MQAUSX for z/OS Queue Manager To Queue Manager Configuration Manual

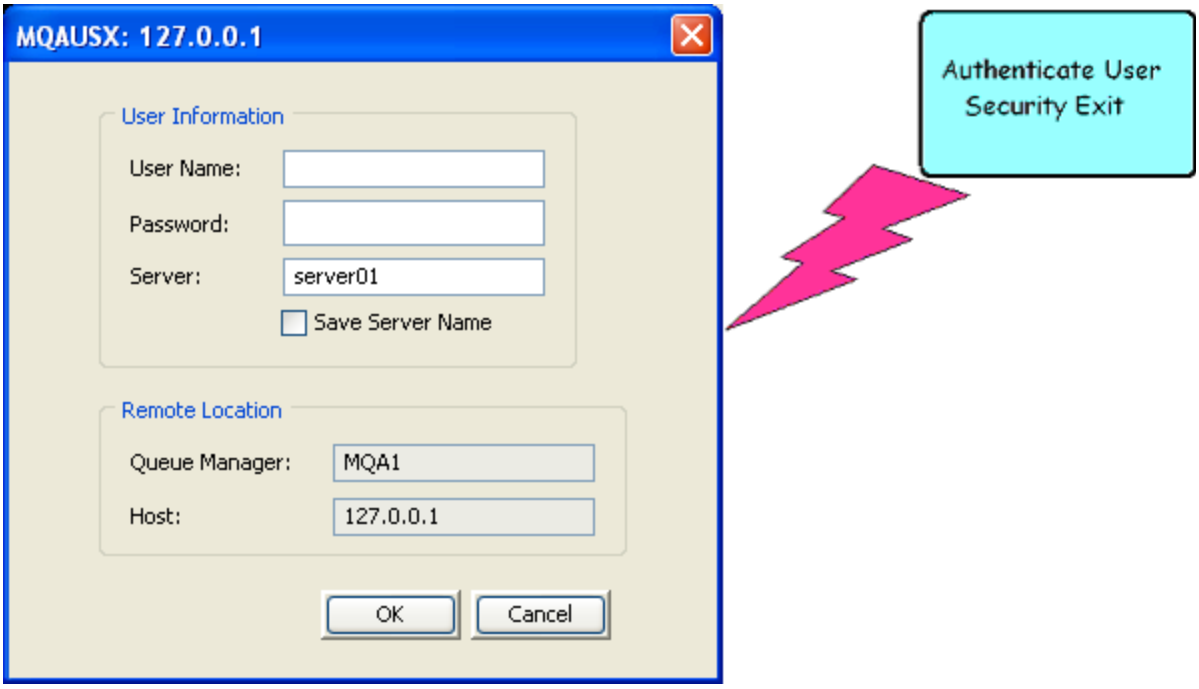

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Table of Contents

1 Introduction

1.1 Overview

MQ Authenticate User Security Exit for z/OS (z/MQAUSX) is a new solution that allows a company to fully authenticate a user who is accessing a WebSphere MQ resource. It verifies the User's UserId and Password against the z/OS server's native OS system.

The security exit will operate with WebSphere MQ v5.3.1, v6.0 and v7.0 in z/OS v1.4 or higher environments. It works with Server Connection, Client Connection, Sender, Receiver, Server, Requestor, Cluster-Sender and Cluster-Receiver channels of WebSphere MQ queue manager.

The MQ Authenticate User Security Exit for z/OS solution is comprised of 2 components: client-side security exit and server-side security exit.

1.1.1 Client-Side Security Exit

The ***client-side security exit*** first checks if the server-side exit is defined for the particular channel. The client-side exit will receive a 128-bit security token to be used in the encryption process of the user's password. It will prompt the user for his / her UserId and Password (and domain name for Windows), encrypt the data and send it to the server-side security exit.

For each connection attempt, the server-side security exit will verify that it is an acceptable client exit attempting the connection. If so, then the server-side will send a unique 128-bit security token. When the server-side security exit receives the encrypted data, it will decrypt the incoming data and then perform UserId and Password (and domain) verification against the native OS (or file - optional). If successful, the connection will be allowed.

If the company or MQ Administrator chooses not to use native OS UserId and Password checking, he or she can set up the server-side security exit to use a file for UserId and Password checking. The file is a plain text file where each row will contain 2 columns: UserId and Password. Any standard text editor can be used to modify the file.

1.1.2 Server-Side Security Exit

The ***server-side security exit*** supports the concept of 'Proxy IDs'. After a user has been successfully validated against the native z/OS or file based validation data and the 'Proxy Mode' flag is set, then the server-side security exit will look up the user's UserID in the Proxy file for their Proxy ID. The Proxy ID will be used for all MQ interactions.

