to write these messages as we can see in its console.

```
using System;
using System.Text;
using RabbitMQ.Client;

namespace RabbitMQConsumer
{
    public class MessageReceiver : DefaultBasicConsumer
    {
        private readonly IModel _channel;

        public MessageReceiver(IModel channel)
        {
            _channel = channel;
        }

        public override void HandleBasicDeliver(string consumerTag, ulong deliveryTag, bool
redelivered, string exchange, string routingKey, IBasicProperties properties, byte[] body)
        {
            Console.WriteLine($"Consuming Message");
            Console.WriteLine(string.Concat("Message received from the exchange ", exchange));
            Console.WriteLine(string.Concat("Consumer tag: ", consumerTag));
            Console.WriteLine(string.Concat("Delivery tag: ", deliveryTag));
            Console.WriteLine(string.Concat("Routing tag: ", routingKey));
            Console.WriteLine(string.Concat("Message: ", Encoding.UTF8.GetString(body)));
            _channel.BasicAck(deliveryTag, false);
        }
    }
}
```

```
    }
}
```

After completing with understanding code snippet of MessageReceiver class next we are going to call this class in the Main method.

### Code snippet of Main Method

In the main method we have created connectionFactory class and passed credentials and Hostname after that we have created connection, next we have created channel and set prefetchCount to 1 such that it tells RabbitMQ not to give more than one message to a worker at a time, Next, we have created instance of MessageReceiver class and passed IModel (channel) to it, in final step we have called "**BasicConsume**" method and passed queue name to it "**request.queue**" along with we have set autoAck to false and passed the messageReceiver instance to it.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using RabbitMQ.Client;

namespace RabbitMQConsumer
{
    class Program
    {
        private const string UserName = "guest";
        private const string Password = "guest";
        private const string HostName = "localhost";

        static void Main(string[] args)
        {
            ConnectionFactory connectionFactory = new ConnectionFactory
            {
                HostName = HostName,
                UserName = UserName,
                Password = Password,
            };

            var connection = connectionFactory.CreateConnection();
            var channel = connection.CreateModel();

            // accept only one unack-ed message at a time
            // uint prefetchSize, ushort prefetchCount, bool global

            channel.BasicQos(0, 1, false);

            MessageReceiver messageReceiver = new MessageReceiver(channel);
            channel.BasicConsume("request.queue", false, messageReceiver);

            Console.ReadLine();
        }
    }
}
```

Note: - prefetchCount

In order to defeat that we can set the prefetch count with the value of 1. This tells RabbitMQ not to give more than one message to a worker at a time. Or, in other words, don't dispatch a new message to a worker until it has processed and acknowledged the previous one. Instead, it will dispatch it to the next worker that is not still busy.

Now we have complete working mechanism Let's create request from "RequestRabbitMQ" console and consume a message from "RabbitMQConsumer" application.

### Queue is Empty

## Queues

▼ All queues (1)

Pagination

Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
request.queue	D	idle	0	0	0	0.00/s	0.00/s	0.00/s	

After we saw that queue (request.queue) is empty next we are going to publish message to request.queue.

### Publishing Message

```
public class Directmessages
{
    private const string UserName = "guest";
    private const string Password = "guest";
    private const string HostName = "localhost";

    public void SendMessage()
    {
        byte[] messagebuffer = Encoding.Default.GetBytes("Send My First RabbitMQ Message");
        model.BasicPublish("request.exchange", "directexchange_key", properties, messagebuffer);
        Console.WriteLine("Message Sent");
    }
}
```

After we have published message now let's have a view on (queue) request.queue.

### Queue after publishing Message



Exchanges

Queues

Admin

Pagination

Page 1 of 1 - Filter:

☐ Regex ?

Displaying 1 item , page size up to: 100

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
request.queue	D	idle	1	0	1	0.00/s	0.00/s	0.00/s	

► Add a new queue

After we have push message to (queue) request.queue the console application will start consuming it below is snapshot.

### Consumed Message from request.queue

```

file:///D:/RabbitMQApp/RabbitMQConsumer/RabbitMQConsumer/bin/Debug/RabbitMQConsumer.EXE
Consuming Message
Message received from the exchange request.exchange
Consumer tag: amq.ctag-U29QRsqTtkTck1UEHzsugw
Delivery tag: 1
Routing tag: directexchange_key
Message: Send My First RabbitMQ Message
  
```

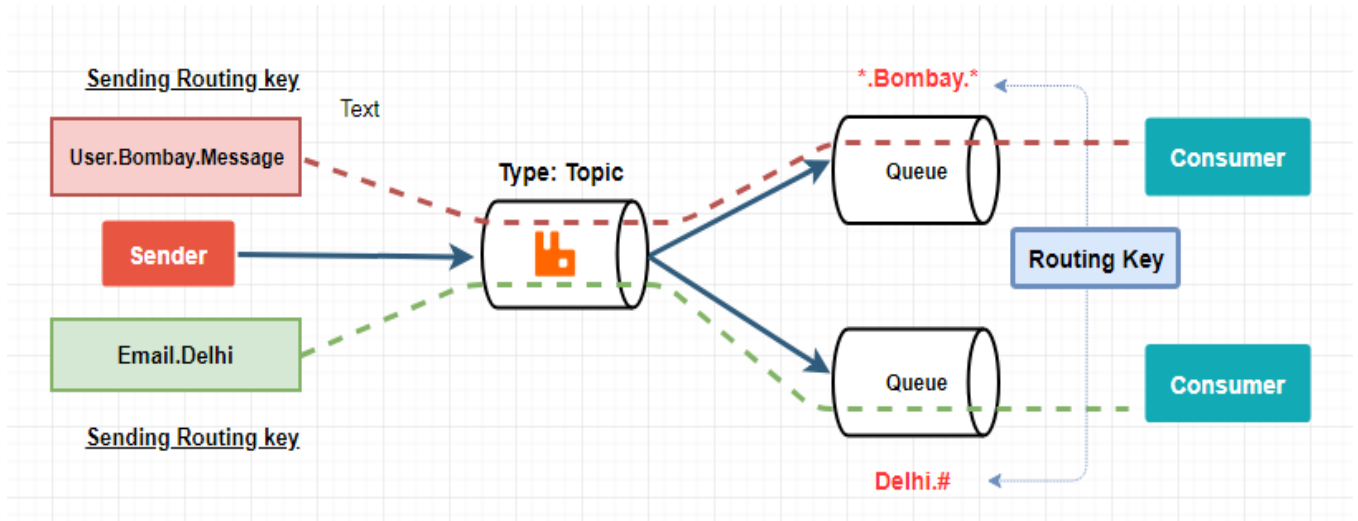
Finally, we have completed consuming Message from RabbitMQ queue.

### Conclusion

In this article, we have learned how to Produce and consume RabbitMQ Direct Message Exchanges with .Net Application in step by step way along with that how to connect to RabbitMQ server using RabbitMQ.Client, how to create direct exchange, queue and bindings.

### Using RabbitMQ Topic Message Exchanges with .Net Application

In this article, we are going to use Topic Message Exchanges and push messages into RabbitMQ using .Net Application and RabbitMQ.Client and read messages from RabbitMQ using .Net Application and RabbitMQ.Client in step by step way.



### What is the Topic Exchange?

The topic exchange does a wildcard match between the routing key and the routing pattern specified in the binding.

In topic exchange, the routing key must not be a simple text such as "Bombay" it must be words with delimited by dots such as "\*.bombay.\*" or "#.bombay" or "Bombay.#".

For example :- I have 2 queues one for Bombay and other for Delhi then the user must send routing key which will match the pattern of routing key then only that message will be added to queue, else message will be lost.

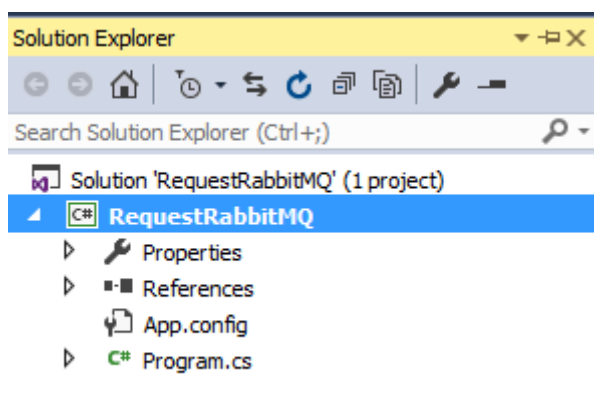
Note: -

\* (star) can substitute for exactly one word.

# (hash) can substitute for zero or more words.

### Creating RequestRabbitMQ Application

Let's Create a simple console application with Name "**RequestRabbitMQ**".

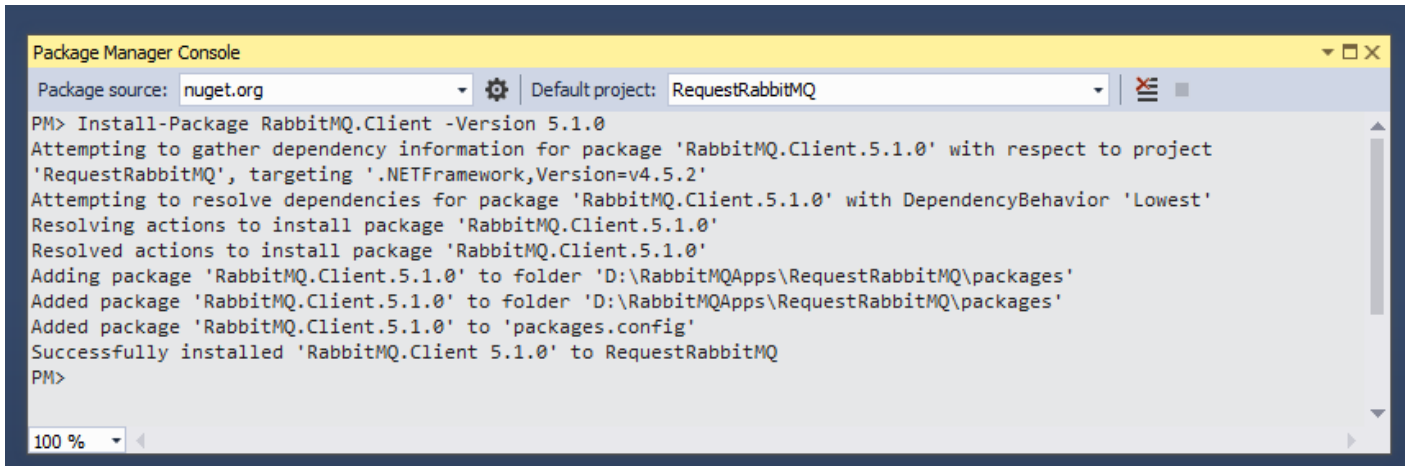


After creating application next we are going to add "**RabbitMQ.Client**" NuGet package.

## Adding RabbitMQ.Client NuGet Package

In this part for creating a connection with the RabbitMQ server to create request, we need to add "RabbitMQ.Client" package from NuGet Package.

Command to install: - Install-Package RabbitMQ.Client -Version 5.1.0



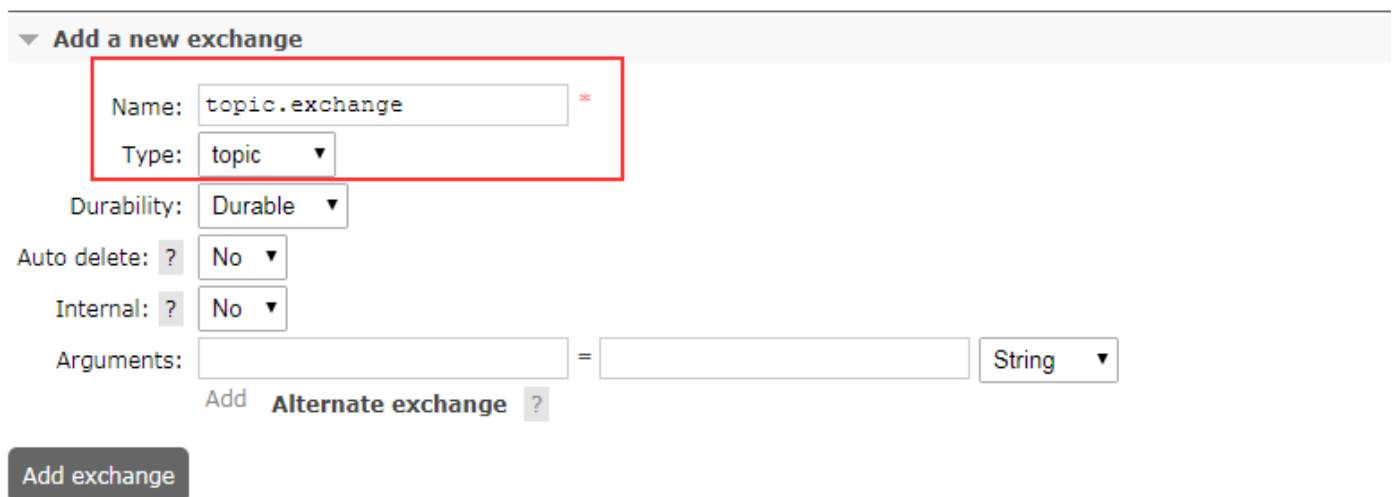
```

