

# IBM MQ Series Adaptor Configuration

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## Overview

IBM MQ Transport Adaptor (hereafter MQ TA) is an add-in for FIXServer that allows clients to communicate with FIXServer over IBM MQSeries middleware. The document contains full instructions how to install MQ TA for testing.

## Description

MQ TA is responsible for:

- Establishing and maintaining sessions with MQ Series Server to communicate with Clients
- Transmitting messages to its clients
- Delivering messages from clients
- Facilitating monitoring and administration

## Monitoring and Administration

MQ TA provides the following monitoring information:

- Number of messages sent
- Number of messages received
- Time the last message was sent/received for each client
- List of clients

## Integration Guide

### Installation MQ Adaptor to FixEdge

Normally MQ adaptor is distributed as a zip-archive with the name [MQAdaptor-xx.zip](#), where **xx** stands for MQ adaptor version. The distribution package consists of:

File	Description
<a href="#">BIN\MQTAAddin-xx.dll</a> or <a href="#">BIN\MQTAAddin.so</a>	MQ Transport Adaptor dynamic library for Windows or MQ Transport Adaptor shared library for Linux
<a href="#">DOC\MQTA_InstallationGuide.pdf</a>	MQ Transport Adaptor - Installation Guide. This document
<a href="#">DOC\VersionHistory.txt</a>	MQ Transport Adaptor Version History
<a href="#">DOC\FIXEdge.properties</a>	Sample FIX Edge configuration file.

To install MQ adaptor:

- IBM MQ Client libraries must be installed on the FIX Edge machine where MQ Adaptor is ran. Third-party libraries are not included into TA package. They can be downloaded from [here](#).

- Unpack the package and copy [MQTAAddin-xx.dll/ MQTAAddin-xx.so](#) into the FIX Edge /bin folder. Configure adaptor according to the instructions below.
- Restart FIX Edge.

## Configuration

IBM MQ Transport Adaptor can be configured using FIXICC or directly by editing the [FIXEdge.properties](#) file of the correspondent FIX Edge instance. All properties to be set up are described in the table below. You can also use [FIXEdge.properties](#) file from the package as an example.

Make sure that configuration of the adaptor correlates with the MQ Series Server parameters.

Property Name	Default Value	Description
TransportLayer.MQAdaptor.Description	MQ Transport Adaptor DLL	Description of the transport adaptor
TransportLayer.MQAdaptor.DllName	bin/MQTAAddin.dll	Path to the transport adaptor module
TransportLayer.MQAdaptor.TimeIntervalBeforeReconnect	1000	Time interval in milliseconds between reconnect attempts
TransportLayer.MQAdaptor.StorageDirectory	FixEdge1/log	Logging directory for storage of outgoing messages. Required.
TransportLayer.MQAdaptor.BufferSizeForMessage	65536	Message buffer size. Max value is 4194304. 0 means a default value 64 * 1024
TransportLayer.MQAdaptor.MQ_HOSTNAME	localhost	MS Series Server host name
TransportLayer.MQAdaptor.MQ_PORT	1414	MS Series Server port
TransportLayer.MQAdaptor.MQ_MANAGER_NAME	TestMQ	MS Series manager name
TransportLayer.MQAdaptor.MQ_CHANNEL_NAME	TestConnection	MS Series Channel name
TransportLayer.MQAdaptor.MQ_CCSID	437	MS Series Server CCSID. The coded character set identifier to use with the WebSphere MQ queue
TransportLayer.MQAdaptor.SslKeyRepository	/var/mqm/ssl/key	Path to SSL certificate storage file without extension (SCKR,MQSSLKEYR) e.g. /var/mqm/ssl/key or C:\Program Files\IBM\WebSphere MQ\ssl\key
TransportLayer.MQAdaptor.SslCipherSpecification	TRIPLE_DES_SHA_A_US	SSL CipherSpec name (SSLCIPH), required to use SSL, e.g. TRIPLE_DES_SHA_US
TransportLayer.MQAdaptor.SslClientAuthentication	false	Remote peer authentication (SSLCAUTH)
TransportLayer.MQAdaptor.SslPeerName	CN=QMGR.*, OU=IBM, OU=WEBSPPHERE	Remote peer DN filter(SSLPEER)
TransportLayer.MQAdaptor.WaitIntervalForGet	1000	Time interval in milliseconds to wait between polling message on MQ Series Server
TransportLayer.MQAdaptor.NumAttemptReconnect	10	Number of reconnect attempts to MQ Series Server
TransportLayer.MQAdaptor.SessionNumber	1	Number of sessions with MQ Series. Each session is a set of MQ Series queues.
TransportLayer.MQAdaptor.Session.1.ClientID	MQClient	MQ session ID.
TransportLayer.MQAdaptor.Session.1.SmartXMLProcessor	true	Enables mode of processing XML/FIXML messages: <ul style="list-style-type: none"> <li>• For outgoing FIX XML message (MsgType = n) adaptor extracts XML data then sends data to MQ client.</li> <li>• For incoming XML/FIXML raw data adaptor wraps data into FIX XML message (MsgType = n) then routes message to FIX Edge.</li> </ul>
TransportLayer.MQAdaptor.Session.1.ToClientQueue	MQClient_to	The name for Queue, dedicated for message coming from client to MQ via FIX Edge