The server-side security exit has the ability to allow or restrict users from logging in with the 'CHIN' or the CHIN's Started-task UserIds. This is controlled by the server-side security exit's property keyword 'Allowmqm'.

The server-side security exit has the capability to allow or limit the incoming channel connections according to the name of the associated Server Connection channel (SVRCONN).

Each Server Connection channel can be allocated a maximum number of connections and the server-side security exit will ensure that this maximum is not exceeded.

Client connections to a queue manager are limited by either channel name or the 'DefaultMCC' property keyword in the initialization file. In today's use of J2EE applications, it is a possibility that one J2EE application could overwhelm the queue manager with client connections, thus preventing any connections being made from other applications.

The server-side security exit has the ability to allow or restrict the incoming IP address. The server-side security exit uses a regular expression parser to parse the incoming client IP address against a predefined regular expression pattern.

For those channels where authentication is not required, the server-side security exit can be set to not perform this function. This is controlled by the server-side security exit's property keyword 'NoAuth'.

The server-side security exit, when in non-authentication mode, has the ability to allow or restrict users from connecting with a blank UserID value. This is controlled by the server-side security exit's property keyword 'AllowBlankUserID'.

The server-side security exit, when in non-authentication mode, has the ability to allow or restrict the incoming UserID. The server-side security exit uses a regular expression parser to parse the incoming client UserID against a predefined regular expression pattern.

2 Queue Manager To Queue Manager Overview

This section provides an overview of how z/MQAUSX can authenticate the UserId and Password of the connection request from one queue manager to any queue manager.

As mentioned in Chapter 1, z/MQAUSX is comprised of 2 WMQ security exits: client-side security exit and server-side security exit.

2.1 Sender and Receiver Channel Pair

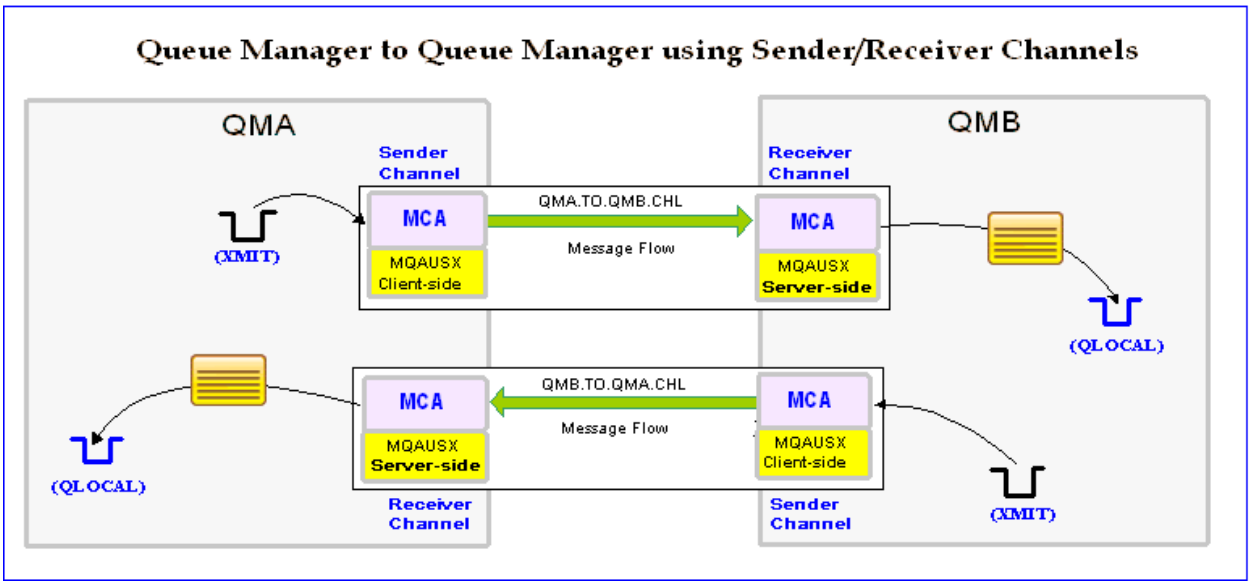
As noted below (in yellow) in the diagram, the z/MQAUSX client-side security exit works with the Sender (SDR) channel and the z/MQAUSX server-side security exit works with the Receiver (RCVR) channel.

There is a Message Channel Agent (MCA) at each end of the channel. The MCA is a component that handles the sending and receiving of messages between queue managers. Before the MCA can send and receive messages, the UserId and Password must be authenticated as detailed below:

- The MCA that is running the Sender channel will call z/MQAUSX client-side security exit to send a security message that contains the UserId and encrypted Password across the channel to the Receiver channel.
- The MCA that is running the Receiver channel will call z/MQAUSX server-side security exit to authenticate the incoming UserId and encrypted Password.