Package Manager Console
Package source: nuget.org | Default project: RequestRabbitMQ
PM> Install-Package RabbitMQ.Client -Version 5.1.0
Attempting to gather dependency information for package 'RabbitMQ.Client.5.1.0' with respect to project 'RequestRabbitMQ', targeting '.NETFramework,Version=v4.5.2'
Attempting to resolve dependencies for package 'RabbitMQ.Client.5.1.0' with DependencyBehavior 'Lowest'
Resolving actions to install package 'RabbitMQ.Client.5.1.0'
Resolved actions to install package 'RabbitMQ.Client.5.1.0'
Adding package 'RabbitMQ.Client.5.1.0' to folder 'D:\RabbitMQApps\RequestRabbitMQ\packages'
Added package 'RabbitMQ.Client.5.1.0' to folder 'D:\RabbitMQApps\RequestRabbitMQ\packages'
Added package 'RabbitMQ.Client.5.1.0' to 'packages.config'
Successfully installed 'RabbitMQ.Client 5.1.0' to RequestRabbitMQ
PM>
  
```

After installing NuGet package of "RabbitMQ.Client" next we are going to create an exchange from web admin console.

## Adding Topic Exchange

Go to <http://localhost:15672/#/exchanges>, name exchange as "topic.exchange" after entering name next, we select Type as "topic" and click on add exchange button to create.



▼ Add a new exchange

Name:  \*

Type:

Durability:

Auto delete: ?

Internal: ?

Arguments:  =

Add **Alternate exchange** ?

**Add exchange**

After adding "topic.exchange" next we are going to Add 2 Queue.

## Adding queue

In this part we are going to create 2 queues with different routing key but for same "topic.exchange".

Go to <http://localhost:15672/#/queues>

1. topic.bombay.queue
2. topic.delhi.queue

Adding first queue with name "topic.bombay.queue".

Add a new queue

Name:  \*

Durability:

Auto delete: ?

Arguments:  =

Add
Message TTL ? | Auto expire ? | Max length ? | Max length bytes ? |
Dead letter exchange ? | Dead letter routing key ? | Maximum priority
Lazy mode ? Master locator ?

Add queue

Adding the second queue with name "topic.delhi.queue".

Add a new queue

Name:  \*

Durability:

Auto delete: ?

Arguments:  =

Add
Message TTL ? | Auto expire ? | Max length ? | Max length bytes ? |
Dead letter exchange ? | Dead letter routing key ? | Maximum priority
Lazy mode ? Master locator ?

Add queue

After adding queue is View of the queues which we have added.

## Queues

▼ All queues (3)

Pagination

Page  of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
request.queue	D	idle	0	0	0				
topic.bombay.queue	D	idle	0	0	0				
topic.delhi.queue	D	idle	0	0	0				

After adding queue next we are going to binding queue with "**topic.exchange**".

### Binding the topic.bombay.queue with topic.exchange

In this part, we are binding **topic.exchange** with a **topic.bombay.queue** using a pattern of unique routing key "**\*.Bombay.\***".

Add binding to this queue

From exchange:  \*

Routing key:

Arguments:  =  String ▼

**Bind**

### Snapshot of binding

▼ Bindings

From	Routing key	Arguments	
(Default exchange binding)			
<input type="text" value="topic.exchange"/>	<input type="text" value="*.Bombay.*"/>	<input type="text"/>	<b>Unbind</b>

⇓

### Binding the topic.delhi.queue with topic.exchange

In this part, we are binding **topic.exchange** with a **topic.delhi.queue** using a pattern of unique routing key "**Delhi.#**".

Add binding to this queue

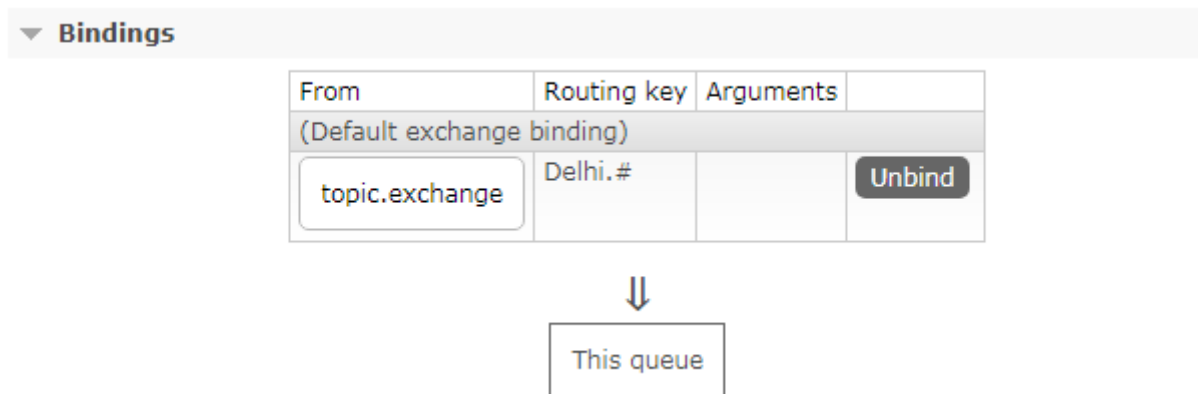
From exchange:  \*

Routing key:

Arguments:  =  String ▼

**Bind**

### Snapshot of binding



After completing with binding next we are going to publish message

### **Adding a Topicmessages Class**

we have created a "Topicmessage" name class in this class we are going to create request and push to RabbitMQ.

First, we have declared Username, Password and HostName as constant. After that, we have created a method with name "**SendMessage**" in that message we have created a connection to RabbitMQ server using RabbitMQ.Client after creating connection next we have passed credentials along with HostName to connectionFactory. Next, we have written a simple message "**Message from Topic Exchange 'Bombay'**" and got it in bytes array form, finally, we are going assign all these values to a BasicPublish method of "**RabbitMQ.Client**"

Routing pattern: - "any text .Bombay. any text".

Examples of routing key: -

"Order.Bombay.Pizza",

"Book.Bombay.Hotels",

"Visit.Bombay.Parks",

"List.Bombay.Colleges".

### **The parameter passed to it**

Exchange: "topic.exchange"

Routing key: "Message.Bombay.Email"

**Code Snippet**