TransportLayer.MQAdaptor.Session.1.FromClientQueue	MQClient_from	The name for Queue, dedicated for message coming from MQ to client via FIX Edge
TransportLayer.MQAdaptor.Session.1.ErrorQueue	MQClient_error	The name for Queue dedicated for message, which cannot be handled because of error.
TransportLayer.MQAdaptor.Session.1.SenderID	-	Not required. SenderCompID (Tag = 49) in the received message is set to the property value.
TransportLayer.MQAdaptor.Session.1.TargetID	-	Not required. TargetCompID (Tag = 56) in the received message is set to the property value.
TransportLayer.MQAdaptor.Session.1.FromClientDropMessageFilter	-	Not required. Defines a regular expression (perl syntax) to drop matched messages coming from MQ.
TransportLayer.MQAdaptor.Session.1.SmartXMLProcessorFromClientMessageFilter	-	Not required. Defines a regular expression (perl syntax) to apply SmartXMLProcessor to matched messages coming from MQ. Overrides default filter: case insensitive "<!\?xml version.* <FIXML.*"

# WebSphere MQ Setup Guide

## Getting MQ Soft

If you need to setup your own MQ server, you can download software from [IBM Site](#)

## WebSphere MQ Configuration

Steps to configure access to WebSphere MQ (running on Windows) from the remote host are described below. These configuration is performed on the MQ Server host.

1. Create User
  - a. Create non-domain user e.g. **mquser** in 'mqm' group.
  - b. Change its domain to local host name e.g. **EVUAKYISD0223**.
  - c. Grant this user permissions to login remotely.
  - d. Grant this user Administrative permissions.
2. Start MQ
  - a. Start all MQ services ('IBM MQSeries' and 'IBM WebSphere MQ (Installation N)') under user created on previous step. .  
In order to change user for service go to Services. Select service and open its properties, go to 'Log On' tab, select 'This user' and specify user credentials.
3. Configure Manager and Queues
  - a. Start MQExplorer.

**Create Queue Manager**

### Queue Manager

Enter basic values

Queue manager name: \* TestMQ

Make this the default queue manager

Default transmission queue:

Dead-letter queue:

Max handle limit: 256

Trigger interval: 999999999

Max uncommitted messages: 10000

? < Back Next > Finish Cancel

b. Add new Queue Manager (e.g. TestMQ)

New Server-connection Channel

### Create a Server-connection Channel

⚠ If you make changes to this or earlier pages, any changes you have made on later pages will be lost

Name:

Select an existing object from which to copy the attributes for the new object.

c.

Add Server-connection channel to created Queue Manager (e.g. **TestConnection** )