After the UserId and Password has been successfully authenticated, the channel will go to a 'Running' state and the messages will flow along the channel.

The following diagram highlights security exits in an MQ environment:



2.2 Server and Requester Channel Pair

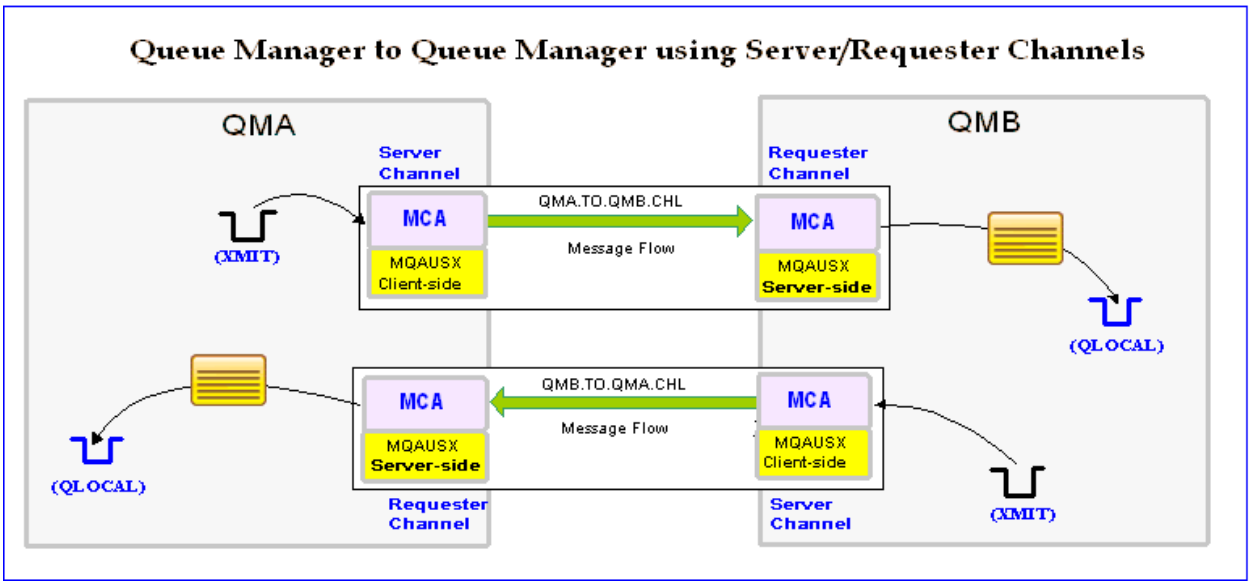
As noted below (in yellow) in the diagram, the z/MQAUSX client-side security exit works with the Server (SVR) channel and the z/MQAUSX server-side security exit works with the Requester (RQSTR) channel.

There is a Message Channel Agent (MCA) at each end of the channel. The MCA is a component that handles the sending and receiving of messages between queue managers. Before the MCA can send and receive messages, the UserId and Password must be authenticated as detailed below:

- The MCA that is running the Server channel will call z/MQAUSX client-side security exit to send a security message that contains the UserId and encrypted Password across the channel to the Requester channel.
- The MCA that is running the Requester channel will call z/MQAUSX server-side security exit to authenticate the incoming UserId and encrypted Password.

After the UserId and Password has been successfully authenticated, the channel will go to a 'Running' state and the messages will flow along the channel.

The following diagram highlights security exits in an MQ environment:



3 Configuring a Sender Channel

This section describes the necessary entries to enable the client-side security exit on a Sender Channel. The client-side security exit and its data will be applied to 2 fields of the Sender Channel. The MQ Administrator will need to update these 2 fields of the Sender Channel.

For more information on client-side IniFile parameters, please review *Appendix A* and for more information on client-side encrypted file, review *Appendix B* of the ***MQAUSX Client-side Configuration*** manual.

3.1 z/OS

On z/OS, SCYEXIT and SCYDATA will contain the following values assuming a default install:

- SCYEXIT
  MQAUSXCL

- SCYDATA - There are 2 ways to specify the UserId and Password:

  1. By explicitly setting them in the SCYDATA
     u=fred;p=abcdef

  2. By setting them in a dataset and specifying a DD name
     CLNTINI

The following is an example of an MQSC command using a DDName for SCYDATA:

```
DEFINE CHANNEL ('QMA.TO.QMB.CHL') CHLTYPE(SENDER) +
       TRPTYPE(TCP) +
       CONNAME(127.0.0.1(1415) +
       XMITQ(QMB.XMIT) +
       SCYEXIT(MQAUSXCL') +
       SCYDATA('CLNTINI') +
       REPLACE
```

4 Configuring a Receiver Channel

This section describes the necessary entries to enable the server-side security exit on a Receiver Channel. The server-side security exit and its data will be applied to 2 fields of the Receiver Channel. The MQ Administrator will need to update these 2 fields of the Receiver Channel.