```

public class Topicmessages
{
    private const string Username = "guest";
    private const string Password = "guest";
    private const string HostName = "localhost";

    public void SendMessage()
    {
        //Main entry point to the RabbitMQ .NET AMQP client
        var connectionFactory = new RabbitMQ.Client.ConnectionFactory()
        {
            Username = Username, Password = Password, HostName = HostName
        };

        var connection = connectionFactory.CreateConnection();
        var model = connection.CreateModel();
        var properties = model.CreateBasicProperties();
        properties.Persistent = false;

        byte[] messagebuffer = Encoding.Default.GetBytes("Message from Topic Exchange 'Bombay' ");
        model.BasicPublish("topic.exchange", "Message.Bombay.Email", properties, messagebuffer);
        Console.WriteLine("Message Sent From :- topic.exchange ");
        Console.WriteLine("Routing Key :- Message.Bombay.Email");
        Console.WriteLine("Message Sent");
    }
}

```

**Main Code snippet**

```

using System;
namespace RequestRabbitMQ
{
    class Program
    {
        static void Main(string[] args)
        {
            Topicmessages topicmessages = new Topicmessages();
            topicmessages.SendMessage();
            Console.ReadLine();
        }
    }
}

```

After completing entire process let's save the application and run after running the application you will see a Message sent a message on a console just for notification it means we have successfully published a message to "topic.bombay.queue".

**Published Message to "topic.bombay.queue"**

```

file:///D:/RabbitMQApps/RequestRabbitMQ/RequestRabbitMQ/bin/Debug/RequestRabbitMQ.EXE
Message Sent From :- topic.exchange
Routing Key :- Message.Bombay.Email
Message Sent
-

```

### Now Let's See queue status "request.queue"

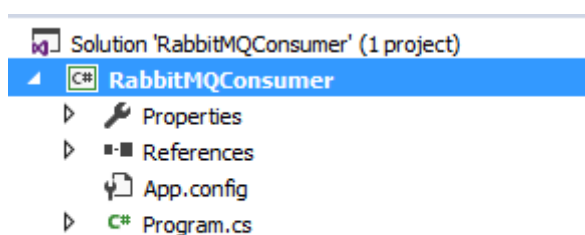
If you see Queues status you will see Ready "1" which means we have successfully published a message to "topic.bombay.queue".

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
request.queue	D	idle	0	0	0				
topic.bombay.queue	D	idle	1	0	1	0.00/s	0.00/s	0.00/s	
topic.delhi.queue	D	idle	0	0	0				

After publishing a message next we are going to create .Net Console application for consuming message from the queue.

### Creating RabbitMQConsumer Application

Let's create another console application for consuming messages from a queue with Name "RabbitMQConsumer"



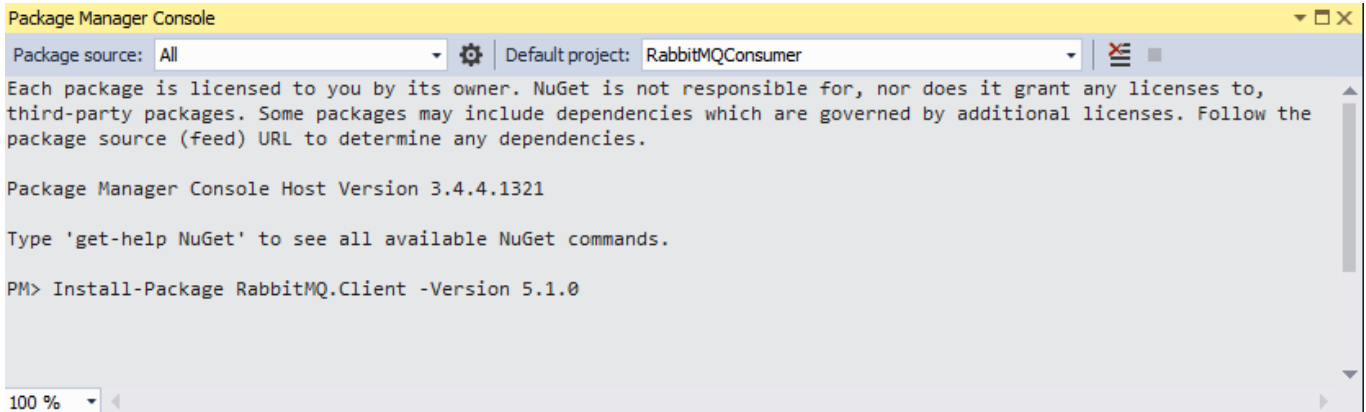
After creating application next we are going to add "RabbitMQ.Client" NuGet package.

### Adding RabbitMQ.Client NuGet Package

In this part for creating a connection with the RabbitMQ server to create request, we need to add "RabbitMQ.Client" package from NuGet Package.

Command to install: - Install-Package RabbitMQ.Client -Version 5.1.0





After installing RabbitMQ.Client next we are going to add a class with name **"MessageReceiver"**.

### Code snippet of MessageReceiver class

In this part, we have created MessageReceiver class and this class inherits DefaultBasicConsumer class which is from RabbitMQ.Client next we have to override HandleBasicDeliver method this method receives message body next, we are going to write these messages as we can see in its console.

```
public class MessageReceiver : DefaultBasicConsumer
{
    private readonly IModel _channel;

    public MessageReceiver(IModel channel)
    {
        _channel = channel;
    }

    public override void HandleBasicDeliver(string consumerTag, ulong deliveryTag, bool
redelivered, string exchange, string routingKey, IBasicProperties properties, byte[] body)
    {
        Console.WriteLine($"Consuming Topic Message");
        Console.WriteLine(string.Concat("Message received from the exchange ", exchange));
        Console.WriteLine(string.Concat("Consumer tag: ", consumerTag));
        Console.WriteLine(string.Concat("Delivery tag: ", deliveryTag));
        Console.WriteLine(string.Concat("Routing tag: ", routingKey));
        Console.WriteLine(string.Concat("Message: ", Encoding.UTF8.GetString(body)));
        _channel.BasicAck(deliveryTag, false);
    }
}
```

After completing with understanding code snippet of MessageReceiver class next we are going to call this class in the Main method.

### Code snippet of Main Method while consuming "topic.bombay.queue"

In the main method we have created connectionFactory class and passed credentials and Hostname after that we have created connection, next we have created channel and set prefetchCount to 1 such that it tells RabbitMQ not to give more than one message to a worker at a time, Next, we have created instance of MessageReceiver class and passed IModel (channel) to it, in final step we have called **"BasicConsume"**

method and passed queue name to it "**topic.bombay.queue**" along with we have set autoAck to false and passed the messageReceiver instance to it.

```
using System;
using RabbitMQ.Client;

namespace RabbitMQConsumer
{
    class Program
    {
        private const string UserName = "guest";
        private const string Password = "guest";
        private const string HostName = "localhost";

        static void Main(string[] args)
        {
            ConnectionFactory connectionFactory = new ConnectionFactory
            {
                HostName = HostName,
                UserName = UserName,
                Password = Password,
            };

            var connection = connectionFactory.CreateConnection();
            var channel = connection.CreateModel();

            // accept only one unack-ed message at a time
            // uint prefetchSize, ushort prefetchCount, bool global

            channel.BasicQos(0, 1, false);

            // ==== prefetchCount
            // In order to defeat that we can set the prefetch count with the value of 1
            // This tells RabbitMQ not to give more than one message to a worker at a time.
            // Or, in other words, don't dispatch a new message to a worker until it has
            // processed and acknowledged the previous one. Instead, it will dispatch it to t
            // the next worker that is not still busy.

            MessageReceiver messageReceiver = new MessageReceiver(channel);
            channel.BasicConsume("topic.bombay.queue", false, messageReceiver);

            Console.ReadLine();
        }
    }
}
```

Now we have complete working mechanism Let's create request from "**RequestRabbitMQ**" console and consume a message from "**RabbitMQConsumer**" application.

### **The queue has one Request which we have published**

The below snapshot contains only one message in topic.bombay.queue which we have published.

## Queues

▼ All queues (3)

Pagination

Page **1** ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
request.queue	D	idle	0	0	0				
topic.bombay.queue	D	idle	1	0	1	0.00/s	0.00/s	0.00/s	
topic.delhi.queue	D	idle	0	0	0				

### Consumed Message from topic.bombay.queue

```

file:///D:/RabbitMQApps/RabbitMQConsumer/RabbitMQConsumer/bin/Debug/RabbitMQConsumer.EXE
Consuming Topic Message
Message received from the exchange topic.exchange
Consumer tag: amq.ctag-tfp1bom4gcnoF401N-RiQA
Delivery tag: 1
Routing tag: Message.Bombay.Email
Message: Message from Topic Exchange 'Bombay'
  
```

After successfully consuming message from "topic.bombay.queue" next we are going to publish a message to another queue which is "topic.delhi.queue".

### Published Message to topic.delhi.queue

In topicmessage class, I have just made a small change in routing key "Delhi.TicketBooking" and message which we send to publish a message to "topic.delhi.queue".

Routing pattern: - "Delhi. any text".

Examples of routing key: - "Delhi.Pizza", "Delhi.Hotels", "Delhi.Parks", "Delhi.Colleges".

### Code Snippet

```

public class Topicmessages
{
    private const string UserName = "guest";
    private const string Password = "guest";
    private const string HostName = "localhost";

    public void SendMessage()
    {
        //Main entry point to the RabbitMQ .NET AMQP client
        var connectionFactory = new RabbitMQ.Client.ConnectionFactory()
        {
            UserName = UserName,
  
```

```

        Password = Password,
        HostName = HostName
    };

    var connection = connectionFactory.CreateConnection();
    var model = connection.CreateModel();

    var properties = model.CreateBasicProperties();
    properties.Persistent = false;

    byte[] messagebuffer = Encoding.Default.GetBytes("Message from Topic Exchange 'Delhi'");