New Server-connection Channel

### Change properties

Change the properties of the new Server-connection Channel

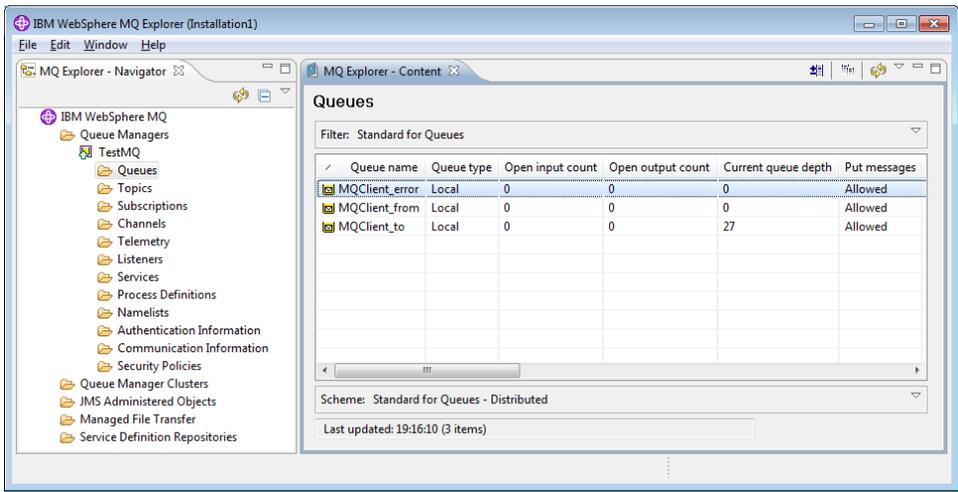
- General
- Extended
- MCA
- Exits
- SSL
- Statistics

**MCA**

MCA user ID:

d.

Set channel MCA with user from step 1.1 ( **mquser** ):



4.

Add queues.

### Check connection to Queue Manager from remote host

#### Check connection using MQ Explorer

In order to use described approach you need to install IBM WebSphere MQ Explorer to the client box.

In order to check connection to Queue Manager from the remote (client) host:

1. Open MQExplorer on remote host
2. Add Remote Queue Manager performing the following steps:

**Add Queue Manager**

**Select the queue manager and connection method**  
Identify the queue manager to add and choose the connection method to use

Queue manager name:

How do you want to connect to this queue manager?

- Connect directly**  
This option creates a new connection to the queue manager (recommended)
- Connect using a client channel definition table**  
This option uses a CCDT to create a new connection to the queue manager
- Connect using an intermediate queue manager**  
This option uses an existing connection from another queue manager  
(Recommended when new connections are restricted)



a. Specify Queue Manager name

**Add Queue Manager**

**Specify new connection details**  
Provide details of the connection you want to set up

Queue manager name:

Connection details

Host name or IP address:

Port number:

Server-connection channel:

Is this a multi-instance queue manager?

Connection details to second instance

Host name or IP address:

Port number:

Server-connection channel:

Autoreconnect

Automatically refresh information shown for this queue manager

Refresh interval (seconds):

b.

Specify host and Server-connection channel

c. Click Finish

QM should be accessible via remote MQ Explorer.

## Check connection using FE

In order to check connection to Queue Manager from the remote (client) host using FE:

1. Configure FE using the following sample properties:

### FIXEdge.properties

```

TransportLayer.TransportAdapters = TransportLayer.MQAdaptor

#-----
# MQ Adaptor Settings
#-----

TransportLayer.MQAdaptor.Description = MQ Transport Adaptor DLL
TransportLayer.MQAdaptor.TimeIntervalBeforeReconnect = 1000

TransportLayer.MQAdaptor.DllName = bin/MQTAaddin-vc10-MD-x64.dll
TransportLayer.MQAdaptor.StorageDirectory = FixEdge1/log
TransportLayer.MQAdaptor.NumAttemptReconnect = -1
TransportLayer.MQAdaptor.WaitIntervalForGet = 10000
TransportLayer.MQAdaptor.BufferSizeForMessage = 65536

```

```

TransportLayer.MQAdaptor.MQ_HOSTNAME = EVUAKYISD0223.kyiv.epam.com
TransportLayer.MQAdaptor.MQ_MANAGER_NAME = TestMQ
TransportLayer.MQAdaptor.MQ_PORT = 1414
TransportLayer.MQAdaptor.MQ_CCSID = 437
TransportLayer.MQAdaptor.MQ_CHANNEL_NAME = TestConnection

TransportLayer.MQAdaptor.SessionNumber = 1
TransportLayer.MQAdaptor.Session.1.ClientID = MQClient
TransportLayer.MQAdaptor.Session.1.FromClientQueue = MQClient_from
TransportLayer.MQAdaptor.Session.1.ToClientQueue = MQClient_to
TransportLayer.MQAdaptor.Session.1.ErrorQueue = MQClient_error
TransportLayer.MQAdaptor.Session.1.SmartXMLProcessor = false