For more information on server-side IniFile parameters, please review *Appendix A* of the ***MQAUSX for z/OS Server-side Installation and Operation*** manual.

4.1 z/OS

On z/OS, SCYEXIT and SCYDATA will contain the following values assuming a default install:

- SCYEXIT
  MQAUSX
- SCYDATA
  MQAUSXIN

The following is an example of an MQSC command for creating a Receiver Channel with the server-side security exit and its data:

```
DEFINE CHANNEL ('QMA.TO.QMB.CHL') CHLTYPE(RECEIVER) +
       TRPTYPE(TCP) +
       SCYEXIT('MQAUSX') +
       SCYDATA('MQAUSXIN') +
       REPLACE
```

5 Configuring a Server Channel

This section describes the necessary entries to enable the client-side security exit on a Server Channel. The client-side security exit and its data will be applied to 2 fields of the Server Channel. The MQ Administrator will need to update these 2 fields of the Server Channel.

For more information on client-side IniFile parameters, please review *Appendix A* and for more information on client-side encrypted file, review *Appendix B* of the ***MQAUSX Client-side Configuration*** manual.

5.1 z/OS

On z/OS, SCYEXIT and SCYDATA will contain the following values assuming a default install:

- SCYEXIT
  MQAUSXCL

- SCYDATA - There are 2 ways to specify the UserId and Password:

  1. By explicitly setting them in the SCYDATA
     u=fred;p=abcdef

  2. By setting them in a dataset and specifying a DD name
     CLNTINI

The following is an example of an MQSC command using a DDName for SCYDATA:

```
DEFINE CHANNEL ('QMA.TO.QMB.CHL') CHLTYPE(SERVER) +
       TRPTYPE(TCP) +
       CONNAME(127.0.0.1(1415) +
       XMITQ(QMB.XMIT) +
       SCYEXIT(MQAUSXCL') +
       SCYDATA('CLNTINI') +
       REPLACE
```

6 Configuring a Requester Channel

This section describes the necessary entries to enable the server-side security exit on a Requester Channel. The server-side security exit and its data will be applied to 2 fields of the Requester Channel. The MQ Administrator will need to update these 2 fields of the Requester Channel.

For more information on server-side IniFile parameters, please review *Appendix A* of the ***MQAUSX for z/OS Server-side Installation and Operation*** manual.

6.1 z/OS

On z/OS, SCYEXIT and SCYDATA will contain the following values assuming a default install:

- SCYEXIT
  MQAUSX
- SCYDATA
  MQAUSXIN

The following is an example of an MQSC command for creating a Receiver Channel with the server-side security exit and its data:

```
DEFINE CHANNEL ('QMA.TO.QMB.CHL') CHLTYPE(REQUESTER) +
       TRPTYPE(TCP) +
       SCYEXIT('z/MQAUSX') +
       SCYDATA('z/MQAUSXIN') +
       REPLACE
```

7 Appendix A– Encryption

MQ Authenticate User Security Exit for z/OS Solution uses the 'Tiny Encryption Algorithm Variant' (called TEAV or XTEA) for encryption and decryption of the user's password between the client-side security exit and the server-side security exit.

7.1 TEA Encryption Algorithm

This is relatively new, sufficiently strong and very compact and fast block cipher algorithm with a 128-bit key. It is not patented and is available in public domain.

Initially, the ***Tiny Encryption Algorithm*** (TEA) was developed by David Wheeler and Roger Needham of Cambridge University Computer Lab, UK, in 1994:
http://www.ftp.cl.cam.ac.uk/ftp/papers/djw-rmn/djw-rmn-tea.html

Later it was enhanced and renamed

- Block TEA, XTEA or TEAN, 1997:
  http://www.ftp.cl.cam.ac.uk/ftp/users/djw3/xtea.ps
  http://en.wikipedia.org/wiki/XTEA

- And XXTEA, 1998:
  http://www.ftp.cl.cam.ac.uk/ftp/users/djw3/xxtea.ps

The review, cryptanalysis, summary of attacks and discussion is presented by Matthew D. Russell in 'An Overview of TEA and Related Ciphers', 2004:
http://www-users.cs.york.ac.uk/~matthew/TEA/TEA.html

Also see the ***Tiny Encryption Algorithm*** website maintained by Simon Shepherd, Professor of Computational Mathematics, Director of the Cryptography and Computer Security Laboratory, Bradford University, England:
http://www.simonshepherd.supanet.com/tea.htm

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