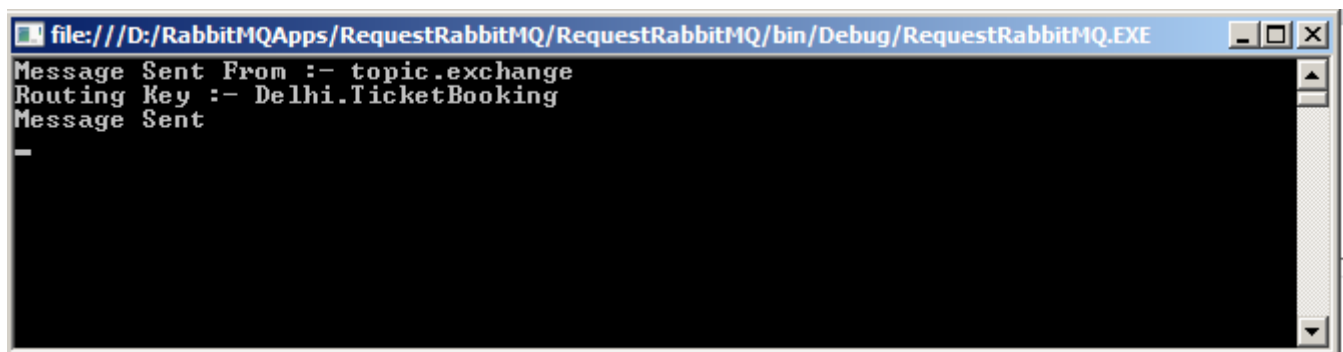
    model.BasicPublish("topic.exchange", "Delhi.TicketBooking", properties,
messagebuffer);

    Console.WriteLine("Message Sent From :- topic.exchange ");
    Console.WriteLine("Routing Key :- Delhi.TicketBooking");
    Console.WriteLine("Message Sent");
}
}

```

After making changes let's save and run application to publish message to "topic.delhi.queue".

### Published Message to "topic.delhi.queue"



### The queue has one Request which we have published

## Queues

▼ All queues (3)

Pagination

Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
request.queue	D	idle	0	0	0				
topic.bombay.queue	D	idle	0	0	0	0.00/s	0.00/s	0.00/s	
topic.delhi.queue	D	idle	1	0	1	0.00/s	0.00/s	0.00/s	

## Code snippet of Main Method while consuming "topic.delhi.queue" from RabbitMQConsumer

In this part, I have just changed the queue name to **"topic.delhi.queue"** in RabbitMQConsumer application.

```
using System;
using RabbitMQ.Client;

namespace RabbitMQConsumer
{
    class Program
    {
        private const string UserName = "guest";
        private const string Password = "guest";
        private const string HostName = "localhost";

        static void Main(string[] args)
        {
            ConnectionFactory connectionFactory = new ConnectionFactory
            {
                HostName = HostName,
                UserName = UserName,
                Password = Password,
            };

            var connection = connectionFactory.CreateConnection();
            var channel = connection.CreateModel();

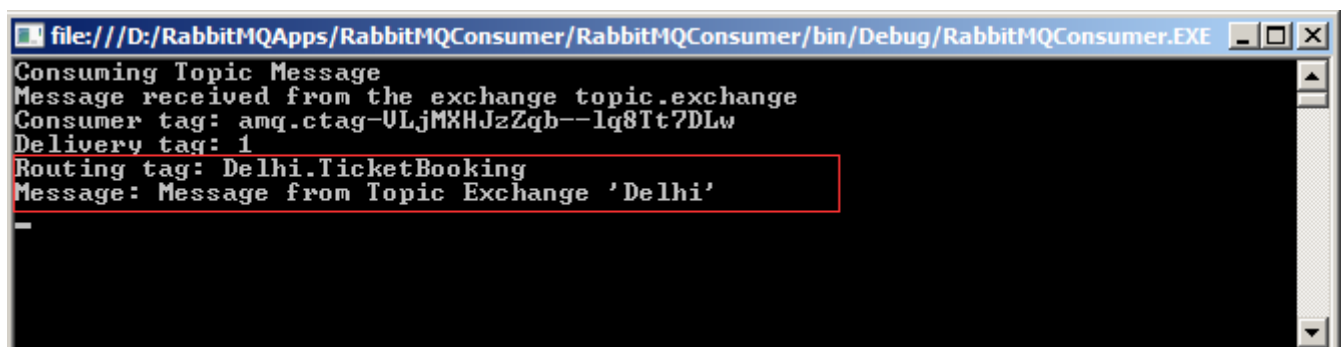
            // accept only one unack-ed message at a time
            // uint prefetchSize, ushort prefetchCount, bool global

            channel.BasicQos(0, 1, false);

            // ==== prefetchCount
            // In order to defeat that we can set the prefetch count with the value of 1
            // This tells RabbitMQ not to give more than one message to a worker at a time.
            // Or, in other words, don't dispatch a new message to a worker until it has
            // processed and acknowledged the previous one. Instead, it will dispatch it to t
            // the next worker that is not still busy.

            MessageReceiver messageReceiver = new MessageReceiver(channel);
            channel.BasicConsume("topic.delhi.queue", false, messageReceiver);
            Console.ReadLine();
        }
    }
}
```

## Consumed Message from topic.delhi.queue



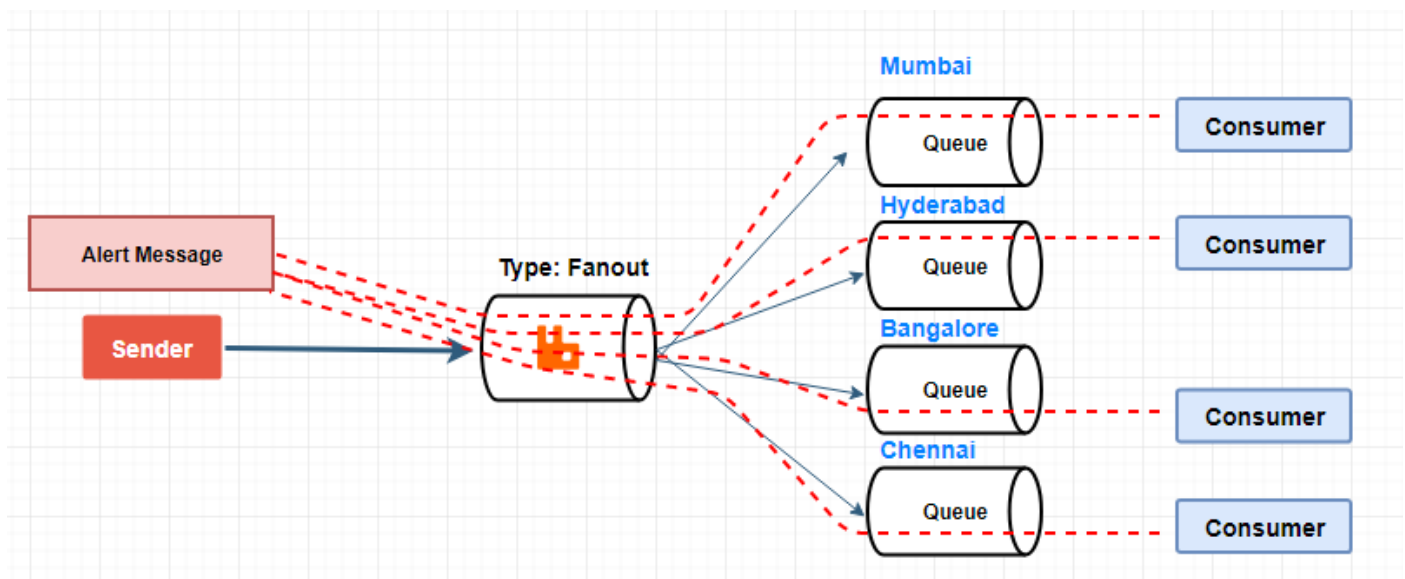
Finally, we have completed consuming Message from **"topic.delhi.queue"** queue.

## Conclusion

In this article, we have learned how to use Topic Message Exchanges and how to create exchange and queue for topic exchange and how to push messages into RabbitMQ using .Net Application and RabbitMQ.Client and read messages from RabbitMQ using .Net Application and RabbitMQ.Client in step by step way.

## Using RabbitMQ Fanout Message Exchanges with .Net Application

In this article, we are going to use Fanout Message Exchanges and push messages into RabbitMQ using .Net Application and RabbitMQ.Client and read messages from RabbitMQ using .Net Application and RabbitMQ.Client in step by step way.



### What is a fanout exchange?

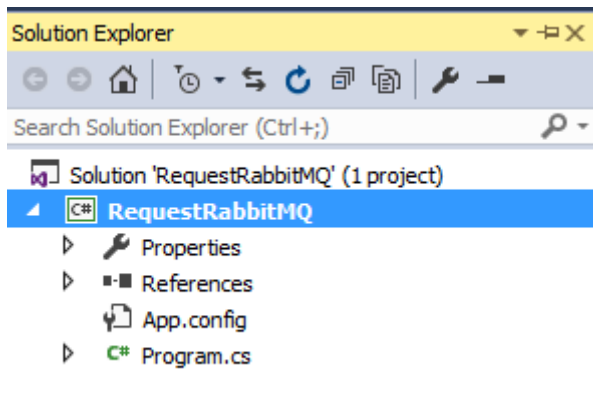
A fanout exchange routes messages to all of the queues that are bound to it.

This exchange is used when you want to publish a common message to all queue which is connected to the particular exchange and in fanout exchange **routing key** is ignored.

e.g. if a company has updated some guidelines and you want push guideline all branches that time you can use fanout exchange.

## Creating RequestRabbitMQ Application

Let's Create a simple console application with Name "**RequestRabbitMQ**".

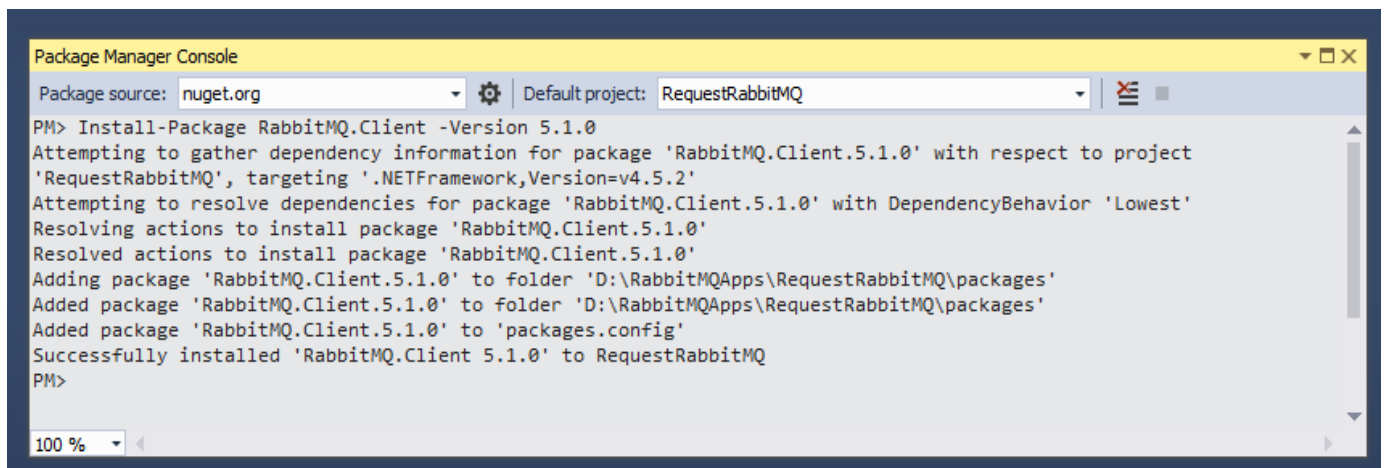


After creating application next we are going to add "**RabbitMQ.Client**" NuGet package.

## Adding RabbitMQ.Client NuGet Package

In this part for creating a connection with the RabbitMQ server to create request, we need to add "RabbitMQ.Client" package from NuGet Package.

Command to install: - Install-Package RabbitMQ.Client -Version 5.1.0



After installing NuGet package of "**RabbitMQ.Client**" next we are going to create an exchange from web admin console.

## Adding Fanout Exchange

Go to <http://localhost:15672/#/exchanges> , name exchange as "**fanout.exchange**" after entering name next, we select Type as "**fanout**" and click on add exchange button to create.

▼ Add a new exchange

Name:  \*

Type:  ▼

Durability:  ▼

Auto delete: ?  ▼

Internal: ?  ▼

Arguments:  =   ▼

Add **Alternate exchange** ?

**Add exchange**

After adding "**fanout.exchange**" next we are going to Add 4 Queue and bind it to same exchange.

### Adding queue

In this part we are going to create 4 queues with different routing key but for same "**fanout.exchange**".

Go to <http://localhost:15672/#/queues>

1. Mumbai
2. Hyderabad
3. Bangalore
4. Chennai

Adding the first queue with name "**Mumbai**".

▼ Add a new queue

Name:  \*

Durability:  ▼

Auto delete: ?  ▼

Arguments:  =   ▼

Add **Message TTL** ? | **Auto expire** ? | **Max length** ? | **Max length bytes** ? | **Overflow behaviour** ? | **Dead letter exchange** ? | **Dead letter routing key** ? | **Maximum priority** ? | **Lazy mode** ? | **Master locator** ?

**Add queue**



In a similar way, I have added rest of queues as shown in below snapshot.

## Queues

▼ All queues (4)

Pagination

Page  of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates		
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack
Bangalore	D	idle	0	0	0			
Chennai	D	idle	0	0	0			
Hyderabad	D	idle	0	0	0			
Mumbai	D	idle	0	0	0			

After adding all queues next we are going to bind queues with “**fanout.exchange**”.

### **Binding the Queues (Bangalore, Chennai, Hyderabad, Mumbai) with fanout.exchange**

In this part, we are binding **fanout.exchange** with all queues (Bangalore, Chennai, Hyderabad, Mumbai).

First queue we are going to bind is Bangalore.

Add binding to this queue

From exchange:  \*

Routing key:

Arguments:  =   ▼

### **Snapshot of binding**

▼ Bindings

From	Routing key	Arguments	
(Default exchange binding)			
fanout.exchange			<input type="button" value="Unbind"/>



This queue

An example is for Bangalore queue in a similar way we are going to do for all rest of queues which are there of fanout exchange (Chennai, Hyderabad, Mumbai).

After completing with binding next we are going to publish message

### **Adding a Fanoutmessages Class**

we have created a "fanoutmessage" name class in this class we are going to create request and push to RabbitMQ.

First, we have declared Username, Password and HostName as constant. After that, we have created a method with name "**SendMessage**" in that message we have created a connection to RabbitMQ server using RabbitMQ.Client after creating connection next we have passed credentials along with HostName to connectionFactory. Next, we have written a simple message "**Message is of fanout Exchange type**" and got it in bytes array form, finally, we are going assign all these values to a BasicPublish method of "**RabbitMQ.Client**"

While assigning we are going to set exchange as "**fanout.exchange**" and there will not be routing key for fanout exchange.

### **Code Snippet**