```

## 2. Check if Queues are accessible:

### FixEdge.log

```

[DEBUG] 20120718-11:41:33.609 [2840] [MQEngine] - Was created queue 'MQClient_from'
[DEBUG] 20120718-11:41:33.609 [2840] [MQQueuesReader_Debug] - createClientQueue() finished
[DEBUG] 20120718-11:41:33.609 [2840] [MQQueuesReader_Debug] - ClientQueue created.
[DEBUG] 20120718-11:41:33.609 [2840] [MQQueuesReader_Debug] - MQQueuesReader::
readFromQueuesAndPassToTL().
[DEBUG] 20120718-11:41:33.609 [2840] [MQQueuesReader_Debug] - fromClientQueue->getFirst().
[DEBUG] 20120718-11:41:38.039 [12692] [MQEngine] - Was created queue 'MQClient_to'
[DEBUG] 20120718-11:41:38.251 [12692] [MQEngine] - Was created queue 'MQClient_error'
[DEBUG] 20120718-11:41:38.251 [12692] [MQQueueWriter] - Queues were created for client 'MQClient'
[NOTE] 20120718-11:41:38.251 [12692] [MQQueueWriter] - Restore messages for out queue 'MQClient'.
[NOTE] 20120718-11:41:38.251 [12692] [MQQueueWriter] - Create storage for the: MQClient
[DEBUG] 20120718-11:41:38.251 [12692] [MQQueueWriter] - Load storage.
[DEBUG] 20120718-11:41:38.251 [12692] [MQQueueWriter] - Persistence storage use file: D:\Program
Files\B2Bits\FIX_Edge\v.5.4.1.40091\FixEdge\log\MQ-MQClient_07180941382511.out
[NOTE] 20120718-11:41:38.251 [12692] [MQQueueWriter] - Restore messages for error queue 'MQClient'.
[NOTE] 20120718-11:41:38.251 [12692] [MQQueueWriter] - Create storage for the: MQClient-Errors
[DEBUG] 20120718-11:41:38.251 [12692] [MQQueueWriter] - Load storage.
[DEBUG] 20120718-11:41:38.252 [12692] [MQQueueWriter] - Persistence storage use file: D:\Program
Files\B2Bits\FIX_Edge\v.5.4.1.40091\FixEdge\log\MQ-MQClient -Errors_07180941382511.out
[DEBUG] 20120718-11:41:43.678 [2840] [MQQueueRead] - Was performed get operation on queue
'MQClient_from' with reason code :2033
[DEBUG] 20120718-11:41:43.678 [2840] [MQQueueRead] - MQQueueRead::getFirst failed to get message ''
[DEBUG] 20120718-11:41:43.678 [2840] [MQQueuesReader_Debug] - MQQueuesReader::
readFromQueuesAndPassToTL().
[DEBUG] 20120718-11:41:43.678 [2840] [MQQueuesReader_Debug] - fromClientQueue->getFirst().

```

## 3. Route message to MQ and check FE logs:

### FixEdge.log

```

[DEBUG] 20120718-11:48:16.389 [7968] [FL_MsgTrace] - New message FIX was received from session with ID
'TROIKALSE'. Message: '8=FIX.4.49=16535=D49=LSE56=TROIKA34=250=3073757=ECL_TURQ97=Y52=20120718-09:48:
16.38811=900010081=1003000321=255=TESTA54=160=20000809-18:20:3238=400040=244=3059=010=224'.
[DEBUG] 20120718-11:48:16.389 [7968] [BL_Layer] - Process incoming message.
[DEBUG] 20120718-11:48:16.389 [7968] [BL_RoutingTable] - There are no suitable rules were found for
message with Source ID 'LSE', executing DefaultRule.
[DEBUG] 20120718-11:48:16.389 [7968] [CC_Layer] - BL has processed a message. Number of client IDs for
delivery :0. Number or FIX sessions for delivery :0.. Number or sources identifiers for delivery :1.

Source IDs:
1. 'MQClient'

[DEBUG] 20120718-11:48:16.389 [7968] [TransportLayer] - Sending message '8=FIX.4.49
=16535=D49=LSE56=TROIKA34=250=3073757=ECL_TURQ97=Y52=20120718-09:48:16.38811
=900010081=1003000321=255=TESTA54=160=20000809-18:20:3238=400040=244=3059=010=224' to client MQClient
[DEBUG] 20120718-11:48:16.389 [7968] [MQQueueWriter] - Was put message to messageQueue. Message =
(ToClientQueue, MQClient, 8=FIX.4.49=16535=D49=LSE56=TROIKA34=250=3073757=ECL_TURQ97=Y52=20120718-09:48:
16.38811=900010081=1003000321=255=TESTA54=160=20000809-18:20:3238=400040=244=3059=010=224)
[DEBUG] 20120718-11:48:16.389 [7968] [MQQueueWriter] - Store into the Persistence storage.