```
using System;
using RabbitMQ.Client;
using System.Text;

namespace RequestRabbitMQ
{
    public class Fanoutmessages
    {
        private const string UserName = "guest";
        private const string Password = "guest";
        private const string HostName = "localhost";

        public void SendMessage()
        {
            //Main entry point to the RabbitMQ .NET AMQP client
            var connectionFactory = new RabbitMQ.Client.ConnectionFactory()
            {
                UserName = UserName,
                Password = Password,
                HostName = HostName
            };

            var connection = connectionFactory.CreateConnection();
            var model = connection.CreateModel();

            var properties = model.CreateBasicProperties();
            properties.Persistent = false;

            byte[] messagebuffer = Encoding.Default.GetBytes("Message is of fanout Exchange
type");

            model.BasicPublish("fanout.exchange", "", properties, messagebuffer);
            Console.WriteLine("Message Sent From :- fanout.exchange ");
        }
    }
}
```

```

        Console.WriteLine("Routing Key :- Routing key is Not required for fanout exchange");
        Console.WriteLine("Message Sent");
    }
}

```

### **Main Code snippet**

```

using System;
namespace RequestRabbitMQ
{
    class Program
    {
        static void Main(string[] args)
        {
            Fanoutmessages fanoutmessages = new Fanoutmessages();
            fanoutmessages.SendMessage();
            Console.ReadLine();
        }
    }
}

```

After completing entire process let's save the application and run after running the application you will see a Message sent a message on a console just for notification it means we have successfully published a message to all queues of "fanout.exchange" exchange.

### **Published Message to all queues of "fanout.exchange"**



### **Now Let's See queue status (Bangalore, Chennai, Hyderabad, Mumbai) queue**

If you see Queues status you will see Ready "1" which means we have successfully published a message to all queues of fanout exchanges.

## Queues

▼ All queues (4)

Pagination

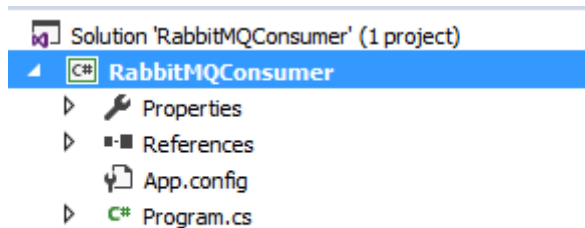
Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
Bangalore	D	idle	1	0	1	0.00/s			
Chennai	D	idle	1	0	1	0.00/s			
Hyderabad	D	idle	1	0	1	0.00/s			
Mumbai	D	idle	1	0	1	0.00/s			

After publishing a message next we are going to create .Net Console application for consuming message from the queue.

### Creating RabbitMQConsumer Application

Let's create another console application for consuming messages from a queue with Name "RabbitMQConsumer"

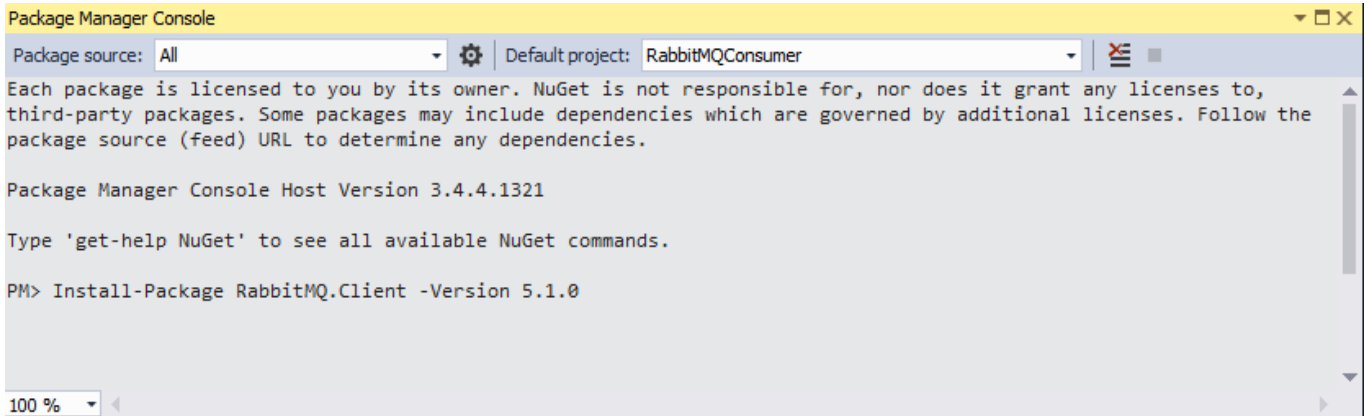


After creating application next we are going to add "RabbitMQ.Client" NuGet package.

### Adding RabbitMQ.Client NuGet Package

In this part for creating a connection with the RabbitMQ server to create request, we need to add "RabbitMQ.Client" package from NuGet Package.

Command to install: - Install-Package RabbitMQ.Client -Version 5.1.0



After installing RabbitMQ.Client next we are going to add a class with name **"MessageReceiver"**.

### Code snippet of MessageReceiver class

In this part, we have created MessageReceiver class and this class inherits DefaultBasicConsumer class which is from RabbitMQ.Client next we have to override HandleBasicDeliver method this method receives message body next, we are going to write these messages as we can see in its console.