```

```
[DEBUG] 20120718-11:48:16.389 [12228] [MQQueueWriter] - Was get message from MessageQueue. Message: (
toClientQueue,MQClient, 8=FIX.4.49=16535=D49=LSE56=TROIKA34=250=3073757=ECL_TURQ97=Y52=20120718-09:48:
16.38811=900010081=1003000321=255=TESTA54=160=20000809-18:20:3238=400040=244=3059=010=224)
[DEBUG] 20120718-11:48:16.460 [12228] [MQQueueWrite] - Was performed put operation on queue
'MQClient_to' with reason code :0. Message = '8=FIX.4.49
=16535=D49=LSE56=TROIKA34=250=3073757=ECL_TURQ97=Y52=20120718-09:48:16.38811
=900010081=1003000321=255=TESTA54=160=20000809-18:20:3238=400040=244=3059=010=224'
[DEBUG] 20120718-11:48:16.460 [12228] [MQQueueWrite] - message was successfully sent to to queue
'MQClient_to' with reason code :0
[DEBUG] 20120718-11:48:16.460 [12228] [MQQueueWriter] - message was put to ToClient queue.Client
'MQClient'. MMessage '8=FIX.4.49=16535=D49=LSE56=TROIKA34=250=3073757=ECL_TURQ97=Y52=20120718-09:48:
16.38811=900010081=1003000321=255=TESTA54=160=20000809-18:20:3238=400040=244=3059=010=224'
```

## Configuring SSL in IBM MQ Server

**This instruction assumes that non-SSL configuration works OK**

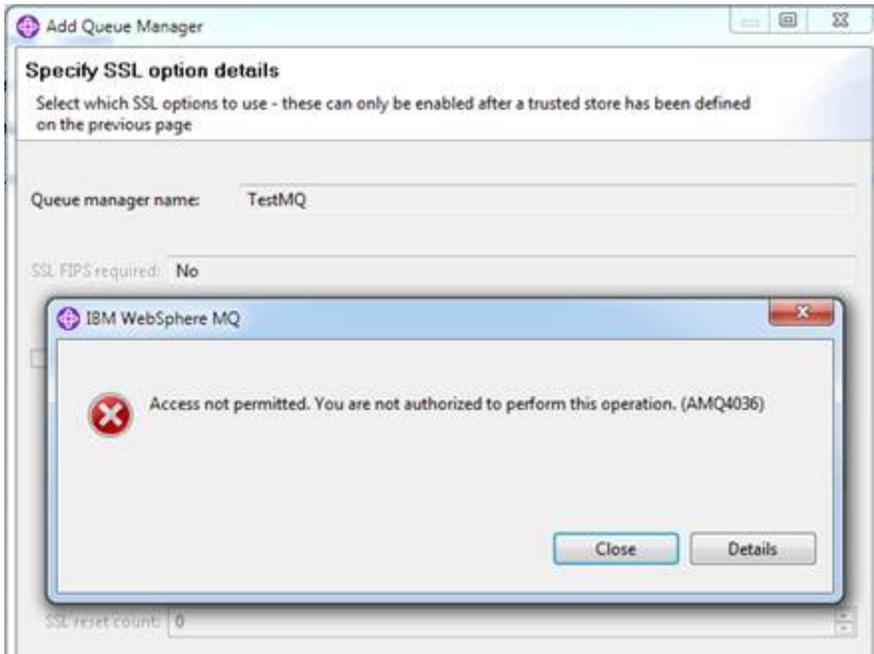
1. On IBM MQ server start IBM Key Management tool
2. Create new Key Database File
  - Key database type: CMS
  - File name: key.kdb
  - Location: use same location as specified in "SSL Key Repository" parameter of your Queue Manager (for example, if SSL Key Repository is "C:\Program Files (x86)\IBM\WebSphere MQ\Qmgrs\FIXEdge\ssl\key", then set Location: C:\Program Files (x86)\IBM\WebSphere MQ\Qmgrs\FIXEdge\ssl)
3. Create Password and set "Stash password to a file" checkbox
4. Click on "New Self-Signed..." button to create self-signed certificate
  - Key Label: set it as "ibmwebsphermq<QM\_name>", here QM\_name - name of your Queue Manager in lower case
  - Common Name: set any
  - Organization: set any
  - Organization Unit: set any
5. Close IBM Key Management using menu Key Database File -> Close and then Key Database File -> Exit
6. Go to SSL Key Repository folder and make sure that only SYSTEM and your MQ user have full access to key.kdb, key.rdb and key.sth files. All other user may have only "Read" permissions
7. In Websphere MQ Explorer go to Channels
8. Open Properties of your channel and on SSL tab select SSL Cipher Spec. For example, TRIPLE\_DES\_SHA\_US.
  - Select SSL Authentication = Optional if you don't plan to use SSL client authentication.
  - Apply your changes
9. From SSL Key Repository folder (see step 2) copy three files: key.kdb, key.rdb and key.sth files somewhere on FIXEdge's server (for example, FixEdge1/conf)
10. Configure FIXEdge.properties to use SSL connection with MQ:
 

```
TransportLayer.MQAdaptor.SslKeyRepository = C:\B2BITS\FIXEdge\FixEdge1\conf\key
TransportLayer.MQAdaptor.SslCipherSpecification = TRIPLE_DES_SHA_US
TransportLayer.MQAdaptor.SslClientAuthentication = false
TransportLayer.MQAdaptor.SslPeerName =
```