```
public class MessageReceiver : DefaultBasicConsumer
{
    private readonly IModel _channel;

    public MessageReceiver(IModel channel)
    {
        _channel = channel;
    }

    public override void HandleBasicDeliver(string consumerTag, ulong deliveryTag, bool
redelivered, string exchange, string routingKey, IBasicProperties properties, byte[] body)
    {
        Console.WriteLine($"Consuming fanout Message");
        Console.WriteLine(string.Concat("Message received from the exchange ", exchange));
        Console.WriteLine(string.Concat("Consumer tag: ", consumerTag));
        Console.WriteLine(string.Concat("Delivery tag: ", deliveryTag));
        Console.WriteLine(string.Concat("Routing tag: ", routingKey));
        Console.WriteLine(string.Concat("Message: ", Encoding.UTF8.GetString(body)));
        _channel.BasicAck(deliveryTag, false);
    }
}
```

After completing with understanding code snippet of MessageReceiver class next we are going to call this class in the Main method.

### Code snippet of Main Method while consuming "Mumbai" queue

In the main method we have created connectionFactory class and passed credentials and Hostname after that we have created connection, next we have created channel and set prefetchCount to 1 such that it tells RabbitMQ not to give more than one message to a worker at a time, Next, we have created instance of MessageReceiver class and passed IModel (channel) to it, in final step we have called **"BasicConsume"** method and passed queue name to it **"Mumbai"** along with we have set autoAck to false and passed the messageReceiver instance to it.

```

// uint prefetchSize, ushort prefetchCount, bool global


channel.BasicQos(0, 1, false);

// ==== prefetchCount
// In order to defeat that we can set the prefetch count with the value of 1
// This tells RabbitMQ not to give more than one message to a worker at a time.
// Or, in other words, don't dispatch a new message to a worker until it has
// processed and acknowledged the previous one. Instead, it will dispatch it to t
// he next worker that is not still busy.

MessageReceiver messageReceiver = new MessageReceiver(channel);
channel.BasicConsume("Mumbai", false, messageReceiver);

Console.ReadLine()

```

 (extension) string IModel.BasicConsume(string queue, bool autoAck, IBasicConsumer consumer) (+ 4 overloads)  
Start a Basic content-class consumer.

```

using System;
using RabbitMQ.Client;
namespace RabbitMQConsumer
{
    class Program
    {
        private const string UserName = "guest";
        private const string Password = "guest";
        private const string HostName = "localhost";

        static void Main(string[] args)
        {
            ConnectionFactory connectionFactory = new ConnectionFactory
            {
                HostName = HostName,
                UserName = UserName,
                Password = Password,
            };

            var connection = connectionFactory.CreateConnection();
            var channel = connection.CreateModel();
            // accept only one unack-ed message at a time
            // uint prefetchSize, ushort prefetchCount, bool global

            channel.BasicQos(0, 1, false);
            // ==== prefetchCount
            // In order to defeat that we can set the prefetch count with the value of 1
            // This tells RabbitMQ not to give more than one message to a worker at a time.
            // Or, in other words, don't dispatch a new message to a worker until it has
            // processed and acknowledged the previous one. Instead, it will dispatch it to t
            // he next worker that is not still busy.
            MessageReceiver messageReceiver = new MessageReceiver(channel);
            channel.BasicConsume("Mumbai", false, messageReceiver);

            Console.ReadLine();
        }
    }
}

```

Now we have complete working mechanism Let's create request from "RequestRabbitMQ" console and consume a message from "RabbitMQConsumer" application.

### The queue has one Request which we have published

The below snapshot shows all queues have one message which we have published using fanout exchange.

## Queues

▼ All queues (4)

Pagination

Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
Bangalore	D	idle	1	0	1	0.00/s			
Chennai	D	idle	1	0	1	0.00/s			
Hyderabad	D	idle	1	0	1	0.00/s			
Mumbai	D	idle	1	0	1	0.00/s			

### Consumed Message from Mumbai queue

This message is only consumed from Mumbai queue rest queues are unread till now.

```

file:///D:/RabbitMQApps/fanout/RabbitMQConsumer/RabbitMQConsumer/bin/Debug/RabbitMQConsu...
Consuming fanout Message from Mumbai
Message received from the exchange fanout.exchange
Consumer tag: amq.ctag-rYWjTDJmz_GSC-3mk3D8fA
Delivery tag: 1
Routing tag:
Message: Message is of fanout Exchange type
  
```

The status of the queue after reading Message from Mumbai queue.

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
Bangalore	D	idle	1	0	1	0.00/s			
Chennai	D	idle	1	0	1	0.00/s			
Hyderabad	D	idle	1	0	1	0.00/s			
Mumbai	D	idle	0	0	0	0.00/s	0.00/s	0.00/s	

In a similar way, if we read a message from Bangalore queue than just need to make a change in “**queue name**” in **RabbitMQConsumer**.

### Consumed Message from Bangalore queue

We have changed just name of the queue from Mumbai to Bangalore. To read a message from Bangalore queue.

```
using System;
using RabbitMQ.Client;

namespace RabbitMQConsumer
{
    class Program
    {
        private const string UserName = "guest";
        private const string Password = "guest";
        private const string HostName = "localhost";

        static void Main(string[] args)
        {
            ConnectionFactory connectionFactory = new ConnectionFactory
            {
                HostName = HostName,
                UserName = UserName,
                Password = Password,
            };

            var connection = connectionFactory.CreateConnection();
            var channel = connection.CreateModel();

            // accept only one unack-ed message at a time
            // uint prefetchSize, ushort prefetchCount, bool global

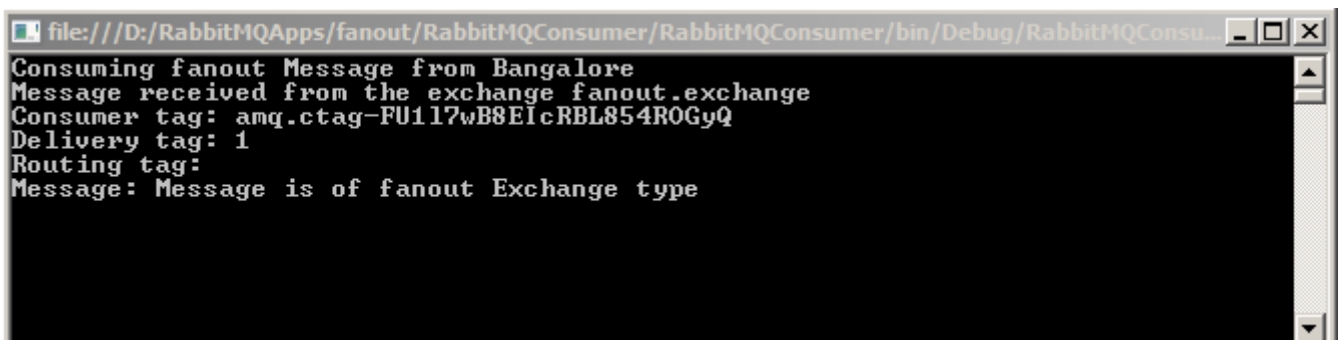
            channel.BasicQos(0, 1, false);

            #region MyRegion
            // ==== prefetchCount
            // In order to defeat that we can set the prefetch count with the value of 1
            // This tells RabbitMQ not to give more than one message to a worker at a time.
            // Or, in other words, don't dispatch a new message to a worker until it has
            // processed and acknowledged the previous one. Instead, it will dispatch it to t
            // the next worker that is not still busy.
            #endregion

            MessageReceiver messageReceiver = new MessageReceiver(channel);
            channel.BasicConsume("Bangalore", false, messageReceiver);

            Console.ReadLine();
        }
    }
}
```

Let's save and run application to red message from Bangalore queue.