## Troubleshooting

If MQ TA fails to initialize with record in log "Failed to set character set. Code: some code": make sure QueueManager on server side is running and you are trying to set right code character set.

If the following error message appears while accessing remote MQ manager using MQExplorer



you should perform the following steps:

1. Login to remote server where MQ Instance is running
2. Open cmd
3. Run 'runmqsc'. Check if connected to correct QM:

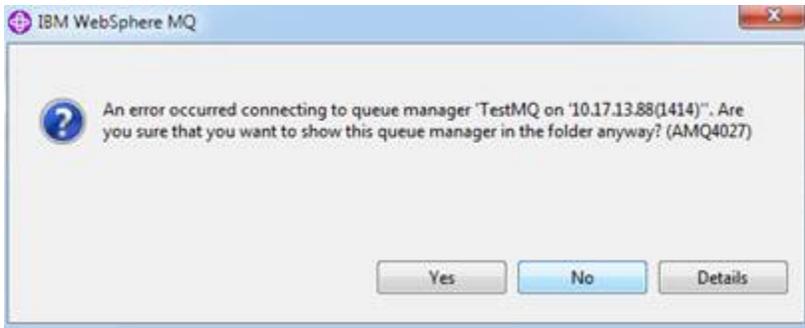
```
C:\mspec\mquser> runmqsc
5724-N72 (C) Copyright IBM Corp. 1994, 2011. ALL RIGHTS RESERVED.
Starting MQSC for queue manager TestMQ.
```