```
file:///D:/RabbitMQApps/fanout/RabbitMQConsumer/RabbitMQConsumer/bin/Debug/RabbitMQConsu...
Consuming fanout Message from Bangalore
Message received from the exchange fanout.exchange
Consumer tag: amq.ctag-FU117wB8ElcRBL854R0GyQ
Delivery tag: 1
Routing tag:
Message: Message is of fanout Exchange type
```



The status of the queue after reading Message from Bangalore queue.

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
Bangalore	D	idle	0	0	0	0.00/s	0.00/s	0.00/s	
Chennai	D	idle	1	0	1	0.00/s			
Hyderabad	D	idle	1	0	1	0.00/s			
Mumbai	D	idle	0	0	0	0.00/s	0.00/s	0.00/s	

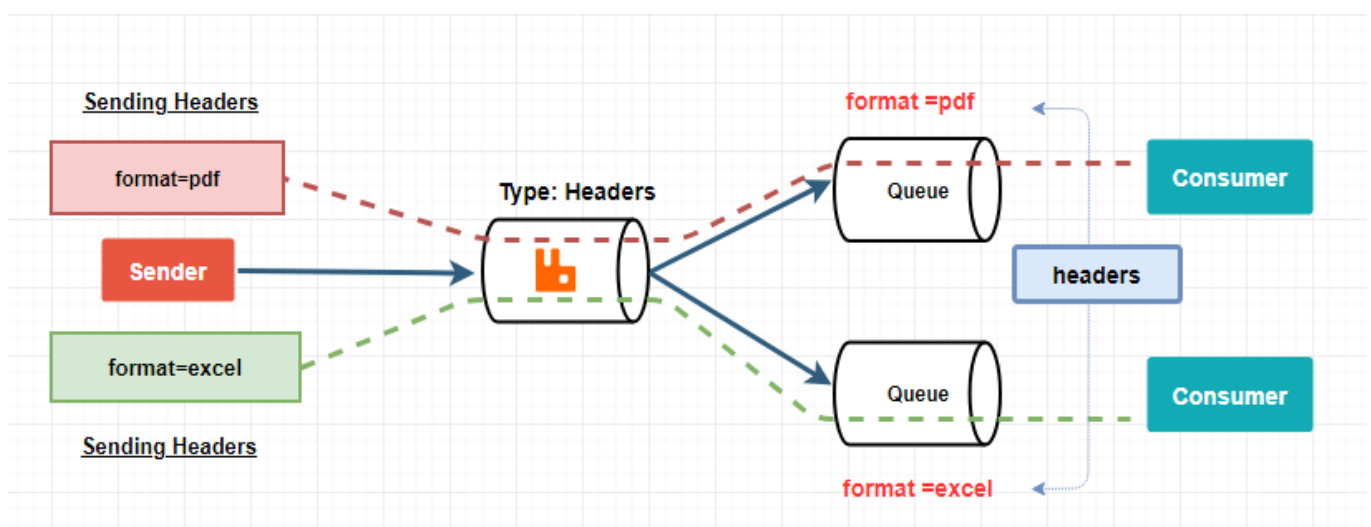
Finally, we have learned how fanout exchange works and how we can publish messages and consume messages from fanout exchange in step by step way.

### Conclusion

In this article, we have learned how to use Fanout Message Exchanges and how to create exchange and queue for Fanout exchange and how to push messages into RabbitMQ using .Net Application and RabbitMQ.Client and read messages from RabbitMQ using .Net Application and RabbitMQ.Client in step by step way.

### Using RabbitMQ Headers Message Exchanges with .Net Application

In this article, we are going to use Headers Message Exchanges and push messages into RabbitMQ using .Net Application and RabbitMQ.Client and read messages from RabbitMQ using .Net Application and RabbitMQ.Client in step by step way.



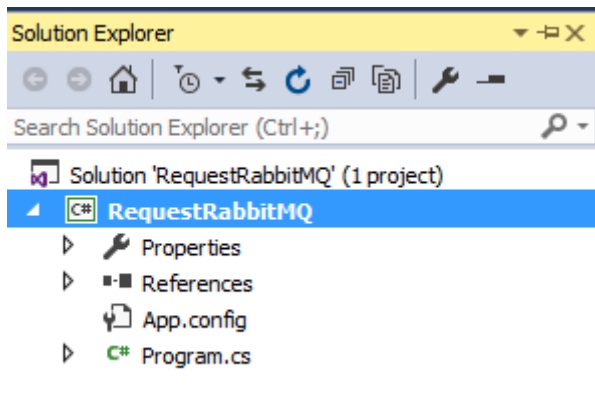
## What is a Headers exchange?

Headers exchanges use the message header attributes for routing.

This exchange is used when you want to send a message to queue but this time it will not depend on routing key it will be sent to queue on bases of header attributes.

## Creating RequestRabbitMQ Application

Let's Create a simple console application with Name "**RequestRabbitMQ**".

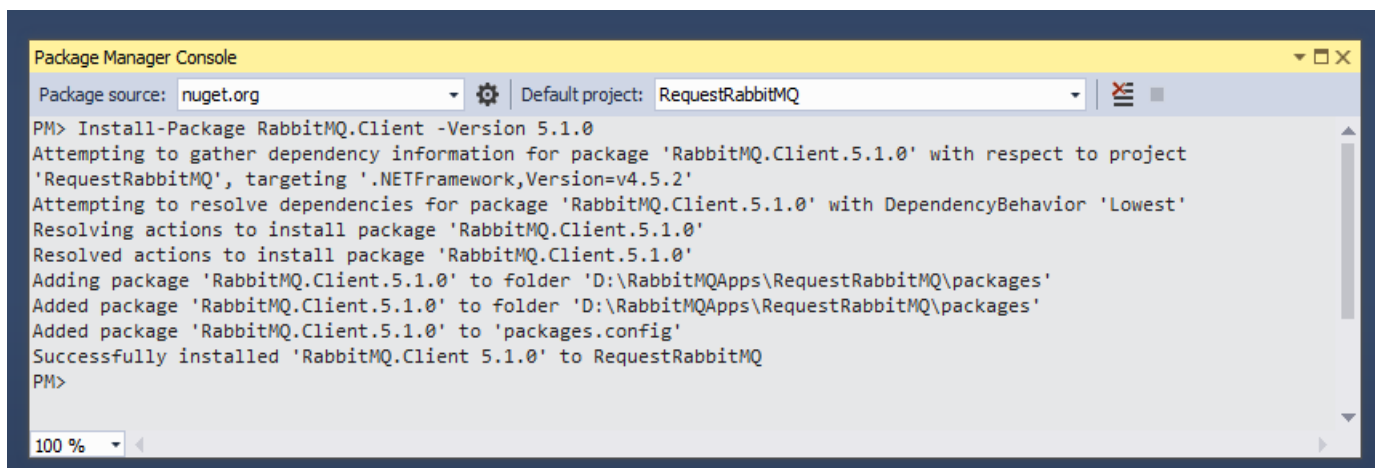


After creating application next we are going to add "**RabbitMQ.Client**" NuGet package.

## Adding RabbitMQ.Client NuGet Package

In this part for creating a connection with the RabbitMQ server to create request, we need to add "RabbitMQ.Client" package from NuGet Package.

Command to install: - Install-Package RabbitMQ.Client -Version 5.1.0



After installing NuGet package of "**RabbitMQ.Client**" next we are going to create an exchange from web admin console.

Note: -

Headers exchange routes message based on header values instead of routing keys.

A special argument named x-match has 2 values {all, any} where all is the default value of a headers binding.

– x-match = all :- means that all the values must match.

– x-match = any :- means just one matching header value is sufficient.

Referenced from: - <http://javasampleapproach.com/spring-framework/spring-boot/springboot-rabbitmq-headers-exchange>

### **Adding Fanout Exchange**

Go to <http://localhost:15672/#/exchanges> , name exchange as "**headers.exchange**" after entering name next, we select Type as "**headers**" and click on add exchange button to create.

▼ Add a new exchange

Name:  \*

Type:  ▼

Durability:  ▼

Auto delete: ?  ▼

Internal: ?  ▼

Arguments:  =   ▼

Add **Alternate exchange** ?

After adding "**headers.exchange**" next we are going to Add 2 Queue and bind it to same exchange.

### **Adding queue**

In this part, we are going to create 2 queues without different routing key but for same "**headers.exchange**".

Go to <http://localhost:15672/#/queues>

1. ReportPDF
2. ReportExcel

▼ Add a new queue

Name:  \*

Durability:

Auto delete: ?

Arguments:  =

Add  |  |  |  |  |  |  |  |

Add queue

In a similar way, I have added rest of queues as shown in below snapshot.

## Queues

▼ All queues (2)

Pagination

Page  of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
ReportExcel	<input type="text" value="D"/>	<input type="text" value="idle"/>	0	0	0				
ReportPDF	<input type="text" value="D"/>	<input type="text" value="idle"/>	0	0	0				

After adding all the queues next we are going to bind queues with "headers.exchange".

### Binding the Queues

In this part, we are binding **headers.exchange** with a "ReportPDF" queue and while binding we are going to set arguments such as format=pdf and x-match=all these arguments need to be passed by producer in the header such that message will be sent to the accurate queue.

Add binding to this queue

From exchange:  \*

Routing key:

Arguments:  =

=

=

Bind

### Snapshot of binding

▼ Bindings

From	Routing key	Arguments	
(Default exchange binding)			
headers.exchange		format: pdf x-match: all	Unbind

⇓

This queue

In this part, we are binding **headers.exchange** with a **"ReportExcel"** queue and while binding we are going to set arguments such as format=pdf and x-match=all this argument needs to be passed by producer in the header such that message will be sent to the accurate queue.

Add binding to this queue

From exchange: headers.exchange \*

Routing key:

Arguments:	format	=	excel	String ▼
	x-match	=	all	String ▼
		=		String ▼

Bind

### Snapshot of binding

▼ Bindings

From	Routing key	Arguments	
(Default exchange binding)			
headers.exchange		format: excel x-match: all	Unbind

After binding all arguments to their respective queue next we are going to publish the message for that we are going to add a class.

### Adding a Headersmessages Class

we have created a "Headersmessages" name class in this class we are going to create request and push to RabbitMQ.

First, we have declared Username, Password, and HostName as constant. After that, we have created a method with name **"SendMessage"** in that message we have created a connection to RabbitMQ server using RabbitMQ.Client after creating connection next we have passed credentials along with HostName to connectionFactory. Next, we have written a simple message **"Message to Headers Exchange 'format=pdf'"** and got it in bytes array form, finally, we are going assign all these values to a BasicPublish method of **"RabbitMQ.Client"**

While assigning we are going to set exchange as **"headers.exchange"** and there will not be routing key for headers exchange.

### Code Snippet

```
public class Headersmessages
{
    private const string UserName = "guest";
    private const string Password = "guest";
    private const string HostName = "localhost";

    public void SendMessage()
    {
        //Main entry point to the RabbitMQ .NET AMQP client
        var connectionFactory = new RabbitMQ.Client.ConnectionFactory()
        {
            UserName = UserName,
            Password = Password,
            HostName = HostName
        };

        var connection = connectionFactory.CreateConnection();
        var model = connection.CreateModel();

        var properties = model.CreateBasicProperties();
        properties.Persistent = false;

        Dictionary<string,object> dictionary = new Dictionary<string, object>();
        dictionary.Add("format", "pdf");
        properties.Headers = dictionary;

        byte[] messagebuffer = Encoding.Default.GetBytes("Message to Headers Exchange
'format=pdf' ");

        model.BasicPublish("headers.exchange", "", properties, messagebuffer);

        Console.WriteLine("Message Sent From :- headers.exchange ");
        Console.WriteLine("Routing Key :- Does not need routing key");
        Console.WriteLine("Message Sent");
    }
}
```

### Main Code snippet

```
using System;
namespace RequestRabbitMQ
{
    class Program
    {
        static void Main(string[] args)
        {
```

```

        Headersmessages headersmessages = new Headersmessages();
        headersmessages.SendMessage();
        Console.ReadLine();
    }
}
}

```

After completing entire process let's save the application and run after running the application you will see a Message sent a message on a console just for notification it means we have successfully published a message to all queues of "headers.exchange" exchange.

### Published Message to Reportpdf queues of "Headers.exchange"



### Now Let's See queue status

If you see Queues status of Reportpdf queue you will see Ready "1" which means, we have successfully published a message to Reportpdf queues using headers exchanges.

## Queues

▼ All queues (2)

Pagination

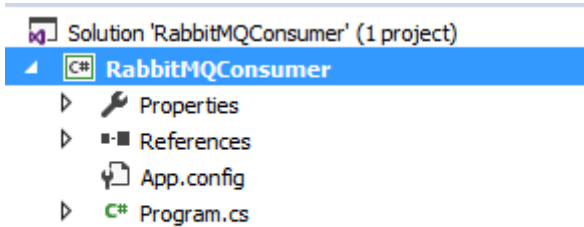
Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
ReportExcel	D	idle	0	0	0				
ReportPDF	D	idle	1	0	1	0.00/s			

After publishing a message next, we are going to create .Net Console application for consuming message from the queue.

### Creating RabbitMQConsumer Application

Let's create another console application for consuming messages from a queue with Name "RabbitMQConsumer"

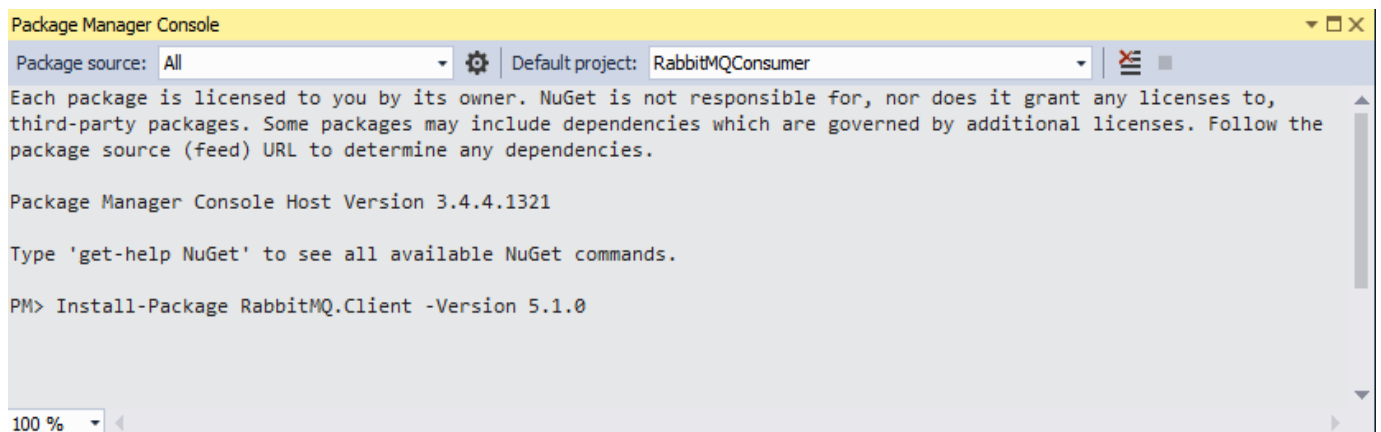


After creating application next, we are going to add "**RabbitMQ.Client**" NuGet package.

### **Adding RabbitMQ.Client NuGet Package**

In this part for creating a connection with the RabbitMQ server to create request, we need to add "RabbitMQ.Client" package from NuGet Package.

Command to install: - Install-Package RabbitMQ.Client -Version 5.1.0



After installing RabbitMQ.Client next we are going to add a class with name "**MessageReceiver**".

### **Code snippet of MessageReceiver class**

In this part, we have created MessageReceiver class and this class inherits DefaultBasicConsumer class which is from RabbitMQ.Client next we have to override HandleBasicDeliver method this method receives message body next, we are going to write these messages as we can see in its console.

```
using System;
using System.Text;
using RabbitMQ.Client;

namespace RabbitMQConsumer
{
    public class MessageReceiver : DefaultBasicConsumer
    {
        private readonly IModel _channel;

        public MessageReceiver(IModel channel)
        {
            _channel = channel;
        }
    }
}
```



```

    }

    public override void HandleBasicDeliver(string consumerTag, ulong deliveryTag, bool
redelivered, string exchange, string routingKey, IBasicProperties properties, byte[] body)
    {
        Console.WriteLine($"Consuming Headers Message");
        Console.WriteLine(string.Concat("Message received from the exchange ", exchange));
        Console.WriteLine(string.Concat("Consumer tag: ", consumerTag));
        Console.WriteLine(string.Concat("Delivery tag: ", deliveryTag));
        Console.WriteLine(string.Concat("Routing tag: ", routingKey));
        Console.WriteLine(string.Concat("Message: ", Encoding.UTF8.GetString(body)));
        _channel.BasicAck(deliveryTag, false);
    }
}
}

```

After completing with understanding code snippet of MessageReceiver class next we are going to call this class in the Main method.

### Code snippet of Main Method while consuming "Mumbai" queue

In the main method we have created connectionFactory class and passed credentials and Hostname after that we have created connection, next we have created channel and set prefetchCount to 1 such that it tells RabbitMQ not to give more than one message to a worker at a time, Next, we have created instance of MessageReceiver class and passed IModel (channel) to it, in final step we have called "**BasicConsume**" method and passed queue name to it "**ReportPDF**" along with we have set autoAck to false and passed the messageReceiver instance to it.

```

channel.BasicQos(0, 1, false);

// ==== prefetchCount
// In order to defeat that we can set the prefetch count with the value of 1
// This tells RabbitMQ not to give more than one message to a worker at a time.
// Or, in other words, don't dispatch a new message to a worker until it has
// processed and acknowledged the previous one. Instead, it will dispatch it to t
// he next worker that is not still busy.

```

```

MessageReceiver messageReceiver = new MessageReceiver(channel);
channel.BasicConsume("ReportPDF", false, messageReceiver);

```

```

Console.ReadLine();

```

```

using System;
using RabbitMQ.Client;

namespace RabbitMQConsumer
{
    class Program
    {
        private const string UserName = "guest";
        private const string Password = "guest";
        private const string HostName = "localhost";
    }
}

```

```

static void Main(string[] args)
{
    ConnectionFactory connectionFactory = new ConnectionFactory
    {
        HostName = HostName,
        UserName = UserName,
        Password = Password,
    };

    var connection = connectionFactory.CreateConnection();
    var channel = connection.CreateModel();

    // accept only one unack-ed message at a time
    // uint prefetchSize, ushort prefetchCount, bool global

    channel.BasicQos(0, 1, false);

    // ==== prefetchCount
    // In order to defeat that we can set the prefetch count with the value of 1
    // This tells RabbitMQ not to give more than one message to a worker at a time.
    // Or, in other words, don't dispatch a new message to a worker until it has
    // processed and acknowledged the previous one. Instead, it will dispatch it to t
    // the next worker that is not still busy.

    MessageReceiver messageReceiver = new MessageReceiver(channel);
    channel.BasicConsume("ReportPDF", false, messageReceiver);

    Console.ReadLine();
}
}
}

```

Now we have completed with consuming module Let's consume a message from "ReportPDF" queue which we have already published.

### The queue has one Request which we have published

The below snapshot shows of ReportPDF queue have one message which we have published using headers exchange.

## Queues

▼ All queues (2)

Pagination

Page 1 ▼ of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
ReportExcel	D	idle	0	0	0				
ReportPDF	D	idle	1	0	1	0.00/s			

### Consumed Message from ReportPDF queue

The snapshot while consuming message is only consumed from ReportPDF queue.

```

file:///H:/RabbitMQApps/Headers/RabbitMQConsumer/RabbitMQConsumer/bin/Debug/RabbitM...
Consuming Headers Message
Message received from the exchange headers.exchange
Consumer tag: amq.ctag--aR6iSdJxR9Q_Y9_AC2YBA
Delivery tag: 1
Routing tag:
Message: Message to Headers Exchange 'format=pdf'
=

```

The status of the queue after reading Message from ReportPDF queue.

Page **1** of 1 - Filter:  ☐ Regex ?

Overview			Messages			Message rates			+/-
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
ReportExcel	D	idle	0	0	0				
ReportPDF	D	idle	0	0	0	0.00/s	0.00/s	0.00/s	

We have completed consuming messages from ReportPDF queue.

## Conclusion

In this article, we have learned how to use headers Message Exchanges and how to create exchange and queue for headers exchange and how to push messages into RabbitMQ using .Net Application and RabbitMQ.Client and read messages from RabbitMQ using .Net Application and RabbitMQ.Client in step by step way.

## **Author**

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<https://www.codeproject.com/Members/saineshwarbageri>

<https://stackoverflow.com/users/1234855/saineshwar?tab=profile>

## **Useful Links**


- Source Code Download Link: - <https://github.com/saineshwar/RabbitMQ>
- Read Articles: - <https://www.tutlane.com/tutorial/rabbitmq>

## **Reference**

- <http://rabbitmq.com>
- <https://www.cloudamqp.com>

## **NuGet's**

- RabbitMQ.Client



**Now  
that  
you've  
read the  
book...**

**TELL US WHAT YOU THINK!**

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**DID IT TEACH YOU WHAT YOU WANTED  
TO LEARN?**

**WAS THERE ROOM FOR IMPROVEMENT?**

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