4. Execute 'ALTER QMGR CHLAUTH(DISABLED)':

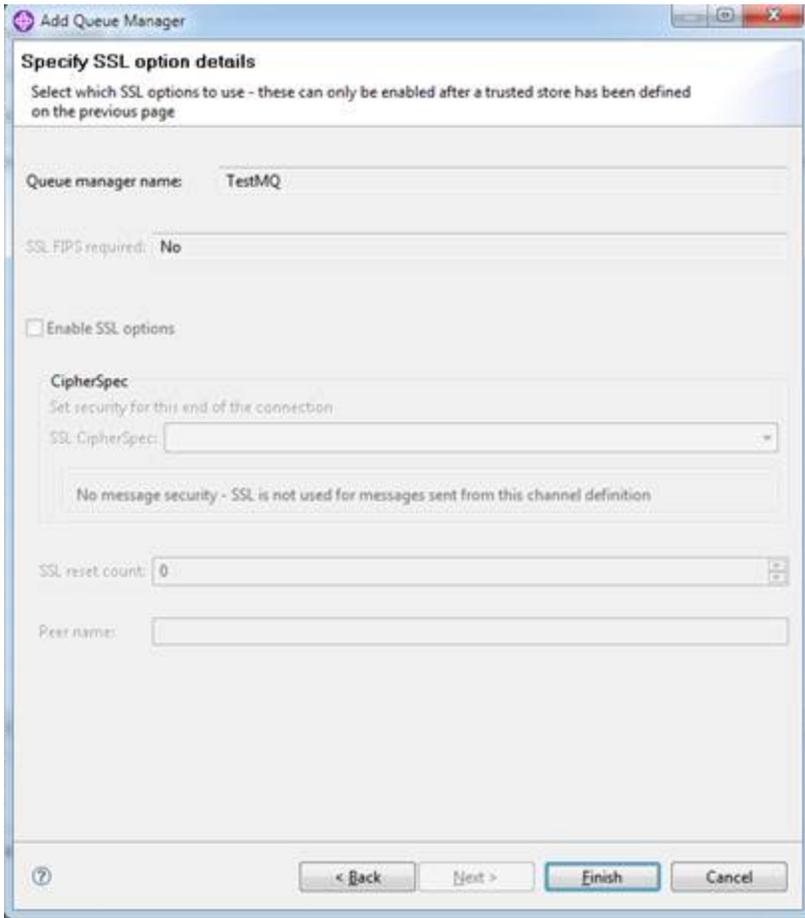
```
C:\mspec\mquser> runmqsc
5724-N72 (C) Copyright IBM Corp. 1994, 2011. ALL RIGHTS RESERVED.
Starting MQSC for queue manager TestMQ.

ALTER QMGR CHLAUTH(DISABLED)
1 : ALTER QMGR CHLAUTH(DISABLED)
AMQ8085: WebSphere MQ queue manager changed.
```

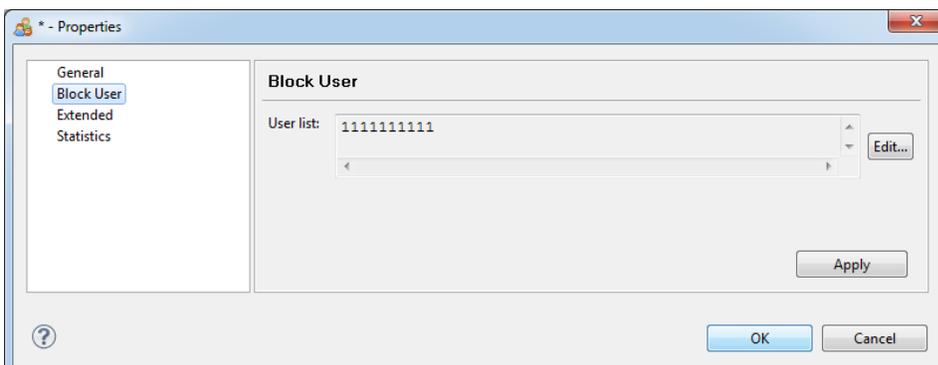
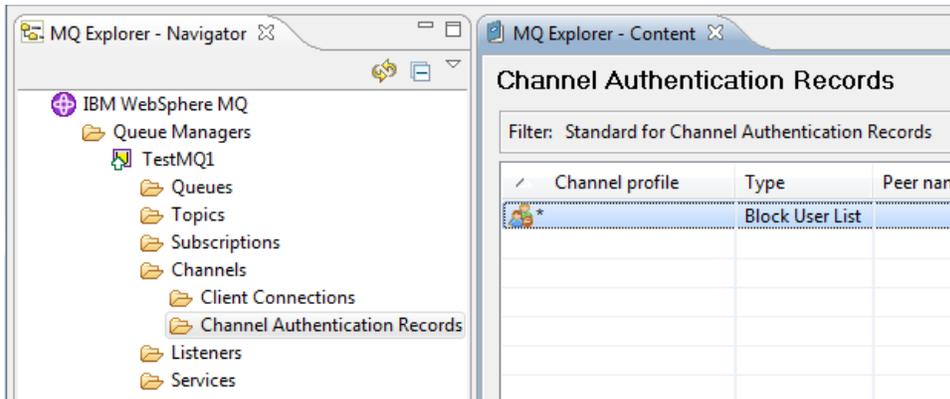
5. Try to reestablish connection by clicking 'No' in the dialog:



6. And Finish in the dialog:



7. If the error is still here, look at Channel authentication records and make sure that your account is not in the Block User List:



8. Try again steps 5-6.